



A **PACCAR** COMPANY

SERVICE MANUAL

Section	HYDRAULIC CLUTCH SYSTEM
Number	PM815002
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HYDRAULIC CLUTCH SYSTEM

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Table of Contents

Safety	1
Applies To	2
Exploded View	3
What's New	4
General Information	5
Special Tools	6
Specifications	7
How It Works	8
Maintenance	9
Disassembly / Assembly	10
Inspection	11
Troubleshooting	12
Glossary	13
Index	14

1 Safety

General Safety Instructions..... 1 - 2

Warnings, Cautions and Notes 1 - 3

General Safety Instructions

A number of alerting messages are in this manual. Please read and follow them. They are there for your protection and information. These messages can help you avoid injury to yourself or others and help prevent costly damage to the vehicle.

Warnings, Cautions and Notes



WARNING!

Always disconnect the air supply from the clutch servo before removing the clutch servo from the transmission. Do not install and pressurize the air system until the clutch servo is secured back onto the transmission. Failure to do so may result in a buildup of air pressure against the back plate which may lead to personal injury or death.



WARNING!

Brake fluid may be a hazard to human health and the environment. Always dispose of brake fluid in accordance with applicable regulations.



CAUTION

Make sure both of the torx screws that mount the master cylinder to the front wall/clutch pedal assembly are started in their threads before final torque to avoid damaging the threads in the aluminum clutch pedal casting.



CAUTION

Always maintain a minimum of 0.5 mm (0.02 in) clearance between the push rod of the clutch pedal and the hydraulic master cylinder piston. Equipment damage may occur if this clearance is not properly maintained.



CAUTION

Do not allow brake fluid to spill or come in contact with painted surfaces. In case of contact, flush the area with water.

