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Datasheet for the decision of 25 November 2025

Case Number: T 0822/20 - 3.4.03

Application Number: 13157442.8

Publication Number: 2605392

IPC: H01L23/00

Language of the proceedings: EN

Title of invention:
Electric power converter

Patent Proprietor:
Hitachi, Ltd.

Opponent:
Valeo Siemens eAutomotive France SAS

Relevant legal provisions:
EPC Art. 52(1), 56, 76(1), 113(2), 123(2)
RPBA 2020 Art. 12(6)

Keyword:
Amendments - extension beyond the content of the application as filed (no)
Inventive step - (yes)
Late-filed document - admitted (no)

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Case Number: T 0822/20 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 25 November 2025

Appellant: (Opponent)	Valeo Siemens eAutomotive France SAS 14 Avenue des Béguines 95800 Cergy (FR)
Representative:	Valeo Powertrain Systems Service Propriété Intellectuelle Immeuble le Delta 14, avenue des Béguines 95892 Cergy Pontoise (FR)
Respondent: (Patent Proprietor)	Hitachi, Ltd. 6-6 Marunouchi 1-chome Chiyoda-ku Tokyo 100-8280 (JP)
Representative:	MERH-IP Matias Erny Reichl Hoffmann Patentanwälte PartG mbB Paul-Heyse-Straße 29 80336 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 15 January 2020 concerning maintenance of the European Patent No. 2605392 in amended form.**

Composition of the Board:

Chairman	T. Häusser
Members:	M. Papastefanou
	G. Decker

Summary of Facts and Submissions

I. The appeal of the opponent concerns the decision of the opposition division maintaining the European patent EP 2 605 392 B1 in amended form.

The contested patent stems from the European patent application with number 13 157 442, which is a divisional application of the European patent application with number 07 014 404 ("parent application").

The opposition was based on the grounds of lack of novelty and inventive step (Article 100(a) EPC), insufficient disclosure (Article 100(b) EPC) and added subject-matter (Article 100(c) EPC). In the decision under appeal, the opposition division concluded that the ground for opposition under Article 100(c) EPC prejudiced the maintenance of the patent as granted because claim 1 comprised added subject-matter due to an unallowable intermediate generalisation. A first auxiliary request filed during the oral proceedings was found to fulfil the requirements of the EPC and the patent was maintained on that basis.

II. Reference is made to the following documents:

D1: US 2003/0132040 A1;
D24: JP 10 303 349 A;
English machine translation of D24 filed on 13 May 2019 by the opponent;
D200: JP 2003 047 259 A;
English machine translation of D200 filed on 20 September 2019 by the opponent.

III. After the board issued its preliminary opinion in a communication under Article 15(1) RPBA, both the respondent/patent proprietor (see letter dated 20 December 2024) and the appellant/opponent (see letter dated 5 May 2025) informed the board that they would not be attending the oral proceedings scheduled for 9 October 2025. The oral proceedings were subsequently cancelled by the board.

IV. The parties' requests as they appear from their written submissions are as follows.

The **appellant** ("opponent") requested, as a main request, that the decision under appeal be set aside and the patent be revoked in its entirety. As a first auxiliary request, the opponent requested that certain features be added to claim 1 as maintained by the opposition division. As a second auxiliary request, the opponent requested that the patent be maintained as maintained by the opposition division (see point 2 on page 4 of the statement setting out the grounds of appeal).

The **respondent** ("proprietor") requested that the appeal be "rejected" (i.e. dismissed). In the alternative, it requested that the patent be maintained on the basis of the auxiliary request filed with the proprietor's reply to the grounds of appeal (see point I. on the first page of the reply to grounds of appeal).

