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**Datasheet for the decision  
of 11 December 2023**

**Case Number:** T 2045/20 - 3.5.02

**Application Number:** 11848107.6

**Publication Number:** 2654061

**IPC:** H01H35/00, G08B21/02,  
H03K17/94, G01V8/20

**Language of the proceedings:** EN

**Title of invention:**

Multi-axis photoelectric sensor

**Patent Proprietor:**

Omron Corporation

**Opponents:**

SICK AG  
Leuze electronic GmbH & Co. KG

**Relevant legal provisions:**

EPC Art. 100(a), 54, 56

**Keyword:**

Novelty - main request (yes)  
Inventive step - main request (yes)

**Decisions cited:**

T 0332/87



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Case Number: T 2045/20 - 3.5.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 11 December 2023**

**Appellant:**  
(Opponent 1)

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(Opponent 2)

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**Decision under appeal:**

**Decision of the Opposition Division of the  
European Patent Office posted on 7 December 2020  
rejecting the opposition filed against European  
patent No. 2654061 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman**            R. Lord  
**Members:**            C.D. Vassoille  
                              J. Hoppe  
                              G. Flyng  
                              R. Cramer

## Summary of Facts and Submissions

I. The appeals of the opponents concern the decision of the opposition division with which the oppositions against European patent no. 2 654 061 were rejected.

II. The following documents are relevant for the present decision:

E1: EP 1 331 433 A2

E2: JP 2007 235408 A (and English translation E2.1/E2.2)

E16: DE 20 2009 008 950 U1

E17: Operating manual "SafetyLab", Leuze electronic GmbH + Co. KG (2009/03)

E18: Operating manual "COMPACTplus-m", Leuze electronic GmbH + Co. KG (2009/12)

E19: Operating manual "MLD 300, MLD 500", Leuze electronic GmbH + Co. KG (2010/08)

III. In a communication under Article 15(1) RPBA, the board informed the parties of its preliminary opinion according to which the maintenance of the patent was not prejudiced by the ground for opposition under Article 100(a) EPC in combination with Articles 54 and 56 EPC.

IV. Oral proceedings before the board took place on 11 December 2023 as a videoconference.

The appellants (opponent 1 and opponent 2) requested that the decision under appeal be set aside and the European patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or as an auxiliary measure that the patent be maintained in amended form based on one of auxiliary requests 1 to 4, filed with the reply to the statements of grounds of appeal.

- V. Claim 1 of the patent as granted, according to the respondent's main request, reads as follows (feature numbering added in squared brackets):

"**[1.1]** A multi-axis photoelectric sensor (S) comprising;

**[1.2]** a projector (1) and an optical receiver (2) disposed opposed to each other, between which a detection area (LC) is formed by a plurality of optical axes;

**[1.3]** detection means that sequentially detects a non-shielded state/a shielded state of the optical axes to determine the non-shielded state/shielded state of the detection area (LC) as a whole;

**[1.4]** signal output means that outputs a high-level signal while the detection means determines that the detection area (LC) is in the non-shielded state and stops the signal output when the detection means determines that the detection area (LC) is shielded; and

**[1.5]** muting processing means that temporarily disables the signal output stop function of the signal output means on a condition that the determination results from the detection means and a detection signal input from an external muting device change according to a prescribed sequence, wherein

[1.6] the muting processing means includes abnormality detection means that divides into a plurality of stages the sequence of a change in the determination results from the detection means and the detection signal from the muting device for monitoring to detect an abnormality in the sequence in the one of the plurality of stages being monitored; and

[1.7] output control means that prevents the signal output stop function from being disabled in response to detection of the abnormality by the abnormality detection means, **characterized in that**

[1.8] the muting processing means further includes notification means that outputs, in response to detection of the abnormality by the abnormality detection means, information indicating a type of the one of the plurality of stages in which the abnormality has been detected."

Claims 2 to 6 are dependent on claim 1.

VI. The arguments of the appellants which are relevant for the present decision can be summarised as follows:

The ground for opposition under Article 100(a) EPC in conjunction with Articles 54 and 56 EPC prejudiced the maintenance of the patent as granted.

In particular, the subject-matter of claim 1 of the main request was not new with respect to any of documents E1, E2 and E16. The subject-matter of claim 1 was also not new with respect to either of documents E18 and E19, which constituted prior art under Article 54(2) EPC.

