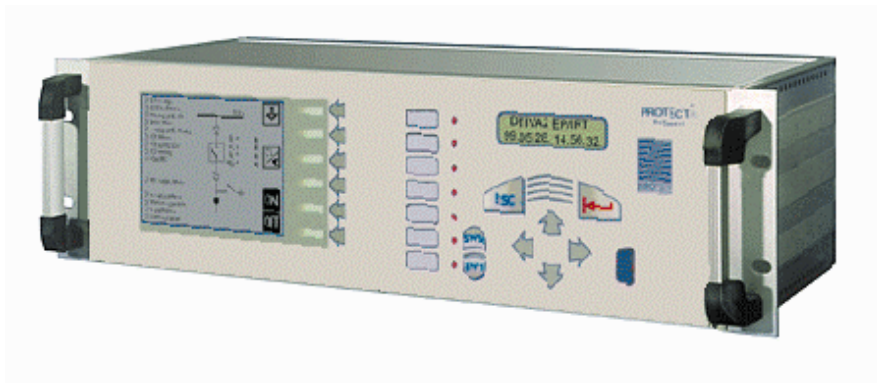
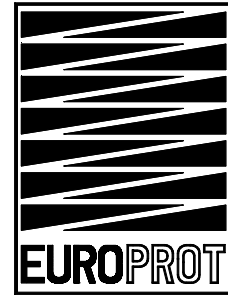


# DTIVA-EP

## DIGITAL OVERCURRENT PROTECTION AND AUTOMATIC RECLOSING DEVICE



### *Field of application*

The members of the **EuroProt** complex protection series are basically modular devices. The modules are assembled and configured according to the required protection functions. This information sheet describes the specialities of one of the numerous applications: the **DTIVA-EP** factory configuration (and its versions). The general user's manual for the **EuroProt** devices is the document „EPCP-2004 EuroProt complex protection, hardware and software manual”, which provides all common information to the members of the **EuroProt** complex protection series.

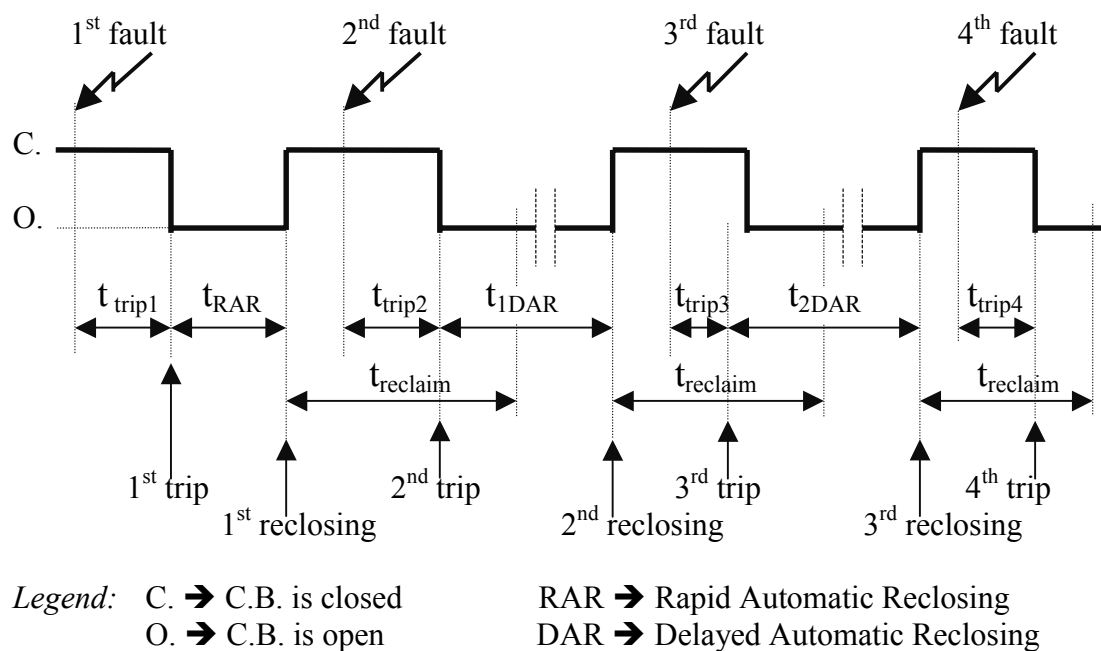
The **DTIVA-EP** complex numerical device made by PROTECTA Co. Ltd. is pre-configured for a three-phase definite time overcurrent protection with earth-fault protection, and it is extended with automatic reclosing function. This can be applied on overhead and cable lines in a not effectively earthed network, where the phase short circuits cause overcurrent exceeding the rated current. The earth faults can be selectively detected using an earth fault current increasing resistor (ECIR) inserted between the network star point and the ground in some seconds after an earth fault has occurred.

The additional supervisory and control functions (SCADA) extend the device to a complex field unit.

### *Main characteristics*

- The *protection part* of the device includes the following functions:
  - three phase overcurrent function with high current setting (fast) stage,  $I_{>>}$ ,
  - three phase overcurrent function with low current setting (delayed) stage,  $I_{>}$ ,
  - zero sequence overcurrent function with high current setting (fast) stage,  $3I_{0>>}$ ,
  - zero sequence overcurrent function with low current setting (delayed) stage,  $3I_{0>}$ .

