

## FUNCTION BLOCK DESCRIPTION

# Automatic Reclosing Function for Medium Voltage Networks

ANSI 79, IEC 0→1



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PROTECTION, AUTOMATION AND  
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## VERSION INFORMATION

| VERSION     | DATE       | MODIFICATION   | COMPILED BY  |
|-------------|------------|--|--------------|
| Preliminary | 2009-11-24 | Preliminary version, without technical information   | Petri        |
|             | 2010-10-05 | Naming revision  | Csipke       |
| 1.0         | 2010-11-11 | First edition  | Petri        |
| 1.1         | 2016-05-23 | Naming revision, "Run" output added, corrections, minor formatting   | Erdős        |
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## CONTENTS

|        |   |    |
|--------|---|----|
| 1      | Application .....                                     | 4  |
| 1.1    | Introduction .....                                    | 4  |
| 1.2    | Mode of operation .....                               | 5  |
| 1.2.1  | Starting the MV automatic reclosing cycle .....       | 5  |
| 1.2.2  | Starting the dead time counter .....                  | 6  |
| 1.2.3  | The dead time .....                                   | 6  |
| 1.2.4  | Special dead time for the first cycle .....           | 6  |
| 1.2.5  | Reduced dead time .....                               | 7  |
| 1.2.6  | Phase fault start .....                               | 7  |
| 1.2.7  | Checking the ready state of the circuit breaker ..... | 7  |
| 1.2.8  | Reclosing with synchronous state supervision .....    | 7  |
| 1.2.9  | Reclosing with synchronous switching .....            | 7  |
| 1.2.10 | Impulse duration of the CLOSE command .....           | 7  |
| 1.2.11 | Behavior after reclosing .....                        | 8  |
| 1.2.12 | Behavior after manual close command .....             | 8  |
| 1.2.13 | Behavior in case of evolving fault .....              | 8  |
| 1.2.14 | The final trip .....                                  | 8  |
| 1.2.15 | Action time .....                                     | 8  |
| 1.2.16 | Accelerating trip commands .....                      | 8  |
| 1.2.17 | Dynamic blocking conditions .....                     | 9  |
| 1.2.18 | “Not Ready” conditions .....                          | 9  |
| 2      | MV AutoReclosing Function Overview .....              | 10 |
| 2.1    | Settings .....  | 10 |
| 2.1.1  | Parameters .....                                      | 10 |
| 2.2    | Function I/O .....                                    | 13 |
| 2.2.1  | Analogue Inputs .....                                 | 13 |
| 2.2.2  | Binary Input Signals (Graphed Output Statuses) .....  | 13 |
| 2.2.3  | Binary Output Signals (Graphed Input Statuses) .....  | 13 |
| 2.2.4  | Online Data .....                                     | 14 |
| 2.2.5  | Events .....  | 14 |
| 2.3    | Technical Data .....                                  | 15 |
| 2.4    | Notes for Testing .....                               | 15 |

# 1 Application

## 1.1 Introduction

The MV automatic reclosing function can realize up to four shots of reclosing for medium-voltage networks. The parameter *Dead Time* can be set individually for each reclosing and separately for earth faults and for multi-phase faults. All shots are of three-phase reclosing.

The starting signal of the cycles can be generated by any combination of the protection functions or external signals of the binary inputs. The selection to generate the binary input REC79\_St\_GrO\_ (Protection Start) is made by graphic equation programming.

The automatic reclosing function is triggered if, as a consequence of a fault, a protection function generates a trip command to the circuit breaker and the protection function resets because the fault current drops to zero and/or the circuit breaker's auxiliary contact signals open state. According to the preset parameter values, either of these two conditions starts counting the *Dead Time*, at the end of which the MV automatic reclosing function generates a close command automatically. If the fault still exists or reappears, then within the "**Reclaim time**" (according to parameter setting *Reclaim Time*, started at the close command) the protection functions picks up again and the subsequent cycle is started. If no pickup is detected within this time, then the MV automatic reclosing cycle resets and a new fault starts a fresh autoreclosing sequence with the first cycle.

