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**Datasheet for the decision
of 8 October 2021**

Case Number: T 1618/18 - 3.5.02

Application Number: 13275200.7

Publication Number: 2846451

IPC: H02M7/483

Language of the proceedings: EN

Title of invention:

Power converter

Applicant:

General Electric Technology GmbH

Relevant legal provisions:

EPC Art. 83

RPBA Art. 12(4)

Keyword:

Sufficiency of disclosure - main request (no)

Late-filed request - admitted (no)



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Case Number: T 1618/18 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 8 October 2021

Appellant: General Electric Technology GmbH
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Representative: Brevalex
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 8 February 2018
refusing European patent application No.
13275200.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Lord
Members: H. Bronold
W. Ungler

Summary of Facts and Submissions

- I. The appeal of the applicant is against the decision of the examining division to refuse European patent application No. 13 275 200.7 *inter alia* for insufficiency of disclosure (Article 83 EPC).
- II. The appellant requested that the decision under appeal be set aside and that a patent be granted based on the claims of their main request as filed with letter dated 11 September 2015 or on the basis of their auxiliary request as filed with the statement setting out the grounds of appeal.
- III. The appellant filed the following document during the first instance proceedings to support their arguments regarding sufficiency of disclosure:

D6 : Wei Li et al: "Control and Performance of a Modular Multilevel Converter System", 6 September 2011, Retrieved from the Internet: URL:[http://www.opal-rt.com/sites/default/files/technical_papers/Control and Performance of a modular multilevel converter system_1.pdf](http://www.opal-rt.com/sites/default/files/technical_papers/Control_and_Performance_of_a_modular_multilevel_converter_system_1.pdf) [retrieved on 2014-04-24]
- IV. In a communication under Article 15(1) RPBA 2020 the board informed the appellant of its preliminary opinion that *inter alia* the statement of grounds of appeal was not sufficiently substantiated regarding the ground of refusal of insufficient disclosure and that the board was further not convinced by the appellant's corresponding substantive arguments. Moreover the board was inclined not to admit the appellant's auxiliary request.

V. Claim 1 according to the main request reads as follows:

"A modular power converter (10,110,210,310,410,510,610) comprising:

a first terminal (12,14) for connection to a first electrical network (24);

a second terminal (18) for connection to a second electrical network (26,126,226,326,426,526,626);

at least one module (28) connected between the first and second terminals (12,14,18), the or each module (28) including at least one switching element (30) and at least one energy storage device (32), the or each switching element (30) and the or each energy storage device (32) in the or each module (28) combining to selectively provide a voltage source, the or each switching element (30) in the or each module (28) being switchable to transfer power between the first and second terminals (12,14,18); and

a control unit (34) being configured to selectively control switching of the or each switching element (30) in the or each module (28) to store energy from or release energy to either or both of the first and second terminals (12,14,18) so as to decouple respective power flows at the first and second terminals (12,14,18) and thereby inhibit a modulation of power flow at one of the first and second terminals (12,14,18) from modifying a power flow at the other of the first and second terminals (12,14,18)."

VI. In the light of the board's decision to exercise its discretion under Article 12(4) RPBA 2007 not to admit the appellant's auxiliary request, it was not necessary to cite the wording of the auxiliary request here.

VII. The appellant's arguments, as far as they are relevant for this decision, can be summarised as follows:

The invention defined in the main request was sufficiently disclosed in the patent. The described capacitor was able to decouple the power flows between the first and second terminals of the claimed modular converter. Corresponding disclosure was to be found on pages 10, 11, 13 and 14 of the originally filed description, in particular page 13, lines 1 to 8. The examining division's grounds were not convincing because sophisticated controllers were part of the common general knowledge. For example, the Apollo Guidance Computer used to be a sophisticated controller but was now 50 years old and well known to the skilled person. The sophisticated controller of D6 merely represented an example of the knowledge of the skilled person at the date of filing of the application.

Further, the patent was directed to the detection of active power oscillations with a frequency of 1 to 2 Hz. Such a detection was normal practice for the person skilled in the art. The person skilled in the art further knew how to allocate the energy resulting from the power oscillations to different capacitors in order to avoid the power flow at the other terminal being modified, thereby achieving the desired decoupling.

Regarding the auxiliary request, the appellant had not seen any need to file an auxiliary request earlier because they had assumed that their arguments regarding Article 83 EPC were sufficient. Moreover, the arguments in the contested decision concerning lack of inventive step were unclear. Further, the focus of the first instance proceedings had changed in view of document D6. Therefore, the appellant filed an auxiliary request

to overcome the corresponding objections directly at the beginning of the appeal proceedings. Consequently, the auxiliary request was admissible.

Reasons for the Decision

1. Admissibility

The appeal was filed in due time and form and sufficiently substantiated, at least with respect to the ground of refusal of lack of inventive step. Consequently, the appeal is admissible.

2. Main request - Article 83 EPC

2.1 Notwithstanding the question as to whether the appellant's arguments regarding sufficiency of disclosure are sufficiently substantiated in the sense of Article 12(2) RPBA 2007, as indicated in the board's communication under Article 15(1) RPBA, the board has arrived at the conclusion that claim 1 according to the main request does not meet the requirement of Article 83 EPC. Therefore, no decision of the board is required regarding sufficiency of substantiation in this respect.

2.2 With respect to insufficiency of disclosure the contested decision indicates in point 15.1 that the person skilled in the art was not able to design a controller which realises the desired decoupling of power flows between first and second terminals which have to be supplied from the same capacitor.

