

# Certificate

No. ESY 075386 0336 Rev. 00

## Unit Certificate

**Holder of Certificate:** **Shenzhen Kstar New Energy Company Limited**

The 9th Floor, R&D Building  
Kstar Industrial Park, Guangming Hi-tech Industrial Zone  
518107 Shenzhen, Guangdong Province  
PEOPLE'S REPUBLIC OF CHINA

**Product:** **Converter**  
**(Hybrid Inverter & Energy Storage Inverter)**

**Model(s):** **Hybrid Inverter:**  
**KAC50DP2, KAC49.9DP2, KAC40DP2, KAC30DP2,**  
**KAC29.9DP2, KAC25DP2, KAC20DP2,**  
**KAC50DP2-S0, KAC49.9DP2-S0, KAC40DP2-S0,**  
**KAC30DP2-S0, KAC29.9DP2-S0, KAC25DP2-S0,**  
**KAC20DP2-S0**  
**Energy Storage Inverter:**  
**KAC50D2, KAC49.9D2, KAC40D2, KAC30D2,**  
**KAC29.9D2, KAC25D2, KAC20D2, KAC50D2-S0,**  
**KAC49.9D2-S0, KAC40D2-S0, KAC30D2-S0,**  
**KAC29.9D2-S0, KAC25D2-S0, KAC20D2-S0**

**Parameters:** See page 2 to 8

**Applicable standards:** VDE-AR-N 4105:2018  
DIN VDE V 0124-100 (VDE V 0124-100):2020

This Certificate confirms the compliance with the above listed standards on a voluntary basis. It refers only to the sample submitted to TÜV SÜD Product Service GmbH and does not certify the quality or safety of the serial products. It was issued according to TÜV SÜD Product Service certification program Photovoltaics and Grid Integration. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 64290253079001

**Date,** 2026-04-14



( Billy Qiu )

