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1 MV Process General

This chapter describes the most common processes seen from the library implementations in LIB 500 BASE and LIB 510 v. 4.0.3.

1.1 Station/Process Picture

1.1.1 Picture Specific Functions

A process picture is located in the picture specific area and consists of the picture functions installed. The medium voltage process objects are typical example of picture specific functions. Picture specific functions are activated during run mode: by clicking on the representation symbol by the mouse and selecting the wanted function.

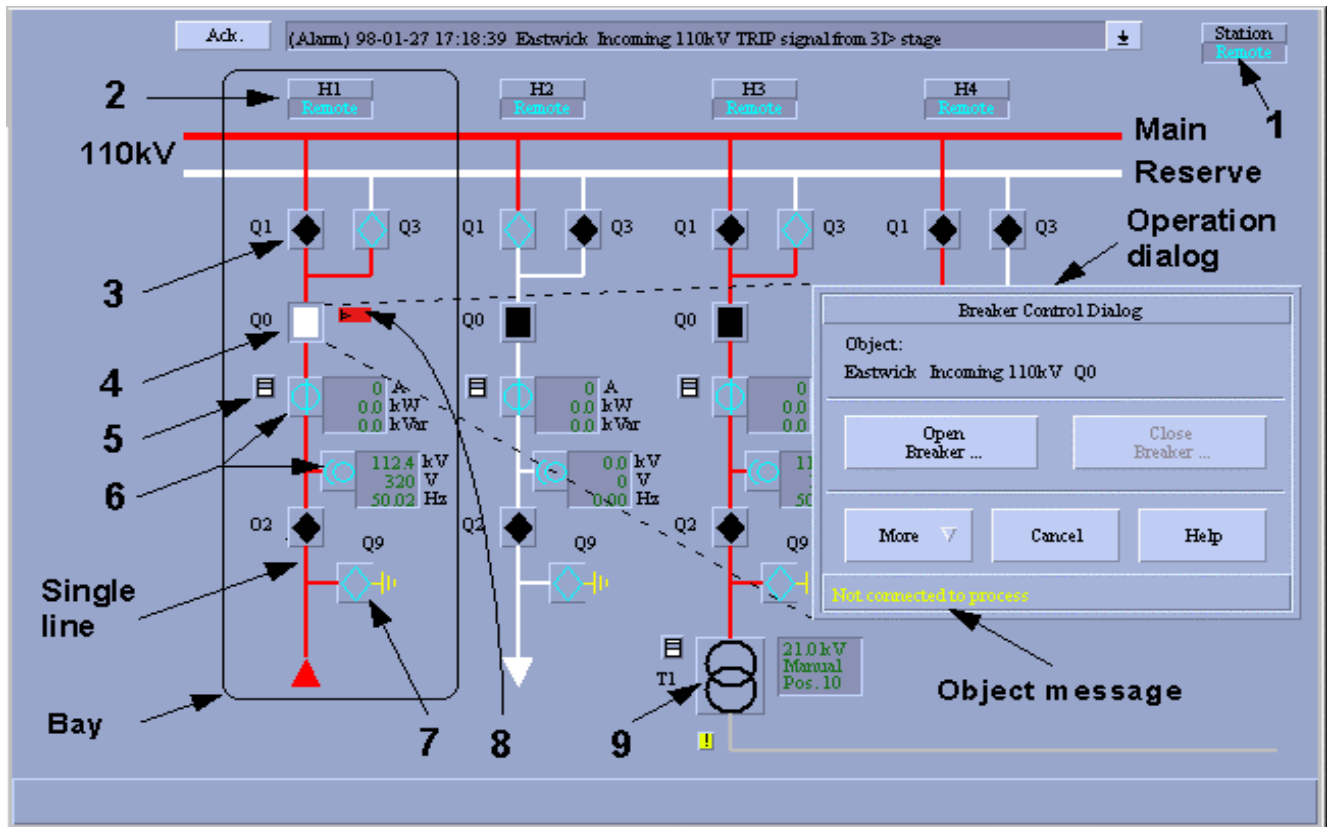


Figure 1. Some picture functions in the MV process

Number	Picture function	Remarks
1	Station Local/Remote	Can be configured to be invisible, then the Local/Remote indication is shown in the header, see the picture header overview in the introduction chapter.
2	Bay Local/Remote	-
3	Disconnecter	Other symbols can be used.
4	Circuit breaker	Other symbols can be used.
5	Relay symbol	Several functions can be activated, that is depending on the device behind the symbol.
6	Measuring functions	The measurements can be presented in different ways (preconfigured).
7	Earth switch	Other symbols can be used.
8	Trip tag	A trip tag shows the reason for tripping, like overcurrent, earth fault current etc. An auto reclosing tag is also available.
9	Transformer	Other symbols can be used.

