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Datasheet for the decision
of 10 June 2025

Case Number: T 0287/23 - 3.5.05

Application Number: 17172153.3

Publication Number: 3264210

IPC: G05B23/02

Language of the proceedings: EN

Title of invention:
Safety system, program, and method

Patent Proprietor:
Omron Corporation

Opponent:
Wieland Electric GmbH

Headword:
Retroactive analysis in a safety system/OMRON

Relevant legal provisions:
EPC Art. 56, 100(a)

Keyword:
Inventive step - main and auxiliary requests (no): no credible
technical effect over the whole scope claimed - distinguishing
features relate to arbitrary and non-functional measures

Decisions cited:

G 0001/19, G 0002/21, T 0746/22, T 1699/22, T 2010/22,
T 1580/23

Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: **T 0287/23 - 3.5.05**

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 10 June 2025

Appellant: (Patent Proprietor)	Omron Corporation 801 Minamifudodo-cho Horikawahigashiiru Shiokoji-dori Shimogyo-ku Kyoto-shi, Kyoto 600-8530 (JP)
Representative:	HKW Intellectual Property PartG mbB Theresienhöhe 12 80339 München (DE)
Respondent: (Opponent)	Wieland Electric GmbH Brenner Str. 10-14 96052 Bamberg (DE)
Representative:	2K Patentanwälte Blasberg Kewitz & Reichel Partnerschaft mbB Schumannstrasse 27 60325 Frankfurt am Main (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 14 December 2022 revoking European patent No. 3264210 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Peirs
	C. Heath

Summary of Facts and Submissions

I.   The appeal lies from the decision of the opposition
        division to revoke the opposed patent (Article 101(2)
        and 101(3)(b) EPC).

        This decision was based on a main request and two
        auxiliary requests (first and second auxiliary
        requests). The opposition division deemed that none of
        the claim requests complied with Articles 54 or 56 EPC.
        The appealed decision had regard to the following
        prior-art document:

        D11:   Wieland Electric GmbH, "*samos*® PRO - *samos*®
                PLAN5+ Software" Manual; Doc. no. BA000968,
                11/2014 (Rev. A); Wieland Electric GmbH,
                November 2014.

II.   Oral proceedings before the board were held on
        10 June 2025.

        The appellant (patent proprietor) requested that the
        appealed decision be set aside and that the opposition
        be rejected (**main request**) or, in the alternative, that
        the patent be maintained in amended form based on the
        set of claims according to the **first auxiliary request**
        underlying the appealed decision or a **third auxiliary
        request** filed with the statement of grounds of appeal.

        The respondent (opponent) requested that the appeal be
        dismissed.

        At the end of the oral proceedings, the board's
        decision was announced.

III.   Claim 1 of the **main request** reads as follows (board's
        feature labelling):

        (a) "A safety system (1) comprising:
        (b) a safety controller (100) configured to execute a
            safety program;
        (c) a collection unit configured to collect an input
            value over a predetermined period, the input value
            being a value of an input signal selected
            previously in one or a plurality of input signals
            input to the safety controller (100); and
        (d) a visualization unit configured to reproduce a
            behavior of the safety program over the
            predetermined period based on the input value
            collected over the predetermined period, and to
            express visually an operating state of the safety
            program at an appointed point of time in the
            predetermined period,
            characterized in that:
        (e) the visualization unit comprises: a unit configured
            to schematize and display a combination of commands
            comprised in the safety program, and
        (f) a unit configured to change a display mode of a
            corresponding element comprised in the schematized
            display according to the input value, an internal
            value, and an output value, the internal value and
            the output value being calculated according to the
            input value."

IV.   Claim 1 of the **first auxiliary request** differs from
        claim 1 of the main request in that feature (c) is
        replaced by the following feature (board's feature
        labelling and underlining, the latter reflecting
        amendments vis-à-vis feature (c)):

(g) "a collection unit configured to collect<u>, from the safety controller (100),</u> an input value over a predetermined period, the input value being a value of an input signal selected previously in one or a plurality of input signals input to the safety controller (100); and".

