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Datasheet for the decision of 21 November 2025

Case Number: T 0821/24 - 3.4.02

Application Number: 17202372.3

Publication Number: 3487060

IPC: H02M7/5387

Language of the proceedings: EN

Title of invention:
Method and control system for controlling a voltage source converter using power-synchronisation control

Applicant:
ABB Schweiz AG

Relevant legal provisions:
EPC Art. 84, 111(1)

Keyword:
Claims - essential features missing: main request (yes), fourth auxiliary request (no)
Remittal to the department of first instance on the basis of the fourth auxiliary request (yes)

Decisions cited:
T 1055/92, T 0630/93, T 0133/85

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Case Number: T 0821/24 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 21 November 2025

Appellant: (Applicant)	ABB Schweiz AG Bruggerstrasse 66 5400 Baden (CH)
Representative:	Kolster Oy Ab (Salmisaarenaukio 1) P.O. Box 204 00181 Helsinki (FI)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 January 2024 refusing European patent application No. 17202372.3 pursuant to Article 97(2) EPC**

Composition of the Board:

Chairman	H. Bronold
Members:	C.D. Vassoille
	M. Blasi

Summary of Facts and Submissions

I. The appeal of the applicant (appellant) lies from the decision of the examining division refusing European patent application no. 17 202 372.3.

II. In the contested decision the examining division concluded that the main request did not meet the requirements of Article 84 EPC, and that this also applied to the then first, second and third auxiliary requests.

III. In the statement of grounds of appeal, the appellant requested that the decision of the examining division be set aside and that a European patent be granted on the basis of claims 1 to 14 of the main request filed on 21 April 2022, or, in the alternative, that the case be remitted to the examining division for further prosecution. As further auxiliary requests, grant of a patent, or, in the alternative, remittal to the examining division, was requested on the basis of the claims of the second, third or first auxiliary requests, in this order. Oral proceedings were also requested.

IV. In a communication under Article 15(1) RPBA, annexed to the summons to oral proceedings, the Board informed the appellant that claim 1 of the main request did not include all essential features necessary to achieve the technical effect disclosed in the application, in particular the direct proportional relationship between the active power producing current component and the active power reference.

V. Together with the letter dated 22 August 2025, the appellant submitted the set of claims of a fourth auxiliary request, combining the subject-matter of dependent claims 2 and 3 into independent claim 1 of the main request, and to be considered after the main request. By letter dated 10 November 2025 the appellant withdrew the request for oral proceedings and filed an amended description of the fourth auxiliary request.

VI. The appellant requested that the decision under appeal be set aside and that, on the basis of the claims of one of the following requests, in the following order:
- main request as filed on 21 April 2022,
- fourth auxiliary request as filed with letter dated 22 August 2025
- second and third auxiliary requests as filed on 5 December 2023
- first auxiliary request as filed on 21 April 2021,

a patent be granted or, alternatively, the case be remitted to the examining division for further prosecution.

VII. Claim 1 of the main request has the following wording:

"A method of controlling a grid-connected voltage source converter, VSC (7), using power-synchronisation control, wherein the method comprises:

determining a VSC current vector (i) in the dq-frame based on a VSC phase angle (θ) which is determined based on an integration of a power control error,

determining an active power producing current component (i_d^{ref}) of a reference current vector (i_{ref}) in the dq-frame based on an active power reference (P_{ref}) for the VSC (7),

determining the reference current vector (i_{ref}) based on the active power producing current component (I_d^{ref}),

determining a damping component based on a virtual damping resistance (R_a), the reference current vector (i_{ref}) and the VSC current vector (i),

determining a voltage vector (v) based on a VSC voltage magnitude (V) and the damping component, and

controlling the VSC (7) based on the voltage vector (v)."

VIII. Compared to claim 1 of the main request, claim 1 of the fourth auxiliary request comprises the following additional text indicated by underlining:

"[...] determining an active power producing current component (i_d^{ref}) of a reference current vector (i_{ref}) in the dq-frame based on an active power reference (P_{ref}) for the VSC (7), wherein the active power producing current component (i_d^{ref}) is determined based on setting it proportional to the active power reference (P_{ref}), wherein the active power producing current component (i_d^{ref}) is determined by

$$i_d^{ref} = \frac{P_{ref}}{\kappa V}$$

where (P_{ref}) is the active power reference for the VSC (7), κ is a space-vector scaling constant and V is the VSC voltage magnitude (V), [...]"