In any event, even if feature 1.8 were considered not to be disclosed in any of those documents, the subject-

matter of claim 1 would not involve an inventive step, either when considering documents E1 or E2 alone, or when considering document E1 in combination with E2. There was also no inventive step with regard to document E16 in combination with documents E1 or E2. Furthermore, the subject-matter of claim 1 of the main request did not involve an inventive step in view of a combination of documents E1, E2 or E16 with either of documents E18 or E19.

The detailed arguments are discussed in the reasons below.

VII. The arguments of the respondent which are relevant for the present decision can be summarised as follows:

No objection based on document E17 was discussed in the statement of grounds of appeal of opponent 2 and therefore the requirements of Article 12(3) RPBA were not fulfilled with respect to this document.

The arguments of opponents 1 and 2 concerning document E2 should not be taken into account in the appeal proceedings, since no proper evidence in the form of an acceptable translation into one of the official languages of the European Patent Office was submitted in the appeal proceedings.

The subject-matter of claim 1 was new with respect to each of documents E1, E2, E16, E18 and E19, since none of these documents disclosed at least feature 1.8. It followed that also the combination of these documents did not result in the subject-matter of claim 1 of the main request. The ground for opposition under Article 100(a) EPC in conjunction with Articles 54 and 56 EPC

therefore did not prejudice the maintenance of the patent as granted.

## **Reasons for the Decision**

### *1. Introductory remarks*

#### *1.1 Relevance of document E17*

1.1.1 In the appeal proceedings, the opponents did not provide any substantiated arguments based on document E17. In their statement of grounds of appeal, opponent 2 gave reasons why documents E17, E18 and E19 constituted prior art under Article 54(2) EPC. However, neither in the written procedure nor at the oral proceedings did they explain the significance of document E17 with regard to the subject-matter of claim 1.

1.1.2 In the communication under Article 15(1) RPBA, the board already noted that there was no substantiated factual submission under Article 12(3) RPBA present in the appeal proceedings with regard to document E17. The opponents have not disputed this and have not provided any further substantiation in this regard. Document E17 is therefore not admitted into the appeal proceedings (Article 12(5) RPBA).

The question of whether this document is to be considered as prior art under Article 54(2) EPC can therefore be left open.



1.2 *Translation of document E2*

1.2.1 In the reply to the appeals the respondent argued that neither of the opponents had submitted a translation of document E2 or clearly identified the version of the translation relied on in their statement of grounds of appeal. Opponent 1 had submitted an insufficient translation E2.1 on 24 May 2019 and another translation E2.2 was submitted on 3 June 2020. The arguments of opponents 1 and 2 concerning document E2 thus should not be taken into account in the appeal proceedings, since no proper evidence in the form of an acceptable translation into one of the official languages of the European Patent Office was submitted in the appeal proceedings.

1.2.2 As the board already pointed out in its communication under Article 15(1) RPBA, documentary evidence may be filed in any language, but the EPO may require that a translation into one of the official languages be filed. The document may only be disregarded if a required translation is not filed in due time (Rule 3(3) EPC). However, the condition of this last sentence is not fulfilled, nor was its non-fulfilment invoked by the respondent.

Additionally, as the respondent themselves pointed out, a further translation E2.2 of document E2 was filed on 3 June 2020 and this translation is a certified translation (Rule 5 EPC). Consequently, it is not apparent to the board that the respondent was prevented from relying on the certified translation, nor have they presented any arguments in support of their assertion that the translation E2.1 was inadequate, in

particular in comparison with the certified version of the E2 translation (E2.2).

The board therefore concludes that there is no convincing reason why the submissions based on documents E2 and E2.1 should not be taken into account in the appeal proceedings.

2. *Main request - Ground for opposition under Article 100(a) in combination with Article 54 EPC*

The subject-matter of claim 1 of the respondent's main request is new, since none of documents E1, E2, E16, E18 and E19 discloses at least feature 1.8, i.e. that the muting processing means further includes notification means that outputs, in response to detection of the abnormality by the abnormality detection means, information indicating a type of the one of the plurality of stages in which the abnormality has been detected.