V.   Claim 1 of the **third auxiliary request** differs from claim 1 of the first auxiliary request in that it further includes the following feature at the end (board's feature labelling):

(h) ", wherein the collection unit starts generation of the input value over the predetermined period when a predetermined collection condition is established, the input value comprising an input value before a point of time in which the collection condition is established".

Reasons for the Decision

1.   *Technical background*

1.1   The invention underlying the opposed patent addresses the difficulty of properly maintaining and diagnosing industrial safety systems after their initial deployment. When a safety operation causes a machine to stop, it can be difficult to identify the root cause, especially if the triggering event was transient or intermittent (e.g. a momentary interference with a sensor). According to the patent, this makes troubleshooting and verifying the correct performance of the safety components challenging.

1.2   The opposed patent therefore proposes a safety system
        that is designed for *ex-post facto* or retroactive
        analysis. This safety system comprises three main
        functional parts:

        -    a "safety controller" which executes a safety
             program;

        -    a "collection unit" configured to collect an "input
             value" over a predetermined period, where this
             input value is defined as the value of an input
             signal that was "input to the safety controller";

        -    a "visualisation unit" that uses this collected
             "input value" to reproduce a behaviour of the
             safety program over that predetermined period and
             then visually expresses the operating state of the
             program at an appointed point in time.

        This is supposed to allow an operator to "replay" the
        safety program's past execution based on its actual
        input history, thereby facilitating the investigation
        of the cause of a safety operation such as a
        malfunction.

1.3   Figure 1 (reproduced below) of the opposed patent
        schematically illustrates the overall architecture of
        the claimed "safety system (1)". The safety system
        includes a safety controller (100), which is the
        central processing unit running the safety logic. The
        "safety controller" receives input signals from safety
        components, such as a safety sensor (16) (e.g. a light
        curtain), and controls output devices, such as a safety
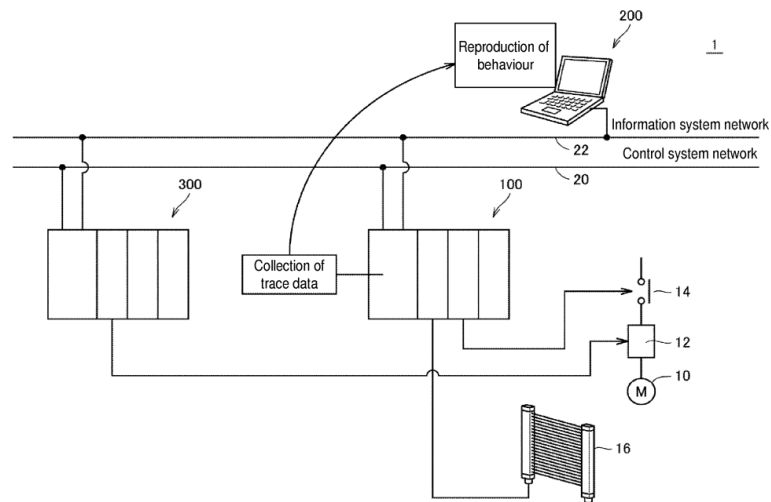   relay (14), which in turn can stop a motor (10).

FIG. 1

A "collection unit", represented conceptually by the
arrow labelled "Collection of trace data", gathers
trace data associated with the safety controller (100)
over a period of time. A support device (200), which
comprises the "visualisation unit", is configured to
receive this collected trace data. This support device
then performs the "Reproduction of behaviour", allowing
an operator to analyse the past operational state of
the safety program that was running on the safety
controller.

2.   *Main request: claim 1 – inventive step*

2.1   In Reasons 3.1.1 and 3.1.2 of the appealed decision,
        the opposition division found document **D11** to disclose
        all of the features of claim 1 as granted.

2.2   Reasons 3.1.2 of the appealed decision only provides
        excerpts from D11's disclosure for each feature. It
        does however not explicitly identify the specific
        components in D11 that correspond to each feature of
        granted claim 1. In order to determine whether the
        appellant's challenge to the disclosure in D11 of the

"collection unit" according to **feature (c)** and,
consequently, the basis for the "reproduction"
mentioned in **feature (d)** is well-founded, the board
would therefore need to conduct its own profound
analysis of D11.

