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Analysis of an event in an electric transformer station by means of the SCADA system

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Abstract

The information of the events that take place during some failure are sent in the event list and the failure list of the SCADA application, according to the nature of the information and contain information on the beginning and ending of the event, by means of time tags recording the moment the event occurred and the moment of its registration in SCADA.
Besides the information stored by the SCADA application, it is also very important to extract the recordings from the numeric terminals. These recordings contain time tags, numerical values of all analog sizes and wave shape and phasors typical to voltage and power.

Keywords: SCADA; The parameter window; recording; list of events; list of damages

1. General information

The implementation of the SCADA systems in the electric transformer stations was performed in different time periods.

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The SCADA systems implemented in order to monitor electric transformer stations, are achieved in such a manner so as to be able to receive information on certain events taking place in specific installations. Besides the events received by the SCADA application at the moment of the event, the recordings performed at the moment of the event occurrencecan also be downloaded later.

2. General presentation of the technical solution:

The information of the events that take place during some failure are sent in the event list and the failure list of the SCADA application, according to the nature of the information and contain information on the beginning and ending of the event, by means of time tags recording the moment the event occurred and the moment of its registration in SCADA [1]. Besides the time tags, the events are accompanied by information regarding the designation of the equipment where the event took place [4], the station, cell, relay, protection. All the information prior to the event about protection inception, the phases the failure appears, and also the post-event information, regarding the status of the entire equipment in the stations the event took place, is of paramount importance.

Besides the information stored by the SCADA application, it is also very important to extract the recordings from the numeric terminals. These recordings contain time tags, numerical values of all analog sizes and wave shape and phasors typical to voltage and power. After receiving this information, one can filter it according to station, equipment, relay, time, etc.

The information from the event list, failure list and the terminal recording list are needed in order to perform a complete analysis of an event in the electric network [2], [3].

In order to analyse an event in an electric transformer station by means of the SCADA system, one or two different programmes are required, in order to extract and visualise the events.

The programme aiming to extract events

It is designed to connect the computer running the programme to the protection equipment that contain osciloperturbograph modules.

By means of this programme, the connection to the equipment may be achieved in different ways:

Directly, using a serial cable;

Using a (AFB) FieldBus Adaptor and a FieldBus loop that may contain many devices;

Using commuted or rented telephone lines by modems;

Using TCP-IP to a server convertor of communication means.

The actions that can be achieved by means of a programme of downloading events, are[6], [8]:

Manage the list of connected events;

Visualise and modify working parameters of the osciloperturbograph equipment;

Save/tag the recordings;

Generate manual recordings;

Convert the recordings into different formats.

In order to achieve this, the user has three elements:

Work menu

Toolbar

Main window with the equipment parameters

The parameter window

It aims at displaying the actual working parameters of the equipment and allows their modification, for the osciloperturbograph device.

The elements that need to be defined are:

The address of the equipment;

Equipment identifier, any designation, usually the equipment designation (LEA, Trafo, ...);

Type of connection to the equipment;

Equipment type, by selecting an element from the equipment list;

Connection speed;

Connection mode; select one of the types: