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Other Languages: NONE **Author:** Caleb Iverson
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Coding Information

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Title: LT, RH- Hydraulic Clutch Diagnostic & Service Information

Applies To: LT, RH, Equipped with a Manual Transmission and Eaton Advantage Solo Self-Adjusting Clutch

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

12/20/2017 - Added RH to "Applies To"
 09/11/2017 - Formatting corrected
 08/16/2017 - Updated parts notes, only one slave cylinder is required for repair: hydraulic with air assist or hydraulic clutch without air assist.
 07/03/2017 - Added Eaton Manual links
 06/30/2017 - Initial Article Release

DESCRIPTION

This iKNOW document is designed to outline the specific clutch service procedures with hydraulic clutch release systems.

SYMPTOM(s)

Customer Observations or Concerns:

Spongy Pedal
 Won't go into gear
 No clutch brake

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description
N/A	N/A

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions


Hand Operated Vacuum Pump Tester	ZTSE2499		Vacuum Bleed Procedure
Solo Clutch Resetting Tool	RR1005CL		
Clutch Measurement Tool	RR1007CL		




SERVICE PARTS INFORMATION


Kit Description	Part Number	Quantity Required	Notes
CYLINDER, CLUTCH OPERAT,	3868300C94	1	
CYLINDER, CLUTCH OPERAT OR MAST 35.7MM ID	3866376C91	1	Order only if not equipped Air Assist
CYLINDER, CLUTCH OPERAT AIR ASSIST OR MAST 35.7MM ID	3866377C91	1	Order only if equipped with Air Assist
HOSE FLEX HYDRAULIC CLUTCH	3953848C1	1	
CLAMP, PIPE SGL-CUSHIONED 7/16 ID X .281 MOUNTING	98959R1	2	
BOLT M6 X 25 PHC CLS 10.9	30194R1	2	M6 X 25
NUT, HEXAGON HEAD FLANGE CLASS 10 M6	40233R1	2	M6 X 25
WASHERS, FLAT METRIC	1696027C1	4	M6
1 GALLON BRAKE FLUID	428104C1	1	


DIAGNOSTIC STEP(s)

 WARNING:	
To prevent property damage, personal injury, and / or death, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.	

 WARNING:	
To prevent property damage, personal injury, and / or death, remove the ground cable from the negative terminal of the battery box before disconnecting any electrical components. Always connect the ground cable last.	

 WARNING:	
To prevent property damage, personal injury, and / or death, if the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip or fall over.	

 WARNING:	
To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.	

 WARNING:	
To prevent property damage, personal injury, and / or death, park vehicle on a hard, flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in either direction.	

Step	Action	Decision
#1	If symptoms above are present, replace the master cylinder, air assist servo cylinder hose, and the hydraulic hose between them.	Continue to Step 2.

Step	Action	Decision
#2	Perform re-routing procedure here . Then perform the clutch bleeding procedure outlined here .	Continue to Step 3.

Step	Action	Decision
#3	DIAGNOSTIC: Measure clutch pedal free-play using Clutch Measurement Tool (RR1005CL): 1. Depress the pedal by hand until the master cylinder begins to stroke. Is clutch pedal free-play between 0.4" and 0.6"?	Yes. Continue to Step 4.
		No. Adjust Clutch Linkage follow the Eaton Manual on Page 8.

Step	Action	Decision
#4	DIAGNOSTIC: Measure release bearing gap using clutch measurement tool (RR1007CL). See page 8, step 3 of Eaton Manual for reference, if needed. Is release bearing gap .490" to .560"?	Yes. Continue to Step 5.
		No. Perform In Vehicle Resetting Procedure in the Eaton Manual on page 14.

Step	Action	Decision
#5	DIAGNOSTIC: Measure clutch brake squeeze: 1. Insert 0.010" feeler gauge between release bearing and clutch brake 2. Measure how far the clutch pedal is from the floor at time of release of 0.010" feeler guage. See page 9 of Eaton Manual for reference, if needed. Is clutch brake squeeze 1" from the floor?	Yes. Finish repairs and release truck.
		No. Repeat Step 2.