V. Claim 1 of the patent as maintained by the opposition division has the following wording (features' numbering as in the decision under appeal, see point 60):

An electric power converter comprising:

a) *a power module (500) having a power semiconductor element (21) for converting from DC current to AC current;*
b) *a capacitor module (300) having a capacitor element (302) for smoothing the DC current;*
c) *a flat plate conductor (301) for electrically connecting said power module (500) and said capacitor module (300); and*
d) *a channel formation (220) for forming a cooling medium channel in which a cooling medium flows; wherein*
e) *said power module (500) and said capacitor module (300) are arranged at opposite sides of the channel formation (220); and*
f1) *said flat plate conductor (301) is arranged between said capacitor element (302) and said channel formation (220),*
f2) *wherein terminals of said capacitor module (300) are formed by bending an end of the flat plate conductor (301) towards said power module (500); characterized in that*
g) *the terminals of the capacitor module (300) are directly connected with terminals of the power module (500), wherein*
h) *said flat plate conductor (301) has two stacked flat plate conductors with an insulator therebetween, wherein*
k) *terminals of said capacitor module (300) are formed by both ends of the flat plate conductors being bent in opposite directions, and has a connection face for electrically connecting with a DC terminal of said power module (500).*

VI. The wording of the proprietor's auxiliary request is not relevant to this decision.

VII. The parties' relevant arguments can be summarised as follows:

On added subject-matter

According to the **opponent**, the term "directly connected" in feature g) of claim 1 as maintained by the opposition division included interpretations which were not supported by the originally filed disclosure of the application or the parent application. The **proprietor** argued that the content of the application as originally filed did not support the opponent's interpretation of the term "directly connected".

On inventive step

The **opponent** argued that the subject-matter of claim 1 of the patent as maintained by the opposition division did not involve an inventive step in view of a combination of D1 or D200 with D24. The opposition division was wrong in not admitting D200 into the proceedings because it was relevant and therefore the board should admit it in the appeal proceedings.

According to the **proprietor**, D200 was not *prima facie* relevant and the opposition division was right in not admitting it. The board should not admit it, either. The disclosures of D1, D24 and D200 were fundamentally different and could not be combined.

Reasons for the Decision

1. Decision in written procedure

After the board issued its preliminary opinion, both

parties declared that they would not be attending the oral proceedings (see point III. above).

The board, after reviewing the parties' written submissions, considers that the case is ready for decision and oral proceedings without the presence of the parties would serve no purpose. The parties are treated as relying on their respective written cases (Article 15(3) RPBA).

The oral proceedings were thus cancelled and the decision is issued in the written procedure.

2. Admissibility of the appeal

2.1 The proprietor argued that, as far as the ground for opposition of added subject-matter was concerned, the opponent had not substantiated its appeal case sufficiently because it could not immediately be understood from the opponent's reasoning why the decision of the opposition division was allegedly incorrect (see page 3, first paragraph of the reply to the grounds of appeal). Although not explicitly stated by the proprietor, the board understands this argument as an indication that the appeal is inadmissible.

2.2 In the decision under appeal the opposition division concluded that the first auxiliary request did not contain added subject-matter and involved an inventive step.

2.3 Irrespective of whether the opponent substantiated sufficiently its case with respect to the issue of added subject-matter, the proprietor did not raise any objections regarding the opponent's appeal case against the opposition division's conclusions regarding the

ground for opposition of lack of inventive step. Hence, at least in this aspect, the admissibility of the opponent's appeal was uncontested.

Since there cannot be a partially admissible appeal (see *Case Law of the Boards of Appeal of the European Patent Office*, 11th edition 2025 ("*Case Law*"), section V.A. 2.6.8), the appeal is admissible.

3. The claimed invention

The invention relates to an electric power converter that converts direct current power to alternating current power, or vice versa.

A common problem in power converters, especially when high levels of power are involved, is heating. A common measure against this is a cooling system, which the claimed converter comprises in the form of a channel formation in which cooling liquid flows.

A source of heat is also the inverter included in the power converter, especially when switching times are long. The claimed power converter addresses this issue by providing flat conductor terminals at the capacitor module which are directly connected to the terminals of the power module. In this way the inductance of the connection is lowered and the switching speed is increased resulting in a decreased heat generation.

