Unified Patent Court
Einheitliches Patentgericht
Juridiction unifiée du brevet

UPC – Court of Appeal
UPC_CoA_622/2025
UPC_CoA_623/2025

Final decision

of the Court of Appeal of the Unified Patent Court
of 27 May 2026
concerning Patent EP 2 778 423 (infringement and counterclaim for revocation)

HEADNOTES:

1. Whether a submission made more specific at second instance is new depends on how general it was at first instance. A submission is not new if it serves to further specify and clarify an already conclusive submission from the first instance by adding further factual allegations.

2. An appeal submission concerning a counterclaim for revocation, which is based on a publication already submitted at first instance, is new if the specific technical information and the suggestions regarding the teaching of the invention, which the person skilled in the art is to derive from the publication according to the appeal submission, were not presented before the Court of First Instance.

3. Claim features must be interpreted in the light of the claim as a whole (UPC Court of Appeal, 13 May 2024, UPC_CoA_1/2024, *VusionGroup v Hanshow*, para. 29). As a general rule, it is to be assumed that identical terms in a patent claim have the same meaning. A different understanding of an identical term in different features of a patent claim is possible if the interpretation of the claim, taking into account the description, leads to such an understanding. Such a different interpretation may arise from the function of the respective features of the claim.

KEYWORDS:

- New arguments in the appeal proceedings, R. 222.2 RoP
- Interpretation of the patent claim – Distinction from the prior art
- Interpretation of the patent claim – determinative nature of the language of the proceedings

APPELLANT, DEFENDANT AND COUNTER-CLAIMANT FOR REVOCATION BEFORE THE COURT OF FIRST INSTANCE

Hefei Xinhu Canned Motor Pump Co., Ltd, Hefei, Anhui, People's
Republic of China (hereinafter: Hefei)
represented by Dr Blumenröder, Attorney-at-law, and other Attorneys-at-law and patent attorneys of the firm Grünecker Patent- und Rechtsanwälte PartG mbB, Munich, Germany

APPELLEE, CLAIMANT AND COUNTER-CLAIMANT FOR ANNULMENT BEFORE THE COURT OF FIRST INSTANCE

Grundfos Holding A/S, Bjerringbro, Denmark

(hereinafter: Grundfos)

represented by Dr Markus B. Bölling, Attorney-at-law, and other Attorneys-at-law and patent attorneys of the firm Mitscherlich Patent- und Rechtsanwälte PartmbB, Munich, Germany

PATENT AT ISSUE

EP 2 778 423

LANGUAGE OF THE PROCEEDINGS

German

DECIDING JUDGES

Panel 2
Rian Kalden, legally qualified judge and presiding judge
Patricia Rombach, legally qualified judge and judge-rapporteur
Ingeborg Simonsson, legally qualified judge
Uwe Ausfelder, technically qualified judge
Steven Kitchen, technically qualified judge

CONTESTED DECISION OF THE COURT OF FIRST INSTANCE

Decision of the Düsseldorf local division of 8 May 2025 in the infringement action and the counterclaim for annulment (UPC_CFI_11/2024, CC_32539/2024)

ORAL HEARING

The joint oral hearing concerning the infringement action and the counterclaim for annulment (Rule 220.5, Rule 302.3 of the RoP) took place on 26 February 2026.

FACTS

1. Grundfos is the proprietor of European patent 2 778 423 (hereinafter: the patent at issue), which was filed on 11 March 2013. The publication of the notice of grant took place on 28 February 2018. The patent at issue is in force in Germany, France and Italy. The invention according to the patent at issue relates to a centrifugal pump unit, in particular a heating circulation pump unit.

2. Claim 1 reads as follows:

‘Heating circulation pump unit comprising a centrifugal pump (1), an electric motor (7) driving the pump (1), an electronic speed controller (11) for the motor (7) and an internal electronic control system (16), in which the control variable is the speed of the motor (7), wherein the speed controller (11) and the control system (16) form part of the unit, a signal input for external control of the motor (7) is provided, and means (20) are provided for switching from the internal electronic control system (16) to an external speed control system or for activating an external speed control system, characterised in that the means (20) for switching are electronic means which determine whether or not an external control system is connected and, upon determining that an external control system is connected, switch to the external control system.”

3. Hefei offers, through the German company [redacted] under the product designations JSA 20-4/130, JSA 20-6/130, JSA 25-4/180 and JSA 25-6/180, including in Germany. These are also offered and sold by Hefei under their product names “GPA III” (hereinafter: the contested embodiments). Hefei also advertises the contested embodiments on its website www.shinhoopump.com.

4. In its action, Grundfos challenges the offering and distribution of the contested embodiments by Hefei in Germany, France and Italy.

5. In the contested decision, the Düsseldorf local division found that there had been a patent infringement and upheld the claims seeking an injunction, disclosure, destruction, recall, provisional damages and a declaration of liability for damages. The local division dismissed the counterclaim for annulment brought by Hefei and ordered Hefei to bear the costs of both proceedings.

6. Hefei has lodged appeals against the decision.

APPLICATIONS SOUGHT BY THE PARTIES

7. In summary, with regard to the infringement action, Hefei requests that the contested decision be set aside, the action be dismissed, and the costs of the proceedings be imposed on Grundfos.

8. For the first time in its grounds of appeal, Hefei has, in the alternative, requested that the proceedings be stayed until a final decision has been made on the action for revocation brought by Shinhoo Europe S.r.l., and in the further alternative: that the contested decision be set aside and be made subject to the condition subsequent that the patent be declared wholly or partially invalid in the aforementioned revocation proceedings.

9. With regard to the counterclaim for revocation, Hefei requests, in summary, that the contested decision be set aside, that the patent at issue be declared invalid in its entirety, and that Grundfos be ordered to pay the costs of the proceedings.

10. In summary, with regard to the infringement action, Grundfos requests that the appeal be dismissed. In the event that the Court of Appeal should declare the patent at issue valid only to the extent of an alternative claim made in the application for amendment of the patent dated 22 July 2024,

Grundfos requests that the contested decision be upheld to the extent of the corresponding auxiliary claim set out in its Reply of 22 July 2024 in the infringement proceedings at first instance. Furthermore, Grundfos requests that the auxiliary claims be dismissed and seeks an order that Hefei bear the costs of the appeal proceedings.

11. Furthermore, by a document dated 4 December 2025, Grundfos filed an application to amend the claim pursuant to Rule 263 of the RoP, together with further alternative claims. Reference is made to the content thereof.

12. With regard to the counterclaim for revocation, Grundfos requests that the appeal be dismissed, or alternatively that the patent at issue be upheld to the extent of the alternative claims set out in the application for amendment of the patent dated 22 July 2024, and that the costs of the appeal proceedings be borne by Hefei.

SUBMISSIONS OF THE PARTIES

13. Hefei reiterates the arguments put forward at first instance and essentially submits:
    - The local division proceeded on the basis of an incorrect understanding of the features ‘connection of an external speed control’, ‘means for switching over’ or ‘connection’, and ‘means which determine whether an external control is connected or not and which, upon determining that an external control is connected, switch over to the external control’.
    - The local division wrongly affirmed the novelty of the patent at issue.
    - The local division wrongly refused to admit the prior art introduced into the proceedings for the first time in the Reply.
    - The local division wrongly assumed that the lack of inventive step did not result from a combination of D6 with D5, nor from a combination of D1 and D5, nor from a combination of D5 with D7.
    - The local division wrongly failed to admit the challenge to inventive step based on a combination of D5 and D7.
    - At the very least, the proceedings should be stayed due to the pending standalone action for nullity; in any event, the decision should be issued subject to the condition precedent that the patent at issue is invalid, Art. 56(1) of the UPC Agreement in conjunction with Rule 118.2(a) of the RoP.

14. Grundfos defends the contested decision, largely by repeating and elaborating on the arguments put forward at first instance, and further submits:
    - According to the claims, speed-related control systems are also covered, insofar as the actual speed is monitored, compared with a setpoint and (where deviations from this setpoint are detected) influenced to bring it into line with the setpoint.
    - Hefei’s understanding, as expressed in the grounds of appeal, regarding the distinction between “switching over” and “switching on” is consistent with Grundfos’s interpretation at first instance. Switching on is a demand-based activation.
    - Hefei’s new submissions and the evidence presented for the first time in the appeal proceedings are not admissible.
    - The amendment to the claim, which was requested for the first time in the appeal proceedings, should be admitted because the local division may, in the contested decision, have interpreted Patent Claim 1 in a manner that contradicts the interpretation agreed upon by both parties.

REASONS FOR THE DECISION

A. Subject-matter of patent claim 1

1. The patent and its technical background

15. The invention according to the patent at issue relates to a centrifugal pump unit, in particular a heating circulation pump unit (paragraph 1).

16. According to the description, centrifugal pump units of this type typically consist of a centrifugal pump and an electric motor driving it, an electronic speed controller, e.g. a frequency converter for the motor, and an internal electronic control system in which the manipulated variable is the speed of the motor, whereby the speed controller and control system form part of the unit and are typically arranged in a terminal box or electronics box adjacent to the pump and motor housing. The controlled variable of such a control system is, for
B. the differential pressure between the receipt and outlet of the pump, the flow rate or quantities derived therefrom (para. 2).

