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Datasheet for the decision of 16 October 2015

Case Number: T 0265/11 - 3.5.02

Application Number: 01947842.9

Publication Number: 1403832

IPC: G08C19/00, H02H9/00

Language of the proceedings: EN

Title of invention:
INTRINSICALLY SAFE EXPLOSION-PROOF SENSOR CIRCUIT

Patent Proprietor:
Azbil Corporation

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

Relevant legal provisions:
EPC Art. 123(2), 123(3), 83, 84, 153(2), 153(4)
EPC R. 7

Keyword:
Amendments - allowable (no) -
main, first and second auxiliary request
Amendments - allowable (yes) - third auxiliary request
Sufficiency of disclosure - (yes)

Catchword:
See point 2. of the reasons.

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Case Number: T 0265/11 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 16 October 2015

Appellant: (Opponent)	Endress+Hauser (Deutschland) AG+Co. KG PatServe Colmarer Strasse 6 79576 Weil am Rhein (DE)
Respondent: (Patent Proprietor)	Azbil Corporation 2-7-3 Marunouchi Chiyoda-ku Tokyo 100-6419 (JP)
Representative:	Greene, Simon Kenneth Elkington and Fife LLP Prospect House 8 Pembroke Road Sevenoaks, Kent TN13 1XR (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 25 November 2010 concerning maintenance of the European Patent No. 1403832 in amended form.**

Composition of the Board:

Chairman	M. Ruggiu
Members:	H. Bronold
	R. Cramer

Summary of Facts and Submissions

I. The appeal concerns the interlocutory decision of the Opposition Division of the European Patent Office posted on 25 November 2010 concerning maintenance of European Patent No. 1403832 in amended form.

II. The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked. Further, the appellant requested that a translation of the original claims into English filed by the appellant with letter dated 15 September 2015 be used for determining whether the subject-matter of the European patent application extends beyond the content of the application as filed.

III. The respondent (patent proprietor) requested that the appeal be dismissed and the patent be maintained in the form approved by the opposition division (main request), or alternatively that the decision under appeal be set aside and the patent be maintained on the basis of the claims of the first auxiliary request filed with letter dated 11 August 2011, or on the basis of the claims of the second auxiliary request filed with letter dated 9 October 2015, or on the basis of the claims of the third auxiliary request filed during oral proceedings before the board held on 16 October 2015.

IV. Claim 1 of the main request reads (the same indexing as in the contested decision is used):

An intrinsically safe sensor signal processing circuit, comprising:

a) a sensor means (1) to measure a physical value in a hazardous area;
b) a safety barrier means (3) mounted in a non-hazardous area or in an enclosure housing in the hazardous area;
c) a current limiting resistor (Rh) located inside of the safety barrier (3), connected in series with the sensor (1);
d) a first operational amplifier (10)
d1) located inside of the safety barrier (3); and
e) a second operational amplifier
e1) located inside of the safety barrier (3),
characterized in that
d2) said first operational amplifier (10) is a driver
d3) of the sensor signal,
d4) coupling a first group of the current limiting resistors (Rh) between an output and an inverting-input of the first operational amplifier (10), and that
e2) said second operational amplifier (20) is a feedback operational amplifier
e3) measuring the sensor signal,
e4) coupling a second group of the current limiting resistors (Rh) between an output and an inverting-input of the second operational amplifier (20).

V. Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the expressions "group of current limiting resistors (Rh)" of each of features d4) and e4) are further limited as being "located inside of the safety barrier (3), and connected in series with the sensor (1)".

VI. Claim 1 of the second auxiliary request differs from claim 1 of the main request in that

feature c) reads:

"a plurality of current limiting resistors (Rh) located inside of the safety barrier (3), a current limiting resistor (Rh) being connected in series with each signal line connected to the the [sic] sensor means (1);"

and in that the expression "first group of current limiting resistors (Rh)" of feature d4) is further limited as being
"located inside of the safety barrier (3)".

VII. Claim 1 of the third auxiliary request differs from claim 1 of the main request in that

feature c) reads:
"a plurality of current limiting resistors (Rh) located inside of the safety barrier (3), connected in series with the sensor means (1);"

and in that the expression "first group of current limiting resistors (Rh)" of feature d4) is further limited as being "located inside of the safety barrier (3)".

VIII. Furthermore, each request includes a claim 2 that is dependent on claim 1.

IX. The appellant essentially argued as follows:

Request for replacement of the translation of the claims

The appellant had filed a translation of the claims of international application PCT/JP01/005835 and argued that it was evident from this translation that features b), c), d1), and e1) were different in the originally

filed claims with respect to the English translation filed by the respondent on entry into the European phase under Article 158(2) EPC 1973. Thus, the claims of the main request extended beyond the content of the original application. Further, the appellant requested to remit the case to the department of first instance or to adjourn the oral proceedings to verify the translation under Article 158(2) EPC 1973.