4. Patent as maintained by the opposition division

4.1 Added subject-matter, Articles 123(2) and 76(1) EPC

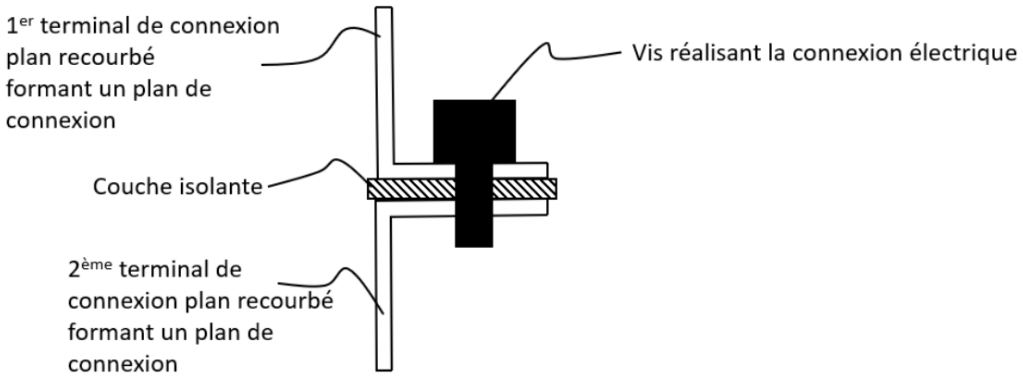
4.1.1 The point of contention was feature g) of claim 1 according to which *the terminals of the capacitor*

module (300) are directly connected with terminals of the power module (500), and more specifically the term "directly connected".

4.1.2 The parties agreed that there was no explicit disclosure of the term "directly connected" in the originally filed application or the parent application. They also agreed that Figures 32B to 32G as originally filed (corresponding to the respective figures of the patent and the parent application) disclosed that the terminals of the capacitor module (1424N, 1424P in Figure 32B) were in direct contact with the terminals of the power module (IT1N, "ITIP" [the board notes that it should read "IT1P"] in Figure 32C; see also paragraphs [0170] to [0179] of the published application, which is taken to correspond to the application as originally filed).

4.1.3 The opponent argued, however, that the term "directly connected" did not only mean "in direct contact" but also "electrically directly connected". According to the opponent, the terminals of the capacitor module could be directly electrically connected with the terminals of the power module without them being in (direct) contact with each other. The opponent submitted a figure (see page 7 of the statement of the grounds of appeal; the figure is not among the figures of the patent or those originally filed) which showed the terminals of the power module and the terminals of the capacitor module being connected with a screw. Between the terminals there is a layer of insulating material ("couche isolante").

The figure is reproduced below:



According to the opponent, this figure showed that two terminals could be in "direct electrical connection" to each other without them being in contact, i.e. without a direct physical connection. The term "directly connected" in feature g) of claim 1, which could also be understood as "directly electrically connected", comprised thus configurations of the connection of the terminals of the power module and the capacitor module which were not disclosed in the originally filed application or in the parent application.

4.1.4 The board does not find this argument of the opponent convincing. In the board's view, the qualification of the connection between the terminals as "direct" is to be understood in the same way both in relation to their physical as well as to their electrical connections.

It is undisputed that with respect to the physical connection, "directly connected" is to be understood that there is no other material/part between the two terminals so that the terminals are in physical contact to each other. In the board's view, a "direct" electrical connection should be understood in the same way, i.e. that the electrical current flows directly from one terminal to the other without flowing through

any other material/part. In the board's understanding, there has to be a distinction between an "electrical connection" and a "direct electrical connection". In the former, the skilled person would understand that two parts (e.g. the terminals of the capacitor and the power modules) are connected so that electrical current can flow from one to the other. There is no limitation as to whether there is anything else between these two parts as long as the electrical connection functions, i.e. current flows from one part to the other, irrespective of whether or not it flows through any other part between them. In contrast to that, in a "direct" electrical connection, the skilled person would understand that the current flows from one part to the other without flowing through any intermediate materials/parts.

Under this understanding, the opponent's figure reproduced above does not show a direct electrical connection since the current flows from the first terminal through the screw ("Vis") before reaching the other terminal.

4.1.5 This also applies to the disclosure of the parent application. The same Figures 32B to 32G are comprised in that application and provide the necessary basis for the contested feature.