The sequence of the initial actions on starting the automatic reclosing function is as follows:

- Pickup of a protection function programmed to the binary input REC79\_St\_GrO\_ (Protection Start) starts a timer defined by the *Action Time* parameter. During its running time, the trip signal of the protection should be received.
- Triggering signal of the MV automatic reclosing function programmed to the binary input REC79\_Tr\_GrO\_ (AutoReclosing Start) is the protection trip, it starts the "In progress" state, (REC79\_InProg\_GrI\_) and starts a counter defined by the *Start Signal Max Time* parameter. During its running time, the automatic reclosing cycle trigger signal (CB open or protection trip reset) should be received.
- Starting signal of the MV automatic reclosing function can be protection trip resetting or CB open signal which starts the dead time.
- Close command is generated at the end of the *Dead Time*. It starts a counter defined by the *Reclaim Time* parameter.

There are some additional requirements to perform automatic reclosing:

- The MV automatic reclosing function can be blocked by the variable REC79\_Blk\_GrO\_, which can be programmed by the user.
- After pickup of the protection function, a timer starts to count down a period within which the trip command must be generated to start the reclosing cycles. Beyond this period, the function enters the "dynamic blocked" state. This period is defined by the parameter *Action Time*.
- At the moment of generating the close command, the circuit breaker must be ready for operation, which is signaled via binary input REC79\_CBRdy\_GrO\_ (CB Ready). The preset parameter value REC79\_CBTO\_TPar\_ (CB Supervision time) decides how long the MV automatic reclosing function is allowed to wait when the function is in "In Progress" state. If the signal is not received during this time, then the function terminates. The function then resets when the duration defined by the parameter *Dynamic Blocking Time* elapses.

Depending on the preset parameter value, the MV automatic reclosing function can influence the operation of the protection functions as well. The binary outputs of the autoreclosing function can be applied for this purpose in the EuroCAP logic editor.

In case of a manual close command which is assigned to the logic variable REC79\_**ManCI**\_GrO\_ (Manual Close) using graphic equation programming, a preset parameter value decides how long the MV automatic reclosing function should be disabled **after the manual close** command.

The **duration of the close command** depends on preset parameter *Close Command Time*, but terminates if any of the protection functions issues a trip command.

## 1.2 Mode of operation

The MV automatic reclosing function can control up to four reclosing cycles, separately for earth faults and for multi-phase faults. Depending on the preset parameter values *EarthFault RecCycle* and *PhaseFault RecCycle*, there are different modes of operation, both for earth faults and for multi-phase faults:

|                  |   |
|------------------|---|
| Disabled         | No automatic reclosing is selected,             |
| 1. Enabled       | Only one automatic reclosing cycle is selected, |
| 1.2. Enabled     | Two automatic reclosing cycles are activated,   |
| 1.2.3. Enabled   | Three automatic reclosing cycles are activated, |
| 1.2.3.4. Enabled | All automatic reclosing cycles are activated.   |

The function can be switched Off /On using the *Operation* parameter.

The user can also block the function applying the logic editor. The binary status variable to be programmed is REC79\_**Blk**\_GrO\_ (Block).

If the device is generally blocked, then the MV automatic reclosing function is also blocked.

### 1.2.1 Starting the MV automatic reclosing cycle

Depending on the present parameter value *Reclosing Started by*, the MV automatic reclosing function can be started either by resetting of the TRIP command (setting: Trip reset) or by the binary signal indicating the open state of the circuit breaker (setting: CB open).

If the reset state of the TRIP command is selected to start the function, then the conditions are defined by the user applying the logic editor. The binary input status variable to be programmed is: REC79\_**Tr**\_GrO\_ (AutoReclosing Start).

If the open state of the circuit breaker is selected to start the function (CB open), then also the binary status variable REC79\_**CBOpen**\_GrO\_ (CB OPEN position) is additionally to be programmed.

