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Datasheet for the decision of 10 January 2013

Case Number: T 1226/08 - 3.4.01

Application Number: 99203602.0

Publication Number: 1069436

IPC: G01R 15/16

Language of the proceedings: EN

Title of invention:
Directional high voltage detector

Patentee:
Jomitek ApS

Opponent:
NESA A/S

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 83

Keyword:
"Sufficiency of disclosure (no)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1226/08 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 10 January 2013

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 13 May 2008 revoking European patent No. 1069436 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chairman: G. Assi
Members: P. Fontenay
A. Pignatelli

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division to revoke European patent No. EP-B-1 069 436. The decision was announced during the oral proceedings before the opposition division and dispatched on 13 May 2008.

II. In its decision, the opposition division held that the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art (Articles 100(b) and 83 EPC 1973). Particular reference was made to paragraph [0049] of the patent specification relative to a preferred embodiment according to which the "*relative direction of the energy is determined by a simple mathematical multiplication of the polarity of the current and the voltage at a given point in time between the zero crossings*". According to the opposition division such a multiplication of the polarities covered four different situations corresponding to the two different polarities, (+) or (-), for both voltage and current, thus leading to two possible results. The fact that this result was directly indicative of the direction of flow of the energy was considered to be part of the common general knowledge in the field of the invention. Reference was made, in this respect, to document D2 (Power System Protection, Vol. 2, second revised edition of 1995, published by the Institution of Electrical Engineers, London (GB), pages 46-58) relative to an excerpt of a text book in the field.

However, the opposition division held that neither the main request nor any of the auxiliary requests then on

file referred to inventive subject-matter within the meaning of Articles 100(a) and 56 EPC 1973 when considering the teaching of document D1 (US-A-4 287 547) as closest prior art together with common general knowledge. The patent in suit was thus revoked.

III. The appellant (patentee) filed an appeal against said decision by a letter received on 1 July 2008. The prescribed appeal fee was paid on the same day.

In the statement setting out the grounds of appeal, filed on 23 September 2008, the appellant requested, as a main request, that the decision of the opposition division be set aside and the patent be maintained in an unamended form or, alternatively, that the patent be maintained in amended form on the basis of one of various sets of claims according to auxiliary requests 1 to 6 annexed to the statement of grounds. The main request as well as the six auxiliary requests filed with the statement of grounds correspond to the requests underlying the decision in suit.

IV. In a facsimile dated 12 January 2009, the respondent (opponent) requested that the appeal be rejected. Concerning the appellant's main request, the respondent reiterated its view that the description of the granted patent lacked the technical information which would have enabled a person skilled in the art to implement the invention (Article 83 EPC 1973). Concerning the appellant's auxiliary requests, the respondent raised objections under Articles 52(2)(d) and 123(2) EPC as well as Articles 84, 54 and 56 EPC 1973.

V. Both parties requested that oral proceedings be held in the case that the Board did not intend to grant their respective main requests.

VI. On 8 November 2012, the Board issued a communication pursuant to Article 15(1) Rules of Procedure of the Boards of Appeal (RPBA), expressing its provisional opinion with regard to the requests then on file.

Concerning, more particularly, the issue of sufficiency of disclosure under Article 83 EPC 1973, the Board expressed its doubts as to whether this requirement was met.

In its communication, the Board further commented on the other objections raised by the respondent.

VII. The appellant and the respondent reacted to the comments of the Board by letters dated 10 December 2012.

Concerning the issue of sufficiency of disclosure, the appellant stressed that there was no requirement in the description of the granted patent for a measurement point corresponding to the top of the voltage sine. Rather, it was "*necessary to determine the respective polarity of the current and the voltage at a given point in time between two successive zero-crossings of the voltage*" (underlined by the appellant). It was further noted that it was the determination of successive zero-crossings of the voltage curve which permitted to determine a point (the same for both the voltage and current) positioned between said zero-crossings, where the polarities of both the voltage and current were determined. The determination of the

energy direction flow was thus directly derivable from the method described in paragraph [0049] of the patent in suit.