REPAIR STEP(s)

Routing and Clipping

Master Cylinder Supply Hose Routing

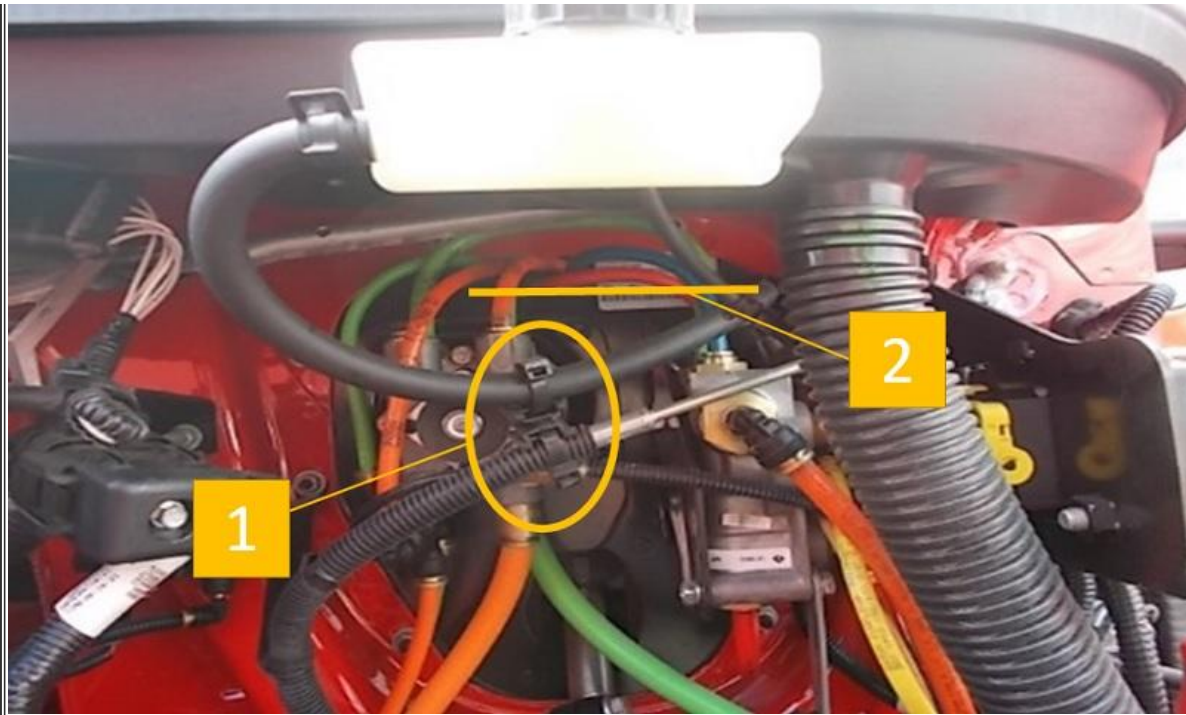


Figure 1. Incorrect Master Cylinder Supply Hose Routing

Item 1: P-trap

Item 2: Master Cylinder Inlet level

Note: In Figure #1 you can see that the master cylinder supply hose is clamped down to the air assist servo cylinder supply hose. This creates a p-trap (aeration) at the master cylinder. To remove the air from the system, proper routing must be achieved.

1. Cut 2 zip ties holding the master cylinder supply hose down to the air assist servo cylinder supply hose.

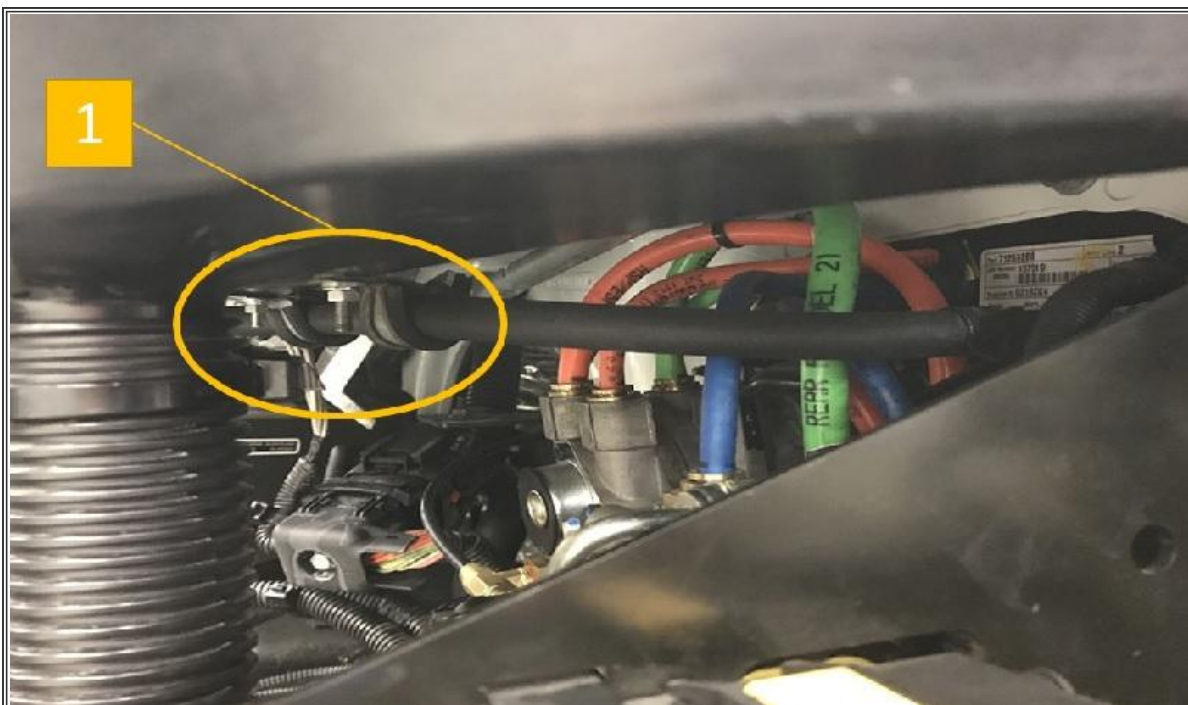


Figure 2. Correct Master Cylinder Supply Hose Routing

Item 1: New Supply Hose Clipping Points



Figure 3. Top View of Cowl Tray

Item 1: Drilling locations

2. Drill 2 holes in the approximate location (Figure 3, Item 1) in the cowl tray using a 1/4" drill bit.
3. Using 2 bolts, 2 nuts, 4 washers and 2 p-clamps secure the master supply hose to the cowl tray.