# Certificate

**No. ESY 075386 0336 Rev. 00**

## Parameters:

| Model                                                 | KAC50DP2                                                      | KAC49.9DP2 | KAC40DP2 | KAC30DP2 |
|-------------------------------------------------------|---------------------------------------------------------------|------------|----------|----------|
| PV terminal parameters                                |                                                               |            |          |          |
| Maximum input voltage [V <sub>DC</sub> ]              | 950                                                           |            |          |          |
| Rated input voltage [V <sub>DC</sub> ]                | 720                                                           |            |          |          |
| PV input operating voltage range [V <sub>DC</sub> ]   | 250-950                                                       |            |          |          |
| MPPT voltage range (full load) [V <sub>DC</sub> ]     | 620-800                                                       | 620-800    | 500-800  | 400-800  |
| MPPT tracker number                                   | 4                                                             |            |          |          |
| Maximum operating PV input current [A <sub>DC</sub> ] | 45/45/45/45                                                   |            |          |          |
| Maximum PV short circuit current [A <sub>DC</sub> ]   | 60/60/60/60                                                   |            |          |          |
| Maximum input power [W]                               | 100000                                                        | 100000     | 80000    | 60000    |
| Battery input/output parameters                       |                                                               |            |          |          |
| Battery type                                          | Lithium-ion                                                   |            |          |          |
| Maximum voltage [V <sub>DC</sub> ]                    | 900                                                           |            |          |          |
| Battery rated voltage [V <sub>DC</sub> ]              | 720                                                           |            |          |          |
| Battery voltage range [V <sub>DC</sub> ]              | 150–900                                                       |            |          |          |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)  | 330-900                                                       | 330-900    | 280-900  | 250-900  |
| Maximum charge power [W]                              | 50000                                                         | 49900      | 40000    | 30000    |
| Maximum discharge power [W]                           | 50000                                                         | 49900      | 40000    | 30000    |
| Maximum charge/discharge current [A <sub>DC</sub> ]   | 80/80                                                         | 80/80      | 72/72    | 65/65    |
| Grid terminal input parameters                        |                                                               |            |          |          |
| Rated input voltage [V <sub>AC</sub> ]                | 3P+N+PE, 230/400                                              |            |          |          |
| Rated input frequency [Hz]                            | 50                                                            |            |          |          |
| Maximum continuous input current [A <sub>AC</sub> ]   | 160                                                           | 144        | 128      | 96       |
| Maximum continuous input active power [W]             | 100000                                                        | 99800      | 80000    | 60000    |
| Maximum continuous input apparent power [VA]          | 110000                                                        | 99800      | 88000    | 66000    |
| Power factor                                          | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |            |          |          |
| Grid terminal output parameters                       |                                                               |            |          |          |
| Rated output voltage [V <sub>AC</sub> ]               | 3P+N+PE, 230/400                                              |            |          |          |
| Rated output frequency [Hz]                           | 50                                                            |            |          |          |
| Rated output current [A <sub>AC</sub> ]               | 72                                                            | 72         | 58       | 43       |
| Maximum continuous output current [A <sub>AC</sub> ]  | 80                                                            | 72         | 64       | 48       |
| Rated output active power [W]                         | 50000                                                         | 49900      | 40000    | 30000    |
| Maximum output active power [W]                       | 50000                                                         | 49900      | 40000    | 30000    |
| Maximum continuous output apparent power [VA]         | 55000                                                         | 49900      | 44000    | 33000    |
| Power factor                                          | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |            |          |          |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Model                                                 | KAC29.9DP2                                                    | KAC25DP2 | KAC20DP2 |
|-------------------------------------------------------|---------------------------------------------------------------|----------|----------|
| PV terminal parameters                                |                                                               |          |          |
| Maximum input voltage [V <sub>DC</sub> ]              | 950                                                           |          |          |
| Rated input voltage [V <sub>DC</sub> ]                | 720                                                           |          |          |
| PV input operating voltage range [V <sub>DC</sub> ]   | 250-950                                                       |          |          |
| MPPT voltage range (full load) [V <sub>DC</sub> ]     | 400-800                                                       | 350-800  | 300-800  |
| MPPT tracker number                                   | 4                                                             |          |          |
| Maximum operating PV input current [A <sub>DC</sub> ] | 45/45/45/45                                                   |          |          |
| Maximum PV short circuit current [A <sub>DC</sub> ]   | 60/60/60/60                                                   |          |          |
| Maximum input power [W]                               | 60000                                                         | 50000    | 40000    |
| Battery input/output parameters                       |                                                               |          |          |
| Battery type                                          | Lithium-ion                                                   |          |          |
| Maximum voltage [V <sub>DC</sub> ]                    | 900                                                           |          |          |
| Battery rated voltage [V <sub>DC</sub> ]              | 720                                                           |          |          |
| Battery voltage range [V <sub>DC</sub> ]              | 150-900                                                       |          |          |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)  | 200-900                                                       |          |          |
| Maximum charge power [W]                              | 29900                                                         | 25000    | 20000    |
| Maximum discharge power [W]                           | 29900                                                         | 25000    | 20000    |
| Maximum charge/ discharge current [A <sub>DC</sub> ]  | 65/65                                                         | 60/60    | 55/55    |
| Grid terminal input parameters                        |                                                               |          |          |
| Rated input voltage [V <sub>AC</sub> ]                | 3P+N+PE, 230/400                                              |          |          |
| Rated input frequency [Hz]                            | 50                                                            |          |          |
| Maximum continuous input current [A <sub>AC</sub> ]   | 87                                                            | 80       | 64       |
| Maximum continuous input active power [W]             | 59800                                                         | 50000    | 40000    |
| Maximum continuous input apparent power [VA]          | 59800                                                         | 55000    | 44000    |
| Power factor                                          | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |          |          |
| Grid terminal output parameters                       |                                                               |          |          |
| Rated output voltage [V <sub>AC</sub> ]               | 3P+N+PE, 230/400                                              |          |          |
| Rated output frequency [Hz]                           | 50                                                            |          |          |
| Rated output current [A <sub>AC</sub> ]               | 43                                                            | 36       | 29       |
| Maximum continuous output current [A <sub>AC</sub> ]  | 43                                                            | 40       | 32       |
| Rated output active power [W]                         | 29900                                                         | 25000    | 20000    |
| Maximum output active power [W]                       | 29900                                                         | 25000    | 20000    |
| Maximum continuous output apparent power [VA]         | 29900                                                         | 27500    | 22000    |
| Power factor                                          | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |          |          |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Model                                                      | KAC50DP2-S0                                                   | KAC49.9DP2-S0 | KAC40DP2-S0 | KAC30DP2-S0 |
|------------------------------------------------------------|---------------------------------------------------------------|---------------|-------------|-------------|
| PV terminal parameters                                     |                                                               |               |             |             |
| Maximum input voltage [V <sub>DC</sub> ]                   | 950                                                           |               |             |             |
| Rated input voltage [V <sub>DC</sub> ]                     | 720                                                           |               |             |             |
| PV input operating voltage range [V <sub>DC</sub> ]        | 250-950                                                       |               |             |             |
| MPPT voltage range (full load) [V <sub>DC</sub> ]          | 620-800                                                       | 620-800       | 500-800     | 400-800     |