4.1.6 The board thus agrees with the opposition division that claim 1 as maintained does not contain added subject-matter and meets the requirements of Articles 123(2) and 76(1) EPC.

4.2 Inventive step (Articles 52(1) and 56 EPC)

The opponent argued that the subject-matter of claim 1

did not involve an inventive step in view of a combination of D1 with D24 or a combination of D200 with D24. It is noted that text references to D24 and D200 below refer to their respective English translations.

D1 in combination with D24

4.2.1 It is uncontested that D1 discloses features a), b), d) and e) of claim 1 (see point V. above). It is also common ground that D1 does not disclose features h) and k).

4.2.2 A point of dispute was whether D1 disclosed a flat plate conductor according to features c), f1), f2) and g) of claim 1.

The opponent referred to Figures 13, 31B and 38A of D1 and argued that they showed a flat plate conductor like the one in claim 1. More particularly, in Figures 31B and 38A there was a visible part without any reference sign under the part referenced as "12", which would represent a flat plate conductor located between the capacitor element ("38", see Figure 13 of D1) and the channel formation ("12" in Figures 31B and 38A). Moreover, the end of this flat plate conductor was bent towards the power module forming thus the terminals of the capacitor module.

See for example Figure 38A of D1 as marked-up by the opponent in the statement of the grounds of appeal (page 12):

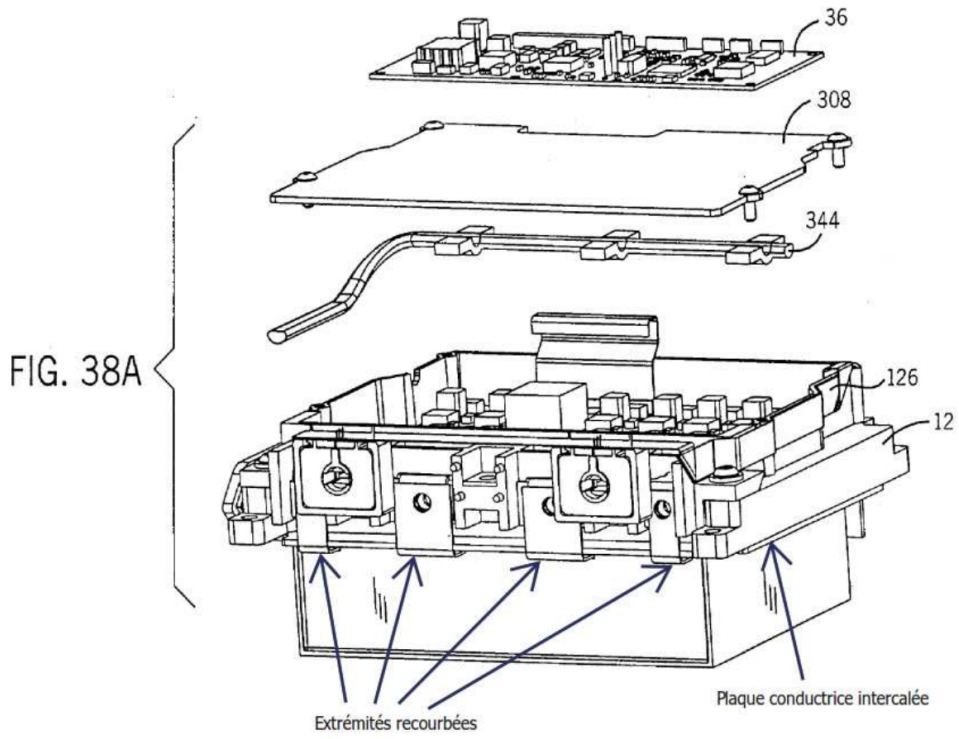


FIG. 38A

D1, Fig. 38A

According to the opponent, D1 disclosed thus features c), f1) and f2) of claim 1.

Moreover, since the terminals of the power module were connected directly to those terminals of the capacitor module, D1 disclosed also feature g) (see statement of the grounds of appeal, page 12).

