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**Datasheet for the decision
of 9 December 2025**

Case Number: T 1070/23 - 3.5.01

Application Number: 15174376.2

Publication Number: 2963762

IPC: H02J3/38, H02M7/48

Language of the proceedings: EN

Title of invention:

FLOATING VOLTAGE SUPPRESSION IN A PV-INVERTER

Patent Proprietor:

Sungrow Power Supply Co., Ltd.

Opponent:

SMA Solar Technology AG

Headword:

Floating voltage suppression/SUNGROW

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

Novelty - (main request - no, auxiliary request - yes)
Inventive step - (auxiliary request - no)

Catchword:

A single technical feature not disclosed in the prior art is sufficient to confer novelty to a claim, independent of its technical effect (concept of "photographic novelty"). The technical effect is only relevant for the assessment of inventive step (see reasons, point 13).



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 1070/23 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 9 December 2025

Appellant: Sungrow Power Supply Co., Ltd.
(Patent Proprietor) No. 1699 Xiyou Road
New & High Technology Industrial Development Zone
Hefei, Anhui 230088 (CN)

Representative: Santarelli
Tour Trinity
1 bis Place de la Défense
92400 Courbevoie (FR)

Respondent: SMA Solar Technology AG
(Opponent) Sonnenallee 1
34266 Niestetal (DE)

Representative: Kleine, Hubertus
Loesenbeck - Specht - Dantz
Patent- und Rechtsanwälte
Am Zwinger 2
33602 Bielefeld (DE)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 3 April 2023
revoking European patent No. 2963762 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman M. Höhn
Members: L. Falò
E. Mille

Summary of Facts and Submissions

- I. The appeal was filed by the proprietor against the decision of the opposition division to revoke European patent No. 2 963 762.
- II. In the statement setting out the grounds of appeal, the appellant requested that the opposition division's decision be set aside and that the patent be maintained as granted (main request) or in amended form according to auxiliary request 2 as filed during oral proceedings in opposition (auxiliary request).
- III. The appellant further requested that the case be remitted to the opposition division for a finding on inventive step "*in the event that the Board of Appeal is unable to find for the Patentee on inventive step*". It also requested oral proceedings.
- IV. The respondent (opponent) requested that the decision of the opposition division be confirmed and, on an auxiliary basis, that oral proceedings be held.
- V. In the communication accompanying the summons to oral proceedings, the Board informed the parties that it tended to consider claim 1 of the main request not novel over E1, DE 10 2011 121197 A1, and claim 1 of the auxiliary request not inventive over the same document. Therefore, it was minded to dismiss the appeal.
- VI. In a letter dated 26 May 2025, the appellant announced that it would not attend the oral proceedings, which were subsequently cancelled.

VII. Claim 1 of the main request reads:

A floating voltage suppression method applied to a multi-input multi-stage inverter, the multi-input multi-stage inverter comprising a plurality of first-stage power conversion circuits at an input side, the method comprising:

determining a suspended branch of the multi-input multi-stage inverter, wherein the suspended branch is a branch for which an input voltage is less than a preset voltage, and the input voltage less than the preset voltage is a floating voltage; and

sending continuously a driving signal for a switching device to a first-stage power conversion circuit of the multi-input multi-stage inverter connected to the suspended branch to drive the switching device of the first-stage power conversion circuit to operate on or off continuously for the first-stage power conversion circuit to pull down the floating voltage, until the suspended branch is connected to a photovoltaic cell panel to cause an input voltage not less than the preset voltage for the suspended branch.

VIII. Claim 1 of the auxiliary request differs from the main request by the addition, before the "determining" step, of the following feature:

before determining a suspended branch of the multi-input multi-stage inverter, determining that the multi-input multi-stage inverter is in a stand-alone input mode,

wherein a plurality of branches is provided at the input side of the multi-input multistage inverter, and in the stand-alone input mode, the plurality of branches is independent from each other.

Reasons for the Decision

1. The application concerns suppressing floating voltages at the input of photovoltaic multi-input multi-stage inverters.

If the inverter is in a stand-alone input mode, floating voltages may be present on the input branches which are not connected to the photovoltaic cell panel. This constitutes a risk for the human operators and may interfere with the inverter's normal operations (paragraphs [0001] to [0003]).

2. Existing floating voltage suppression methods are said to imply higher hardware costs as they require discharge resistors in parallel to the input or avoiding a common ground coupling of the input sampling circuits ([0004] to [0008]).
3. To overcome the problems of the known methods, it is determined whether a branch of the multi-input multi-stage inverter is suspended, that is, whether its input voltage is less than a preset voltage. If so, a driving signal for a switching device is continuously sent to the first-stage power conversion circuit of the inverter connected to the suspended branch to make the switching device operate continuously in an "on" or "off" state and, thus, pull the input floating voltage down to zero ([0036] to [0038]).

Main request

4. The opposition division found that claim 1 of the main request lacked novelty in view of E1 (see point 14 of the decision).
5. The appellant argued that E1 failed to disclose the following features:

sending continuously a driving signal for a switching device to a first-stage power conversion circuit of the multi-input multi-stage inverter connected to the suspended branch to drive the switching device of the first-stage power conversion circuit to operate on or off continuously for the first-stage power conversion circuit to pull down the floating voltage, until the suspended branch is connected to a photovoltaic cell panel to cause an input voltage not less than the preset voltage for the suspended branch.

