

# Open transition sequence of operations

## Interlocking

1. In “manual” and “automatic” mode of operation, main and tie breakers may not be closed simultaneously.
2. All “manual” operations of main and tie breakers are performed using operator interface or breaker control switch. When in manual mode, control of breakers is in the hands of the operator and no automatic transfers will occur.

## Lock-out

Overcurrent trip switch (OTS) on main and tie breakers are incorporated in the control scheme such that there will be no closure of any breaker onto a fault. Scheme cannot be defeated and is active except during emergency operations (inoperative controls). Trip unit and OTS switch must be reset to resume automatic operations.

## Device definitions

- 43-A/M device is the auto/manual switch
- Retransfer mode is optional, and accomplished via a hardwire switch designated 43-1

## Manual operations

### “Manual mode”

43-A/M = manual, retransfer mode = optional

## Initial startup

1. Place device 43-A/M in “manual” operation.
2. Verify all transfer related circuit breakers are in the fully connected position in their cells.
3. Open and close breakers (using operator interface or breaker control switch) to obtain normal operating conditions.
4. Configure settings as required on HMI.
5. Place device 43-A/M in “automatic” operation.

## Normal conditions

1. Main breakers 52-1 and 52-2 are closed.
2. Tie breaker 52-T is open.
3. Device 43-A/M in “automatic” position.

## Emergency operation

If controls are inoperative or no control power is available, all breakers may be manually operated.

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### **m CAUTION**

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**UNDER THESE CONDITIONS, NO INTERLOCKING WILL BE ACTIVE. OPERATOR MUST NOT PARALLEL ANY SOURCES.**

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## Test mode

To enter test mode, turn test mode switch (43-T) to on. This is a simulated test mode. Follow the instructions on the HMI screen to simulate the loss or return of a source.

**Note:** This is a live test, and the system will respond as if a real failure had occurred. Test function will self-cancel if a real failure should take place while testing.

## Settings

All user-settable time delays are set using the timer settings page on the HMI. Delay times may be changed at any time.

## Sequence of automatic operations “Open transition switching”

43-A/M = auto, retransfer = optional

See normal conditions for initial configuration.

**Note:** Open-transition transfers between live sources are time-delayed in neutral, to prevent back-emf damage.

- A. Loss of utility power at main 52-1
  - 1. Device 27/47-1 detects loss of normal voltage.
  - 2. Time delay 5 seconds (adjustable 0–60 seconds).
  - 3. Main 52-1 opens.
  - 4. Tie breaker 52-T closes (no time delay)
- B. Loss of utility power at main 52-2
  - 1. Device 27/47-2 detects loss of normal voltage.
  - 2. Time delay 5 seconds (adjustable 0–60 seconds).
  - 3. Main 52-2 opens.
  - 4. Tie breaker 52-T closes (no time delay).
- C. Loss of utility power at main 52-1 and 52-2  
No action is taken.
- D. Return of normal voltage to main 52-1  
(following sequence “A” above)
  - 1. Device 27/47-1 detects normal voltage.
  - 2. Time delay 10 seconds (adjustable 0–60 seconds).
  - 3. Tie breaker 52-T opens.
  - 4. Time delay 2 seconds (adjustable 0–10 seconds),  
and then main 52-1 closes.
- E. Return of normal voltage to main 52-2  
(following sequence “B” above)
  - 1. Device 27/47-2 detects normal voltage.
  - 2. Time delay 10 seconds (adjustable 0–60 seconds).
  - 3. Tie breaker 52-T opens.
  - 4. Time delay 2 seconds (adjustable 0–10 seconds),  
and then main 52-1 closes

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Printed in USA  
Publication No. SWB\_ATO\_TUNA\_OPEN

# Closed transition sequence of operations

## Interlocking

1. In “manual” and “automatic” mode of operation, main and tie breakers may not be closed simultaneously.
2. All “manual” operations of main and tie breakers are performed using operator interface or breaker control switch. When in manual mode, control of breakers is in the hands of the operator and no automatic transfers will occur.

## Lock-out

Overcurrent trip switch (OTS) on main and tie breakers are incorporated in the control scheme such that there will be no closure of any breaker onto a fault. Scheme cannot be defeated and is active except during emergency operations (inoperative controls). Trip unit and OTS switch must be reset to resume automatic operations.

## Device definitions

- 43-A/M device is the auto/manual switch
- Retransfer mode is optional, & accomplished via a hardwire switch designated 43-1
- Transition is selectable via hardwire switch designed 43-2

## Manual operations

### “Manual mode”

43-A/M = manual, retransfer mode = optional

## Initial startup

1. Place device 43-A/M in “manual” operation.
2. Verify all transfer related circuit breakers are in the fully-connected position in their cells.
3. Open and close breakers (using operator interface or breaker control switch) to obtain normal operating conditions.
4. Configure settings as required on HMI.
5. Place device 43-A/M in “automatic” operation.

## Normal conditions

1. Main breakers 52-1 and 52-2 are closed.
2. Tie breaker 52-T is open.
3. Device 43-A/M in “automatic” position.

## Emergency operation

If controls are inoperative or no control power is available, all breakers may be manually operated.

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### **m CAUTION**

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**UNDER THESE CONDITIONS, NO INTERLOCKING WILL BE ACTIVE. OPERATOR MUST NOT PARALLEL ANY SOURCES.**

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## Test mode

To enter test mode, turn test mode switch (43-T) to on. This is a simulated test mode. Follow the instructions on the HMI screen to simulate the loss or return of a source.

**Note:** This is a live test, and the system will respond as if a real failure had occurred. Test function will self-cancel if a real failure should take place while testing.

## Settings

All user-settable time delays are set using the timer settings page on the HMI. Delay times may be changed at any time.



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## Sequence of automatic operations “Close transition switching”

43-A/M = auto, retransfer = optional, transition = closed

See normal conditions for initial configuration.

- A. Loss of utility power at main 52-1
  - 1. Device 27/47-1 detects loss of normal voltage.
  - 2. Time delay 5 seconds (adjustable 0–60 seconds).
  - 3. Main 52-1 opens.
  - 4. Tie breaker 52-T closes (no time delay)
  
- B. Loss of utility power at main 52-2
  - 1. Device 27/47-2 detects loss of normal voltage.
  - 2. Time delay 5 seconds (adjustable 0–60 seconds).
  - 3. Main 52-2 opens.
  - 4. Tie breaker 52-T closes (no time delay).
  
- C. Loss of utility power at main 52-1 and 52-2  
No action is taken.
  
- D. Return of normal voltage to main 52-1  
(following sequence “A” above)
  - 1. Device 27/47-1 detects normal voltage.
  - 2. Time delay 10 seconds (adjustable 0–60 seconds).
  - 3. Device 25 verifies synchronism.
  - 4. Main 52-1 closes.
  - 5. Time delay 2 seconds(adjustable 0–10 seconds),  
and then tie breaker 52-T opens.
  
- E. Return of normal voltage to main 52-2  
(following sequence “B” above)
  - 1. Device 27/47-2 detects normal voltage.
  - 2. Time delay 10 seconds (adjustable 0–60 seconds).
  - 3. Device 25 verifies synchronism.
  - 4. Main 52-2 closes.
  - 5. Time delay 2 seconds(adjustable 0–10 seconds),  
and then tie breaker 52-T opens.

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