- The ***additional characteristics of protection part*** of the device are as follows.
  - The operation of the two zero sequence O/C stages may be enabled with parameter setting by an external zero sequence voltage relay ( $U_0>$ ),
  - time delay parameters can be set independently (for the high and low current stages as well as the accelerated stages),
  - as an option, the low current zero sequence O/C stage can be ordered with zero sequence directional feature (for this function only setting ranges will be defined in this description).
- The ***automatic reclosing function*** of the device are as follows.
  - one fast reclosing cycle (RAR =Rapid Automatic Reclosing).
  - two slow reclosing cycles (DAR1, DAR2 = Delayed Automatic reclosing).
- The ***additional characteristics of reclosing function*** of the device are as follows.
  - programmable to accelerated or selective time delay for the first trip, for RAR, for DAR1 and for definite trip,
  - each reclosing shots can be activated or blocked separately,
  - the automatic reclosing function can be programmed for phase faults and for earth faults separately.
- There are four parameter sets for the protection functions, the changing is possible with the “Protect for Windows” parameter setting program.
- For the automatic reclosing function there are two parameter sets in each parameter packages, the changing of which is possible by hand or by remote control.
- The device can be set to trip in case of  $U_0>$  starting when a "Live Line Working" mode (LLW) is set.
- Continuous and periodical "healthy and ready to work" monitoring system is built into the device including checking of current transformer circuits and control circuits as well.
- The device has 22 output contacts (20 NO and 2 NC), 4 pcs of them has fixed assignments, and 10 contacts can be programmed by digital software matrix, and by parameters they can be assigned individually to the RTU function as well, and 8 of them is controlled by the RTU function.
- Event log for storing 50 events and event sequence recorder for recording 300 digital events with 1 ms resolution.
- The device is equipped with 24 optical coupler inputs, 8 of them is used by the protection functions, 16 is used by the RTU function.
- The device has a real time clock with battery supported RAM which can be synchronised by an external PC or SCADA, or by a Word Time Synchroniser (GPS-OP) made by PROTECTA Co. Ltd.
- Integrated disturbance recorder.



**Figure 1. Automatic Reclosing Cycles**

### **Main hardware features**

The **DTIVA-EP** complex digital overcurrent protection is a full numerical system, based on powerful microcontrollers. Within the limits of the hardware the functions and the versions are determined by the software.

The different hardware versions of the device – with identical software – cover practically all usual protective functions of the medium voltage part of the electric power system.

### **Technical data**

General technical specification see in <b>EuroProt system information sheet</b>
Type tests see in <b>EuroProt system information sheet</b>
Design and sizes see in <b>EuroProt system information sheet</b>

### *Setting ranges:*

Parameter	Range
Phase overcurrent protection	
Setting of the low current setting stage related to the CT rated current	30 to 2500, step 5 [%]
Setting of the high current setting stage related to the CT rated current	30 to 2500, step 5 [%]
CT primary rated current related to 1A or 5A secondary value	50 to 1500, step 25 [A]
Selective time delay of the low current setting stage	0 to 60000, step 10 [ms]
Selective time delay of the high current setting stage	0 to 60000, step 10 [ms]
Directional zero sequence overcurrent protection	
Setting of the zero sequence low current setting stage, as percent of the rated CT current	10 to 140, step 1% (or ‰ with toroidal CT)
Setting of the zero sequence high current setting stage, as percent of the rated CT current	20 to 2500, step 5 [%]
The primary rated current of the zero sequence CT reduced to 100 mA, or 500 mA secondary value, used only to scale the displayed values	10 to 1000, step 1[A]
Lower angle limit	0 to 359, step 1[deg]
Upper angle limit	0 to 359, step 1[deg]
Hysteresis of the angle measurement (drop-off ratio of angle decision)	0 to 359, step 1[deg]
Angle error compensation (1/10 deg)	0 to 3599, step 1[1/10deg]
High current setting stage time delay	0 to 60000, step 1 [ms]
Low current setting stage time delay	0 to 60000, step 1 [ms]
Zero sequence overvoltage protection	
Setting of the zero sequence overvoltage function, as percent of the rated voltage of the device	10 to 110, step 1 [%]
Zero sequence overvoltage stage time delay	0 to 60000, step 1 [ms]
Phase overvoltage protection	
Setting of the function related of the rated input voltage of the device	10 to 110, step 1[%]
Definition of under- or overvoltage measurement	0 / 1
Time delay setting	0 to 60000, step 1 [ms]
3/2 logic	0 / 1
Breaker failure protection	
Timer of the breaker failure protection	0 to 60000, step 1 [ms]
Timer for pole mounted switches	0 to 60000, step 1 [ms]
Automatic reclosing function	
RAR dead time	0 to 60000, step 1 [ms]
DAR1 dead time	0 to 600, step 1 [s]
DAR2 dead time	0 to 600, step 1 [s]

## *Options*

- Interface to a SCADA system (see the **EuroProt** system information sheet)
- Need of output contacts with 4 A DC breaking capability
- Additional digital input modules (in the modularity of 8 pcs)
- Graphic LCD

## *Ordering information*

- Type of protection [DTIVA-EP]
- Rated C.T. current [1 A, 5 A]
- Rated V.T. voltage [100 V, 200 V]
- Design type [19 inch cabinet frame mounted device, panel mounted device with flash mounted form, panel mounted device with raised-hinged form]
- Auxiliary DC voltage [220 V, 110 V, or other]