| MPPT tracker number                                        | 4                                                             |               |             |             |
| Maximum operating PV input current [A <sub>DC</sub> ]      | 45/45/45/45                                                   |               |             |             |
| Maximum PV short circuit current [A <sub>DC</sub> ]        | 60/60/60/60                                                   |               |             |             |
| Maximum input power [W]                                    | 100000                                                        | 100000        | 80000       | 60000       |
| Battery input/output parameters                            |                                                               |               |             |             |
| Battery type                                               | Lithium-ion                                                   |               |             |             |
| Maximum voltage [V <sub>DC</sub> ]                         | 900                                                           |               |             |             |
| Battery rated voltage [V <sub>DC</sub> ]                   | 720                                                           |               |             |             |
| Battery voltage range [V <sub>DC</sub> ]                   | 150-900                                                       |               |             |             |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)       | 330-900                                                       | 330-900       | 280-900     | 250-900     |
| Maximum charge power [W]                                   | 50000                                                         | 49900         | 40000       | 30000       |
| Maximum discharge power [W]                                | 50000                                                         | 49900         | 40000       | 30000       |
| Maximum charge/ discharge current [A <sub>DC</sub> ]       | 80/80                                                         | 80/80         | 72/72       | 65/65       |
| Grid terminal input/output parameters                      |                                                               |               |             |             |
| Rated input/output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |               |             |             |
| Rated input/output frequency [Hz]                          | 50                                                            |               |             |             |
| Rated output current [A <sub>AC</sub> ]                    | 72                                                            | 72            | 58          | 43          |
| Maximum continuous input/output current [A <sub>AC</sub> ] | 80                                                            | 72            | 64          | 48          |
| Rated output active power [W]                              | 50000                                                         | 49900         | 40000       | 30000       |
| Maximum continuous input/output active power [W]           | 50000                                                         | 49900         | 40000       | 30000       |
| Maximum continuous input/output apparent power [VA]        | 55000                                                         | 49900         | 44000       | 33000       |
| Power factor                                               | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |               |             |             |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Model                                                      | KAC29.9DP2-S0                                                 | KAC25DP2-S0 | KAC20DP2-S0 |
|------------------------------------------------------------|---------------------------------------------------------------|-------------|-------------|
| PV terminal parameters                                     |                                                               |             |             |
| Maximum input voltage [V <sub>DC</sub> ]                   | 950                                                           |             |             |
| Rated input voltage [V <sub>DC</sub> ]                     | 720                                                           |             |             |
| PV input operating voltage range [V <sub>DC</sub> ]        | 250-950                                                       |             |             |
| MPPT voltage range (full load) [V <sub>DC</sub> ]          | 400-800                                                       | 350-800     | 300-800     |
| MPPT tracker number                                        | 4                                                             |             |             |
| Maximum operating PV input current [A <sub>DC</sub> ]      | 45/45/45/45                                                   |             |             |
| Maximum PV short circuit current [A <sub>DC</sub> ]        | 60/60/60/60                                                   |             |             |
| Maximum input power [W]                                    | 60000                                                         | 50000       | 40000       |
| Battery input/output parameters                            |                                                               |             |             |
| Battery type                                               | Lithium-ion                                                   |             |             |
| Maximum voltage [V <sub>DC</sub> ]                         | 900                                                           |             |             |
| Battery rated voltage [V <sub>DC</sub> ]                   | 720                                                           |             |             |
| Battery voltage range [V <sub>DC</sub> ]                   | 150-900                                                       |             |             |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)       | 250-900                                                       | 210-900     | 200-900     |
| Maximum charge power [W]                                   | 29900                                                         | 25000       | 20000       |
| Maximum discharge power [W]                                | 29900                                                         | 25000       | 20000       |
| Maximum charge/ discharge current [A <sub>DC</sub> ]       | 65/65                                                         | 60/60       | 55/55       |
| Grid terminal input/output parameters                      |                                                               |             |             |
| Rated input/output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |             |             |
| Rated input/output frequency [Hz]                          | 50                                                            |             |             |
| Rated output current [A <sub>AC</sub> ]                    | 43                                                            | 36          | 29          |
| Maximum continuous input/output current [A <sub>AC</sub> ] | 43                                                            | 40          | 32          |
| Rated output active power [W]                              | 29900                                                         | 25000       | 20000       |
| Maximum continuous input/output active power [W]           | 29900                                                         | 25000       | 20000       |
| Maximum continuous input/output apparent power [VA]        | 29900                                                         | 27500       | 22000       |
| Power factor                                               | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |             |             |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Model                                                | KAC50D2                                                       | KAC49.9D2 | KAC40D2 | KAC30D2 |
|------------------------------------------------------|---------------------------------------------------------------|-----------|---------|---------|
| Battery input/output parameters                      |                                                               |           |         |         |
| Battery type                                         | Lithium-ion                                                   |           |         |         |
| Maximum voltage [V <sub>DC</sub> ]                   | 900                                                           |           |         |         |
| Battery rated voltage [V <sub>DC</sub> ]             | 720                                                           |           |         |         |
| Battery voltage range [V <sub>DC</sub> ]             | 150–900                                                       |           |         |         |
| Battery voltage range [V <sub>DC</sub> ] (Full Load) | 330-900                                                       | 330-900   | 280-900 | 250-900 |
| Maximum charge power [W]                             | 50000                                                         | 49900     | 40000   | 30000   |
| Maximum discharge power [W]                          | 50000                                                         | 49900     | 40000   | 30000   |
| Maximum charge/discharge current [A <sub>DC</sub> ]  | 80/80                                                         | 80/80     | 72/72   | 65/65   |
| Grid terminal input parameters                       |                                                               |           |         |         |
| Rated input voltage [V <sub>AC</sub> ]               | 3P+N+PE, 230/400                                              |           |         |         |
| Rated input frequency [Hz]                           | 50                                                            |           |         |         |
| Maximum continuous input current [A <sub>AC</sub> ]  | 160                                                           | 144       | 128     | 96      |
| Maximum continuous input active power [W]            | 100000                                                        | 99800     | 80000   | 60000   |
| Maximum continuous input apparent power [VA]         | 110000                                                        | 99800     | 88000   | 66000   |
| Power factor                                         | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |           |         |         |
| Grid terminal output parameters                      |                                                               |           |         |         |
| Rated output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |           |         |         |
| Rated output frequency [Hz]                          | 50                                                            |           |         |         |
| Rated output current [A <sub>AC</sub> ]              | 72                                                            | 72        | 58      | 43      |
| Maximum continuous output current [A <sub>AC</sub> ] | 80                                                            | 72        | 64      | 48      |
| Rated output active power [W]                        | 50000                                                         | 49900     | 40000   | 30000   |
| Maximum output active power [W]                      | 50000                                                         | 49900     | 40000   | 30000   |
| Maximum continuous output apparent power [VA]        | 55000                                                         | 49900     | 44000   | 33000   |
| Power factor                                         | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |           |         |         |