Various kinds of dialogs are opened when clicking, e.g. on the picture functions in the Bay. These dialogs do often also contain subdialogs. Both dialogs and subdialogs contain a help function, giving further assistance, if needed.

The procedure for handling a function in an operation dialog is just to click on the function to be executed. A request to verify the operation is given, before executing, otherwise the user cannot regret the operation.

The object messages are giving actual information and status regarding the object, e.g. in figure x the object is a circuit breaker that is not connected to the process.

1.2 Graphical Representations and Functionality

Some principles are general and used for all MV functions (symbols and colors etc.). A description of these general principles is given in this section.

1.2.1 Switching Devices Status Indication

The status presentation for an object consists of three parts: a representation symbol, a color and a suffix. These three define the exact object status. The relationship between color and suffix indication can be defined in the Application Settings. Either color or suffix or even both of them can be selected for status indication.

1.2.2 Color Coding & Suffixes

The current state is indicated by different symbols. The color or/and suffix of the symbol gives additional information on the object.

Color	Suffix	Status
GREEN	*	Normal state
GREEN	(TI)**	Time invalid
CYAN	ME	Manually entered
YELLOW	WA	Warning for Analog inputs
YELLOW	IB	Alarm, event, printouts and/or reprocessing blocked
BROWN	CB	Control blocked
RED	AL	Alarm, acknowledged
RED, blinking	AL	Alarm, unacknowledged
MAGENTA	IV	Invalid
MAGENTA	BL	Update blocked, external
DARK BLUE	SE	External substitution
MAGENTA	NU	Not updated (OS=4..9)
MAGENTA	NU	Not updated (OS=2)
MAGENTA	NS	Not sampled (OS=10)
MAGENTA	BL	Update blocked, internal
DARK BLUE	SI	Internal substitution
WHITE	***	Selected on monitor
WHITE, blinking	***	Selected, under command

*Suffix is not shown

**As default suffix is not shown

***No separate suffix. The suffix indicating the state before selection will remain.

1.2.3

Color definitions

The colors used in LIB 510 MV Process refers to the following System colors (M scope). The colors can be changed by using the Color Settings tool that is being opened from the System Configuration folder in the Tool Manager.

Color	Color definition
GREEN	Normal, dynamics ("M",32)
CYAN	Manually entered ("M",29)
YELLOW	Warning ("M",17)
BROWN	Control blocked ("M",28)
RED	Alarm ("M",16)
MAGENTA	Not updated ("M",30)
DARK BLUE	Substituted ("M",38)
WHITE	Selected object ("M",27)
BLACK	Foreground, normal ("M",14)

1.2.4 Switching devices status indication

Different colors and symbols are used to indicate the status of the objects.

Circuit breaker and disconnector

The symbols below are the symbols that are used as standard symbols. The symbols to the left are for circuit breakers and the ones to the right for disconnectors.





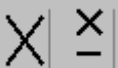


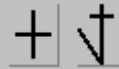
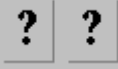
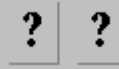
Symbols		State
Circuit breaker	Disconnecter	
		close
		open
		intermediate position (0,0)
		faulty position (1,1)
		not sampled

Figure 2. Examples of the different symbols for circuit breaker and disconnector

1.2.5 Selection

Selectable objects are highlighted according to motif standard. There are no “hidden” functions.

Please note that selectable is not equal to controllable. Clicking on a selectable object will bring up the main dialog from which other actions can be initiated. By default only one object can be selected per MicroSCADA screen; selecting another object will cancel the previous selection.

1.3 Controlling Switching Devices

1.3.1 Main Control Dialog, Circuit Breaker

The circuit breaker main control dialog is aimed for monitoring and controlling the circuit breaker.

Functionality

Operations can be made if the circuit breaker is motorised (i.e. remotely controllable), the operators authorisation level is Control (1) or higher, the circuit breaker state allows controls, and if there are no active blockings. If operations are allowed, the button Open breaker or Close breaker will respectively be active.