IX. Corresponding amendments are present in the independent system claim 7 of the fourth auxiliary request. The adapted description filed with letter of 10 November

2025 reflects the amendments to claims 1 and 7 of the fourth auxiliary request.

X. Since the appellant withdrew the request for oral proceedings, the decision is issued in writing.

XI. The arguments of the appellant are dealt with in the reasons for the present decision.

Reasons for the Decision

1. Main request – Clarity and support by the description (Article 84 EPC)

1.1 Claim 1 of the main request does not meet the requirements of Article 84 EPC.

1.2 The appellant submitted that the actual contribution of the present invention to the prior art was the general inventive idea of determining the active power producing current component based on the active power reference (as defined in claim 1 of the main request), thereby providing a robust closed-loop system for strong grids. In the appellant's view, the detailed implementation of this general idea may vary and the skilled person would be able to derive various practical embodiments within the scope of the independent claims from the application as a whole and from common general knowledge. In support, the appellant cited decisions T 1055/92, T 630/93 and T 133/85.

1.3 The Board is not convinced by these arguments. Throughout the proceedings, the appellant has not disputed that the invention's improvement over traditional power-synchronisation control is achieved by pole–zero cancellation, which reduces the active-power closed-loop dynamics from a third-order system to a first-order system (see description as originally filed, page 2, lines 17 to 24). The appellant expressly confirmed this view in the statement of grounds of appeal (point 25).

The Board agrees with the appellant that pole-zero cancellation is the mechanism underlying the invention that achieves a robust closed-loop system. However, this is only disclosed to be achieved under the specific conditions as disclosed on page 3, lines 4 to 13 and page 5, lines 7 to 14 of the description as filed, and reflected in claims 2 and 3 of the application as filed (i.e. setting the d-axis current reference proportional to the active power reference according to a defined direct proportional scaling, $i_d^{ref} = P_{ref}/(\kappa \cdot V)$). No alternative means to achieve the pole-zero cancellation, other than the disclosed direct proportional relationship $i_d^{ref} = P_{ref}/(\kappa \cdot V)$ with correct scaling, can be derived from the disclosure of the application as originally filed.

1.4 As the Board had already noted in its communication under Article 15(1) RPBA, claim 1 of the main request merely states, in general terms, "determining an active power producing current component (i_d^{ref}) of a reference current vector (i_{ref}) in the dq-frame based on an active power reference (P_{ref})". The wording "based on" covers non-proportional, indirect proportional or dynamic dependencies on P_{ref} (e.g. saturation, ramping, set-point shaping, and composite terms), which do not necessarily maintain the instantaneous proportionality $i_d^{ref} = P_{ref}/(\kappa \cdot V)$ and therefore do not achieve the asserted pole-zero cancellation across the whole breadth of claim 1. Consequently, claim 1 of the main request covers embodiments that do not achieve the asserted technical effect (pole-zero cancellation and the resulting robust first-order behaviour).

Contrary to the appellant's argument, this finding is not changed by the fact that claim 1 explicitly claims a method using power-synchronisation control (PSC). PSC

identifies a synchronisation strategy via control of the active power, in particular obtaining the VSC phase angle by integrating the active power error, instead of using a phase-locked loop (PLL). However, this does not in any way imply how the active power producing current component i_d^{ref} is derived based on P_{ref} and the appellant did not submit any specific explanations in this respect.

The boundaries of claim 1 are therefore unclear, since an essential feature necessary to solve the stated technical problem is omitted, such that the requirements of Article 84 EPC are not met. Rather, the skilled person is left to guess which of the many possibilities for "basing" i_d^{ref} on P_{ref} would actually achieve the desired technical effect, which also indicates a lack of support by the description for the full breadth of claim 1 (Article 84 EPC, second sentence, EPC).

1.5 As regards decisions T 1055/92, T 133/85 and T 630/93, cited by the appellant, the Board does not see a contradiction with the principles applied in the case at hand.

In decision T 1055/92 the competent board essentially found that the primary function of a patent claim is to set out the scope of protection sought for the invention and that it is therefore not always necessary for a claim to describe the technical features or steps in every detail. The decision does not, however, permit omission of features that are essential to achieving the technical effect with which the application is concerned. On the contrary, decision T 1055/92 in point 5 of the reasons states that the claim must contain the features necessary to solve the technical problem in

question. The Board therefore does not consider that the cited decision advances any view that conflicts with the present decision.

