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**Datasheet for the decision  
of 27 September 2016**

**Case Number:** T 1447/12 - 3.5.03

**Application Number:** 06825182.6

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**Language of the proceedings:** EN

**Title of invention:**

Process field device temperature control

**Applicant:**

Rosemount Inc.

**Headword:**

Field device/ROSEMOUNT

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step (no)



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Case Number: T 1447/12 - 3.5.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.03**  
**of 27 September 2016**

**Appellant:** Rosemount Inc.  
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**Representative:** Bohnenberger, Johannes  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 28 December  
2011 refusing European patent application  
No. 06825182.6 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** F. van der Voort  
**Members:** A. Madenach  
P. Guntz

## Summary of Facts and Submissions

I. The present appeal arises from the decision of the examining division refusing European patent application No. 06825182.6, published as WO 2007/041188 A1, on the grounds that the independent claims of each of a main and an auxiliary request were not clear (Article 84 EPC) and that their subject-matter did not involve an inventive step (Articles 52(1) and 56 EPC) having regard to either

D1: US 2003/0221491 A1

or

D2: US 5 932 332 A,

and taking into account the common general knowledge of the person skilled in the art.

II. In the statement of grounds of appeal, the appellant requested that the decision under appeal be set aside and that a European patent be granted on the basis of claims of a main request or an auxiliary request. As an auxiliary measure, oral proceedings were requested.

III. In a communication pursuant to Article 15(1) RPBA accompanying a summons to oral proceedings, the board gave its preliminary opinion, *inter alia* raising objections under Articles 52(1) and 56 EPC having regard to either D1 or D2.

IV. With a letter dated 26 August 2016, the appellant submitted, by way of replacement, claims 1 to 20 of a main request and claims 1 to 5 of an auxiliary request.

V. Oral proceedings were held on 27 September 2016.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 20 of a main request or, in the alternative, on the basis of claims 1 to 5 of an auxiliary request, both requests as filed with the letter dated 26 August 2016.

At the end of the oral proceedings, after deliberation, the chairman announced the board's decision.

VI. Claim 1 of the main request reads as follows:

"A field device system (12) for use in an industrial process configured to couple to a process control loop (18) comprising:

a field device (14) having a housing configured to couple to the industrial process and monitor or control the industrial process, the field device (14) including a temperature control signal output (20) related to a temperature of the field device (14), wherein the field device (14) includes an internal temperature sensor (36) and the temperature control signal output (20) is related to the temperature of the temperature sensor (36), and wherein the field device (14) includes a process interface element (30) configured to sense a process variable of the industrial process and wherein the field device (14) is adapted to transmit information related to the process variable via the control loop (18);

a separate heater (22) mounted to the field device (14) by means of an interface between a connector (82) on the heater (22) and a mating connector (84) on the

field device (14), wherein the heater (22) is configured to heat the field device in response to the temperature control signal (20), and

a separate heater element (24), which is mounted externally on the housing of the field device (14) and controlled by the heater (22) in response to the temperature control signal output (20), wherein a connection (88) from the heater (22) is used to power the heater element (24), and wherein a relationship between the temperature control signal output (2) and heat from the heater element (24) is programmable."

Claim 1 of the auxiliary request reads as follows:

"A method reducing accumulation of process material on a field device (14) in an industrial process, comprising:

sensing an internal temperature of the field device (14);

providing a temperature control signal output (20) related to the sensed temperature;

coupling the temperature control signal output (20) to a heater (22) which is thermally coupleable to the field device (14);

responsively heating the field device (14) with the heater (22) as a function upon the temperature control signal output, and

measuring temperature of the field device (14) with an internal temperature sensor (36) and the temperature

control signal output (20) is related to temperature of the temperature sensor (36),

characterised in that:

the heater (22) is a separate element which is mounted to the field device (14) by means of an interface between a connector (82) on the heater (22) and a mating connector (84) on the field device (14), and characterized by

heating the field device (14) by means of a heating element (24), which is mounted externally on the housing of the field device (14) and which is controlled by the heater (22) in response to the temperature control signal output (20),

powering the heater element (24) by means of a connection (88) from the heater (22), and

programming a relationship between the temperature control signal output (20) and heat from the heater element (24)."

