# Setting for grid operator of Czech Republic

 **SolaX Power Network Technology (Zhe jiang) Co. , Ltd.**

hereby confirms that the following inverters fulfill EN 50549-1:2019:

Declaration of conformity with PPDS 2018, part of grid protection settings, further relating to RfG regulation 2016/631 (EU).

Here with SolaX Power Netword Technology (Zhejiang) CO.,LTD. declares, that the following products are compliant to the below described properties required by RFG 2016/631(EU) described in EN50549-1, and fullfill the requirements of Czech grid regulations authorities according PPDS 2018 př.č. 4:

**X1-Hybrid-3.0-N-C**     **X1-Hybrid-3.7-N-C**     **X1-Hybrid-4.6-N-C**     **X1-Hybrid-5.0-N-C**

**X1-Hybrid-3.0-D-C**     **X1-Hybrid-3.7-D-C**     **X1-Hybrid-4.6-D-C**     **X1-Hybrid-5.0-D-C**

**X1-Hybrid-3.0-N-E**     **X1-Hybrid-3.7-N-E**     **X1-Hybrid-4.6-N-E**     **X1-Hybrid-5.0-N-E**

**X1-Hybrid-3.0-D-E**     **X1-Hybrid-3.7-D-E**     **X1-Hybrid-4.6-D-E**     **X1-Hybrid-5.0-D-E**

**X1-Fit-3.7C**     **X1-Fit-3.7E**

**X1-Fit-4.6C**     **X1-Fit-4.6E**

**X1-Fit-5.0C**     **X1-Fit-5.0E**

### A.) Grid protection settings according PPDS 2018 pr.c.4, section 8.1 (MIKROZDROJE)

| Parameter | Maximum disconnect time | Trip value |
|---|---|---|
|  |  |  |
| overvoltage 1. level [1] | 3 | 230V + 10% (253 VAC) |
| overvoltage 2. level | 0,2 | 230V + 15% (264,5 VAC) |
| overvoltage 3. level | 0,1 | 230V + 20% (276 VAC) |
| undervoltage | 1,5 | 230V - 15% (195,5 VAC) |
| overfrequency | 0,5 | 52 Hz |
| underfrequency | 0,5 | 47,5 Hz |

(1) 10min value corresponding to EN50160. The calculation of the 10-min value shall comply with the 10min aggregation of EN EN61000-4-30, class S. The function shall be based on the calculation of the square root of the arithmetic mean of the squared input values over 10min. In deviation from EN61000-4-30 a moving window shall be used. The calculation of a new 10min value at least every 3s is sufficient.

**B.) FREQUENCY AND VOLTAGE STABILITY according PPDS 2018 pr.c.4, section 9.1.1 and 9.1.2.**

The inverters are not allowed to disconnect from grid within changes of frequency specified with a RoCoF immunity of at least +/- 2Hz/s in the time and f-U windows specified below.

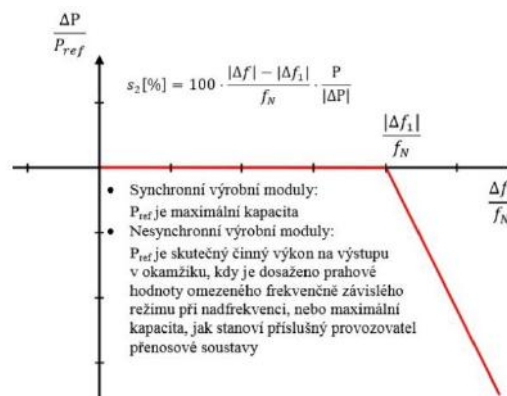**The minimum time period for operating in underfrequency and overfrequency situations**:

| Rozsah frekvence | Doba trvání |
|---|---|
| **47 – 47,5 Hz** | **20 s** |
| 47,5 – 48,5 Hz | 30 min* |
| 48,5 – 49 Hz | 90 min* |
| 49 – 51 Hz | neomezeně |
| 51 – 51,5 Hz | 30 min |

**The continuous operating voltage range is defined for the inverters within the range of**

**85% Un to 110% Un at the point of connection.**

**C.) POWER RESPONSE TO OVERFREQUENCY according PPDS 2018 pr.c.4, section 9.3.1 .**

Inverters are capable of activating active power response to overfrequency at a frequency threshold f1 at least between and including 50,2 Hz and 52 Hz with a droop in a range of at least s=2 % to s=12 %.

Default values for threshold f in CZ are 50,2 HZ and s=5%



$$s_2[\%] = 100 \cdot \frac{|\Delta f| - |\Delta f_1|}{f_N} \cdot \frac{P}{|\Delta P|}$$

- Synchronní výrobní moduly:
  $P_{ref}$ je maximální kapacita
- Nesynchronní výrobní moduly:
  $P_{ref}$ je skutečný činný výkon na výstupu v okamžiku, kdy je dosaženo prahové hodnoty omezeného frekvenčně závislého režimu při nadfrekvenci, nebo maximální kapacita, jak stanoví příslušný provozovatel přenosové soustavy

**D.) POWER RESPONSE TO UNDERFREQUENCY according PPDS 2018 pr.c.4, section 9.3.2.**

The inverters power is 100% stable within underfrequency occurences in the range of 47,5 to 50,0 Hz

**E.) DIGITAL INPUT TO THE INTERFACE PROTECTION according PPDS 2018 pr.c.4, section 5.1**

The inverters are equipped with an EPO port to allow transfer trip and stop immediately the power feeding tot he grid.

### F.) AUTOMATIC RECONNECTION AFTER TRIPPING

The inverter, disconnected from grid by the protections, will automatically re-connect,
1. if the voltage and frequency is observed for 300s (5min) in the range of:

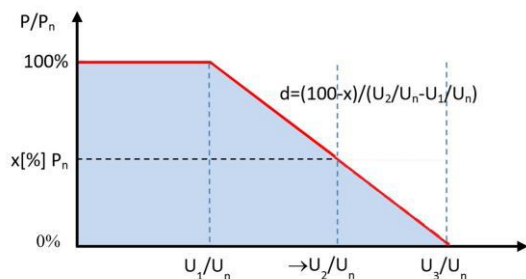   Voltage: 85-110 % of its nominal value
   Frequency: 47,5-50,05 Hz

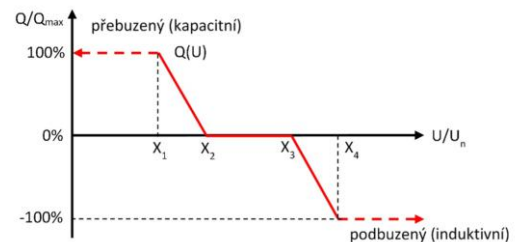2. with a ramp up curve of 10% Pn per minute

**OTHERS:**

**Function P(U), Q(U) and P(f) according PPDS 2018 pr.c.4, section 9.3.3 and 9.4. and 9.3.1** The inverters are able to follow the above mentioned required functions. The default values are as written below. For activation or further information

B.1 for P(U):



U1/Un = 109%; U2/Un = 110%; U3/Un = 111%

B.2 for Q(U):



x1 = 0,94; x2 = 0,97; x3 = 1,05; x4 = 1,08

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