Functional Description Library BlockLib_Px_breaker.lib

The "BlockLib_Px_breaker.lib" library provides a universal function block for the 12V, 24V, and 48V circuit breakers of the PM and PC series, which can be used to select all information relevant to the operation as well as to switch individual outputs on or off.

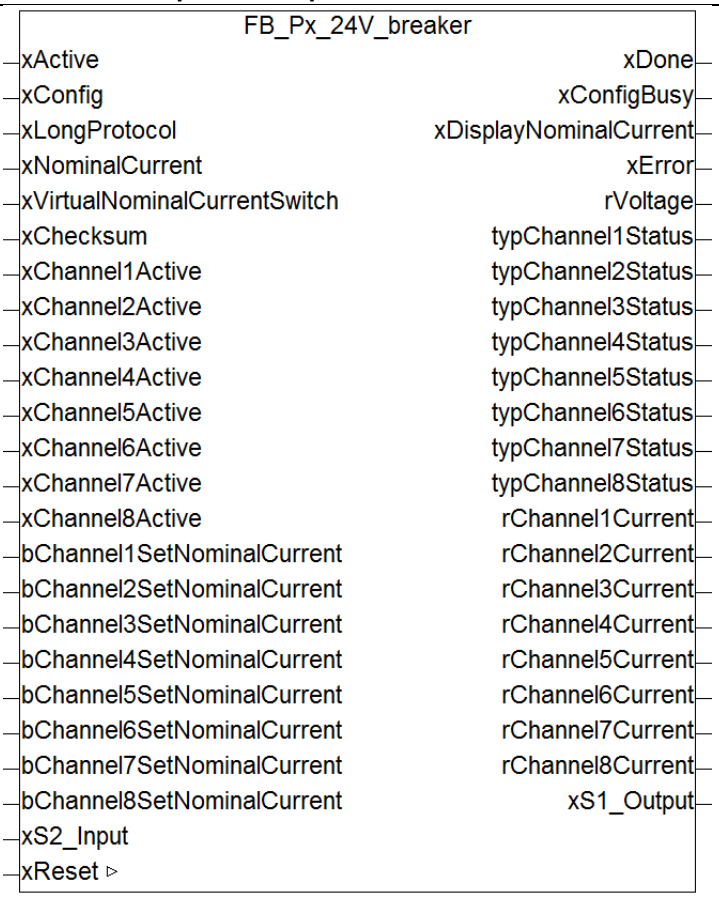
The following circuit breakers are supported by these function blocks:

Series	Order number	Function Block
ECONOMY SMART	PM-0712-200-0	FB_Px_12V_breaker
	PM-0712-400-0	
	PM-0748-200-0	FB_Px_48V_breaker
	PM-0748-400-0	
	PM-0748-400-0	
	PC-0748-800-0	
	PM-0724-120-0	FB_Px_24V_breaker
	PM-0724-200-0	
	PM-0724-240-0	
	PM-0724-400-0	
	PM-0724-400-1	
	PC-0724-800-0	
	PC-0724-800-1	
ECONOMY REMOTE	PM-3724-200-0	
	PM-3724-400-0	
	PC-3724-800-0	
BASIC SMART	PM-0824-120-0	
	PM-0824-120-1	
	PM-0824-240-0	
	PM-0824-240-1	
	PM-0824-240-2	
	PM-0824-480-0	
	PC-0824-480-0	
	PC-0824-480-1	
BASIC FIX	PM-2824-120-0	
	PM-2824-180-0	
	PM-2824-240-0	
	PM-9824-076-0	
	PM-9824-152-0	
BASIC LIGHT	PM-1824-120-0	
	PM-1824-240-0	
	PM-1824-240-2	
	PM-1824-480-0	
	PC-1824-480-0	

Block Description		
Name:	FB_Px_12V_breaker, FB_Px_24V_breaker, FB_Px_48V_breaker	
Type:	Function Block	
Name of Library:	BlockLib_Px_breaker.lib	
Applicable to:	All circuit breakers of the PM and PC series are equipped with a 2-wire interface via S1/S2	
Input Parameters:	**Data Type:**	**Description:**
xActive	BOOL	Activate block (true=active / false=not active)
xConfig	BOOL	Start configuration of the channels (configuration is initiated with a rising edge at xConfig)
xLongProtocol	BOOL	Activate long/short protocol (true=long/ false=short)
xNominalCurrent	BOOL	Read nominal current or actual current flow (true=nominal current / false=actual current)
xVirtualNominalCurrentSwitch	BOOL	Set nominal current setting by remotely (true=nominal current can be set / false=nominal current setting is disabled)
xChecksum	BOOL	Activate checksum function (true=active / false=not active)
xChannel1Active	BOOL	Turn on/off Channel 1 through 8
…	…	
xChannel8Active	BOOL	
bChannel1SetNominalCurrent … bChannel2SetNominalCurrent	REAL	The nominal current of each circuit breaker can be set individually in 6 stages: ***Economy Remote***: 0=2A, 1=3A, 2=4A, 3=6A, 4=8A, 5=10A ***Basic Light***: 0=1A, 1=2A, 2=3A, 3=4A, 4=5A, 5=6A
xS2_Input	BOOL	Digital Input: Circuit breaker data via S2
Input/Output Parameters:	**Data Type:**	**Description:**
xReset	BOOL	Reset errors and warnings on the circuit breaker

Output Parameters:	Data Type:	Description:
xDone	BOOL	Configuration has been performed
xConfigBusy	BOOL	Configuration is being performed
xDisplayNominalCurrent	BOOL	Shows whether the set nominal current or the actual flowing current is represented by the variables rChannel1Current through rChannel8Current (true=nominal current, false=actual current)
xError	BOOL	xError is set to true if either no stop bit is detected or the checksum does not match
rVoltage	REAL	Input voltage
typeChannel1Status … typeChannel8Status	typeChannelStatus	0: Channel active -> Active 1: Overload detected -> Warning 2: Triggered -> Tripped 3: Channel not active -> Not Active
rChannel1Current … rChannel8Current	REAL	Actual current value or set nominal current
xS1_Output	BOOL	Digital Output Signal: PLC data via S1

Graphic Description with a 24V Block



Task Configuration:

This block must be executed in a separate task with a constant call interval. The call interval may jitter within certain limits. The max. permissible jitter depending on the cycle time is specified in the respective manual.
The call interval can be between 70 and 200ms depending on the calculation time of the controller.

Function Description:

General

The connection to the circuit breaker is made via a ***xS2_Input*** digital input and a ***xS1_Output*** digital output.
This function block supports both the short protocol and the long protocol, which can be used to read the current values of each channel and the module input voltage.

Functions

The block is activated via the ***xActive*** input. After activation, information from the circuit breaker is recorded and displayed in a cycle the size of the call interval.

In order to control the channels on the circuit breaker or to set the nominal current, a rising edge must occur at the ***xConfig*** input. The ***xConfig*** variable must remain set to true until the ***xDone*** output reports the completion of the configuration process. While the configuration is being performed, ***xConfigBusy*** will remain set to *true*.
In order to configure the channels using the buttons on the device, either the block must be deactivated for this period via **xActive** or ***xConfig*** will not be activated.

The ***xLongProtocol*** input can be used to read further information from the circuit breaker. The long protocol makes it possible to read or write the following variables:
xVirtualNominalCurrentSwitch, ***bChannel1SetNominalCurrent*** through ***bChannel8SetNominalCurrent***, ***xDisplayNominalCurrent***, ***rVoltage***, ***rChannel1Current*** through ***rChannel8Current.***

The ***xNominalCurrent input*** can be used to inform the circuit breaker whether the actual flowing currents or the nominal currents should be selected (supported from FW > 2.1). The currents are selected via the variables ***rChannel1Current*** through ***rChannel8Current***. The variable ***xDisplayNominalCurrent*** can be used to determine whether it is the currently flowing currents or the set nominal currents.

With the variable ***xVirtualNominalCurrentSwitch*** it is possible to set the nominal current for all ***Economy Remote (thermomagnetic characteristic)*** and ***BasicLight (active current limitation)*** circuit breakers via the variables ***bChannel1SetNominalCurrent*** through ***bChannel8SetNominalCurrent***. The nominal current of each channel can be set individually in 6 stages:

Economy Remote:	**0=2A, 1=3A, 2=4A, 3=6A, 4=8A, 5=10A**
Basic Light:	**0=1A, 1=2A, 2=3A, 3=4A, 4=5A, 5=6A**

The function block additionally supports the checksum function with the variable ***xChecksum***. This function ensures that only error-free data transmissions are recorded and processed. If a faulty transfer is detected, the variable ***xError*** is set to *true*. Starting with the following versions, the circuit breakers support the checksum function:

Economy Smart	**FW ≥ 2.24**
Economy Remote	**FW ≥ 2.24**
Basic Smart	**FW ≥ 2.25**
Basic Light	**FW ≥ 2.25**
Basic Fix	**FW ≥ 2.25**

The channels can be switched on/off via the inputs ***xChannel1Active*** through ***xChannel8Active***. The configuration is started with the ***xConfig*** input.

The status of the channels can be monitored with the***typChannel1Status*** through ***typChannel8Status*** outputs. The following channel states exist: ***Active, Warning, Tripped*** and ***Not_Active***.