2.1 *Document E1*

2.1.1 As regards novelty of the subject-matter of claim 1 of the main request with respect to document E1, opponent 2 argued that paragraph [0066] of E1 disclosed feature 1.8 in that an abnormality was detected and an error message displayed. However, the board notes that paragraph [0066] concerns an invalid muting area switching signal from the sequencer. It is thus not clear how this passage could be understood to refer to a detected abnormality within the meaning of claim 1, which is an abnormality in the sequence in the one of the plurality of stages being monitored. Irrespective of this, the mere displaying of an error message in any case cannot be directly and unambiguously equated with

feature 1.8, according to which the notification means outputs, in response to detection of the abnormality by the abnormality detection means, information indicating a type of the one of the plurality of stages in which the abnormality has been detected.

- 2.1.2 Furthermore, document E1 in paragraph [0042] discloses that when the muting area is set, the indicator lamps of the mode state indicator lamp group 70 that correspond to the optical paths where muting is set are turned on. It is further disclosed in this paragraph that this enables the user to visually check whether or not the muting area is set for each optical path. The mere visual indication of muted areas cannot be equated with feature 1.8 either. In particular, this clearly does not correspond to displaying information indicating a type of the one of the plurality of stages in which an abnormality has been detected. Neither in paragraph [0042] nor in paragraph [0041] is it directly and clearly disclosed that the indicator lamps (see figure 10) are used in any way to indicate an impermissible object, such as a human body. Even if this were true, however, the board is still not convinced that this corresponds to an indication of a type of the one of the plurality of stages in which the abnormality has been detected, as required by feature 1.8.

Since neither of the passages mentioned above discloses the subject-matter of feature 1.8, this also applies to a combination of these passages in the sense of an overall assessment of the disclosure of document E1.

- 2.1.3 Opponent 1 further argued that figures 12a to 12c of document E1 illustrated the muting process of a permissible object. Furthermore, the indicator lamp

group of figure 10 showed an indicator lamp group which, according to paragraph [0062], indicated not only the permissible objects but also the impermissible objects entering the light curtain.

The board notes that, according to paragraph [0062] of E1, the operation of the pressing machine 11 is forcibly stopped when the human body enters together with the workpiece through the light curtain. There is no indication in paragraph [0062], in particular not in connection with the state display monitor of figure 10 of E1, that information is output indicating a type of the one of the plurality of stages in which the abnormality has been detected, within the meaning of feature 1.8.

The foregoing also applies when the disclosure of paragraph [0066] of E1 is additionally considered. In particular, as already noted above, paragraph [0066] refers to an error in the sequencer, as correctly identified by the opposition division. Considering this, it is not apparent, nor has it been convincingly argued by the opponents, how this indicates an output, in response to the detection of the abnormality by the abnormality detection means, of information indicating a type of the one of the plurality of stages in which an abnormality has been detected.

- 2.1.4 In the light of the above considerations, the board has come to the conclusion that document E1 does not disclose feature 1.8 and that the subject-matter of claim 1 of the main request is therefore new with respect to document E1.

## 2.2 Document E2

2.2.1 Opponent 1 essentially argued that the embodiment of document E2 shown in figure 12 and described *inter alia* in paragraph [0048] with respect to an operation indicator lamp for each of a plurality of detection areas, was also applicable to the embodiment according to figures 15 and 18. Furthermore, according to figure 18 and paragraph [0080] of E2, abnormalities in the sequence in the one of the plurality of stages being monitored were detected. This was also clear from paragraph [0059] of E2. Sequences 5 to 52 of figure 18 each constituted a separate detection area within the meaning of paragraph [0048] or [0073] of E2. The skilled person would therefore understand that the teaching of paragraph [0048] also applies to the embodiment according to figure 15 of document E2.

In this context, opponent 2 additionally argued that the two embodiments concerned in document E2 were in fact compatible, since they differed only in their geometric arrangement. In particular, the embodiment of figures 12 and 13 also included a muting function, as did the embodiment of figure 15.

2.2.2 The board does not agree with the opponents' argument according to which the skilled person would directly and unambiguously understand the use of an operation indicator lamp, as described in paragraph [0048], to be applicable to the embodiment of figure 15 of document E2 (see the translation E2.2). On the contrary, the description in paragraphs [0073] ff., in particular with reference to figure 15, as stated by the respondent, describes a preset muting sequence based on a known shape of a workpiece and the predicted

interruption of the optical axes. This is not the case in the embodiment of figure 12. Rather, as correctly found by the opposition division, paragraphs [0047] and [0048] refer to the subdivision of a multi-axis photoelectric detector to create detection regions without any reference to stages, monitoring or muting. Rather, the embodiment of figure 12 is concerned with adjacent workbenches and corresponding adjacent light projection/reception units with overlapping detection areas. The opposition division therefore correctly concluded that paragraph [0048] of document E2 relates to a fundamentally different embodiment than paragraphs [0070] to [0077]. This is not changed by the fact that paragraph [0076] of document E2 states that the light curtain can be switched off when a person is expected to be in a certain area.

Thus, there is nothing disclosed in document E2 that would lead the skilled person to believe that the detection areas in the embodiment of figure 12 correspond to the sequence steps in the embodiment of figures 15, 18.

2.2.3 The decision of the board of appeal in T 332/87, cited by opponent 1, cannot be considered relevant either. Unlike in the cited case T 332/87, as explained above, the different embodiments of document E2 concern different underlying teachings and there is no guidance for the skilled person as to how they could be combined.

2.2.4 For the sake of completeness, it should also be noted that the timing diagram according to figure 18 of E2 cannot be understood as a visual indication of a detected abnormality in the sense of feature 1.8, namely an output of information indicating the type of

one of the plurality of stages in which the abnormality has been detected. On the contrary, as rightly argued by the respondent, a timing diagram is fundamentally different from notification means within the meaning of feature 1.8.

2.2.5 In the light of the above considerations, the board has come to conclusion that document E2 does not disclose feature 1.8 and that the subject-matter of claim 1 of the main request is therefore new with respect to document E2.

### 2.3 *Documents E16, E18 and E19*

2.3.1 Document E16 in paragraph [0035] discloses a seven-segment display for displaying error messages in the form of error codes. It does not contain a more detailed description of the type of error codes to be displayed. Against this background, the board already set out in the communication under Article 15(1) RPBA that document E16 did not appear to contain any explicit or implicit information as to the indication of a type of the one of the plurality of stages in a muting sequence in which an abnormality has occurred (and also expressed a similar preliminary opinion with respect to documents E18 and E19). Since neither of the opponents presented new arguments on this issue, the board maintains its opinion and concludes that feature 1.8 is not disclosed in document E16. The subject-matter of claim 1 of the main request is therefore new with respect to document E16.

2.3.2 Similarly, document E18 in section 5.2.1 on pages 38, 39 discloses a seven-segment display which is capable of indicating muting errors such as error code "E 50"

indicating that a muting time limit has been exceeded ("Muting-Zeitbegrenzung überschritten"), see page 102. Thus, while a muting error can be displayed in E18, feature 1.8 explicitly requires information indicating a type of the one of the plurality of stages in which the abnormality has been detected to be output. This feature does not result directly and unambiguously from the mere indication of a muting error, in particular not by the mere indication that the muting time limit has been exceeded.

Since the opponents have not put forward any further arguments on this point, the board confirms its preliminary opinion that feature 1.8 is not disclosed in document E18 and that the subject-matter of claim 1 of the main request is therefore new with respect to document E18.

2.3.3 The reasons given above for documents E16 and E18 also apply in principle to document E19, where on pages 13 and 14 a seven-segment display for indicating muting errors, such as the expiry of a muting time limit, is disclosed (see section 3.3.3). In addition, section 3.3.4 discloses a muting indicator lamp ("Muting Leuchtmelder"), which can also indicate muting errors. However, there is no disclosure which suggests that the muting errors relate to a type of the one of the plurality of stages in which the abnormality has been detected, as required by feature 1.8.

In the absence of further submissions by the opponents on this point, the board confirms its preliminary opinion that feature 1.8 is not disclosed in document E19 and that the subject-matter of claim 1 of the main request is therefore new over document E19.



#### 2.4 *Conclusion on Novelty*

Since the subject-matter of claim 1 of the main request is new with respect to each of documents E1, E2, E16, E18 and E19, and since the opponents did not raise any further objections of lack of novelty against the main request, the board concluded that the ground for opposition under Article 100(a) EPC in combination with Article 54 EPC does not prejudice the maintenance of the patent as granted.

#### 3. *Main request - Ground for opposition under Article 100(a) in combination with Article 56 EPC*

3.1 In view of the distinguishing feature 1.8, opponent 1 argued that the subject-matter of claim 1 was obvious in view of document E1 or document E2 alone or in view of a combination of document E1 with document E2.

