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Datasheet for the decision of 18 March 2022

Case Number: T 1819/17 - 3.4.02

Application Number: 11761032.9

Publication Number: 2656023

IPC: G01F23/284

Language of the proceedings: EN

Title of invention:
LOOP-POWERED FIELD DEVICE

Patent Proprietor:
Rosemount Tank Radar AB

Opponent:
Endress+Hauser (Deutschland) AG+Co. KG

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes) - after amendment

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

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Chambres de recours

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Case Number: T 1819/17 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 18 March 2022

Appellant: (Opponent)	Endress+Hauser (Deutschland) AG+Co. KG PatServe Colmarer Strasse 6 79576 Weil am Rhein (DE)
Respondent: (Patent Proprietor)	Rosemount Tank Radar AB Box 13045 402 51 Göteborg (SE)
Representative:	Kransell & Wennborg KB P.O. Box 2096 403 12 Göteborg (SE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 12 July 2017 rejecting the opposition filed against European patent No. 2656023 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	R. Bekkering
Members:	A. Hornung
	G. Decker

Summary of Facts and Submissions

I. The opponent appealed against the decision of the opposition division rejecting the opposition against the European patent No. 2 656 023.

Opposition had been filed against the patent as a whole and based on the grounds for opposition under Articles 100(a) and (b) EPC.

The opposition division had found that the grounds for opposition set out in Articles 100(a) and (b) EPC did not prejudice the maintenance of the patent as granted.

II. Oral proceedings before the board were held on 18 March 2022.

During oral proceedings, after higher-ranking claim requests had been discussed and then not been found allowable by the board, the patentee declared that the fifth auxiliary request, filed with its reply to the opponent's statement of grounds of appeal dated 23 March 2018, constituted its new main request.

III. The opponent (appellant) requested, in conclusion, as a main request that the decision under appeal be set aside and that the European patent be revoked. As an auxiliary request, it requested that the case be remitted to the opposition division for further prosecution on the basis of the patentee's new main request, corresponding to the patentee's fifth auxiliary request filed with the reply to the statement of grounds of appeal dated 23 March 2018.

IV. The patentee (respondent) requested, in conclusion, as a sole and main request that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims according to the fifth auxiliary request filed with the reply to the statement of grounds of appeal dated 23 March 2018.

V. The following document will be referred to in the present decision:

D3a: WO 2008/003628 A1

VI. Independent claim 1 according to the main request reads as follows:

"A loop-powered field device (10) for determining a process variable and providing a measurement signal indicative of said process variable to a remote location via a two-wire current loop (4), said loop-powered field device comprising:

a measurement device (11) for determining said process variable; and

loop interface circuitry (12) for providing said measurement signal to the two-wire current loop and for providing power from said two-wire current loop to said measurement device,

wherein said loop interface circuitry comprises:

current control circuitry (14) connected to the two-wire current loop and the measurement device, said current control circuitry being controllable by said measurement device to provide said measurement signal to the two-wire current loop; and

a first converter for converting an input power from the two-wire current loop to an output power for powering the measurement device, said first converter having an output (19a-b) for providing power to said measurement device,

characterized in that:

said first converter is a switching converter, said first converter having inputs (18a-b) connected to said two-wire current loop in series with said current control circuitry (14);

said loop interface circuitry (12) further comprises voltage regulation circuitry (16) for regulating a voltage (Vcs) across said current control circuitry (14) towards a desired voltage, by controlling an input voltage (Vin) across the inputs (18a-b) of the first converter,

said current control circuitry (14) is controllable to regulate a loop current flowing through said two-wire current loop (4) with a first time constant, and said voltage regulation circuitry (16) is configured to regulate said input voltage (Vin) across the inputs of the first converter with a second time constant being substantially greater than said first time constant,

said second time constant is at least 10 times greater than said first time constant,

said loop-powered field device (10) further comprises an energy storage device (25) connected to said first converter on the output side thereof, and

said loop-powered field device (10) further comprises a shunt regulator (28) for limiting the output voltage of the first converter".

Independent method claim 6 according to the main request reads as follows:

"A method of providing power from a two-wire current loop (4) to a loop-powered field device (10) using loop interface circuitry (12) comprising:

current control circuitry (14) for providing a measurement signal from said loop-powered field device to a remote location via said two-wire control loop;

a first converter for converting an input power from the two-wire current loop to an output power for powering the measurement device, said first converter having input terminals (18a-b) connected in series with said current control circuitry, and output terminals (19a-b) for providing power to said loop-powered field device, said first converter being a switching converter, and said current control circuitry is controlled to regulate said loop current with a first time constant, and said input voltage across the inputs of the first converter is regulated with a second time constant being substantially greater than said first time constant, said second time constant is at least 10 times greater than said first time constant, said loop-powered field device (10) further comprises an energy storage device (25) connected to said first converter on the output side thereof, and

said loop-powered field device (10) further comprising a shunt regulator (28) for limiting the output voltage of the first converter,

said method comprising the steps of:

controlling (101) said current control circuitry to regulate a loop current flowing through said two-wire current loop, thereby providing said measurement signal; and

regulating (102) a voltage across said current control circuitry towards a desired voltage, by controlling an input voltage across the inputs of the first converter".

