# Breaker Arc Detection Scheme in UR Relays

GE Publication No. GET-8404

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The conditions that prove an arc condition concerning a circuit breaker (flashover) are: open breaker and presence of current in any phase. The arc detector can easily be build in FlexLogic™. An overcurrent element (IOC) with a low setting will be used for current detection. As a substitute for IOC, three FlexElements™ can be used for current detection in all three phases.

The logic can be per phase discriminated or can use a single input from breaker auxiliary contacts to determine breaker status, when the breaker is three pole operated. The following example presents a single pole discriminated logic:
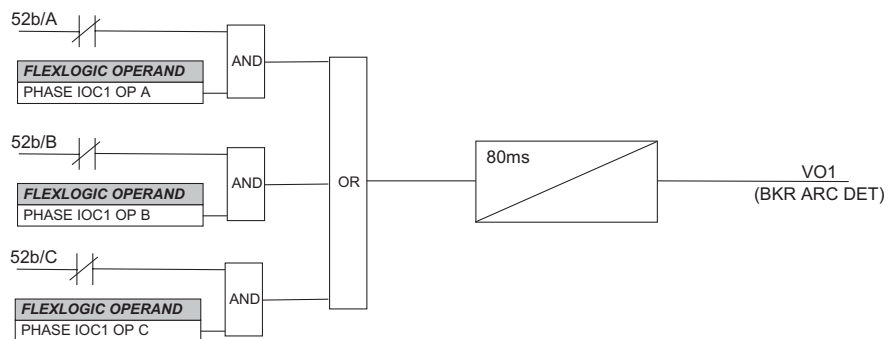
The timer should introduce a delay to avoid false signals due to a possible race between breaker auxiliary contacts operation and reset of the overcurrent elements. Virtual Output 1 can be used to send an alarm.

To implement the Breaker Arc Detection scheme in FlexLogic™, make the following settings changes:

PARAMETER	H7A	H7C	H8A	H8C
ID	52b/A	52b/B	52b/C	Cont Ip 4
Events	Disabled	Disabled	Disabled	Disabled

Test Rig | Settings: Inputs/Outputs

PARAMETER	TIMER 1
Type	millisecond
Pickup Delay	80
Dropout Delay	0

Test Rig | Settings: Flexlogic

PARAMETER	VIRTUAL OUTPUT 1
ID	BKR ARC DET
Events	Disabled

Test Rig | Settings: Inputs/Outputs

PARAMETER	PHASE IOC1
Function	Enabled
Source	SRC x (SRC 1)
Pickup	0.200 pu
Delay	0.00 s
Reset Delay	0.00 s
Block A	OFF
Block B	OFF
Block C	OFF
Target	Self-reset
Events	Disabled

The FlexLogic™ implementation is shown below:

1	52B/A ON(H7A)
2	PHASE IOC1 OP A
3	AND(2)
4	52B/B ON(H7C)
5	PHASE IOC1 OP B
6	AND(2)
7	52B/C ON(H8A)
8	PHASE IOC1 OP C
9	AND(2)
10	OR(3)
11	TIMER 1
12	= BKR ARC DET (VO1)
13	END