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**Datasheet for the decision
of 14 April 2026**

Case Number: T 0762/23 - 3.5.01

Application Number: 18720202.3

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IPC: H02M1/00, G01D5/249, H02P8/34,
G05D1/00

Language of the proceedings: EN

Title of invention:
SERVO DRIVER

Applicant:
Siemens Aktiengesellschaft

Headword:
Converting servo driver control signals/SIEMENS

Relevant legal provisions:
EPC Art. 56, 84, 123(2)
RPBA 2020 Art. 13(2)

Keyword:
Inventive step - configuring a converter for servo driver control signals in different formats by switching between conversion modes representing predefined input/output format combinations (yes - no hint in prior art)



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Case Number: T 0762/23 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 14 April 2026

Appellant: Siemens Aktiengesellschaft
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted/electronically transmitted on 6 December 2022 refusing European patent application No. 18720202.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman G. Flyng
Members: W. Zubrzycki
E. Mille

Summary of Facts and Submissions

- I. This is an appeal against the decision of the examining division to refuse European patent application No. 18720202.3 for lack of inventive step (Article 56 EPC).
- II. The examining division held that the main and first auxiliary requests then on file lacked an inventive step in view of a combination of D1 (US 2015/069948 A1) with either D8 (CN 2 768 055 Y) or D9 (CN 103 389 684 B). Furthermore, they held that the additional features of the second auxiliary request were, in addition to being obvious in view of D8, common practice. The additional features of the third auxiliary request were held to be obvious in view of D6 (US 2006/271251 A1) and D7 (TW 201 338 944 A).
- III. In the statement setting out the grounds of appeal, the appellant requested that the examining division's decision be set aside and that a patent be granted on the basis of the refused main request or, alternatively, four auxiliary requests filed therewith.
- IV. In a communication accompanying a summons to oral proceedings, the Board set out its preliminary opinion that all those requests lacked an inventive step over D1 in view of D10 ("DELTA ASDA-B2-F SERIES SERVO DRIVE USER MANUAL", Released in 2015), which was introduced into the proceedings under Article 114(1) EPC.
- V. With its reply, the appellant filed a new main request and a new first auxiliary request, and provided arguments in favour of inventive step.

VI. The oral proceedings took place by videoconference on 14 April 2026.

During the oral proceedings, added subject-matter and clarity (Articles 84 and 123(2) EPC) of claim 1 of the new main request were discussed.

The appellant then filed new claims 1 and 2, entitled "NEW MAIN REQUEST FILED DURING HEARING", and withdrew all other claims previously on file. The appellant's final request was that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 and 2 filed during the oral proceedings.

At the end of the oral proceedings, the Chairman announced the decision.

VII. Claim 1 reads:

"A servo driver (10), characterized by comprising:

a driver (11),

a pulse conversion module (12) and

a pulse interface (13),

wherein the pulse conversion module (12) is connected between the pulse interface (13) and the driver (11), and the pulse conversion module (12) converts the type of a pulse control signal received by the pulse interface (13) and then outputs same to the driver (11), with the type of the pulse control signal comprising at least one of a clockwise and counter-clockwise pulse control type, a pulse plus direction control type and an AB-phase input control type,

wherein the pulse conversion module (12) comprises a complex programmable logic device (14), and pulse conversion logic for realizing the conversion between different pulse control system signal types is provided in the complex programmable logic device (14) and wherein the complex programmable logic device is configured for parallel processing, and

wherein the pulse conversion module (12) comprises a display (15) and two buttons (16) which are in signal connection with the complex programmable logic device (14), wherein the pulse conversion module (12) is a separate device provided on a housing of the servo driver (10) so as to expose the display (15) and the two buttons (16),

wherein a user switches between various conversion modes of the pulse conversion module (12) via the two buttons (16), and

wherein the display (15) at least displays a conversion mode which is currently implemented by the pulse conversion module (12), and the display (15) is a 1-bit digital display displaying at least the numbers 0 to 8, and each number displayed corresponds to one conversion mode, wherein the nine numbers 0 to 8 represent all the conversion modes between every two of the three control types, and wherein the two buttons (16) respectively realize the operations of adding one to and subtracting one from a number on the 1-bit digital display when being pressed down, so as to switch the conversion mode by means of either of the two buttons (16)."

VIII. Claim 2 is dependent on claim 1.

IX. The appellant argued as follows.

Claim 1 differed from the closest prior art D1, *inter alia*, in that the pulse conversion module was a device separate from a servo driver and equipped with a display and two buttons. The claim further differed in the manner in which the buttons and the display were used to configure the pulse conversion module, namely by switching between nine conversion modes.

These distinguishing features solved the technical problem of how to provide an existing servo driver, by means of an external add-on module, with compatibility with different upper computers/PLCs having different control signal types, while ensuring easy user control and monitoring, with a space-saving and resource-efficient solution, without increasing the size, complexity and power consumption of the servo driver.

It would not have been obvious in view of the combination of D1 and D10 to provide the pulse conversion module as a separate device equipped with its own buttons and display. D10, which was a user manual for a servo driver, did not prompt the provision of a conversion device separate from that servo driver.

It was accepted that D10 disclosed a control panel with a display and two buttons for setting operating parameters of the servo driver. However, D10 neither taught nor suggested using the buttons to select conversion modes representing different combinations of pulse formats used to control the servo driver.

Furthermore, D10 used a hierarchical menu system in which navigation modes, parameter groups and parameter codes were selected and edited one by one. Thus, in

view of D10, it would at most have been obvious to make the user follow a multi-step process in which the input and output pulse formats would be chosen in the menus and set in separate steps. By contrast, in claim 1 both the input and output formats were set by a single selection of a conversion mode.

Contrary to the decision's findings, the claimed solution was not obvious in view of documents D8 and D9. D8 disclosed a control console for a servo driver comprising a touch screen used to provide four-axis motion control. D9 disclosed a servo driver with a button and a display, but did not disclose that the button was used for controlling a parameter indicated on the display. Accordingly, neither of these documents disclosed a button for switching between different conversion modes.

Enabling the user to configure the pulse conversion module by pressing buttons to scroll through predefined conversion modes provided the technical effect of making the pulse conversion module configurable in a simple manner and with a small number of input operations: switching from one mode to another required only a few button presses and took little time.

Reasons for the Decision

1. *Admittance*

The Board admits the claims filed during the oral proceedings into the appeal proceedings under Article 13(2) RPBA. The amendments made in claim 1 are justified by exceptional circumstances, as they address and overcome objections under Articles 123(2), 84 and

56 EPC raised by the Board for the first time.

2. *Invention*

2.1 It is known in the art that in order to control a servo motor, a PLC or control computer provides a servo motor driver ("servo driver" in claim 1) with two series of pulses that encode the desired direction and speed of movement. Looking at Figure 1 of the original application, three encoding formats are commonly used: clockwise and counter-clockwise format, pulse plus direction format, and AB-phase format, see the original application, page 1, lines 11 to 16.

It is said that in industrial practice, it sometimes happens that a servo driver and a PLC support different pulse formats and therefore cannot work together, see page 1, lines 19 to 24. The invention addresses such a mismatch, see page 1, lines 28 to 30.

2.2 The invention in claim 1 concerns the combination of a servo driver and a pulse conversion module for converting between different pulse formats.

Looking at Figure 2, the pulse conversion module 12 interfaces between a pulse interface 13 and a driver 11. While not explicitly claimed, it is clear from the claimed context that the pulse interface is a module via which control signals are received from a PLC or control computer, and that the driver is the portion of the servo driver which performs the actual motor control on the basis of those signals, cf. page 1, lines 31 to 35, and page 4, lines 12 to 17.

2.3 Looking at Figure 3, the pulse conversion module is equipped with a display 15 and two buttons 16, see page

4, lines 32 to 33 and page 6, lines 5 to 6. It is provided on the housing of the servo driver in order to expose the buttons and display to the user, see page 5, lines 16 to 18.

- 2.4 Looking at Figure 4, the pulse conversion module is capable of taking any of the three known pulse formats, as input, and providing any of them as output, see also page 4, second paragraph.

The crucial aspects of the invention, set out in the last two claim features, are that each combination of input and output pulse formats selected from those three pulse formats is represented by one of nine modes, and that the user configures the input and output formats by switching between those modes, see page 5, lines 18 to 37. More specifically, the display indicates the currently selected conversion mode by a number between 0 and 8, and the user presses the buttons to increment or decrement this number by one, see page 6, lines 5 to 11.

3. *Clarity and basis, Articles 84 and 123(2) EPC*

The Board is satisfied that claims 1 and 2 comply with the requirements of Articles 123(2) and 84 EPC. Objections raised by the Board in this respect for a previous version of claim 1 were overcome by amendments.

4. *Inventive step, Article 56 EPC*

- 4.1 It is common ground that D1, which concerns a pulse processor for converting between different formats of a servo driver's pulse control signals, is an appropriate starting point for the assessment of inventive step.

Since none of the other documents on file concerns such conversion, none is a more promising starting point than D1 for assessing the inventive step of the claimed subject-matter.

- 4.2 The appellant does not dispute that the pulse processor of D1, corresponding to the pulse conversion module in claim 1, receives pulse control signals a1 and a2 from a command device over an implicit pulse interface and converts them into signals y1 and y2 which it provides to a servo driver that operates a motor, see Figure 2 and paragraph [25].

Nor does the appellant dispute that, like the claimed pulse conversion module, the pulse processor of D1 is able to convert any one of the three known pulse formats into the same format or one of the other two, see paragraphs [31], [72] and [76], and reasons for the decision, page 8, fifth bullet point. Paragraph [33] of D1 further discloses that the output pulse format is selected according to user settings. It is common ground that D1 is silent on how these settings are input, see reasons for the decision, page 7, second paragraph.

It is also common ground that D1, which merely presents schematic representations of the pulse processor and the servo driver, is silent on how they are actually arranged, in particular on whether they are separate devices.

- 4.3 The Board agrees with the appellant (see section IX. above) that the pulse conversion module in claim 1 differs from the pulse processor of D1, *inter alia* (lettering added by the Board):

A) By a 1-bit digital display (15) and two buttons (16).

B) In that the pulse conversion module (12) is a separate device provided on a housing of the servo driver (10) so as to expose the display (16) and the two buttons (16).

C) In that a user switches between various conversion modes of the pulse conversion module (12) via the two buttons (16).

D) In that the display (15) at least displays a conversion mode which is currently implemented by the pulse conversion module, and the display is 1-bit digital display displaying at least the numbers 0 to 8, and each number displayed corresponds to one conversion mode, wherein the nine numbers 0 to 8 represent all the conversion modes between every two of the three control types.

E) In that the two buttons (16) respectively realize the operations of adding one to and subtracting one from a number on the 1-bit digital display when being pressed down, so as to switch the conversion mode by means of either of the two buttons (16).

4.4 The Board considers that the technical problem is to enable the pulse processor of D1 to work with different servo drivers and PLCs using different pulse formats, without modifying the hardware of the servo drivers, and to provide means for configuring the user settings which specify the input and output pulse formats.

- 4.5 As set out in section IX above, the appellant formulated a somewhat different problem. The Board considers its own formulation to be more appropriate, at least because that formulation does not contain a hindsight pointer to the use of an external add-on module and takes account of the need to configure the user settings in D1. In the end it does not really matter which of the two formulations is adopted. The Board considers that the claimed subject-matter would not have been obvious under either formulation.
- 4.6 The Board considers that, starting from D1 and faced with one of the above problems, the skilled person would have consulted D10, which discloses a servo driver having a control panel with a one-bit display and two buttons, see page 4-2.
- 4.7 However, even assuming, contrary to the appellant's arguments, that it would have been obvious for the skilled person to implement the pulse processor as a separate module and to equip it, in view of D10, with a display and two buttons, the Board still considers that the claimed manner of selecting the input and output pulse formats would not have been obvious. In particular, the Board considers that the skilled person would not have assigned combinations of input and output pulse formats to nine conversion modes and enabled the user to switch between those modes.
- 4.8 The Board considers that D10 does not disclose any suggestion to set parameter values by selecting modes representing combination of input and output pulse formats.

Furthermore, the Board agrees with the appellant that, since D10 features a conventional hierarchical menu

system in which parameters are selected and edited one by one (see pages 4-4 and 4-5), it, in fact, teaches away from the claimed solution, in which the values of two parameters, namely the input and output formats, are set by a single button press. This crucial factor was not fully taken into account in the Board's negative preliminary opinion, see section IV above.

Accordingly, the Board judges that the combined teachings of D1 and D10 would not have provided any motivation to enable the user to switch between nine conversion modes in order to set the input and output pulse formats.

- 4.9 Other documents on file do not suggest the claimed use of two buttons to switch between nine conversion modes for setting the input and output formats either.

Concerning documents D8 and D9, the Board does not share the examining division's view (reasons for the decision, pages 5, 6 and 9) and agrees with the appellant that neither of them provides any hint towards this solution.

D9 discloses a servo driver equipped with a single button and a display for carrying out manual operations of the servo driver. However, D9 does not provide any details as to the nature of those operations. D8, which concerns a remote control console for a servo motor, does not even disclose buttons for setting discrete parameter values, but rather a touch screen with motion controllers for different kinematic axes. Components 12 in D8, which the examining division equated with such buttons (reasons for the decision, page 11, third paragraph), are apertures in the front panel 1 in which LEDs are embedded, see page 8, first paragraph.

Documents D6 and D7 were cited in the decision only for a different aspect of the invention, namely the use of two transceivers, as defined in claim 2, and are therefore not relevant for assessing the obviousness of present claim 1, and of the solution in question in particular.

The remaining documents cited in the search report neither relate to control panels for servo drivers nor provide any hint at assigning sets of operating parameters to selectable modes in a comparable machine-control context.

Finally, in any event, the Board disagrees with the decision that these features could simply be dismissed as "common practice" (i.e. common general knowledge), see section II above, last sentence.

- 4.10 The Board judges that the idea of assigning combinations of the input and output formats to nine modes selectable via two buttons has technical character and counts towards inventive step. As correctly analysed by the appellant, this idea is based on technical considerations, namely the need to configure the controller quickly and with a minimal number of input operations.
- 4.11 For these reasons, the Board judges that claim 1 involves an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent with the following claims and a description to be adapted thereto:

Claims: 1 and 2 received during the oral proceedings of 14 April 2026.

The Registrar:

The Chairman:



T. Buschek

G. Flyng

Decision electronically authenticated