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**Datasheet for the decision  
of 15 February 2023**

**Case Number:** T 0572/20 - 3.5.02

**Application Number:** 10000319.3

**Publication Number:** 2346133

**IPC:** H02J3/38, H02J3/18

**Language of the proceedings:** EN

**Title of invention:**

Converter device and method for converting electrical power

**Patent Proprietor:**

Siemens Aktiengesellschaft

**Opponent:**

Woodward Kempen GmbH

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)



**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  
Fax +49 (0)89 2399-4465

Case Number: T 0572/20 - 3.5.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 15 February 2023**

**Appellant:** Siemens Aktiengesellschaft  
(Patent Proprietor) Werner-von-Siemens-Straße 1  
80333 München (DE)

**Representative:** Siemens Patent Attorneys  
Postfach 22 16 34  
80506 München (DE)

**Respondent:** Woodward Kempen GmbH  
(Opponent) Krefelder Weg 47  
47906 Kempen (DE)

**Representative:** Cohausz & Florack  
Patent- & Rechtsanwälte  
Partnerschaftsgesellschaft mbB  
Bleichstraße 14  
40211 Düsseldorf (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 21 January 2020  
revoking European patent No. 2346133 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** R. Lord  
**Members:** C.D. Vassoille  
W. Ungler

## **Summary of Facts and Submissions**

- I. The appeal of the patent proprietor lies against the decision of the opposition division revoking European patent no. 2 346 133.
- II. The following documents are relevant for the present decision:
- D1: EP 1 386 078 B1
- D4: M. Tsili et al.: "Review of grid code technical requirements for wind farms", IET Renewable Power Generation, pages 1 to 25, 2009.
- D9: Enercon GmbH sales brochure: "ENERCON WIND TURBINES", "GRID INTEGRATION AND WIND FARM MANAGEMENT", pages 3 and 6, status 04/08.
- III. In the decision under appeal the opposition division came to the conclusion that the then main request fulfilled the requirements of Articles 83 and 123(2) EPC. The subject-matter of claim 1 of the main request, however, was considered not to involve an inventive step in view of a combination of documents D2 (EP 1 906 505 A1) and pages 3 and 6 of document D9.
- IV. The board summoned the parties to oral proceedings. In a communication under Article 15(1) RPBA annexed to the summons to oral proceedings, the board informed the parties of their preliminary opinion on the case.

The board further provided their preliminary opinion that the request for transfer of the party status as

opponent should be rejected and that the case should proceed with the original opponent.

- V. Oral proceedings took place on 15 February 2023 as a Zoom videoconference.

The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained in amended form according to the main request filed during the oral proceedings before the opposition division on 22 November 2019.

The respondent (opponent) requested that the appeal be dismissed.

- VI. During the oral proceedings, the respondent withdrew their request for transfer of opponent status so that the proceedings were pursued on behalf of Woodward Kempen GmbH.

- VII. Claim 1 of the appellant's sole request has the following wording (feature references in bold added by the board):

" **1a)** Converter device (102) for converting an input power (106) to an electrical output power (108), the converter device (102) comprising:

**1b)** - a voltage input (118) for receiving a voltage signal (120), said voltage signal (120) being indicative of a voltage in a electricity network (112) to which the converter device (102) is coupled during operation in order to provide said electrical output power (108) to said electricity network (112);

**1c)** - a controller (122); wherein

**1ca)** - the controller being configured for setting the phase angle between the voltage and the current of the electrical output power (108) at a constant out-of-band value (170a, 170b) if the voltage indicated by the voltage signal (120) is outside the predetermined voltage band ( $\Delta U_b$ ), and

**1cb)** keeping the magnitude of the phase angle constant during a grid fault when the voltage indicated by the voltage signal (120) is outside the predetermined voltage band ( $\Delta U_b$ );  
characterized by

**1d)** - the controller (122) being configured for changing the phase angle between the voltage and the current of the electrical output power (108) at the boundary of said predetermined voltage interval in a stepwise manner; and

**1e)** - the controller (122) being configured for operating with a constant in-band value of the phase angle between the voltage and the current of the electrical output power (108) if the voltage indicated by the voltage signal (120) is inside the predetermined voltage band."

