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**Datasheet for the decision
of 29 November 2024**

Case Number: T 1347/22 - 3.2.03

Application Number: 14810324.5

Publication Number: 3008402

IPC: F25D29/00, G06Q10/08

Language of the proceedings: EN

Title of invention:

SINGLE POINT COMMUNICATION SCHEME FOR A TRANSPORT
REFRIGERATION SYSTEM

Patent Proprietor:

Thermo King Corporation

Opponent:

Schmitz Cargobull AG

Relevant legal provisions:

EPC Art. 54(2), 54, 56
RPBA 2020 Art. 11, 12(2)

Keyword:

State of the art - advertisement brochure (yes)
Novelty - (yes)
Inventive step - (no)
Remittal - (no)

Decisions cited:

T 0804/05, T 0184/11, T 0146/13



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Case Number: T 1347/22 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 29 November 2024

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
16 March 2022 concerning maintenance of the
European Patent No. 3008402 in amended form.**

Composition of the Board:

Chairman C. Herberhold
Members: B. Goers
F. Bostedt

Summary of Facts and Submissions

I. European patent No. 3 008 402 relates to a transport refrigeration system (TRS) and a method of communication for a transport refrigeration system.

II. The opposition division decided to maintain the patent as amended according to auxiliary request 2.

This decision was appealed by both the patent proprietor and by the opponent, both of whom will be referred to as such in the following for the sake of simplicity.

III. During oral proceedings before the Board the final requests were the following.

The patent proprietor requested that the decision under appeal be set aside and the patent be maintained as granted (main request) or, in the alternative, a patent be maintained based on auxiliary request 1 filed during the opposition proceedings, based on auxiliary requests 2 to 7 filed during the opposition proceedings, or on auxiliary requests 8 to 15 submitted for the first time with the reply to the opponent's appeal.

The opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

IV. The following documents are referred to in this decision.

E4: WO 97/26750 A1

E5: US 2013/144442 A1

- E6: US 2003/167345 A1
- E8a: Three photographs of a printed brochure "Die TKM Kühleinheit", allegedly of E8b
- E8b*: "Die TKM Kühleinheit", Schmitz Cargobull, paper brochure, "Stand August 2012", 16 pages
- E8c Certificate "Schmitz Cargobull VG12-25986/TKM-BRO-DE-4963-3512 Broschüre Kühlgerät TKM, 14 September 2012
- E12: Reif K.: "Batterien, Bordnetze und Vernetzung", Bosch Fachinformation Automobil, Vieweg+Teubner, 2010, Auszüge
- E15: Instruction manual "MITSUBISHI Transport Refrigeration Unit, CPE14-2BAIIIES", "delivered since March '98"
- E16: Bulletin "Elektroventile für die Regelung von kältetechnischen Kreisläufen", Sporlan Mechatronics, RACE Catalogue 100-9, June 2010
- E17: "2nd Generation Electronic Expansion Valve", Parker Hannifin Corporation, Sporlan Division, "Form 100-304/ 112010"

* During the oral proceedings before the Board, a copy of the paper brochure E8b was presented and inspected by the parties and the Board.

V. Claim wording relevant for this decision

- (a) Independent device claim 1 of the main request (patent as granted) reads (feature numbering added in "[]"):

"[1] *A transport refrigeration system (TRS,200) comprising:*

[1.1] *a refrigeration circuit (212);*

- [1.2] one or more TRS components (228, 203-206) connected via an industrial grade communication link (207,250); characterized by
- [1.3] a single point access coordinator (202) connected to the one or more TRS components (228,203-206) via the industrial grade communication link (207,250) and connected to the refrigeration circuit (212),
- [1.4] wherein the single point access coordinator (202) is configured to communicate with an external device via a commercial grade communication link (207, 252)
- [1.5] and configured to relay a message from the external device to an intended TRS component of the one or more TRS components (228, 203-206) via the industrial grade communication link (207, 250),
- [1.6] wherein the single point access coordinator (202) is configured to:
 - [1.6.1] receive a message packed in a communication grade communication protocol from the external device via the commercial grade communication link (255);
 - [1.6.2] unpack the message from the communication grade communication protocol;
 - [1.6.3] determine the intended TRS component of the one or more TRS components (228,203-206) for the message;
 - [1.6.4] repack the message in an industrial grade communication protocol;
 - [1.6.5] and send the message to the intended TRS component of the one or more TRS components (228,203-206) via the industrial grade communication link (207,250)."