Air Assist Servo Supply Hose Routing



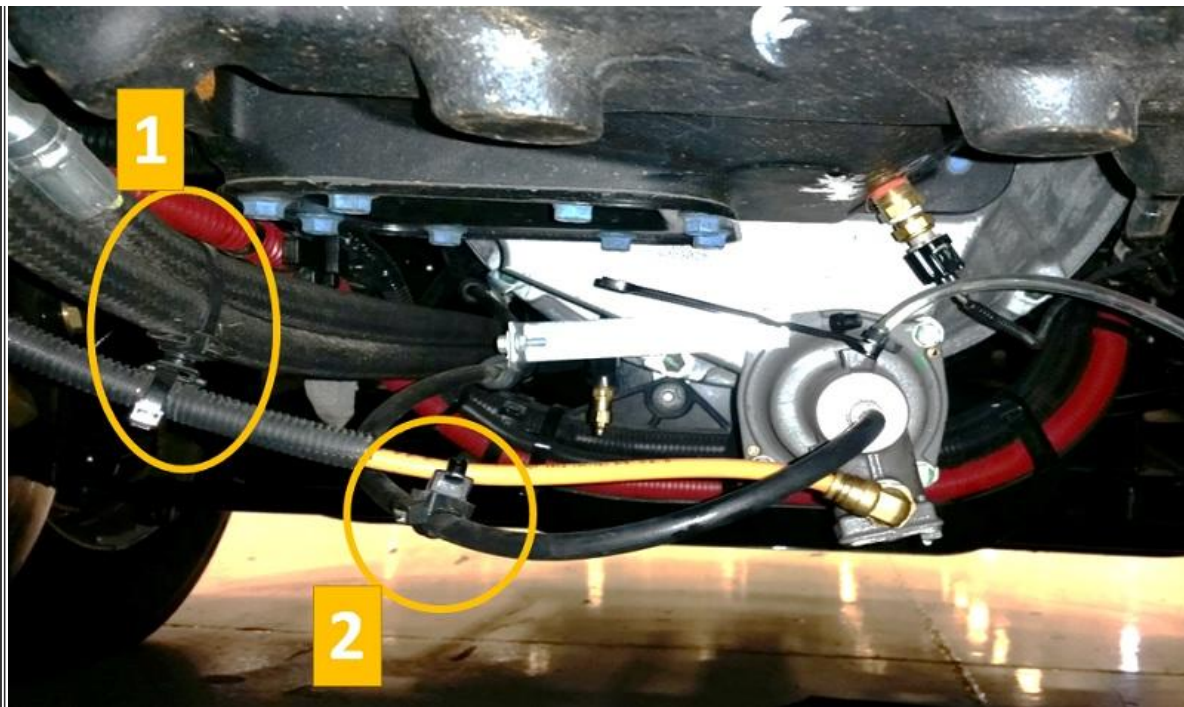


Figure 4. Incorrect Air Assist Servo Cylinder Supply Hose Routing

Item 1: Saddle clamp on the wrong side of transmission cooler lines

Item 2: Saddle clamp

1. Disconnect the air hose from the air assist servo cylinder.
2. Cut the zip tie at the saddle clamp (Figure 4, Item 2).



Figure 5. Correct air assist servo Cylinder Supply Hose Routing

Item 1: Air line routed over transmission cooler lines
Item 2: Saddle clamp
Item 3: Extension Brake Repositioned

3. Re-position the extension bracket (Figure 5, Item 3) bolted to the air assist servo cylinder as high as possible without causing a hose rub condition.
4. Re-route the air line over the transmission cooler lines (Figure 5, Item 1).
5. Secure the air line to the air assist servo cylinder supply hose with a new zip tie to the saddle clamp (Figure 5, Item 2).
6. Re-insert the air line into the air assist servo cylinder air supply connection.

Bleeding Procedure

Hand Operated Vacuum Bleeding Procedure

1. Pull vehicle into the shop, apply parking brake, chock wheel and open hood.
2. Drain air tanks.

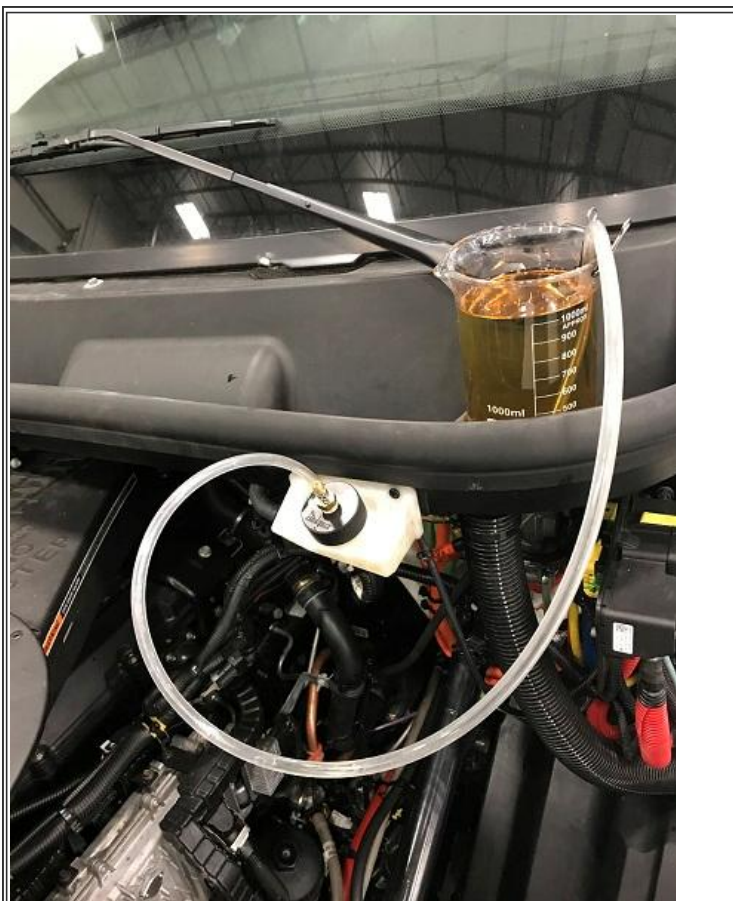


Figure 6. Reservoir Hook-up

3. Fill a clean container full of brake fluid (at least a quart).
4. Install reservoir adapter cap.
5. Insert tube from reservoir adapter cap into container full of brake fluid, submerge until 10mm from the bottom of the container.

6. Set container full of brake fluid on the cowl to allow gravity feed.

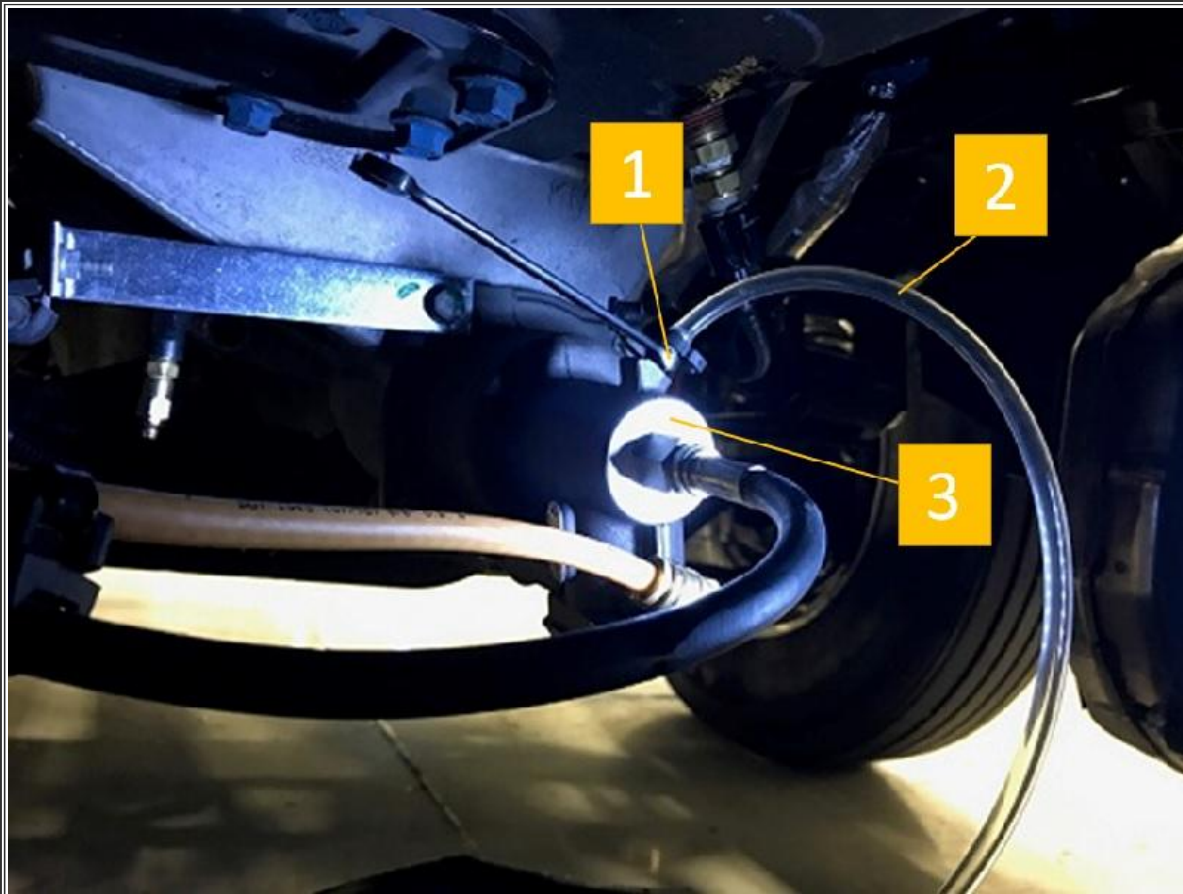


Figure 7. Air Assist Servo Bleeder Screw

Item 1: Bleeder Screw

Item 2: Hand Operated Vacuum Pump Suction Hose

Item 3: Air Assist Servo

7. Set-up hand operated vacuum pump to the air assist servo bleeder screw.

8. Pump hand operated vacuum pump up to 15" of mercury and then open the bleeder screw.

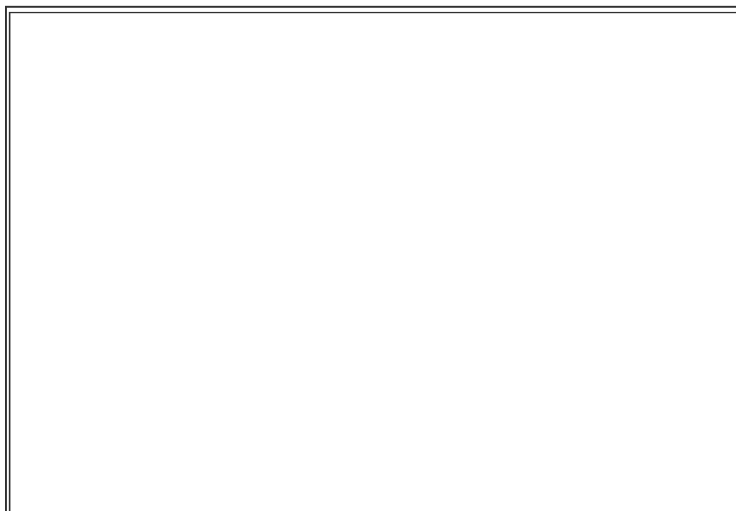




Figure 7. Hand Operated Vacuum Pump

9. Continue pumping keep vacuum needle between 10" and 15" of mercury.
10. Once container on hand operated vacuum pump is full, close the bleeder screw.
11. Release the pressure in the hand operated vacuum pump by pressing the relief valve.
12. Dump the brake fluid into an empty container.
13. Set-up the hand operated vacuum pump again to pull vacuum.
14. Pump hand operated vacuum pump up to 15" of mercury and then open the bleeder screw.
15. Continue pumping keep vacuum needle between 10" and 15" of mercury, while doing this have an assistant press the clutch pedal twice. Perform this step three times.
16. Adjust fluid level to max level.
17. Install battery/skirt cover.
18. Return to step 3 in step based diagnostics.

WARRANTY INFORMATION

Group:	11000 - Clutch
Noun:	352 - Hose / Pipe

Warranty Claim Coding:

Refer to the [Warranty Coding Manual](#) for Group and Noun Codes.

Standard Repair Time(s)

Description	Chassis	SRT	Hours
Hydraulic master cylinder, hydraulic hose, and air assist servo cylinder replace Re-route hoses Includes Vacuum Bleed Procedure	LT	T-Time	2.0 HRS

Standard Repair Time(s):

Refer to the [SRT Manual](#) for Repair Times

OTHER RESOURCES

[Master Service Information Site](#)

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