The MV automatic reclosing function gets the trip commands of the protection functions intended to trigger the reclosing function. The conditions for detecting the triggered state of the protection functions are defined by the user applying the logic editor. The binary input status variable to be programmed is: REC79\_**Tr**\_GrO\_ (AutoReclosing Start). This signal starts a dedicated timer, the elapsed time of which is compared to the preset parameter value *Start Signal Max.Time*.

The MV automatic reclosing function enters the dynamic blocking state:

- If the parameter selection for *Reclosing Started by* is “Trip reset” and the trip impulse is too long
- If the parameter selected for *Reclosing Started by* is “CB open”, then during the runtime of the timer CB open signal is not received

For further information about the dynamic blocking state see Chapter 1.2.17.

## 1.2.2 Starting the dead time counter

In the base case, the *Dead Time* counter of any reclosing cycle is started by the starting signal (See Chapter 1.2.1) but starting can be delayed. The delay is activated while the value of the REC79\_DtDel\_GrO\_ (Dead Time Start Delay) status signal is TRUE. The conditions are defined by the user applying the logic editor. This delay is limited by the timer parameter *DeadTime Max.Delay*.

## 1.2.3 The dead time

For all four reclosing cycles, separate *Dead Times* can be defined for line-to-line faults and for earth faults.

The timer parameters for line-to-line faults are:

1. *Dead Time Ph*
2. *Dead Time Ph*
3. *Dead Time Ph*
4. *Dead Time Ph*

The timer parameters for earth faults are:

1. *Dead Time EF*
2. *Dead Time EF*
3. *Dead Time EF*
4. *Dead Time EF*

The difference in *Dead Time* settings for phase faults and earth faults can be justified as follows: the medium voltage networks are usually either grounded by a reactor (Petersen coil) or resistance. Consequently, in case of a single-phase-to-ground fault, the currents are relatively low and the air insulation regenerates quickly after breakdown.

In case of line-to-line faults, the currents are high, so a longer *Dead Time* is needed for the air insulation to regenerate around the fault location.

## 1.2.4 Special dead time for the first cycle

No special *Dead Time* is selectable for the first cycle. This selection is active in the version for high-voltage networks only.

### 1.2.5 Reduced dead time

No reduced *Dead Time* is selectable for the medium-voltage automatic reclosing function. This selection is active in the version for high-voltage networks only.

### 1.2.6 Phase fault start

The MV automatic reclosing function is prepared to generate three-phase trip commands only. The applied *Dead Time* setting depends on the detected fault type indicated by the input signal REC79\_**PhFit**\_GrO\_ (PhaseFault Start). (This signal is TRUE in case of a phase-to-phase fault.)

### 1.2.7 Checking the ready state of the circuit breaker

At the end of the *Dead Time*, reclosing is possible only if the circuit breaker can perform the command. The binary variable REC79\_**CBRdy**\_GrO\_ (CB Ready) indicates this state. The conditions are defined by the user applying the logic editor.

If the circuit breaker is not ready, the controller function waits for a pre-programmed time for this state. The waiting time is defined by the user as parameter value *CB Supervision Time*. If this condition is not fulfilled during the waiting time, then the function enters “Dynamic blocked” state.

For further information about the dynamic blocked state, see Chapter 1.2.17.

### 1.2.8 Reclosing with synchronous state supervision

Reclosing is possible only if the conditions required by the *Synchro-check, synchro-switch* function are fulfilled. This state is signaled by the binary variable REC79\_**SynRel**\_GrO\_ (SYNC Release) from the *Synchro-check, synchro-switch* function. The conditions are defined by the user applying the logic editor. The MV automatic reclosing function waits for a pre-programmed time for this signal. This time is defined by the user as parameter value *SynCheck Max Time*. If the “SynRel” signal is not received during the running time of this timer, then the “synchronous switch” operation is started (See Chapter 1.2.9) and the binary output signal REC79\_**CIReq**\_GrI\_ (CloseRequ. SynSwitch) is generated which is connected to the *Synchro-check, synchro-switch* function.

### 1.2.9 Reclosing with synchronous switching

If the conditions of the synchronous state are not fulfilled, another timer starts. This waiting time is defined by the user as parameter value *SynSW Max Time*.

The separate *Synchro-check, synchro-switch* function controls the generation of the close command in case of relatively rotating voltage vectors on both sides of the circuit breaker to make contact at the synchronous state of the rotating vectors. For this calculation, the closing time of the circuit breaker must be defined in that function.

This mode of operation is indicated by the output variable REC79\_**CIReq**\_GrI\_ (CloseRequ. SynSwitch).

If no switching is possible during the running time of this timer, then the MV automatic reclosing function enters “Dynamic blocked” state and resets.

For further information about the dynamic blocked state, see Chapter 1.2.17.

### 1.2.10 Impulse duration of the CLOSE command

The “Close” impulse is generated as one of the output status signals of the MV automatic reclosing function REC79\_**Close**\_GrI\_ (Close command). This signal is common to all three phases. The impulse duration is defined by the user setting the timer parameter *Close Command Time*.

### 1.2.11 Behavior after reclosing

When the close command is generated, a timer is started to measure the *Reclaim Time*. This timer is prolonged up to the reset of the close command (if the close command duration is longer than the *Reclaim Time* set). If the fault is detected again during this time, then the sequence of the MV automatic reclosing cycles continues. If no fault is detected, then at the expiry of the *Reclaim Time*, the reclosing is evaluated as successful and the function resets. If a fault is detected after the expiry of this timer, then the cycles restart with the first reclosing cycle.

If the user programmed the status variable `REC79_St_GrO_` (Protection Start) and it turns to TRUE state during the *Reclaim Time*, then function continues even if the trip command is received after the expiry of the *Reclaim Time*.

### 1.2.12 Behavior after manual close command

This state of manual close command is signaled by the binary variable `REC79_ManCI_GrO_` (Manual Close). The conditions are defined by the user applying the logic editor.

After a manual close command, the MV automatic reclosing function enters “Not Ready” state for the time period defined by parameter *Block after Man.Close*. For “Not Ready” state, see Chapter 1.2.18.

If the manual close command is received during the running time of any of the cycles, then the function enters “Dynamic blocked” state and resets. For further information about the dynamic blocked state, see Chapter 1.2.17.

### 1.2.13 Behavior in case of evolving fault

In case of evolving faults, the *Dead Time* parameters depend on the first fault detection and the evolving fault cannot change this decision.

### 1.2.14 The final trip

If the fault still exists at the end of the last cycle, the MV automatic reclosing generates the signal for final trip: `REC79_FinTr_GrI_` (Final Trip). After final trip, the MV automatic reclosing function enters “Dynamic blocked” state.

A final trip command is also generated if a fault is detected again during the *Dead Time*. For further information about the dynamic blocked state, see Chapter 1.2.17.

### 1.2.15 Action time

The user can compose the binary status variable `REC79_St_GrO_` (Protection Start) to indicate the start of the protection functions, whose operations are related to the MV automatic reclosing function. See Chapter 1.1. This signal starts a counter defined by the preset parameter value *Action Time*. During its running time, the function waits for the trip command. If no trip command is received, then the function enters “Dynamic blocked” state.

For further information about the dynamic blocked state, see Chapter 1.2.17.

### 1.2.16 Accelerating trip commands

Depending on the Boolean parameter settings, the automatic reclosing function block can accelerate trip commands of the individual reclosing cycles. This means that the output `REC79_TrAcc_GrI_` (Acceleration) of the function block becomes active for the first starting state of the protection function or at the end of the *Dead Time* of the running cycle, if the dedicated parameter enables acceleration. This signal “TrAcc” needs user-programmed graphic equations to generate the accelerated trip command.

