

Conditioned Circuit breaker failure trip

Application description:

The circuit breaker failure protection is applied to a double busbar system. Dependent on the isolator switch positions Q1 and Q2, the circuit breaker failure protection will trip different bus zones: either bus zone 1 or 2. The bus zone tripping can only be initiated if at least one isolator is closed.

The following signals are required in the input/output matrix

- 2 isolators (disconnectors) – information derived via binary input;
- 2 annunciations to initiate trip signals for the two busbars – output via binary outputs.

Information	No.	Display text:	L	Type	Source																Destination																					
					BI																BO																					
					3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	LE	Buf	S	C	E
P.System Data 1																																							*			
Osc. Fault Rec.																																						*	*			
P.System Data 2					*	*																										*						*	*			
50/51 Overcur.																																							*			
67 Direct. O/C																																							*			
Measur. Superv																																						*		*		
Fault Locator																																							*			
50BF BkrFailure	01403	>BLOCK 50BF		SP																																		X				
	01431	>50BF ext SRC		SP																																	X					
	01451	50BF OFF		OUT																																	X					
	01452	50BF BLOCK		OUT																																	X					
	01453	50BF ACTIVE		OUT																																	X					
	01456	50BF int Pickup		OUT																																	X					
	01457	50BF ext Pickup		OUT																																	X					
	01471	50BF TRIP		OUT																																	X	X				
	01480	50BF int TRIP		OUT																																		X				
	01481	50BF ext TRIP		OUT																																		X				
Ctrl Authority		Trip BZ1		SP																	X																					
		Trip BZ2		SP																	X																					
Control Device		52Breaker		CF_D12																		X	X	X													X	X	X			
		52Breaker		DP		X	X																														X	X	X			
		Disc.Swit.		CF_D2																									X	X						X	X	X				
		Disc.Swit.		DP		X	X																													X	X	X				
		GndSwit.		CF_D2																									X	X						X	X	X				
		GndSwit.		DP					X	X																										X	X	X				
		52 Open		IntSP																	X																					
		52 Close		IntSP																	X																					
		Disc.Open		IntSP																	X																					
		Disc.Close		IntSP																	X																					
		GndSw Open		IntSP																	X																					
		GndSw Cl.		IntSP																	X																					
		Block Data		IntSP																	X																					
		Q2 Op/Cl		CF_D2																																		X				
		Q2 Op/Cl		DP							X	X																										X	X			
	Q9 Op/Cl		CF_D2																																			X				
	Q9 Op/Cl		DP																																			X				
	Fan ON/OFF		CF_D2																																			X				

Picture 1: allocation information in the input/output matrix

One isolator is already defined in the default parameters (called disconnecter switch). The second isolator (Q2) has to be created by the user (see picture 1). The required information type in this example is command with feedback (CF_D2), i.e. the isolator can also be controlled via the RTU functionality of the device. If only the isolator status is required and not the control functionality, the information type DP (double point information) is sufficient.

	SOURCE	DESTINATION
1471 Brk Failure TRIP (50BF Trip)	coming from BF protection function	CFC chart
Trip BZ1 (user defined)	CFC chart	BO 7
Trip BZ2 (user defined)	CFC chart	BO 8

The two annunciations *Trip BZ1* and *Trip BZ2* (single point annunciations) to trip the two individual busbars have to be allocated to source CFC. Don't forget to connect the Breaker Failure annunciation *1471 50BF Trip* with destination CFC.

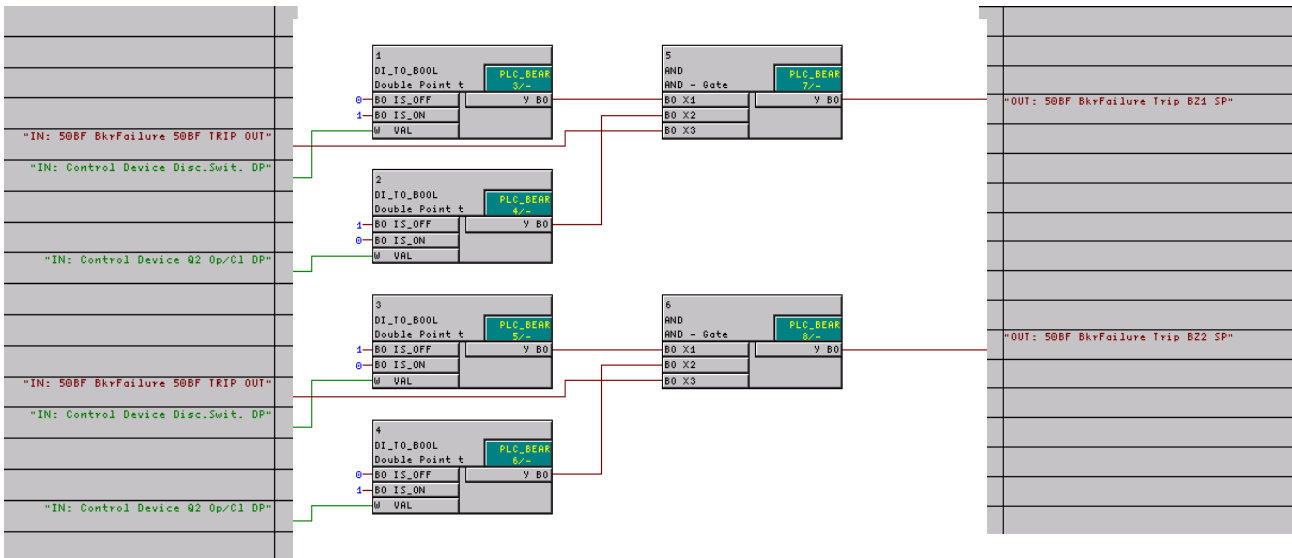
The CFC chart uses DI_TO_BOOL gates to obtain the isolator position status (Q1 and Q2). The DI_TO_BOOL gate is also explained in the module „Easy Interlocking“. The DI_TO_BOOL gate allows the decoding of the four possible states of a DP (double point) information with Boolean output, i.e. one implies that the DP state matches the decode bits set on the DI_TO_BOOL gate. Note the information inside the frame in picture 2 . The DI_TO_BOOL gate will only output (Y BO) a logic 1 when the DP information connected to its VAL input matches the decode inputs IS_ON and IS_OFF.

IS_ON	IS_OFF	VAL for DP	VAL for DP !	Y
0	0	Undefined	INTERM (intermediate position 00), undefined	1
0	0	OFF, ON, INTERM	OFF, ON, INTERM (intermediate position 11)	0
0	1	OFF	OFF	1
0	1	ON, INTERM, undefined	ON, INTERM (intermediate position 00), INTERM (intermediate position 11), undefined	0
1	0	ON	ON	1
1	0	OFF, INTERM, undefined	OFF, INTERM (intermediate position 00), INTERM (intermediate position 11), undefined	0
1	1	INTERM, undefined	INTERM (intermediate position 11)	1
1	1	OFF, ON	OFF, ON, INTERM (intermediate position 00), undefined	0

Picture 2: description of the DI_TO BOOL gate

Q1 must have the opposite state to Q2. Only when Q1 has position 1=on and Q2 has position 0=off, will a trip signal to bus zone 1 be released. The trip signal to bus zone 1 (Trip BZ1) will be issued when the annunciation 1471 50BF Trip occurs.

The same applies to bus zone 2. In this case Q1 must be 0=off and Q2 must be 1=on. As soon as the annunciation 1471 50BF Trip occurs, the bus zone 2 annunciation (Trip BZ2) will be issued (see picture 3).



Picture 3: CFC-chart