- 5.1 The appellant argued that the expression "*sending continuously a driving signal [...] to operate on or off continuously*" had to be interpreted as limiting the driving pattern to a pulsed pattern, i.e. excluding a continuously "on" or "off" signal. This was because, in the description, it was stated that an overly long duty cycle of the signal would interfere with the normal operation of the inverter (paragraph [0039]). Moreover, the signal as described throughout the application had a duty cycle. Therefore, the skilled person would have concluded that a pulsed pattern was used to turn the switch on or off periodically.
- 5.2 In contrast, the input connection of E1 was short-circuited and, therefore, the switching device could

not be considered to "*operate on and off continuously*" in the sense specified above.

- 5.3 The appellant further observed that the claimed features should be interpreted as a whole, rather than in isolation, and that the interpretation should be technically reasonable and take into account the overall disclosure of the patent.
6. The opposition division interpreted the expression "*a driving signal [...] to drive the switching device [...] to operate on or off continuously*" as not being limited to a pulsed signal but also covering a continuous signal. This continuous signal was anticipated by the short-circuiting of the input terminals of the power conversion circuit disclosed in E1, Figure 4, step 440, read in light of paragraphs [0023] to [0025]. The condition ending the short-circuiting was moreover disclosed in paragraph [0029].
7. The Board agrees with the opposition division's interpretation of claim 1. The wording of the claims should typically be given its broadest technically sensible meaning. In the current case, the broadest, technically sensible interpretation of the wording "*sending continuously a driving signal for a switching device [...] to operate on or off continuously*" includes the case of a continuous driving signal keeping the switching device in an "on" or "off" state. In the Board's view, the fact that this is presented in the description as interfering with - but not necessarily precluding - the operation of the inverter does not render this interpretation technically unreasonable. Elements of the description which are not reflected in the claims - here, the feature of the

signal having a duty cycle or pulsed pattern - cannot, as a rule, limit the claimed subject-matter.

8. Following this interpretation, the Board concludes that the "sending" step of claim 1 is anticipated by E1 for the same reasons provided in the contested decision.
9. It has not been contested that the remaining features of claim 1 are disclosed in E1. Therefore, the claim lacks novelty (Article 54 EPC).

Auxiliary request - novelty and inventive step

10. The opposition division interpreted the feature:

before determining a suspended branch of the multi-input multi-stage inverter, determining that the multi-input multi-stage inverter is in a stand-alone input mode

as indicating that the determination of a suspended branch followed the determination that the multi-input multi-stage inverter was in a stand-alone input mode (point 18.2 of the decision). Since it was not derivable from the claim what happened if the inverter was not in a stand-alone mode, the feature had no technical effect. In particular, and contrary to the proprietor's arguments, it did not credibly increase the safety of the system, which was due to the pulling down of the floating voltage rather than the determination of input mode of the inverter. Claim 1 was therefore new but lacked an inventive step.

11. The appellant argued that the expression "*before determining a suspended branch, determining that mode=stand alone*" was to be interpreted as "*before*

determining a suspended branch, determining if mode=stand alone". This implied that the remaining steps were only executed if the outcome of the determination was positive, in analogy with the expression "before driving, determining that tyre pressure = as specified by manufacturer". Therefore, a technical effect was present.

12. The respondent agreed with the opposition division's interpretation of the claim and further argued that, since the added feature was redundant and did not add any technically relevant matter, claim 1 lacked novelty. Moreover, even if considered novel the claim would still lack an inventive step since it would have been obvious for the skilled person to apply the claimed method only to input ports or groups of them which were "*stand alone*" to avoid the unnecessary execution of the method steps.
13. The Board takes the view that a single technical feature not disclosed in the prior art is sufficient to confer novelty to a claim, independent of its technical effect (concept of "photographic novelty"), the technical effect only being relevant for the assessment of inventive step. As it is common ground that the additional feature of claim 1 of the second auxiliary request, irrespective of its interpretation, is not disclosed in E1, the Board concludes that the claim is novel (Article 54 EPC).
14. For assessing inventive step, the Board accepts the appellant's interpretation. While the Board agrees with the opposition division that the added feature does not credibly increase safety, the Board acknowledges the presence of a technical effect, namely avoiding the execution of unnecessary steps.

15. The Board agrees however with the respondent that the additional features of claim 1 cannot support an inventive step, as the skilled person knows that input floating voltages may only exist if the inverter is in a stand-alone input mode. Therefore, verifying the input mode of the inverter before executing steps aimed at pulling down any floating voltages is, in the Board's view, an obvious design choice within the common general knowledge.

16. Accordingly, the Board judges that claim 1 lacks an inventive step in view of E1 (Article 56 EPC).

Conclusion

17. For the reasons given, none of the appellant's claim requests is allowable. A remittal of the case to the department of first instance would serve no purpose. The appeal must therefore be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



T. Buschek

M. Höhn

Decision electronically authenticated