(b) In auxiliary request 1, claim 1 corresponds to that of the main request with the only restriction that "plural" TRS components are defined instead of "one or more".

(c) In auxiliary request 2, independent claim 1 includes the additional features [1.1.1], [1.7] and [1.8].

*"[a refrigeration circuit]
[1.1.1] having a primary fluid path (214) in which a compressor (216) is fluidly coupled to a condenser (220) by a discharge line (218), the condenser is fluidly coupled to a main electronic expansion valve (228), the main electronic expansion valve is fluidly coupled to an evaporator (220) by an evaporator input line (230), and the evaporator (220) is fluidly coupled to the compressor (216);"*

*"[1.7] wherein the single point access coordinator (202) is a TRS controller (202) configured to control operation of the refrigeration circuit (212),
[1.8] and wherein the TRS controller (202) is programmed to control, as one of the TRS components, the main electronic expansion valve (228) in response to data provided by a plurality of sensors."*

(d) Independent claim 1 of auxiliary request 3 combines the features of claim 1 of auxiliary requests 1 and 2.

(e) Independent claim 1 of auxiliary request 4 comprises the following additional restriction with respect to the main request:

"wherein the industrial grade communication link (207,250) is a J1939 control area network (CAN) connection;"

- (f) Independent claim 1 of auxiliary request 5 combines the features of claim 1 of auxiliary requests 1 and 4.
- (g) Independent claim 1 of auxiliary request 6 combines the features of claim 1 of auxiliary requests 2 and 4.
- (h) Independent claim 1 of auxiliary request 7 combines the features of claim 1 of auxiliary requests 1, 2 and 4.
- (i) Claim 1 of auxiliary requests 8 to 11 corresponds to claim 1 of auxiliary request 2, 3, 6 and 7 with the following additional feature:

"by a suction line (234)"

- (j) Claim 1 of auxiliary requests 12 to 15 correspond to claim 1 of auxiliary request 8 to 11 with the following amendments in feature [1.8] (marked in bold and strike-through):

*"[1.8'] and wherein the TRS controller (202) is programmed to control, ~~as one of the~~ **various** TRS components, **including** the main electronic expansion valve (228), **via the industrial grade communication link** in response to data provided by a plurality of sensors."*

VI. The patent proprietor's arguments relevant to the present decision can be summarised as follows.

- (a) Consideration of E8a, E8b and E8c

The opposition division's decision to introduce documents E8a, E8b and E8c was not accepted.

(b) Prior art status E8b

As argued in the written proceedings, it was not established beyond any reasonable doubts that document E8b was prior art under Article 54(2) EPC. It was not established that E8a and E8b corresponded to the same document and that this document was a printed brochure. Nor did E8b have the character of an advertisement. There was also a discrepancy between the date printed on E8b and that on E8c. In addition, even assuming that E8b was a printed brochure, it was not established that there was a significant period of time between the date printed on E8b and the priority date of the patent, such that E8b could be considered to have been distributed to members of the public. In this respect, the situation was different from that in T 146/13, T 184/11 and T 804/05.

(c) Main request and auxiliary request 1 - novelty and inventive step

The subject-matter of claim 1 of the main request and of auxiliary request 1 was novel over E8b, which did not directly and unambiguously disclose a single point access coordinator and a message relay according to features [1.2] to [1.6.5]. Nor could it be derived from E8b what the term "Telematik" used in E8b in various variants such as "Telematik-Einheit", "Telematik TrailerConnect", "Trailer-Telematik" or "Cargobull Telematics" meant, whether it corresponded to a single point access coordinator and, if so, whether it communicated with the refrigeration circuit and other components of the TRS via the disclosed bus connection.

With regard to auxiliary request 1, the communication with plural components via the industrial grade communication link was clearly not obvious to the skilled person.

(d) Remittal

The case should be remitted to the opposition division if the Board came to the conclusion that the subject-matter of the main request and of auxiliary request 1 was novel.

(e) Auxiliary request 2 - inventive step

The refrigeration unit in E8b was essentially a "black box" whose function could only be guessed. In particular, no electronic expansion valve was disclosed. E8b did not even disclose any cooling power control. Nor was it disclosed that an expansion valve was controlled via a TRS controller in response to sensor data. Furthermore, it was not disclosed that the single point access coordinator was a TRS controller.

(f) Auxiliary requests 3 to 7 - inventive step

At least the definition of the industrial grade communication link as a J1939 control area network (CAN) connection was neither disclosed nor obvious from any of D4, D5, D6 and D12.

(g) Auxiliary requests 8 to 15 - inventive step

The subject-matter of claim 1 of auxiliary requests 8 to 11 involved an inventive step for the same reasons already discussed for the higher ranking requests.

Even if the skilled person considered an electronic expansion valve, there is nothing to suggest that this valve would be controlled via the industrial grade communication link, since it could also be controlled by a local control circuit in the refrigeration circuit.

VII. The opponent's arguments relevant to the present decision can be summarised as follows.

(a) Consideration of E8a, E8b and E8c

Documents E8a, E8b and E8c form part of the evidence on which the decision was based and must be considered in the appeal proceedings.

(b) Prior art status E8b

Document E8b was prior art under Article 54(2) EPC. As was apparent from the paper copy presented at the oral proceedings, E8b was indeed a printed advertising brochure of the kind typically distributed to interested members of the public, in this case for example at the trade fair "IAA Nutzfahrzeuge 2012". Additional evidence E8c also proved that E8b had been printed well before the priority date.

(c) Main request and auxiliary request 1 - novelty and inventive step

E8b disclosed all the features of claim 1 of the main request and of auxiliary requests 1. It was implicit in the communication scheme on page 13 that a message was relayed from an external device via a commercial standard (such as a mobile phone standard) to the "Trailer Connect Steuergerät" via its SIM card. The

"Trailer Connect Steuergerät" thus was at least part of a "single point access coordinator" within the meaning of the claim. The message had to be unpacked and then repacked for the data bus protocol, see page 12 first paragraph, the data bus being an industrial grade communication link. Processing the message in this relay process was not excluded by claim 1. The data bus in E8b was connected to and communicated with various TRS components such as the "Trailer Connect interface" - a data logger - , the refrigeration circuit "TKM 01" and the machine human interface ("Kontrollpanel"). Even if the disclosure of which components were in communication with the data bus was understood in a very narrow way, communication with plural TRS components via the data bus was at least obvious.

(d) The opponent did not comment on the issue of remittal.

(e) Auxiliary request 2 - inventive step

E8b disclosed a refrigeration circuit which had to be controlled in some way, the device of E8b thus including a TRS controller within the meaning of the claim. The use of an electronic expansion valve as a control element in a refrigeration circuit in general was well known and thus obvious to a skilled person. The controller controlling the refrigeration circuit TKM 01 had to communicate with the "Trailer connect Steuergerät". It was thus at least part of a possibly distributed single point access coordinator and the communication with the valve via the data bus was disclosed or it was at least obvious that the valve was included in the communication protocol.

(f) Auxiliary requests 3 to 7 - inventive step

The only further relevant distinguishing feature was the definition of the industrial grade communication link as a J1939 control area network (CAN). This was an industrial standard widely used in the automotive industry at the priority date and its application in E8b to embody the disclosed data bus connection was obvious from the common general knowledge (as represented by D12) and any of D4, D5 and D6.

(g) Auxiliary requests 8 to 15 - inventive step

Auxiliary requests 8 to 15 should not be admitted into the appeal proceedings. None the subject-matter of claim 1 of the requests involved an inventive step. The amended feature "suction line" did not constitute an additional distinguishing feature. It was also obvious to include the expansion valve and further TRS components in the bus communication system.

Reasons for the Decision

1. Documents E8a, E8b and E8c are taken into account in the appeal proceedings.
- 1.1 In the exercise of its discretion, the opposition division admitted documents E8a, E8b and E8c into the opposition proceedings. The criterion applied was the *prima facie* relevance of these documents.
- 1.2 Documents E8a, E8b and E8c form part of the evidence on which the appealed decision was based (Article 12(2) RPBA) and reviewing the substantive grounds of the decision requires the consideration of these documents. The Board does not have an own discretion according to Article 12(4), first and second sentence, in the application of which the Board could decide not to admit documents E8a, E8b and E8c but can only review the opposition division's exercise of discretion.
- 1.3 It is established case law that, on appeal against a decision taken by a department of first instance in exercise of its discretion, it is not for the board to review all the facts and circumstances of the case as if it were in that department's place and decide whether or not it would have exercised its discretion in the same way. Instead, the Board only reviews whether the opposition division took its decision by taking the right principles into account and has not acted in an arbitrary or unreasonable way. The *prima facie* relevance of these documents is an appropriate criterion. As to whether the decision was taken in an arbitrary or unreasonable manner, the patent proprietor

has not provided any reasons in this respect and the Board does not see any either.

2. Prior art status of E8b

The Board agrees with the conclusion in the appealed decision that E8b is part of the prior art under Article 54(2) EPC.

2.1 E8b is a brochure issued by the company Schmitz Cargobull in which the product "TKM Kühleinheit" is advertised. E8a shows a picture of the brochure.

During oral proceedings before the Board, the brochure was presented in its original paper version. The Board and the parties verified that its contents were identical to the electronic representations in E8a and E8b. It was *inter alia* noted that the identification number on page 16 was identical.

From the inspection, the Board considers it established that the brochure presented was identical to the electronic document E8b used in the proceedings. For this reason, the patent proprietor's argument that E8b was only an intermediate electronic and thus unpublished version cannot be accepted.

2.2 E8b - as examined by the Board and the parties at the oral proceedings - has the typical look and feel of an advertising brochure distributed to potential customers (see in this respect also T 184/11, reasons 3.2). In addition, the disclaimers on page 15 indicate the intention to distribute the brochure freely.

2.3 According to established case law, it is to be assumed - in the absence of any evidence to the contrary - that

such an advertisement brochure is made available to interested customers, without any obligation to keep it secret (see Case Law of the Boards of Appeal, 10th edition, 2022, I.C.3.2.1.c), provided that a sufficient period of time has elapsed between the printing date and the priority date of the patent. The period of time between the printing date of a brochure and the priority date which is sufficient to ensure its pre-publication cannot be defined as a general rule and has to be decided on a case-by-case basis.

- 2.4 Based on the evidence on file, it is considered established that E8b was distributed to members of the public before the priority date of the patent.
- 2.4.1 The patent proprietor argued that in the present case, unlike the situations described in decisions T146/13, T184/11 and T804/05, there was no significant period of time between the date indicated on the advertisement brochure E8b (August to September 2012) and the priority date of the patent (10 June 2013), which would allow the conclusion that E8b had been distributed. However, given the case-by-case nature of such an assessment, the following conclusions are not in contradiction with the decisions cited.
- 2.4.2 First, page 15 of E8b states that its content represents the status as of August 2012 ("Stand August 2012").
- 2.4.3 Second, page 15 of E8b contains a reference to a certificate number of the company "ClimatePartner". Document E8c is the relevant certificate confirming that that greenhouse gas emission offsets were paid for the printing of the brochure. This certificate E8c is dated 14 September 2012, i.e. shortly after the date

printed on E8b (i.e. the completion date of the editorial process of E8b: "Stand August 2012").

2.4.4 Apart from the fact that a distribution of E8b to the public is, in view of the above considerations, to be assumed, the dates mentioned in E8b and E8c are also consistent with the alleged distribution at the trade fair "IAA Nutzfahrzeuge 2012", which took place from 20 to 27 September 2012.

3. Main request - novelty

The subject-matter of claim 1 of the main request is not novel over the disclosure of E8b.

3.1 The patent proprietor argued that E8b did not disclose features [1.2] to [1.6.5] of claim 1, i.e. that a message is relayed from an external device by a single access point coordinator to one or more of an intended TRS component (features [1.5] and [1.6]) via the industrial grade communication link.

However, this is not convincing for the following reasons.

3.2 E8b discloses a transport refrigeration system (TRS) which includes as one of the TRS components a refrigeration circuit ("Transportkältemaschine TKM 01") (**feature [1.1]**).

3.3 According to the disclosure on pages 12 and 13 of E8b the refrigeration circuit is connected to a "Telematik TrailerConnect" or "Telematik-Einheit" [telematics unit] via an industrial grade communication link (page

12: "Daten-Bus" [data bus]), thereby anticipating **feature [1.2]**.

3.4 This telematics unit includes a controller "TrailerConnect Steuergerät" which comprises a SIM card (page 12) and relays data received wireless from external devices (via a "Telematik Server" or from a control app on a smartphone) to the TRS components and vice versa (i.e. bidirectionally, see scheme on page 13). It is implicit that the external devices (such as a smartphone, see page 13) communicate with the TrailerConnect controller via a commercial grade communication link such as a mobile phone standard. Therefore, this TrailerConnect controller forms at least a central part of a single point access coordinator in accordance with **features [1.3] to [1.5]**

3.5 It is also implicitly disclosed in E8b as a prerequisite for the relay of messages that the TrailerConnect controller converts incoming data from external devices from the commercial grade communication protocol to the industrial grade communication protocol and vice versa (see bidirectional communication shown in the scheme on page 13).

Contrary to the patent proprietor's view, features [1.6] to [1.6.5] of claim 1 do not require the message to be relayed unmodified. For example, in the embodiment of Figure 2 of the patent, the messages communicated between the TRS controller and the refrigeration circuit must be processed in order to control the refrigeration circuit components such as the expansion valve. This is no different for the control of the fans or the compressor in E8b. Moreover, these internal control messages do not always have to

be completely identical to the messages exchanged between the external devices and the TRS controller. Both in the patent and in the system of E8b, some messages are relayed without modification (such as a request for certain sensor data as the data stored by the TCI in E8b) and some are indeed modified (such as control signals, sent to the refrigeration circuit, e.g. in response to a new temperature set-point, see patent, paragraph [0030]: the single point access coordinator "generates a response and proceeds [to pack it into a message signal]". Similarly, in E8b following a temperature regulation on the smartphone (page 13), this message transferred via the phone network, the SIM-Card and the data-bus must eventually generate a control signal for the components of the refrigeration circuit.

Therefore, **features [1.6] to [1.6.5]** are also disclosed in E8b.

4. Auxiliary request 1

The only amendment made to the subject-matter of claim 1 of auxiliary request 1 as compared to the main request is that "plural" TRS components are defined instead of "one or more". This amended subject-matter does not involve an inventive step for the following reasons.

4.1 Further ("plural") TRS components, also disclosed in E8b, are at least the following:

- the "Trailer Connect Interface" (TCI), which includes a data logger function for collecting, storing and transmitting data from various sensors

(such as temperatures and humidity in the cargo space and fuel level of the diesel engine, see page 12)

- the human machine interface
("Kontrollpanel" [control panel], see page 6)

4.2 Indeed, as argued by the patent proprietor, it is not directly and unambiguously disclosed in E8b whether in addition to the control circuit itself further TRS components are connected with the TrailerConnect controller via the industrial grade communication link (the bus system disclosed in E8b). In addition, it is not disclosed in E8b whether the TrailerConnect Interface is part of the TRS controller, or whether it acts as a further TRS component connected to the TRS controller via the industrial grade communication link.

Therefore, the subject matter of claim 1 of auxiliary request 1 differs from the disclosure of E8b in that messages are relayed via the industrial grade communication link to "plural" TRS components, whereas E8b clearly and unambiguously discloses such communication with only one component, i.e. with the TKM 01 unit.

4.3 However, it is disclosed in E8b that data is exchanged between the refrigeration circuit, the TCI collecting the sensor data and also the control panel which allows e.g. the adjustment of the refrigeration circuit control set-point(s). In fact, temperature control is disclosed on the display on page 5. Such temperature control implies control actions on components of the TRS. This requires the respective exchange of data with the refrigeration circuit. Since the single access point controller may be "a distributed network of control elements", see [0010] of the patent, this is

independent of whether the control program for the refrigeration circuit is located in E8b in the TRS controller or, locally, at the refrigeration circuit itself. This control requires at least the temperature data from the data logger for comparison with a setpoint.

The technical problem related to this distinguishing feature is thus to simplify the communication of the TRS components.

- 4.4 The exchange of data between different components is known to the skilled person as a task typically performed by a data bus and is thus - in view of the already existing data bus - an obvious measure. Therefore, the skilled person would integrate the further TRS components into the already existing industrial grade communication link (the data bus), since the messages from these TRS components must, in any case, be translated into the bus protocol at the latest in the TRS controller (e.g. for exchange with the external device or the refrigeration circuit).
- 4.5 To the extent that the patent proprietor argued that it was not directly and unambiguously disclosed in E8b that plural components communicate with an external device via the same single point access coordinator (as required by auxiliary request 1) this is not persuasive.

E8b discloses only a single remote connection means (which is the SIM card of the TrailerConnect controller). In particular, E8b discloses that the temperature of the TKM 01 refrigeration circuit ("Kühlgerät") can be controlled by an external device such as a smartphone (page 13, see point 3.4 above).

The control of the refrigeration cycle TKM 01 requires data which is collected by the data logger TCI (such as the cargo space temperature and the humidity). It is in the nature of a bus system to interconnect the different components of a system integrated into one data exchange protocol. The temperature in the cargo space is the main parameter that must be maintained during the transport of goods (see page 2). Therefore, it is not convincing that the temperature data collected by the TCI is not communicated to and used for the control of the cooling power via the refrigeration circuit TKM 01. The data bus already provided for this purpose is an obvious choice.

5. The patent proprietor's request for remittal

The case is not remitted to the opposition division as auxiliarily requested by the patent proprietor.

In view of the fact that a full discussion of inventive step was the subject of the appealed decision for the maintained lower ranking request (auxiliary request 2 of the present proceedings, see below) based on the same documents, there are no special reasons to remit the case pursuant to Article 11 RPBA at this stage.

6. Auxiliary request 2 - inventive step

The subject-matter of claim 1 of auxiliary request does not involve an inventive step for the following reasons.

6.1 Common and distinguishing features compared to the disclosure of E8b

6.1.1 E8b discloses at least the following components of the TKM 01 refrigeration unit:

- an evaporator ("Verdampfer" see pages 7 and 9),
- a condenser ("Kondensator," see page 9) and
- a compressor ("Kältemittelverdichter", see page 11).

These are typical components of any refrigeration circuit. A generic representation of such circuit is e.g. found in E5, Figure 1.

In addition, such a refrigeration circuit necessarily requires the respective fluid connections and an expansion device (i.e. a means to reduce pressure and temperature) between the condenser and the evaporator. The expansion device is thus a technical requirement of a refrigeration circuit and is implicitly disclosed in E8b.

6.1.2 Nor is it a distinguishing feature that the single point access coordinator is a TRS controller as defined in feature [1.7]. According to E8b, the TrailerConnect controller and the TKM 01 unit exchange control data (sensor signals or remote input data) via the bus (page 12: "ständigen Daten-Bus zur Telematik-Einheit für die Steuerung [...]"). Therefore, the TRS controller is "configured to control the operation of the refrigeration unit". The fact that the actual location of the refrigeration circuit control logic (whether in the TrailerConnect controller or locally on the cooling circuit) is not disclosed in E8b is irrelevant. As discussed above, according to the patent, the TRS controller "may comprise a distributed network of control elements" (see paragraph [0010]) and therefore

the TRS controller defined in claim 1 encompasses both possibilities.

6.1.3 However, the Board agrees with the patent proprietor in that E8b does not disclose details of the implicitly disclosed expansion device in the refrigeration circuit. In particular, it does not disclose that this device is a controlled electronic expansion valve (features [1.1.1] and [1.8]). This is a further distinguishing feature compared to E8b.

6.1.4 Furthermore, as with the integration of other TRS components into the bus communication system "via the industrial grade communication link" (see discussion of auxiliary request 1), claim 1 of auxiliary request 2 does not define whether the expansion valve is controlled directly or indirectly by the TRS controller (i.e. via a local refrigeration circuit controller which is in communication with the valve e.g. by an analogue signal or via control signals from the single access point controller). This broad understanding of claim 1 is consistent with the description, see again paragraph [0010]: "The TRS controller may comprise a distributed network of control elements (not shown)."

For the sake of argument (and because this is also relevant to auxiliary requests 12 to 15, see point 10. below), it will be assumed in the following that the subject-matter of claim 1 at least implicitly requires control of the main electronic expansion valve **via the industrial grade communication link** (see also the explicit wording of feature [1.8'] of auxiliary requests 12 to 15).

Such integration of the expansion valve into the data bus communication system of E8b is also not directly and unambiguously disclosed in E8b.

6.1.5 To conclude, the distinguishing feature under consideration is that the electronic expansion valve of the refrigeration circuit is an electronic expansion valve controlled in response to the TRS controller (single point access controller) - via the industrial grade communication link- and data provided by a plurality of sensors.

6.2 Objective technical problem

According to the appealed decision, the objective technical problem is how to implement "a more efficient control of E8b's refrigeration circuit". The opponent formulated a similar problem, namely how to provide a more efficient control with fewer components. Both technical problems are not convincing, for the following reasons.

6.2.1 It is a requirement for the transport refrigeration unit disclosed in E8b - as it is for any transport refrigeration unit - to keep the temperature in the cargo space of the trailer essentially constant (see e.g. page 5: "gleichmäßige Temperaturführung", page 13: "Temperaturregelung") under different ambient conditions (such as sun exposure/no sun exposure). The temperature in the cargo space is measured in the system of E8b by several (four) temperature sensors (page 12: "vier Temperatur-Sensoren"). Such temperature control is disclosed in E8b in the form of the rotational speed of the compressor (see page 5, paragraph 2). Therefore, E8b already discloses the

control of the cooling power in response to a plurality of sensor signals.

- 6.2.2 Although feature [1.8] requires "to control [...] the main electronic expansion valve", the feature does not define a control target, nor does it define in response to which sensor signal the valve should be controlled. The added feature [1.8] thus simply defines an electronic expansion valve as one of the actors in the control of the refrigeration circuit and - since it is undefined - for any control purpose.

The objective technical problem is thus to effectively include into the TRS controller a suitable actor for the control of the refrigeration circuit of E8b, either in addition or as an alternative to the control of the cargo space temperature via the rotational speed of the compressor disclosed in E8b (see page 5, paragraph 2).

