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**Datasheet for the decision
of 22 July 2014**

Case Number: T 1641/09 - 3.4.02

Application Number: 00963711.7

Publication Number: 1224447

IPC: G01L9/00

Language of the proceedings: EN

Title of invention:

PREINSTALLATION OF A PRESSURE SENSOR MODULE

Patent Proprietor:

Rosemount Inc.

Opponent:

Endress u. Hauser GmbH u.Co. KG

Headword:

Sensor modules

Relevant legal provisions:

EPÜ Art. 56

RPBA Art. 12(4)

Keyword:

Late-filed evidence - admitted (no)
inventive step (yes, non obvious identification of the problem
)

Decisions cited:

T 0002/83

Catchword:



**Beschwerdekammern
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Chambres de recours**

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Case Number: T 1641/09 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 22 July 2014

Appellant: Endress u. Hauser GmbH u.Co. KG
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Respondent: Rosemount Inc.
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Representative: Boulton Wade Tennant
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 19 June 2009 rejecting the opposition filed against European patent No. 1224447 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman A. Klein
Members: H. von Gronau
D. Rogers

Summary of Facts and Submissions

- I. The appeal of the opponent is directed against the decision of the Opposition Division to reject the opposition against the above mentioned patent.
- II. The appellant requested to admit documents D8 and D10 into the procedure. Document D8 had not been admitted by the Opposition Division, and document D10 was filed during the appeal procedure with letter dated 27 February 2014. The appellant further requested to set aside the decision under appeal and to revoke the European patent. Alternatively the appellant requested that the case be remitted to the department of the first instance for further consideration of document D10.
- III. The respondent and patent proprietor requested as a main request to dismiss the appeal, and hence maintain the patent as granted. Alternatively, the respondent requested to maintain the patent in amended form on the basis of the claims of either of the first or second auxiliary requests, both filed under cover of a letter dated 19 June 2014. In addition the respondent requested that documents D8 and D10 not be admitted into the proceedings.
- IV. Oral proceedings took place on 22 July 2014. At the end of the oral proceedings the appeal was dismissed.
- V. The independent claims 1 and 19 of the patent as granted read as follows:

" 1. A pressure sensor module (50), comprising:

a transducer (52) having an isolator (54) adapted to receive process fluid (56), and having a pressure sensor (58) coupled to the isolator;
a circuit (60) coupled to the pressure sensor and providing a bus (64) for energization, control, and a digital representation of pressure;
a feedthrough (66) having contacts (68) and an insulator (70) surrounding the contacts;
a housing (72) that surrounds the pressure sensor, the housing having a threaded sleeve (76) supporting the feedthrough and a threaded process fluid inlet (74) around the isolator; and

characterized in that the feedthrough is adapted to join to a selected external module (79) and to couple the bus to the selected external module via the contacts, the sleeve is adapted to support the selected external module, and the housing is integrally formed to hermetically seal the circuit and the pressure sensor."

"19. A method of manufacturing a pressure sensor module (50), comprising:

forming a transducer (52) by coupling an isolator (54) that is adapted to receive process fluid (56) to a pressure sensor (58);
coupling a circuit (60) to the pressure sensor, the circuit providing a bus (64) for energization, control, and a digital representation of pressure;
providing an insulating feedthrough (66) with contacts (68); and
surrounding the pressure sensor and the circuit with an external support structure (72), shaping the structure to form a threaded process fluid inlet (74) around the isolator, and shaping the structure to form a threaded sleeve (76) supporting the feedthrough; and

characterized by the contacts coupling to the bus, the insulating feedthrough being adapted to join to a converter module (79), and the threaded process fluid inlet being formed integrally with the external support structure which is hermetically surrounding the pressure sensor and the circuits."

VI. The following documents cited in the procedure are relevant for the present decision.

D1: US 5764928 A

D2: US 4970898 A

D4: extract from the product catalogue from Endress +Hauser

D5: certificate of conformity PTB Nr. Ex-96.D.2017 X from the "Physikalisch Technische Bundesanstalt"

D6: extract from the manual "WIKA: Druck und Temperaturmesstechnik"

D8: Translation of the "Prüfbericht - test report - PTB Ex 98-28124", Physikalisch-Technische Bundesanstalt, Braunschweig und Berlin

D9: US 5637802 A

D10: US 5606513 A

Reasons for the Decision

1. Admission of late filed documents

1.1 The late filed document D8 was not admitted by the Opposition Division because the opponent had not provided sufficient proof that this document had been made available to the public before the priority date. The Board does not consider that the Opposition Division wrongly exercised its discretion not to admit

document D8. It is not the Board's function to review all the facts and circumstances of the case as if it were in that department's place, but only to verify whether the way in which the department had exercised its discretion lies within the proper limits (cf. G7/93).