# Certificate

**No. ESY 075386 0336 Rev. 00**

|                                                      |                                                               |       |         |         |
|------------------------------------------------------|---------------------------------------------------------------|-------|---------|---------|
| Model                                                | KAC29.9D2                                                     |       | KAC25D2 | KAC20D2 |
| Battery input/output parameters                      |                                                               |       |         |         |
| Battery type                                         | Lithium-ion                                                   |       |         |         |
| Maximum voltage [V <sub>DC</sub> ]                   | 900                                                           |       |         |         |
| Battery rated voltage [V <sub>DC</sub> ]             | 720                                                           |       |         |         |
| Battery voltage range [V <sub>DC</sub> ]             | 150-900                                                       |       |         |         |
| Battery voltage range [V <sub>DC</sub> ] (Full Load) | 200-900                                                       |       |         |         |
| Maximum charge power [W]                             | 29900                                                         | 25000 | 20000   |         |
| Maximum discharge power [W]                          | 29900                                                         | 25000 | 20000   |         |
| Maximum charge/ discharge current [A <sub>DC</sub> ] | 65/65                                                         | 60/60 | 55/55   |         |
| Grid terminal input parameters                       |                                                               |       |         |         |
| Rated input voltage [V <sub>AC</sub> ]               | 3P+N+PE, 230/400                                              |       |         |         |
| Rated input frequency [Hz]                           | 50                                                            |       |         |         |
| Maximum continuous input current [A <sub>AC</sub> ]  | 87                                                            | 80    | 64      |         |
| Maximum continuous input active power [W]            | 59800                                                         | 50000 | 40000   |         |
| Maximum continuous input apparent power [VA]         | 59800                                                         | 55000 | 44000   |         |
| Power factor                                         | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |       |         |         |
| Grid terminal output parameters                      |                                                               |       |         |         |
| Rated output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |       |         |         |
| Rated output frequency [Hz]                          | 50                                                            |       |         |         |
| Rated output current [A <sub>AC</sub> ]              | 43                                                            | 36    | 29      |         |
| Maximum continuous output current [A <sub>AC</sub> ] | 43                                                            | 40    | 32      |         |
| Rated output active power [W]                        | 29900                                                         | 25000 | 20000   |         |
| Maximum output active power [W]                      | 29900                                                         | 25000 | 20000   |         |
| Maximum continuous output apparent power [VA]        | 29900                                                         | 27500 | 22000   |         |
| Power factor                                         | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |       |         |         |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Model                                                      | KAC50D2-S0                                                    | KAC49.9D2-S0 | KAC40D2-S0 | KAC30D2-S0 |
|------------------------------------------------------------|---------------------------------------------------------------|--------------|------------|------------|
| Battery input/output parameters                            |                                                               |              |            |            |
| Battery type                                               | Lithium-ion                                                   |              |            |            |
| Maximum voltage [V <sub>DC</sub> ]                         | 900                                                           |              |            |            |
| Battery rated voltage [V <sub>DC</sub> ]                   | 720                                                           |              |            |            |
| Battery voltage range [V <sub>DC</sub> ]                   | 150-900                                                       |              |            |            |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)       | 330-900                                                       | 330-900      | 280-900    | 250-900    |
| Maximum charge power [W]                                   | 50000                                                         | 49900        | 40000      | 30000      |
| Maximum discharge power [W]                                | 50000                                                         | 49900        | 40000      | 30000      |
| Maximum charge/ discharge current [A <sub>DC</sub> ]       | 80/80                                                         | 80/80        | 72/72      | 65/65      |
| Grid terminal input/output parameters                      |                                                               |              |            |            |
| Rated input/output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |              |            |            |
| Rated input/output frequency [Hz]                          | 50                                                            |              |            |            |
| Rated output current [A <sub>AC</sub> ]                    | 72                                                            | 72           | 58         | 43         |
| Maximum continuous input/output current [A <sub>AC</sub> ] | 80                                                            | 72           | 64         | 48         |
| Rated output active power [W]                              | 50000                                                         | 49900        | 40000      | 30000      |
| Maximum continuous input/output active power [W]           | 50000                                                         | 49900        | 40000      | 30000      |
| Maximum continuous input/output apparent power [VA]        | 55000                                                         | 49900        | 44000      | 33000      |
| Power factor                                               | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |              |            |            |