VIII. The appellant's arguments, as far as they are relevant for the present decision, can be summarised as follows:

*Exclusion of document D9 from the appeal procedure*

Document D9, which was submitted during the oral proceedings before the opposition division, should not be taken into account in the appeal procedure, because it was late-filed and not more relevant than the prior

art documents that had already been on file. The opposition division had not correctly exercised its discretion as to the admittance of document D9. In particular, the decision did not provide any reasoning as to why document D9 was considered to be *prima facie* relevant to the proceedings.

*Inventive step in view of a combination of documents D1 and D9*

The subject-matter of claim 1 involved an inventive step in view of a combination of documents D1 and D9. It was not disputed that document D1 disclosed in figure 3 a diagram showing a characteristic curve of the phase angle as a function of the grid voltage.

However, the person skilled in the art would not combine the control structures of documents D1 and D9, since document D1 was concerned with a phase angle control, whereas document D9 clearly disclosed a separate control of the active power and of the reactive power. In particular, this was clear from the fourth figure from the top on page 6 of document D9, which showed a gap between the abrupt change in active power and a change in reactive power. Consequently, there was no synchronisation between the changes in active power and reactive power at the boundary of the voltage interval, which would be a necessary condition for the change in phase angle at the boundary of the voltage interval. It was therefore clear that the fourth figure from the top of document D9 did not disclose a change in a stepwise manner and did not disclose a constant phase angle. It was not even clear that document D9 in the fourth figure from the top on page 6 disclosed a stepwise change in active power and

reactive power, since there was no axis labelling present in this figure.

It also had to be taken into account that document D9 on page 6 showed a number of different diagrams. In view of this, it was questionable why the skilled person would have chosen exactly the fourth figure from the top and not one of the other figures. Overall, the skilled person would have had no reason to change the ramped shape of the curve shown in figure 3 of D1.

IX. The respondent's arguments, as far as they are relevant for the present decision, can be summarised as follows:

*Exclusion of document D9 from the appeal procedure*

Pages 3 and 6 of document D9 should be taken into account in the appeal procedure. The opposition division had correctly exercised their discretion to admit pages 3 and 6 of document D9 into the proceedings. In the decision under appeal it was found that the subject-matter of claim 1 did not involve an inventive step in view of the combination of documents D2 and D9. From this result alone it was clear that document D9 was *prima facie* relevant regarding the maintenance of the patent under appeal.

*Inventive step in view of a combination of documents D1 and D9*

The subject-matter of claim 1 did not involve an inventive step in view of a combination of documents D1 and D9. It was undisputed that the converter device of document D1 differed from the subject-matter of claim 1 only in that the phase angle at the boundary of the

predetermined voltage interval was changed in a stepwise manner.

The objective technical problem when starting from D1 and in view of the distinguishing feature was that of how to maximise the voltage band in which regulation-free operation was possible such that the provision of active power was maximised within the predetermined voltage interval.

Document D1 did not contain any specification of the curve shown in figure 3 (see also the description in paragraph [0022] of D1). The skilled person was therefore free to choose any slope and, in particular, also a mathematical step function at the boundary of the voltage interval as required by claim 1.

Document D9, from the author of document D1, disclosed a step function of the active power and the reactive power at the boundary of the voltage interval (see the fourth figure from the top on page 6). The person skilled in the art, faced with the objective technical problem, would recognise that a corresponding stepwise change of the phase angle at the boundary of the voltage interval would solve the objective technical problem. It should also be noted that the person skilled in the art would know from common general knowledge that the change at the boundary had to be made quickly (see document D4, page 10 and figure 18). It was therefore obvious to the person skilled in the art to modify the slope of the curve shown in figure 3 of document D1 so that the change at the boundaries of the voltage interval between  $U_{\min}$  and  $U_{\max}$  was made in a stepwise manner as required by claim 1.



## Reasons for the Decision

### 1. *Exclusion of document D9 from the appeal proceedings*

1.1 The appellant requested that document D9 be not taken into account in the appeal proceedings on the grounds that it had been late-filed and that the opposition division had not provided any reasoning as to why they considered document D9 to be *prima facie* relevant.