## **Reasons for the Decision**

1. *Claim 1 of the main request - inventive step (Articles 52(1) and 56 EPC)*

1.1 The board considers D2, and in particular the embodiment shown in Figure 4, as representing the closest prior art.

The board notes that some of the features relevant to claim 1 are not explicitly shown in Figure 4. They can,

however, be deduced from Figures 2A and 2E and the related description, which also apply to the embodiment of Figure 4, it being noted that, compared to the embodiments of Figures 2A, 2E and 3, the embodiment of Figure 4 additionally provides venting for cooling the control unit (cf. col. 8, lines 20-23, and col. 17, lines 10-13). The appellant did not object.

More specifically, document D2 relates to a pressure transducer assembly for controlling the pressure of gases or vapours, useful for example in the production of semiconductor devices (column 1, lines 22-50). Hence, the transducer assembly may be considered as a field device system for use in an industrial process.

The field device, i.e. the pressure transducer, is configured to couple to a process control loop via the output of the transducer output signal (see Figure 2E and column 9, lines 17-27) and includes a sensor 210 and a thermal shell 216 configured to couple to the industrial process via a tube 214 (column 9, lines 8-10) and to monitor or control the industrial process via a control unit 220 (column 9, lines 17-23). The field device further includes a temperature control signal output related to a temperature of the field device (Figure 2E: "temperature measurement from temperature sensor" and column 11, lines 3-22), an internal temperature sensor wherein the temperature control signal output is related to the temperature of the temperature sensor (*ibidem*), and a process interface element in the form of the sensor 210 which is configured to sense a process variable, i.e. the pressure of gases or vapours used in the process as established by capacitance measurements (cf. column 1, lines 62-65), of the industrial process. The field device is adapted to transmit information related to

the process variable (Figure 2E: "capacitance measurement from sensor output terminals") via the control loop (Figure 2E: "transducer output signal").

The field device system further comprises a separate temperature controller 220b, which corresponds to the separate heater in the terminology of claim 1, mounted on the field device, wherein the heater is configured to heat the field device in response to the temperature control signal (column 11, lines 3-22).

The field device system further comprises a separate heater (a heater element in the terminology of claim 1), shown as 218 in Figure 2A, which is mounted externally on the thermal shell 216 of the field device and which is controlled by the temperature controller (i.e. the heater) in response to the temperature control signal output (column 11, lines 3-22).

- 1.2 Claim 1 uses the term "housing", in which the housing is a part of the field device ("a field device (14) having a housing") and wherein the separate heater element "is mounted externally on the housing".

The board notes that the term "housing" does not appear in the application as filed. Hence, any type of "housing" which is a part of the field device and which houses one or more elements of the field device, for example the sensor, may be considered as constituting a housing within the meaning of claim 1. It is also noted that the claimed field device may have more than one housing. Further, it is noted that it is arguable that Figure 5 of the application in suit shows a housing. However, the housing as referred to in claim 1 is not limited to this specific housing and is therefore to be interpreted more generally.



With this in mind, the thermal shell 216 which houses the sensor 210 (column 9, lines 8-10 ("Sensor 210 is housed within thermal shell 216 ...")), wherein the heater element 218 is mounted externally on the thermal shell 216, can be considered as constituting a "housing" within the meaning of claim 1.

1.3 It follows that the subject-matter of claim 1 differs from the system known from D2 in that:

(i) the separate heater is mounted to (*sic*) the field device by means of an interface between a connector on the heater and a mating connector on the field device;

(ii) a connection from the heater is used to power the heater element; and

(iii) a relationship between the temperature control signal output and heat from the heater element is programmable.

1.4 None of the above features (i) to (iii), either alone or in combination with one of the other features contributes to an inventive step for the following reasons:

Re (i): From D2, Figure 2E ("temperature measurement from temperature sensor") in combination with column 11, lines 3-22, it follows that an interface between the temperature controller (*i.e.* the heater) 220b and the field device, which includes the temperature sensor, is present. D2 leaves it open whether this interface is a direct wired connection or implemented by means of a connector/mating connector

pair, all well-known *per se*. In view of the embodiment of Figure 4 of D2, in which the temperature controller (*i.e.* the heater) is mounted on the field device by means of screws 250a and, hence, can be separately removed, the skilled person would, without exercising inventive skill, consider an implementation using a connection by means of a connector/mating connector pair, in order to allow the upper housing, which includes the temperature controller (*i.e.* the heater) 220b, to be easily unscrewed and removed from the lower housing which includes the field device.