1.6 The same applies to decision T 630/93. The competent board accepted functional/general wording when it provides a clear delimitation and the description equips the skilled person to carry out the invention over the entire claimed range. It does not dispense with the need to include limitations that are causally linked to the technical effect with which the application is concerned. On the contrary, point 3.2 of the reasons states that features that are necessary to solve the technical problem concerned must be present in the claim. Consequently, the decision does not contain anything that contradicts the present decision.

1.7 Finally, the appellant referred to decision T 133/85 in the statement of grounds of appeal, where the competent board found that a claim which does not include a feature which is described in the application (on the proper interpretation of the description) as an essential feature of the invention, and which is therefore inconsistent with the description, is not supported by the description for the purpose of Article 84 EPC (headnote 1).

1.8 The Board acknowledges that generalisation in claim drafting is permissible. However, even in a generalised form, an independent claim must still include all features essential to solving the (subjective) technical problem addressed by the application and to achieving the technical effect relied upon, across the whole breadth of the claim. If the claim, by virtue of its general wording, encompasses embodiments that do not achieve that effect or solve the problem, its scope

is not clear. In line with established case law of the Boards of Appeal, the claim does not meet the requirements of Article 84 EPC (see also Case Law of the Boards of Appeal, 11th edition 2025, II.A.3.3).

1.9 Contrary to the appellant's view, this approach does not run counter to the accepted generalisation provisions in the EPO. The overarching principle is that the applicant is entitled to protection only for the invention disclosed. "The invention", however, is necessarily linked to the solution of a technical problem with reference to the pertinent background art as addressed in or at least understandable from the application, as required by Rule 42(1)(c) EPC. Accordingly, claim generalisation cannot extend to embodiments that do not solve that problem or achieve the stated technical effect, since such embodiments do not belong to "the invention" and thus cannot be the subject-matter of a claim. This basic principle sets the permissible limits for generalisation.

For the sake of completeness, the Board notes that a claim must also be clear in itself. If the skilled person must rely on the description merely to work out, within a broadly generalised claim, which features actually achieve the technical problem with which the application is concerned, this indicates a lack of clarity under Article 84 EPC.

1.10 In the present case, it is clear from the application that protection is sought for a method and control system for controlling a grid-connected voltage source converter using power-synchronisation control, which are robust when used with "strong grids". Therefore, it is evident that the scope of protection can only encompass embodiments that achieve this objective. All

other embodiments not covered by this go beyond what the appellant can claim protection for.

As explained above, claim 1 of the main request covers embodiments for which, in the Board's view, the objective of the invention as described in the application is not fulfilled.

1.11 In the light of the above considerations, the Board arrived at the conclusion that claim 1 of the main request does not meet the requirements of Article 84 EPC.

1.12 Since the main request is not allowable, the request for remittal to the examining division for further prosecution on the basis of the main request cannot be granted either.

2. Fourth auxiliary request - Clarity (Article 84 EPC)

2.1 Claim 1 of the fourth auxiliary request incorporates the additional features of dependent claims 2 and 3 of the main request. Corresponding amendments have been made to independent claim 7.

2.2 Consequently, claims 1 and 7 of the fourth auxiliary request define the specific conditions disclosed on page 3, lines 4 to 13, and page 5, lines 7 to 14 of the description as filed. These conditions, reflected in claims 2 and 3 of the application as originally filed, include setting the d-axis current reference proportional to the active power reference according to a defined scaling: $i_d^{ref} = P_{ref}/(\kappa \cdot V)$. Reference is made to the reasons set out with respect to the main request above.

2.3 The Board is thus satisfied that claims 1 and 7 of the fourth auxiliary request contain all essential features necessary to solve the technical problem underlying the invention. Although the application as originally filed includes further implementation details, their omission from claims 1 and 7 does not render the claims unsupported or unclear. Nor is it apparent to the Board that these features are required to address any lack of clarity of the claims within the meaning of Article 84 EPC.

2.4 The Board therefore concludes that the claims of the fourth auxiliary request meet the requirements of Article 84 EPC.

3. Request for remittal

Under Article 111(1) EPC, the Board may exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution. Considering that the contested decision was based exclusively on Article 84 EPC as the sole ground for refusing the application, the Board finds it appropriate to remit the case as it is the primary object of the appeal proceedings to review the decision under appeal in a judicial manner. Consequently, the case is remitted to the examining division for further prosecution on the basis of the claims of the fourth auxiliary request. The considerations of the examining division shall include any adaptation of the description, if necessary.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution.

The Registrar: The Chairman:

L. Gabor H. Bronold

Decision electronically authenticated