| Model                                                      | KAC29.9D2-S0                                                  | KAC25D2-S0 | KAC20D2-S0 |
|------------------------------------------------------------|---------------------------------------------------------------|------------|------------|
| Battery input/output parameters                            |                                                               |            |            |
| Battery type                                               | Lithium-ion                                                   |            |            |
| Maximum voltage [V <sub>DC</sub> ]                         | 900                                                           |            |            |
| Battery rated voltage [V <sub>DC</sub> ]                   | 720                                                           |            |            |
| Battery voltage range [V <sub>DC</sub> ]                   | 150-900                                                       |            |            |
| Battery voltage range [V <sub>DC</sub> ] (Full Load)       | 250-900                                                       | 210-900    | 200-900    |
| Maximum charge power [W]                                   | 29900                                                         | 25000      | 20000      |
| Maximum discharge power [W]                                | 29900                                                         | 25000      | 20000      |
| Maximum charge/ discharge current [A <sub>DC</sub> ]       | 65/65                                                         | 60/60      | 55/55      |
| Grid terminal input/output parameters                      |                                                               |            |            |
| Rated input/output voltage [V <sub>AC</sub> ]              | 3P+N+PE, 230/400                                              |            |            |
| Rated input/output frequency [Hz]                          | 50                                                            |            |            |
| Rated output current [A <sub>AC</sub> ]                    | 43                                                            | 36         | 29         |
| Maximum continuous input/output current [A <sub>AC</sub> ] | 43                                                            | 40         | 32         |
| Rated output active power [W]                              | 29900                                                         | 25000      | 20000      |
| Maximum continuous input/output active power [W]           | 29900                                                         | 25000      | 20000      |
| Maximum continuous input/output apparent power [VA]        | 29900                                                         | 27500      | 22000      |
| Power factor                                               | 0.9 inductive(under-excited) to 0.9 capacitive(over-excited ) |            |            |

# Certificate

No. ESY 075386 0336 Rev. 00

## E.4 Unit certificate

| Unit certificate                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Manufacturer                                                                                | Shenzhen Kstar New Energy Company Limited                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |
| Power generation unit type                                                                  | <p>[Hybrid Inverter]:<br/><u>KAC50DP2, KAC49.9DP2, KAC40DP2, KAC30DP2, KAC29.9DP2, KAC25DP2, KAC20DP2, KAC50DP2-S0, KAC49.9DP2-S0, KAC40DP2-S0, KAC30DP2-S0, KAC29.9DP2-S0, KAC25DP2-S0, KAC20DP2-S0.</u></p> <p>[Energy Storage Inverter]:<br/><u>KAC50D2, KAC49.9D2, KAC40D2, KAC30D2, KAC29.9D2, KAC25D2, KAC20D2, KAC50D2-S0, KAC49.9D2-S0, KAC40D2-S0, KAC30D2-S0, KAC29.9D2-S0, KAC25D2-S0, KAC20D2-S0.</u></p> <p>Remark: certified on representative model <u>KAC50DP2</u> of family design products, results of the measurement of <u>KAC50DP2</u> be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020-06.</p> |                                        |
| Assessment values                                                                           | max. active power $P_{\text{Emax}}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>50 kW (KAC50DP2)</u>                |
|                                                                                             | max. apparent power $S_{\text{Emax}}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <u>55 kVA (KAC50DP2)</u>               |
|                                                                                             | Rated voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <u>3/N/PE~, 230/400 V<sub>AC</sub></u> |
|                                                                                             | Rated current (AC) $I_r$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <u>72.0 A (KAC50DP2)</u>               |
|                                                                                             | Initial short-circuit AC current $I''_k$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <u>95.6 A (KAC50DP2)</u>               |
| Network connection rule                                                                     | <b>VDE-AR-N 4105:2018-11 “Generators connected to the low-voltage distribution network”</b><br>Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |
| Test requirement                                                                            | <b>DIN VDE V 0124-100 (VDE V 0124-100):2020-06 “Network integration of power generation systems – Low voltage”</b><br>Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| Test report                                                                                 | <u>64.290.25.30790.01</u> from <u>2026-03-23</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| The above designated power generation unit meets the requirements of VDE-AR-N 4105:2018-11. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |

# Certificate

No. ESY 075386 0336 Rev. 00

E.5 Test report "Network interactions" for power generation units with an input current > 75 A

| Extract of the test report for power generation units<br>"Determination of electrical properties" |                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System manufacturer:                                                                              | <u>Shenzhen Kstar New Energy Company Limited</u><br><u>The 9th Floor, R&amp;D Building, Kstar Industrial Park, Guangming Hi-tech Industrial Zone, 518107 Shenzhen, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Manufacturer indications:                                                                         | Type of system                                                                                                                                                                                                        | Hybrid Inverter& Energy Storage Inverter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                   | Max. active power $P_{E_{max}}$                                                                                                                                                                                       | <u>50.0 kW (KAC50DP2)</u><br><u>49.9 kW (KAC49.9DP2)</u><br><u>40.0 kW (KAC40DP2)</u><br><u>30.0 kW (KAC30DP2)</u><br><u>29.9 kW (KAC29.9DP2)</u><br><u>25.0 kW (KAC25DP2)</u><br><u>20.0 kW (KAC20DP2)</u><br><u>50.0 kW (KAC50DP2-S0)</u><br><u>49.9 kW (KAC49.9DP2-S0)</u><br><u>40.0 kW (KAC40DP2-S0)</u><br><u>30.0 kW (KAC30DP2-S0)</u><br><u>29.9 kW (KAC29.9DP2-S0)</u><br><u>25.0 kW (KAC25DP2-S0)</u><br><u>20.0 kW (KAC20DP2-S0)</u><br><u>50.0 kW (KAC50D2)</u><br><u>49.9 kW (KAC49.9D2)</u><br><u>40.0 kW (KAC40D2)</u><br><u>30.0 kW (KAC30D2)</u><br><u>29.9 kW (KAC29.9D2)</u><br><u>25.0 kW (KAC25D2)</u><br><u>20.0 kW (KAC20D2)</u><br><u>50.0 kW (KAC50D2-S0)</u><br><u>49.9 kW (KAC49.9D2-S0)</u><br><u>40.0 kW (KAC40D2-S0)</u><br><u>30.0 kW (KAC30D2-S0)</u><br><u>29.9 kW (KAC29.9D2-S0)</u><br><u>25.0 kW (KAC25D2-S0)</u><br><u>20.0 kW (KAC20D2-S0)</u> |
|                                                                                                   | Rated voltage                                                                                                                                                                                                         | <u>3/N/PE~, 230/400 V<sub>AC</sub></u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Measurement period:                                                                               | From 2026-01-13 to 2026-03-16                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