With the grounds of appeal the opponent filed an affidavit of Mr. Thomas Biechele. The purpose of this affidavit is to show that a pressure sensor device with the designation "DeltaPilot S" was delivered in June 1997. This sensor device was said to disclose the relevant features according to document D8. The affidavit in fact explains the content of a delivery slip dated 3 June 1997 mentioning a "DELTAPILOT S DB 50". The affidavit does not indicate under which conditions the device was delivered nor did it contain any reference to document D8 and its possible publication date.

The Board, exercising its discretion under Article 12(4)RPBA, decides not to admit document D8 into the appeal procedure.

- 1.2 The opponent filed document D10 during the appeal procedure with letter dated 27 February 2014. The opponent justified the late filing of document D10 upon the basis that the search in preparation for the opposition was focused on a converter module in combination with a sensor module. The opponent had only recognized during the appeal procedure that the search should be extended. Therefore the document could not have been filed earlier.

The Board does not see any justification why the opponent could not have extended the scope of its prior art search already during the opposition period or the first instance procedure. In addition, document D10 does not prima facie disclose certain essential

features of the invention, in particular whether the mating member 270 seals hermetically the measurement circuitry 246' shown in figure 9a, and whether the multi-pin connector of connection 226 (cf. column 11, lines 30-46) represents an external module in the sense of the patent in suit. The Board therefore decides, exercising its discretion under Article 12(4) RPBA, not to admit document D10 into the procedure.

2. Main request, novelty (Article 54 EPC)

2.1 Lack of novelty was not an issue in the opposition procedure.

3. Main request, inventive step (Article 56 EPC)

3.1 The Board agrees with the Opposition Division and the opponent in that document D9 can be regarded as the closest prior art document. Document D9 (cf. figure 1) discloses a pressure sensor module 50 comprising:
a transducer having an isolator 67A, 67B adapted to receive process fluid, and having a pressure sensor 70A, 70B coupled to the isolator;
a circuit 57, 58 coupled to the pressure sensor and providing a bus 62 for energization, control, and a digital representation of pressure (cf. Figure 11, column 7, line 38-column 8, line 2);
a feedthrough 73A, 73B, 73C having contacts and an insulator 71 surrounding the contacts;
a housing 54 that surrounds the pressure sensor, the housing having a threaded sleeve (cf. Figures 1 and 12) supporting the feedthrough and a process fluid inlet 55 around the isolator, and the housing is integrally formed to hermetically seal the circuit part 57 and the pressure sensor;
the sleeve is adapted to support a selected external

module 52, 60.

3.2 The Board also agrees with the Opposition Division in that the subject-matter of claim 1 differs from document D9 in two respects in that in claim 1 of the patent in suit the process fluid inlet is threaded, and that the digitizing circuit 58 is located inside the hermetically sealed housing.

3.2.1 This second feature, that the digitizing circuit is located inside the hermetically sealed housing, concerns the main aspect of the invention. Paragraph [0002] of the patent in suit describes a prior art pressure sensor such as the one disclosed in document D9 and paragraph [0003] of the patent in suit discusses a problem with this type of sensor: *"Before the modules are joined, however, exposed electronic parts in the sensor modules can be damaged by handling, spilled or airborne corrosive chemicals, or weather conditions. These damaging conditions are often present in an installation location such as a chemical processing plant. Pressure transmitters are thus usually pre-assembled before they are brought into a process plant environment. This also means that the converter modules have to be completed before the sensor module is installed on the process piping"*. The electronic circuit in the claimed arrangement being sealed in the housing of the pressure sensor, even without the transmitter module being installed on the pressure sensor module, has therefore the **effect** that the converter module can be selected and installed later when the pressure sensor module is already attached to the tubing, while the circuit remains protected in the sealed housing of the pressure sensor. This increases the flexibility of setting up the installation.

- 3.2.2 The **problem** with respect to the pressure sensor as disclosed in document D9, identified in the patent in suit and credibly solved therein is thus to provide a flexible selection and installation of the transmitter module after attachment of the pressure sensor to the process tubing in a harsh environment.
- 3.2.3 In line with the general principles of the problem-solution approach as commonly used for assessing inventive step it has to be analysed first whether it is obvious for a person skilled in the art to find and address the above problem in view of document D9.
- 3.2.4 According to the opponent the problem with the modular pressure sensor of document D9 is to be seen as a lack of sufficient robustness. The digitizing circuit 58 was exposed to the environment in the case when the transmitter module 52 was not installed. However, this cannot be regarded as the problem with the pressure sensor of document D9. The complete pressure sensor of document D9 has sealed electronics, and it is therefore well protected. A separation of the modules in the processing plant is not foreseen.
- 3.2.5 The Board has analysed the other cited prior art documents to find out whether this problem of providing flexible selection and installation of the transmitter module after attachment of the pressure sensor to the process tubing has been addressed in the art.