17. In modern heating circulation pumps of the aforementioned type, according to the explanations in the description of the patent at issue, it is part of the prior art that the internal electronic control system not only provides a variety of control curves, e.g. constant pressure curves, proportional pressure curves or the like, which can be selected, but also that the unit is equipped with an internal microprocessor with corresponding software, which is capable of automatically adapting the control setpoints to the heating system based on the conditions in the heating system, in particular the prevailing pressure profiles, the changing temperature of the pumped medium, the flow rate and the like. This self-learning setpoint adjustment of the internal control system has the advantage that the pump adapts almost perfectly to the requirements of the heating system and can thus be operated in a manner suited to the situation whilst consuming comparatively little electrical energy (para. 3).

18. On the other hand, frequency converter-controlled heating circulation pump units were state of the art, in which an external control system was provided for controlling the pump speed. This external control system was typically part of the central control system of the heating system. The interface for speed control is a control input on the pump, via which a pulse-width-modulated signal is transmitted, with the pulse width determining the effective voltage or frequency and thus the speed of the pump. Such pumps are found, for example, in gas boilers, such as those used as compact heating units in flats, but are also used in small houses (para. 4).

19. Different pump series have become established: on the one hand, these self-learning heating circulation pumps, which are installed on-site in heating systems, and on the other hand, externally controlled heating circulation pumps, which are typically installed by the manufacturer in boilers. As the hydraulic requirements are often the same in both cases, the centrifugal pump units differ practically not at all in their mechanical design. However, from a manufacturing perspective, two series must always be produced for the same connection specifications of the pump housing

. Furthermore, with regard to replacement, different centrifugal pump units would always have to be kept in stock for each of the aforementioned applications, which is time-consuming and expensive (para. 5).

20. In the case of larger heating circulation pumps, such as those installed in parallel groups of two to eight pumps, it is, according to the description of the prior art (Grundfos Magna UPE pump), to control these individual heating circulation pumps, each of which has an internal electronic control system, from the outside, whereby the internal control system as such is not influenced, but only the setpoint values (para. 6).

2. Object of the invention

21. Against this background, the invention is based on the objective of designing a centrifugal pump unit of the general type in such a way that it can be used both in a heating system with the internal electronic control in operation and in a boiler with external control, or in a combined configuration (para. 7).

3. Breakdown of features of Patent Claim 1

22. This objective is achieved by a device having the following features (German and thus the relevant language of the proceedings):

1.	Heating circulation pump unit
1.1	comprising a centrifugal pump (1),
1.2	with an electric motor (7) driving the pump (1),
1.3	with an electronic speed controller (11) for the motor (7)
1.4	and an internal electronic control system (16),
1.4.1	in which the control variable is the speed of the motor (7).
2.	The speed controller (11) and the control system (16) form part of the unit.
3.	A signal input is provided for external control of the motor (7).
4.	Means (20) are provided
4.1	for switching from the internal electronic control (16) to an external speed control or for activating an external speed control.
4.2	The means (20) for switching are electronic means which determine whether an external controller is connected or not and, upon detecting a connected external controller, switch to the external controller.

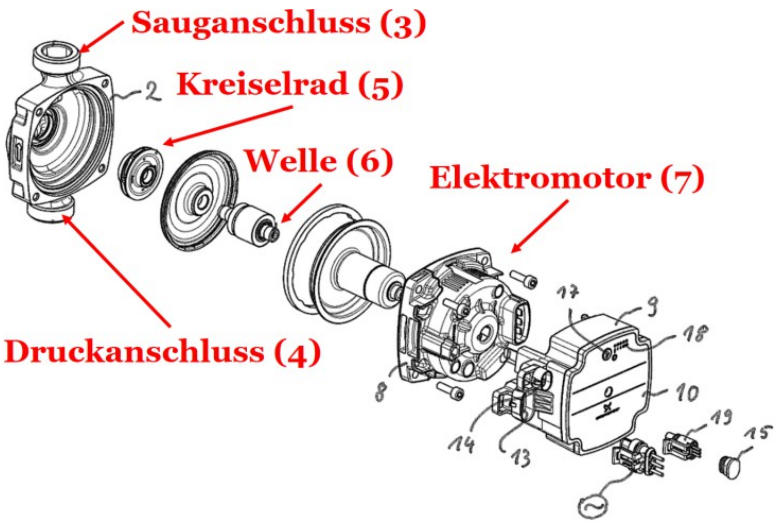
4. Person skilled in the art and interpretation of the patent claim

23. The interpretation of the features depends largely on the perspective of the person skilled in the art. The local division has defined this as a mechatronics engineer with a degree from a university of applied sciences and several years' experience in the development of circulation pumps. In accordance with the parties' views, the Court of Appeal concurs with this view, specifying that the person in question is a mechatronics engineer with a degree from a university of applied sciences (Dipl.-Ing. (FH) or B.Eng.) and several years' experience in the development of circulation pumps.

24. The court bases its decision on the following interpretation of the features:

Feature 1

25. A centrifugal pump is a pump with a rotating shaft that utilises dynamic forces to convey a fluid (radially or axially). In the centrifugal pump unit shown in Fig. 1 (reproduced below with labelling added by Grundfos), an impeller 5 is driven via a shaft 6 by an electric motor 7, and this rotational movement conveys the fluid drawn in via the suction port 3 to the discharge port:



Features 1.4 and 1.4.1

26. According to feature 1.4, the heating circulation pump unit has an internal electronic control system.

27. A control system is characterised by the fact that a variable quantity, the controlled variable, is continuously measured, compared with a setpoint and adjusted to it. According to the description in the specification of the contested patent, the manipulated variable is typically the speed of the motor (para. 2, line 12) and the controlled variable in such a control system is, for example, the differential pressure between the inlet and outlet of the pump, the flow rate or quantities derived therefrom (para. 2, lines 16–19).

28. Feature 1.4.1 accordingly requires that the manipulated variable is the speed of the motor.

29. By contrast, patent claim 1 does not specify the controlled variable. Grundfos is therefore correct in its view that the claim encompasses the possibility that the (actual) speed may also be the controlled variable under feature 1.4.

Features 4, 4.1, 4.2

30. According to feature 4.1, means are provided for switching from the internal electronic control (16) to an external speed control or for connecting an external speed control.

Connection/Switching

31. The local division assumed that ‘switching’ is to be understood as a complete change from the internal electronic control to an external speed control, whereas in the case of ‘activating’, the external speed control operates alongside the internal control.

32. Both parties have successfully challenged this. Both parties are correct in their understanding that ‘switching over’ within the meaning of the patent at issue means switching to continuous external speed control, whereas, by contrast, ‘switching on’ involves exclusively external control only when required or intermittently. The electronic means thus ‘switch over’ to external control in both variants: in one case until an unspecified point in time, and in the other case ‘as required’, i.e. only for as long as there is a need or cause (detection of a connected external control, feature 4.2) to do so.

33. This understanding underlies the general description of the basic concept of the invention, where it is stated: ‘*The centrifugal pump unit according to the invention can advantageously operate both with its internal electronic control and with an external speed control, as well as combinations thereof, for example by the unit operating with the internal control and being controlled by an external speed control only in the event of it being switched on* (emphasis added by the court)’ (para. 10, col. 2, lines 50–57).

34. According to paragraph 12, the means for switching the internal electronic control to an external speed control or for engaging an external speed control are, *according to the invention*, designed such that, upon detection of a connected external control, they “switch *to the external control continuously or, where necessary, on* demand” (emphasis added by the court).

35. In the context of the description of an embodiment, it is stated in accordance with this understanding that it is expedient *to provide* this external speed control *“only for activation, i.e. for predetermined operating situations in which, for example, a large amount of heat is to be dissipated quickly, or in emergency situations that can only be detected by the boiler* control” (para. 14, col. 3, line 58 – col. 4, line 5, emphasis added by the court).

36. By contrast, the general usage of the term identified by the local division, which deviates from this, is irrelevant, as the interpretation of the patent claim must, in principle, be based on an understanding that is consistent with the explanations in the description. Patent specifications constitute their own lexicon with regard to the terms used therein.

37. Contrary to the view of the local division, it cannot be inferred from the remainder of the description that both internal and external control takes place upon activation. Insofar as it is stated in an embodiment that the control and regulation electronics 12 “*switches over*”, *the internal control may then be switched off completely or partially*” (emphasis added by the court, para. 28), the term “partially” can readily be reconciled with the understanding that, during switching on, the internal control may be switched off “temporarily”. However, this does not mean that the internal control must be switched off. The only essential point in this regard is that, for the duration of the switching on or switching over, the control is carried out exclusively by the external control system.

38. By contrast, as Hefei rightly argues, the description of the patent at issue does not indicate how simultaneous internal and external control is to be achieved.