# Certificate

**No. ESY 075386 0336 Rev. 00**

| Rapid voltage change                                                 |                 |
|----------------------------------------------------------------------|-----------------|
| Model                                                                | KAC50DP2        |
| Connection without provisions (regarding the primary energy carrier) | $K_i=0.54$      |
| Most adverse case when switching between generator levels            | $K_i=0.54$      |
| Connection at nominal conditions (of the primary energy carrier)     | $K_i=1.09$      |
| Disconnection at rated power                                         | $K_i=1.03$      |
| Worst value of all switching operations                              | $K_{imax}=1.09$ |

| Flicker (KAC50DP2)                               |     |     |     |     |       |
|--------------------------------------------------|-----|-----|-----|-----|-------|
| Network impedance angle $\Psi_k$                 | 30° | 50° | 70° | 85° | 32°   |
| Coefficient of system flicker $C_\Psi$ (Maximum) |     |     |     |     |       |
| L1                                               | --  | --  | --  | --  | 1.097 |
| L2                                               | --  | --  | --  | --  | 1.073 |
| L3                                               | --  | --  | --  | --  | 1.067 |

# Certificate

No. ESY 075386 0336 Rev. 00

| Harmonics (>16 A and ≤75 A) (KAC50DP2) |                                      |       |       |       |       |       |       |       |       |       |       |             |
|----------------------------------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|
| Phase L1-N                             |                                      |       |       |       |       |       |       |       |       |       |       |             |
| Active power<br>P/Pn[%]                | 0                                    | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | Limit value |
| Ordinal<br>number                      | I <sub>h</sub> /I <sub>ref</sub> [%] |       |       |       |       |       |       |       |       |       |       | [%]         |
| 2                                      | 0.225                                | 0.258 | 0.361 | 0.315 | 0.397 | 0.317 | 0.256 | 0.235 | 0.257 | 0.299 | 0.246 | 8           |
| 3                                      | 1.272                                | 1.448 | 1.354 | 1.222 | 1.069 | 1.006 | 0.997 | 1.004 | 1.035 | 1.121 | 1.161 | -           |
| 4                                      | 0.265                                | 0.341 | 0.134 | 0.129 | 0.243 | 0.238 | 0.205 | 0.180 | 0.176 | 0.211 | 0.171 | 4           |
| 5                                      | 0.980                                | 1.014 | 0.515 | 0.747 | 0.653 | 0.507 | 0.414 | 0.572 | 0.549 | 0.638 | 0.643 | 10.7        |
| 6                                      | 0.162                                | 0.081 | 0.190 | 0.064 | 0.093 | 0.100 | 0.098 | 0.193 | 0.179 | 0.256 | 0.199 | 2.67        |
| 7                                      | 0.769                                | 0.264 | 0.651 | 0.197 | 0.699 | 0.917 | 1.000 | 0.362 | 0.325 | 0.353 | 0.347 | 7.2         |
| 8                                      | 0.104                                | 0.026 | 0.127 | 0.041 | 0.134 | 0.117 | 0.069 | 0.075 | 0.066 | 0.099 | 0.089 | 2           |
| 9                                      | 0.509                                | 0.590 | 0.635 | 0.293 | 0.294 | 0.598 | 0.741 | 0.217 | 0.187 | 0.091 | 0.071 | -           |
| 10                                     | 0.033                                | 0.020 | 0.041 | 0.142 | 0.084 | 0.080 | 0.126 | 0.066 | 0.073 | 0.076 | 0.067 | 1.6         |
| 11                                     | 0.433                                | 0.410 | 0.232 | 0.515 | 0.227 | 0.535 | 0.749 | 0.267 | 0.225 | 0.161 | 0.156 | 3.1         |
| 12                                     | 0.148                                | 0.067 | 0.185 | 0.121 | 0.042 | 0.084 | 0.089 | 0.078 | 0.085 | 0.115 | 0.087 | 1.33        |
| 13                                     | 0.411                                | 0.246 | 0.291 | 0.511 | 0.294 | 0.300 | 0.566 | 0.294 | 0.265 | 0.168 | 0.167 | 2           |
| 14                                     | 0.055                                | 0.098 | 0.085 | 0.114 | 0.059 | 0.120 | 0.118 | 0.041 | 0.037 | 0.027 | 0.037 | -           |
| 15                                     | 0.111                                | 0.190 | 0.102 | 0.209 | 0.154 | 0.195 | 0.314 | 0.101 | 0.097 | 0.048 | 0.059 | -           |
| 16                                     | 0.046                                | 0.040 | 0.064 | 0.073 | 0.069 | 0.077 | 0.054 | 0.116 | 0.100 | 0.081 | 0.106 | -           |
| 17                                     | 0.256                                | 0.166 | 0.236 | 0.118 | 0.260 | 0.094 | 0.208 | 0.200 | 0.173 | 0.098 | 0.094 | -           |
| 18                                     | 0.132                                | 0.108 | 0.132 | 0.070 | 0.073 | 0.059 | 0.060 | 0.043 | 0.041 | 0.034 | 0.039 | -           |
| 19                                     | 0.201                                | 0.230 | 0.140 | 0.110 | 0.242 | 0.106 | 0.127 | 0.181 | 0.144 | 0.114 | 0.072 | -           |
| 20                                     | 0.029                                | 0.101 | 0.087 | 0.083 | 0.040 | 0.076 | 0.079 | 0.065 | 0.045 | 0.041 | 0.036 | -           |
| 21                                     | 0.096                                | 0.049 | 0.178 | 0.118 | 0.125 | 0.154 | 0.132 | 0.103 | 0.081 | 0.053 | 0.036 | -           |
| 22                                     | 0.030                                | 0.022 | 0.040 | 0.071 | 0.025 | 0.084 | 0.044 | 0.032 | 0.030 | 0.033 | 0.025 | -           |
| 23                                     | 0.165                                | 0.090 | 0.169 | 0.172 | 0.117 | 0.114 | 0.041 | 0.123 | 0.093 | 0.067 | 0.041 | -           |
| 24                                     | 0.080                                | 0.150 | 0.040 | 0.071 | 0.039 | 0.025 | 0.063 | 0.024 | 0.017 | 0.021 | 0.024 | -           |
| 25                                     | 0.137                                | 0.149 | 0.077 | 0.126 | 0.074 | 0.135 | 0.035 | 0.065 | 0.045 | 0.019 | 0.025 | -           |
| 26                                     | 0.035                                | 0.111 | 0.040 | 0.032 | 0.026 | 0.062 | 0.068 | 0.023 | 0.016 | 0.023 | 0.022 | -           |
| 27                                     | 0.102                                | 0.043 | 0.136 | 0.061 | 0.044 | 0.093 | 0.063 | 0.069 | 0.061 | 0.035 | 0.032 | -           |
| 28                                     | 0.015                                | 0.033 | 0.045 | 0.048 | 0.043 | 0.029 | 0.041 | 0.023 | 0.024 | 0.016 | 0.024 | -           |
| 29                                     | 0.100                                | 0.128 | 0.106 | 0.073 | 0.061 | 0.132 | 0.035 | 0.071 | 0.059 | 0.031 | 0.023 | -           |
| 30                                     | 0.036                                | 0.100 | 0.031 | 0.027 | 0.021 | 0.027 | 0.045 | 0.020 | 0.020 | 0.020 | 0.023 | -           |
| 31                                     | 0.092                                | 0.074 | 0.042 | 0.071 | 0.060 | 0.100 | 0.047 | 0.071 | 0.060 | 0.029 | 0.029 | -           |
| 32                                     | 0.010                                | 0.082 | 0.017 | 0.030 | 0.027 | 0.023 | 0.042 | 0.017 | 0.015 | 0.016 | 0.014 | -           |
| 33                                     | 0.074                                | 0.081 | 0.062 | 0.043 | 0.049 | 0.057 | 0.045 | 0.046 | 0.038 | 0.021 | 0.016 | -           |
| 34                                     | 0.009                                | 0.022 | 0.052 | 0.033 | 0.026 | 0.014 | 0.035 | 0.029 | 0.021 | 0.025 | 0.020 | -           |
| 35                                     | 0.054                                | 0.063 | 0.047 | 0.053 | 0.074 | 0.093 | 0.054 | 0.053 | 0.040 | 0.021 | 0.016 | -           |
| 36                                     | 0.012                                | 0.045 | 0.032 | 0.014 | 0.019 | 0.033 | 0.018 | 0.013 | 0.012 | 0.017 | 0.015 | -           |
| 37                                     | 0.043                                | 0.030 | 0.048 | 0.078 | 0.082 | 0.075 | 0.072 | 0.063 | 0.047 | 0.030 | 0.021 | -           |
| 38                                     | 0.022                                | 0.036 | 0.016 | 0.024 | 0.022 | 0.015 | 0.032 | 0.023 | 0.019 | 0.016 | 0.016 | -           |
| 39                                     | 0.040                                | 0.080 | 0.042 | 0.061 | 0.049 | 0.051 | 0.037 | 0.039 | 0.029 | 0.021 | 0.013 | -           |
| 40                                     | 0.011                                | 0.031 | 0.031 | 0.014 | 0.016 | 0.017 | 0.018 | 0.016 | 0.013 | 0.017 | 0.014 | -           |
| THC/I <sub>ref</sub>                   | 2.053                                | 2.061 | 1.883 | 1.750 | 1.664 | 1.803 | 1.996 | 1.406 | 1.376 | 1.460 | 1.460 | 13          |
| PWHC/I <sub>ref</sub>                  | 2.300                                | 2.511 | 2.281 | 2.091 | 2.178 | 2.196 | 2.131 | 1.856 | 1.523 | 1.040 | 0.929 | 22          |