VIII. The oral proceedings before the Board were held in presence of the sole respondent's representatives on 10 January 2013. The appellant had previously informed the Board, in a letter dated 19 December 2012, that it neither intended to attend the oral proceedings nor to be represented.

IX. Independent claims 1 and 12 of the appellant's main request read as follows:

"*1. Directional high-voltage detector (5) for a high-voltage conductor (10) comprising*
• at least one voltage-measuring circuit for measuring voltage on said conductor (10) by means of at least one capacitive detector (11),
• at least one current-measuring circuit for measuring current in said conductor (10) by means of at least one magnetic field detector (14, 15, 16),
• and means for deriving the energy flow in the conductor (10) on the basis of measurements made by said voltage-measuring circuit and said current-measuring circuit,
characterised in that
said means determine the energy flow direction on the basis of the respective polarity of the current and voltage at a given point in time between two successive zero-crossings of the voltage."

"12. Method of determining the direction of the energy flow in a high-voltage conductor wherein at least one

voltage-measuring circuit measures voltage on said conductor by means of at least one capacitive detector, at least one current-measuring circuit measures current in said conductor by means of a magnetic field detector and a calculation circuit calculating a directional value derived from the measured voltage and current on the basis of the respective polarity of the current and the voltage at a given point in time between two successive zero-crossings of the voltage."

X. Claim 1 of the appellant's first auxiliary request differs from claim 1 of the main request in that it includes at the end of the claim the following additional limitation: "*said means generating information concerning the energy flow direction*". A similar amendment was made in independent claim 12 of the first auxiliary request with regard to claim 12 of the main request.

Claim 1 of the appellant's second auxiliary request differs from claim 1 of the main request in that the following limitation was added at the end of claim 1: "*said means generating information concerning the energy flow direction in said high-voltage conductor of a high voltage distribution or transmission network*". A corresponding amendment was made in independent claim 12 of the second auxiliary request with regard to claim 12 of the main request.

Independent claims 1 and 12 of the appellant's third auxiliary request differ from independent claims 1 and 12 of the main request in that the expressions "*by use of sample technique*" and "*by using sample technique*" have been added at the end of the claims, respectively.

Claim 1 of the appellant's fourth auxiliary request differs from claim 1 of the main request in that the designation of the claimed apparatus "*Directional high-voltage detector (5) for a high— voltage conductor (10)"* has been amended to *"Directional high-voltage detector (5) for indicating the direction of a fault in a high— voltage conductor (10)". Independent claim 12 of the fourth* auxiliary request was amended with regard to claim 12 of the main request by adding the expression "*for indicating the direction of a fault by said value*" at the end of the claim.

Claim 1 of the appellant's fifth auxiliary request differs from claim 1 of the main request in that the statement "*said means determine zero crossings of the voltage"* has been added immediately following the mention *"characterised in that".* Similarly, independent claim 12 of the fifth auxiliary request has been amended with regard to claim 12 of the main request by including, in the body of the claim, the additional limitation: "*where zero-crossings of the voltage are determined*".

Claim 1 of the appellant's sixth auxiliary request differs from claim 1 of the main request in that the following limitation has been added as first characterising feature: *"said means determine zero crossings of the voltage by use of sample technique".* Independent claim 12 of the sixth auxiliary request is, in essence, identical to independent claim 12 of the main request.

XI. In this decision, reference is made to the provisions of the EPC 2000, which entered into force as of 13 December 2007, unless the former provisions of the EPC 1973 still apply to pending applications, in which case the evocation of the Article or Rule is followed by the indication "1973".

Reasons for the Decision

1. The appeal meets the requirements of Articles 106 to 108 EPC and Rule 99 EPC. It is thus admissible.

2. *Sufficiency of disclosure (Article 83 EPC 1973)*

2.1 The question to be considered concerns whether the present patent discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. In particular, it has to be determined whether the skilled person would be able to derive the direction of the energy flow (main request and auxiliary requests 1-3, 5 and 6) or the direction of a fault (auxiliary request 4) from a measurement carried out at any given point between two consecutive zero crossings of the voltage.

Except when explicitly stated otherwise, the following reasoning applies to the independent claims of all requests.

