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(54) **Device for relay retrofit in an electrical substation**

Vorrichtung zur Relaisnachrüstung in einer elektrischen Unterstation

Dispositif de rattrapage de relais dans une sous-station électrique

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EP 2 760 041 B1

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Description

BACKGROUND OF THE INVENTION

1. Field of the invention

[0001] This invention relates to a device for relay retrofit in an electrical substation.

2. Description of the related art

[0002] Relays and other devices are installed in electrical power systems, typically in an electricity generation, transmission, distribution, industrial or transport system. So the IEDs (Intelligent electronic devices) are sited at locations typically referred to as electricity "substations". Their purpose is typically to measure, protect, control and monitor the system to which they are connected.

[0003] Due to equipment ageing, technology advancement, or many other reasons, it may be desirable to renew the relays. Sometimes this renewal happens sooner than the renewal of the surrounding equipment within the substation, such that the newly-installed relay fits in exactly the same location. This is often termed a "mid-life" retrofit. Hereunder we use the terminology "old" to denote the replaced relay, and "new" to denote the one fitted in replacement of it.

[0004] To avoid inconvenience, or prolonged supply outage of the electrical power system, the preference is to complete the retrofit in the shortest possible time. This means that the work required to strip out the old relay, and make the preparations to accommodate the new relay, must be minimised. One way to do this is to make sure that the wiring which connects the old relay to the panel, cubicle or other device in which it is situated, needs no alteration.

[0005] Particularly in the case of an old relay which is withdrawable, there exists an ideal means to facilitate renewal, without needing to touch the wiring in any way. A withdrawable relay is especially designed such that the active part of the relay draws-out from the device case, without requiring any wires to be disconnected by personnel.

[0006] The field of the invention is to find a means such that a new relay can be made to fit into the remaining installed case of an old relay. The specific Invention is termed a "retrofit patch-brick".

[0007] A patch-brick can exist as a mechanical and electrical interface which serves to link the new relay and the case of the old relay. The patch-brick has a means for the electrical connection mapping between the new relay and the case to be adaptable. This limits the number of design variants that the patch-brick needs to have.

[0008] Prior art retrofit solutions need to be bespoke. This is to say that the new relay can only be used to retrofit a specific type and model of an old relay. It cannot fit correctly for any other type which is being changed-out.

[0009] The prior art solutions involve complete re-

placement of the old relay, removing the entire relay including its case, or bespoke models. In the former case, the disadvantage is that the wiring of the installation has to be modified, and new wire terminations made. This lengthens the time of the retrofit operation, and is potentially more hazardous as work near to live electrical equipment may be required. In the latter case, a specific bespoke retrofit model has to be engineered for every single type of historical relay that needs retrofitting.

[0010] So the invention has the object to overcome the following technical problems:

1) Withdrawable relays have many connections between the case and the active part. Some of these are current transformer circuits, which can be particularly dangerous, or even lethal, if open circuited without special care.

2) There are many device application types for protection relays, each with different numbers of case to active part connections.

3) Typically a new relay will have progressed with technology, and this means that the connections will not be of identical mechanical construction, nor in the same physical layout as per the old relay. Thus, there will not be a direct mate of the new relay into the case of the old relay.

4) Given the variety of devices and connections mentioned in previous points (2) and (3), the wish is to have a simple, adaptable way to interface the new relays to cases of the old relays, without having to have bespoke design for each permutation. Document DE19638971 discloses an electrical substation (the relays panel of a vehicle) comprising many relays with a case (20) and an active part (10), among which at least one new relay (any relay 10 fits, old or new, as long as it is of the same type) fits in the same location as a withdrawable old relay, the active part of the new relay being mechanically housed in the case of the old relay.

SUMMARY OF THE INVENTION

[0011] The invention concerns an electrical substation as defined in claim 1.

[0012] Advantageously the patch-brick is a cassette which can be opened. The cassette can hinge open.

[0013] Advantageously the patch-brick is a cassette comprising terminals on both the new and old relays sides with a means for user-configurable patching between the terminals. This means may comprise flexible wires with fast-on crimp terminals at each end.