2 Applies To

Model Chart..... 2 - 2

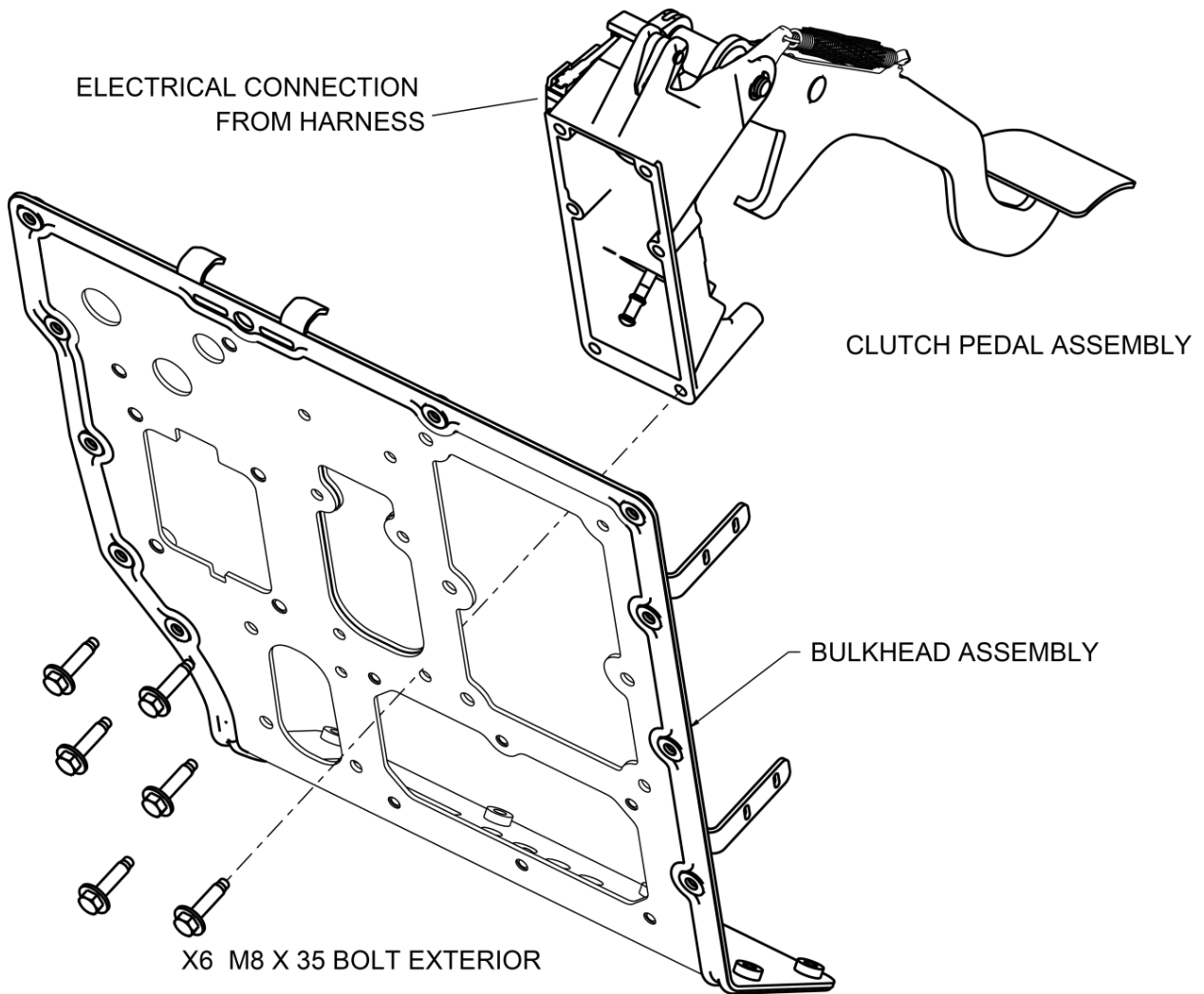
Model Chart

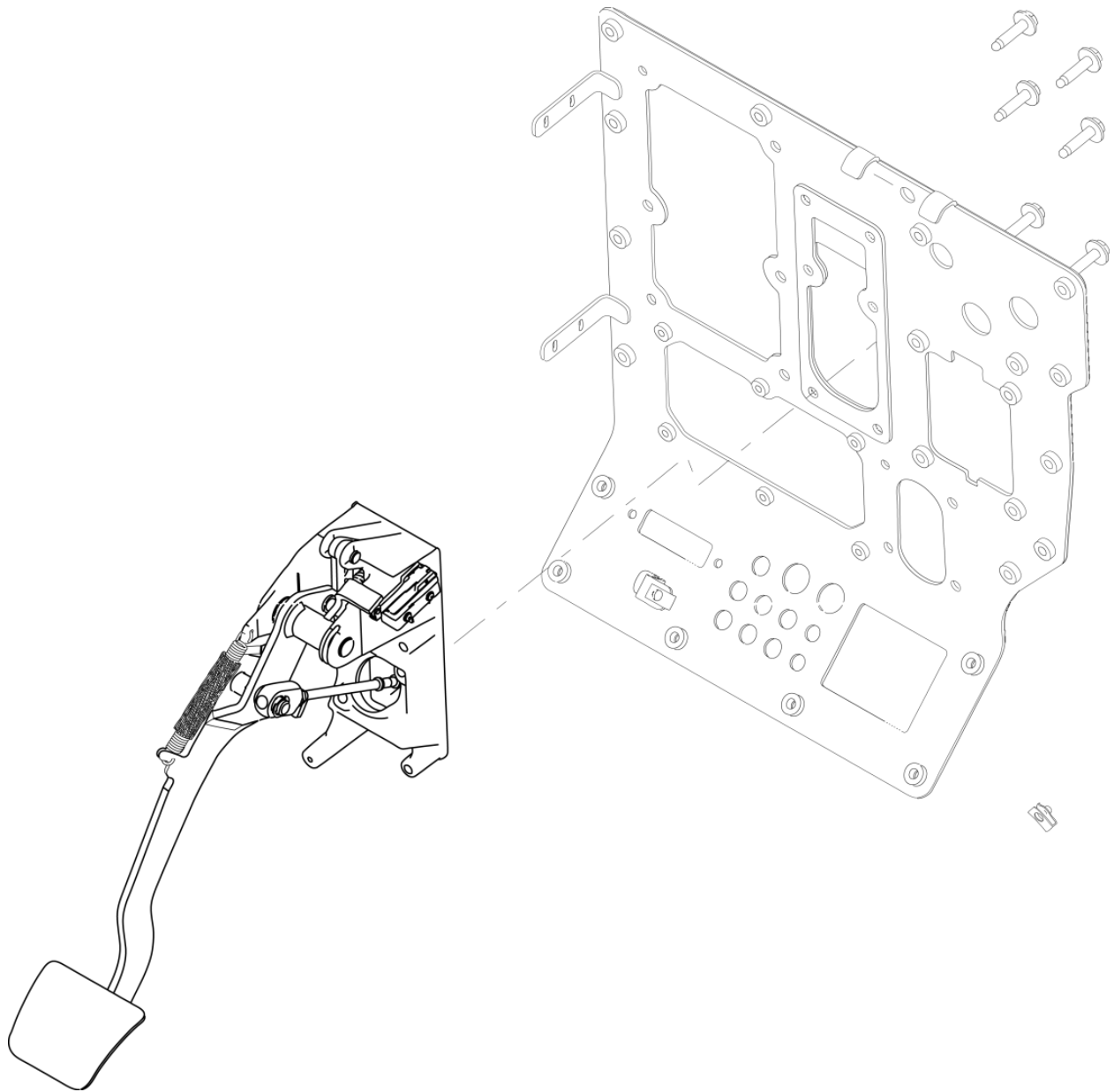
Peterbilt Model 579

3 Exploded View

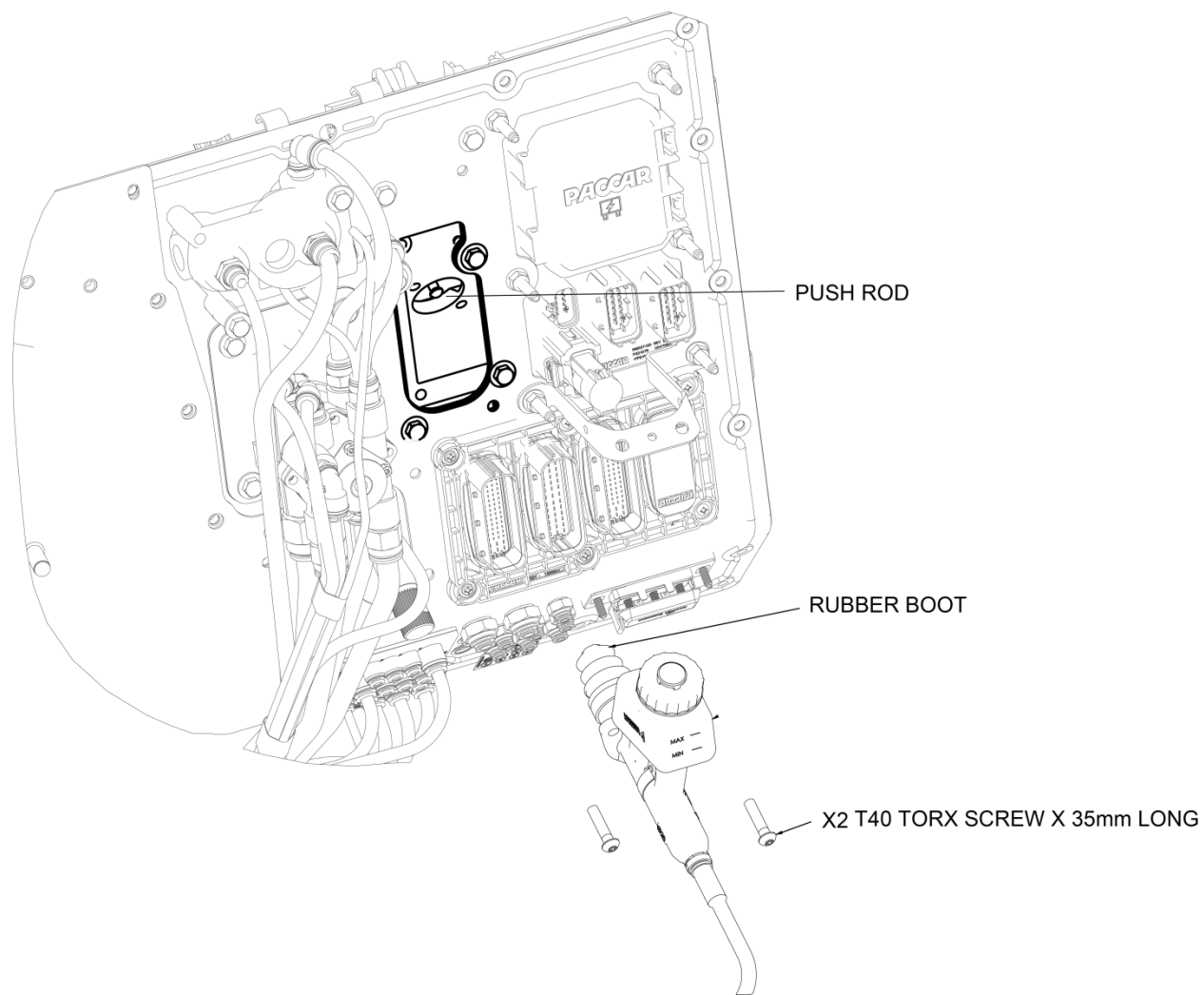
Exploded View 3 - 2

Exploded View

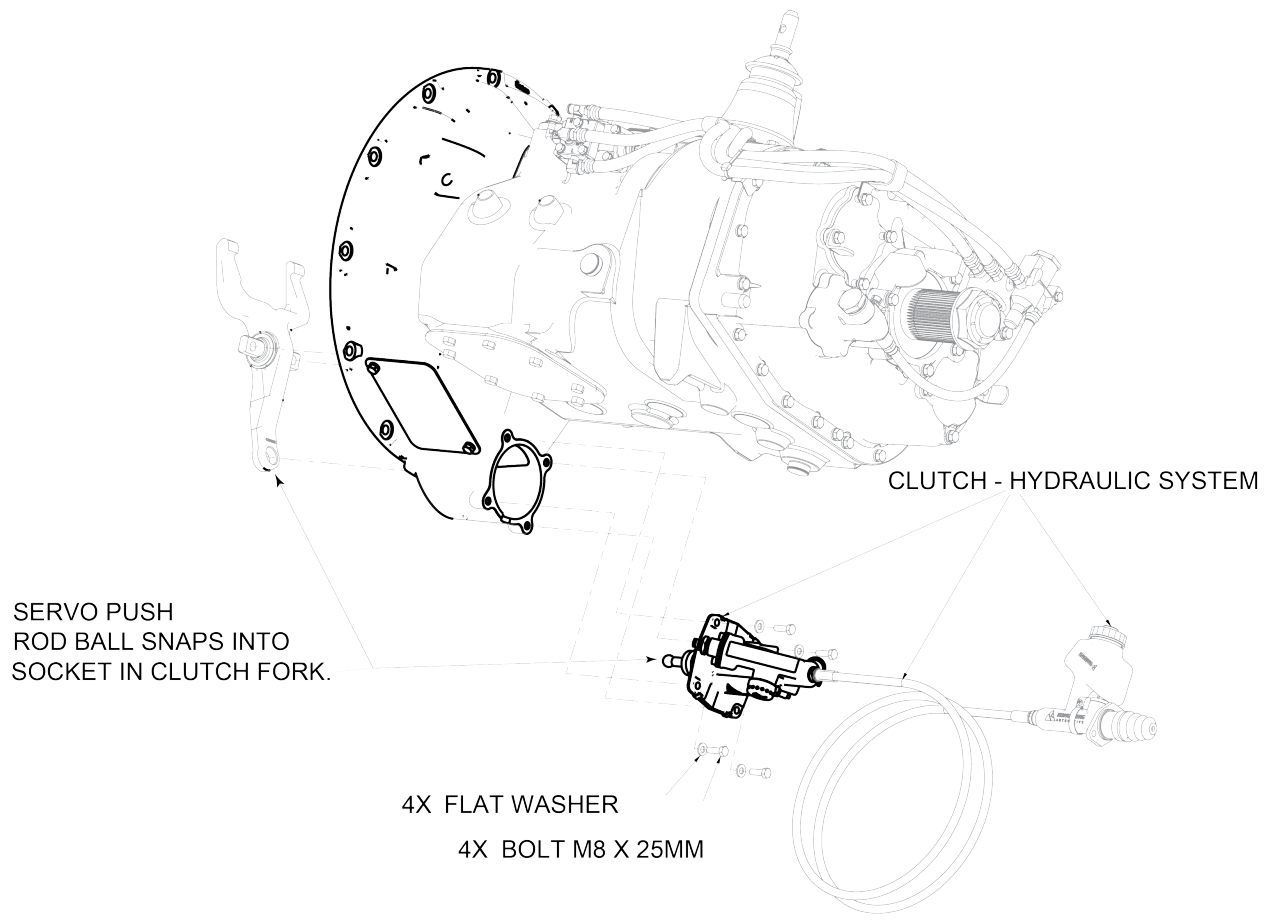




