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**Datasheet for the decision
of 5 May 2025**

Case Number: T 0805/24 - 3.4.02

Application Number: 20176628.4

Publication Number: 3783355

IPC: G01N27/41, G01N27/417

Language of the proceedings: EN

Title of invention:

Method and sensor assembly for estimating gas partial pressure

Applicant:

Siemens Aktiengesellschaft

Relevant legal provisions:

EPC Art. 83, 111(1)
EPC R. 111(2), 103(1)(a)
RPBA Art. 11

Keyword:

Sufficiency of disclosure - main request (yes)
Appealed decision - substantial procedural violation (yes)
Reimbursement of appeal fee - (yes)
Remittal - special reasons for remitting the case (yes)



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Case Number: T 0805/24 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 5 May 2025

Appellant: Siemens Aktiengesellschaft
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 11 December
2023 refusing European patent application No.
20176628.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: C.D. Vassoille
W. Ungler

Summary of Facts and Submissions

- I. The appeal of the applicant lies against the decision of the examining division refusing European patent application no. 20176628.4.
- II. The examining division concluded in the decision under appeal that the main request did not meet the requirement of Article 83 EPC and that this also applied to the then auxiliary requests 1 to 30.
- III. In the statement setting out the grounds of appeal, the applicant requested the following:
- The decision under appeal be set aside due to a substantial procedural violation and the case be remitted to the examining division. Additionally, the applicant requested reimbursement of the appeal fee under Rule 103(1)(a) EPC.
 - The case be remitted to the examining division for further examination of clarity and patentability based on the main request or any of the auxiliary requests 1 to 51, all filed with the statement of grounds of appeal, once the issue of sufficiency of disclosure had been resolved.
 - If the case was not remitted, the grant of a patent based on the main request or, alternatively, on any of the auxiliary requests 1 to 51, all filed with the statement of grounds of appeal.
 - Oral proceedings were requested if the Board intended to maintain the decision under appeal.

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

"A method of estimating a pressure outside a gas sensor (1), the gas sensor (1) comprising a reference terminal (2) and a pump and sense terminal (3), the method comprises the steps of:

applying a first electric current between the reference terminal (2) and the pump and sense terminal (3) for a first amount of time;

after application of the first electric current, recording a first feedback voltage signal at the pump and sense terminal (3);

applying a second electric current between the reference terminal (2) and the pump and sense terminal (3) for a second amount of time;

after application of the second electric current, recording a second feedback voltage signal at the pump and sense terminal (3);

producing a first measured feedback voltage from the first feedback voltage signal and a second measured feedback voltage from the second feedback voltage signal;

producing an offset voltage by determining a difference between the second measured feedback voltage and the first measured feedback voltage;

producing an error signal by determining a difference between a target offset voltage and the produced offset voltage;

adjusting at least one process variable of a set of process variables, the process variable being selected from:

- the first amount of time,
- the second amount of time,
- the first electric current,
- the second electric current,
- the target offset voltage,

as a function of the error signal to produce a new set of process variables;

using the new set of process variables to apply the first electric current between the reference terminal (2) and the pump and sense terminal (3) for the first amount of time;

after application of the first electric current of the new set of process variables, recording the first feedback voltage signal at the pump and sense terminal (3);

using the new set of process variables to apply the second electric current between the reference terminal (2) and the pump and sense terminal (3) for the second amount of time;

after application of the second electric current of the new set of process variables, recording the second feedback voltage signal at the pump and sense terminal (3);

producing the first measured feedback voltage from the first feedback voltage signal and the second measured feedback voltage from the second feedback voltage signal;

producing the offset voltage by determining the difference between the second measured feedback voltage and the first measured feedback voltage;

iteratively producing error signals, new sets of process variables, first and second feedback voltage signals, first and second measured feedback voltages, and offset voltages until the offset voltage is within a predetermined margin of the target offset voltage;

and estimating the pressure outside the gas sensor (1) as an exponential function of the first measured feedback voltage and as an exponential function of the second measured feedback voltage." (emphasis added by the Board)

- V. The applicant's arguments, in so far as they are relevant to the present decision, are referred to in the reasons for the present decision.

Reasons for the Decision

1. Decision in written proceedings

1.1 The statement of grounds of appeal included a conditional request under Article 116(1) EPC, whereby oral proceedings were requested only if the Board intended to maintain the decision under appeal (see point III. above).

1.2 As the condition set by the applicant did not occur, the present decision could be issued in written proceedings. The right to be heard under Article 113(1) EPC has been fully respected, as all arguments and submissions made by the applicant have been duly considered in the decision-making process.

2. Main request - Sufficiency of disclosure (Article 83 EPC)

2.1 The application discloses the invention according to claim 1 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

2.2 The Board is satisfied that a person skilled in the art would have had no difficulty in selecting an appropriate value for the target offset voltage on the basis of the information in the description in combination with common general knowledge.

2.3 The examining division found that it was not apparent to the skilled person from the application which result was desired to be achieved by setting a particular target offset voltage (see in particular the list of possible criteria a.) to e.) on page 17 of the decision

under appeal). The skilled person was therefore "left with a lack of guidance and crucial information which would allow him to enable the invention without working it out himself".

2.4 However, the Board agrees with the applicant's argument that the person skilled in the art would have recognised that the purpose of the target offset voltage is to drive the inside pressure P_{inside} stably to a suitable value which enables the outside pressure $P_{outside}$ to be determined for a particular application, e.g. under atmospheric conditions.

2.5 In particular, the Board is convinced that the skilled person working in the technical field of the invention would have understood that the target offset voltage causes a certain inside pressure P_{inside} , which is also clear from the description on page 6, lines 16 to 17 of the application as filed ("controlling P_{inside} is equivalent to controlling the offset voltage,...") and the corresponding equation preceding that sentence, which is as follows:

$$P_{inside} = P_{outside} \cdot e^{\frac{-V_{N2} \cdot z \cdot F}{R \cdot T}} = \frac{R \cdot T \int_{t_1}^{t_2} i_{pump}(t) dt}{F \cdot z \cdot V_{chamber}} \cdot \frac{1}{\left(1 - e^{\left(\frac{(V_{N2} - V_{N1}) \cdot z \cdot F}{R \cdot T}\right)}\right)}$$

The aim of using a target offset voltage in the context of claim 1 is thus, as convincingly argued by the applicant, to move the inside pressure in the sealed chamber to a certain value.

The target offset voltage would be selected by a person skilled in the art on the basis of normal considerations, in particular in view of the objective that the sealed chamber must withstand the inside

pressure and that leakage is to be reduced, which can be achieved if the inside pressure is sufficiently close to the outside pressure, see in particular page 3, lines 1 to 3 of the application as filed: "Small differences in pressures inside and outside the sealed chamber further reduce leakages". It appears plausible to the Board that mechanical stress and potential damage to the sensor can thereby be prevented and measurement accuracy increased.

2.6 A person skilled in the art would have used the above reproduced equation from page 6 of the application as filed without undue burden to determine which target offset voltage for $V_{N,2} - V_{N,1}$ is suitable for a particular application. In particular, the person skilled in the art would have been able to solve this equation for different offset voltages and to determine a suitable target offset voltage for the desired application to thereby determine a desired inside pressure P_{inside} . The Board is also convinced that it would have been possible for the skilled person to solve the equation on the basis of the information on constants and the ranges of values of the required parameters given in the description in combination with common general knowledge. This was convincingly demonstrated by the applicant in the statement of grounds of appeal for an application involving atmospheric conditions, e.g. for vehicles or flue gas sensors (see in particular pages 12 and 13 of the statement of grounds of appeal).

2.7 It is further to be noted that according to the established case law of the boards of appeal, the requirement of sufficiency of disclosure relates to the invention defined in the claims, and in particular to the combination of structural and functional features

of the claimed invention, and there is no legal basis for extending such a requirement also to encompass other technical aspects possibly associated with the invention (such as results to be achieved or technical effects) not required by the claimed subject-matter (see Case Law of the Boards of Appeal, 10th edition 2022, II.C.3.2).