# Certificate

No. ESY 075386 0336 Rev. 00

| Active power<br>P/Pn[%] | Phase L2-N  |       |       |       |       |       |       |       |       |       |       | Limit value |
|-------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|
|                         | 0           | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   |             |
| Ordinal<br>number       | Ih/Iref [%] |       |       |       |       |       |       |       |       |       |       | [%]         |
| 2                       | 0.187       | 0.065 | 0.117 | 0.102 | 0.145 | 0.149 | 0.131 | 0.138 | 0.146 | 0.174 | 0.142 | 8           |
| 3                       | 1.240       | 1.632 | 1.283 | 1.184 | 1.099 | 1.057 | 1.052 | 1.124 | 1.167 | 1.259 | 1.300 | -           |
| 4                       | 0.063       | 0.058 | 0.142 | 0.085 | 0.148 | 0.125 | 0.113 | 0.089 | 0.105 | 0.115 | 0.084 | 4           |
| 5                       | 0.975       | 1.084 | 0.532 | 0.785 | 0.706 | 0.612 | 0.552 | 0.603 | 0.594 | 0.661 | 0.679 | 10.7        |
| 6                       | 0.093       | 0.031 | 0.051 | 0.092 | 0.177 | 0.229 | 0.218 | 0.078 | 0.103 | 0.135 | 0.088 | 2.67        |
| 7                       | 0.771       | 0.283 | 0.659 | 0.188 | 0.661 | 0.778 | 0.851 | 0.260 | 0.214 | 0.264 | 0.236 | 7.2         |
| 8                       | 0.039       | 0.020 | 0.064 | 0.030 | 0.054 | 0.045 | 0.041 | 0.065 | 0.056 | 0.066 | 0.075 | 2           |
| 9                       | 0.500       | 0.574 | 0.618 | 0.265 | 0.311 | 0.615 | 0.751 | 0.202 | 0.174 | 0.076 | 0.067 | -           |
| 10                      | 0.062       | 0.048 | 0.071 | 0.064 | 0.092 | 0.074 | 0.055 | 0.098 | 0.097 | 0.118 | 0.115 | 1.6         |
| 11                      | 0.490       | 0.429 | 0.285 | 0.550 | 0.265 | 0.546 | 0.772 | 0.303 | 0.268 | 0.225 | 0.202 | 3.1         |
| 12                      | 0.136       | 0.027 | 0.117 | 0.092 | 0.062 | 0.062 | 0.095 | 0.134 | 0.119 | 0.131 | 0.125 | 1.33        |
| 13                      | 0.357       | 0.212 | 0.172 | 0.513 | 0.189 | 0.323 | 0.550 | 0.229 | 0.191 | 0.126 | 0.147 | 2           |
| 14                      | 0.048       | 0.034 | 0.055 | 0.075 | 0.077 | 0.097 | 0.083 | 0.046 | 0.035 | 0.046 | 0.040 | -           |
| 15                      | 0.096       | 0.219 | 0.154 | 0.248 | 0.151 | 0.226 | 0.359 | 0.071 | 0.067 | 0.030 | 0.041 | -           |
| 16                      | 0.032       | 0.055 | 0.084 | 0.119 | 0.028 | 0.086 | 0.121 | 0.068 | 0.082 | 0.053 | 0.075 | -           |
| 17                      | 0.288       | 0.251 | 0.244 | 0.113 | 0.304 | 0.121 | 0.196 | 0.203 | 0.166 | 0.122 | 0.101 | -           |
| 18                      | 0.128       | 0.098 | 0.095 | 0.043 | 0.027 | 0.029 | 0.069 | 0.049 | 0.047 | 0.038 | 0.036 | -           |
| 19                      | 0.213       | 0.221 | 0.072 | 0.135 | 0.218 | 0.110 | 0.080 | 0.146 | 0.126 | 0.092 | 0.070 | -           |
| 20                      | 0.036       | 0.071 | 0.066 | 0.025 | 0.021 | 0.034 | 0.041 | 0.040 | 0.035 | 0.033 | 0.025 | -           |
| 21                      | 0.090       | 0.048 | 0.178 | 0.112 | 0.144 | 0.140 | 0.144 | 0.077 | 0.057 | 0.042 | 0.025 | -           |
| 22                      | 0.031       | 0.072 | 0.079 | 0.069 | 0.019 | 0.070 | 0.056 | 0.029 | 0.028 | 0.027 | 0.032 | -           |
| 23                      | 0.148       | 0.084 | 0.151 | 0.174 | 0.142 | 0.143 | 0.040 | 0.092 | 0.071 | 0.037 | 0.024 | -           |
| 24                      | 0.065       | 0.166 | 0.032 | 0.024 | 0.024 | 0.054 | 0.045 | 0.023 | 0.027 | 0.021 | 0.024 | -           |
| 25                      | 0.128       | 0.134 | 0.070 | 0.137 | 0.096 | 0.106 | 0.043 | 0.097 | 0.075 | 0.051 | 0.039 | -           |
| 26                      | 0.031       | 0.107 | 0.037 | 0.038 | 0.047 | 0.028 | 0.031 | 0.017 | 0.019 | 0.016 | 0.022 | -           |
| 27                      | 0.092       | 0.088 | 0.131 | 0.035 | 0.052 | 0.087 | 0.055 | 0.055 | 0.044 | 0.021 | 0.021 | -           |
| 28                      | 0.014       | 0.072 | 0.028 | 0.042 | 0.029 | 0.023 | 0.045 | 0.018 | 0.027 | 0.021 | 0.023 | -           |
| 29                      | 0.101       | 0.065 | 0.109 | 0.060 | 0.039 | 0.098 | 0.043 | 0.052 | 0.035 | 0.022 | 0.019 | -           |
| 30                      | 0.017       | 0.117 | 0.029 | 0.038 | 0.016 | 0.040 | 0.034 | 0.018 | 0.016 | 0.015 | 0.015 | -           |
| 31                      | 0.081       | 0.077 | 0.040 | 0.090 | 0.051 | 0.096 | 0.018 | 0.040 | 0.030 | 0.018 | 0.023 | -           |
| 32                      | 0.019       | 0.043 | 0.021 | 0.029 | 0.018 | 0.030 | 0.018 | 0.013 | 0.013 | 0.016 | 0.014 | -           |
| 33                      | 0.080       | 0.069 | 0.067 | 0.083 | 0.050 | 0.065 | 0.035 | 0.048 | 0.037 | 0.020 | 0.017 | -           |
| 34                      | 0.011       | 0.041 | 0.033 | 0.023 | 0.019 | 0.014 | 0.028 | 0.021 | 0.018 | 0.022 | 0.015 | -           |
| 35                      | 0.062       | 0.045 | 0.090 | 0.074 | 0.075 | 0.069 | 0.054 | 0.054 | 0.042 | 0.019 | 0.015 | -           |
| 36                      | 0.010       | 0.075 | 0.025 | 0.025 | 0.015 | 0.029 | 0.029 | 0.014 | 0.017 | 0.012 | 0.015 | -           |
| 37                      | 0.049       | 0.028 | 0.022 | 0.048 | 0.072 | 0.070 | 0.049 | 0.044 | 0.034 | 0.019 | 0.016 | -           |
| 38                      | 0.012       | 0.052 | 0.021 | 0.027 | 0.014 | 0.034 | 0.027 | 0.016 | 0.014 | 0.014 | 0.013 | -           |
| 39                      | 0.043       | 0.030 | 0.037 | 0.024 | 0.043 | 0.043 | 0.039 | 0.030 | 0.021 | 0.016 | 0.014 | -           |
| 40                      | 0.011       | 0.018 | 0.026 | 0.021 | 0.011 | 0.013 | 0.019 | 0.015 | 0.013 | 0.014 | 0.013 | -           |
| THC/I <sub>ref</sub>    | 2.006       | 2.190 | 1.774 | 1.717 | 1.639 | 1.784 | 1.985 | 1.437 | 1.433 | 1.518 | 1.542 | 13          |
| PWHC/I <sub>ref</sub>   | 2.299       | 2.564 | 2.213 | 2.133 | 2.226 | 2.095 | 2.111 | 1.586 | 1.319 | 0.929 | 0.828 | 22          |