Reasons for the Decision

1. Admittance of the new main request

The new main request is taken into account in the proceedings (Article 12(4) RPBA 2007).

1.1 The opponent requested not to admit the main request into the proceedings for the following reasons:

- The main request was never filed during the first-instance proceedings.
- Claim 1 of the main request comprised features taken from the description.
- The patentee filed many auxiliary requests during the first-instance proceedings. Even if, as submitted by the patentee, the present main request corresponded essentially to auxiliary request 20, filed during the first-instance proceedings, it could not be expected from the opponent to be prepared to discuss all these numerous auxiliary requests.

1.2 The board does not follow the opponent's argumentation. According to Article 12(4) RPBA 2007, "everything presented by the parties (...) shall be taken into account

by the Board", except for requests which could have been presented in the first-instance proceedings. Since the opposition division had rejected the opposition, there had been no compelling reason for the patentee to file auxiliary requests at all during first-instance proceedings. Article 12(4) RPBA 2007 does not provide a basis for not admitting the patentee's auxiliary requests filed in reply to the opponent's statement of grounds of appeal. The present main request corresponds to the fifth auxiliary request filed by the patentee in reply to the statement of grounds of appeal and, therefore, is to be taken into account in the proceedings.

2. Remittal

The case is not to be remitted to the first instance for examining the allowability of the claims of the present main request.

2.1 The opponent requested to remit the case to the opposition division to examine the allowability of the claims. The opponent submitted that it was surprised to be confronted with new requests comprising features taken from the description.

2.2 The board cannot follow the opponent's argumentation. Since the present main request was filed as fifth auxiliary request with the patentee's reply to the opponent's statement of grounds of appeal, the opponent could not reasonably be surprised that the allowability of the claims of the present main request would be discussed during oral proceedings. According to Article 11 RPBA 2020, in order to remit the case, special reasons have to be present. The board cannot see any such special reasons. In particular, the objectively unfounded surprise of the opponent does not constitute such a special reason.

3. Added subject-matter

Claims 1 and 6 do not comprise amendments containing subject-matter extending beyond the content of the application as filed (Article 123(2) EPC).

3.1 The opponent submitted that the feature "on the output side thereof" in claims 1 and 6 had no basis in the application as originally filed. In particular, the alleged basis on page 10, lines 14 to 16 and 30 to 32, of the patent application as originally filed did not disclose that an energy storage device is *connected* to the first converter on the output side thereof, but merely that it is *provided* on the output side thereof.

3.2 The board is not convinced by the opponent's argument. As submitted by the patentee, it is clear from figure 2 that the additional circuitry (21) is *connected* to and not merely provided on the output side (19a, 19b) of the first converter.

3.3 In response to a question from the board, the opponent confirmed that it had no further objections under Article 123(2) EPC. The board does also not see any infringement of Article 123(2) EPC.

4. Clarity and sufficiency of disclosure

Claims 1 and 6 are clear and the invention defined therein is sufficiently disclosed (Articles 83 and 84 EPC).

4.1 The opponent, for the first time during the appeal proceedings, announced during oral proceedings that it would raise objections under Articles 83 and 84 EPC

against the features of claims 1 and 6 relating to the first and the second time constant.

4.2 The board drew the opponent's attention to the fact that these features were included in granted claims 5 and 6 and that, therefore, no clarity objections could be accepted against these features. Moreover, according to the appealed decision, point 10, the opposition division had concluded that the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The board indicated that it concurred with the view expressed by the opposition division in the appealed decision. Thereupon, the opponent did not proceed to put forward any concrete objections under Articles 83 and 84 EPC. Regarding the compliance with Article 83 EPC, the board refers to the finding of the opposition division as set out in point 10 of the appealed decision, Article 15(8) RPBA 2020.

5. Novelty

It is undisputed that the subject-matter of claims 1 and 6 is novel over the available prior art documents (Article 54(1) EPC; see point 6.2 below).

6. Inventive step

The subject-matter of claims 1 and 6 involves an inventive step (Article 56 EPC).