Opponent 2 essentially argued in their statement of grounds of appeal that the subject-matter of claim 1 of the main request did not involve an inventive step with respect to a combination of E1 or E2 or E16 with one of the documents E18 or E19. No detailed arguments were put forward in this respect.

3.2 As the board found under point 2 above, the output of information within the meaning of feature 1.8 is not known from any of the documents E1, E2, E16, E18 or E19. It follows directly from this that even the combination of these documents does not lead to the subject-matter of claim 1.

3.3 Opponent 1 identified the objective technical problem solved by distinguishing feature 1.8 as providing a

better diagnosable photoelectric sensor with multiple optical axes. This objective technical problem was suitable both with regard to document E1 as a starting point for assessing inventive step and with regard to document E2 as a starting point.

- 3.4 Opponent 1 argued that the person skilled in the art, when searching for solutions to the objective technical problem, would readily have considered indicating the type of the one of the plurality of stages in which the abnormality was detected in documents E1 and E2, since fault indications for different muting stages were already known from those documents.
- 3.5 It is not apparent to the board, and the opponents have not submitted anything to this effect, what disclosure in the prior art would have motivated the skilled person, faced with this objective technical problem, to modify the devices of documents E1 and E2 in a manner that would arrive at the subject-matter of claim 1 of the main request, i.e. to provide notification means as defined by feature 1.8. Nor did the opponents convincingly show that such a modification would have been within the common general knowledge of the skilled person. Common general knowledge was only demonstrated for feature 1.4, but not for feature 1.8.
- 3.6 As the board has already explained in sections 2.1 and 2.2 above, although documents E1 and E2 disclose the indication of muting states, they do not contain any reference to an indication of a type of the one of the plurality of stages in which the abnormality has been detected, as required by feature 1.8.
- 3.7 Furthermore, in the embodiments relevant to the claimed invention, both documents E1 and E2 disclose at most

the detection of an impermissible object in the detection area, but again, no indication of a type of the one of the plurality of stages in which the abnormality has been detected, as required by feature 1.8.

3.8 Moreover, the opponents have not convincingly shown how a corresponding modification of the respective multi-axis photoelectric sensors in E1 and E2 would be implemented in detail and to what extent the notification means disclosed in these documents are at all suitable for displaying information within the meaning of feature 1.8.

3.9 In this context, it should in particular be noted that the embodiment according to figure 12 in connection with paragraph [0048] of document E2 is not compatible with the embodiment of figure 15, as already explained in the above section 2.2. In particular, the assumption of opponent 2 that the embodiments differ only in their geometric arrangement is not correct. The skilled person would therefore have had no reason to combine the two embodiments.

3.10 Moreover, it follows directly from the above that the subject-matter of claim 1 of the main request is also not rendered obvious by a combination of document E1 with document E2. It could therefore be left open whether this objection, raised for the first time in the oral proceedings before the board in respect of distinguishing feature 1.8, should be admitted into the appeal proceedings.

3.11 The above considerations in principle also apply to document E16 when considered as a starting point in the assessment of inventive step.

3.12 Furthermore, neither of documents E18 or E19 provides any motivation for the person skilled in the art to modify the multi-axis photoelectric sensor of documents E1, E2 or E16 in a way that would arrive at the claimed invention. As stated under point 2.3 above, neither of documents E18 and E19 discloses or suggests a notification means that outputs, in response to detection of abnormality by the abnormality detection means, information indicating a type of the one of the plurality of stages in which the abnormality has been detected.

The opponents did not submit any further arguments concerning the obviousness of the subject-matter of claim 1 based on a combination of documents E1, E2 or E16 with one of documents E18 or E19.

3.13 Since the board in any case did not consider documents E18 and E19 to be relevant with regard to the patentability of the subject-matter of claim 1, the question of whether these documents constituted prior art under Article 54(2) EPC could be left open.

3.14 In the light of the above considerations, the board has come to the conclusion that the subject-matter of claim 1 of the main request is not rendered obvious by the relevant prior art and that the ground for opposition under Article 100(a) EPC in combination with Article 56 EPC does not prejudice the maintenance of the patent as granted.

#### 4. *Result*

Since the ground for opposition under Article 100(a) EPC in combination with Articles 54 and 56 EPC does not

prejudice the maintenance of the patent as granted, and since no further grounds for opposition were raised by the opponents, the board had to accede to the respondent's main request.

## Order

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

The appeals are dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated