

(21) Application No 0209505.7

(22) Date of Filing 25.04.2002

(30) Priority Data

(31) 10124266 (32) 18.05.2001 (33) DE

(71) Applicant(s)

ABB Patent GmbH
(Incorporated in the Federal Republic of Germany)
Wallstadter Strasse 59,
D-68526 Ladenburg,
Federal Republic of Germany

(72) Inventor(s)

Juergen Bartelheim
Thomas Georg Karte

(74) Agent and/or Address for Service

Williams Powell
4 St Paul's Churchyard, LONDON,
EC4M 8AY, United Kingdom

(51) INT CL⁷

G05B 19/418 // G05B 23/02

(52) UK CL (Edition V)

G4H HNHE

(56) Documents Cited

EP 1096350 A1 EP 0180423 A1

(58) Field of Search

UK CL (Edition T) **G4H HNHE**

INT CL⁷ **G05B 19/418 23/02**

Other: **ONLINE: WPI, EPODOC, PAJ**

(54) Abstract Title

System for locating control units

(57) In a system for the physical location of a control unit in a process plant, there are provided a fixed-position device (1') and a mobile device, with the fixed-position device (1') being associated with the control unit (1) and comprising a processing unit (11), a communication device (12) with an antenna (13) for wire-free communication, and a non-volatile memory (17). Details relating to the position of the installation location of the control unit (1) are stored in the non-volatile memory (17) such that they can be called up. The mobile device is equipped with a processing unit, a keyboard, a display unit and a communication device which corresponds to the communication device (12) in the fixed-position device (1') and has an antenna for wire-free communication. Details which have been called up relating to the position of the installation location of the control unit (1) in the process plant can be visualized on the display unit.

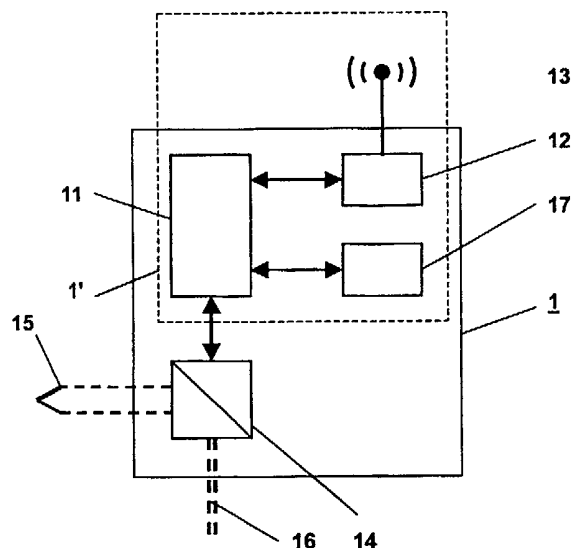


Figure 2

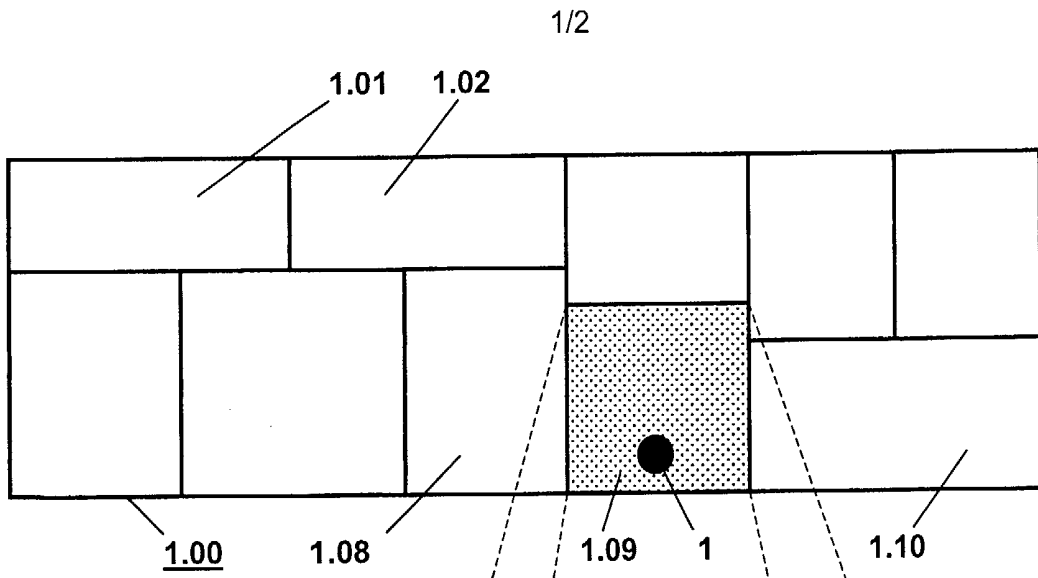


Figure 1a

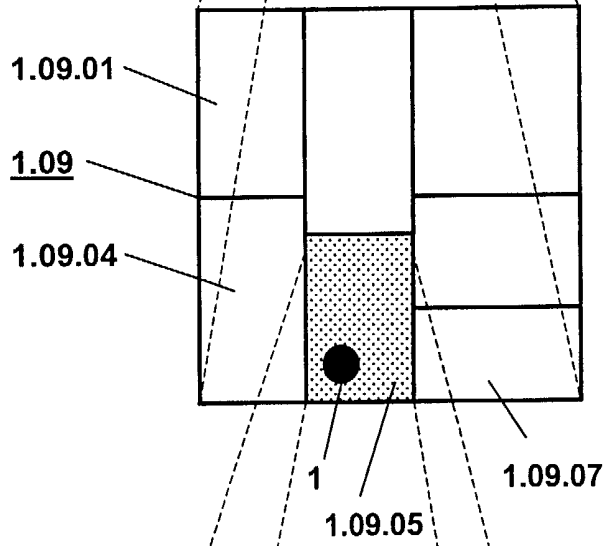


Figure 1b

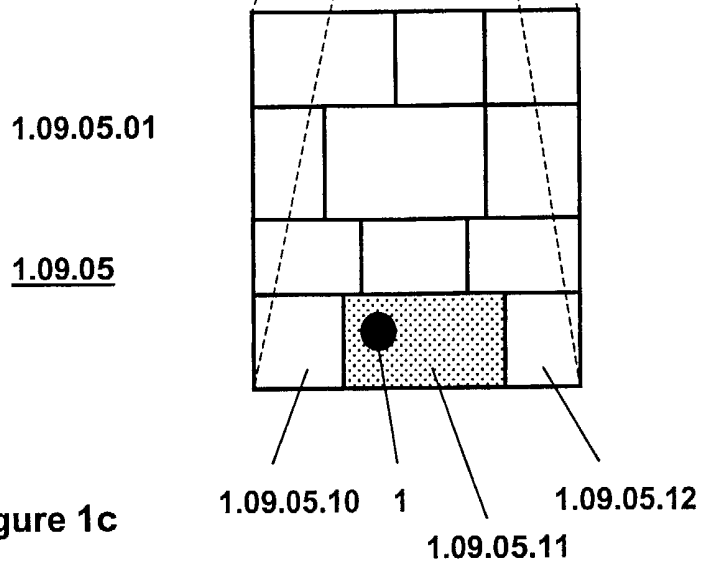


Figure 1c

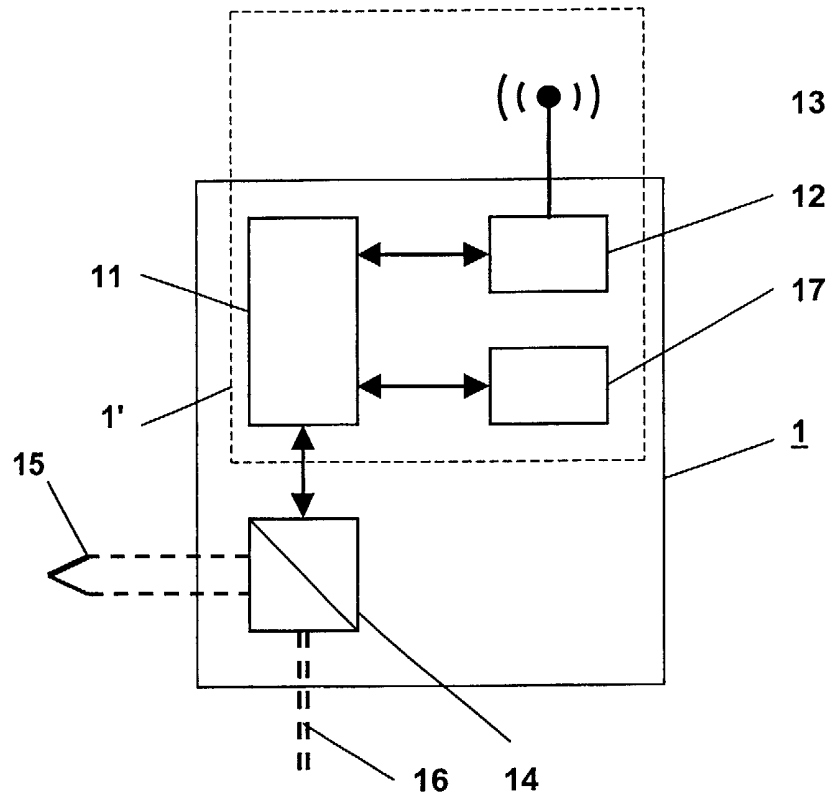


Figure 2

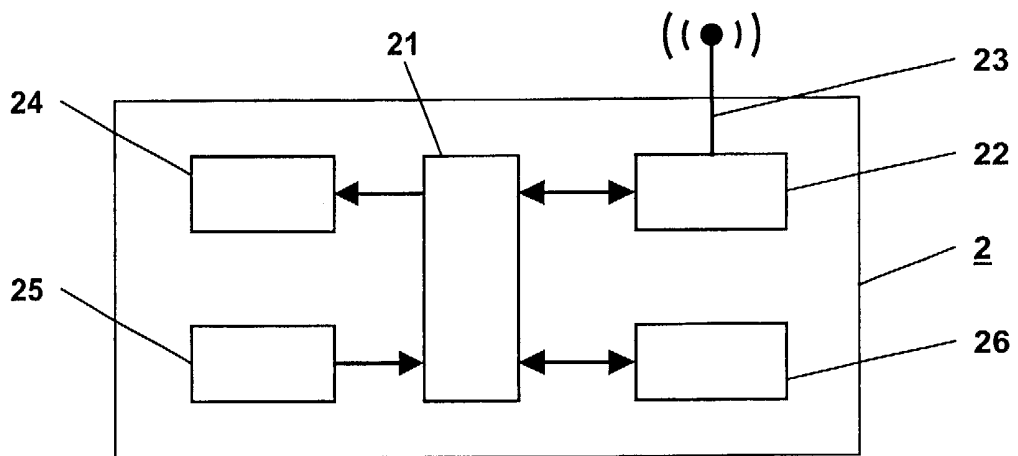


Figure 3

System For Locating Control Units

The invention relates to a system for the physical location of field equipment in the form of control or panel units in a process plant.

5

A large number of control units are installed in complex and/or physically extended process plants, in order to control the technical process in the process plant. These include measured value sensors for physical variables such as pressure, temperature, flow rate, concentration and the like, as well as actuators for operating valves, flaps, feed means and the like.

10

In the event of a defect or fault, the faulty control unit must be identified and located as quickly as possible, in order to allow it to be repaired locally, or in order to allow the faulty control unit to be replaced.

15

All the control units in a process plant are included in a hierarchical structure of control loops comprising control devices. The control devices are in this case combined in a control system which is matched to the process plant. The control system can in this case be installed centrally or in a decentralized manner. Independently of this, each control unit in a given process plant can be identified uniquely, and can be logically associated with a plant part, via the control system means. The logical location process for each control unit that is carried out in this way is, however, inadequate actually to find a faulty control unit in the process plant locally, in a reasonable time.

20

25

Furthermore, identification systems, for example in accordance with DIN 6779, are known, on the basis of which each control unit in a given process plant is identified on the basis of its installation location. However, detailed knowledge of the layout of the process plant is required to find a control unit that is being looked for.

30

The present invention seeks to provide means which allow a control unit in the process plant to be actuated and to be found specifically in the shortest possible time.

35

According to the present invention, a system for physical location of control units in process plants, in which each control unit can be identified uniquely and is connected to a control system via a communication network, and which has a locally oriented

hierarchical structure and a plant identification system based on it, wherein there are provided a fixed-position device and a mobile device, the fixed-position device being associated with the control unit and comprising at least one processing unit, at least one communication device with an antenna for wire-free communication, and at least one non-volatile memory, and wherein details relating to the position of the installation location of the control unit are stored in the non-volatile memory such that they can be called up, the mobile device comprises at least one processing unit, at least one keyboard, at least one display unit and at least one communication device which corresponds to the communication device in the fixed-position device and has an antenna for wire-free communication, and details which have been called up relating to the position of the installation location of the control unit in the process plant can be visualized on the display unit.

The invention is based on a process plant in which each control unit can be identified uniquely and is connected to a control system via a communication network. Furthermore, the process plant has a locally oriented hierarchical structure and a plant identification system based on it.

Embodiments of the invention comprises a fixed-position device and a mobile device. The fixed-position device is associated with the control unit, and is a component which cannot be separated from it. Details relating to the position of the installation location of the control unit are stored in the fixed-position device such that they can be called up.

To this end, the fixed-position device comprises at least one processing unit, a programmable non-volatile memory and a communication device for wire-free communication.

The mobile device comprises at least one processing unit, a keyboard, a display unit and a communication device, which corresponds to the communication device in the fixed-position device, for wire-free communication.

When a defect occurs in a control unit, an alarm message is sent to the control system via the communication network. Furthermore, the communication device for wire-free communication is activated, and continuously transmits the details relating to the

position of the installation location of the control unit, on the basis of the specific plant identification.

5 The position details relating to the faulty control unit are received by the communication device for wire-free communication in the mobile device, and are visualized on the display unit.

10 This makes it possible for the servicing technician who is carrying the mobile device to go to and to find the faulty control unit in the process plant specifically in the shortest possible time, without any detailed knowledge of the plant.

A preferred embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

15 Figure 1 shows an outline illustration of a physically hierarchically structured process plant,

Figure 2 shows an outline illustration of a control unit; and

20 Figure 3 shows an outline illustration of a mobile device.

Figure 1a shows a physically hierarchically structured process plant **1.00** in outlined form. The plant **1.00** is subdivided into plant parts **1.01** to **1.10** in a first structural level. A faulty control or panel unit **1** is shown in the plant part **1.09**. The plant part **1.09**, which is itself broken down into plant sections **1.09.01** to **1.09.07** in a second structural level, is shown enlarged, for this purpose, in Figure 1b. In the second structural level, the faulty control unit **1** is part of the plant section **1.09.05**, which is itself broken down into plant segments **1.09.05.01** to **1.09.05.12** in a third structural level, as shown in Figure 1c. The faulty control unit **1** is part of the plant segment **1.09.05.11** in the fine structure at the third structural level.

30 The nature of the structuring and identification may in this case comply with DIN 6779, the KKS power station identification system, or some other suitable identification system which allows hierarchical structuring of the process plant **1.00**.

As shown in Figure 2, the control unit **1** has an associated fixed-position device **1'** comprising a processing unit **11**, which is connected to a programmable non-volatile memory **17** and to a communication device **12** for wire-free communication.

5 Details relating to the position of the installation location of the control unit **1** are stored in a non-volatile memory **17** of the fixed-position device **1'** such that they can be called up. During the installation of the control unit **1**, the details relating to the position of the installation location are entered in the non-volatile memory **17** in accordance with the preferred plant identification system.

10

In one preferred embodiment, the fixed-position device **1'** is physically integrated in the control unit **1**. This prevents the fixed-position device **1'**, which has the position details, from accidentally being separated from the control unit **1**.

15

The control unit **1** may be in the form of a sensor or actuator. If the control unit **1** is a sensor, it has a transducer **14** for converting physical variables such as pressure, temperature, flow rate, concentration and the like to an electrical variable, and a measured value sensor **15** for the physical variable. If the control unit **1** is an actuator, it has a transducer **14** for converting an electrical variable to a physical variable, and an actuator **16**. Such transducers **14** are known per se, and are regularly equipped with means for identifying and signalling faults.

20

The control unit **1** is connected to a control system via a communication network, which is not shown. The control unit **1** can be identified uniquely within the communication network. Furthermore, the transducer **14** of the control unit **1** is connected to the processing unit **11** in the fixed-position device **1'** in order to transmit defect signals.

25

Furthermore, a mobile device **2**, which is illustrated in Figure 3, is provided, which has a processing unit **21** to which a program memory **26**, a keyboard **25**, a display unit **24** and a communication device **22**, which corresponds to the communication device **12** in the fixed-position device **1'** and has an antenna **23**, are connected for wire-free communication.

30

When a defect occurs in a control unit **1**, an alarm message is sent to the control system via the communication network. Furthermore, the communication device **12** for

35

wire-free communication is activated via the processing unit **11**. At the same time, the details (which are stored in the non-volatile memory **17** of the fixed-position device **1'** such as they can be called up) relating to the position of the installation location of the control unit **1** are called up in accordance with the specific plant identification, and are transmitted continuously.

The position details are received by the mobile device **2**, and are visualized on its display unit **24**. The servicing technician who is carrying the mobile device **2** is thus able, without any detailed knowledge of the plant, to go to and to find the faulty control unit **1** in the process plant **1.00** specifically in the shortest possible time.

During fault-free operation of the control unit **1**, there is no signalling requirement and the fixed-position device **1'** is switched to be inactive. This means that only position details relating to faulty control units **1** are visualized on the display unit **24** of the mobile device **2**.

* * * * *

List of reference symbols

1	Control unit
1'	Fixed-position device
11	Processing unit
12	Communication device
13	Antenna
14	Transducer
15	Measured value sensor
16	Actuator
17	Read only memory
2	Mobile device
21	Processing unit
22	Communication device
23	Antenna
24	Display unit
25	Keyboard
26	Program memory
1.00	Plant
1.01 to 1.10	Plant part
1.09.01 to 1.09.07	Plant section
1.09.05.01 to 1.09.05.12	Plant segment

Claims

1. A system for physical location of control units in process plants, in which each control unit can be identified uniquely and is connected to a control system via a communication network, and which has a locally oriented hierarchical structure and a plant identification system based on it, wherein there are provided a fixed-position device and a mobile device, the fixed-position device being associated with the control unit and comprising at least one processing unit, at least one communication device with an antenna for wire-free communication, and at least one non-volatile memory, and wherein details relating to the position of the installation location of the control unit are stored in the non-volatile memory such that they can be called up, the mobile device comprises at least one processing unit, at least one keyboard, at least one display unit and at least one communication device which corresponds to the communication device in the fixed-position device and has an antenna for wire-free communication, and details which have been called up relating to the position of the installation location of the control unit in the process plant can be visualized on the display unit.
5
10
15
2. A system according to Claim 1, wherein the fixed-position device is physically integrated in the control unit.
20
3. A system according to Claim 1 and 2, wherein the fixed-position device is switched to be inactive during fault-free operation of the control unit and is switched to be active when a defect is present, such that the details relating to the position of the installation location of the control unit in the process plant are output via the communication device.
25
4. A system for locating control units substantially as herein described with reference to each of the accompanying drawings.
30
5. A method for locating control units employing a system according to any preceding claim.



INVESTOR IN PEOPLE

Application No: GB 0209505.7
Claims searched: All

§

Examiner: Russell Maurice
Date of search: 29 November 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.T): G4H (HNHE)
Int CI (Ed.7): G05B (23/02, 19/418)

Other: Online WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0180423 A1 SIEGER (see the Abstract)	-
A	EP 1096350 A1 VOITH (see the Abstract)	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.