

Relion[®] 650 series Circuit breaker control

Application note

This application note will provide configuration example of circuit breaker control. The circuit breaker control shall be used where CB manoeuvres are required. The typical connection between functions will be recommended in this application note. For complete details refer to the respective technical manual and application manual.



This configuration example can be imported from the DVD and will cover REB650, REG650, REL650, REQ650 and RET650 IEDs in the Relion[®] 650 series product family.

1 Import and Insert the Application Template

- In order to import the application template perform the following steps:
- In PCM600 open the application configuration
- In File→ ACT Template Manager→ Import MainApplication Template From the(refer to the place where the CBC.xte or main application template is saved) import the CBC.xte file

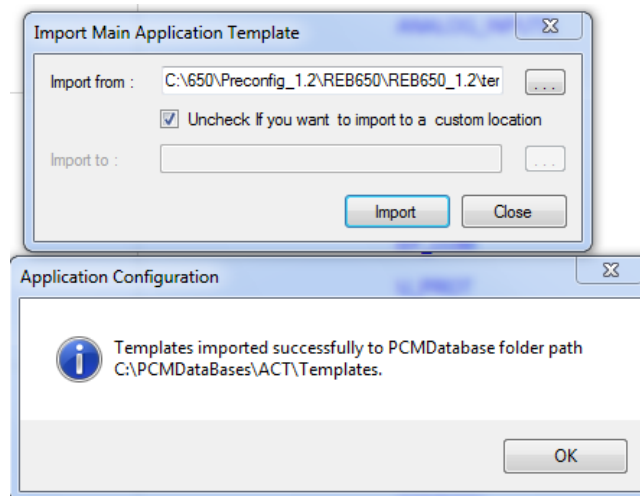


Figure 1 Import CBC main application template

- The template file will be saved in C:\PCMDatabases\ACT\Templates
- In PCM, File→ ACT Template Manager→ Insert MainApplication Template Application configuration
- In the "path" insert the place, where CBC.pcm file is saved
- Select CBC and insert it to the configuration, see figure 2
- Figure 3 and figure 4 will be added to the application configuration

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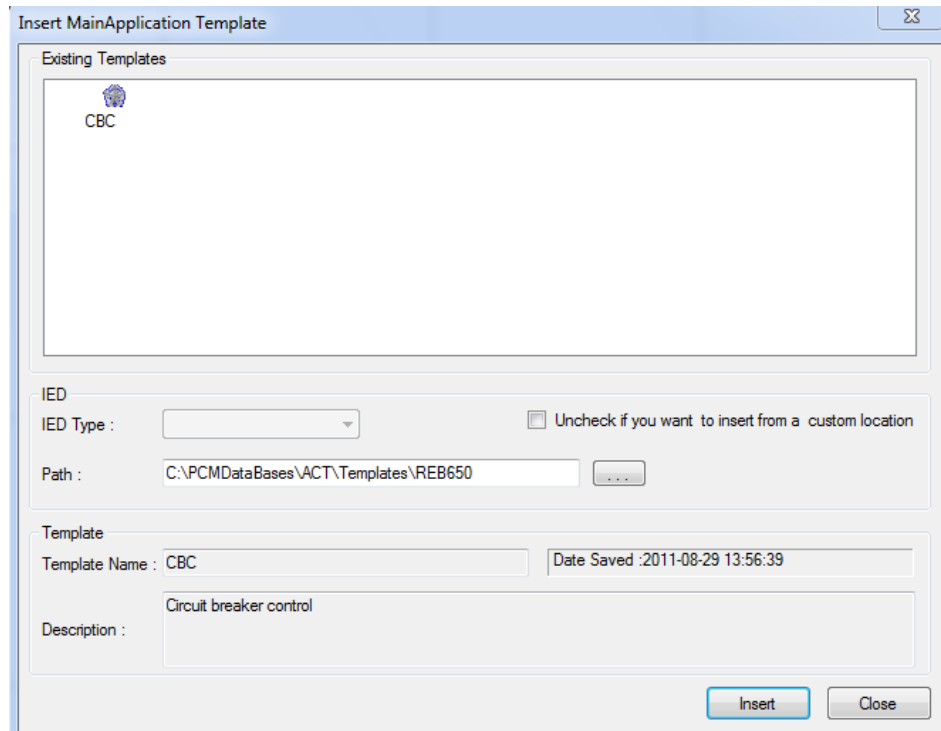