Main request

The subject matter of claim 1 was not originally disclosed since features c), e2) and e3) extended beyond the content of the application as filed. In particular, claim 1 omitted to specify in feature c) a plurality of current limiting resistors located inside of the safety barrier, connected in series with the sensor. The application provided no basis for such an omission. Further, the application as filed did neither disclose a feedback amplifier as specified in feature e2) nor that this feedback amplifier measured the sensor signal as specified in feature e3). Thus, claim 1 of the main request contravened Article 123(2) EPC.

First auxiliary request

Regarding the first auxiliary request the appellant argued that no basis was given for the additional feature "located inside of the safety barrier" and that still the aspect that the current limiting resistors are connected in series with the sensor was omitted in claim 1. Further, the same problems persisted as for the main request since feature c) was unamended and the first and second groups of current limiting resistors were not linked to the single current limiting resistor

of feature c). Therefore, claim 1 of the first auxiliary request contravened Article 123(2) EPC.

Second auxiliary request

The feature "a current limiting resistor (Rh) being connected in series with each signal line" was extending beyond the content of the application as filed since there was no basis for that amendment in the application as filed. Thus, claim 1 of the second auxiliary request was contravening Article 123(2) EPC

Third auxiliary request

All embodiments disclosed in the original application comprised exactly four current limiting resistors. However, due to feature c) defining a plurality of current limiting resistors, claim 1 covered embodiments having only two current limiting resistors, for which there was no basis in the application as filed. Further, it was no longer possible to amend feature c) because the feature "plurality of current limiting resistors" was not present in the granted patent specification, which was the only admissible basis for amendments in opposition proceedings. The subject matter of claim 1 therefore contravened Article 123(2) EPC.

Moreover, claim 1 was contradicting the figures since claim 1 specified current limiting resistors arranged in series whereas the figures showed current limiting resistors connected in parallel. Claim 1 was therefore not supported by the description in the sense of Article 84 EPC.

The invention as claimed was not sufficiently disclosed since the whole patent did not specify where the claimed safety barrier means had to be integrated in the claimed signal processing circuit or how the barrier means should be constituted. Further, following an analysis of the voltage levels at OP Amp 10 in figure 4, it was evident that 250V were applied to the line connected to the hazardous area, which contradicted the purpose of the invention to provide an intrinsically safe sensor signal processing circuit. The patent did not specify how to reduce the voltage levels in the hazardous area. Thus, the third auxiliary request did not fulfill the requirements of Article 83 EPC.

X. The respondent essentially argued as follows:

Request for replacement of the translation of the claims

The respondent stated that they maintained the translation that had been filed on entry into the European phase and had been published. They requested that the case not be remitted and that the oral proceedings not be adjourned.

Main request

The basis of the amendments was figure 4 which disclosed a current limiting resistor as claimed in feature c) of claim 1. It was further evident that the expression "of the current limiting resistors" used in features d4) and e4) of claim 1 referred to the expression "a current limiting resistor" in feature c). The amendment was merely introduced in order to comply with the two-part form according to Rule 43(1) EPC.

First auxiliary request

The expression "located inside of the safety barrier" had been added to features d4) and e4) of claim 1 in order to overcome the objection under Article 123(2) EPC. Claim 1 of the first auxiliary request clarified that the current limiting resistors of features d4) and e4) were connected in series with the sensor as specified in feature c).

Second auxiliary request

The amendment "a current limiting resistor (Rh) being connected in series with each signal line connected to the the [sic] sensor means" in claim 1 was originally disclosed in figure 4.

Third auxiliary request.

For the purpose of Article 123(2) EPC amendments were to be compared with the application as originally filed. Therefore the application as filed was an admissible basis for amendments.

Further, the amendment in feature c) of claim 1 was a literal copy of the wording of claim 1 as originally filed.

The amendment was directed to a series connection of the plurality of current limiting resistors with the sensor. According to the wording of claim 1 it was irrelevant how the resistors are connected to each other.

The safety barrier specified in claim 1 was disclosed in a sufficiently clear and complete manner in paragraph [0008] of the granted patent, from which the skilled person deduced that the current limiting resistors constituted the safety barrier.

There was no difficulty for the skilled person to build the circuit described and shown in the patent. In particular, the invention was not concerned with limitation of the voltage level but with limitation of the current energy in the hazardous area, as was disclosed in paragraphs [0008], [0013] and [0014] and in figure 3 of the patent.

Reasons for the Decision

1. The appeal is admissible.

2. Request for replacement of the translation of the claims

With letter dated 15 September 2015 the appellant filed an uncertified translation of the claims of international application PCT/JP01/05835, which is the original text of the application on which the patent is based. The appellant argued that features b), c), d1) and e1) were different in the originally filed claims with respect to the English translation filed under Article 158(2) EPC 1973 and published.