### 1.2.17 Dynamic blocking conditions

There are several conditions that lead to the dynamic blocked state of the MV automatic reclosing function. This state becomes valid if any of the conditions summarized below are true.

- There is no trip command during the “Action time” (See Chapter 1.2.15).
- The duration of the starting impulse for the MV automatic reclosing function is too long (See chapter 1.2.1).
- If no “CB ready” signal is received at the intended time of reclosing command (See chapter 1.2.7)
- The *Dead Time* is prolonged further than the preset parameter value REC79\_DtDel\_TPar\_ (DeadTime Max.Delay) (See Chapter 1.2.2).
- The waiting time for the “SYNC Release” signal is too long (See chapter 1.2.9)
- After the final trip command (See chapter 1.2.14).
- Automatic reclosing is started during the blocking time after a manual close command (See chapter 1.2.12)
- While *CB State Monitoring* is on, a manual open command (the status variable REC79\_CBOpen\_GrO\_ (CB OPEN single-pole) changes state to TRUE without REC79\_Tr\_GrO\_ (AutoReclosing Start)).
- Automatic reclosing is started during a general block (the device is blocked, see Chapter 1.2).

At the time of the change to start the dynamic blocked state a timer is started, the running duration of which is defined by the time parameter *Dynamic Blocking Time*. During its running time the function is blocked, no reclosing command is generated.

In a dynamic blocked state, the REC79\_Blocked\_GrI\_ (Blocked) status signal is TRUE (similar to “Not ready” conditions).

### 1.2.18 “Not Ready” conditions

There are several conditions that must be satisfied before the MV automatic reclosing function enters “Not Ready” state. This state becomes valid if any of the conditions of the blocking become TRUE outside the running time of the reclosing cycles.

- Reclosing is disabled by the parameter *Operation* if it is selected to “Off”. (See Chapter 1.2)
- No reclosing cycles are selected by the parameters *Earth Fault Rec.Cycle* and *PhaseFault Rec.Cycle* if it is set to “Disabled” (See Chapter 1.2)
- The circuit breaker is not ready for operation: the result of the graphic programming of the binary variable REC79\_CBRdy\_GrO\_ (CB Rdy) is FALSE. (See Chapter 1.2.7)
- After a manual close command (See Chapter 1.2.12)
- If the parameter *CB State Monitoring* is set to TRUE and the circuit breaker is in Open state, i.e., the value of the REC79\_CBOpen\_GrO\_ (CB OPEN position) status variable changes state to TRUE.
- The starting signal for automatic reclosing is selected by parameter REC79\_St\_EPar\_ (Reclosing started by) to be “CB open” and the circuit breaker is in Open state.
- In case of a general block (the device is blocked, see Chapter 1.2).

In a “Not ready” state, the REC79\_Blocked\_GrI\_ (Blocked) status signal is TRUE (similar to “Dynamic blocking” conditions).

## 2 MV AutoReclosing Function Overview

The graphic appearance of the Automatic Reclosing (HV) function block is shown in Figure 2-1. This block shows all binary input and output status signals that are applicable in the logic editor.

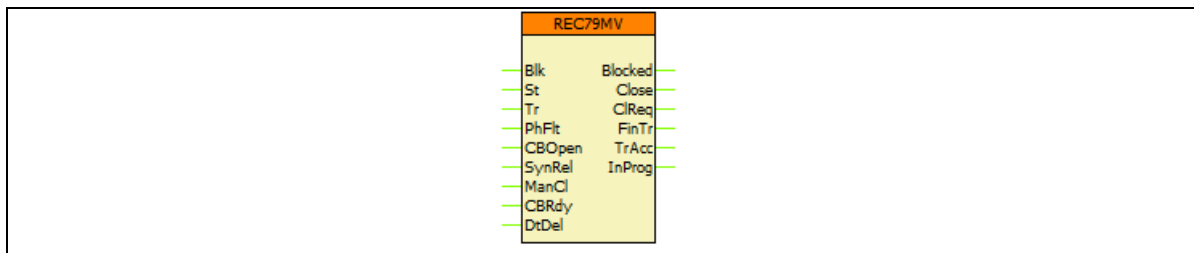


Figure 2-1 The graphic appearance of the MV AutoReclosing function block

### 2.1 Settings

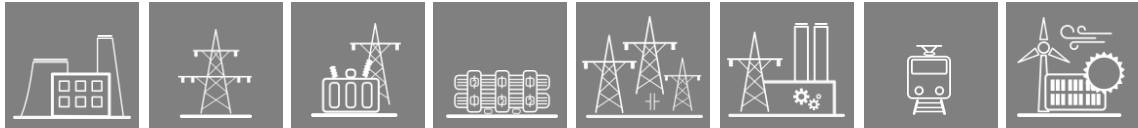
#### 2.1.1 Parameters

The available parameters are listed below in order of their appearance in the *parameters* menu. If the setting range of a parameter should be extended, contact Protecta Support.

Table 2-1 Parameters of the MV AutoReclosing function

| TITLE                 | DIM  | RANGE  | STEP | DEFAULT    | EXPLANATION   |
|-----------------------|------|--|------|------------|---|
| Operation             | -    | Off, On  | -    | Off        | Parameter for enabling/disabling the function   |
| EarthFault RecCycles  | -    | Disabled,<br>1. Enabled,<br>1.2. Enabled,<br>1.2.3. Enabled,<br>1.2.3.4. Enabled | -    | 1. Enabled | Determines the number of enabled autoreclosing cycles during an earth fault   |
| PhaseFault RecCycle   | -    | Disabled,<br>1. Enabled,<br>1.2. Enabled,<br>1.2.3. Enabled,<br>1.2.3.4. Enabled | -    | 1. Enabled | Determines the number of enabled autoreclosing cycles during a phase fault  |
| Reclosing Started by  | -    | Trip reset,<br>CB open   | -    | Trip reset | This parameter determines what signal triggers the start of a reclosing cycle (start of the <i>Dead Time</i> counter)   |
| CB State Monitoring   | -    | FALSE, TRUE  | -    | FALSE      | If this parameter is TRUE, the function gets into "Not Ready" state if the CB state (CBOpen input) gets open without a start signal.  |
| Reclaim Time          | msec | 100 – 100000   | 10   | 2000       | Timer starts after a close command: if a new start signal is received during the time set by this parameter, the next cycle is started (or final trip if the actual one was the last). If the new start signal is received after this time, the first cycle is started. |
| Close Command Time    | msec | 10 – 10000   | 10   | 100        | Defines the duration of the close command impulse   |
| Dynamic Blocking Time | msec | 10 – 100000  | 10   | 1500       | Defines the duration of the dynamic blocking state  |

| TITLE                 | DIM  | RANGE        | STEP | DEFAULT | EXPLANATION   |
|-----------------------|------|--------------|------|---------|---|
| Block after Man.Close | msec | 0 – 100000   | 10   | 1000    | Defines the duration after a manual close command in which the function is blocked  |
| Action Time           | msec | 0 – 20000    | 10   | 1000    | Defines the duration after pickup of the protection function within which the trip command should be received, else the function enters dynamic blocking state  |
| StartSignal Max Time  | msec | 0 – 10000    | 10   | 1000    | This parameter sets the limit for the duration of the start signal (protection function pickup to the AR cycle trigger). If the trigger signal is not received, the function enters dynamic blocking state    |
| DeadTime Max Delay    | msec | 0 – 100000   | 10   | 3000    | If the <i>Dead Time</i> is prolonged beyond this time duration, the function enters dynamic blocking state  |
| CB Supervision Time   | msec | 10 – 100000  | 10   | 1000    | This parameter limits the duration for waiting for the CB to be ready (for reclosing) after a trip. If the “CB ready” condition is not fulfilled within this time, the function enters dynamic blocking state |
| SynCheck Max Time     | msec | 500 – 100000 | 10   | 10000   | The max time allowed for the function to wait for synchronism to be achieved between both sides of the CB. Else, “synchronous switch” operation is started  |
| SynSw Max Time        | msec | 500 – 100000 | 10   | 10000   | The max time allowed for the function to wait for synchronous switching, else the function enters dynamic blocking state  |
| 1. Dead Time Ph       | msec | 0 – 100000   | 10   | 500     | The time between the point of triggering (Trip reset/CB open) and the start of the close command for cycle 1 single-phase autoreclosing   |
| 2. Dead Time Ph       | msec | 10 – 100000  | 10   | 600     | The time between the point of triggering and the start of the close command for cycle 2 single-phase autoreclosing  |
| 3. Dead Time Ph       | msec | 10 – 100000  | 10   | 700     | The time between the point of triggering and the start of the close command for cycle 3 single-phase autoreclosing  |
| 4. Dead Time Ph       | msec | 10 – 100000  | 10   | 800     | The time between the point of triggering and the start of the close command for cycle 4 single-phase autoreclosing  |
| 1. Dead Time EF       | msec | 0 – 100000   | 10   | 1000    | The time between the point of triggering and the start of the close command for cycle 1 three-phase autoreclosing   |
| 1. Special DT EF      | msec | 0 – 100000   | 10   | 1350    | Prolonged cycle 1 dead time for lines without teleprotection  |
| 2. Dead Time EF       | msec | 10 – 100000  | 10   | 2000    | The time between the point of fault clearance and the start of the close command for cycle 2 three-phase autoreclosing  |
| 3. Dead Time EF       | msec | 10 – 100000  | 10   | 3000    | The time between the point of fault clearance and the start of the close command for cycle 3 three-phase autoreclosing  |
| 4. Dead Time EF       | msec | 10 – 100000  | 10   | 4000    | The time between the point of fault clearance and the start of the close command for cycle 4 three-phase autoreclosing  |



| TITLE              | DIM | RANGE       | STEP | DEFAULT | EXPLANATION  |
|--------------------|-----|-------------|------|---------|--|
| Accelerate 1.Trip  | -   | FALSE, TRUE | -    | FALSE   | Enables/disables the shortening of the protection function trip time during the 1 <sup>st</sup> AR cycle |
| Accelerate 2.Trip  | -   | FALSE, TRUE | -    | FALSE   | Enables/disables the shortening of the protection function trip time during the 2 <sup>nd</sup> AR cycle |
| Accelerate 3.Trip  | -   | FALSE, TRUE | -    | FALSE   | Enables/disables the shortening of the protection function trip time during the 3 <sup>rd</sup> AR cycle |
| Accelerate 4.Trip  | -   | FALSE, TRUE | -    | FALSE   | Enables/disables the shortening of the protection function trip time during the 4 <sup>th</sup> AR cycle |
| Accelerate FinTrip | -   | FALSE, TRUE | -    | FALSE   | Enables/disables the shortening of the protection function final trip time                               |

## 2.2 Function I/O

This section briefly describes the analogue and digital inputs and outputs of the function block.

### 2.2.1 Analogue Inputs

This function block does not use analogue inputs.

### 2.2.2 Binary Input Signals (Graphed Output Statuses)

The conditions of the binary inputs are defined by the user, applying the logic editor (*Logic Editor*). Parts written in **bold** are seen on the left side of the function block in the Logic editor.