Figure 2 Insert CBC main application template

2 Application configuration

The number of function instances in the respective product families depending on the number of CB, are as follow:

Function	CBC1	CBC2	CBC3	CBC4
LOCREM	1	1	1	1
LOCREMCTRL	1	1	1	1
QCBAY	1	1	1	1
SCILO	1	2	3	4
SCSWI	1	2	3	4
SXCBR	1	2	3	4

Table 1 Number of function instances available for Circuit Breaker Control

Figure 3 shows the bay remote switch which is common for all CBC packages. Figure 4 shows a part for one circuit breaker application. For applications with more than one circuit breaker (CBC2, CBC3, CBC4), copy this part per circuit breaker in application.

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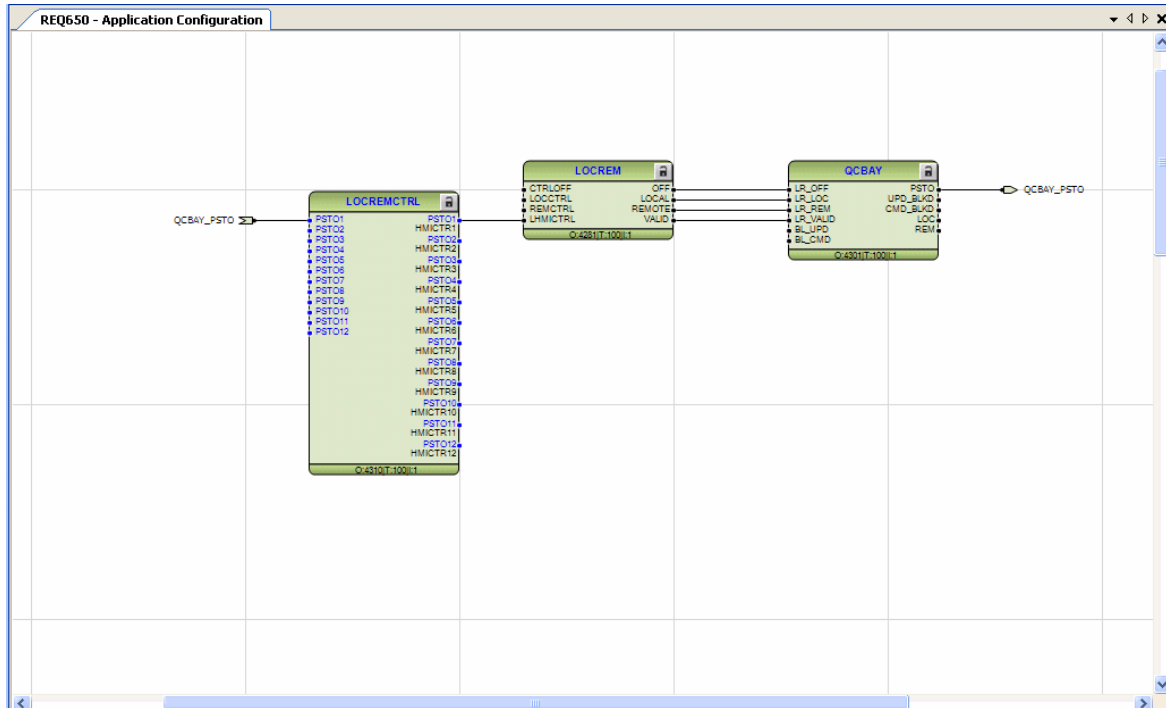