Document D1 explains the logic of how a sensor unit 15 and a transmitter unit 20 cooperate over a bus. D1 does not give any indication how the units are mounted, that the electronics should be sealed and that the transmitter unit might be installed in the plant later

than the sensor unit.

D2 discloses a pressure transmitter with a circuit 20. The circuit 20 is in the sealed circuit compartment 12, and there is a terminal 16 in the terminal compartment 13. The circuit 20 includes the transmitter circuit (*A circuit is represented at 20 in the circuit compartment. The circuit can be conventional, as now used with two-wire transmitters that are well known in the art, cf. column 2, lines 51-54*). Thus D2 does not disclose a flexible arrangement whereby the transmitter circuit can be exchanged.

D4 which was considered as prior art by the examining division discloses different pressure sensor transmitters produced by the opponent. From this brochure it cannot be seen that the transmitter module is outside the sealed compartment so that it can be more easily changed.

D5 discloses a pressure sensor of the type embodied also in the alleged prior use as put forward by the opponent in connection with the non admitted document D8 with several printed circuit boards in a sealed chamber. A tube and cables come out of the chamber and end at a connector. The connector can certainly be connected to another unit. It is not disclosed that the connector comprises any electronic devices. It is not disclosed that the pressure sensor needs a further module to be operable. It is not disclosed that some external electronic module can be mounted **on** the sensor module.

D6 describes the principles of a pressure sensor and the different elements of such a sensor. It does not describe that a module is interchangeably mounted on

the pressure sensor.

- 3.2.6 Thus none of the prior art on file can be seen as recognising the problem identified in the patent in suit. The technical contribution of the patent in suit resides in identifying a problem which was hitherto not recognised in the prior art. As held in T 2/83, relating to so-called "problem inventions" the formulation of a hitherto unrecognised problem may in these circumstances give rise to patentable subject matter.
- 3.2.7 Since the identification of the problem is not obvious, the solution to the problem can not be obvious either, even if it retrospectively appears to be trivial in view of the identified problem.
- 3.3 The question whether the first distinguishing feature of claim 1 of the patent in suit, the threaded process fluid inlet, is obvious with respect to document D9 need not be addressed since the subject-matter of the independent claim 1 of the patent in suit has already been found to involve an inventive step by virtue of the second distinguishing feature alone.
- 3.4 The opponent submitted that a person skilled in the art who wants to modify the set-up disclosed in document D9 would consult document D1. Document D1 disclosed a modular set-up of a sensor. As could be seen from figure 1 a digital interface connector 55 connects the sensor module 15 to the electronic module 20. When this teaching was transferred to the pressure sensor of document D9, the person skilled in the art would obviously integrate the digitizing circuit in the cavity 75 and connect the transmitter module via the

feedthrough contacts. Thereby the person skilled in the art would arrive at the subject-matter of claim 1.

Document D1 discloses neither a sealed cavity nor where the boundaries of such a sealed cavity might be located. Document D1 just discloses in a schematic manner a sensor module 15 and an electronics module 20 which are connected by digital bus 55. Document D9 discloses a similar set-up: the sensor comprises a sensor unit 54 and a transmitter unit 52 connected by the data bus 62. Nothing in document D1 suggests that all elements of the sensor unit 54 should be placed in a sealed cavity. Further, the feedthroughs providing the electrical pathways across barrier 71 between the two circuit boards 57 and 58 are not adapted to connect to a selected external module.

- 3.5 For the reasons set forth above the subject-matter of claim 1 involves an inventive step. Independent claim 19 defines a corresponding method of manufacturing a pressure sensor module. The method of independent claim 19 therefore also involves an inventive step.
4. Accordingly, the auxiliary requests of the patentee need not be considered further.
5. As regards the opponent's request to remit the case to the first instance, the Board notes that the claims under consideration are the claims as granted and the prior art documents on file are the same as those considered by the Opposition division. Hence there are no new issues before the Board that would benefit from being assessed by two instances. The Board therefore dismisses this request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



D. Magliano

A. Klein

Decision electronically authenticated