Table 2-2 The binary input signals of the MV AutoReclosing function

| BINARY INPUT SIGNAL        | SIGNAL TITLE          | EXPLANATION  |
|----------------------------|-----------------------|--|
| REC79_ <b>Blk</b> _GrO_    | Block                 | Disabling input for the function   |
| REC79_ <b>St</b> _GrO_     | Protection Start      | Start signal of a protection function                                    |
| REC79_ <b>Tr</b> _GrO_     | AutoReclosing Start   | Signal to trigger the automatic reclosing cycle (1 <sup>st</sup> option) |
| REC79_ <b>PhFlt</b> _GrO_  | 3Ph Trip              | Start signal of a phase fault protection function                        |
| REC79_ <b>CBOpen</b> _GrO_ | CB OPEN single-pole   | CB open status (2 <sup>nd</sup> option to trigger the AR cycle)          |
| REC79_ <b>SynRel</b> _GrO_ | SYNC Release          | Release signal from synchro-check function                               |
| REC79_ <b>ManCl</b> _GrO_  | Manual Close          | Manual close command signal  |
| REC79_ <b>CBRdy</b> _GrO_  | CB Ready              | Circuit breaker is ready for operation                                   |
| REC79_ <b>DtDel</b> _GrO_  | Dead Time Start Delay | Signal for delaying the start of the <i>Dead Time</i> counter            |

### 2.2.3 Binary Output Signals (Graphed Input Statuses)

These signals can be used in EuroCAP to assign to LED, user LCD object etc. Parts written in **bold** are seen on the right side of the function block in the *Logic Editor*.

Table 2-3 The binary output signals of the MV AutoReclosing function

| BINARY OUTPUT SIGNAL        | SIGNAL TITLE        | EXPLANATION  |
|-----------------------------|---------------------|--|
| REC79_ <b>Blocked</b> _Grl_ | Blocked             | Function is blocked (dynamic blocking or "Not Ready" state)                      |
| REC79_ <b>Close</b> _Grl_   | Close command       | Close command of the function  |
| REC79_ <b>ClReq</b> _Grl_   | CloseReq. SynSwitch | The closing requests synchronous switching (wired to the "SYN25" function block) |
| REC79_ <b>FinTr</b> _Grl_   | Final Trip          | Indication of final trip   |
| REC79_ <b>TrAcc</b> _Grl_   | Acceleration        | Trip command acceleration  |
| REC79_ <b>InProg</b> _Grl_  | In Progress         | Automatic reclosing cycle is in progress   |

## 2.2.4 Online Data

The following values are visible in the *online data* page.

Table 2-4 Online data of the MV AutoReclosing function

| SIGNAL TITLE   | DIMENSION | EXPLANATION   |
|----------------|-----------|---|
| Actual cycle   | [#]       | The current AR cycle running  |
| Status         | -         | The status of the function; Not Ready, Ready, In progress, Successful |
| Enable Command | -         | Function enable command received                                      |
| Block Command  | -         | Function blocked command received                                     |

## 2.2.5 Events

Table 2-5 Events of the MV AutoReclosing function

| EVENT         | VALUE   | EXPLANATION   | IEC61850 DATA ATTRIBUTES |
|---------------|---------|---|--------------------------|
| Blocked       | off, on | Function is blocked (dynamic blocking or "Not Ready" state)           | ARRREC1\$ST\$BlkRec      |
| Close Command | off, on | Close command of the function   | ARRREC1\$ST\$Op          |
| Status        | [...]   | The status of the function; Not Ready, Ready, In progress, Successful | ARRREC1\$ST\$AutoRecSt   |
| Actual cycle  | [#]     | The current AR cycle running  | ARRREC1\$ST\$RecCyc      |
| Final Trip    | off, on | Final trip signal received  | ARRREC1\$ST\$DefTrp      |

## 2.3 Technical Data

Table 2-6 Technical data of the MV AutoReclosing function

| FUNCTION       | VALUE | ACCURACY                                  |
|----------------|-------|---|
| Operating time | -     | $\pm 1\%$ of setting value or $\pm 30$ ms |

## 2.4 Notes for Testing

Keep in mind that this function usually takes place in a surrounding logic and has a complex built-in logic as well. This makes it more challenging to test, compared to other protection function blocks: the logic around the function must always be observed when going through this manual.

If the function is getting blocked too often, check the conditions of the Dynamic Blocking or the "Not Ready" state.