2.3 The board was not able to identify any substantive argument of the appellant in the written procedure regarding the required control other than an indication that the Apollo Guidance Computer was an example of a sophisticated controller, the use of which was within the capabilities of the person skilled in the art, which does not seem to be related to the subject-matter claimed in claim 1. The relevant issue here is not whether such sophisticated controllers were known, but rather whether the person skilled in the art would know how to arrange and operate such a controller in order to achieve the technical effect of the claimed invention.

The division's argument in this respect is however directed to the fact that document D6 merely discloses how to transfer energy between the capacitor and the AC grid, and that from this disclosure the skilled person does not have sufficient knowledge to realise the claimed decoupling of power flows, which requires that any modulation of power flow at the first and second terminals is inhibited.

The appellant's argument that a capacitor decoupled the respective power flows in the AC and DC networks does not contain any information about how the corresponding switches have to be operated to achieve the claimed result ("...selectively control switching...so as to decouple...and thereby inhibit modifying a power flow..."). Thus, as correctly pointed out in the contested decision, decoupling and inhibiting is a function of the control unit, and not of the energy storage device.

The mere citation of the passage of the description on page 13 to which the examining division objected as not being sufficient, does not represent a reason why the examining division's assumption was wrong.

- 2.4 During the oral proceedings before the board the appellant essentially argued that the examining division assumed that the invention related to reactive power oscillations. It followed however from several parts of the description that the patent was directed to the detection of active power oscillations in the range of 1 to 2 Hz. Moreover, it was clear from the description how the decoupling was carried out by the control unit which was configured to selectively control switching of the switching elements so as to decouple respective power flows at the first and second terminals.

The board disagrees. It is correct that the patent refers to active power oscillations having a frequency of 1 to 2 Hz. The board further has no doubts that the skilled person is able to identify or measure such power oscillations and to understand how the switches of the circuit of figure 2 have to be operated in order to modify the charge of a capacitor or to bypass it as described on pages 10 and 11 of the description. However, the board does not agree that from such a basic description of the general operation principles of a modular power converter, the skilled person learns the complex control scheme which would be required in order to achieve the desired result of decoupling the power flows at the first and second terminals of the modular power converter. The corresponding feature is merely claimed as a result to be achieved. The description also contains no further explanation of how, i.e. by what control scheme, the desired

decoupling may be achieved. None of the parts of the description cited by the appellant add anything to the result to be achieved as comprised in claim 1.

Moreover, in relation to figure 8 of D6 it becomes clear that the control scheme described in D6, although it merely relates to a very specific case in which a modulation of power flow on the DC side of the converter of D6 is prevented, is already very complex. As argued by the examining division in the contested decision, the person skilled in the art does not learn from the patent or D6 how to avoid any modulation of power flow at one of the first and second terminals in the sense of claim 1.

Therefore, the board concludes that the basic description of known operation principles of a modular power converter as described in the patent is not sufficient for a person skilled in the art to be able to carry out the claimed invention, in particular the claimed decoupling of power flows.

- 2.5 This holds true even more if it is taken into account that the claimed subject-matter *de facto* even covers a modular power converter with only a single energy storage device. It is not conceivable how it would be possible to modify the charge at this single energy storage device (a capacitor according to the embodiments) without modifying its voltage and thereby inevitably modifying a power flow at the other terminal in the sense of claim 1. It is common general knowledge that the charge stored in a capacitor is proportional to its voltage. Even the application cites the corresponding physical relationship in the formula at the bottom of page 12. Thus, an increase in charge at the (possibly) single energy storage device implies an

increased voltage at the corresponding other terminal of the converter which in turn implies a change of power flow.

- 2.6 The board thus concludes that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, contrary to Article 83 EPC. Consequently, the main request is not allowable.

3. Auxiliary request - Article 12(4) RPBA 2007

- 3.1 The auxiliary request is not admissible. The main request filed with letter dated 15 September 2015 has been left unamended for the whole of the examination proceedings and no auxiliary request was filed during the examination proceedings. Only with the grounds of appeal did the appellant file an auxiliary request. However, the board could not identify any obstacles to filing such a modified request during the proceedings before the examining division.

In that context, the board is not convinced by the appellant's argument that they had assumed that their arguments regarding Article 83 EPC of the main request were convincing, so that they considered it unnecessary to file an auxiliary request earlier.

- 3.2 The board further does not agree that a change in reasoning was occasioned by the examining division. The fact that the examining division changed their arguments in view of document D6 was caused by the fact that the appellant filed D6 in the context of their arguments regarding sufficiency of disclosure. Thus, the "change" of arguments of the examining division

represents nothing other than the division's mandatory response to the appellant's argument in order to respect the appellant's right to be heard.

3.3 Moreover, the board does not agree with the appellant's argument that because the contested decision also contained allegedly unclear reasons why the subject-matter of the main request does not involve an inventive step the late filing of an auxiliary request would be justified. The examining division had consistently argued lack of inventive step from their first communication and throughout the whole first instance proceedings.

3.4 The board has therefore arrived at the conclusion that the auxiliary request could and should have been filed during the first instance proceedings. Consequently, the board has exercised its discretion under Article 12(4) RPBA 2007 not to admit the appellant's auxiliary request into the proceedings.

4. Conclusion

As set out above, the appellant's main request is not allowable and the auxiliary request was not admitted. The board is thus not in a position to accede to either of the appellant's requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated