

**DISTRIBUTED POWER**  
**SET-UP, LINKING and DEPARTURE TEST**  
**for**  
**DP LEAD AND REMOTE CONSISTS**  
**JOB AID**  
***EVO LEAD and EVO REMOTE***

These procedures are to be used when performing the following tasks:  
**DP Set-Up, Linking and Departure Tests**

**Process Steps:**

Build and Test **DP** Couple Consists

**DP** Remote Set-up and Linking (**EVO**)

**DP** Lead Set-up and Linking (**EVO**)

**DP** Brake Pipe Test

**DP** Leakage Test

**COMM** Loss Idle Down Test

Conventional Brake Tests and Service Track Departure Test

Secure **DP** Consists

## Table of Contents

<b>Important Considerations when Building and Coupling DP Consists: .....</b>	<b>3</b>
<b>Build and Couple DP Consists: .....</b>	<b>4</b>
<b>DP Remote Set-Up: .....</b>	<b>5</b>
<b>Position Switches and Controls on Remote Unit: .....</b>	<b>5</b>
<b>Use the Display to Link DP Remote Unit: .....</b>	<b>6</b>
<b>DP Lead Set-Up: .....</b>	<b>7</b>
<b>Position Switches and Controls on Lead Unit: .....</b>	<b>7</b>
<b>Using the Display to Link the DP Lead Unit: .....</b>	<b>8</b>
<b>Perform DP Brake Pipe (<i>Continuity &amp; Flow</i>) Test: .....</b>	<b>10</b>
<b>Select DP System Mode: .....</b>	<b>10</b>
<b>Perform Leakage Test: .....</b>	<b>10</b>
<b>Distributed Power Operation Screen: .....</b>	<b>10</b>
<b>COMM Loss Idle Down Test: .....</b>	<b>11</b>
<b>Perform Conventional Brake Test / Service Track Departure Test: .....</b>	<b>12</b>
<b>Perform Dynamic Brake Test: .....</b>	<b>13</b>
<b>Perform Actuated Release Test: .....</b>	<b>14</b>
<b>Securing DP Consists on Shop Track: .....</b>	<b>15</b>
<b>Unlinking and Ending Distributed Power Operations: .....</b>	<b>17</b>
<b>Ending DP on Lead Unit: .....</b>	<b>17</b>
<b>Ending DP on Remote Unit: .....</b>	<b>17</b>

### **Important Considerations when Building and Coupling DP Consists:**

A very important consideration when coupling the **DP** Lead consist to the **DP** Remote consist is the intended placement of the Remote consist when the train is built. Depending on Transportation's requirements, the Lead and Remote consist will need to be coupled together and oriented in one of two ways:

- A) **Remote Consist to be used in a Mid-Train Position:** When the Remote consist is to be used in a mid-train position, it can be coupled behind the **DP** Lead consist in any orientation (*i.e., short hood or long hood leading*). The **DP** consists can then be moved together by the train crew off the shop tracks and onto the train. The Remote consist will be backed onto the train in the required position. Once the Remote is placed on the train, the **DP** Lead consist can be uncoupled from the Remote consist and moved onto the head-end of the train with the proper orientation.
- B) **Remote Consist to be used on Extreme Tail-End of Train:** When the Remote consist is to be used at the extreme tail-end of the train, it must be coupled to the **short hood** of the **DP** Lead locomotive. This will facilitate movement of the Remote consist onto the train's tail end. Once the Remote is placed on the tail-end, the **DP** Lead consist can be uncoupled from the Remote consist and moved to the head-end of the train with the proper orientation. If there is more than one locomotive in the Remote consist, a **DP** Remote equipped with red Marker Lights is to be directly coupled to the short hood of the **DP** Lead locomotive.

### **EXCEPTION :**

**Locomotives 2523 to 2538 CAN NOT be used on the extreme Tail-End of train because they are not equipped with Marker Lights.**

### **Build and Couple DP Consists:**

1. Comply with all Safety Rules.
2. Connect and open all **MU** hoses, **MU** cables (*27 pin electrical*) and walkway chains on Lead consist.
3. Connect and open all **MU** hoses, **MU** cables (*27 pin electrical*) and walkway chains on Remote consist (if more than one unit in Remote consist).
4. Couple **BRAKE PIPE HOSES ONLY** between Lead and Remote consist. Leave brake pipe end valves between Lead and Remote consist **CLOSED** at this time.
5. On **DP** Lead unit, set up air brake as **LEAD CUT-IN**.
6. On controlling Remote unit, set up air brake as **LEAD CUT-IN**. Any trailing units in Remote consist are to have their air brake set for trail operation.
7. Place all switches on Lead and Remote consist in appropriate positions for locomotive's specific location in the consist.
8. At this point all units in Lead consist need to be left **ISOLATED**.

### **EVO as DP Remote Set-Up:**

1. Verify on display screen that air brake is set up as **LEAD CUT-IN**.
2. Place the independent brake in the **FULL APPLICATION** position.
3. Place the automatic brake handle in **REL** (*Release*) position.

### **Position Switches and Controls on Remote Unit:**

4. Place the Engine Control / Isolation Switch to **RUN**.
5. Place the Distributed Power Circuit Breaker (*DP Radio*) **ON**.
6. Place the Engine Run Switch to **OFF**.
7. Place the Generator Field Switch to **OFF**.
8. Place the Control Switch to **ON**.
9. Place the Dynamic Brake Circuit Breaker / Switch to **ON**.
10. Place the Throttle Handle to **IDLE**.
11. Remove the Reverse Handle.

**Note:** *If the Remote consist is to be used on the extreme rear of train, turn on the **MARKER LIGHTS** on appropriate end.*

### Use the Display to Link DP Remote Unit:

1. Ensure that right hand screen is set up as the gauges screen.  
If necessary, press the Screen Controls key to set up display.
2. Press the **DISTRIBUTED POWER** key on the right display.
3. Press the **REMOTE SET-UP** key.
4. Enter the Lead locomotive number that will be controlling the Remote by selecting **COUNT UP, COUNT DOWN, DIGIT RIGHT and DIGIT LEFT** keys.
5. Set the direction of the Remote unit in relation to the **DP** Lead unit. Press the **OPPOSITE DIR'N** key if the Remote is facing backwards compared to the Lead unit. The default is "*Direction **SAME** as lead*".
6. Press the **DONE** key.

**Note:** *A **Penalty** application will occur and the **PCS Open** alarm will appear. Do not attempt Penalty recovery on the Remote.*

7. Place the automatic brake handle in **HO** (*Handle Off*) position and insert the locking pin to secure the handle.
8. Place the independent brake handle in the **RELEASE** position.
9. At this point, the Remote's brake pipe will reduce to **0 PSI** with a corresponding **45 PSI** brake cylinder application. After the brake pipe pressure drops below **25 PSI**, the Remote's brake valve will go to the **CUT-OUT** position.
10. Before moving onto **DP** Lead unit set up, **OPEN** the brake pipe end valves between the Lead and Remote consist.

### **EVO as DP Lead Set-Up:**

1. Verify on display screen that air brake is set up as **LEAD CUT-IN**.
2. Place the independent brake handle in the **FULL APPLICATION** position.
3. Place the automatic brake handle in **REL** (*Release*) position.

### **Position Switches and Controls on Lead Unit:**

4. Place the Engine Control / Isolation Switch to **RUN**.
5. Place the Distributed Power Circuit Breaker (*DP Radio*) **ON**.
6. Place the Engine Run Switch to **ON**.
7. Place the Generator Field Switch to **OFF**.
8. Place the Control / Fuel Pump Switch to **ON**.
9. Place the Dynamic Brake Circuit Breaker / Switch to **ON**.
10. Place the Throttle Handle to **IDLE**.

## Using the Display to Link the DP Lead Unit:

1. Ensure that right hand screen is set up as the gauges screen.  
If necessary, press the Screen Controls key to set up display.
2. Press the **DISTRIBUTED POWER** key on the right hand display.
3. Press the **LEAD SET-UP** key.
4. Enter the Remote locomotive number that will be controlled by this Lead unit by selecting **COUNT UP, COUNT DOWN, DIGIT RIGHT and DIGIT LEFT** keys.
5. Press the **LINK** key:
  - If the display indicates **LINKED OK**, a Penalty application will occur, the **PCS AB** and **PENALTY B** alarm icons will appear. Continue with **Step 6**.
  - If the display indicates **LINK RADIO FAIL**, **DP** units are **Linked** but the radio test failed on one of the dual radios. Press **Unlink** and try to link again. If problem clears, continue with **Step 6**. If problem persists after third attempt, the problem **DP** radio **must be** replaced if a **DP** radio is available. If no radio available, or a radio change-out does not correct the problem, the unit is still capable of operating as a **DP** unit but **must have** the defect flagged with the **MSREP** to ensure problem is repaired at first opportunity. If time permits, continue troubleshooting problem. Go to **Step 6** to identify the **DP** unit with bad radio.
  - If the display indicates **LINK FAIL**, verify that the correct Remote locomotive number is entered. If Remote unit number is verified as correct, verify on the Remote unit that the correct Lead number was entered when linking from Remote to Lead.
6. Press the **DONE** key:

**Note:** If the **LINK RADIO FAIL** was displayed in Step 5, the bad radio will now be identified in the **DP** System Log on the right hand (gauges) screen. The log will display a message along the lines of, "**Radio B Fail Lead w/####**". This indicates the "B" radio on the Lead unit failed to link to Remote unit "####".



7. The crew message will display ***DISTRIBUTED POWER PENALTY SOURCE IS STILL PRESENT***. If in a Penalty application, move the automatic brake handle to **SUP** (*Suppression*) position to reset the Penalty. If in an Emergency application, move the automatic brake handle to **EM** (*Emergency*) position to reset the Emergency.
8. After a two minute Penalty reset time out, the message will display ***CHARGE TRAIN BEFORE RUNNING BRAKE TEST***. Recover the air brake system by placing the automatic brake handle in the **REL** (*Release*) position to charge the brake pipe.

### Perform DP Brake Pipe (*Continuity & Flow*) Test:

1. Once the crew message displays **PERFORM BRAKE PIPE TEST WHEN READY** wait for the **FLOW** on Lead and Remote units to drop below **20 CFM** and stabilize before proceeding.
2. Press the **BRK PIPE TEST** key followed by **EXECUTE**.
3. When prompted, place the automatic brake handle in the **MIN** (*Minimum Reduction*) position.
4. If successful, the **BRAKE PIPE TEST OK** message should appear.

#### **Note:**

- *If the Brake Pipe Test is **OK**, continue with **Step 5**.*
- *If the Brake Pipe Test **FAILS**, check the brake pipe hoses and verify end valves are fully open. Retest as necessary.*

5. Place the automatic brake handle in the **REL** (*Release*) position.

### Select DP System Mode:

6. From the right display, press the **DP Main Menu** key.
7. Press the **MODE** key.
8. Press the **RUN** key followed by **EXECUTE**.

### Perform Leakage Test:

9. On the right hand screen, press the following keys in sequence:  
**Distributed Power | DP Main Menu | SYSTEM |  
LEAKAGE TEST | EXECUTE**

### Distributed Power Operation Screen:

10. On the left screen, press the **DISTRIBUTED POWER (F4)** key to monitor Lead and Remote status (*if **DP Ops** screen is not already displayed*).

### **COMM Loss Idle Down Test:**

1. Verify **COMM** Loss Idle Down function by placing Lead unit in throttle **2** and turning off the Distributed Power Circuit Breaker (*DP Radio*).
2. When the **COMM** icon appears on left Distributed Power Operation screen and indicates a sustained **COMM** loss by turning red, place the automatic brake handle in the **FULL SERVICE** position.
3. Allow the air brake system to stabilize for about a minute then turn on the Distributed Power Circuit Breaker.
4. On the left Distributed Power Operation screen, observe that the Remote status indicates **ISOL** and that **FLOW** indicates **OUT**.
5. Return the throttle handle to the **IDLE** position.
6. One the left screen, press the **REMOTE MENU** key.
7. Press the **NORMAL** key followed by **EXECUTE**. The Remote status should change to **NORM**.
8. Recharge the brake pipe by moving automatic brake handle to the release position.
9. Following a **3 PSI** rise in brake pipe pressure, the Remote brake valve should cut in with a numeric flow value displayed.
10. Place the **GF** switch to **OFF** and return the throttle handle to **IDLE**.

### **Perform Conventional Brake Test / Service Track Departure Test:**

1. Perform a brake test on the Lead consist as per **CN MR 3418** regulations. The Remote consist will be tested at the same time.
2. During **MR 3418** brake test, observe the reaction of the Remote unit on the left Distributed Power Operation screen ensuring that the Remote unit tracks with what the Lead unit is doing during all phases of the test. **THE ONE EXCEPTION IS THAT REMOTE LOCOMOTIVE PENALTY AND EMERGENCY BRAKE CYLINDER APPLICATIONS ARE LIMITED TO 45 +/- 3 PSI.** Note that there will be a slight time lag in the order of **2-4** seconds until the Remote signal matches the Lead.
3. During performance of the Lead consist brake test, the Remote consist should experience the same brake cylinder applications and releases as the Lead consist. Brake piston movement on the Remote consist must be verified from a position on the ground at the same time as the Lead consist is checked.
4. Isolate the Lead unit (*rest of the Lead consist should already be isolated*) and set unit up for loading in the forward direction. Increase loading until you observe the Remote moving in the forward direction. This will verify that Remote consist is set up properly for direction.
5. Repeat step **4** in the reverse direction and verify that the Remote moves in the reverse direction.
6. Put all units in Lead consist and Remote consist to **RUN** and verify loading on units in Lead consist. In addition, verify all units in Remote consist load.
7. With the **GF** switch **ON** and **REVERSER HANDLE CENTRED**, advance the throttle handle slowly through each notch position and verify on the left Distributed Power Operation screen that the Remote responds to each throttle change by displaying **T1** to **T8**. There will be a slight time lag for the Remote unit to respond to each notch change.

## Perform Dynamic Brake Test:

1. Make a **10 PSI** or greater brake pipe reduction with the automatic brake handle.

**Note:** *Verify on the left Distributed Power Operation screen that Remote BC indicates brake cylinder pressure in response to application of the automatic brake.*

2. Ensure the Generator Field Switch in the **ON** position.
3. Place the Reverser in **FORWARD** position.
4. Place the **DB** handle in Dynamic Braking position **#1**.
5. Verify brake cylinder pressure on the Remote unit is reduced to **BC = 0 PSI**.
6. Advance the **DB** handle slowly through each notch position. Watch the **THROTTLE** indication on the left screen to verify that the Remote responds to the **DB** handle changes **B1** to **B8**.
7. Place the **DB** handle to the **OFF** position.
8. Place the Reverser in the **CENTER** (*Neutral*) position.
9. Place the Generator Field Switch in the **OFF** position.
10. Verify there is no re-application of brake cylinder pressure on the Remote.
11. Place the automatic brake handle in the **FULL** (*Full Service*) position.
12. Verify that a **28 PSI** brake pipe reduction is made by observing the left screen. The left hand screen should now show **BP = 62 PSI ( $\pm 3$  PSI)** as well as a brake cylinder application on both Lead and Remote consists.

### **Perform Actuated Release Test:**

1. Place the independent brake handle in the **ACTUATE** position.  
Hold at least **10 sec** and then remove your hand from the handle.
2. Verify on left Distributed Power Operation screen that Remote brake cylinder pressure reduces to, and remains at, **BC = 0 PSI**.
3. Place the independent brake in the **FULL APPLICATION** position.
4. Verify that Remote brake cylinder pressure has re-applied.
5. Place the automatic brake handle in the **REL** (*Release*) position.

### **Securing DP Consists on Shop Track:**

After **DP** Lead and Remote consists are coupled, set-up, linked and tested, the locomotives must be secured by setting the **DP System Mode** to **IDLE**.

1. Apply the independent brake on the **DP** Lead unit in **FULL**.
2. On the right hand screen, press the **Distributed Power** key.
3. Press the **DP Main Menu** key.
4. Press the **MODE** key.
5. Press the **IDLE** key followed by **EXECUTE**.
6. Verify on the left hand Distributed Power Operation screen that the **DP** System mode has changed from **Run** to **Idle**.
7. Secure consist per shop track procedures.

**UNLINKING AND ENDING DISTRIBUTED POWER  
IF / WHEN REQUIRED**

**NOT PART OF NORMAL DISTRIBUTED POWER  
SET-UP AND DEPARTURE TESTS**



## **Unlinking and Ending Distributed Power Operations:**

The following procedures are to be used to unlink and end Distributed Power operations for the purpose of troubleshooting, replacing failed components, changing **DP** operating ends, etc. Distributed power operation is ended on the Lead unit first and followed by the Remote unit second.

### **Ending DP on Lead Unit:**

1. On the Lead unit, ensure unit in **ISOLATE**, throttle in **IDLE**, **REVERSER CENTRED** and the independent applied in **FULL**.
2. From the right hand screen, press the **Distributed Power** key.
3. Press the **DP Main Menu** key.
4. Press the **END DIST PWR** key followed by **EXECUTE**.
5. The brake pipe will reduce to **10 PSI** and the crew message will display: ***DP UNLINKING – EMV TEST IN PROGRESS WAIT***
6. After **60** seconds, the **EMV** test will drop the brake pipe pressure to **0 PSI** and the crew message will display:  
***TRAINLINE EMERGENCY, TO CLEAR, GO TO EMERGENCY***
7. After **60** second emergency reset times out, recover emergency.

### **Ending DP on Remote Unit:**

8. On the Remote unit, place Engine Control - Isolation Switch in **ISOLATE** and apply independent brake in **FULL**.
9. From the right hand screen, press the **Distributed Power** key.
10. Press the **DP Main Menu** key.
11. Press the **END DIST PWR** key followed by **EXECUTE**.
12. Set up air brake as **LEAD CUT-IN**.
13. Recover emergency brake.