4.2.3 The board does not find these arguments persuasive. There is no disclosure or suggestion that the module described in D1 comprises a flat plate conductor. On the contrary, there is explicit disclosure of a strip conductor (see Figures 19A and 19B, and paragraphs [0084] to [0086]), which is also present in Figures 13, 31B and 38A (see e.g. reference sign "134" in Figures 13 and 31B; there is no reference sign in Figure 38A, but the part is clearly visible). In the board's understanding this strip conductor serves as a

connector between the terminals of the capacitor module and those of the power module. There is thus no direct connection between the terminals of the capacitor and those of the power module since they are connected via the strip conductor (134).

The board concludes thus that D1 does not disclose features c), f1), f2) and g) of claim 1.

4.2.4 Hence, claim 1 as maintained by the opposition division differs from D1 by features c), f1), f2), g), h) and k).

4.2.5 According to the opponent, D24 discloses features h) and k). Without contesting this, and irrespective of whether it would be possible or obvious for the skilled person to combine the teachings of D1 and D24, the board notes that a combination of D1 and D24 would still miss features c), f1), f2) and g) of claim 1.

The subject-matter of claim 1 is thus not obvious to the skilled person in view of a combination of D1 and D24, contrary to the arguments of the opponent.

D200 in combination with D24

4.2.6 The opposition division considered D200 to be late filed and not *prima facie* relevant, so it did not admit it into the opposition proceedings (see point 82 of the Reasons for the impugned decision).

The opponent, although it did not contest the late filing of D200, argued that the opposition division had erred in its *prima facie* assessment because D200 was the only prior art document available which "clearly disclosed" a flat plate conductor of the capacitor

module (see reference sign "15a" in Figures 1(A) and (B)). D200 was thus at least as relevant as D1, which the opposition division considered not to disclose the flat plate conductor. D200 should therefore have been admitted into the proceedings or at least the board should now admit it into the appeal proceedings.

4.2.7 It is established case law that a board's review of first-instance discretionary decisions is rather limited. It is in fact limited to the review of whether the first-instance department exercised its discretion according to the wrong principles, without taking the right principles into account or in an arbitrary or unreasonable way (see *Case Law*, section V.A 3.4.1 b)).

In the case at hand, the opposition division used the criterion of *prima facie* relevance, which is among the established right principles for exercising discretion (see also *idem*, section IV.C 4.5.3). The opponent did not contest this, either.

However, in cases where, like in the present case, a first-instance discretionary decision is taken on a substantive ground (here the *prima facie* assessment of the disclosure of D200), the opposition division's assessment underlying that decision is open to review by the board (see *idem*, section V.A 3.4.1 c)).

4.2.8 The board notes that D200 does not disclose any power/switching module. A possible connection of a power/switching module is only implied in the description (see e.g. paragraph [0029]). There are thus no details about the way the terminals of a possible power/switching module and the capacitor module are (to be) connected. Moreover, the end of the flat plate conductor does not seem to be bent in order to form the

terminals of the capacitor module (see reference signs "14" and "15" in Figures 1(A), 1(B) and 2).

The skilled person can thus only speculate about how a possible power/switching module would be connected to the capacitor module. Under these circumstances, the skilled person would need to use hindsight in order to formulate a technical problem related to reducing the inductance in the connection between the capacitor and a (not disclosed) power/switching module so that they can take D24 into consideration and arrive at a possible combination.

In addition, there is no disclosure about any channel formation in the cooler (21) (feature d)) in D200. The opponent argued that it would have been implicit for the skilled person that the cooler (21) in D200 would comprise a channel formation for the cooling medium to flow. The board, however, notes that there is neither any disclosure nor any suggestion of any inlet or outlet for the cooling medium in the cooler (21). Even if it were to be accepted that channel formations as the one of the claimed power converter were part of the skilled person's common general knowledge at the patent's priority date, the board's opinion is that other forms of coolers were also generally known so that cooler (21) does not necessarily comprise a channel formation. In any case, there is no direct and unambiguous disclosure of such a channel formation in D200. Hence, compared to D1, D200 discloses even fewer features of claim 1.

The board's conclusion is thus that D200 is not *prima facie* relevant and the opposition division was correct in not admitting it into the opposition proceedings. Moreover, the board does not see any particular

circumstances of the appeal proceedings that would justify its admittance at this stage. The opponent did not identify any such circumstances, either. D200 is therefore not admitted into the appeal proceedings (Article 12(6), first sentence, RPBA).

4.2.9 Even if, for the sake of argument, D200 were to be considered, in the absence of any details about a power/switching module and its possible connection with the capacitor module, the board cannot see any motivation for the skilled person, when starting from D200, to take D24 into consideration. As mentioned previously, the skilled person can only speculate about the possible connection between the terminals of the capacitor module and those of a power/switching module and it does not seem apparent that the problem of high inductance would necessarily arise. The skilled person would need hindsight in order to consider D24.

Moreover, it is not apparent how the teaching of D24 could be combined with the one of D200. A comparison of the terminals 14 and 15 in Figures 1(A) and (B) of D200 and the respective terminals 24, 25, 14, and 15 in Figures 1 and 2 of D24 points rather to the conclusion that their respective structures are incompatible, or at least that the skilled person would have to carry out further modifications which would go beyond what could be considered obvious in the present context.

4.2.10 The board's opinion is therefore that the subject-matter of claim 1 would not be obvious to the skilled person in view of a possible combination of D200 with D24, even if D200 were to be admitted into the proceedings.

4.2.11 The board therefore agrees with the opposition division that the subject-matter of claim 1 as maintained involves an inventive step (Articles 52(1) and 56 EPC).

5. First auxiliary request of the opponent

5.1 The opponent requested that two additional features be added to claim 1 as maintained by the opposition division because they were inextricably linked to the features related to the direct connection between the terminals of the power and the capacitor modules. More specifically, the opponent submitted that a feature related to the use of screws for connecting the terminals and a feature related to a connection "plane-to-plane" of the bent terminals in order to implement an electrical connection should be added in claim 1 (see point 4 on page 17 of the statement of the grounds of appeal).

5.2 The board notes that, according to Article 113(2) EPC, it is the patent proprietor who determines the text of the submitted requests. It is therefore neither for the opponent nor for the board to dictate which features should be included in the claims.

The board rather understands this "request" of the opponent as an objection that claim 1 as maintained contains an intermediate generalisation which does not have any basis in the application as originally filed (Article 123(2) EPC) or the parent application (Article 76(1) EPC).

5.3 Regarding the screws, the board agrees with the proprietor and the opposition division (see points 64 and 68 of the Reasons for the decision under appeal) that they are not inextricably linked to features g)

to k) of claim 1. Firstly, there are no screws in Figures 32B to 32G which show the connection between the terminals. According to the description the terminals are fixed to each other "by means of a screw or any other appropriate fixture" (see e.g. paragraphs [126] and [127] of the parent application corresponding to paragraphs [0148] and [0149] of the application as published). Hence, the way the terminals are fixed to each other is left open. Secondly, the screws do not seem to play any role in the problem solved by the invention, which is to reduce the inductance in the connection between the two modules. Whether the terminals are fixed to each other by screws or by any other fixing means (fixtures) is irrelevant in that respect.

5.4 Regarding the "plane-to-plane" connection, the board agrees with the proprietor that there is no explicit disclosure of such a feature in the application as originally filed (see page 5 of the proprietor's reply to the appeal, second to fourth paragraphs).

5.5 The board's conclusion is, therefore, that there is no unallowable intermediate generalisation in claim 1 of the patent as maintained by the opposition division. The opponent's "first auxiliary request" is therefore rejected.

6. Second auxiliary request of the opponent

The opponent's second auxiliary request is to maintain the patent as maintained by the opposition division (see point 5 on page 18 of the statement of the grounds of the appeal). This request corresponds to the proprietor's main request that the appeal be rejected/ dismissed. Since it makes no sense for an appellant to

request that its own appeal be dismissed, the board considers this request to be irrelevant.

7. In view of the considerations in points 4. and 5. above, the appeal is to be dismissed.

8. Since the board grants the proprietor's main request to dismiss the appeal, it does not need to consider the proprietor's auxiliary request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Sánchez Chiquero T. Häusser

Decision electronically authenticated