Figure 3 Bay local remote switch

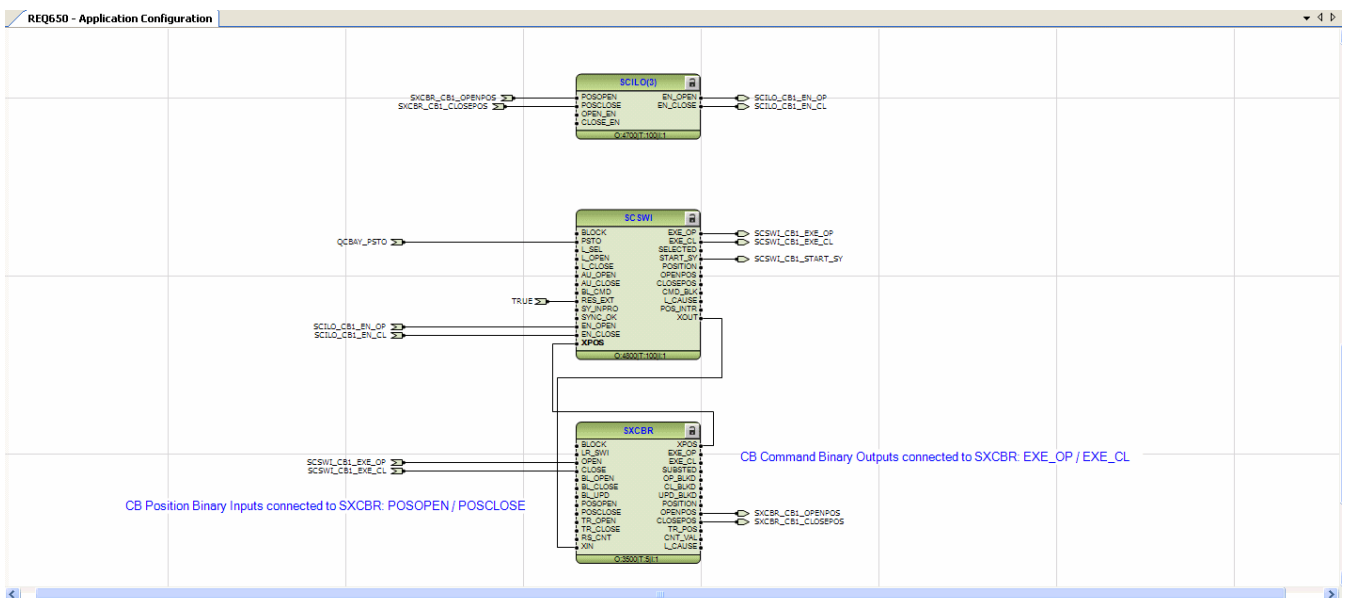


Figure 4 CBC Application configuration

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2.1 Binary input and output connection in QCBAY function block

Table 2 shows the bay local remote switch connection alternatives.

FROM	TO
Function name Output	Function name Input
QCBAY PSTO	LOCREMCTRL PSTO
LOCREMCTRL PSTO	LOCREM HMICTRL
Binary Input	LOCREM LOCCTRL
Binary Input	LOCREM REMCTRL
LOCREM OFF	QCBAY LR_OFF
LOCREM LOCAL	QCBAY LR_LOC
LOCREM REMOTE	QCBAY LR_REM
LOCREM VALID	QCBAY LR_VALID
QCBAY PSTO	SCSWI PSTO
QCBAY UPD_BLK	SXCBR BL_UPD
QCBAY CMD_BLKD	SCSWI BL_CMD

Table 2 Binary connection for Bay Local Remote Switch

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2.2 Binary input and output connection in SCILO function block

The number of Interlocking function block will vary depending on the number of circuit breakers used in the configuration. Figure 5 shows the inputs and outputs defined in the function and Table 2 shows the binary connection alternatives in this function.

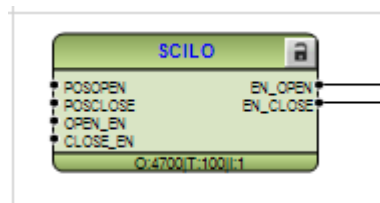


Figure 5 SCILO, interlocking function block

The open and close position, POSOPEN/POSCLOSE in Interlocking function block can be received from circuit breaker (SXCBR).