- 2.8 Overall, it is therefore irrelevant for the question of sufficiency of disclosure under Article 83 EPC in the present case which technical effect is actually solved by the iterations using a certain target offset voltage (e.g. maintaining a balanced inside pressure, consistent and reliable measurements, etc. ...). At most, this question would have to be answered in the context of a discussion of inventive step.
- 2.9 In the present case, what is relevant is that a person skilled in the art would have been able to select an appropriate target offset voltage which would result in an appropriate inside pressure P_{inside} suitable to estimate the pressure outside of a gas sensor according to the claimed method for a particular gas sensor application. Furthermore, the Board does not consider that it would be unduly burdensome for a person skilled in the art to carry out such selection of the target offset voltage. On the contrary, the applicant convincingly explained that this could be done with a simple Excel spreadsheet.
- 2.10 The Board concludes that the main request meets the requirement of Article 83 EPC.

3. Auxiliary requests

The findings on the main request also apply to those auxiliary requests filed with the statement of grounds of appeal which correspond to auxiliary requests 1 to 30 on which the decision under appeal is based. Consequently, these auxiliary requests comply with the requirements of Article 83 EPC.

4. Substantial procedural violation / Request for reimbursement of the appeal fee

4.1 The applicant requested reimbursement of the appeal fee on the ground that the examining division committed a substantial procedural violation, *inter alia*, because it did not give reasons in the decision under appeal for not admitting the auxiliary request 31 filed for the first time during the oral proceedings before the examining division.

4.2 According to Rule 111(2) EPC, decisions of the European Patent Office open to appeal shall be reasoned. The reasoning has to enable the applicant and the board of appeal to examine whether the decision was justified or not. A written decision should discuss in detail the facts, evidence and arguments which are essential to the decision, and has to contain the logical chain of reasoning which led to the relevant conclusion. It should be complete and self-contained. Moreover, the right to be heard under Article 113(1) EPC encompasses the right of a party to have its comments considered in the written decision. Although a decision does not have to address each and every argument of a party in detail, it must comment on the crucial points of dispute in order to give the losing party a fair idea of why its submissions were not considered convincing

(see in particular Case Law of the Boards of Appeal, 10th edition 2022, III.K.3.4.1 and III.K.3.4.2).

- 4.3 It is apparent from page 3 of the minutes of the oral proceedings before the examining division that the applicant filed a new auxiliary request 31 during the oral proceedings and that this new auxiliary request was not admitted into the proceedings under Rule 137(3) EPC. However, the decision under appeal is completely silent on the reasons for not admitting the then auxiliary request 31 (now auxiliary request 48). Point 4.10 of the decision under appeal merely states that: "No new requests were admitted to the proceedings". The only arguments to be found in the file are those made by the examining division during the oral proceedings (see minutes, page 3), but these are not part of the final decision of the examining division. The then newly filed auxiliary request 31 was not annexed to the minutes (contrary to the clear instructions in the Guidelines for Examination in the European Patent Office in Part E-III.8.5.2), nor was it otherwise made part of the public file.
- 4.4 In conclusion, the written decision does not provide the examining division's reasons for not admitting the then auxiliary request 31 into the proceedings. As previously mentioned, the written decision must provide reasons for rejecting each request, including those not admitted, to allow for judicial review. The minutes of the oral proceedings include arguments from an individual member of the examining division against admitting the then auxiliary request 31. However, since the written decision does not endorse these arguments by either repeating them or referencing them, they are not part of the final decision. Failing to justify in the written decision why a request was not admitted

into the proceedings contravenes Rule 111(2) EPC and constitutes a substantial procedural violation.

4.5 Reimbursement of the appeal fee in full under Rule 103(1)(a) EPC is equitable because the appeal is allowable and because the proceedings before the examining division suffer from a substantial procedural violation.

4.6 The question of whether the objections concerning other procedural violations invoked by the applicant were in fact justified could therefore be left open.

5. Request for remittal (Article 111(1) EPC, Article 11 RPBA)

5.1 The applicant requested that the case be remitted to the first instance department on the grounds that the case had suffered from a substantial procedural violation and in order to discuss clarity and patentability of the main request, which had not been discussed in the decision under appeal. The applicant argued that judicial review within the meaning of Article 12(2) RPBA implied a decision at first instance and could take place only after these objections had been heard and decided at first instance.

5.2 The Board considers a remittal in the present case to be justified in view of the arguments put forward by the applicant, which constitute special reasons for a remittal under Article 11 RPBA. The case is therefore remitted to the examining division for further prosecution.

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.
3. The appeal fee is reimbursed.

The Registrar:

The Chairman:



T. Buschek

R. Bekkering

Decision electronically authenticated