2.3   Instead, the board accepts, *arguendo*, that D11 indeed
        does not disclose feature (c) and the sub-feature
        "based on the input value collected over the
        predetermined period" of feature (d).

2.4   The appellant ascribes to "the characterizing features
        of the invention" the technical effect that

        -   "it becomes possible to evaluate the safety system
            in the case of a malfunction or the like"

        or, in a refinement, that

        -   "it becomes possible to evaluate the safety system
            in the case of a malfunction <u>triggered by the input
            signal</u>" (emphasis as in the original).

        The board is not convinced that this technical effect
        can be credibly associated with **features (c) and (d)**.
        In fact, feature (c) relates to the collection of an
        unspecified input value and feature (d) to the
        presentation of information derived from that value.
        Moreover, the board notes that claim 1 is not limited
        to any state of "malfunction". The input signals
        mentioned in feature (c) could therefore relate to the
        system's normal operation. Furthermore, the evaluation
        of a "malfunction" in a complex safety system typically
        depends on a multitude of factors. While a specific
        "input value" *can* be a trigger, it is rarely the sole
        cause. Other factors, such as the internal logic of the

safety program, the internal state of the safety
controller, malfunctions in output devices or
environmental conditions, can also influence the
system's overall behaviour. Correspondingly, the board
does not consider the appellant's objective technical
problem framed as "allowing a more accurate evaluation
of a safety system" to be derivable from technical
effects directly and causally related to the technical
features of the claimed invention (see e.g. **G 2/21**,
Reasons 25).

2.5   In a further refinement, the appellant argued that the
        technical effect of the distinguishing features (c) and
        (d) was to enable a retroactive analysis of the safety
        program's behaviour. It described a scenario where, by
        collecting an input value from a safety component (such
        as a light curtain) and using it to reproduce the
        program's behaviour, an operator could identify the
        factor that caused a safety stop (referring to
        paragraph [0056] of the patent description).

        The board was not convinced by this line of argument
        for two reasons:

2.5.1   First, the technical effect of enabling a meaningful
        retroactive analysis is not credibly achieved over the
        entire scope of claim 1. The claim language is overly
        broad and covers embodiments where this specific
        technical effect would not materialise. To give an
        example, the board notes that claim 1 does not specify
        when the selection mentioned in feature (c) must occur.
        This means that the "input signals" are not limited to
        live operational data but could well be test signals
        from a storage medium (such as a DVD), having been
        "selected previously" during an early development
        phase. These test signals could in turn stem from a

rudimentary, earlier version of the program, e.g. a
version developed while in a debugging phase or as a
minimum viable product. Likewise, the "behaviour" being
reproduced in accordance with feature (d) is not
specified and could in fact relate to the basic
function of an early program version rather than the
currently deployed operational logic. In such cases,
which are actually encompassed by claim 1, the claimed
process would offer no practical retroactive-diagnostic
value for a deployed system. The appellant's scenario
is thus only *one* advantageous embodiment whose effects
however cannot be generalised to the claim as a whole.

2.5.2   Secondly, the board recalls that even if an
        advantageous technical effect is described in the
        patent specification, this is not sufficient for
        acknowledging an inventive step if it is not achieved
        by the invention as defined in the *claims* over their
        entire scope (cf. **T 2010/22**, Reasons 4.6.1).

2.6   In its preliminary opinion, the board had tentatively
        considered that features (c) and (d) could provide the
        technical effect of giving "some indication of which
        input values to take when the visualisation unit
        according to feature (d) reproduces the safety
        program's behaviour". However, upon further
        consideration of the breadth of claim 1 and on the
        basis of the parties' arguments exchanged at the
        hearing before the board, the board no longer adheres
        to this view, for the following reasons:

2.6.1   The phrase "selected previously" used in feature (c)
        provides no guarantee that the collected "input values"
        are indeed relevant to the current version of the
        safety program or its associated behaviour. As set out
        in point 2.5.1 above, it is well possible that the

selection was made for a rudimentary, earlier version
of the program. Using such outdated or contextually
irrelevant "input values" to reproduce the behaviour of
a different or more mature program version would, from
an objective perspective, not provide a useful
technical indication and could even be misleading.