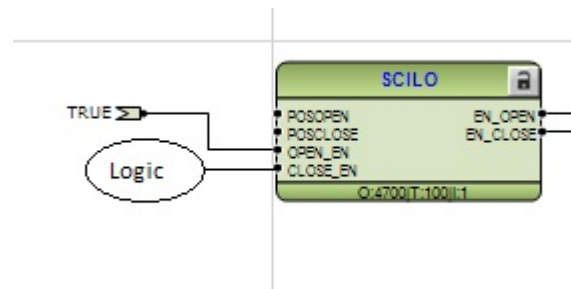


Figure 6 Enable open/close in Interlock function block

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SCILO	Connected to
Inputs	(Function name)
POSOPEN	SXCBR OPENPOS
POSCLOSE	SXCBR CLOSEPOS
OPEN_EN	Normally TRUE
CLOSE_EN	Interlocking logic: This can be built with simple logic blocks with AND/OR from local signals or external signals from other IEDs via GOOSE
Outputs	
EN_OPEN	SCSWI EN_OPEN
EN_CLOSE	SCSWI EN_CLOSE

Table 3 SCILO binary connections

Enabled open or close position outputs will be connected to switch controller, SCSWI, as figure 4 shows.

2.3 Binary input and output connection in SCSWI function block

The number of switch controller function block will vary depending on the number of circuit breakers used in configuration. Figure 7 shows the inputs and outputs defined in the function and Table 4 shows the binary connection alternatives in switch controller. In this section input and output connections that are necessary for the circuit breaker control configuration will be described.

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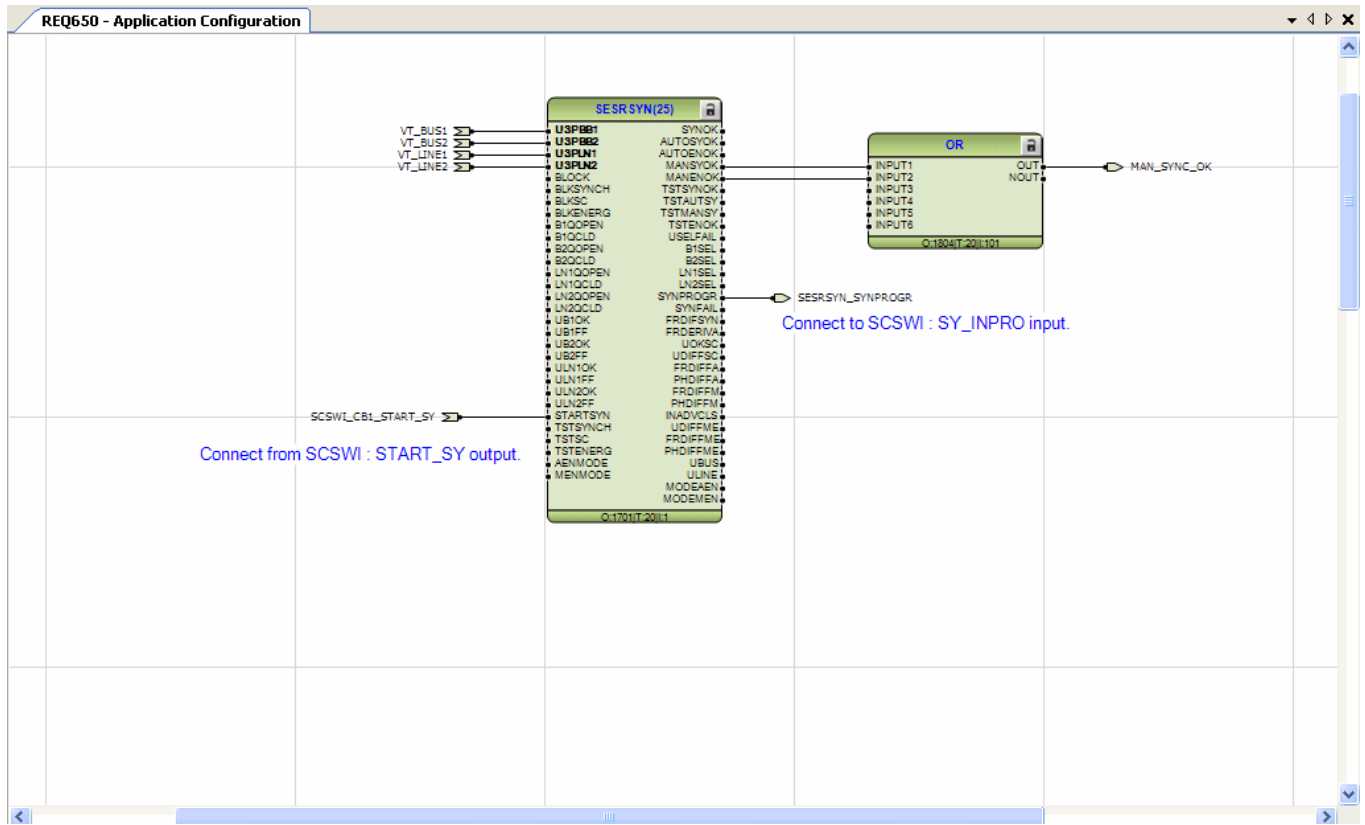


Figure 7 SCSWI, switch controller function block

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SCSWI	Connected to	
Inputs	Function name	
BLOCK		
PSTO	QCBAY PSTO	
L_SEL	Binary input	
L_OPEN	Binary input	
L_CLOSE	Binary input	
AU_OPEN		
AU_CLOSE		
BL_CMD		
RES_EXT	SELECTED from other apparatus locally or via GOOSE	
SY_INPRO	SESRSYN	SYNPROGR
SYNC_OK	SESRSYN	SYNOK
EN_OPEN	SCILO	EN_OPEN
EN_CLOSE	SCILO	EN_CLOSE
XPOS	SXCBR	XPOS
Outputs		
EXE_OP	SXCBR	OPEN
EXE_CL	SXCBR	CLOSE
SELECTED	SELGGIO SELECTED from other apparatus locally or via GOOSE	
START_SY	SESRSYN	STARTSYN
POSITION		
OPENPOS		
CLOSEPOS		
CMD_BLK		
L_CAUSE		
POS_INTR		
XOUT	SXCBR	XIN

Table 4 Binary connections for SCSWI

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The operator place allocation from bay control function block, QCBAY, shall be connected to PSTO in switch controller. Application configurations with Synchrocheck function shall connect the MANSYOK/MANENOK from synchrocheck to the input in Switch controller. In applications where synchronizing is used, the synchronizing is started by connecting START_SY from Switch Controller to the STARTSYN in the Synchrocheck function. The output SYNOK is connected to the Circuit Breaker SXCBR as shown in figure 9. When internal Synchrocheck is not configured / available, an external Synchrocheck can be configured via binary inputs and outputs.

The execute command for open or close direction from switch controller will be sent to circuit breakers, SXCBR, OPEN or CLOSE inputs.

The execution information XOUT will be sent to circuit breakers XIN input.

2.4 Binary input and output connection in SXCBR function block

The number of circuit breaker function block will vary depending on the number of circuit breakers used in configuration. Figure 8 shows the inputs and outputs defined in the function and Table 5 shows binary connection alternatives in the function. In this section input and output connections that are necessary for the circuit breaker control configuration will be described.