[0014] The main advantage of the invention is to allow fast retrofitting, without having to consider many different models of retrofit relay to account for differences in the old relay's design and application. It is also safe, because the retrofit can be performed without needing to disturb current transformer or other wiring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig.1 shows an embodiment of the invention device.
Fig.2 shows another embodiment of the invention device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The invention considers a new device (relay), whose active part can mechanically be housed inside the case of an old relay. The invention device is a patch-brick, which is a small cassette which attaches to the rear of the active part of the new relay or other Intelligent Electronic Device (IED) which is to be fitted.

[0017] Fig.1 shows an embodiment of how the invention patch-brick 10 mates with a new relay 11 on one side and an old case relay 12 on the other side. The patch-brick 10 locked onto the back of the new relay (IED) 11 will slide (arrow 13) into the old relay case 12. A locking of the patch-brick onto the back of the new relay is necessary to avoid the need for shorting contacts on the patch-brick. On Fig.1, the patch-brick depth 14 is shown exaggerate, for clarity. Such a depth is likely 2-3 cm only, in practice.

[0018] Fig.2 shows another embodiment of said invention patch-brick 10. Arrow 20 shows mating with the case of an old relay (for example by blade contact). Arrow 21 shows locking onto the new relay 11 (for example by fixation on chassis). Such an arrangement shows a hinged patch-brick 22. Internal patching might be achieved by wires 23 terminated with fast-on connectors 24 and 25, or a PCB (Printed Circuit Board) per model. Such an embodiment allows customizing. It snaps shut when done.

[0019] The invention patch-brick is designed to have a relatively small depth of protrusion behind the new relay (or IED). The two faces of the cassette are particularly designed such that on one face the electrical connectors are designed for mating with the new relay, and on the reverse face the connectors are designed to mate with those within the old relay case. Internal to the patch-brick there is a means for adaptable "patching" of electrical connections between these two faces, such that integration of the new relay's electrical circuits into the old installation scheme is completed. The novelty is that the patch-brick can be opened for purposes of configuration, with the means to change the patching - ie. for personnel to adapt the wire routing to suit the peculiarities of the installation, the old relay, and the new relay.

[0020] In a preferred embodiment of the invention, the patch-brick is a cassette which can be opened, to allow preconfiguration of the internal connections. The cassette can hinge open, or split by other mechanical means, such that the internal wire connections between the two external faces are exposed. Terminals on both the new

and old faces are disposed in the cassette, with the means for user-configurable "patching" between these terminals. In a typical solution, these internal terminals have fast-on connectors, and the electrical patching is done by means of flexible wires with fast-on crimp terminals at each end. This allows personnel to route the connection and push on the wire at each end, to suit their needs. Once all electrical patch connections are made, the cassette assembly can be reassembled, housing the electrical connections safely inside. The patch-brick can then be attached to the rear of the new relay, such that the new relay and the attached patch-brick appear as one complete entity. The new relay and the patch-brick assembly can then be slid directly into the case of the old relay, because the connectors on the rear face have the same mechanical mating mechanism as per the old relay's active part.

[0021] In some cases, the new relay may protrude beyond the front panel, compared to the old relay, but this can be accommodated with a standard projection collar arrangement.

Claims

1. An electrical substation comprising many Intelligent Electronic Devices with a case (12) and an active part, among which at least one new Intelligent Electronic Device fits in the same location as a withdrawable old Intelligent Electronic Device, the active part (11) of the new Intelligent Electronic Device being mechanically housed in the case of the old Intelligent Electronic Device, whereby there is no direct mate of the new Intelligent Electronic Device into the case of the old Intelligent Electronic Device and that a retrofit patch-brick (10) is attached to the rear of the active part (11) of the new Intelligent Electronic Device to slide in the old Intelligent Electronic Device case (12).
2. The electrical substation of claim 1, wherein the patch-brick is a cassette which can be opened.
3. The electrical substation of claim 2, wherein the cassette can hinge open.
4. The electrical substation of claim 2, wherein the patch-brick is a cassette comprising terminals on both the new and old Intelligent Electronic Devices sides with a means for user-configurable patching between the terminals.
5. The electrical substation of claim 4, wherein the means for user-configurable patching between the two sides comprises flexible wires with fast-on crimp terminals at each end.

Patentansprüche

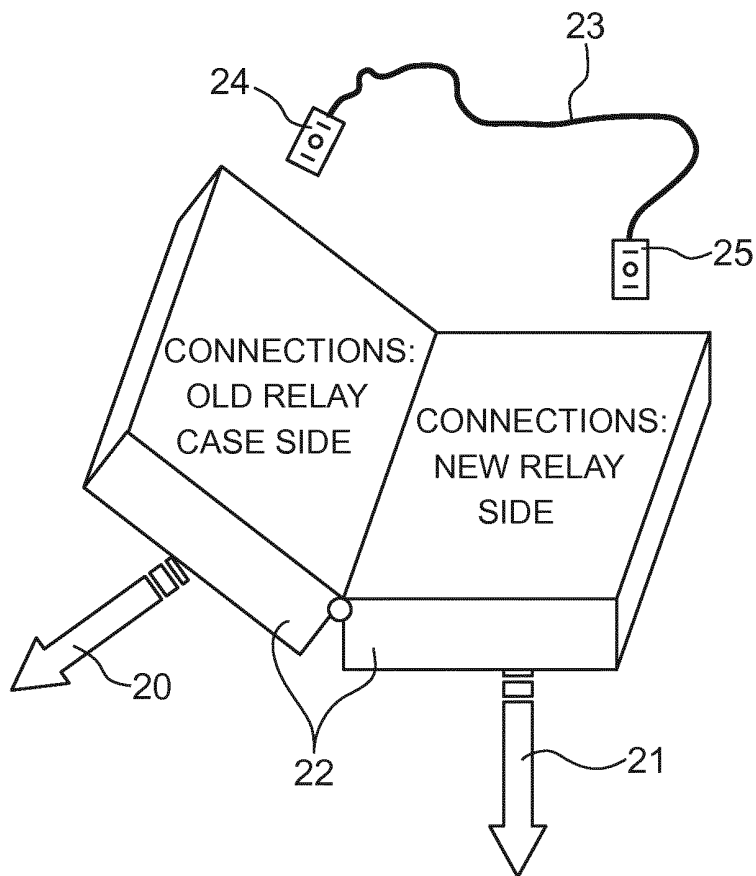
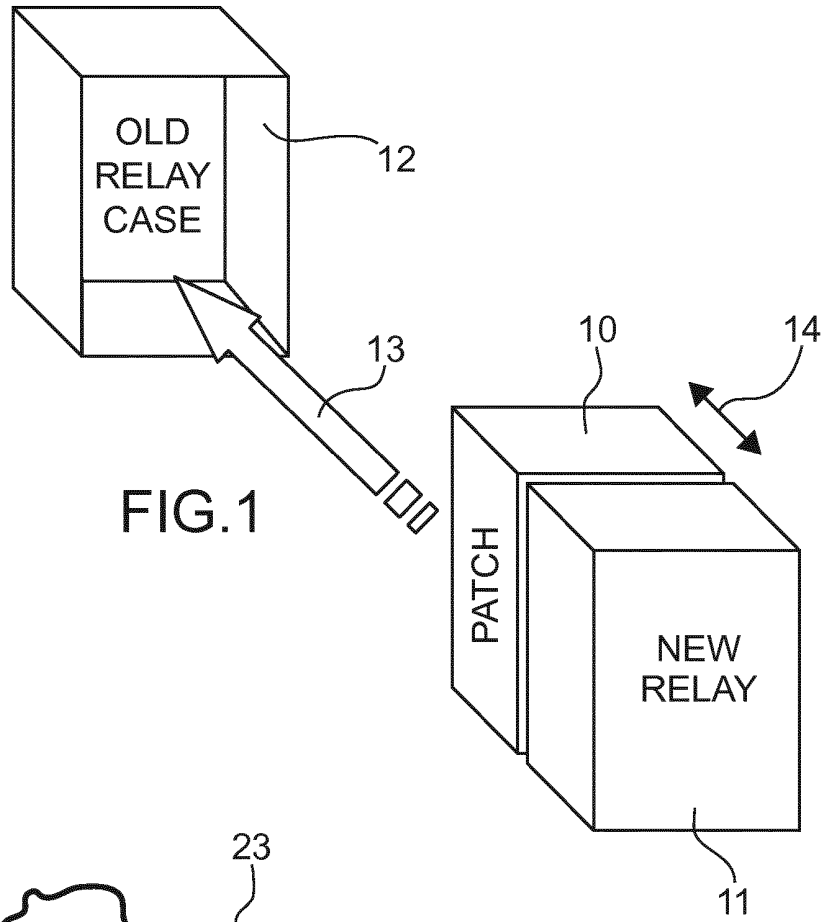
1. Elektrische Unterstation, umfassend zahlreiche intelligente elektronische Vorrichtungen mit einem Gehäuse (12) und einem aktiven Teil, wovon wenigstens eine neue intelligente elektronische Vorrichtung an die gleiche Stelle paßt wie eine ausbaubare alte intelligente elektronische Vorrichtung, wobei das aktive Teil (11) der neuen intelligenten elektronischen Vorrichtung mechanisch in dem Gehäuse der alten intelligenten elektronischen Vorrichtung untergebracht ist, wobei keine direkte Passung der neuen intelligenten elektronischen Vorrichtung in das Gehäuse der alten intelligenten elektronischen Vorrichtung existiert, und wobei ein Nachrüst-Schaltelement (10) an der Rückseite des aktiven Teils (11) der neuen intelligenten elektronischen Vorrichtung zum Einschieben in das Gehäuse (12) der alten intelligenten elektronischen Vorrichtung angebracht ist. 5 10 15 20
2. Elektrische Unterstation nach Anspruch 1, wobei das Schaltelement eine Kassette ist, die geöffnet werden kann. 25
3. Elektrische Unterstation nach Anspruch 2, wobei die Kassette durch ein Scharnier geöffnet werden kann.
4. Elektrische Unterstation nach Anspruch 2, wobei das Schaltelement eine Kassette ist, die Anschlüsse sowohl an der Seite der neuen als auch an der Seite der alten intelligenten elektronischen Vorrichtungen umfaßt, mit einer Einrichtung zum benutzerkonfigurierbaren Schalten zwischen den Anschlüssen. 30 35
5. Elektrische Unterstation nach Anspruch 4, wobei die Einrichtung zum benutzerkonfigurierbaren Schalten zwischen den zwei Seiten flexible Drähte mit Schnellkrimpanschlüssen an jedem Ende umfaßt. 40

Revendications

1. Sous-station électrique comprenant de nombreux dispositifs électroniques intelligents dotés d'un boîtier (12) et d'une partie active, parmi lesquels au moins un nouveau dispositif électronique intelligent s'intègre au même emplacement qu'un dispositif électronique intelligent ancien amovible, la partie active (11) du nouveau dispositif électronique intelligent étant mécaniquement logée dans le boîtier de l'ancien dispositif électronique intelligent, selon quoi il n'y a pas d'accouplement direct du nouveau dispositif électronique intelligent dans le boîtier de l'ancien dispositif électronique intelligent et un bloc de correction de rattrapage (10) est fixé à l'arrière de la partie active (11) du nouveau dispositif électronique intelligent pour coulisser dans le boîtier de l'ancien 45 50 55

dispositif électronique intelligent (12).

2. Sous-station électrique selon la revendication 1, dans laquelle le bloc de correction est une cassette qui peut être ouverte.
3. Sous-station électrique selon la revendication 2, dans laquelle la cassette peut s'ouvrir par charnière.
4. Sous-station électrique selon la revendication 2, dans laquelle le bloc de correction est une cassette comprenant des bornes sur les côtés des dispositifs électroniques intelligents à la fois nouveau et ancien grâce à un moyen de rattrapage pouvant être configuré par l'utilisateur entre les bornes.
5. Sous-station électrique selon la revendication 4, dans laquelle le moyen de rattrapage pouvant être configuré par l'utilisateur entre les deux côtés comprend des fils souples comprenant des terminaisons à sertir rapides à chaque extrémité.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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