2.2 The curves illustrative of the voltage and current over time in a distribution or transmission network according to the present invention are, normally, phase

shifted waves which, with appropriate selection of the time origin, may be expressed as follows:

$$U(t) = U_0.\cos(\omega t) \quad \text{and}$$
$$I(t) = I_0.\cos(\omega t+\theta), \text{ with}$$

U_0 and I_0 defining the peak voltage and peak current,
θ the phase shift, and
ω the angular frequency characteristic of said network (cf. Figure 5 of the granted patent).

It is known that the phase shift depends on the total load present in the network at any given time, which load may be resistive, capacitive or inductive.

In the decision under appeal (Reasons, point 1.1), the examining division relied on paragraph [0049] of the granted patent according to which "*the relative direction of the energy is determined by simple mathematical multiplication of the polarity of the current and the voltage at a given point in time between the zero crossings*" of the voltage. Apparently, the instantaneous energy flow

$$P(t) = U(t).I(t)$$

is meant here, rather than the integral

$$1/\Delta T.\int P(t)dt$$

over an integer number of periods ΔT, indicative of the average energy flow. It is known that this later parameter is the parameter having a concrete physical meaning, that is, in the present circumstances, the parameter indicative of the direction of the users or fault toward which the energy is flowing.

In this respect, the Board notes that, as a consequence of the phase shift between voltage and current, the product P(t) would provide a positive or a negative result depending on which point in time is actually selected between two consecutive zero crossings of the voltage. The mere selection of a point between the said zero crossings would therefore normally be insufficient to provide an indication as to the actual (average) energy flow at the detector location. In effect, a measurement according to the claimed invention, relying solely on the identification of the voltage and current polarities at a given point, would only be valid if it provided the same results for all the points between two successive zero crossings of the voltage curve. This is not the case in normal working states where the load is not entirely resistive.

2.3 The examining division's argumentation, in this respect, is thus not convincing.

The Board does not contest that the selection of the claimed "*given point*" at the top (or bottom) of the voltage wave would permit to determine the sought information (in this regard, cf. D2, page 48, first paragraph), as submitted by the applicant during the examination procedure.

It is, however, observed that this interpretation of the claimed "*given point*" is not supported by the disclosure of the invention. Indeed, the original claims 13, 19 and 21 as well as the description of the granted patent (cf. paragraphs [0048] and [0049]) consistently refer to the essential role of the polarity of the current and voltage, no emphasis at all

being put on the need to select a specific point, let alone the need of choosing the top (or bottom) of the voltage. Rather, by underlining the importance of accurately determining the zero crossings of the voltage (cf. paragraphs [0051] to [0056] and Figure 6 of the granted patent), the appellant submitted that an essential feature of the invention was to identify a half-period of the voltage as defined by two successive zero crossings. Such identification, however, would only be meaningful, in the Board's view, if the polarity alone was essential.

In its letter of 10 December 2010 (cf. point II.1), the appellant confirmed this understanding. It had never been intended to limit the interpretation of the notion of the claimed "*given point*" to the top (or bottom) of the voltage. What really mattered was to detect the respective polarity of the current and the voltage at a given point in time (the same for the voltage and current) between two successive zero crossings of the voltage, any such point being suitable.

2.4 The limitation introduced in claims 1 and 12 of the appellant's fourth auxiliary request according to which the claimed detector and method are "*for indicating the direction of a fault*" does not affect the above findings. Even if it could be argued, in favour of the appellant, that an essentially resistive load could be indicative of a fault (shortcut) in the network, the granted patent fails to indicate how a measurement based on measured polarities at a given point could indeed permit to distinguish between situations with or without a phase shift.

2.5 The Board also notes, in view of the foregoing, that the present invention would achieve the aimed result by choosing the time point corresponding to the top (or bottom) of the voltage signal. The scope of the claims, however, extends to a complete range of suitable points between two consecutive zero crossings of the voltage. Success in only a point of a claimed range is not sufficient to conclude that the invention can be carried out in the whole range claimed.

2.6 In conclusion, the requirement of Article 83 EPC 1973 prejudices the maintenance of the patent in the form according to the appellant's main request and six auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

R. Schumacher G. Assi