The main control dialog shows messages of the circuit breaker status on the information bar. Only the most important message is shown, but all active messages can be seen in the Object messages dialog by selecting it under the More... button. Active messages can be seen in the Object messages dialog and more detailed explanations of their meaning can be found in Help.

When the option Open breaker or Close breaker is selected, the selection command is sent to the control unit. Before the operation is carried out, the user has to verify the operation in the confirmation dialog. In case there are errors e.g. in the communication, a SCIL status code is shown. The actual meaning of the code can be found in the Status Codes Manual (1MRS751251-MEN).

If the circuit breaker objects are not connected to the process, the dialog simulates the actual operation within database.

Other supported features are accessible by the More... button. Help on each subdialog is found by clicking the sub-dialogs Help button.

Figure 3 presents the main control dialog for circuit breaker which is opened from the picture function.

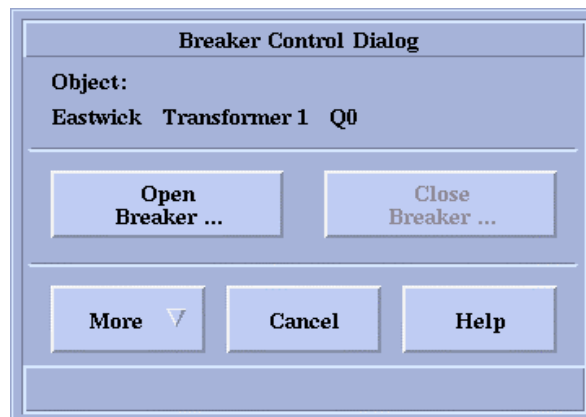


Figure 3. The main control dialog for the circuit breaker

The object identification text (OI) of the selected circuit breaker is shown on the upper part of the dialog.

Table 1 The dialog buttons have the following functionality:

Button	Functionality
Open breaker	When the circuit breaker is connected to the process, this button sends an open selection command to the control unit and the control action acknowledgement will be displayed, see Figure 4. If there is no connection to the process, this dialog simulates the control selection.
Close breaker	When the circuit breaker is connected to the process, this button sends a close selection command to the control unit and the control action acknowledgement dialog will be displayed, see Figure 4. If there is no connection to the process, this dialog simulates the control selection.
More	Opens a selection list of the circuit breaker sub-functionality.
Cancel	Closes the dialog and its sub-dialogs.
Help	Opens the help dialog.

Control Confirmation Dialog

Figure 4 presents the control confirmation dialog which is opened from the main control dialog of the circuit breaker. The function of this dialog is to confirm the selected action before executing it i.e. performing the second step of the secured control.

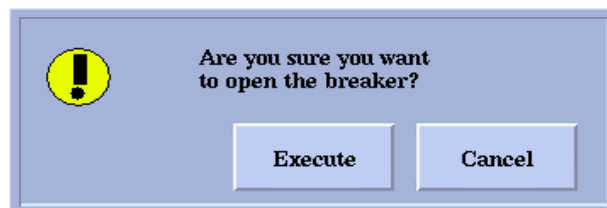


Figure 4. Circuit breaker control confirmation dialog

On the basis of the question in the dialog it is possible to verify that the right action is to be executed.

Table 2 The dialog buttons have the following functionality:

Button	Functionality
Execute	Executes the selected command. In case of a simulated process, the change in the database is simulated.
Cancel	Deselects the object and closes the dialog.

1.4 Common functions

This chapter gives a description of the functions that are common to most of the standard functions in the MV Process software package. The functions that are individual or available for only a few standard functions within the MV Process are described in connection to the corresponding standard function. In this common function section, the switching device will be used as an example function, but the principle is the same for all MV Process standard functions.

1.4.1 Alarm state dialog

The alarm state dialog can be opened by selecting Alarm state... which can be found by clicking the More button in the main control dialog.

The dialog presents all persisting or fleeting alarms for the device, bay or substation depending on the selected standard function, and the unacknowledged alarms can be acknowledged.

Functionality

The persisting and fleeting alarms can be seen in a combo-box. If there are no alarms, the combo-box does not contain any text. In case there is one alarm, the object identifier is shown in the combo-box. If there are more than one alarm, the text Acknowledge all is shown in the combo-box by default. In that case all existing alarms can be viewed by scrolling the combo-box up and down.