39. Nothing else follows from the fact that the patent at issue describes the larger-scale heating circulation pumps known in the prior art (Grundfos Magna UPE pump) in such a way that groups of two to eight pumps are installed in parallel, each having an internal electronic control system which can (also) be controlled externally without the internal control system being affected (para. 6). For in this respect it is made clear that *'in this case, it is not the internal control system as such that is influenced, but merely the setpoint* values' (para. 6, last sentence).

40. The understanding of the features depends solely on the wording of the patent claims in the language of the proceedings (Art. 70(1) EPC). It is therefore irrelevant that the English translation of patent claim 1 in the patent specification supports the local division's interpretation.

Suitability for cumulative switching and switching over

41. Feature 4.1 contains a functional and purpose specification in the form of means for switching or connecting. Functional and purpose specifications define the product in such a way that it must be suitable for use for the function and purpose specified in the patent claim (UPC Board of Appeal, Order of 14 February 2025, UPC_CoA_383/2024, *Abbott v Sibio*, para. 47). This means that the means must be designed in such a way that they are suitable for switching from the internal electronic control (16) to an external speed control or for connecting an external speed control.

42. The local division held that it was not necessary for the means to be suitable for both switching and connecting. Rather, it was sufficient for them to be suitable merely for switching or merely for connecting.

43. Hefei has unsuccessfully challenged this.

44. The very use of the word 'or' makes it clear that it is sufficient for the means to be suitable either for switching or for connecting (switching as required, see above). Otherwise, the use of the word 'and' would have been more natural.

45. Nor can a restrictive interpretation be inferred from the description. The fact that a design of the heating circulation pump unit suitable for both switching and connecting is not strictly required, but that one of the two alternatives suffices, follows from paragraph 7, which formulates the basic idea of the invention as "*to design a centrifugal pump unit of the general type in such a way that it can be used both in a heating system with the internal electronic control in operation and in a boiler with external control, or in a combined* manner" (emphasis added by the court). Here, too, there is no requirement that the combination, in the sense of temporary activation, must be present in addition to the switching capability. In this respect, too, the use of the word 'and' would otherwise have been appropriate.

46. Contrary to Hefei's view, it does not follow from paragraph 10 of the description that, according to claim 1, the unit must be capable of operating exclusively with its electronic control, exclusively with an external speed control, or in combinations thereof.

47. Paragraph 10 formulates the basic idea of the invention according to the patent at issue as combining the pump types known from the prior art, but also providing for combinations with regard to control/regulation which were not possible in this form. *"The centrifugal pump unit according to the invention can advantageously operate both with its internal electronic control and with an external speed control, as well as combinations thereof, for example by the unit operating with the internal control and being controlled by an external speed control only when the latter is switched on. It is therefore not strictly necessary to operate in only one or the other mode; combinations are also advantageously possible' (emphasis added by the court).*

48. The skilled person will gather from the description that the option of switching on involves a possible combination of the internal electronic control and the external electronic control. Hefei regards the wording *'as well as combinations* thereof' as a clear indication that all three alternatives mentioned (internal electronic control; external speed control; a combination of both) must be made possible by the centrifugal pump unit according to the invention. However, this is contradicted by the fact that, in the example of such a combination, the unit operates with the internal control and *is 'controlled by an external speed control only in the event of switching on*'. From this, the person skilled in the art deduces that, in the example, the alternative of switching over in the sense of continuous external speed control does not exist; rather, the unit (in principle) operates with internal control and is controlled by an external speed control only when switched on.

49. The fact that it is not strictly necessary for means for switching to be present alongside means for engagement, and vice versa, is confirmed by the embodiments. In these, both switching alone and engagement alone are possible.

50. According to one embodiment*, "in accordance with the invention, a simple switchover can be effected by means of a switch on the pump unit, which is formed, for example, by a contact within the electrical connection plug for the signal input, which is closed when the mating plug is inserted, by a microswitch in this area, by a hold sensor or the like. Such a switch is particularly useful when a switchover is to be made from the internal electronic control to an external speed control, i.e. for example, where the same pump unit is to be used as a replacement for a centrifugal pump unit in a boiler that is externally controlled in terms of speed, or where a heating circulation pump operating with internal electronic [sic!] Control in a heating* system" (para. 13, emphasis added by the court). It is therefore sufficient here that a switch can be made to electronic control on a permanent basis –
i.e. for an indefinite period.

51. In contrast, in the case of self-learning setpoint adjustment, it is considered appropriate *to provide for "external speed control only for switching on, i.e. for predetermined* operating situations" (para. 14, line 49, col. 3, line 58 – col. 4, line 2). Hefei unsuccessfully refers to the following paragraph, according to which '[*p]referably* (…) *the centrifugal pump unit according to the invention is designed in such a way that the external control not only allows speed control,*

but also that the self-learning setpoint adjustment can be activated and deactivated via the external control system. In this way, the advantageous self-learning setpoint adjustment (…) can also be specifically used in heating systems which otherwise only output a speed signal for the centrifugal pump unit via their own control system" (para. 15, emphasis added by the court). In this respect, as made clear by the word "preferably", this is merely an illustrative example.

52. Hefei argues unsuccessfully that, since paragraph 15 contains no further explanation regarding any additional configuration of the unit—unlike in the case of external control—the same unit must be capable of switching from on-demand switching/activation (during active self-learning setpoint adjustment) to permanent switching. This may be the case in this preferred embodiment, but it does not alter the fact that patent claim 1 is not limited to this embodiment.

53. Contrary to Hefei's view, the requirement for the cumulative presence of the ability to both switch over and switch on does not arise from the fact that the Grundfos Magna UPE pump, which is discussed in the patent at issue, already contains means for switching over. In this context, it can be left open whether this is the case. The fact that a patent specification distinguishes itself from the prior art specifically described therein may be relevant to the interpretation of the patent claim. However, a prerequisite for this is that it is sufficiently clear from the patent specification to what the distinction relates and by which feature the patent distinguishes itself from that configuration. It cannot be inferred from the description of the patent at issue that the Grundfos Magna UPE pump already incorporates means for switching. As stated above (para. 39), on the contrary, it can be inferred from the description that, in this type of pump*, 'it is not the internal control as such that is influenced, but merely the setpoint* specifications' and that, consequently, external control is not provided for.

Interpretation taking into account feature 4.2

54. Contrary to Hefei's view, the fact that 'means for switching' within the meaning of feature 4.2 may also be such that they merely enable switching on does not support the argument that the person skilled in the art would infer from feature 4.1 that both alternatives must necessarily be present.

Means for switching on are also means for switching over within the meaning of feature 4.2

55. According to feature 4.2, the means for switching are electronic means which determine whether an external controller is connected or not and, upon determining that an external controller is connected, switch to that controller.

56. Both parties correctly assume that means for switching over within the meaning of feature 4.2 may not only be means which are spatially and physically designed in such a way as to enable 'switching over', but also means which are merely suitable for enabling 'connection' in the aforementioned sense. This follows from the fact that 'switching on' ultimately also constitutes a switching operation, albeit one that is limited in time from the outset.

57. The person skilled in the art also deduces from the description of the patent at issue that the patent at issue does not distinguish in this respect. According to this, *"in accordance with the invention*, *means for switching the internal electronic control to an external speed control <u>or for connecting</u> an external speed control* are designed [...], *such that they determine whether an external control is connected*

or not and, upon detection of a connected external control, switch *to the external control permanently or, where appropriate, on* demand" (para. 12, lines 18–25, emphasis added by the court).

A consistent interpretation leads to no other understanding

58. Claim features must be interpreted in the light of the claim as a whole (UPC Court of Appeal, 13 May 2024, UPC_CoA_1/2024, *VusionGroup v Hanshow*, para. 29). As a general rule, it is to be assumed that identical terms in a patent claim have the same meaning. However, a different understanding of an identical term (here: "switching") in different features of a patent claim is possible if the interpretation of the claim, taking into account the description, leads to such an understanding. Such a different interpretation may arise from the function of the respective features of the claim. This is the case here. Feature 4.1 defines the means for switching as those which enable switching and/or enable temporary switching (activation), whilst feature 4.2 concerns the technical prerequisites for enabling switching (whether continuous or temporary) in the first place.

Feature 4.2

59. Feature 4.2 is also a functional feature. This means that it is sufficient for the means to be designed spatially and physically in such a way that they are suitable for determining whether an external control is connected or not and – upon determining that an external control is connected – for switching to the external control.

Mandatory direct detection of a contact or indirect detection via a control signal?

60. The local division held that feature 4.2 contained no specifications as to how the detection of the connection of an external controller was to be carried out. This could therefore be done directly, for example by detecting the contact between the plug and the mating connector via a microswitch within the plug. However, the scope of protection also covers a design in which the detection is indirect, for example by detecting the presence of an external control signal. Furthermore, patent claim 1 leaves the decision as to how the switching is carried out to the discretion of the person skilled in the art.

61. In Hefei's view, however, detection requires not only the identification of a connection, but also the identification that no connection to an external control unit is present. This is already implied by the wording 'or not'. Consequently, the means must not only electronically determine, either via 'handshaking' or through suitable calibration cycles (para. 12), or via a microswitch within the plug (para. 27), whether an external control is connected, but must also actively detect that no such external control is present.

62. Hefei further objects to the local division's view that, according to the patent at issue, an external control signal can only follow after switching. The detection and the switching are two independent steps.

63. The Court of Appeal concurs with the local division's view. The claim leaves open how detection and switching within the meaning of feature 4.2 take place. The fact that 'handshaking' and the 'calibration cycles' are merely examples of implementation is, for example, mentioned in paragraph 12

, where the following is stated: *"For example*, a suitable electronic circuit can be used to determine at intervals whether the signal input is connected to an external controller or not. Since the external controller also *typically* operates electronically, this can be determined either by means of appropriate 'handshaking' or by suitable calibration cycles".

64. For a "determination" within the meaning of feature 4.2, it is therefore also sufficient if the presence of an external control signal is detected. The fact that, according to patent claim 1, it is not strictly necessary to check the connection of the electrical connector of the signal input is also evident from the fact that the defining feature of patent claim 4, which refers back to patent claim 1, provides that the switching means comprise a sensor or microswitch designed to detect a connection of the electrical connector plug (14) of the signal input.

65. In the embodiment described in paragraph 27, a distinction is also made between the detection of a mating plug and the electronic determination of whether an external control unit is connected (*"The control and regulation electronics are designed such that they automatically detect whether a) the plug 14 is in contact with a mating plug 19, for this purpose, a microswitch is provided within the plug 14 to detect this – and b) whether an external control system is connected via the mating plug 19; this is* determined *electronically*").

66. Contrary to Hefei's view, the detection of external control signals is a suitable means within the meaning of feature 4.2. It is true that control by an external control signal only takes place after switching has occurred. However, this does not preclude the external control signal also being the trigger for the switching.

67. Nothing to the contrary follows from paragraph 28, which describes as follows what happens in the embodiment after it has been detected that an external control unit is connected; *"As soon as this is detected, the control and regulation electronics 12 are switched via an electronic switch 20 in such a way that, when a PWM signal is present at the input formed by the plug 14, a corresponding speed signal for the motor 7 is generated via the frequency converter 11. The control and regulation electronics 12 therefore switch to the external receipt; the internal regulation may then be switched off completely or partially"* (para. 28, emphasis added by the court). The person skilled in the art understands from this that the switchover should take place as soon as possible after an external controller has been detected.

68. Contrary to Hefei's view, it cannot be inferred from patent claim 1 that the control system must actively detect that no connection to an external control system is present.

The existence of a decision-making logic that makes its own decisions regarding the external signal and the takeover of speed control?

69. Hefei argues that the local division erred in assuming that the switching means need not be capable of making its own decisions regarding the external signal and the takeover of speed control.

70. Hefei further argues that even if one were to assume that means for mere permanent switching would suffice, this interpretation is unconvincing simply because

this basis there is a risk that, following the detection of an external control signal and the inevitable switching, the internal control would remain permanently inactive, even though subsequently, for whatever reason, no external control signal is sent to the speed controller. If, in order to remedy this interpretation, one were to adopt the view that a switchover only occurs when control signals are actually transmitted from the external control system, there would be no continuous switchover, but merely a switchover on demand, i.e. an engagement in accordance with the patent in dispute. On this basis, continuous switching with a complete deactivation of the internal control would consequently be practically impossible. Consequently, after detecting a connection from an external control system and before switching, the electronic means would have to possess at least a decision-making logic in the sense that, in addition to detecting the connection from the external control system, they can determine whether to switch permanently or only on demand, and then act accordingly.

71. This argument cannot be accepted. However, the Court of Appeal does not fail to recognise that a decision-making logic must be present which recognises the control signal from the external control system. However, it is not necessary for this decision-making logic to make its own decisions regarding the external signal. Grundfos rightly points out that feature 4.1 does not require the cumulative presence of switching and activation means. The risk that no external control signal is sent to the speed controller exists – as Grundfos further rightly points out – in all pumps with exclusively central speed control.

B. Appeal concerning the counterclaim for annulment

72. The appeal against the dismissal of the counterclaim for declaration of invalidity is largely successful.

I. Feasibility of the invention

73. The local division has affirmed the feasibility of the teaching of the patent. As the appeal does not challenge this view, the question of feasibility is not the subject of the appeal proceedings.

II. Patent claim 1: Obviousness of the invention based on DE 101 39 510 A1 (DE'510, Annex B&B D5, hereinafter: 'D5') in combination with general technical knowledge

74. Hefei has successfully challenged the dismissal of the counterclaim for revocation in respect of patent claim 1.

75. The subject-matter of patent claim 1 is in any event suggested by D5 in combination with common technical knowledge.

a) Admissibility of the combination of D5 with common technical knowledge

76. In the counterclaim for revocation, Hefei based the lack of inventive step with regard to patent claim 1 on combinations with D5 in which D7 was not included and in which D5 did not serve as a starting point. Furthermore, Hefei also appealed, for the first time in its Reply to the counterclaim for invalidity, for the lack of inventive step in respect of the subject-matter of patent claim 1, using D5 as a starting point in combination with D7 and D20. However, Hefei

already substantiated the lack of novelty of the subject-matter of patent claim 1 with D5 in the counterclaim for revocation. In this context, Hefei argued, inter alia, with reference to the specification of the contested patent, that circulation pumps usually comprise a radial centrifugal pump and typically include an electric motor driving the pump. The same applies to the speed controller. Hefei has thus appealed to general technical knowledge and routine measures in this matter.

77. In the opinion of the local division, the assertion of D5 as the starting point for the person skilled in the art (in combination with D7) as an attack on the inventive step of patent claim 1 constitutes an extension of the claim, the admission of which is out of the question in the absence of the requirements set out in Rule 263 of the RoP.

78. It is not necessary to decide whether the local division was correct in not admitting a combination of D5 and D7 with regard to patent claim 1. In any event, the Court may conclude that the subject-matter of patent claim 1 was obvious on the basis of a combination of D5 with general technical knowledge.

79. It need not be determined whether an extension of the claim within the meaning of Rule 263(1) of the RoP has already occurred where, in the context of a counterclaim for the revocation of the patent, new prior art or new combinations of prior art are introduced into the proceedings. This is because Hefei has already set out in the statement of counterclaim all the facts which substantiate the lack of inventive step on the basis of a combination of D5 and common general knowledge or routine measures. The fact that Hefei did not present these facts in the context of the discussion of inventive step is irrelevant. However, the defendant bringing a counterclaim for revocation must substantiate the reasons why inventive step is to be denied. It is not sufficient to appeal to a large number of documents. Rather, a substantiated argument must be put forward as to why a particular prior art document is of interest to the person skilled in the art as a starting point for solving the problem of the invention and, where applicable, why this prior art document is combined with other prior art documents. If a combination with general technical knowledge is claimed, a substantiated argument must be put forward as to the source of that general technical knowledge. Hefei's submission meets these requirements, according to which D5 does not explicitly disclose that the circulation pump is designed as a centrifugal pump, but radial centrifugal pumps are typically used as circulation pumps. Grundfos had the opportunity during the oral hearing before the Court of Appeal to comment on the question of inventive step based on D5 in combination with general technical knowledge.

b) Subject matter of D5

80. The invention according to D5 relates to a method for controlling the speed of a circulation pump (para. 1). According to the description in D5, such circulation pumps convey the heating medium in a heating system and are usually installed between a boiler and at least one heat-consuming heating circuit. The amount of heat supplied to consumers depends directly on the speed or the conveyed flow rate (para. 2). Conventional circulation pumps are known which can be switched manually between several stages in order to vary the delivered flow rate. Furthermore, there are pumps with a control method known as pulse width modulation (para. 3, lines 16–21).

81. D5 is based on the task of creating a simple method for controlling the speed of a circulation pump, which can be used flexibly with various circulation pumps and control devices in different heating systems (para. 5).

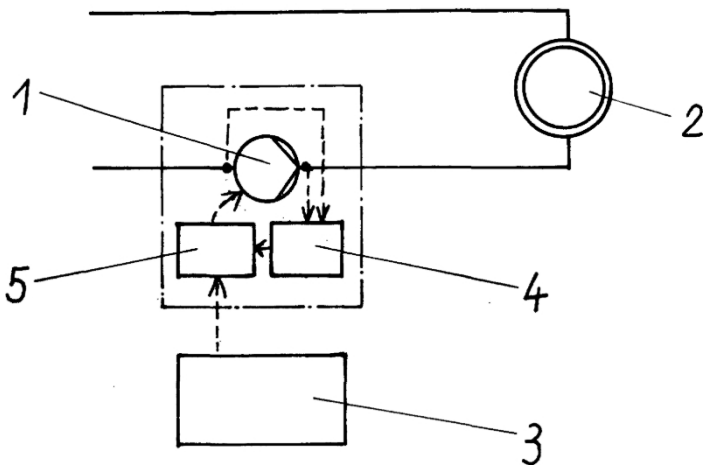
82. To implement the method according to the invention, a circulation pump is used which is equipped with a measuring device for detecting the pressure difference and with an additional receipt for a pulse width modulation signal. The connection between the circulation pump and the heating system's control unit is established via the control circuit, whereby the operating mode is set automatically on the control circuit or must be specified during installation. Preferably, limit values for the signals to be selected should be set on the control circuit during installation as evaluation criteria (para. 10).

83. The method according to the invention enables a conventional pump, which operates by measuring the pressure difference in the connected pipe of the heating circuit, to be controlled. The operating modes of a pressure-differential-controlled pump and a pulse-width-modulated pump are combined without sacrificing their respective advantages. The control circuit, preferably of modular design, can be mounted either directly on the circulation pump or on the control unit. The two incoming signals for pulse width modulation and pressure differential, both of which allow conclusions to be drawn regarding the desired flow rate, are continuously evaluated by the control circuit (para. 11).

84. A reduction in heating output caused by modulating the burner could, for example, no longer lead to an undersupply of heating heat, because in parallel with the incoming pulse-width-modulated signal from the control unit to reduce the flow rate, the flow rate is also monitored via the pressure differential. In the event of high heat demand and the associated low throttling in the heating circuit, the pressure differential would also be small. In this case, the control circuit compares the measured setpoint values against one another and, depending on the selected operating mode, determines how the circulation pump is ultimately controlled (para. 12).

85. Figure 3 shows the order of a circulation pump in a heating circuit with internal measurement of the pressure differential and a control circuit for signal selection in an external control unit (para. 16 et seq.).

Fig.3



86. In the order shown in Figure 3, the measuring device 4 for detecting the pressure difference and the control circuit 5 for signal selection are integrated into the circulation pump 1. If the control unit 3 does not supply a signal for pulse width modulation to the control circuit 5, the circulation pump 1 operates according to the internally measured pressure difference. In the event that a signal for pulse width modulation is present at the control circuit 5, this is given priority or not in accordance with the specified selection criteria (para. 20).

c) D5 as a suitable starting point

87. The question of inventive step or obviousness within the meaning of Article 56 of the UPC Agreement is assessed in accordance with the general principles developed by the UPC Court of Appeal (UPC-BerG, 26 February 2024, UPC_CoA_335/2023 – *Nanostring/10X Genomics*; 25 November 2025, UPC_CoA_464/2024 – Meril/Edwards; 25 November 2025, UPC_CoA_528/2024 – *Amgen/Sanofi*). The question of whether a person skilled in the art would use a prior art document as a starting point for solving a technical problem depends on whether it is relevant to the solution of the problem.

88. D5 is of interest for solving the task of designing a centrifugal pump unit in such a way that it can be used both in a heating system with internal electronic control and in a boiler with external control, or in a combination of both.

89. The invention according to D5 is based on the task of creating a simple method for controlling the speed of a circulation pump, which can be used flexibly with various circulation pumps and control devices in different heating systems. The tasks thus overlap with regard to the operation of different control systems. This is sufficient to qualify D5 as a suitable starting point (see *Meril/Edwards*; *Amgen/Sanofi*).

90. D5 merely refers to “circulation pumps” and is silent as to which specific pump is used. It can be left open whether – as Hefei has already argued at first instance – this thereby directly and unambiguously discloses centrifugal pumps as well. Since it was known to the person skilled in the art at the priority date that circulation pumps are usually designed as centrifugal pumps, it was in any case obvious to provide a centrifugal pump for the circulation pump disclosed in D5 as well. If circulation pumps are typically – and, according to the technical literature submitted in the appeal proceedings, even exclusively – designed as centrifugal pumps, it is natural for a person skilled in the art to refer to the prior art relating to circulation pumps when solving a problem specific to centrifugal pumps, and conversely to refer to the prior art relating to centrifugal pumps when solving a problem specific to circulation pumps.

91. Grundfos has unsuccessfully objected to the admissibility of the argument first substantiated in the appeal proceedings and the documents submitted.

92. Whether a submission specified at the second instance is new depends on how general it was at the first instance. A submission is not new if it serves – as in this case – to further specify and clarify an already conclusive submission from the first instance by means of additional factual assertions. In the statement of grounds for appeal, Hefei expanded on the submission made at first instance and clarified that, in the state of the art, heating circulation pumps are typically or exclusively used as

centrifugal pumps. This argument is not new, as it merely clarifies and substantiates the factual claim in the counterclaim.

93. Furthermore, Grundfos did not substantively contest the relevant submission either at first instance or on appeal. At first instance, Grundfos merely argued that the fact that circulation pumps are usually centrifugal pumps does not imply disclosure. As a rule, an uncontested submission cannot be rejected on the grounds of late filing (see UPC Court of Appeal, decision of 3 October 2025, UPC_CoA_534/2024, *Belkin v Philips*, para. 208).

94. Since the statement of facts is admissible, the evidence submitted in support of the statement and to substantiate the general technical knowledge (extract from Dubbel, Pocket Book of Mechanical Engineering, 17th ed. 1990, Annex D23, Recknagel Sprenger Schramek, Handbook of Heating and Air Conditioning Technology, 73rd ed., 2007, Annex D24, and an expert report [GRU2]) must also be
Rule 222.2 of the RoP.

d) Disclosure of features 1.4 (internal electronic control), 1.4.1 (control variable = motor speed) and 2 and 3 (speed controller and control form part of the unit/signal input for external control)

95. The direct and unambiguous disclosure of features 1.4, 1.4.1, 2 and 3 is rightly not in dispute between the parties.

e) Obviousness of feature 1.1 (centrifugal pump)

96. Since centrifugal pumps were generally used in circulation pumps at the priority date, it was in any event obvious to a person skilled in the art to design the circulation pump disclosed in D5 as a centrifugal pump.

f) Disclosure of feature 1.2 (electric motor)

97. Feature 1.2 is not directly and unambiguously disclosed in D5. D5 does not describe how the circulation pump is driven. However, the person skilled in the art would consider the use of an electric motor as a means of drive as part of routine practice (see *Meril/Edwards*, para. 136, regarding the lack of inventive step in routine measures). Hefei had already pointed out in the counterclaim for revocation that, even according to the assessment of the state of the art in the introductory section of the description of the patent at issue, centrifugal pump units *typically* consist of a centrifugal pump and an electric motor driving it (para. 2, emphasis added by the Court). This submission, which Grundfos has not contested in any substantiated manner, is confirmed by the statements in the technical handbook (D23) submitted in the appeal proceedings. According to this, only centrifugal pumps driven by electric motors, usually directly coupled, are used as circulation pumps (D23 p. M29).

g) Disclosure of feature 1.3 (electronic speed controller)

98. Nor does the provision of an electronic speed controller constitute an inventive step. When using an electric motor, it was obvious to a person skilled in the art to design the speed controller electronically as well.

h) Disclosure of feature 4.1 (means for switching from internal electronic control to external speed control or for engaging an external speed control)

99. Feature 4.1 is directly and unambiguously disclosed in D5. D5 describes a circulation pump and/or a control unit with a control circuit, by means of which incoming signals for pulse width modulation are detected and evaluated by measuring the pressure difference in the connected pipe of the heating circuit. Consequently, a signal selection is made based on the values currently most favourable for the at least one heat-consuming heating circuit (para. 7). In doing so, the circulation pump operates, as described in paragraph 8, in accordance with the signal corresponding to the pressure difference in the connected pipe when no signal for pulse width modulation is present via the control unit. Conversely, the circulation pump will operate in accordance with the signal for pulse width modulation via the control unit. In the latter case, the system switches to external control. This constitutes an activation within the meaning of the patent at issue.

100. Grundfos argues, unsuccessfully, that D5 does not show that the internal control can be switched off wholly or partly after the switchover. As explained in relation to the interpretation of the feature, it is not necessary for its realisation that the internal control be switched off after the switchover or engagement (para. 37). The only relevant factor is whether the external control takes over the control on a time-dependent and demand-dependent basis.

i) Disclosure of feature 4.2

101. The switching means disclosed in D5 are also electronic means which determine whether an external control is connected or not and, upon detecting a connected electronic control, switch over to the external control.

102. Paragraph 8 describes a method in which the circulation pump operates in accordance with the signal corresponding to the pressure difference in the connected pipe when no signal for pulse width modulation is present via the control unit. Conversely, the control circuit will operate according to the signal for pulse width modulation via the control unit, regardless of whether or not a signal corresponding to the pressure difference in the connected line is present (see also para. 20). This is shown in lines 1 and 2 of the table in Figure 1.

Fig. 1

pulsweitenmoduliertes Signal (vom Regelgerät)	Signal entsprechend der Druckdifferenz (Pumpe)	**Reaktion der Pumpe (nach Regelschaltung)**
kein	0-100 %	Signal Druckdifferenz; 0-100 %
0-100 %	0-100 %	Signal Regelgerät; 0-100 %
30 %	80 %	Maximalwert-Auswahl, Signal Druckdifferenz; 80 %
30 %	80 %	Minimalwert-Auswahl, Signal Regelgerät; 30 %

103. The control circuit compares the measured setpoints with one another and decides, depending on the selected operating mode, how the circulation pump is to be controlled (para. 12, lines 46–49). One of these operating modes is priority-dependent control, which is also the subject of dependent

patent claim 4. This is illustrated in Figure 1 in lines 1 and 2. Further operating modes are described in paragraph 9. According to this, in an *'alternative embodiment'* (emphasis added by the court), the control circuit may select the maximum value or the minimum value to control the pump (see also sub-claims 5 and 6). This is illustrated in Figure 1 in lines 3 and 4. Against this background, the person skilled in the art understands the statement in paragraph 7—that a signal selection is made according to the values currently most favourable for at least one heat-consuming heating circuit (para. 7, lines 66–69)—to mean that the selected operating mode is decisive in determining which values are favourable.