The appellant requested that the content of the uncertified translation of the claims be used as a basis for the analysis according to Article 123(2) EPC.

According to Article 150(3) EPC 1973 (now Article 153(2) EPC) an international application for which the European Patent Office is a designated or elected Office, and which has been accorded an international date of filing, shall be equivalent to a regular European application. PCT/JP01/05835, for which the European Patent Office is an elected Office, has been accorded an international date of filing of 4 July 2001. Therefore, Rule 7 EPC 1973 (corresponding to Rule 7 EPC) applies mutatis mutandis to the translation of PCT/JP01/05835 filed under Article 158(2) EPC 1973.

No evidence was provided that the translation filed under Article 158(2) EPC 1973 is not in conformity with the original text of the application. Thus, in accordance with Rule 7 EPC 1973, the board assumes that the translation on file is in conformity with the original text of the application for determining whether the subject matter of the European patent extends beyond the content of the application as filed.

Further in this respect, the appellant requested that the case be remitted to the department of first instance, or that the proceedings before the board be adjourned. The appellant provided however no explanation why it could not have presented its objections to the translation on file at an earlier stage, accompanied by proper evidence, e.g. in the form of a certified translation. The respondent requested that the request for remittal or adjournment be rejected.

Since no evidence to the contrary in the sense of Rule 7 EPC was provided proving a non-conformity of the translation on file, and since the request for remittal or adjournment was filed very late, i.e. during the oral proceedings before the board, the request for remittal or adjournment is rejected.

3. Main request - Article 123(2) EPC

3.1 Considering feature c) of claim 1, there exists an ambiguity as to whether this feature has to be read together with features d4) and e4), each of which defines that a group of the current limiting resistors is coupled between respective output and inverting input of the first and second operational amplifiers. The respondent wishes the expression "group of the current limiting resistors" to be interpreted as referring to feature c), implying that, when read together with features d4) and e4), the originally disclosed plurality of current limiting resistors connected in series with the sensor is still specified in claim 1. However, the board is not convinced by this argumentation.

The preamble of claim 1 specifies merely "a current limiting resistor". The characterising portion refers to "the current limiting resistors" which do not have an antecedent in the claim. Therefore, the first group and the second group of "the current limiting resistors" can not be interpreted to necessarily refer to feature c). Consequently, the first and second group of resistors are not limited to the location and connection requirements of feature c), namely to be located inside the safety barrier and connected in series with the sensor.

The application as filed does further not disclose an intrinsically safe signalling processor circuit which comprises merely a (single) current limiting resistor located inside the safety barrier and connected in series with the sensor. The application discloses a plurality of (four or five) current limiting resistors located inside the safety barrier which are all connected in series with the sensor, see original claim 1, figure 4 and 6 to 8 and the corresponding description in paragraphs [0017], [0021], [0022] or [0024].

Therefore, although claim 1 as a whole seems to claim plural current limiting resistors, the feature that a plurality of current limiting resistors is located inside the safety barrier and connected in series to the sensor is no longer present in claim 1. The amendment in claim 1 is thus not directly and unambiguously derivable from the application as filed.

Consequently, claim 1 of the main request contravenes Article 123(2) EPC.

4. First auxiliary request - Article 123(2) EPC

4.1 Since claim 1 of the first auxiliary request contains feature c) in unamended form, what is said above with respect to the subject matter of claim 1 of the main request applies mutatis mutandis to the subject matter of claim 1 of the first auxiliary request.

Thus, claim 1 of the first auxiliary request contravenes Article 123(2) EPC.

5. Second auxiliary request - Article 123(2) EPC

The second auxiliary request includes the feature "a current limiting resistor (Rh) being connected in series with each signal line connected to the the [sic] sensor means (1)".

According to the respondent, the basis for this amendment can be found in figure 4 of the application.

However, figure 4 shows a specific plurality of current limiting resistors, namely four current limiting resistors, each of which being connected in series with a signal line connected to the sensor means. Neither figure 4 nor the remainder of the application discloses a (single) current limiting resistor being connected in series with each signal line connected to the sensor means. Therefore, the skilled person cannot derive the amendment of claim 1 of the second auxiliary request directly and unambiguously from the application.

Consequently, claim 1 of the second auxiliary request also contravenes Article 123(2) EPC.

6. Third auxiliary request - Articles 83, 84, 123 (2) and (3) EPC

6.1 Amendments - Article 123(2) and (3) EPC

In feature c) the wording "a current limiting resistor (Rh)" was replaced with the wording "a plurality of current limiting resistors (Rh)". The same expression was already present in originally filed claim 1. Feature c) is literally disclosed in the application as filed.