6.1 It is undisputed that the closest prior art is represented by the device disclosed in D3a, figure 5.

6.2 The subject-matter of claim 1 differs from the device of D3a at least in that it comprises the following features **F1** to **F3**:

F1: said current control circuitry (14) is controllable to regulate a loop current flowing through said two-wire current loop (4) with a first time constant, and said voltage regulation circuitry (16) is configured to regulate said input voltage (Vin) across the inputs of the first converter with a second time constant being substantially greater than said first time constant, said second time constant is at least 10 times greater than said first time constant,

F2: said loop-powered field device (10) further comprises an energy storage device (25) connected to said first converter on the output side thereof,

F3: said loop-powered field device (10) further comprises a shunt regulator (28) for limiting the output voltage of the first converter.

6.3 At least features **F2** and **F3** involve an inventive step for the following reasons:

6.3.1 Feature **F2** solves the objective technical problem of providing energy to the measurement device when needed, in particular, when the available current is low. There is no indication in D3a or in any other available prior art document that an electrical circuitry should be connected to the *output* side of the first converter for storing energy in order to provide additional power to the measurement device when needed. If an energy storage device is present at all in the device of D3a, it would appear, as submitted by the patentee during oral proceedings, that this function was served by the capacitor C provided at the *input* side of the first converter. As submitted by the patentee, "[a]rranging energy storage on the output side is advantageous as it

will not slow down any change of adjustment of current in the current loop. It may also make the provision of energy storage easier to design for compliance with explosion safety standards" (patentee's letter of reply, dated 23 March 2018, point 4.3.2).

6.3.2 Feature **F3** solves the objective technical problem of contributing "to the independence of the regulation in the first converter as well as to an explosion-safe design" (patentee's letter of reply, dated 23 March 2018, point 4.4.2). There is no indication in D3a or in any other available prior art document that a shunt regulator should be provided for limiting the *output* voltage of the first converter. D3a discloses a shunt regulator IS_2 provided at the *input* side of the first converter which, therefore, does not function as a typical means for limiting the *output* voltage of the first converter.

6.4 For the first time during appeal proceedings, the opponent provided the following counter-arguments at the oral proceedings before the board:

6.4.1 Feature **F2** was anticipated by the device of D3a. Indeed, D3a, [0105], figure 5, disclosed a second converter UR_2 and a transformer (91), both connected at the output of the first converter. It was implicit that both devices comprised a capacitor element having an intrinsic capability of storing energy.

The board is not convinced by the opponent's argument. Even if it were to be conceded that a capacitor element is implicitly present in the second converter UR_2, the board does not see how this capacitor element, or the transformer (91), would have the function of an "energy storage device" within the meaning as understood by the skilled person in view of the patent description,

paragraphs [0045] and [0046], namely being a device for storing a certain amount of energy and being capable of releasing this energy in such a manner that sufficient energy is provided to the measurement device as soon and as much as needed. Therefore, feature **F2** is novel. Furthermore, feature **F2** involves an inventive step for the reason given in point 6.3.1 above.

6.4.2 According to the opponent, feature **F3** was anticipated by the device of D3a. Indeed, D3a, [0105], figure 5, disclosed the provision of a shunt regulator IS_2 within the voltage regulator (30). Even though the shunt regulator was provided at the *input* side of the first converter, it contributed to limiting the *output* voltage of the first converter. Since claim 1 did not specify the exact position of the shunt regulator in the loop-powered field device, feature **F3** was not novel.

The board sees no reason why regulating the *input* voltage of the first converter with the shunt regulator IS_2 should imply that the *output* voltage is regulated. Therefore, **F3** is novel. Furthermore, feature **F3** involves an inventive step for reason given in point 6.3.2 above.

6.5 The method of claim 6 provides power to a loop-powered field device comprising features **F2** and **F3**. Therefore, the subject-matter of claim 6 involves an inventive step over D3a for reasons corresponding to those given for claim 1.

6.6 Upon explicit request from the board during oral proceedings, the opponent confirmed that it had no further objections based on further prior art documents. The board does also not see any reason to question inventive step on the basis of the remaining available prior art documents.

7. For the above reasons the board is satisfied that the patent as amended with claims according to the present new main request and the invention to which it relates, meet the requirements of the EPC.

The description, however, still needs to be adapted to meet the requirements of the EPC; in particular, it needs to be brought in conformity with the amended claims.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent as amended with the following claims and drawings, and a description to be adapted:

Claims:
No. 1 to 7 according to the fifth auxiliary request filed with the reply to the statement of grounds of appeal dated 23 March 2018

Drawings:
Sheets 11 and 12 of the patent specification

The Registrar: The Chairman:

H. Jenney R. Bekkering

Decision electronically authenticated