

Attachment A.1

Note : The automated recloser is denoted as MCR (Mid-Circuit Recloser)

Scheme 1 - Automated recloser near mid-point

Note : The automated recloser is denoted as MCR (Mid-Circuit Recloser)

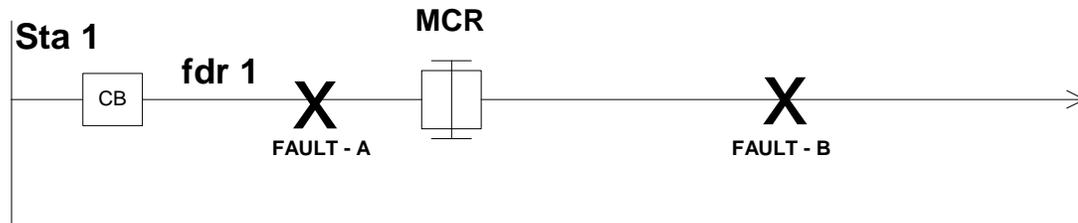


Figure 1 - Single MCR Scheme

Configuration:

- Circuit Breaker (or Power Recloser) at Station 1 for Feeder 1.
- Normally Closed Mid-Circuit Recloser on Feeder 1.

Operation: MCR Only Scheme.

- Sta1 CB trips for faults upstream of the MCR (Fault – A) or upon failure of MCR to trip for faults downstream of the MCR (Fault – B)
- MCR trips for faults downstream of the MCR (Fault – B) only

Operation Sequence:

For a fault at location A		For a fault at location B	
Time	Action	Time	Action
0s	CB Trip	0s	CB remains closed
2s	CB reclose	0s	MCR trips
30s	CB reclose	2s	MCR reclose
30+s	CB trip/lockout	2+s	MCR trips
		30s	MCR reclose
		30+s	MCR trip/lockout

Note: If the fault clears during the device reclose sequence, then the device, CB or MCR, remains closed.

Attachment A.2

Note : The automated recloser is denoted as MCR (Mid-Circuit Recloser)

Scheme 2 - Automated recloser near mid-point plus tie recloser (Half Loop)

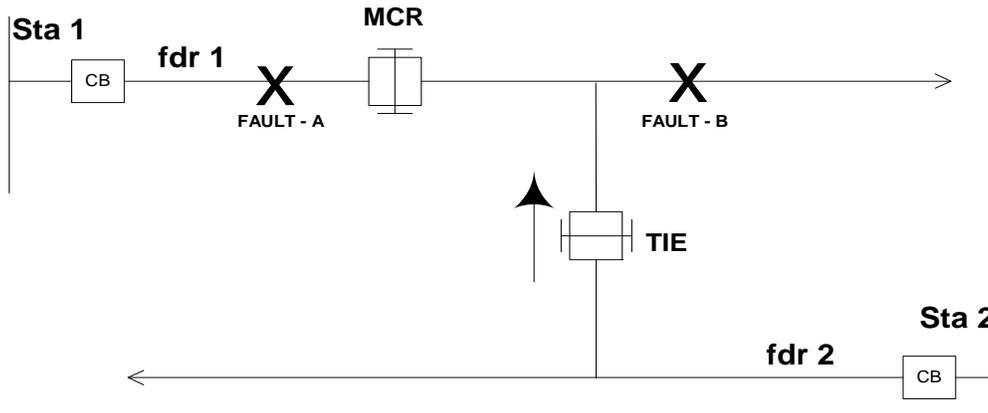


Figure 2- Half Loop Scheme

Configuration:

- Circuit Breaker (or Power Recloser) at Station 1 for Feeder 1.
- Normally Closed Mid-Circuit Recloser on Feeder 1.
- Normally Open Tie Recloser between Feeder 1 and Feeder 2.

Operation: Half Loop Scheme.

- Sta1 CB trips for faults upstream of the MCR (Fault – A) or upon failure of MCR to trip for faults downstream of the MCR (Fault – B)
- MCR trips for faults downstream of the MCR (Fault – B) only
- MCR opens after a time delay for a loss of voltage on Fdr 1.
- Tie device will close after a time delay on the loss of voltage on **Fdr1 only**.

Operation Sequence:

For a fault at location A		For a fault at location B	
Time	Action	Time	Action
0s	CB Trip	0s	CB remains closed
2s	CB reclose	0s	MCR trips
30s	CB reclose	2s	MCR reclose
30+s	CB trip/lockout	2+s	MCR trips
45s	MCR open	30s	MCR reclose
60s	TIE closes	30+s	MCR trip/lockout
		60s	TIE closes
		60+s	TIE trip/lockout

Note: If the fault clears during the device reclose sequence, then the device, CB, MCR or TIE, remains closed.

Attachment A.3

Note : The automated recloser is denoted as MCR (Mid-Circuit Recloser)

Scheme 3 - Automated recloser near mid-point on 2 lines plus tie recloser (Full loop)

Operation Sequence:

FULL LOOP SCHEME

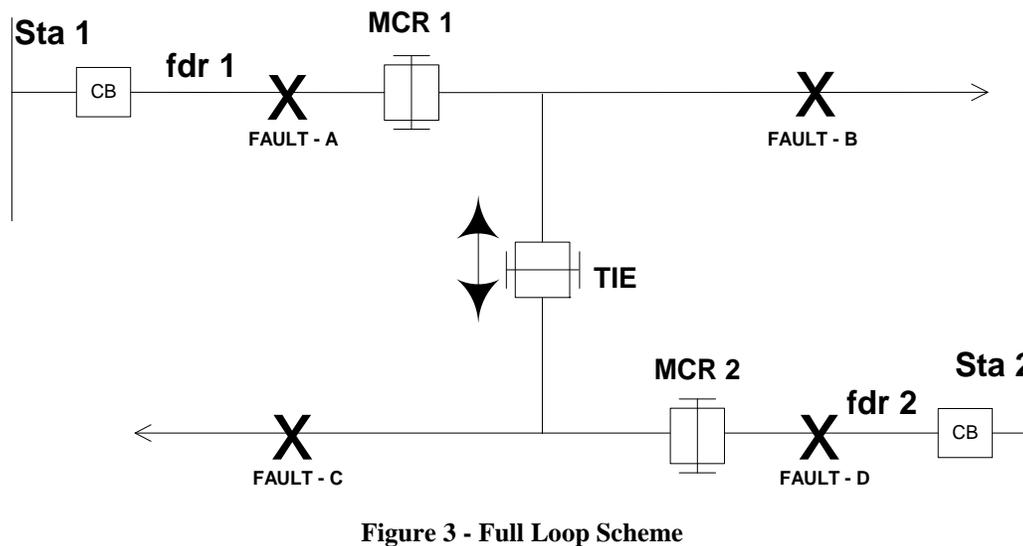


Figure 3 - Full Loop Scheme

Configuration:

- Circuit Breaker (or Power Recloser) at Station 1 for Feeder 1.
- Normally Closed Mid-Circuit Recloser on Feeder 1.
- Normally Open Tie Recloser between Feeder 1 and Feeder 2.
- Normally Closed Mid-Circuit Recloser on Feeder 2.
- Circuit Breaker (or Power Recloser) at Station 2 for Feeder 2.

Operation: Full Loop Scheme.

- Sta1 CB trips for faults upstream of the MCR1 (Fault – A) or upon failure of MCR1 to trip for faults downstream of the MCR1 (Fault – B)
- MCR1 trips for faults downstream of the MCR1 (Fault – B) only
- MCR1 opens after a time delay for a loss of voltage on Fdr 1.
- MCR2 trips for faults downstream of the MCR2 (Fault – C) only
- MCR2 opens after a time delay for a loss of voltage on Fdr 2.
- Sta2 CB trips for faults upstream of the MCR2 (Fault – D) or upon failure of MCR2 to trip for faults downstream of the MCR2 (Fault – C)

- Tie device will close after a time delay on the loss of voltage of either Fdr1 or Fdr2.

FULL LOOP SCHEME cont'd

Operation Sequence:

For a fault at location A		For a fault at location D	
Time	Action	Time	Action
0s	CB1 Trip	0s	CB2 Trip
2s	CB1 reclose	2s	CB2 reclose
30s	CB1 reclose	30s	CB2 reclose
30+s	CB1 trip/lockout	30+s	CB2 trip/lockout
45s	MCR1 open	45s	MCR2 open
60s	TIE closes	60s	TIE closes
Note: If the fault clears during the device reclose sequence, then the device, CB, MCR or TIE, remains closed.			

For a fault at location B		For a fault at location C	
Time	Action	Time	Action
0s	CB1 remains closed	0s	CB2 remains closed
0s	MCR1 trips	0s	MCR2 trips
2s	MCR1 reclose	2s	MCR2 reclose
2+s	MCR1 trips	2+s	MCR2 trips
30s	MCR1 reclose	30s	MCR2 reclose
30+s	MCR1 trip/lockout	30+s	MCR2 trip/lockout
60s	TIE closes	60s	TIE closes
60+s	TIE trip/lockout	60+s	TIE trip/lockout
Note: If the fault clears during the device reclose sequence, then the device, CB, MCR or TIE, remains closed.			