The respondent requested that pages 3 and 6 of document D9 be taken into account in the appeal procedure.

1.2 The board notes that the opposition division, in the exercise of their discretion, admitted pages 3 and 6 of document D9 to the opposition proceedings, applying the criterion of *prima facie* relevance (see point 5.2) of the reasons of the decision under appeal). In particular, the opposition division found that the document was *prima facie* highly relevant because it concerned a wind power plant with a converter and showed in the figures of page 6 that the active and reactive power and, consequently, the phase angle were changed in a stepwise manner in the event of a grid short-circuit.

The board is satisfied that this meets the requirements for *prima facie* examination. It should also be noted that the opposition division did in fact find that the appellant's then main request did not involve an inventive step in view of a combination of document D2 with D9.

Consequently, it is not apparent to the board that the opposition division exercised their discretion to admit

pages 3 and 6 of document D9 to the opposition proceedings according to the wrong criteria or in an arbitrary manner.

- 1.3 Furthermore, the decision under appeal is based on these parts of document D9 (i.e. pages 3 and 6) and the decision forms a basis of the appeal proceedings pursuant to Article 12(1) (a) RPBA. Moreover, pursuant to Article 12(2) RPBA, a party's appeal case shall be directed to the requests, facts, objections, arguments and evidence on which the decision under appeal was based.

Therefore, the board sees no legal basis for excluding the duly admitted pages 3 and 6 of document D9 from the appeal proceedings and the appellant has not provided any further arguments in this respect.

- 1.4 The board has therefore decided to refuse the appellant's request not to take into account pages 3 and 6 of document D9 in the appeal proceedings.

2. *Admittance of the parties' submissions regarding the objection under Article 56 EPC based on the combination of documents D1 and D9*

- 2.1 In the reply to the appeal, the respondent submitted on page 15, last paragraph, to page 16, first paragraph, that the skilled person would arrive at the subject-matter of claim 1 in an obvious way in view of a combination of documents D1 and D9. No explicit arguments were provided in support of this objection. Rather, the respondent stated that the submissions regarding the combination of document D2 with document D9 applied analogously to the combination of documents D1 and D9.

Against this background, the objection based on a combination of documents D1 and D9, insofar as it is based on analogous arguments, is regarded by the board as sufficiently substantiated within the meaning of Article 12(3) RPBA.

- 2.2 As regards the respondent's objection under Article 56 EPC based on a combination of documents D2 and D9, on which the decision under appeal is based, the appellant had provided extensive arguments in their statement of grounds of appeal.

The board therefore concluded that the appellant's submission of analogous arguments in reply to the respondent's objection based on documents D1 and D9 must be considered as substantiated within the meaning of Article 12(3) RPBA.

- 2.3 In these circumstances, the board decided, in the interests of fairness and in accordance with the principle of equal treatment of the parties, to take into account the analogous arguments concerning the combination of documents D1 and D9. These arguments were explicitly raised by both parties for the first time during the oral proceedings before the board, but were sufficiently substantiated, in accordance with Article 12(3) RPBA, by the analogous arguments presented in relation to a combination of documents D2 and D9.

3. *Inventive step - Article 56 EPC*

- 3.1 The subject-matter of claim 1 of the appellant's sole request does not involve an inventive step in view of the combination of documents D1 and D9.

3.2 It was not disputed by the parties that document D1 differs from the subject-matter of claim 1 only in that the phase angle is changed in a stepwise manner at the boundary of the voltage interval between  $U_{\min}$  and  $U_{\max}$ , as shown in figure 3 of document D1.

3.3 With regard to the combination of documents D1 and D9, the respondent did not contest an interpretation of the wording "in a stepwise manner" in the sense of an abrupt change or a mathematical step function.

3.4 The board understands that the respondent considered the objective technical problem to be that of how to maximise the voltage band within which regulation-free operation was possible, so as to maximise the provision of active power within the predetermined voltage band, while moving as quickly as possible to a voltage stabilisation setting of the controller in the event of a grid fault.