The currently selected alarm can be acknowledged by pressing the Acknowledge alarm button. The button is active, if an unacknowledged alarm is present and the authorization level of the operator is Control (1) or higher.

Figure 2 presents the switching device alarm state dialog.

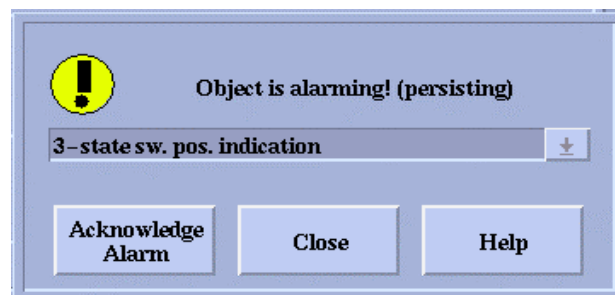


Figure 5. Switching device alarm state dialog (FPU_SSWD.PIC)

The alarm state of the selected process object is shown on the upper part of the dialog. The buttons have the following functionality:

Button	Functionality
Acknowledge Alarm	Sets the alarm receipt status to acknowledged.
Close	Closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWD.HLP.

1.4.2

Blockings dialog

The blocking dialog can be opened by selecting Blockings... which can be found by clicking the More button in the main control dialog.

Depending on the selected standard function, the blockings dialog is used for making the following blockings within the selected device, bay or substation in MicroSCADA/SCS database:

Blocking	Function
Update	The indications are not updated from the process.
Control	Operation commands are not sent to the process.
Alarm	Alarms are not activated, regardless of the object state.
Event	Event registrations are not made. The events are not shown in event list.
Printout	Events are not sent to the printer.
Reprocessing	Event channel activation is blocked, i.e. no event driven execution of tasks has been performed.

Functionality

The current blocking state for the selected switching device can be seen in the position of the toggle buttons (a down pressed button means that the selection in question is active).

There are three cases where both toggle buttons for blocking can be unset.

- There is a discrepancy in the database, i.e. some process object(s) are blocked but not all.
- It is not possible to perform the blocking. This results from the signal settings, e.g. the printer is not defined for the signal(s). In this case the text identifying the blocking is written in grey color.
- There are no signals found to be blocked/deblocked. The reason may be that no process database is created for the object or there is a configuration error. This situation is also indicated by an information message.

Operations can be made, if the authorization level of the operator is Control (1) or higher. The user can set the wanted blocking state with the help of the toggle buttons. When OK is selected, the actual blockings are made and the dialog is closed. If Cancel is selected, the blocking selections are ignored and the dialog is closed.

Figure 3 presents the switching device blocking dialog.

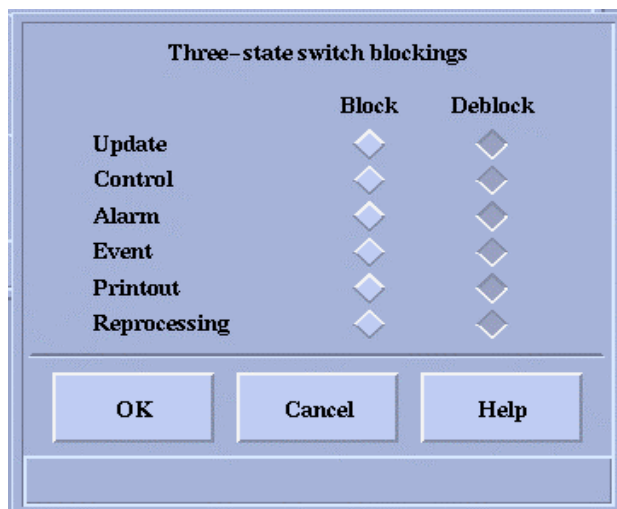


Figure 6. Switching device blocking dialog (FPU_SSWF.PIC)

Table 3 The buttons have the following functionality:

Button	Functionality
Toggle buttons	Set/reset the corresponding blocking. When the dialog is opened, these buttons are set to indicate the current blocking state of the switching device. In case of not motorized switching device, the Control blocking toggle buttons are set insensitive. If there is discrepancy in the database (i.e. some process objects have different blocking state compared to others), neither block nor deblock is set.
OK	Sets the selected blockings to the database and closes the dialog.
Cancel	Discards all changes made and closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWF.HLP.

1.4.3

Object messages dialog

The object messages dialog is opened by selecting Object messages... which can be found by clicking the More button in the main dialog.

An overall picture of the standard function state can be seen in the dialog. The dialog shows information messages active at the moment the dialog is opened. The most important active message is also shown in the information bar of the main dialog.

Functionality

A new "snapshot" can be taken by pressing Refresh. The dialog can be closed by pressing Close. If messages do not fit into one view, they can be viewed with the scrollbar.

Information messages

The object messages are listed under the corresponding Object messages section in each MV Process standard function.

Figure 4 presents the switching device object messages dialog.

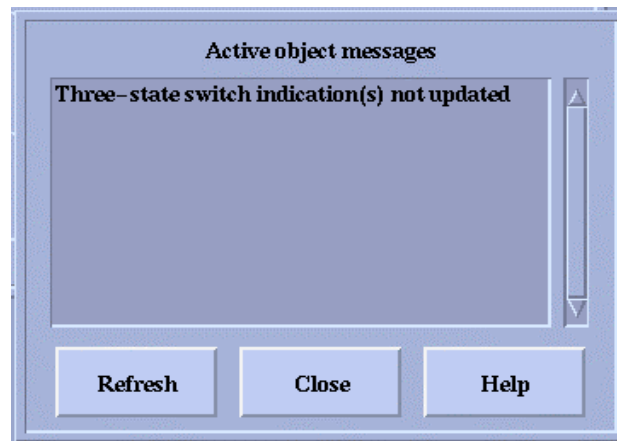


Figure 7. Switching device object messages dialog (FPU_SSWJ.PIC)

Table 4 The buttons have the following functionality:

Button	Functionality
Refresh	Takes a "snapshot" of the current object state.
Close	Closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWJ.HLP.

1.4.4

Normal state settings dialog

The normal state settings dialog can be opened by selecting State settings... which can be found by clicking the More button in the main control dialog.

The normal value has a meaning only, if all spontaneous object state changes are defined to activate an alarm (when the LA attribute value of the indication object is 15).

The value of the normal state is checked at system start-up. If the state of an object at start-up is not equal to the normal state, an alarm is activated. If a normal state is not defined, no alarm is activated at start-up regardless of the object state.

Functionality

Operations can be made, if the authorization level of the operator is Control (1) or higher. The normal state can be selected by choosing the correct alternative from the list. Selection can be saved by pressing OK and cancelled by pressing Cancel.

Figure 5 presents the switching device normal state settings dialog.

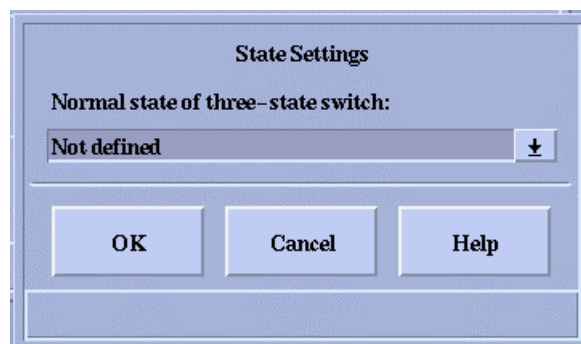


Figure 8. Switching device normal state settings dialog (FPU_SSWG.PIC)

Table 5 The buttons have the following functionality:

Button	Functionality
Selector	Selects the normal state of the switching device. When the dialog is opened, the selector shows the current normal state.
OK	Sets the selected normal state to the database and closes the dialog.
Cancel	Closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWG.HLP.

1.4.5 Operation countings dialog

The operation countings dialog can be opened by selecting Operation countings... which can be found by clicking the More button in the main control dialog.

The operation countings counts the number of switch state changes. The counter is increased with one every time the switch is closed or earthed (which means that the indication object in MicroSCADA database receives value 1).

Functionality

Operations can be made, if the authorization level of the operator is Control (1) or higher. The counting is set in use with the Counter in use button. The current counter value is shown in the Counter value field. The counter limit can be edited in the Counter limit field. Settings can be saved by pressing OK. The counter can be reset by pressing Reset Counter.

Figure 6 presents the switching device operation countings dialog.

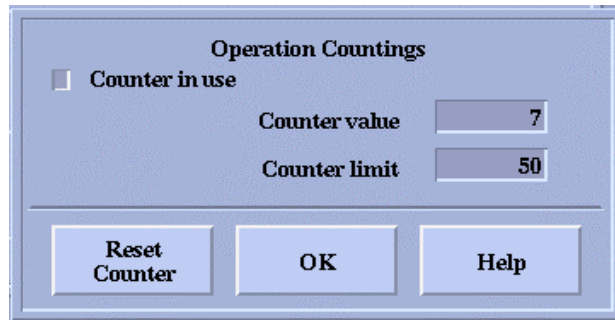


Figure 9. Switching device operation countings dialog (FPU_SSWI.PIC)

Table 6 The buttons have the following functionality:

Button	Functionality
Toggle button Counter in use	Activate/Deactivate operation counting. When the dialog is opened, the toggle button shows the current state of operation countings.
Reset Counter	Resets the counter value to zero.
OK	Sets the selected state of operation countings to the database and closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWI.HLP.

1.4.6

Position simulation dialog

The position simulation dialog can be opened by selecting Simulation... which can be found by clicking the More button in the main control dialog.

During some communication problems or field device failure, the position of the switch is not automatically known by the system. This dialog has been designed for operators to maintain the consistency of the database in case of an abnormal situation.

Functionality

Operation mode

The current operation mode can be seen in the position of the Simulation toggle buttons (a down pressed button means that the selection in question is active). Simulation ON means that the position indication is not connected to the process and therefore, it has to be updated manually by the operator. Simulation OFF means that position indication is connected to the process and it is updated automatically by the system. In case of neither ON nor OFF has been pressed down, the position indication has been set out of use (a special switch state setting done by the system engineer).

The operation mode can be changed, if the authorization level of the operator is Engineering (2) or higher. The user can set the wanted operation mode with the help of the toggle buttons. When the OK button is selected, the actual setting for the operation mode is made and the dialog is closed. If Cancel is selected, all selections within the dialog, including operation mode selections, are ignored and the dialog is closed.

If the position indication does not have any interface to the process, i.e. no station number or address, simulation cannot be set OFF.

Position setting

The current position of the switch can be seen in the Position toggle buttons. In case of none of the toggle buttons has been pressed down, the position indication is somehow not acceptable or it is not updated, i.e. it is not sampled.

The position of the switch can be changed, if the simulation is ON and the operator's authorization level is Operation (1) or higher. The user can set the wanted position with the help of the toggle buttons. When the OK button is selected, the actual setting for the position is made and the dialog is closed. If Cancel is selected, all selections within the dialog, including position settings, are ignored and the dialog is closed.

If simulation is not ON, the toggle buttons for the position settings have been dimmed.

Figure 7 presents the switching device position simulation dialog.

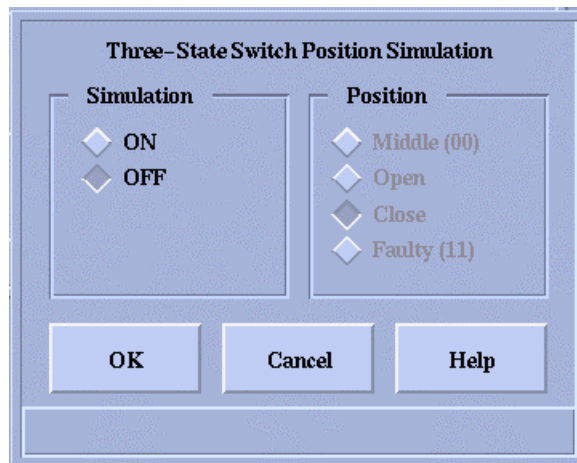


Figure 10. Switching device position simulation dialog (FPU_SSWK.PIC)

Table 7 The buttons have the following functionality:

Button	Functionality
Toggle buttons for simulation setting	Shows the current operation mode of simulation and can be used to set the position simulation ON or OFF. If there is no process interface defined in the database, the simulation cannot be set in OFF mode.
Toggle buttons for position setting	Shows the current position of the switch and can be used to set the wanted position if the simulation mode is ON.
OK	Sets the selected state of position simulation to the database and closes the dialog.
Cancel	Discards all changes made and closes the dialog.
Help	Opens the general LIB 510 help dialog with the help text file FPU_SSWK.HLP.