6.3 Obviousness

- 6.3.1 Electronic expansion valves are well known as possible actors in the control of refrigeration cycles. Such valves are disclosed e.g. in any of D15, D16 and D17 (see, for example, Figure 14 of D15 which shows how the expansion valve is usually integrated into the cooling circuit). Various control actions are possible, depending on the (undefined) connection to sensor input signals and the (undefined) control target. Possible examples are capacity control (see D15, page 13), control of the evaporator temperature (see D16, page 12: "Verdampfungsdruck") or control of the superheating value (see D17) in order to protect the compressor.

The implementation of an electronic expansion valve and its inclusion as a (further or alternative) actor in

the control of the refrigeration circuit of E8b is therefore an obvious choice for a skilled person in view of any of the above mentioned possible control targets and does not involve an inventive step.

6.3.2 As discussed above, a TRS controller exchanging control data with the refrigeration circuit TKM 01 is already disclosed in E8b. The simple integration of actors and sensors directly into an existing bus communication system is thus an obvious choice for the skilled person. It is well known in the art that bus systems offer the advantage of scalability which allows the inclusion of further components in the communication protocol (this is also discussed in D5, see paragraphs [0004] and [0005]).

6.3.3 Therefore, feature [1.8] (also in its restricted understanding as explicitly defined in feature [1.8'] of auxiliary requests 12 to 15) does not involve an inventive step.

7. Auxiliary requests 3 to 7

The independent claims of these requests correspond to those of the main request with permutations of the following additional features:

- (a) "**plural** TRS components" as in auxiliary request 1
- (b) features [1.1.1], [1.7] and [1.8] as in auxiliary request 2
- (c) "wherein the industrial grade communication link is a J1939 control area network (CAN) connection"

That these features in combination have no synergistic effect was uncontested.

7.1 As explained above, feature (a) and (b) do not involve an inventive step (see points 3., 4. and 6. above).

7.2 Feature (c) does not involve an inventive step either. As explained above, E8b discloses a bus system (page 12: "Daten-Bus") as communication link between the TRS components and the single point access coordinator.

A CAN connection with the network protocol J1939 according to feature (c) is a well-established industrial bus standard in the automotive industry which was already known at the patent's priority date (see E12, page 147 and E6, e.g. paragraph [0004]). That CAN is a suitable standard which is also used in transport refrigeration systems is mentioned in E5 (paragraphs [0021] and [0024]) and E4 (page 7, line 27 to page 8, line 17 and page 24, lines 2 to 9).

No particular advantages in combination with the further features of claim 1 are mentioned in the patent and the patent proprietor did not submit any either.

Therefore, the established industrial standard of a J1939 control area network is an obvious choice for the skilled person to embody the bus system of E8b with an industrial grade communication link and does not involve an inventive step.

8. Admittance of auxiliary requests 8 to 15

Auxiliary requests 8 to 15 were filed for the first time with the reply to the opponent's appeal. Their admittance was contested by the opponent pursuant to Articles 12(4) and 12(6), second sentence, RPBA.

However, as will be shown under points 9. and 10. below, all these requests are not allowable, at least for the same reasons already discussed for the higher-ranking requests. The question of their admittance can thus be left open.

9. Auxiliary requests 8 to 11

The only amendment made to claim 1 of auxiliary requests 8 to 11 compared to auxiliary requests 2, 3, 6 and 7 is the explicit definition of a suction line between the evaporator and the compressor. This feature does not further restrict the refrigeration circuit as defined in auxiliary requests 2, 3, 6 and 7 as this is implicit in such a circuit (see point 6.1.1 above).

Therefore, these requests are not allowable for the same reasons.

10. Auxiliary requests 12 to 15

As already explained for auxiliary request 2 (see point 6. above) the control of the electronic expansion valve via the industrial grade communication link does not involve an inventive step.

In so far as claim 1 now also relates to the control of "various" TRS components (including the electronic expansion valve) this does not add a further distinguishing feature, as such a control function includes e.g. relaying messages to the data logger (TCI) in order to retrieve stored or measured data.

11. As none of the patent proprietor's requests is allowable the opponent's appeal is successful.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Spira

C. Herberhold

Decision electronically authenticated