2.6.2   The phrase "input signals input to the safety
         controller" mentioned in feature (c) does not, over the
         whole scope of claim 1, provide a reliable technical
         limitation that could justify an "indication" as
         referred to in the board's tentative technical effect.
         Claim 1 does not preclude that these signals may
         originate from a generic storage medium (cf.
         point 2.5.1 above). In such a scenario, there would be
         no verifiable link between the signals and the
         functional context of "the safety controller (100)". A
         skilled reader faced with signals on a storage medium
         would have, at least in general, no way of verifying
         their origin based on their intrinsic physical
         properties, such as amplitude or frequency. If the
         origin and relevance of the signals cannot be verified
         as to whether they stem from the specific "safety
         controller", they cannot provide a technically
         meaningful "indication" of which input values to take
         for a relevant reproduction.

2.6.3   The phrase "based on" used in feature (d) is also broad
         and does not imply a direct or an unmodified use of the
         collected "input value". It could encompass
         (significant) intermediate processing, where the
         collected input value is transformed before being used
         in the reproduction. If such an arbitrary processing is
         considered, *any* "input signal" could in principle be
         manipulated to produce a desired reproduction outcome.
         This would however render the choice of the initial

input signal technically meaningless, implying that it could not serve as a credible "indication" that constrains the reproduction in any technical sense.

2.7   In conclusion, it is not apparent to the board how the mere "collection" of unknown "input values" as per feature (c) on the basis of which an undefined "operating state of the safety program" is supposed to be "visualised" in accordance with feature (d) can lead to a tangible technical effect. Therefore, the respondent is right that no technical effect can be credibly associated with the distinguishing features considered by the appellant, at least not over the whole scope claimed. Hence, it is not possible for the board to formulate an objective technical problem that is derivable from effects directly and causally related to the technical features of the claimed invention.

2.8   In the absence of a credibly solved objective technical problem, no inventive step can be acknowledged on account of distinguishing features (c) and (d). The board reaches this conclusion based on two separate, alternative lines of reasoning:

2.8.1   Following the principles established in **G 1/19** (cf. Reasons 49, 82 and 124), the problem-solution approach may be concluded without formulating an objective technical problem if the distinguishing features do not credibly achieve any technical effect over the whole scope claimed (see e.g. **T 746/22**, Reasons 1.5 and **T 1699/22**, Reasons 2.7). Hence, features (c) and (d) cannot support an inventive step.

2.8.2   In the alternative, even when formally completing the problem-solution approach, the same conclusion is reached. The board finds the reasoning in case

T 1580/23 (Reasons 2.2.8) pertinent in this regard, where it was found that distinguishing features which solve no objective technical problem merely relate to an "arbitrary or non-functional modification" of the prior art and, as such, cannot contribute to an inventive step. The present board concurs with this approach and finds it useful to distinguish between these two terms. Distinguishing features can be regarded as being "arbitrary" when they represent a choice made without any technical reason or purpose, and "non-functional" when they have no objectively derivable technical function within the context of the claimed invention (see e.g. **G 1/19**, Reasons 33, last two sentences). While the former term focuses on the choice process and the latter on the outcome of the distinguishing features' implementation, both aspects are relevant to the case in hand.

2.8.3   Applying this framework to features (c) and (d), the board finds that the specific modification of the prior art associated with these features is not prompted by any technical consideration but represents a mere design choice. Therefore, using the terminology adopted in **T 1580/23**, the modification is "arbitrary". Likewise, since the board has already established that features (c) and (d) do not produce any credible technical effect, the resulting modification is "non-functional". A modification that is demonstrably both "arbitrary" and "non-functional" cannot contribute to an inventive step. In agreement with the conclusion in **T 1580/23**, the board therefore finds that the subject-matter of claim 1 does not involve an inventive step.

2.9   Hence, the ground for opposition under Articles 100(a)
        and 56 EPC prejudices the maintenance of the patent as
        granted.

3.   *First auxiliary request: claim 1 - inventive step*

3.1   Even when considering **feature (g)** not to be disclosed
        in D11, the board can identify no technical effect in
        relation to this feature that would be credibly solved
        over the whole scope claimed. The appellant did not
        provide any substantive arguments in this regard and
        merely referred to the technical effect mentioned for
        the main request (see points 2.4 and 2.5 above).

3.2   For reasons similar to those set out in point 2.6
        above, the board no longer adheres to the tentative
        technical effect considered in its preliminary opinion
        for the first auxiliary request, namely that
        feature (g) allowed for a practical way to provide the
        "input values" for the "collection unit" mentioned in
        claim 1.

3.3   While feature (g) specifies that the "input values" are
        collected "from the safety controller", this does not
        cure the deficiencies inherent in the broad wording of
        the other features of claim 1. The reasoning set out in
        points 2.6.1 and 2.6.2 above therefore applies also to
        claim 1 of the first auxiliary request.

3.4   In particular, indicating the source of the "input
        values", as done in feature (g), cannot overcome the
        fact that claim 1 still fails to specify which "input
        values" are collected or to ensure that these values
        are relevant to the current version of the safety
        program. As explained in point 2.6.1 above, the "input
        signal" that is "selected previously" could well be

outdated or contextually irrelevant. Furthermore, even
if this input signal was collected "from the safety
controller", the board's reasoning as set out in
point 2.6.2 above remains valid, given that claim 1
still does not preclude a scenario where the controller
is merely processing rudimentary signals obtained from
a generic storage medium without a verifiable link to
its functional safety context. Moreover, specifying
only that these potentially outdated or functionally
irrelevant signals are sourced "from the safety
controller" as per feature (g) fails to establish that
a "practical way" of providing meaningful data for
analysis is credibly achieved over the entire scope
claimed.

3.5   The board therefore finds that feature (g) does not
       contribute to a credible technical effect, either. This
       again means that it is not possible to frame an
       objective technical problem for claim 1 of the first
       auxiliary request that is derivable from effects
       directly and causally related to the technical features
       of the claimed invention. As a result, neither can this
       claim 1 involve an inventive step (Article 56 EPC).

4.   *Third auxiliary request: claim 1 - inventive step*

4.1   In support of inventive step regarding claim 1 of the
       third auxiliary request, the appellant argued that the
       additional **feature (h)** provided the technical effect of
       enabling a *retroactive* analysis of the safety program's
       behaviour. It explained that by including an "input
       value" from before the "collection condition" is
       established, the system captured the "run-up" to a
       state transition. This, in the appellant's view,
       allowed for a more accurate and detailed analysis by
       helping to identify which input changes were causative

for the event. The appellant therefore considered the objective technical problem to be "to provide a safety system by which the behavior of the safety program can be analyzed more accurately and in greater detail".

4.2   This line of argument could likewise not convince the board. The alleged technical effect of a "more accurate and detailed analysis" is not credibly achieved over the entire scope of claim 1 for two reasons:

4.2.1   First, the claim does not provide any details regarding the term "collection condition" mentioned in feature (h). As a result, this "collection condition" is not limited to a specific type of operational situation, such as a "state transition" considered by the appellant. If the "collection condition" is arbitrary, the significance of the preceding "input value" is equally speculative and does not necessarily lead to a more accurate or more detailed analysis.

4.2.2   Secondly, and more fundamentally, feature (h) does not overcome the deficiencies already identified in the context of the main request. The analysis enabled by this feature can only be as accurate or detailed as the underlying data allows. As established in point 2.6 above, the claim covers embodiments where the collected "input values" are themselves outdated, contextually irrelevant or from an unverified source. Adding a (single) preceding data point of the same potentially poor quality cannot credibly make the overall analysis "more accurate" or "more detailed" in a technically meaningful way.

4.3   As a result, the board is not persuaded that the objective technical problem recited by the appellant is

credibly solved by the distinguishing features of
claim 1 of the third auxiliary request.

4.4   As a consequence, no objective technical problem that
is derivable from effects directly and causally related
to the technical features of the claimed invention can
be identified for claim 1 of the third auxiliary
request.

4.5   This in turn means that present claim 1 cannot involve
an inventive step, either (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

S. Lichtenvort   K. Bengi-Akyürek

Decision electronically authenticated