104. Contrary to Grundfos' view, it is therefore not mandatory under D5 that a selection of maximum or minimum values be made in accordance with lines 3 and 4 of the table in Figure 1. The selection criterion may be solely the priority of the signal for pulse width modulation. This understanding is confirmed by the fact that only patent claim 2 protects a method according to claim 1, characterised in that a signal selection is made based on the values most favourable for the at least one heat-consuming heating circuit (2). Accordingly, only sub-claims 5 and 6 relate to a selection based on the maximum or minimum value.

105. If the operating mode described in paragraphs 8 and 20 of D5 and corresponding to line 2 of Fig. 1 is employed, in which absolute priority is given to the pulse width modulation signal, the detection of a pulse width modulation signal results in activation within the meaning of the patent at issue if no pulse width modulation signal has been received previously.

Late submission and combination of paragraphs 20 and 8

106. Grundfos unsuccessfully argues that Hefei first relied on a combination of paragraphs 20 and 8 of the prior art in the appeal proceedings, and thus belatedly, to support the argument regarding direct and unambiguous disclosure.

107. An argument in the appeal concerning a counterclaim for revocation, which is based on a publication already submitted at first instance, is new if the specific technical information and the suggestions regarding the teaching of the invention, which the person skilled in the art is supposed to derive from the publication according to the argument in the appeal, were not raised before the Court of First Instance. In the counterclaim for revocation, Hefei referred to both paragraph 20 and paragraph 8 in relation to the lack of novelty of patent claim 1. Consequently, the submission cannot be regarded as new.

Conclusion

108. Even if there were to be a lack of direct and unambiguous disclosure of features 1.1 and 1.2 in D5, in which the other features of patent claim 1 are directly and unambiguously disclosed, it was, in any event, obvious to the person skilled in the art, on the basis of their general technical knowledge derived from D23 and D24, to provide for features 1.1 and 1.2 as a routine measure. Since the remaining features are disclosed in D5, D5, in combination with general technical knowledge, was obvious.

III. Need to examine the dependent claims

109. In its defence to the application for revocation, Grundfos defended all the dependent claims. In the

application for amendment of the patent at issue, Grundfos, in the event that the Court

counterclaim for revocation to be well-founded, it conditionally requested, in the form of auxiliary claims, that the patent at issue be upheld. This is to be understood as meaning that a decision must first be made on the dependent claims.

IV. Patent claim 2

110. The dependent patent claim 2 is also not patentable. It is characterised in that the signal input is formed by an electrical connector
(14) arranged on the unit housing (2, 8, 9). Since an electrical connection is also required for the pump according to D5, the person skilled in the art will, as a routine step in the art, also consider a connector plug, such as that known for example from the Grundfos Data Booklet GRUNDFOS ALPHA2 Circulator Pumps (D7, p. 14), in the circulation pump designed as a centrifugal pump unit according to D5.

V. Patent claim 3

111. No different assessment applies to independent claim 3. This claim is dependent on claims 1 and 2 and is characterised in that the means for switching comprise a switch on the pump unit.

112. Contrary to Grundfos' view, patent claim 3 is not limited to a reset switch intended to ensure that the factory default setting is restored when a pump unit is installed in or removed from a heating system. No such limitation can be inferred from the wording of the patent claim. Rather, it may also be a switch serving to switch between an internal electronic control or to engage an external speed control.

113. Providing a switch in a device such as that described in D5 for the purpose of switching or connecting, so that the electronic switching can also be carried out manually, constitutes a routine measure and is therefore not inventive.

VI. Patent claim 4

114. The counterclaim for revocation is, however, unsuccessful with regard to dependent patent claim 4.

115. Patent claim 4 provides, as an additional feature, that the means for switching (according to claim 1) comprise a sensor or microswitch designed to detect a connection of the electrical connector (14) of the signal input. This requires that the means be designed in such a way that they are suitable for detecting a connection of the connector plug. The person skilled in the art recognises that the sensor or microswitch, as described in paragraph 27 of the specification of the contested patent as step a), serves to detect whether the plug is in contact with a mating plug. Only in a further step b) is it determined whether an external control unit is connected via the mating plug. Unlike for the realisation of feature 4.2, the detection of an external control signal is therefore not sufficient.

116. Contrary to Hefei's view, it cannot be directly and unambiguously inferred from D5 that a connection is detected. D5 merely describes the detection of a

pulse width modulation signal, but not a sensor or microswitch that detects whether the plug is connected to a mating connector.

117. Nor is the detection of a connection by a sensor or microswitch directly and unambiguously disclosed in the Grundfos data sheet UPM2, UPM GEO, UPM2K Circulation Pumps 50/60 Hz (Annex B&B D6, hereinafter D6). However, it is provided there that, in the event of a cable break, the pump should continue to operate at maximum speed (p. 9, section 'PWM input signal').

118. The operation of the PWM input signal is described in more detail on p. 9 of the D6 data sheet as follows: "At high percentage values of the PWM signal (duty cycle), a hysteresis function prevents the pump from repeatedly switching on and off when the input signal fluctuates around the switching point. At low PWM signal percentages, the pump runs at maximum speed for safety reasons. In the event of a cable break in the gas boiler, the pump then continues to run at maximum speed to dissipate the heat from the main heat exchanger. This function is also suitable for heat pumps to ensure that the pumps dissipate the heat in the event of a cable break." This is illustrated in the following figures:

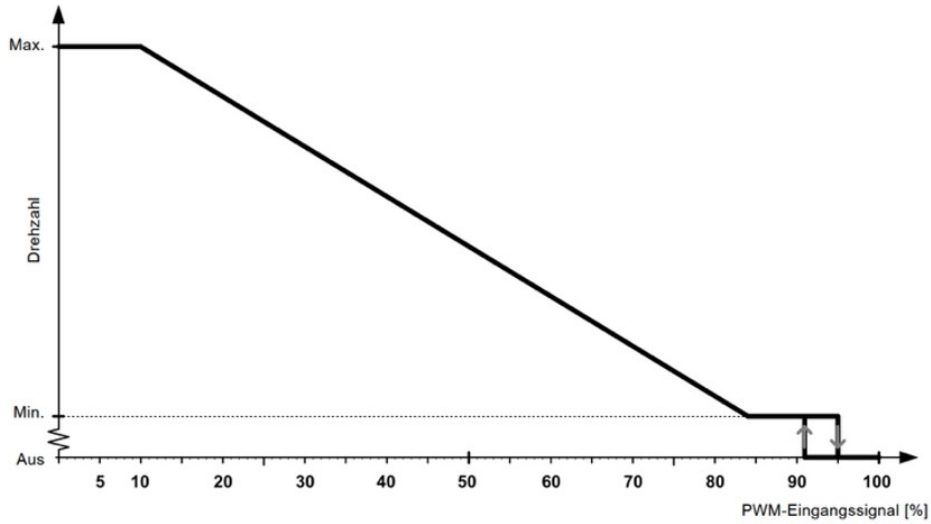


Abb. 6 PWM-Eingangsprofil

PWM-Eingangs-signal [%]	Pumpenstatus
< 10	Die Pumpe läuft mit maximaler Drehzahl.
10-84	Die Pumpendrehzahl wird linear vom maximalen auf den minimalen Wert abgesenkt.
85-91	Die Pumpe läuft mit minimaler Drehzahl.
91-95	Eine Hysteresefunktion verhindert, dass die Pumpe immer wieder ein- und ausschaltet, wenn das Eingangssignal um den Schaltpunkt schwankt.
96-100	Betriebsbereitschaft.

5

119. Thus, the only indication of a cable break is a low PWM input signal (< 10%). Consequently, it is not determined whether a connection actually exists, but merely a corresponding conclusion is drawn from a low value of the PWM signal.

VII. Patent claim 5

120. Patent claim 5 is to be examined only insofar as it does not refer back to the patentable sub-claim 4 (see Court of Appeal, 17 February 2026, UPC_CoA_305/2025, *Rematec/Europe Forestry*). To that extent, it is not patentable. Accordingly, the centrifugal pump unit is protected under one of the preceding claims, in which the control system (16) features a self-learning setpoint adjustment designed to automatically detect the operating points of the pump in relation to the system.

121. As is apparent from the specification of the contested patent, this not only provides a variety of control curves, e.g. constant pressure curves, proportional pressure curves or the like, which can be selected, but the unit also has a microprocessor with corresponding software which is capable, on the basis of the conditions of the heating system, in particular the prevailing pressure profiles, the changing temperature of the pumped medium, the flow rate and the like, to automatically adapt the setpoint values of the control system to the heating system. The specification of the contested patent states that the self-learning setpoint adjustment of the internal control system has the advantage that the pump adapts almost perfectly to the requirements of the heating system and can thus be operated with comparatively low electrical energy depending on the situation (specification of the contested patent, para. 3).

122. Such self-learning setpoint adjustment is not disclosed in D5. The general description of the prior art merely describes the provision of characteristic curves (D5, para. 4, col. 1, lines 45–48). The embodiment is described in such a way that the speed of the circulation pump is controlled in accordance with the heat demand, which is indicated by a changing pressure difference at the circulation pump due to varying opening states of thermostatic valves (D5, para. 18, col. 2, lines 66–col. 3, line 2).

123. However, the use of a self-learning setpoint adjustment is obvious to the person skilled in the art. D5 does not specify how the speed of the pump is controlled based on the measured pressure differential. The person skilled in the art is therefore faced with the task of finding a control system that can be integrated into the circulation pump according to D5. D7 is of interest to the person skilled in the art because, as with the circulation pump according to D5, the differential pressure is determined in the circulation pump disclosed therein (D7 p. 5 *"Control of heating* systems", "GRUNDFOS ALPHA2 *automatically controls the differential pressure by adjusting the pump performance to the actual heating demand, without the use of external* components"). A combination of D5 and D7 with regard to patent claim 5 was already asserted by Hefei in the counterclaim for revocation.

124. D7 specifies various control options. In addition to *"integrated proportional-pressure* control" and *"integrated constant-pressure* control", these also include *"integrated* $AUTO_{ADAPT}$control" (D7 p. 6 under "Construction"), which corresponds to a self-learning setpoint adjustment. In D7, this is achieved in such a way that the AUTOADAPT function (in the factory setting) automatically adjusts the pump output to the demand, i.e. to the size of the system and the heat demand. The output is adjusted gradually over time (D7 p. 5 under "AUTOADAPT").

125. Grundfos argues unsuccessfully that D5 does not describe how a self-learning setpoint adjustment interacts with the criteria of control circuit 5 described in Figure 1 of D5. In any case, such interaction is not necessary if the operating mode 'Priority'

(priority) of the external controller is selected as the operating mode. In this case, either the external control (without setpoint adjustment) or the internal control (then with setpoint adjustment) is used.

126. Nor are there any other fundamental difficulties or interactions that preclude the use of a self-learning setpoint adjustment within the scope of the invention according to D5. On the contrary, D5 highlights as an advantage of the method according to the invention that the operating modes of a pressure-differential-controlled and a pulse-width-modulated pump are combined without sacrificing their respective advantages (para. 11, col. 2, lines 28–31).

VIII. Patent claim 6 Subject

matter of patent claim 6

127. The action for revocation is unsuccessful, however, in so far as the invalidity of sub-claim 6 is asserted. Patent claim 6 protects a centrifugal pump unit according to claim 5, characterised in that the self-learning setpoint adjustment can be activated and deactivated via the external control.

128. The external control system thus influences the internal control system. It is therefore a kind of hybrid operation.

Novelty over D5

129. Hefei unsuccessfully argues that the distinguishing feature of patent claim 6 is already disclosed in D5, since D5 does not directly and unambiguously disclose any self-learning setpoint adjustment (see para. 122 above).

Inventive step based on D5 in combination with EP 0 866 228 A2 (D1)

130. Contrary to Hefei's view, this feature characterising patent claim 6 is also not suggested by EP 0 866 228 A2 (D1). It is true that D1 discloses in column 4, lines 3 et seq. that an external adjustment device for a circulation pump can simultaneously serve as a control, regulation and monitoring device. However, D1 does not disclose a self-learning setpoint adjustment. Consequently, a combination of D5 and D1 does not lead to the subject-matter of patent claim 6.

Inventive step in combination with CN 202326137 U (D12)

131. The same applies to CN 202326137 U (D12). It, too, does not disclose any self-learning setpoint adjustment. Consequently, D12, even in conjunction with D1, D2, D5, D6 or D8—which are cited in combination with it and which likewise do not feature a self-learning setpoint adjustment—cannot inspire the creation of a corresponding centrifugal pump unit with a self-learning setpoint adjustment, nor can it inspire making such a unit activatable or deactivatable via an external control system.

IX. Patent claim 7

132. Patent claim 7 is also found to be patentable.

133. Accordingly, a centrifugal pump unit according to claim 5 or 6 is protected, characterised in that external switching means are provided by which the self-learning setpoint adjustment of the internal control (16) can be reset and/or one or more control curves of the internal control (16) can be modified.

134. The subject-matter of patent claim 7 is not obvious to a person skilled in the art from a combination of D5 and D7. Hefei's appeal to the push-button in D7 (p. 8) is unsuccessful. This is because this switch/button can only be used to switch between an automatic setpoint adjustment (AUTOADAPT) and "two constant-pressure curves, two proportional-pressure curves and three fixed-speed curves". However, the necessity and possibility of resetting the AUTOADAPT function as claimed by means of the switch/button is not disclosed, in particular not directly and unambiguously. Furthermore, in D7 it is only possible to switch between the various curves. However, these control curves of the internal control system cannot be modified – as alternatively claimed in claim 7, inter alia. The specification of the contested patent distinguishes between selecting the control curves and modifying them (see para. 16, lines 29–30). Consequently, it is irrelevant whether the "push-button" in D7 (p. 8) can be regarded as an "external switching means" at all. Nor do Hefei's submissions justify the assumption that providing a means of resetting the AUTOADAPT function (D7) or a means of modifying one or more control curves of the internal control would constitute a mere routine measure.

X. Patent claim 8

135. The subject-matter of patent claim 8 is a centrifugal pump unit according to claim 7, characterised in that an external switch is provided which is ordered at a spatial distance from the pump unit, preferably in a control panel of a heating system in which the centrifugal pump unit is installed. In the absence of a legal interest (see Court of Appeal, 17 February 2026, UPC_CoA_305/2025, *Rematec/Europe Forestry*), there is no need to examine patentability, as patent claim 8 refers back to the patentable patent claim 7.

XI. Patent claim 9

136. Claim 9 is also patentable. It protects a centrifugal pump unit according to one of the preceding claims, characterised in that further control signals are transmitted, preferably modulated, via the electrical line which transmits the speed control signals, preferably PWM signals, wherein isolators are provided on the unit side which separate the speed control signals from the remaining control signals.

Inventive step based on EP 0 866 228 A2 (D1) in combination with common technical knowledge

137. Hefei unsuccessfully argues that the defining feature is already suggested by claim 1 of EP 0 866 228 A2 (D1) in combination with general technical knowledge. Claim 1 of D1 discloses only the setting of operating parameters via a separate (external) setting device and thus not necessarily the transmission of control signals, in particular not speed control signals. Consequently, it is not demonstrated that unit-side separation means are necessary to separate the remaining control signals.

Inventive step based on EP 0 735 273 (D2) in combination with common technical knowledge

138. The subject-matter of sub-claim 9 is also not suggested by D2 in combination with general technical knowledge.

139. D2 relates to a twin-pump comprising two impellers arranged in a housing which convey a fluid, each impeller being driven by a respective electric motor, and by means of a higher-level control and/or regulation system, the speeds of the two electric motors can each be set or regulated independently of one another to any value between standstill and the rated speed (col. 1, lines 3–10).

140. According to the description of an embodiment, each control unit 5 is connected to the higher-level control unit 4 via an additional communication interface. The control units 5 exchange data with the higher-level control unit via the communication interface. In this way, the control unit 5 can notify the higher-level control unit 4 of a fault in the respective pump or motor. The higher-level controller 4 can also switch the pump to specific operating modes. Possible operating modes include, for example, standstill, maximum speed or controlled operation of the pump. This makes it possible for one pump to operate at maximum speed whilst the other pump is run in controlled mode. A further operating mode is the synchronisation of the two pumps, such that both pumps are operated at the same speed. It is also possible for only one pump to be in operation whilst the other is shut down (col. 5, lines 41–58).

141. It is not apparent why D2 should be of interest to a person skilled in the art for the further development of a centrifugal pump in accordance with the specifications of D5. D2 discloses the permanent external control of two pumps by a higher-level control system. Switching over to, or switching on an external control system as required, is not disclosed therein. In particular, D2 does not provide for speed control signals via the (external) higher-level control system described therein. Instead, the head or the pressure difference serve as the (external) reference variable for the (internal) control systems of the two pumps (D2 col. 2, lines 11–20, 48–52, col. 3, lines 7–12, col. 5, lines 27–40; Fig. 3). In the absence of speed control signals specified by the external higher-level control system, D2 also does not provide for isolators on the unit side to separate speed control signals from other control signals.

XII. Claim 10

142. Patent claim 10 is also found to be patentable.

143. This provides, as an additional feature, that the pump unit is intended to supply a multi-heating circuit system and that means are provided for detecting the heating circuit to be circulated.