# Certificate

No. ESY 075386 0336 Rev. 00

| Phase L3-N              |             |        |        |        |        |        |        |        |        |        |        |             |
|-------------------------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| Active power<br>P/Pn[%] | 0           | 10     | 20     | 30     | 40     | 50     | 60     | 70     | 80     | 90     | 100    | Limit value |
| Ordinal number          | Ih/Iref [%] |        |        |        |        |        |        |        |        |        |        | [%]         |
| 2                       | 0.074       | 0.274  | 0.249  | 0.106  | 0.079  | 0.076  | 0.118  | 0.131  | 0.112  | 0.092  | 0.092  | 8           |
| 3                       | 1.341       | 10.129 | 19.935 | 30.479 | 40.591 | 50.817 | 61.042 | 71.160 | 80.290 | 90.335 | 99.944 | -           |
| 4                       | 0.095       | 0.211  | 0.082  | 0.231  | 0.128  | 0.117  | 0.122  | 0.142  | 0.088  | 0.061  | 0.115  | 4           |
| 5                       | 1.267       | 1.644  | 1.205  | 1.258  | 1.108  | 1.034  | 1.021  | 1.087  | 1.128  | 1.234  | 1.281  | 10.7        |
| 6                       | 0.164       | 0.136  | 0.084  | 0.152  | 0.205  | 0.198  | 0.187  | 0.109  | 0.100  | 0.116  | 0.134  | 2.67        |
| 7                       | 0.945       | 1.041  | 0.523  | 0.740  | 0.634  | 0.552  | 0.503  | 0.550  | 0.532  | 0.601  | 0.606  | 7.2         |
| 8                       | 0.103       | 0.043  | 0.089  | 0.103  | 0.122  | 0.132  | 0.119  | 0.172  | 0.120  | 0.160  | 0.149  | 2           |
| 9                       | 0.807       | 0.237  | 0.612  | 0.186  | 0.674  | 0.869  | 0.967  | 0.373  | 0.345  | 0.336  | 0.343  | -           |
| 10                      | 0.037       | 0.045  | 0.041  | 0.085  | 0.092  | 0.067  | 0.086  | 0.050  | 0.055  | 0.065  | 0.075  | 1.6         |
| 11                      | 0.531       | 0.575  | 0.604  | 0.252  | 0.299  | 0.572  | 0.718  | 0.187  | 0.150  | 0.069  | 0.045  | 3.1         |
| 12                      | 0.074       | 0.038  | 0.042  | 0.065  | 0.089  | 0.066  | 0.036  | 0.086  | 0.127  | 0.132  | 0.103  | 1.33        |
| 13                      | 0.444       | 0.422  | 0.264  | 0.516  | 0.109  | 0.437  | 0.684  | 0.285  | 0.234  | 0.209  | 0.177  | 2           |
| 14                      | 0.133       | 0.044  | 0.158  | 0.169  | 0.065  | 0.106  | 0.167  | 0.097  | 0.077  | 0.106  | 0.090  | -           |
| 15                      | 0.369       | 0.209  | 0.280  | 0.415  | 0.166  | 0.236  | 0.445  | 0.251  | 0.202  | 0.195  | 0.124  | -           |
| 16                      | 0.058       | 0.026  | 0.046  | 0.088  | 0.036  | 0.105  | 0.133  | 0.044  | 0.035  | 0.038  | 0.032  | -           |
| 17                      | 0.142       | 0.180  | 0.151  | 0.257  | 0.186  | 0.226  | 0.343  | 0.104  | 0.097  | 0.044  | 0.064  | -           |
| 18                      | 0.084       | 0.087  | 0.067  | 0.055  | 0.046  | 0.040  | 0.084  | 0.067  | 0.072  | 0.057  | 0.076  | -           |
| 19                      | 0.243       | 0.243  | 0.177  | 0.095  | 0.257  | 0.073  | 0.171  | 0.166  | 0.133  | 0.098  | 0.067  | -           |
| 20                      | 0.119       | 0.110  | 0.136  | 0.106  | 0.063  | 0.090  | 0.108  | 0.045  | 0.040  | 0.036  | 0.038  | -           |
| 21                      | 0.200       | 0.179  | 0.034  | 0.134  | 0.226  | 0.139  | 0.106  | 0.118  | 0.093  | 0.042  | 0.040  | -           |
| 22                      | 0.052       | 0.023  | 0.040  | 0.035  | 0.040  | 0.035  | 0.062  | 0.030  | 0.025  | 0.027  | 0.025  | -           |
| 23                      | 0.084       | 0.058  | 0.163  | 0.085  | 0.120  | 0.137  | 0.151  | 0.079  | 0.058  | 0.045  | 0.029  | -           |
| 24                      | 0.072       | 0.073  | 0.069  | 0.035  | 0.048  | 0.028  | 0.040  | 0.031  | 0.040  | 0.024  | 0.039  | -           |
| 25                      | 0.129       | 0.031  | 0.101  | 0.101  | 0.076  | 0.104  | 0.029  | 0.074  | 0.063  | 0.031  | 0.034  | -           |
| 26                      | 0.051       | 0.123  | 0.043  | 0.066  | 0.048  | 0.029  | 0.087  | 0.018  | 0.017  | 0.018  | 0.021  | -           |
| 27                      | 0.104       | 0.049  | 0.052  | 0.074  | 0.064  | 0.096  | 0.044  | 0.091  | 0.076  | 0.051  | 0.044  | -           |
| 28                      | 0.039       | 0.031  | 0.025  | 0.042  | 0.053  | 0.024  | 0.029  | 0.017  | 0.021  | 0.016  | 0.022  | -           |
| 29                      | 0.068       | 0.089  | 0.122  | 0.059  | 0.054  | 0.071  | 0.074  | 0.052  | 0.041  | 0.022  | 0.022  | -           |
| 30                      | 0.043       | 0.042  | 0.037  | 0.024  | 0.024  | 0.027  | 0.018  | 0.017  | 0.020  | 0.024  | 0.019  | -           |
| 31                      | 0.077       | 0.105  | 0.094  | 0.060  | 0.038  | 0.082  | 0.032  | 0.065  | 0.051  | 0.033  | 0.024  | -           |
| 32                      | 0.017       | 0.088  | 0.030  | 0.027  | 0.018  | 0.020  | 0.047  | 0.015  | 0.013  | 0.015  | 0.016  | -           |
| 33                      | 0.050       | 0.095  | 0.048  | 0.105  | 0.070  | 0.083  | 0.067  | 0.063  | 0.047  | 0.030  | 0.023  | -           |
| 34                      | 0.018       | 0.019  | 0.022  | 0.024  | 0.015  | 0.034  | 0.018  | 0.013  | 0.013  | 0.017  | 0.014  | -           |
| 35                      | 0.049       | 0.103  | 0.058  | 0.059  | 0.061  | 0.047  | 0.044  | 0.051  | 0.040  | 0.022  | 0.017  | -           |
| 36                      | 0.018       | 0.051  | 0.020  | 0.030  | 0.014  | 0.023  | 0.015  | 0.018  | 0.015  | 0.019  | 0.014  | -           |
| 37                      | 0.035       | 0.112  | 0.068  | 0.037  | 0.059  | 0.050  | 0.057  | 0.035  | 0.027  | 0.016  | 0.015  | -           |
| 38                      | 0.011       | 0.058  | 0.029  | 0.017  | 0.014  | 0.031  | 0.017  | 0.012  | 0.012  | 0.013  | 0.013  | -           |
| 39                      | 0.036       | 0.057  | 0.035  | 0.017  | 0.045  | 0.037  | 0.058  | 0.038  | 0.032  | 0.019  | 0.016  | -           |
| 40                      | 0.014       | 0.030  | 0.031  | 0.021  | 0.019  | 0.032  | 0.028  | 0.015  | 0.013  | 0.014  | 0.013  | -           |
| THC/I <sub>ref</sub>    | 0.034       | 0.061  | 0.028  | 0.037  | 0.027  | 0.035  | 0.038  | 0.030  | 0.019  | 0.015  | 0.016  | 13          |
| PWHC/I <sub>ref</sub>   | 0.011       | 0.032  | 0.020  | 0.023  | 0.018  | 0.016  | 0.023  | 0.016  | 0.014  | 0.014  | 0.014  | 22          |

Remark: I<sub>ref</sub>= 72.0 A