With respect to feature e2), the board takes the view that the term "feedback" used in connection with operational amplifiers refers to circuitry connected between input and output of the operational amplifier. Figure 4 of the application as originally filed discloses that the output terminal of amplifier 20 is connected to the inverting input terminal of the operational amplifier 20 via a current limiting resistor Rh. The topology shown in figure 4 therefore discloses a feedback amplifier in the sense of claim 1.

Regarding feature e3) claim 1 defines that "...said second operational amplifier (20) is ... measuring the sensor signal...". The understanding of the board is that an operational amplifier usually does not "measure" a signal in the sense of providing a meter reading at its output but that an operational amplifier can be used to provide an output signal that is a representation, i.e. a "measure" of an output signal .

In that context, the originally filed description as published (EP 1 403 832 A1) discloses in paragraph [0016] that "The feeder OP amp 20 measures the feedback current passed through from the sensor" and that "...the measured current I be obtained from meter 30(A)." It is clear from the original disclosure in paragraph [0016] that the sensor signal is input to the second operational amplifier 20 and that a current measurement of the sensor signal can be obtained at meter 30, which is connected to the output of the operational amplifier 20. Moreover, paragraph [0022] points out that "...a current measurement is not practical for some circuitry, as compared to a voltage measurement...". Thus, although the first embodiment shown in figure 4 uses a current measurement, the originally filed description provides an alternative to

a current measurement; see also figure 7, the voltage gauge 31. Thus, the application as originally filed suggests for all embodiments that the sensor signal is measured, be it via voltage measurement or via current measurement.

Therefore, claim 1 of the third auxiliary request does not contravene Article 123(2) EPC.

6.2 Moreover, all of the amendments made to claim 1 according to the third auxiliary request represent limitations of features of granted claim 1. Feature c) is limited from "a" to "a plurality of" current limiting resistors and in feature d4) the first group of current limiting resistors is limited (redundantly) in that it is "located inside of the safety barrier (3)".

The protection conferred by the patent as amended according to the third auxiliary request is therefore not extended. Consequently, the third auxiliary request does not contravene Article 123(3) EPC.

6.3 Clarity - Article 84 EPC

6.3.1 According to decision G 3/14 in considering whether, for the purposes of Article 101(3) EPC, a patent as amended meets the requirements of the EPC, the claims of a patent may be examined for compliance of the requirements of Article 84 EPC only when, and then only to the extent that the amendment introduces non-compliance with Article 84 EPC.

The board did not identify any non-compliance with Article 84 EPC which was introduced by the amendments made if compared to the claims as granted.

Therefore, the third auxiliary request does not contain any feature that may be examined by the board under Article 84 EPC.

6.3.2 The appellant argues further that according to claim 1 the current limiting resistors were connected in series, whereas according to figures 4, 6 and 7 the current limiting resistors are shown as connected in parallel to each other. However, this argument does not take into consideration that according to claim 1 the current limiting resistors are defined to be connected in series with the sensor means, as shown in figures 4, 6, 7 and 8. Thus, claim 1 is not unclear in that respect either.

6.4 Sufficiency of disclosure - Article 83 EPC

The appellant contests that the feature "safety barrier means" is sufficiently disclosed since no physical safety barrier means is disclosed in which the operational amplifiers and the current limiting resistor(s) are located.

In paragraph [0004] of the application as originally filed it is stated that "To realize intrinsic safety, a safety barrier may be designed in a non-hazardous area by relatively large circuits with energy limiting resistors, Zener diodes, fuses, and so on." Thus, according to the originally filed application, the safety barrier means includes an electric circuit, such as the current limiting resistors Rh shown in figure 4 in order to limit current rush, see also paragraph [0007].

The patent proposes to arrange a current limiting resistor in any possible rush current path according to paragraphs [0021], [0026], [0029], and [0033] as well as figures 4 and 6 to 8 of the patent. This disclosure is sufficiently clear and complete for a skilled person to carry out the current-limiting aspect of the invention.

Consequently, the subject-matter of the third auxiliary request fulfills the requirements of Article 83 EPC.

6.5 The statement of grounds of appeal did not address the findings of the opposition division with respect to novelty and inventive step regarding the main request. Therefore these findings are not a subject of the present appeal procedure (Article 12(2) RPBA). None of the parties addressed novelty and inventive step of the amended claims according to the first to third auxiliary requests. The board did prima facie not identify any non-conformance with the requirements of novelty and inventive step either.

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 in the following version:

- claims 1 and 2 of the third auxiliary request filed during the oral proceedings of 16 October 2015
- description pages 2 to 5 filed during the oral proceedings before the Opposition Division on 26 October 2010
- drawings figures 1 to 8 of the patent specification.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu

Decision electronically authenticated