144. A multi-heating circuit system is characterised by several heating circuits; in the case of heating circulation pumps for boilers, this typically comprises one heating circuit for space heating and one heating circuit for domestic hot water heating (see the patent at issue, para. 19, col. 5, lines 11–16). The means of the centrifugal pump unit for identifying the heating circuit to be circulated can preferably automatically detect which of the heating circuits needs to be served, in order to then be able to switch over accordingly. This detection can, for example, be carried out via the pressure curve at the pump, namely when, during the switchover process from one heating circuit to another, both heating circuits are briefly open and a pressure drop can thus be detected (patent at issue, para. 19, col. 5, lines 17–26).

145. Contrary to Hefei's view, the fact that a pressure sensor was known in the prior art is not sufficient to regard the feature as obvious. Rather, the pressure sensor must be ordered or connected within a pump unit suitable for supplying a multi-heating circuit system in such a way that it enables the identification of the heating circuit to be circulated.

146. Hefei's reference to D7 is also unsuccessful. Whilst it is undisputed that D7 discloses a pump unit suitable for supplying a multi-heating circuit, it does not disclose that a pressure sensor, a temperature sensor or any other means of detection determines which of the heating circuits is to be served.

147. *Contrary to Hefei's* view, the statement *"installation in new systems for fully automatic adjustment of the performance to flow demands without the use of bypass valves or similar expensive* components" (D7, p. 4, column 1, last paragraph) does not, contrary to Hefei's view, imply that a distinction is made between different heating circuits. Rather, the fact that an adjustment dependent on the entire system takes place can be inferred from the following statement: *"The AUTOADAPT function (factory setting) automatically adjusts the pump performance to the demand, i.e. the size of the system (emphasis added) and the heating* demand" (D7 p. 5, column 1 under "AUTOADAPT"). However, no means of identifying the heating circuit to be circulated in a multi-heating-circuit system can be inferred from this.

XIII. Claim 11

148. Patent claim 11 is not to be examined to the extent that it refers back to the patentable claims. Its subject-matter beyond that is not patentable. It contains the additional feature that several profiles/control curves are stored in the internal control system (16), which can be selected via switches/control means.

149. This feature does not establish inventive step. The person skilled in the art, who, starting from D5, considers D7 for the detailed configuration of the internal control system described therein (see para. 123 above), will find that the use of different profiles/control curves and the selection of the desired profile by operating a switch are disclosed there (*"The pump performance (flow and head) can be changed by pressing the control box push-button as indicated in the table below and Fig.* 16" (D7 p. 9).

XIV. Auxiliary claim 1

150. A decision must be made on the auxiliary claims, as they are made in the event that the counterclaim for revocation is well-founded. This is to be understood to mean that, even in the event of partial invalidity, a decision must be made on the auxiliary claims in the order selected.

151. The above comments on patent claim 11 apply mutatis mutandis to patent claim 1 according to auxiliary request 1, in which patent claim 1 (granted version) is supplemented by the feature characterising patent claim 11 (granted version).

XV. Subordinate claim 2

152. With regard to auxiliary claim 2, which supplements patent claim 1 with the features of patent claim 5, reference is made to the comments on patent claim 5.

XVI. Auxiliary claim 3

153. Under auxiliary request 3, patent claim 1 is supplemented by the defining features of patent claims 5 and 11. In this respect, reference is made to the comments on patent claims 5 and 11.

XVII. Auxiliary claim 3-A

154. Auxiliary claim 3-A is intended to specify the switching in feature 4.2 in more detail as follows (addition highlighted).

4.2 Hi3A	The means (20) for switching from the internal electronic control (16) to an external speed control or for activating an external speed control are electronic means which determine whether an external control is connected or not and, upon detection of a connected external control, switch to the external control.

155. Since this does not entail any substantive change to the subject-matter of patent claim 1, this addition does not render the invention patentable.

XVIII. Auxiliary claim 3-B

156. Patent claim 1 according to auxiliary request 3-B contains the following addition in feature 4.2 (addition highlighted):

4.2 Hi3B	The means (20) for switching are electronic means which determine whether an external controller is connected or not and, upon detection of a connected external controller, switch to the external controller, so that the internal control may be wholly or partially deactivated.

157. This merely clarifies, as in the example of implementation in the description of the patent at issue (para. 28, lines 7–9), that after switching, control is performed by the external control system, so that

in any event, the internal rule is no longer required at times and may, in any event, be switched off at times, but need not be.

158. Since this does not result in any change to the meaning of feature 4.2, patentability is to be assessed in the same way as for granted claim 1.

XIX. Auxiliary claim 3-C

159. Since patent claim 1 of auxiliary request 3-C constitutes a combination of auxiliary request 3-A and auxiliary request 3-B, the same applies to auxiliary request 3-C.

XX. Auxiliary request 3-D

160. Since claim 1 of auxiliary request 3-D combines claim 1 of auxiliary request 3-A with the defining feature of claim 11, patentability must be denied for the reasons set out in relation to auxiliary request 3-A and claim 11.

XXI. Auxiliary request 3-E

161. Claim 1 of auxiliary request 3-E is a combination of auxiliary request 3-B and claim 11. The assessment here is no different from that for auxiliary request 3-B and claim 11.

XXII. Auxiliary Request 3-F

162. Claim 1 of auxiliary request 3-F is a combination of auxiliary requests 3-A, 3-B and claim 11. Since these are not patentable in their own right, the combination cannot establish patentability either.

XXIII. Auxiliary claim 4

163. Claim 1 of auxiliary request 4 contains, in feature 4.1, the amendment reproduced below:

4.1 HA4	[means] for switching from the internal electronic control (16) to an external speed control ~~or for engaging an external speed control.~~

164. The deletion of the alternative that the means are suitable for 'activating' does not entail any substantive change, since, as explained above (see paragraph 56 above), activation is a switchover that is limited in time from the outset. In both alternatives, the electronic means 'switch over' to an external control system, in one case until an unspecified point in time and in the other case 'as required', i.e. only for as long as there is a need to do so (see para. 32 above). The person skilled in the art thus understands the term 'switching over' in a comprehensive sense, which also encompasses switching on.

165. In the absence of any substantive change, the comments on granted patent claim 1 apply mutatis mutandis in this respect.

XXIV. Auxiliary claims 5 and 6

166. The same applies to patent claim 1 of auxiliary request 5, which supplements claim 1 of auxiliary request 4 with the defining feature of patent claim 11, and to patent claim 1 according to auxiliary request 6, which seeks to supplement claim 1 of auxiliary request 4 with the defining feature of patent claim 5.

XXV. Auxiliary request 7

167. Patent claim 1 in the version of auxiliary request 7 corresponds to patent claim 1 according to auxiliary request 4 and contains the defining features of patent claims 5 and 11. It is not patentable for the reasons set out in relation to patent claims 5 and 11.

C. Appeal regarding the infringement action

168. The appeal regarding the infringement action is successful. Grundfos bases its allegation of infringement solely on the realisation of the features of the unpatentable patent claims 1, 5 and 11, as well as on the subject-matter of the unpatentable auxiliary claims.

D. No stay

169. There is no reason to stay the proceedings until a final decision has been made on the invalidity action brought by Shinhoo Europe
S.r.l. has been finally decided. Nor is there any reason for the decision to be made subject to the condition subsequent that the patent be declared wholly or partially invalid in the aforementioned invalidity proceedings.

E. Costs and value of the claim

170. As the unsuccessful party, Grundfos is to bear the costs of the infringement action in both instances.

171. Grundfos is to bear 75% and Hefei 25% of the costs of the counterclaim in both instances. This allocation of costs is justified by Grundfos's overriding economic interest in the non-patentable patent claims 1, 5 and 11.

172. In accordance with the determination of the value of the claim in the first instance, the value of the claim in the appeal concerning the infringement action and the appeal concerning the counterclaim for invalidation was also to be set at EUR 1,000,000.00 in each case for the appeal proceedings.

DECISION

I. On appeal by Hefei, the final decision of the Düsseldorf local division of 8 May 2025 is set aside.
European patent 2 778 423 is declared invalid in respect of claims 1 to 3, 5 and 11, in so far as these are not dependent on the remaining patent claims. In all other respects, the counterclaim for declaration of invalidity is dismissed.
Grundfos's action against Hefei is dismissed.

II. The further appeal is dismissed.

III. With regard to the infringement action, Grundfos shall bear the court fees and the costs incurred by Hefei for both instances.

IV. With regard to the counterclaim for declaration of invalidity, Grundfos shall bear 75% of the court fees and costs incurred by Hefei in both instances, and Hefei shall bear 25% of the court fees and costs incurred by Grundfos.

V. The value in dispute in the appeal proceedings concerning the infringement action and the counterclaim for annulment is set at EUR 1,000,000.00 in each case.

Issued on 27 May 2026

Rian Kalden Date: 27 May 2026 08:58:19 +02:00

Rian Kalden, legally qualified judge and presiding judge

Patricia Ursula Rombach Digitally signed by Patricia Ursula Rombach Date: 27 May 2026 09:47:08 +02'00'

Patricia Rombach, legally qualified judge and judge-rapporteur

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Uwe Ausfelder, technically qualified judge

STEVEN RICHARD KITCHEN Digitally signed by STEVEN RICHARD KITCHEN Date: 26 May 2026 21:55:15 +02'00'

Steven Kitchen, technically qualified judge

For the