

SINGLE CAR TESTING DEVICE

## CODE OF TESTS

AS ADOPTED BY THE  
ASSOCIATION OF  
AMERICAN RAILROADS



INSTRUCTION PAMPHLET  
No. 5039-4 Sup. 1  
JUNE, 1943

(SUPERSEDING ISSUE, OF APRIL, 1940)



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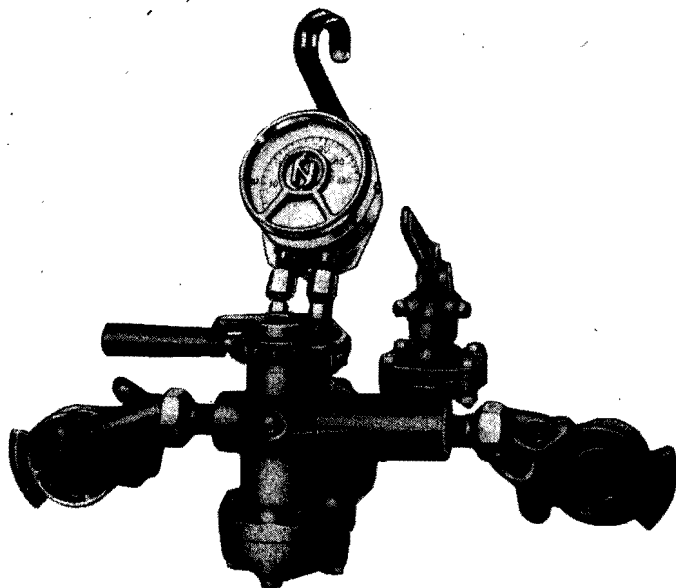


Fig. 1. Front View of the Single Car Testing Device

## Single Car Testing Device

The purpose of the Single Car Testing Device is to provide a means of making a general check on the condition of the brake equipment on "in date" cars while in service and on cars having undergone "periodic repairs", without removing any device from the car.

There are two types of the single car testing device which are similar in appearance, but one is for passenger cars and the other for freight cars. The passenger device, however, can be identified by the name plate which is marked "PASS.", while the name plate on the freight device is marked "FRT."

With this device tests can be made to determine if the \*operating valve or any associated device should be removed from the car for tests on their respective test racks. Results obtained with the Single Car Testing Device must be considered as a preliminary check, because the exact condition of any device can be determined only on a standard test rack provided for that purpose.

In event of the operating valve failing to pass the specified tests, it should be ascertained that the Single Car Testing Device is not at fault, and *under no condition should the valve be condemned before having been tested on the A.A.R. standard test rack.*

Care should be exercised in moving the test device handle back to position No. 3 (Lap) after making brake pipe reductions of 15 pounds or more in position No. 5. When snapped back, the temperature effect will cause the brake pipe pressure to rise  $1\frac{1}{2}$  to 2 pounds and may

NOTE—\*OPERATING VALVE: Device on each car the operation of which results in:

- (a) Admission of air to the brake cylinder
- (b) Release of air from the brake cylinder, and,
- (c) Charging of one or more reservoirs.

A A R Manual, Section E, Page 56.

be the cause of an undesired release. The device handle should be moved slowly toward Lap position.

When testing cars having double equipment, each equipment must be tested separately, that is, one operating valve must be cut out while the other equipment is being tested, and vice versa. A complete test (including brake pipe leakage) must, however, be made with each equipment. The brake pipe leakage test with each equipment is necessary in order to detect any leakage past the operating valve cut-out cock, operating valve pipe connections, etc.

NOTE—Air Signal Equipment must be tested as provided in Instruction Leaflet No. 2377-2.

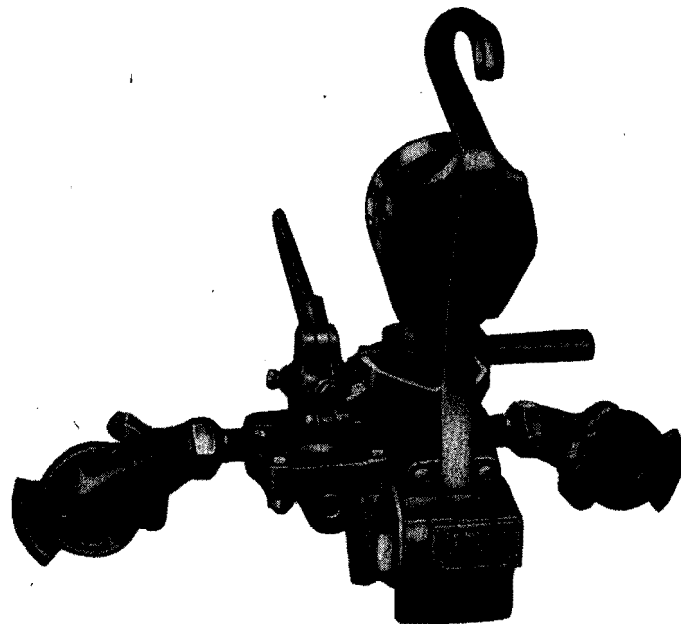


Fig. 2. Rear View of the Single Car Testing Device

## Passenger Equipment

### U-12 Universal Valve, No. 3-E Control Valve and L Triple Valves

#### TEST CODE

The tests are to be made with at least 90 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the test device to the brake pipe hose, move the device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the end of test device marked B.P. to the brake pipe hose at one end of the car; to the other end of the car couple on a dummy hose coupling. Open both angle cocks, move device handle to position No. 1 and charge the brake system to supply line pressure.

#### 1. Brake Pipe Leakage Test

Move device handle to position No. 5, reducing the brake pipe pressure 20 pounds, then return handle slowly to position No. 3 (Lap.)

Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure, which must not exceed  $2\frac{1}{2}$  pounds per minute when testing from supply pressure of 90 pounds.

### 8. Conductor's Valve Test

Move the device handle to position No. 1 to recharge the brake system. With the equipment completely charged, move the device handle to position No. 3 (Lap). Open the conductor's valve with the cord or chain, observing carefully that there are no obstructions to the free and full movement of the conductor's valve handle, and that there is no binding of parts. The opening of the conductor's valve must produce an emergency application. If an emergency is not obtained, a restriction to air flow in the conductor's valve or conductor's valve pipe is disclosed, which must be located and removed. It may also be due to failure of the application valve in the conductor's valve line to open, if the car is equipped with such.

Repeat the above operation for each conductor's valve if car is equipped with more than one valve.

At the completion of the test, move the device handle to position No. 6.

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NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.

## Passenger Equipment

U-12-B, U-12-BC and U-12-BD

Quick Service Universal Valves

### TEST CODE

The tests are to be made with at least 90 pounds in the supply line; before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the test device to the brake pipe hose, move the device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the end of the test device marked B.P. to the brake pipe hose at one end of the car; to the other end of the car couple on a dummy hose coupling. Open both angle cocks, move device handle to position No. 1 and charge the brake system to supply line pressure.

#### 1. Brake Pipe Leakage Test

Close the branch pipe cut-out cock to eliminate quick service. When testing cars having 1" brake pipe, connect the signal pipe to the brake pipe. On cars having 1¼" brake pipe, do not connect to signal pipe. Move the device handle to position No. 5 reducing brake pipe pressure 20 pounds, then return the handle slowly to position No. 3 (Lap). The branch pipe between the cut-

#### 4. Application Test

Move the device handle to position No. 1 to recharge the brake system. Move the device handle to position No. 4, reducing the brake pipe pressure 10 pounds, then return handle to position No. 3 (Lap). The brake must apply before the brake pipe pressure is reduced the amount specified. Failure to apply indicates that the valve must be removed for further investigation on the A.A.R. standard test rack.

#### 5. Release Test

If the brake applies, and the brake pipe reduction is made as specified in the Application Test, move the device handle to position No. 2. The piston and slide valve must move to release position within one minute. Failure to release in the time specified indicates that the valve must be removed for further investigation on the A.A.R. standard test rack.

During the release test, the pressure in the supply line must not vary more than 2 pounds.

#### 6. Service Stability Test

Move the device handle to position No. 1 to recharge the brake system. Move device handle to position No. 5, reducing brake pipe pressure 20 pounds. This test must not produce emergency. If an emergency application is obtained, it would indicate that the universal valve must be removed for further investigation on the A.A.R. standard test rack.

#### 7. Emergency Test

Move the device handle to position No. 1 to recharge the brake system. Move device handle to position No. 6, reducing brake pipe pressure 20 pounds. This test must produce emergency. If an emergency application is not obtained, it indicates that the valve must be removed for further investigation on the A.A.R. standard test rack.

#### 8. Conductor's Valve Test

Move the device handle to position No. 1 to recharge the brake system. With the equipment completely charged, move the device handle to position No. 3 (Lap). Open the conductor's valve with the cord or chain, observing carefully that there are no obstructions to the free and full movement of the conductor's valve handle, and that there is no binding of parts. The opening of the conductor's valve must produce an emergency application. If an emergency is not obtained, a restriction to air flow in the conductor's valve or conductor's valve pipe is disclosed, which must be located and removed. It may also be due to failure of the application valve in the conductor's valve line to open, if the car is equipped with such.

Repeat the above operation for each conductor's valve if car is equipped with more than one valve.

At the completion of this test, move the device handle to position No. 6 and disconnect the 1" brake pipe from the signal pipe if previously connected for these tests.

NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.

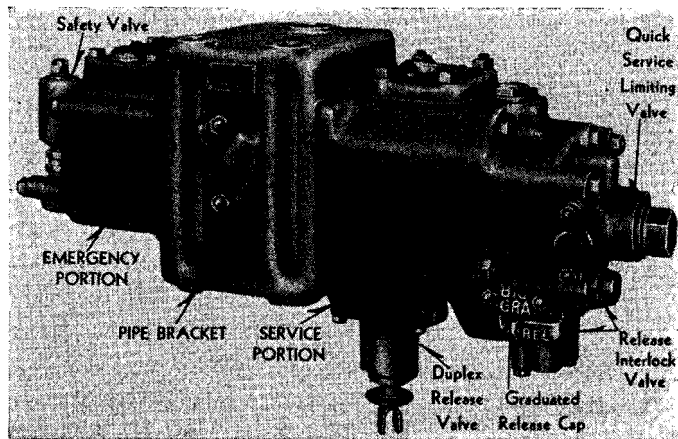


Fig. 4. Front View of the D-22-AR Control Valve

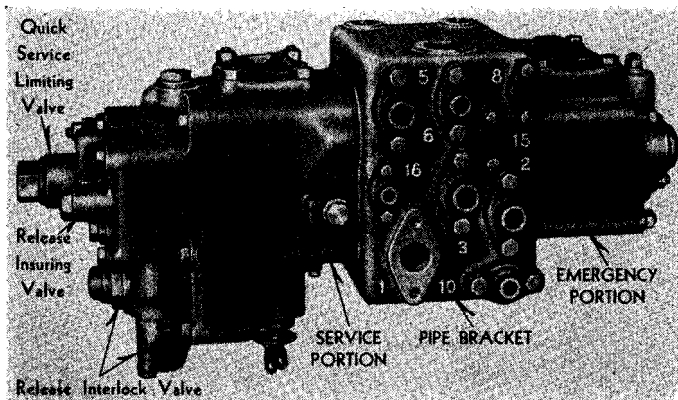


Fig. 5. Rear View of the D-22-AR Control Valve

## Passenger Equipment

### D-22-A, D-22-AR, D-22-B, D-22-BR, D-22-C Control Valves

#### TEST CODE

The tests are to be made with at least 90 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the testing device to the brake pipe hose, move test device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the test device end marked B.P. to the brake pipe hose at one end of the car; to the other end of the car couple on a dummy hose coupling. Open both angle cocks, move the device handle to position No. 1 and charge the brake pipe and reservoirs to supply line pressure.

#### 1. Application Test

Move the device handle to position No. 3 (Lap) for five seconds to determine if the equipment is completely charged. If the brake pipe pressure drops, the reservoirs are not charged to brake pipe pressure. With the equipment charged to supply line pressure, move the device handle to position No. 5 until a five pound brake pipe reduction is obtained, then slowly return the handle to position No. 3 (Lap). The brake pipe pressure must continue to drop until the quick service limiting valve closes, so that the total brake pipe reduction will be not more than 10 pounds. The brake must apply. A further

drop in brake pipe pressure may be due to brake pipe leakage or failure of the quick service limiting valve to close.

## 2. Brake Pipe Leakage Test

Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure which must not exceed  $2\frac{1}{2}$  pounds in one minute. If brake pipe leakage exceeds this limit and no leakage of the brake pipe and its connections can be detected by means of soap suds, excessive leakage may be due to failure of quick service limiting valve to close. A slight pumping action of the emergency piston, indicated at the quick action exhaust, will not affect the leakage test.

NOTE—When testing single cars equipped with Type "A" Quick Service Valve, a greater quick service activity will be indicated, and the brake pipe pressure may continue to reduce after the device handle is placed in Lap position. If the brake pipe pressure, however, continues to reduce more than 6 pounds after the device handle is placed in Lap position, it may be due to excessive quick service valve piston friction or failure of the quick service limiting valve to close.

## 3. Auxiliary Reservoir Leakage Test

During the brake pipe leakage test, if the control valve releases the brake in less than one minute, with the device handle in position No. 3 (Lap), it indicates a leak from the auxiliary reservoir, graduating valve, slide valve, auxiliary reservoir pipe, or a leak into the brake pipe past the test device.

## 4. Release Test

Move the device handle to position No. 2. The piston and slide valve of the D-22 control valve service portion must move to release position within 20 seconds, plus 5 seconds for each one pound brake pipe leakage.

Continue the test until the brake cylinder pistons return to their normal release position.

During the release test, the pressure in the supply line must not vary more than 2 pounds.

Failure of the brake cylinder pistons to return to release position may be due to the D-22 control valve service portion, relay valve or excessive brake rigging resistance. The following procedure will indicate which part of the equipment is responsible for this condition.

**D-22 CONTROL VALVE**—During the release test, an exhaust of air at the exhaust port in the pipe bracket, or from the retaining valve exhaust if one is included in the equipment, shows that the service piston and slide valve have returned to release position. A continuous blow at this exhaust port, however, indicates that the service portion should be removed for further investigation on the A. A. R. standard test rack.

**BRAKE RIGGING**—Close the brake cylinder cut-out cocks, and vent brake cylinder air to atmosphere. If the brake cylinder pistons return to release position, it indicates the brake rigging is not at fault. Open the brake cylinder cut-out cocks.

**RELAY VALVE**—If the trouble has not been located in the D-22 control valve or brake rigging, it indicates that the difficulty is with the relay valve. A plugged or obstructed atmospheric vent port leading to the outer face of the inshot diaphragm, or leading to the space between the differential diaphragms, may be the cause of the failure of the brake to release. If the vent ports are open, the portion should be removed for further investigation on the A. A. R. standard test rack.

## 5. Service Stability Test

Move the device handle to position No. 1 to recharge the brake pipe and reservoirs to supply line pressure. Move the device handle to position No. 5, reducing brake pipe pressure 20 pounds, then slowly return the handle to position No. 3 (Lap). This test must not produce an emergency application.

## 6. Graduated Release Test

*This test need not be made when graduated release is not used.*

Move the device handle to position No. 1 until brake pipe pressure has increased 5 to 6 pounds then return

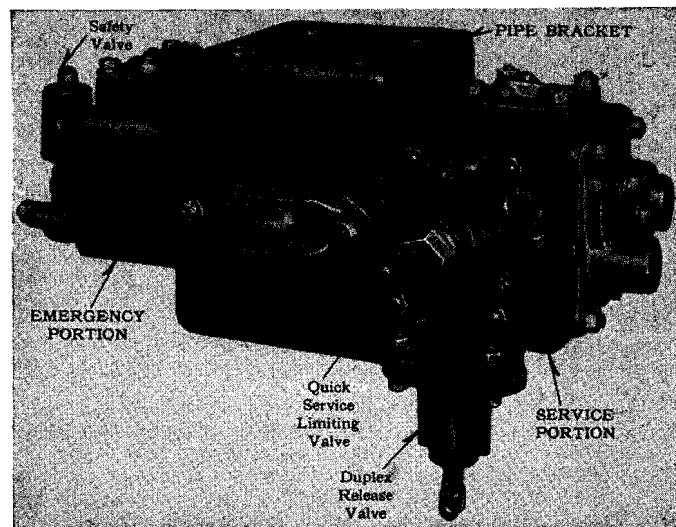


Fig. 6. Front View of the D-22-A Control Valve

handle to position No. 3 (Lap). Repeat the operation several times. At least three graduations must be obtained.

### 7. Emergency Test

Move the device handle to position No. 1 to recharge the brake pipe and equipment to supply line pressure. Move the device handle to position No. 3 (Lap) for 5 seconds to determine if the equipment is completely charged. If the brake pipe pressure drops, the reservoirs are not charged to brake pipe pressure. With the equipment charged to supply line pressure, move the device handle to position No. 3 (Lap), then open the test device  $\frac{3}{8}$ " cock. This test must produce emergency as indicated by the opening of the vent valve by the time the brake pipe pressure drops 10 pounds.

NOTE—In rare instances, failure to obtain emergency in Test No. 7 may be caused by a decrease in the quick action chamber volume in the pipe bracket, due to the accumulation of excessive moisture or, by a restricted quick action chamber charging choke.

### 8. Release Test After Emergency

At the completion of the Emergency Test, wait approximately 30 seconds before attempting to release, in order to permit the vent valve to close. Move the device handle to position No. 1, and charge the brake pipe to 15 pounds, then move the device handle to position No. 3 (Lap). Note that the brake pipe pressure continues to rise, indicating that the emergency piston has moved to accelerated release position. Then move the device handle to position No. 1 until the brake cylinder pistons move to release position.

### 9. Conductor's Valve Test

With the equipment completely charged, move the device handle to position No. 3 (Lap). Open the conductor's valve with the cord or chain, observing carefully that there are no obstructions to the free and full movement of the conductor's valve handle, and that there is no binding of parts. The opening of the conductor's valve must produce an emergency application. If an emergency is not obtained, a restriction to air flow in the conductor's valve or conductor's valve pipe is disclosed, which must be located and removed. It may also be due to failure of the application valve in the conductor's valve line to open, if the car is equipped with such.

Repeat the above operation for each conductor's valve if car is equipped with more than one valve.

At the completion of test, move the device handle to position No. 6.

NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.



# Passenger Equipment

## Types "P" and "PS" Triple Valves

### TEST CODE

The tests are to be made with at least 90 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the test device to the brake pipe hose, move the device handle to position No. 3 (Lap) and open the cock in the supply line. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the end of test device marked B.P. to the brake pipe hose at one end of the car; to the other end of the car couple on a dummy hose coupling. Open both angle cocks, move device handle to position No. 1 and charge the brake system to supply line pressure.

#### 1. Brake Pipe Leakage Test

Move device handle to position No. 5, reducing the brake pipe pressure 20 pounds, then return handle slowly to position No. 3 (Lap).

Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure, which must not exceed  $2\frac{1}{2}$  pounds per minute when testing from 90 pounds supply line pressure.

## 2. Auxiliary Reservoir and Graduating Valve Leakage

During the brake pipe leakage test, if the valve releases the brake in less than one minute with the device handle in position No. 3 (Lap), it indicates a leaky graduating valve, a leak from the auxiliary reservoir, or a leak into the brake pipe past the rotary valve of the test device.

#### 3. Application Test

Move the device handle to position No. 1 to recharge the brake pipe and auxiliary reservoir. Move the device handle to position No. 5, when testing "P" valves or position No. 4 when testing "PS" valves, reducing the brake pipe pressure 10 pounds, then return handle to position No. 3 (Lap). The brake must apply before the brake pipe pressure is reduced the amount specified. Failure to apply indicates that the valve must be removed for further investigation on the A.A.R. standard test rack.

#### 4. Release Test

If the brake applies, and the brake pipe reduction is made as specified in the Application test, move the device handle to position No. 2. The piston and slide valve must move to release position within one minute. Failure to release in the time specified indicates that the valve must be removed for further investigation on the A.A.R. standard test rack.

During the release test, the pressure in the supply line must not vary more than 2 pounds.

### 5. Service Stability Test

Move the device handle to position No. 1 to recharge the brake pipe and auxiliary reservoir. When testing "P" valves, move the device handle to position No. 5, reducing the brake pipe pressure 20 pounds for 12" equipment, or 16 pounds for 14" and 16" equipment. This test must not produce emergency. If emergency application is obtained, it would indicate that the valve must be removed for further investigation on the A.A.R. test rack.

When testing type "PS" valves, move the device handle to position No. 5 reducing the brake pipe pressure 25 pounds. This test must not produce emergency either in the vent valve or the triple valve. If emergency action is initiated at the vent valve, it would indicate that this valve should be removed for further investigation on the standard vent valve test rack. If the vent valve does not produce emergency action but the triple moves to emergency position, indicated by the absence of any exhaust at the safety valve, it would indicate that the triple valve must be removed for further investigation on the standard A.A.R. test rack.

### 6. Emergency Test

Move the device handle to position No. 1 to recharge the brake pipe and auxiliary reservoir. When testing "P" valves, move the device handle to position No. 3 (Lap). Open the test device  $\frac{3}{8}$ " cock ( $\frac{3}{8}$ " orifice) and reduce brake pipe pressure 20 pounds for 12" and 14" equipment. When testing 16" equipment, move the device handle to position No. 6 and reduce brake pipe pressure 25 pounds. This test must produce emergency. If an emergency application is not obtained, it indicates

that the valve must be removed for further investigation on the A.A.R. standard test rack.

When testing type "PS" valves, move the device handle to position No. 6, reducing the brake pipe pressure 20 pounds. This test must produce emergency action of the vent valve. If emergency action is not obtained, it indicates that the vent valve must be removed for further investigation on the standard vent valve test rack.

### 7. Conductor's Valve Test

Move the device handle to position No. 1 to recharge the brake system. With the equipment completely charged, move the device handle to position No. 3 (Lap). Open the conductor's valve with the cord or chain, observing carefully that there are no obstructions to the free and full movement of the conductor's valve handle, and that there is no binding of parts. The opening of the conductor's valve must produce an emergency application. If an emergency is not obtained, a restriction to air flow in the conductor's valve or conductor's valve pipe is disclosed, which must be located and removed. It may also be due to failure of the application valve in the conductor's valve line to open, if the car is equipped with such.

Repeat the above operation for each conductor's valve if car is equipped with more than one valve.

At the completion of the test, move the device handle to position No. 6.

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NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.

### TEST RACK DETAILS

- 1 Air Strainer, P.C. 70800 or N-958
- 1  $\frac{3}{8}$ " Supply Cock, P.C. 96041 or 149-TA
- 1 Type F Feed Valve Pipe Bracket, P.C. 18240 or EV-715C
- 1 10x24" Supply Reservoir, P.C. 510500 or N-3120.
- 2  $\frac{1}{2}$ " Cut-out Cock, P.C. 95413 or 161-TA (Cocks 1 and 2)
- 2  $\frac{3}{4}$ "x60" Hose, with FP-3 Coupling and  $\frac{1}{4}$ " Nipple, P.C. 33987 or N-2414
- 1 10x24" Operating Reservoir, P.C. 96995 or N-3111.
- 1 Single Pointer Air Gage, P.C. 88882 or N-1796.

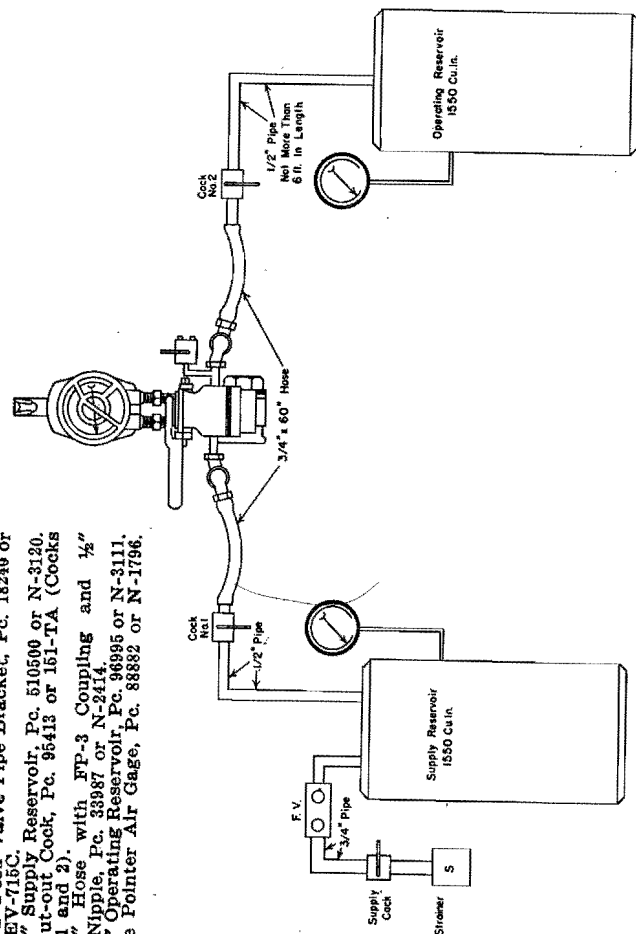


Fig. 7. Diagrammatic View of Arrangement for Testing the PASSENGER Single Car Testing Device

## GENERAL INSTRUCTIONS for TESTING and MAINTAINING the PASSENGER SINGLE CAR TESTING DEVICE

To secure reliable and uniform results with the *Single Car Testing Device*, it must be kept free from leakage and must be tested not less than once each thirty days, or oftener if necessary, and any leakage discovered must be corrected.

As often as service conditions require, the rotary valve and test device  $\frac{3}{8}$ " cock must be lubricated with graphite grease. With the standard quick opening diaphragm cock, it is necessary to apply only a little graphite grease to the cam part of the handle where it contacts the actuating plunger. Where test device with key type cock is in use, the key should be removed, cleaned, and lubricated with graphite grease.

The test gage must be kept accurate, and must be compared with a master gage as often as the device itself is being tested.

### Operation Test

Assemble the device on the rack as shown by Fig. 7.

Open supply cock.

The feed valve must be set to close at 70 pounds.

Operate the valve several times by moving the device handle from position No. 1 to position No. 6, finally leaving the handle in position No. 3 (Lap).

Commence test with all numbered cocks closed and the device handle in position No. 3 (Lap). Open cock 1 and the test device  $\frac{3}{8}$ " cock. Coat the opening of the  $\frac{3}{8}$ "

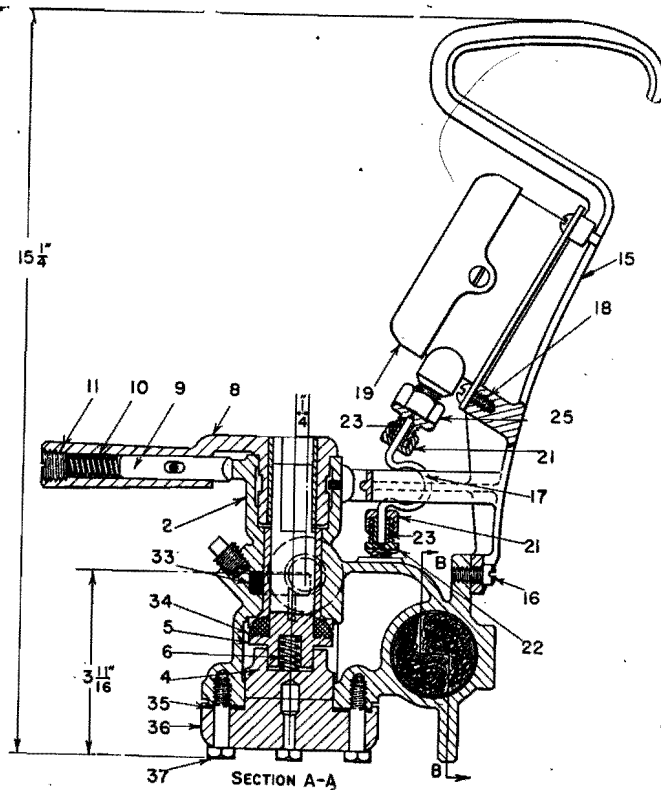


Fig. 8. Sectional View of the Single Car Testing Device

cock with soapsuds in order to detect rotary valve leakage to brake pipe. Close the  $\frac{3}{8}$ " cock and coat the device exhaust port with soapsuds for rotary valve leakage in positions No. 3, 4, 5 and 6. Leakage permitted for the above test is a bubble not larger than 1" in diameter in 5 seconds. At the completion of test, move the device handle to position No. 2.

Open cock 2 and note that the operating reservoir charges from 5 to 20 pounds in 29 to 36 seconds, then move the device handle to position No. 1 and charge the reservoir to 70 pounds.

Move the device handle to position No. 4. The operating reservoir pressure must reduce from 70 to 60 pounds in 10 to 13 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 5. The operating reservoir pressure must reduce from 70 to 40 pounds in 10 to 13 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 6. The operating reservoir pressure must reduce from 70 to 30 pounds in  $3\frac{1}{2}$  to 5 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 3 (Lap). Open the test device  $\frac{3}{8}$ " cock and observe on the operating reservoir gage that the operating reservoir pressure reduces from 70 to 10 pounds in 3 to  $3\frac{3}{4}$  seconds. At the completion of test, close all cocks and remove device from the test rack.

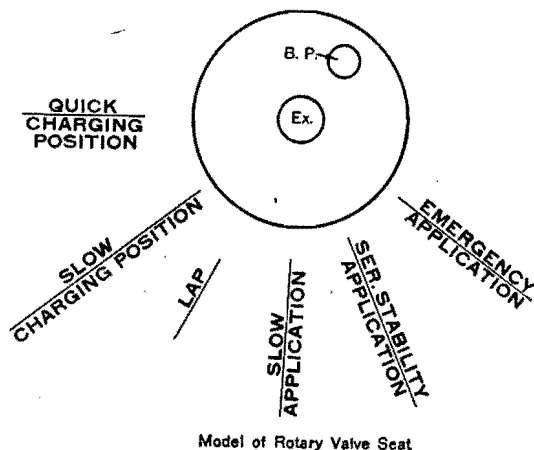
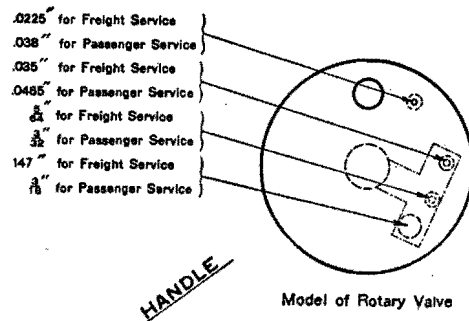


Fig. 9. Rotary Valve and the Rotary Valve Seat of the Single Car Testing Device

### Positions of Passenger Test Device

Position No. 1—M. R. charges brake pipe through  $\frac{1}{4}$ " opening.

Position No. 2—M. R. charges brake pipe through .038" (No. 62 drill) opening.

Position No. 3—Lap.

Position No. 4—Brake pipe pressure reduces through .0465" (No. 56 drill) opening.

Position No. 5—Brake pipe pressure reduces through .09375" ( $\frac{3}{32}$ " drill) opening.

Position No. 6—Brake pipe pressure reduces through .1875" ( $\frac{1}{16}$ " drill) opening.

$\frac{3}{8}$ " Test Device Cock—Brake pipe pressure reduces through .375" ( $\frac{3}{8}$ " drill) opening.

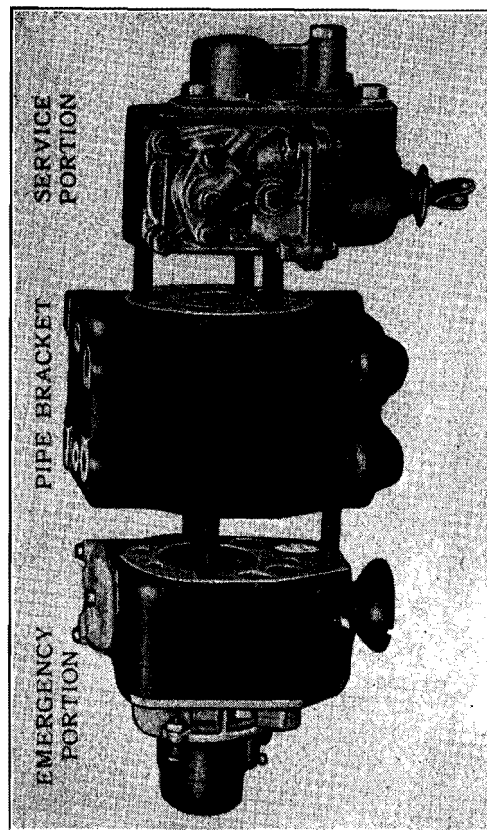


Fig. 10. View of the "AB" Valve with Accelerated Release Piston Showing the Operating Portions and Pipe Bracket

## Freight Equipment

### "AB" Valves

#### TEST CODE

The tests are to be made with 70 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the testing device to the brake pipe hose, move test device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the test device end marked B.P. to the brake pipe hose at one end of the car; to the other end of the car, couple on a dummy hose coupling. Open both angle cocks, move the device handle to position No. 1 and charge the brake pipe and reservoirs to 70 pounds.

### 1. Application Test

With the device handle in position No. 1, charge the brake pipe and reservoirs to 70 pounds, then move the device handle to position No. 3 for five seconds to determine if the equipment is completely charged. With the equipment charged to 70 pounds, move the device handle to position No. 4 until the brake starts to apply, then promptly return the handle to position No. 3, (Lap). This brake application must be obtained with a brake pipe reduction of not more than 3 pounds. The brake pipe pressure must continue to drop until the quick service limiting valve closes, so that the total brake pipe reduction will not be less than 4 pounds or more than 10 pounds. A further drop in brake pipe pressure may be due to brake pipe leakage or failure of the quick service limiting valve to close.

### 2. Brake Pipe Leakage Test

Make a further brake pipe reduction until a total of 15 pounds has been obtained, then return the device handle slowly to position No. 3 (Lap). Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure which must not exceed 2 pounds in one minute. If brake pipe leakage exceeds this limit and no leakage of the brake pipe and its connections can be detected by means of soap suds, excessive leakage may be due to failure of quick service limiting valve to close. A slight pumping action of the emergency piston, indicated at the quick action exhaust, will not affect the leakage test.

NOTE—When testing single cars equipped with Type "A" Quick Service Valve, a greater quick service activity will be indicated, and the brake pipe reduction may exceed the 10 pounds maximum specified above. If the brake pipe reduction, however, exceeds 14 pounds, it may be due to excessive quick service valve piston friction or failure of the quick service limiting valve to close.

### 3. Auxiliary Reservoir Leakage Test

During the brake pipe leakage test, if the "AB" valve releases the brake in less than one minute with the device handle in position No. 3 (Lap), it indicates a leaky graduating valve, slide valve, auxiliary reservoir, auxiliary reservoir pipe, or a leak into the brake pipe past the rotary valve of the test device.

In AB-1-B equipment, release of brakes, as indicated by movement of the brake cylinder piston to release position, may be due to safety valve or selector valve diaphragm leakage.

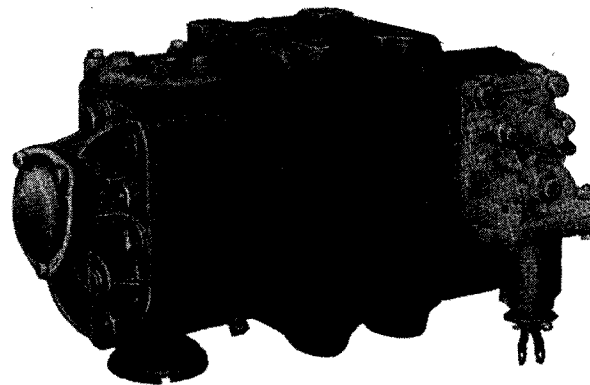


Fig. 11. The "AB" Valve with Plain Accelerated Release Cap

#### 4. Release Test

Move the device handle to position No. 2. The piston and slide valve must move to release position within the time specified.

Cars of 50 ft. or less	Cars 51 to 60 ft.	Cars 61 to 72 ft.
20 sec. + 5 sec. for each 1 lb. brake pipe leakage	25 sec. + 10 sec. for each 1 lb. brake pipe leakage	30 sec. + 15 sec. for each 1 lb. brake pipe leakage

During the release test, the pressure in the supply line must not drop below 70 pounds, but if it does, means must be provided for increasing the supply pressure to 70 pounds and the test repeated.

#### 5. Service Stability Test

Move the device handle to position No. 1 to charge the brake pipe and reservoirs to 70 pounds. Move the device handle to position No. 5, reducing brake pipe pressure 20 pounds, then slowly return the handle to position No. 3 (Lap). This test must not produce an emergency application.

#### 6. Emergency Test

With the device handle still in position No. 3 (Lap), open the test device  $\frac{3}{8}$ " cock. This test must produce an emergency application as indicated by the venting of brake pipe pressure to zero.

NOTE—In rare instances failure to obtain emergency in Test No. 6 may be caused by a decrease in the quick action chamber volume in the pipe bracket due to the accumulation of excessive moisture or by a badly restricted quick action chamber charging choke.

#### 7. Release Test after Emergency

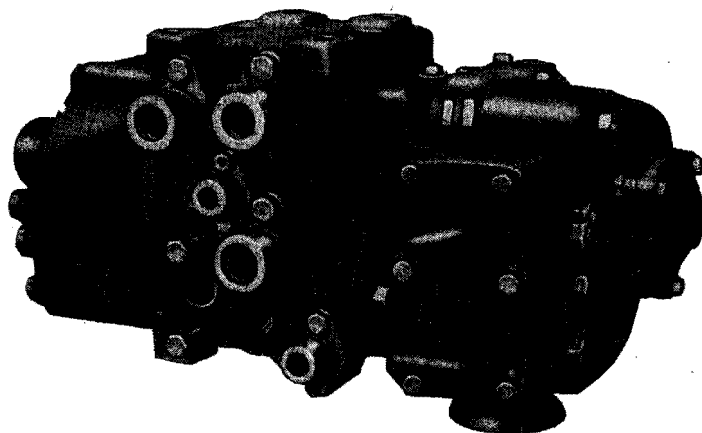
At the completion of the emergency test, wait approximately one minute before attempting a release in order to permit the quick action chamber pressure to exhaust to atmosphere.

Move the device handle to position No. 1 and charge the brake pipe to 28 pounds then immediately return the device handle to position No. 3 and note that the brake pipe pressure continues to rise, due to the air from the brake cylinder and auxiliary reservoir flowing into the brake pipe. This will indicate that the emergency piston has moved to accelerated release position.

When these pressures are nearly equalized, this additional flow of air to the brake pipe will be cut off, and the test device handle should then be moved to position No. 1 to permit the brake pipe to be charged until the "AB" valve service parts move to release position.

NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.





**Fig. 12. Type AB-1-B Valve for Fast Freight Service**

## **Freight Equipment**

### **"AB-1-B" Valves for Fast Freight Service**

When testing cars equipped with AB-1-B Valves, the brake equipment must be subjected to all tests prescribed for Type AB Freight Valves. If the valve fails to pass these tests, or if any erratic action on the part of the control portion is discovered, the portions (including the selector valve portion) must be removed for further investigation on the AAR standard test rack. If a blow occurs at the selector valve portion vent port, with the control valve in either release or application position, it may indicate a ruptured diaphragm in the selector valve portion.

At the completion of these tests the Single Car Testing Device must then be connected to the Signal Pipe by means of a Type "HUF" Hose Coupling, N. Y. A. B. Pc. N-5499 (W.A.B. Pc. 46150), which consists of a double end coupling, one end suitable for coupling with the standard Signal Pipe Coupling, the other end suitable for coupling with the standard Brake Pipe coupling of the Single Car Testing Device. To the other end of the car couple on a dummy signal pipe hose coupling.

The signal pipe must then be charged to a pressure between 45 and 60 lbs. by moving the device handle to position No. 1 and then back to position No. 3 (Lap). Should a blow occur at the selector valve portion vent port, it may also indicate a ruptured diaphragm.

With the device handle in position No. 3 (Lap) observe the brake pipe hand of the device gage for any drop in pressure, which may indicate signal pipe leakage. This drop must not exceed 3 lb. in one minute from 45 lb. pressure.

## Freight Equipment

**“AB-8” and “AB-10” Empty and Load  
and “AB-4-12” Equipments**

### TEST CODE

The tests are to be made with 70 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

#### Test for Testing Device

Before coupling the testing device to the brake pipe hose, move test device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

#### Connecting Device to Car

Connect the test device end marked B.P. to the brake pipe hose at one end of the car; to the other end of the car, couple on a dummy hose coupling. Open both angle cocks, move the device handle to position No. 1 and charge the brake pipe and reservoirs to 70 pounds.

### 1. Application Test

With the device handle in position No. 1, charge the brake pipe and reservoirs to 70 pounds, then move the device handle to position No. 3 for five seconds to determine if the equipment is completely charged. With the equipment charged to 70 pounds, move the device handle to position No. 4 and reduce brake pipe pressure 12 pounds, then slowly return the handle to position No. 3 (Lap). Note that the brake pipe pressure does not continue to drop, and that the brake applies. A further drop in brake pipe pressure may be due to brake pipe leakage or failure of the quick service limiting valve to close. When the car is empty or less than half loaded, only one brake cylinder must apply; when the car is approximately half loaded to fully loaded, both brake cylinders must apply with the “AB” Empty and Load Equipment. With the “AB 4-12” Equipment, both the 4” and 12” brake cylinders must apply regardless of car loading.

### 2. Brake Pipe Leakage Test

Make a further brake pipe reduction until a total of 15 pounds has been obtained, then return the device handle slowly to position No. 3 (Lap). Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure which must not exceed 2 pounds in one minute. If brake pipe leakage exceeds the limit, and no leakage of the brake pipe and its connections can be detected by means of soapsuds, excessive leakage may be due to failure of the quick service limiting valve to close. A slight pumping action of the emergency piston, indicated at the quick action exhaust, will not affect the leakage test.

### 3. Auxiliary Reservoir Leakage Test

During the brake pipe leakage test, if the "AB" valve releases the brake in less than one minute with the device handle in position No. 3 (Lap), it indicates a leaky graduating valve, slide valve, auxiliary reservoir, auxiliary reservoir pipe, or a leak into the brake pipe past the rotary valve of the test device.

### 4. Release Test

Move the device handle to position No. 2. The piston and slide valve must move to release position within the time specified.

Cars of 50 ft. or less	Cars 51 to 60 ft.	Cars 61 to 72 ft.
20 sec. + 5 sec. for each 1 lb. brake pipe leakage	25 sec. + 10 sec. for each 1 lb. brake pipe leakage	30 sec. + 15 sec. for each 1 lb. brake pipe leakage

During the release test, the pressure in the supply line must not drop below 70 pounds, but if it does, means must be provided for increasing the supply pressure to 70 pounds and the test repeated.

### 5. Service Stability Test

Move the device handle to position No. 1 to charge the brake pipe and reservoirs to 70 pounds. Move

the device handle to position No. 5, reducing brake pipe pressure 20 pounds, then slowly return the handle to position No. 3 (Lap). This test must not produce an emergency application.

### 6. Emergency Test

With the device handle still in position No. 3 (Lap), open the test device  $\frac{3}{8}$ " cock. This test must produce an emergency application as indicated by the venting of brake pipe pressure to zero.

NOTE—In rare instances failure to obtain emergency in Test No. 6 may be caused by a decrease in the quick action chamber volume in the pipe bracket due to the accumulation of excessive moisture or by a badly restricted quick action charging chamber choke.

### 7. Release Test after Emergency

At the completion of the emergency test, wait approximately one minute before attempting a release in order to permit the quick action chamber pressure to exhaust to atmosphere.

Move the device handle to position No. 1 and charge the brake pipe to 28 pounds then immediately return the device handle to position No. 3 and note that the brake pipe pressure continues to rise, due to the air from the brake cylinder and auxiliary reservoir flowing into the brake pipe. This will indicate that the emergency piston has moved to accelerated release position.

When these pressures are nearly equalized, this additional flow of air to the brake pipe will be cut off, and

NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.

the test device handle should then be moved to position No. 1 to permit the brake pipe to be charged until the "AB" valve service parts move to release position.

### Strut Cylinder Test for AB-8 and AB-10 Equipment

Charge and maintain the brake pipe pressure at not to exceed 25 pounds, then inspect the pipe and its hose connections leading from the change-over valve to the top of the strut cylinder and, if the car is empty, also inspect the duplicate of this pipe between the strut cylinder and the change-over valve. If the car is loaded, there will be no air pressure in this second pipe and it can be pressure tested only by jacking up the end of the car body. All leaks and other irregularities must be corrected.

With the brake pipe charged and maintained to exceed not over 25 pounds, note that the strut cylinder piston foot is down. Slowly charge and maintain the brake pipe pressure at 40 pounds. Note that the strut cylinder piston foot moves or has moved up. In some instances it may require a few seconds after the brake pipe is charged to 40 pounds pressure before the strut cylinder piston starts to move). If the strut cylinder piston operates outside these limits, it may be due to improper operation of the cut-off valve portion or the strut cylinder.

For Adjustment of the Strut Cylinder, see Instruction Leaflet No. 2391, Sup. 1.

## Freight Equipment

All Triple Valves (Including KD-4-12)

Except AB Valves

### TEST CODE

The tests are to be made with 70 to 90 pounds in the supply line. Before the test apparatus is attached to the supply line, the line must be blown out.

The specified length of cars and pressures used for testing are as follows:

Supply Pressure (Pounds)	Car Length (Feet)	
	Standard Pipe	Extra Heavy Pipe
70	Under 46	Under 50
80	From 46 to 60	From 50 to 70
90	From 60 to 76	From 70 to 90

### Test for Testing Device

Before coupling the testing device to the brake pipe hose, move the device handle to position No. 3 (Lap) and open the cock in the supply pipe. There should be no escape of air from the brake pipe connection or exhaust port of the test device.

### Connecting Device to Car

Connect the test device end marked B.P. to the brake pipe hose at one end of the car; to the other end of the car, couple on a dummy hose coupling. Open both angle cocks, move device handle to position No. 1 and charge the brake pipe and auxiliary reservoir to supply pressure.

### Test for Proper Supply Pressure

When the length of the car is not known, in order

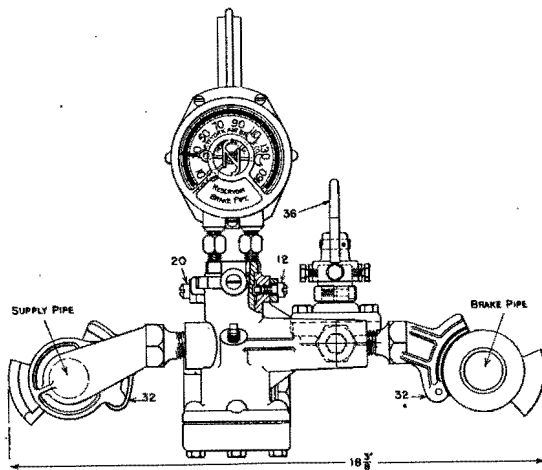
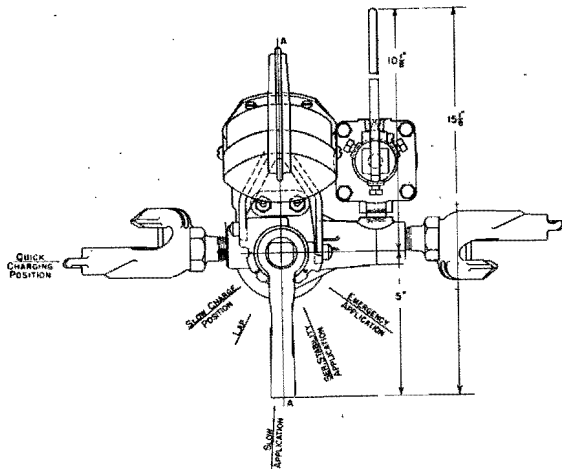


Fig. 13. Views from Assembly Drawing of the Single Car Testing Device

to determine the proper supply pressure to be used on the car under test, proceed as follows:

Close the branch pipe cutout cock. With the brake pipe charged to 70 pounds, move the device handle to position No. 5, reducing the brake pipe pressure from 70 to 50 pounds. If the time for this drop in pressure is 7 seconds or less, 70 pounds must be used in the supply line. If the time is more than 7 and not over 9 seconds, 80 pounds supply must be used. If the time is between 9 and 11 seconds, 90 pounds supply pressure must be used.

At the completion of this test, open the branch pipe cut-out cock and move the device handle to position No. 1 to recharge the brake pipe and auxiliary reservoir to the proper pressure as determined.

### 1. Application Test

Move the device handle to position No. 4, reducing the brake pipe pressure 10 pounds, then return the handle to position No. 3 (Lap).

The brake must apply before the brake pipe pressure is reduced the amount specified.

NOTE—When testing a car with KD-4-12 equipment, both the 4" and 12" brake cylinder pistons must apply. The 4" Take-Up Cylinder piston must move its full travel before the 12" cylinder piston commences to move.

If both the 4" and 12" cylinder pistons apply simultaneously, the transfer valve must be removed and tested per shop test rack code.

Failure to apply indicates that the valve must be removed for further investigation on the A.A.R. standard triple valve test rack. *Triple valves that fail to apply after a release in position No. 1, must not be removed unless they fail to apply after being released in position No. 2.*

## 2. Brake Pipe Leakage Test

Move the device handle to position No. 5, and reduce the brake pipe pressure 5 additional pounds, then return handle slowly to position No. 3 (Lap).

Observe the pressure on the brake pipe gage. Leakage in the brake pipe will be indicated by a drop in pressure, which must not exceed 2 pounds in one minute.

## 3. Auxiliary Reservoir and Graduating Valve Leakage

During the brake pipe leakage test, if the triple valve releases the brake in less than one minute with the device handle in position No. 3 (Lap), it indicates a leaky graduating valve, a leak from the auxiliary reservoir volume, or a leak into the brake pipe past the rotary valve of the test device.

## 4. Release Test

Move the device handle to position No. 2. The piston and slide valve must move to release position within one minute. Failure to release in the time specified indicates that the triple valve must be removed for further investigation on the A.A.R. standard triple valve test rack.

NOTE—When testing a car with KD-4-12 equipment, the 12" brake cylinder piston must move to release position before the 4" cylinder piston commences to return. If this sequence is not obtained the transfer valve must be removed and tested per shop test rack code.

*During the release test, the pressure in the supply line must not vary more than 2 pounds. When the variation is greater, means must be provided for maintaining a constant pressure and the test repeated.*

## 5. Emergency Test

Move the device handle to position No. 1 to recharge the brake pipe and auxiliary reservoir to supply pressure. When testing triples on cars under 46 feet in length, move device handle to position No. 6, reducing brake pipe pressure 20 pounds. When testing triples on cars over 46 feet in length, move device handle to position No. 3 (Lap) and open test device  $\frac{3}{8}$ " cock ( $\frac{1}{4}$ " orifice) reducing brake pipe pressure 20 pounds. This test must produce emergency. If emergency application is not obtained, it indicates that this triple valve must be removed for further investigation on the A.A.R. standard triple valve test rack. At the completion of test move the device handle to position No. 1 and note that there is no prolonged blow at the triple valve exhaust, indicating that the quick action parts have assumed their normal position.

## 6. Service Stability Test

With the device handle in position No. 1, recharge the brake pipe and auxiliary reservoir to supply pressure. Move device handle to position No. 5, reducing brake pipe pressure 20 pounds. This test must not produce emergency. If emergency application is obtained, it indicates that this triple valve must be removed for further investigation on the A.A.R. standard triple valve test rack. At the completion of this test, move the device handle to position No. 6.

NOTE—For Brake Cylinder and Retaining Valve Tests see Instructions on Page 54.

## TEST RACK DETAILS

- 1 Air Strainer, Pc. 70800 or N-958.
- 1 3/4" Supply Cock, Pc. 96041 or 149-TA.
- 1 Type F Feed Valve Pipe Bracket, Pc. 18240 or EV-715C.
- 2 1/2" Cut-out Cock, Pc. 95413 or 151-TA.
- 1 10x24" Supply Reservoir, Pc. 510500 or N-3120.
- 2 3/4x60" Hose with FP-3 Couplings and 1/2" Nipple, Pc. 33987 or N-2414.
- 1 10x14 1/2" Operating Reservoir, Pc. 96801 or N-3610.
- 2 Single Pointer Air Gages, Pc. 83882 or N-1796.

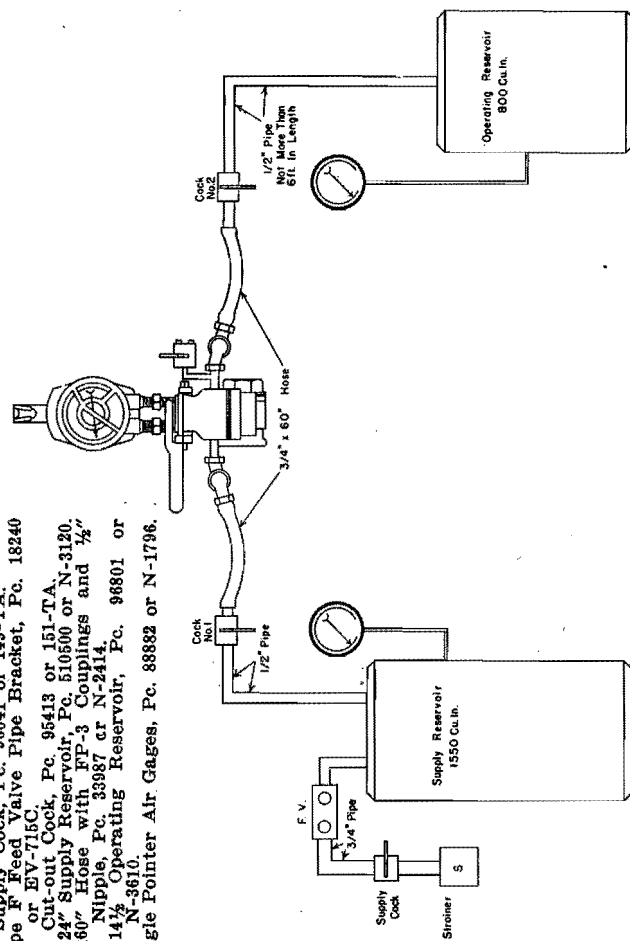


Fig. 14. Diagrammatic View of Arrangement for Testing the FREIGHT Single Car Testing Device

## GENERAL INSTRUCTIONS for TESTING and MAINTAINING the FREIGHT SINGLE CAR TESTING DEVICE

To secure reliable and uniform results with the *single car testing device*, it must be kept free from leakage and must be tested not less than once each 30 days, or oftener if necessary, and any leakage discovered must be corrected.

As often as service conditions require, the rotary valve and test device 3/8" cock must be lubricated with graphite grease. With the standard quick opening diaphragm cock, it is necessary to apply only a little graphite grease to the cam part of the handle where it contacts the actuating plunger. Where test device with key type cock is in use, the key should be removed, cleaned, and lubricated with graphite grease.

The test gage must be kept accurate, and must be compared with a master gage as often as the device itself is being tested.

NOTE—The 3/8" Test Device Cock (1/4" orifice), N. Y. A. B. Co. Pc. No. 2354 (W.A.B. Pc. No. 91148), is now furnished with new Freight Single Car Testing Devices. The customer should install this cock on all freight car testing devices not so equipped.

### Operation Test

Assemble the device on the rack as illustrated by Fig. 14. Open the supply cock.

The feed valve must be set to close at 70 pounds.

Operate the valve several times by moving the device handle from position No. 1 to position No. 6, finally leaving the handle in position No. 3 (Lap).

Commence test with all numbered cocks closed and test device handle in position No. 3 (Lap). Open cock 1 and the test device  $\frac{3}{8}$ " cock. Coat the opening of the  $\frac{3}{8}$ " cock with soapsuds in order to detect rotary valve leakage to brake pipe. Close the  $\frac{3}{8}$ " cock and coat the device exhaust port with soapsuds for rotary valve leakage in positions No. 3, 4, 5 and 6. Leakage permitted for the above test is a bubble not larger than 1" in diameter in five seconds. At the completion of test, move the device handle to position No. 1.

Open cock 2, and when the operating reservoir pressure reaches 58 pounds, move the device handle to position No. 2. Note that the operating reservoir charges from 60 to 65 pounds in 25 to 30 seconds. At the completion of test, move the device handle to position No. 1 and charge the reservoir to 70 pounds.

Move the device handle to position No. 4. The operating reservoir pressure must reduce from 70 to 60 pounds in 10 to 12 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 5. The operating reservoir pressure must reduce from 70 to 50 pounds in 5 to 7 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 6. The operating reservoir pressure must reduce from 70 to 30 pounds in  $3\frac{1}{2}$  to 5 seconds. At the completion of test, move the device handle to position No. 1 and recharge.

Move the device handle to position No. 3 (Lap). Open the test device  $\frac{3}{8}$ " cock and observe on the operating reservoir gage that the operating reservoir pressure reduces from 70 to 10 pounds in not more than  $3\frac{1}{2}$  seconds or less than 3 seconds. At the completion of test, close all cocks and remove device from the test rack.

### Positions of Freight Test Device

Position No. 1—M.R. charges brake pipe through  $\frac{1}{4}$ " opening.

Position No. 2—M.R. charges brake pipe through .0225" (No. 74 drill) opening.

Position No. 3—Lap.

Position No. 4—Brake pipe pressure reduces through .035" (No. 65 drill) opening.

Position No. 5—Brake pipe pressure reduces through .0781" ( $\frac{1}{16}$ " drill) opening.

Position No. 6—Brake pipe pressure reduces through .147" (No. 26 drill) opening.

$\frac{3}{8}$ " Test Device Cock—Brake pipe pressure reduces through .250" ( $\frac{1}{4}$ " drill) opening.



# Brake Cylinder and Retaining Valve

## TEST CODE

The following repair track test code, which covers the necessary tests for retaining valve and for brake cylinder leakage and piston travel according to A.A.R. Rules covering Maintenance of Brakes and Train Air Signal Equipment, supplements the tests prescribed on the preceding pages of this Instruction Pamphlet for other brake devices.

When testing cars equipped with a two or three position retaining valve or three position retaining valve converted to the equivalent of a four position Release Control Retainer, an Exhaust Gage Fitting as shown by Fig. 15 must be available. This fitting must be inserted

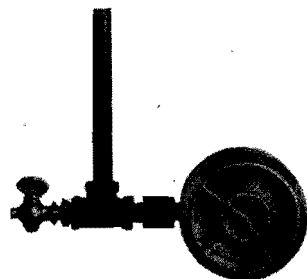


Fig. 15. Exhaust Gage Fitting for testing Retaining Valve with Tapped Exhaust Port.

N.Y.A.B. Pc. N-5524  
(W.A.B. Pc. 522598)

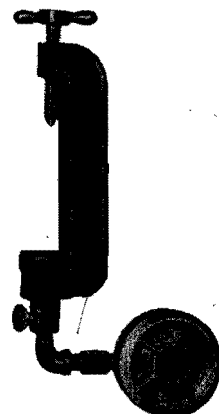


Fig. 16. Release Control Retainer Exhaust Gage Fitting.

N.Y.A.B. Pc. N-5308  
(W.A.B. Pc. 519117)

into the tapped retainer exhaust port after the wasp excluder, if equipped with such, has been removed.

When testing cars with the four position Release Control Retainer, the Exhaust Gage Fitting as shown by Fig. 16 must be used and clamp-mounted to the retainer.

## Test No. 1. Leakage

Attach the proper exhaust gage fitting and close the bleed cock. Turn the retainer handle down to "Direct Exhaust" position.

Make applications and releases of the brake until 50 pounds or more brake cylinder pressure is indicated on the exhaust fitting air gage when the handle of the single car testing device is in No. 1 position. If in excess of 50 pounds, the pressure must be reduced to 50 pounds through the bleed cock.

The piston travel must be within, or adjusted to, the permissible A.A.R. limits or 7 inches minimum and 9 inches maximum.

Observe the test gage for leakage from the combined volumes of the brake cylinder, retaining valve and their relative piping. The drop in pressure, indicated on this gage, must not exceed the amount specified below.

*5 pounds in one minute* (from 50 pounds) when testing a car on which the brake equipment has been given the attention specified in A.A.R. Maintenance Rule 110 for a car with stencil "Out-Of-Date".

*8 pounds in one minute* (from 50 pounds) when testing an "In-Date" car (A.A.R. Maintenance Rule 102).

If the drop in pressure exceeds the amount specified, inspect the retaining valve, retaining valve pipe and brake cylinder pipe, and eliminate any leakage. If no leakage is found, or if the elimination of the leakage found does not reduce the leakage observed on the test gage to less than the limits specified, it indicates a faulty brake cylinder (or in the "AB-1-B" equipment, safety valve leakage or ruptured selector valve diaphragm), in which case the defective conditions must be corrected: and furthermore, A.A.R. Maintenance Rule 110 must be applied, if on an "In-Date" car. If the drop in pressure does not exceed the above specified limits proceed as follows:

### Test No. 2. Retaining Valve Test

#### SECTION "A"

Cars equipped with "Two Position" or "Three Position" Retaining Valve

##### "TWO POSITION" RETAINING VALVE

Move the retainer handle up to "Retaining Position" and immediately open the bleed cock. Note that a continuous exhaust of air through the choked exhaust port in the retaining valve cap is obtained.

Three (3) minutes after the air commences to exhaust, move the retaining valve handle to "Direct Exhaust" position and note that a sufficient blow is obtained to indicate that effective brake cylinder pressure has been retained.

Replace the wasp excluder if the retainer is equipped with one.

##### "THREE POSITION" RETAINING VALVE

Move the retainer handle up to "High Pressure" position and immediately open the bleed cock. Note that a continuous exhaust of air through the choked exhaust port in the retaining valve cap is obtained.

Fifteen (15) seconds after the air commences to exhaust, move the retaining valve handle to "Low Pressure" position and note that air continues to exhaust through the choked exhaust port.

Three (3) minutes after the air commences to exhaust, move the retaining valve handle to "Direct Exhaust" position and note that a sufficient blow is obtained to indicate that effective brake cylinder pressure has been retained.

Replace the wasp excluder if the retainer is equipped with one.

#### SECTION "B"

Cars equipped with either the "Four Position" Release Control Retainer or "Three Position" Retaining Valve converted to the Equivalent of the Release Control Retainer

##### CONVERTED "THREE POSITION" RETAINING VALVE

Move the retainer handle up to "Slow Direct Exhaust" position, open the bleed cock and note that a continuous exhaust of air through the bleed cock is obtained.

Fifteen (15) seconds after the air commences to exhaust move the retainer handle to "High Pressure" position and note that a continuous exhaust of air through the choked exhaust port in the retainer cap is obtained.

Thirty (30) seconds after the air commences to exhaust, move the retainer handle to "Low Pressure" position and note that air continues to exhaust through the choked exhaust port in the retainer cap.

Three (3) minutes after the air commences to exhaust, move the retainer handle to "Direct Exhaust" position and note that a sufficient blow is obtained to indicate that effective brake cylinder pressure has been retained.

Remove the test gage and replace the wasp excluder if the retainer is equipped with one.

##### "FOUR POSITION" RELEASE CONTROL RETAINER

Move the retainer handle up to "Slow Direct Exhaust" position, open the exhaust gage fitting bleed cock and note that a continuous exhaust of air from the bleed cock is obtained.

Fifteen (15) seconds after the air commences to exhaust, move the retainer handle to "High Pressure" position and note that air continues to exhaust from the bleed cock.

Thirty (30) seconds after the air commences to exhaust, move the retainer handle to "Low Pressure" position and note that air continues to exhaust from the bleed cock.

Three (3) minutes after the air commences to exhaust, move the retainer handle to "Direct Exhaust" position and note that a sufficient blow is obtained to indicate that effective brake cylinder pressure has been retained.

Remove the Exhaust Gage Fitting from the Release Control Retainer.

If, during the above tests of the two position, three position or four position retaining valve, any erratic retainer operation is noted in any of the positions, such as failure of air to exhaust, abnormally slow or fast rates of brake cylinder pressure blow down, or air being entirely exhausted before the retainer handle is moved to "Direct Exhaust Position", the Retainer Valve must be repaired or removed from the car and replaced with one known to be in good repair. Any defective retaining valve which has been removed, should be returned to the shop for repairs and more exhaustive tests in accordance with the shop test code.

### Diaphragm Type Cocks

The following instructions should be observed in the operation of test devices which include the *diaphragm type cock* instead of the key type.

Care should be exercised in operating the diaphragm type cock in order to realize the benefits to be derived from the use of this improved type cock, that is, eliminating leakage (thereby giving consistent and dependable test results) and obviating the delay and annoyance incident to reseating, lubricating and replacing cock keys.

When the test device is not in use, the diaphragm cock should be *open*. This practice will prolong the life of the diaphragm by preventing permanent set as the diaphragm is in normal position with the cock open, see Fig. 17.

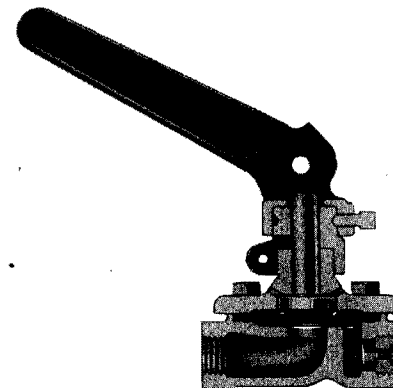


Fig. 17. Sectional View of the Quick Opening Diaphragm Cock with Lever Type Handle

### **Quick Opening Diaphragm Cock**

The distinctive features of this improved diaphragm cock (now supplied as standard with the Single Car Testing Device) are: (a) the quick opening lever type handle, the radial position of which is adjustable to any angle, and (b) controlled diaphragm compression, by means of an adjustment which regulates the amount of travel of the parts transmitting handle movement to the diaphragm.

To adjust the diaphragm compression (or deflection), loosen the cap screw which serves to clamp the split coupling on the threaded portion of the cover and screw down or back off the coupling to increase or decrease the diaphragm compression until the force imparted to the diaphragm by the cam portion of the handle (through the medium of plunger and disc) is just sufficient to prevent leakage past the diaphragm with the handle in closed position.

The clamping cap screw should be tightened when the desired compression on the diaphragm is obtained. The handle position can then be adjusted to the desired angle by loosening three set screws in the handle fulcrum and rotating handle and fulcrum around the clamped coupling. The three set screws must be retightened to hold the handle in place and to permit proper operation of the diaphragm.