Re (ii): The powering of the heater (*i.e.* the heater element) 218 in the system of D2 is not further described. In the absence of any specific information, the skilled person would however, without exercising inventive skill, consider powering by means of a connection from the heater to the heater element, since, by doing so, a separate power supply can easily be avoided and the heater element can be directly controlled by the heater via the power connection.

Re (iii): According to D2, the temperature controller 220b (*i.e.* the heater in the terminology of claim 1) may be a PID controller (column 11, lines 3-22). No further information concerning the controller is given. The skilled person would therefore, depending on the circumstances, choose between two generally known options, namely a hardware controller or a software-implemented and thus programmable PID controller, without the exercise of inventive skill.

The absence of a possible synergistic technical effect achieved by combining features (i) to (iii) is discussed in point 1.5 below in connection with the appellant's arguments.

1.5 The appellant argued that the skilled person would consider the whole transducer 200 or, at the very least, the part within the lower enclosure 212d as a field device in the sense of claim 1, with the enclosure 212d forming its housing. Consequently, the heater (*i.e.* the heater element) 218 arranged on the thermal shell 216 (see Figure 2A) would not be mounted externally on the housing, as required by claim 1. In combination with a connection between the temperature controller (*i.e.* the heater) and the field device by means of a connector/mating connector pair and the powering of the heater (*i.e.* the heater element) through the temperature controller (*i.e.* the heater) via a connection from the temperature controller, a system is arrived at which allowed for a "normal" field device (*i.e.* one without heater and heater element) to be modified, as required, by the addition of the heater and the heater element (cf. the letter dated 26 August 2016, point 8, first sentence).

The board does not accept this argument, since it is based on a particular interpretation of the term "housing" for which the application as filed does not provide a basis (see point 1.2 above). Further, as is apparent from Figure 5 of the application, only the heater 22 is shown to be easily attachable/detachable to/from the field device 14. The same, however, applies to the corresponding temperature controller 220b in the embodiment of Figure 4 of D2. In contrast, the heater element 24 in Figure 5 is not shown to be easily attachable/detachable to/from the field device 14, nor is there any indication to that effect in the description. According to page 10, lines 10-12, the heater element 24 is preferably mounted on the field

device 14. The nature of this mounting is, however, not specified.

Hence, in view of the general meaning of the term "housing" in claim 1, which may be the thermal shell 216 of the field device system of D2, in which the heater element 218 is mounted externally on the thermal shell, and considering that in Figure 5 only the heater is shown to be attachable/detachable to/from the field device 14, even if the claim were interpreted in the light of the description the alleged combinatorial effect is not given.

1.6 For the above reasons, the subject-matter of claim 1 of the main request lacks an inventive step and thus does not meet the requirements of Articles 52(1) and 56 EPC. The main request is therefore not allowable.

2. *Claim 1 of the auxiliary request - inventive step (Articles 52(1) and 56 EPC)*

2.1 Claim 1 of the auxiliary request is essentially directed to a method [of] reducing accumulation of process material on a field device, using a field device system as defined in claim 1 of the main request.

2.2 According to D2, column 1, lines 42-50, the transducers are heated in order to prevent sublimation or precipitation of solid material in vapour deposition processes. Hence, by means of the transducer of D2, which corresponds to the field device of claim 1 of the main request (see point 1.1 above), the same result, i.e. a reduction in accumulation of process material on the transducer, is achieved. Since the remaining functional and constructional features of claim 1

correspond to features of claim 1 of the main request, which was not contested by the appellant, the subject-matter of claim 1 of the auxiliary request does not involve an inventive step and, hence, does not meet the requirements of Articles 52(1) and 56 EPC.

2.3 For the above reasons, the auxiliary request is not allowable.

3. Since none of the requests on file is allowable, the appeal is to be dismissed.

### **Order**

#### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



G. Rauh

F. van der Voort

Decision electronically authenticated