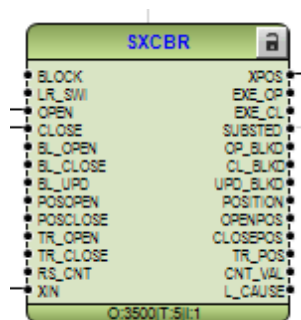


Figure 8 SXCBR, circuit breaker function block

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SXCBR	Connected to	
Inputs	Function name	
BLOCK		
LR_SWI	Binary input if used	
OPEN	SCSWI	EXE_OP
CLOSE	SCSWI	EXE_CL
BL_OPEN		
BL_CLOSE		
BL_UPD		
POSOPEN	Binary input	
POSCLOSE	Binary input	
TR_OPEN		
TR_CLOSE		
RS_CNT		
XIN	SCSWI	XOUT
Outputs		
XPOS	SCSWI	XPOS
EXE_OP	Binary output	
EXE_CL	Binary output	
SUBSTED		
OP_BLKD		
CL_BLKD		
UPD_BLKD		
POSITION		
OPENPOS	SCIO	POSOPEN
CLOSEPOS	SCIO	POSCLOSE
TR_POS		
CNT_VAL		
L_CAUSE		

Table 5 Binary connections in SXCBR

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The OPEN input that indicates action to open the circuit breaker will be received from switch controller, SCSWI (EXE_OP). Figure 3 shows the connection between blocks. The CLOSE input that indicates action to close the circuit breaker can be received from switch controller (EXE_CL) as figure 10 shows or it can be connected like figure 9. A logical OR between EXE_CL from SCSWI and SYNOK from SESRSYN and CLOSECB from autorecloser can be sent to circuit breaker.

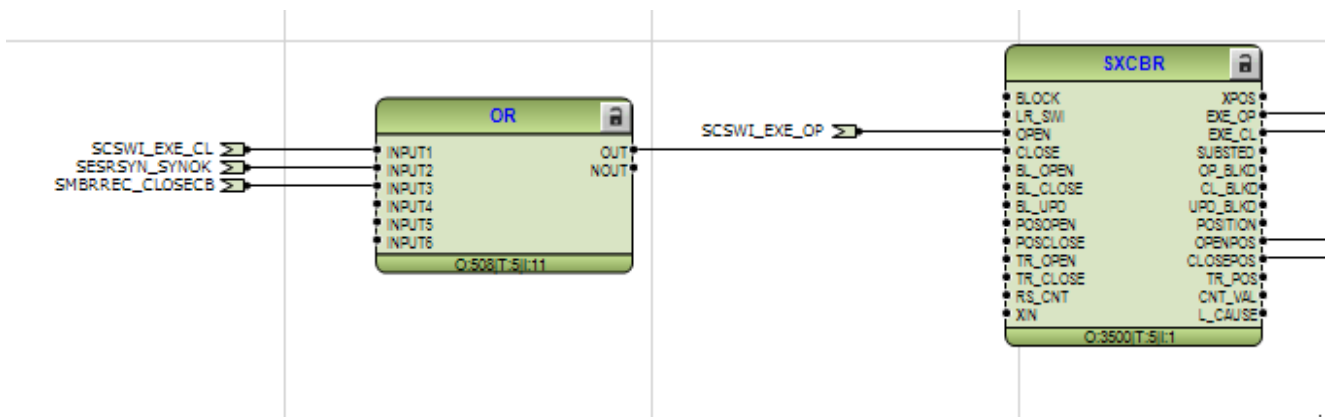


Figure 9 Connection of CLOSE input in circuit breaker function block, first alternative