Since the appellant did not object to this objective technical problem and the board considers the problem as formulated by the respondent to be plausible, the subsequent assessment of inventive step is based on this objective technical problem.

3.5 The board is convinced that it would have been obvious for the person skilled in the art in view of the teaching of document D9 on page 6, to adapt the slope of the curve of the phase shift, as illustrated in figure 3 of D9, such that the phase shift changes in a stepwise manner at the boundary of the predetermined voltage band between  $U_{\min}$  and  $U_{\max}$ .

- 3.6 The board carefully considered the appellant's arguments concerning the disclosure of document D9. In particular, the board agrees that document D9 does not directly and unambiguously disclose that the phase angle is actually controlled. In this context, the board also agrees that document D9, in the fourth figure from the top on page 6, appears to show a gap between the stepwise change in active power and the stepwise change in reactive power. It is also true that document D9 discloses not only one but a number of different possible settings in the event of a grid short-circuit.
- 3.7 Nevertheless, the board is convinced that the skilled person would at least have derived directly and unambiguously, from the fourth figure from the top on page 6 of D9, a stepwise change in active power and reactive power at a grid voltage boundary.
- 3.8 Furthermore, as submitted by the respondent, documents D1 and D9 refer to the same technical field and even originate from the same source. It can therefore be assumed that, faced with the objective technical problem, the person skilled in the art would not only have known document D9 but would also have consulted it in order to solve the objective technical problem.
- 3.9 The board also agrees with the respondent that the person skilled in the art strives to maximise active power in the range within the normal operating voltage band and, in addition, to quickly inject or absorb reactive power in the event of a grid fault (see in particular the common general knowledge of the skilled person proven by document D4, page 10). Against this background, there can be no doubt that the skilled person would have taken from document D9 at least a

general indication of the possibility of a stepwise change of a control parameter at the voltage boundary in order to abruptly carry out grid stabilisation in the event of a grid fault.

3.10 The board is convinced that such a hint would have been sufficient to lead the skilled person, faced with the objective technical problem, in an obvious way to modify the curve in figure 3 of D1 in such a way as to make a stepwise change of the phase angle at the boundary of the voltage band. The question of whether document D9 actually discloses a stepwise change in the phase angle is therefore not considered by the board to be decisive.

3.11 Consequently, even if the person skilled in the art would not have directly and unambiguously derived a stepwise change of the phase angle at the voltage boundary from page 6 of document D9, the board is convinced that the skilled person would still have been motivated, in view of the relevant disclosure in D9, to modify the curve of the phase angle of D1 such as to change the phase angle in a stepwise manner at the boundary as required by claim 1.

In this context, it should also be noted that document D1 does not contain anything that would lead the skilled person to believe that the change between constant phase angles is limited to a ramped transition as shown in figure 3 of D1. On the contrary, document D1 does not contain any description or specification of the curve, let alone any restriction as to a ramped transition between the constant phase angle values. Reference is made in particular to paragraph [0022] of D1, where it is stated in general terms, with reference to figure 3, that the phase angle is changed on the

basis of the characteristic curve in order to stabilise the voltage.

The board notes also that the above considerations differ from those when starting from D2 as in the decision under appeal, since as the appellant has argued, D2 discloses a specific reason why in the context of that document the transition should be ramped, thus teaching away from the development of the present claimed invention. D1 by contrast contains no such teaching.

3.12 Finally, the board observes that the implementation of a stepwise change in the phase angle at the boundary of the voltage band would not have required a major modification of the converter device of D1. On the contrary, the only modification which the skilled person would have had to make is to adapt the curve shown in figure 3 in such a way that a stepwise change at the boundary of the voltage band replaces the ramped part of the curve.

3.13 A corresponding modification of the converter device according to D1 would therefore have been obvious to the skilled person in view of the objective technical problem. Consequently, the subject-matter of claim 1 of the appellant's sole request does not involve an inventive step within the meaning of Article 56 EPC in view of a combination of documents D1 and D9.

#### 4. *Result*

Since the subject-matter of claim 1 of the appellant's sole request does not involve an inventive step in accordance with Article 56 EPC, the board had to accede to the respondent's request.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated