Technical-Sales Information

Number **1VCD850027**
Division: Power Products
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Title: Marketing Secondary Distribution Circuit-breakers complete with REF 601 relay and relative on-board sensors conforming to CEI 0-16 and IEC Standards

Summary:

1. Introduction

The following Technical Information is provided to inform you about the availability for sale of the new series of REF 601 IEC version and REF 601 CEI 0-16 version overcurrent protection devices (briefly referred to below as REF 601 IEC and REF 601 CEI).

2. Product

The following Technical Information is valid for the following series of secondary distribution circuit-breakers up to a service voltage of 24 kV:

a) gas circuit-breakers with right lateral operating mechanism:
- HD4/R with 230 and 300 mm pole centre distance
- HD4/S (version for UniSwitch switchgear) with 210 mm pole centre distance
- HD4/UniMix with 230 mm pole centre distance
- HD4/UniAir with 300 mm pole centre distance

b) vacuum circuit-breakers with right lateral operating mechanism:
- VD4/R with 230 and 300 mm pole centre distance
- VD4/S (version for UniSwitch switchgear) with 210 mm pole centre distance
- VD4/UniMix with 230 mm pole centre distance
- VD4/UniAir with 300 mm pole centre distance

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c) vacuum circuit-breakers with left lateral operating mechanism:
- VD4/L with 230 and 300 mm pole centre distance

The series listed above can, on request, be equipped with the REF 601 series protection device against overcurrents. There are two types of this device available:
- **REF 601 IEC** is the version with protections and trip curves according to the IEC 255-3 Standard. It provides the protection functions against overload (51), against instantaneous and delayed short-circuit (50-51), and against instantaneous and delayed homopolar ground fault (50N and 51N). It also detects the magnetising current of a three-phase transformer to prevent unwarranted tripping on connection of the transformer (68). The REF 601 requires an auxiliary power supply to operate, unlike the PR521 which is a self-supplied trip unit,
- **REF 601 CEI** is the version with protections and trip curves conforming to CEI 0-16. This version is specifically for connection of the medium voltage user to the Italian distribution grids. It replaces the previous PR521 DK device and puts it out of production. It provides the protection functions against overload (51 – not required by all the utilities), against instantaneous and delayed short-circuit (50 and 51), and against instantaneous and delayed homopolar ground fault (50N and 51N).

The REF 601 IEC unit provides up to 3 inputs from the Rogowsky coil type of current sensors, one input from an external toroidal CT, and 4 rated currents can be set from the keyboard: 40, 80, 250, 1250 A. If the circuit-breaker is fitted with 3 current sensors, the 50N and 51N protection functions are carried out with vectorial summing of the phase currents. On the other hand, if 2 current sensors are installed, the external toroidal current transformer must be provided for the 50N and 51N functions. The external toroidal transformer can be with an openable or closed core and have any transformation ratio as long as there is a secondary current of 1 A.

The REF 601 CEI unit has a fixed rated current of 250 A, foresees 3 compulsory inputs from the Rogowsky coil type of current sensors and an input from an external toroidal transformer for the homopolar. The external toroidal CT must be the ABB one with closed core, CEI type, with a transformation ratio of 40/1 A.

The Rogowsky coil type of current sensors needed for REF 601 are different from the current transformers of the PR 521, although they seem the same from the construction viewpoint.

The Rogowsky coil type of current sensors are available in two versions:
- for circuit-breakers with rated current up to 630 A
- for circuit-breakers with rated current higher than 630 A.

Important characteristics of the REF 601 device are:
- trip precision
- wide setting ranges
- individual and simultaneous setting of the three phases

- no limitation (due to the current sensors) to the rated breaking capacity and to the short-time withstand current of the circuit-breaker
- pushbuttons for local electrical operation of the circuit-breaker (opening and closing pushbutton). The lateral circuit-breaker is always provided with a shunt opening release. To command closing from the REF 601, application of the shunt closing release must obviously be requested)
- 5 distinct indicators: “relay operating”, “relay in trip threshold”, “relay tripped”, “relay tripped due to exceeding phase current”, “relay tripped due to exceeding ground fault current”
- interface consisting of an LCD display and of “arrow”, “send” and “exit” keys for facilitated navigation inside the “measurement”, “data recording”, “event recording”, “settings”, “configuration” and “test” menus
- three user levels: “operator” (display only, with free access, by keeping any key pressed for at least 5 sec.), “configurator” (same as above, but also with permission to set the parameters of the protections, i.e. times and thresholds as well as communication, when this is present - access limited by a password), “administrator” (same as above, but also with permission to set the password and configure the basic settings of the device, such as the rated current in the REF 601 IEC - access limited by a password)
- continual display of the current on the most highly loaded phase and of the ground current
- recording of the value of the currents which caused the device to trip
- storage of the number of openings carried out by the device
- event recording (storage of the parameters described above during the last 5 trips of the device) in a non-volatile memory
- "ß = 1" or "ß = 5" curves and “RI” curve specific to the Belgian market (only REF 601 IEC)
- opening of the circuit-breaker by means of undervoltage release (only REF 601 CEI)
- version, on request, with serial RS485 4 wire communication - MODBUS RTU full duplex protocol
- multi-voltage feeder 24 … 240 V a.c.- d.c.

The REF 601 CEI is a specific version for the Italian market. To conform to CEI 0-16, it opens the circuit-breaker by means of the undervoltage release which is therefore supplied as standard when the circuit-breaker is requested complete with REF 601 CEI. The power supply of the undervoltage release must be the same as the power supply voltage foreseen for the REF 601 device.

The REF 601 CEI has been tested and certified according to the CEI 0-16 2008-07 Second ed. Standard: “Technical reference rule for connection to HV and MV grids of electrical power utilities”.

The ABB series of circuit-breakers mentioned above and fitted with REF 601 CEI and its sensors form a *General Integrated Protection System* suitable for declaring the MV user plant suitable, thereby avoiding the user having to pay the Tariff Amount Due for those which are not suitable and allowing the user to receive automatic compensation, in the case of disservices caused by the Utility.

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The REF 601 IEC complete with communication puts the PR 512 PD out of production.
The REF 601 CEI puts the PR 521 DK out of production due to the new CEI 0-16 Standard coming into force, which replaces the ENEL DK 5600 specification and analogous Italian utility documents.
The PR 521 remains in production so as to continue to offer a protection device against overcurrents of the type self-supplied by specific current reducers.

3. PRICE LISTS

Refer to the price lists already distributed to the sales network on the occasion of the presentation of CEI 0-16 and of the ABB devices conforming to CEI 0-16.

4. AVAILABILITY AND DELIVERY TIMES

The circuit-breakers complete with the REF 601 protection device and relative sensors can be ordered from Monday 6th April 2009 with an initial delivery time of 6 weeks ex-works.
When the regime is up and running this will be notified and there will be a reduction in the delivery times as has already occurred for the current series equipped with PR 521 and PR 521DK releases.

5. SALES SUPPORT TOOLS

All the detailed information on the REF 601 will be provided in the HD4/R, VD4/R catalogues, in the specific REF 601 catalogue (being prepared) and in the REF 601 instruction manual.
Certification of conformity with CEI 0-16 will be available on the specific portal over the Intranet (in preparation) and, as soon as it is issued, also on the ANIE portal where the Electricity and Gas Authority has envisaged that all the devices conforming to CEI 0-16 be made available.