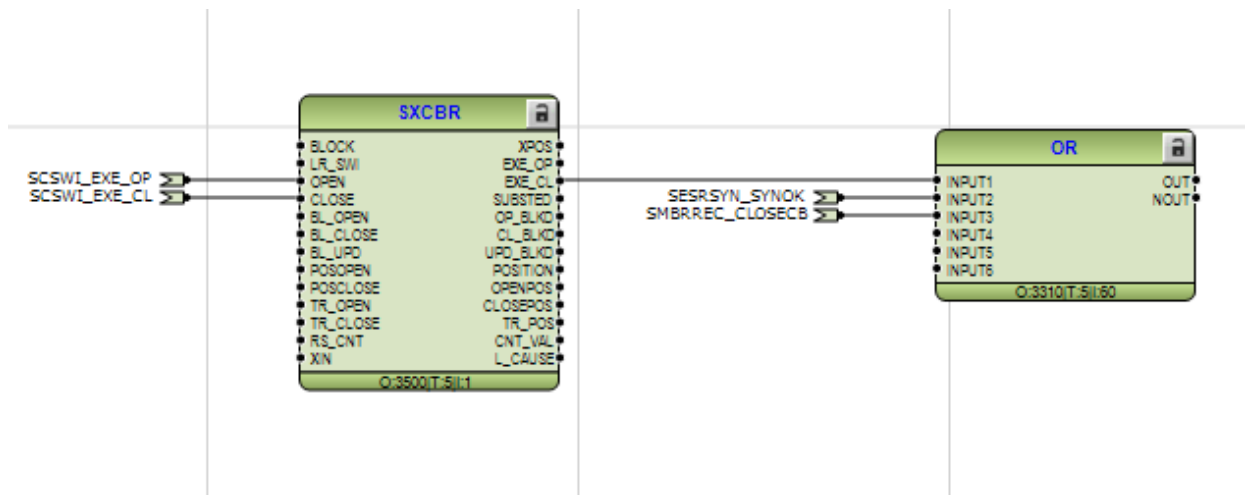


Figure 10 Connection of CLOSE input in circuit breaker function block, second alternative

To block the position updating in circuit breaker (BL_UPD), a signal can be received from the bay control (QCBAY) or a binary input can be connected to BL_UPD.

The execute command for open direction can be connected to a HW binary channel, as figure 10 shows.

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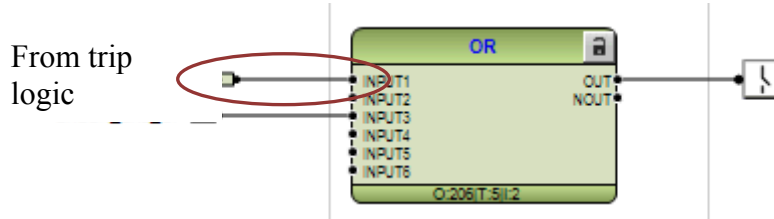


Figure 11 Configuration for executing of open direction in circuit breaker

2.5 Graphical Display Editor for circuit breaker control

The CB symbol can be added to graphical display editor for a circuit breaker, as figure 12 shows. It is then associated the respective SCSWI for indication and controls.

The details for the Local HMI engineering can be found in the “Engineering manual for 650 series” chapter “Local HMI engineering”

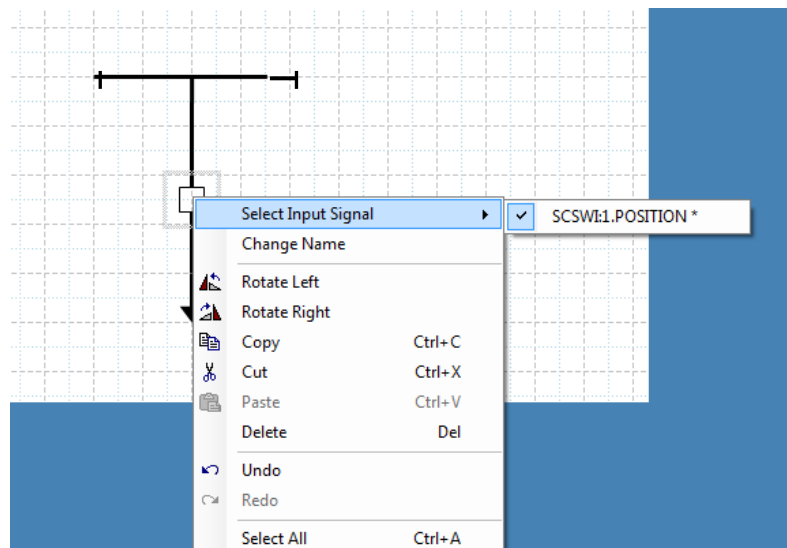


Figure 12 GDE for circuit breaker control