Clutch Pedal to Front Wall

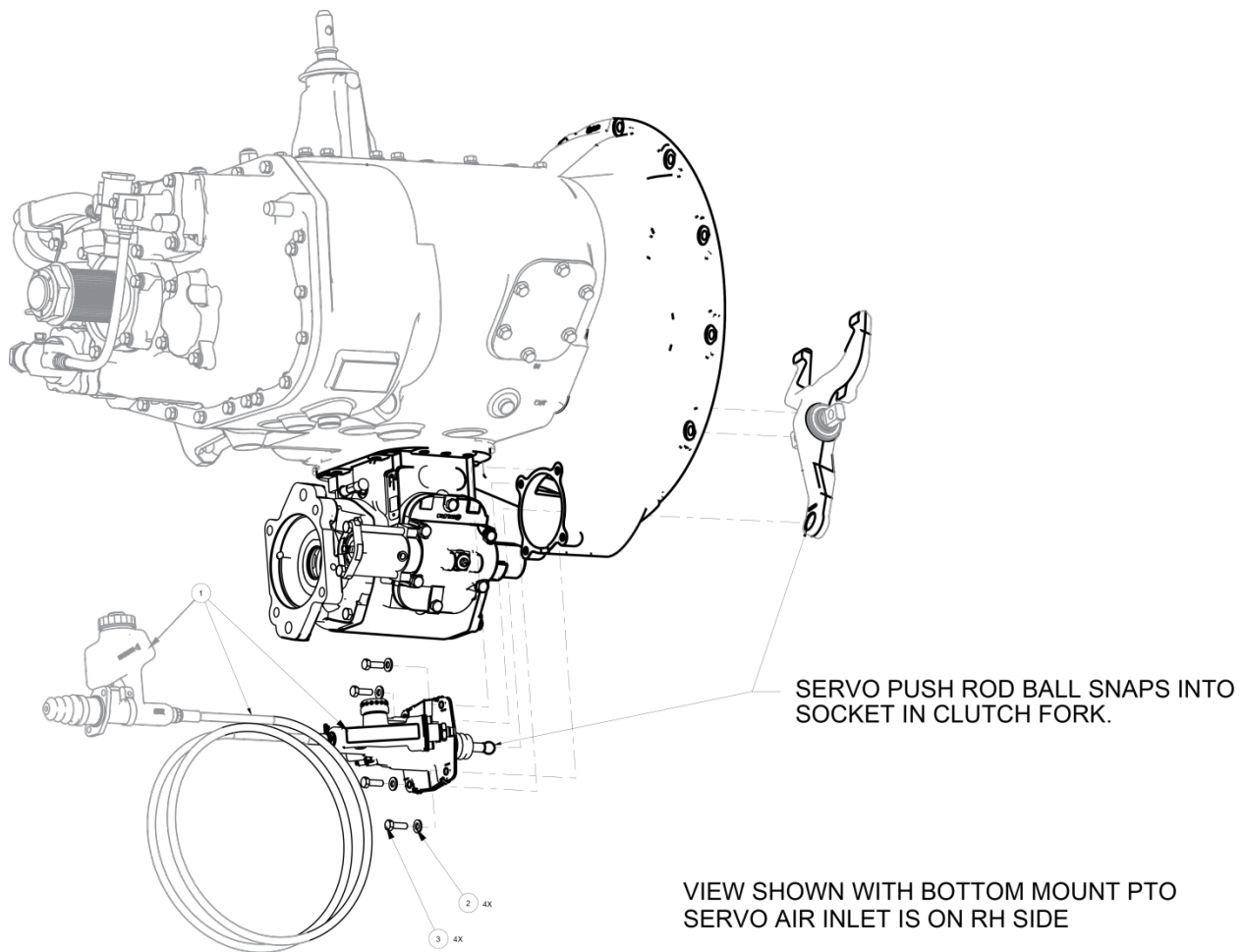


Clutch Master Cylinder To Clutch Pedal

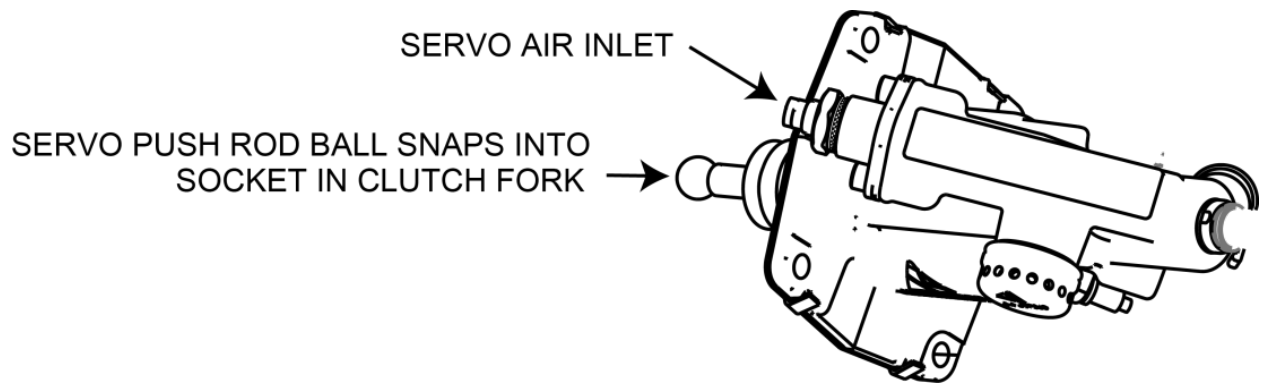


VIEW SHOWN WITHOUT BOTTOM MOUNT PTO
SERVO AIR INLET IS ON LH SIDE.

Clutch Servo Unit to Transmission - (without PTO)



Clutch Servo Unit to Transmission - (with PTO)



Clutch Air Servo

4 What's New

Introduction..... 4 - 2

Introduction

Old clutch pedal with linkages that mechanically connect the clutch pedal to the clutch fork are now replaced by a hydraulic fluid master cylinder over an air actuated clutch servo. Customers will notice a 'psst' sound at each shift of the transmission which indicates the air exhausting from the clutch servo.

There is no adjustment of the clutch pedal travel. Clutch adjustment is made manually at the clutch pressure plate. In this system, there is no adjusting the clutch pedal travel to compensate for clutch wear.

It is very important to adjust the clutch on a scheduled time frame to maximize the life of the clutch. In addition, the vehicle's air system integrity will also impact the operation of the clutch servo.

5 General Information

Introduction..... 5 - 2

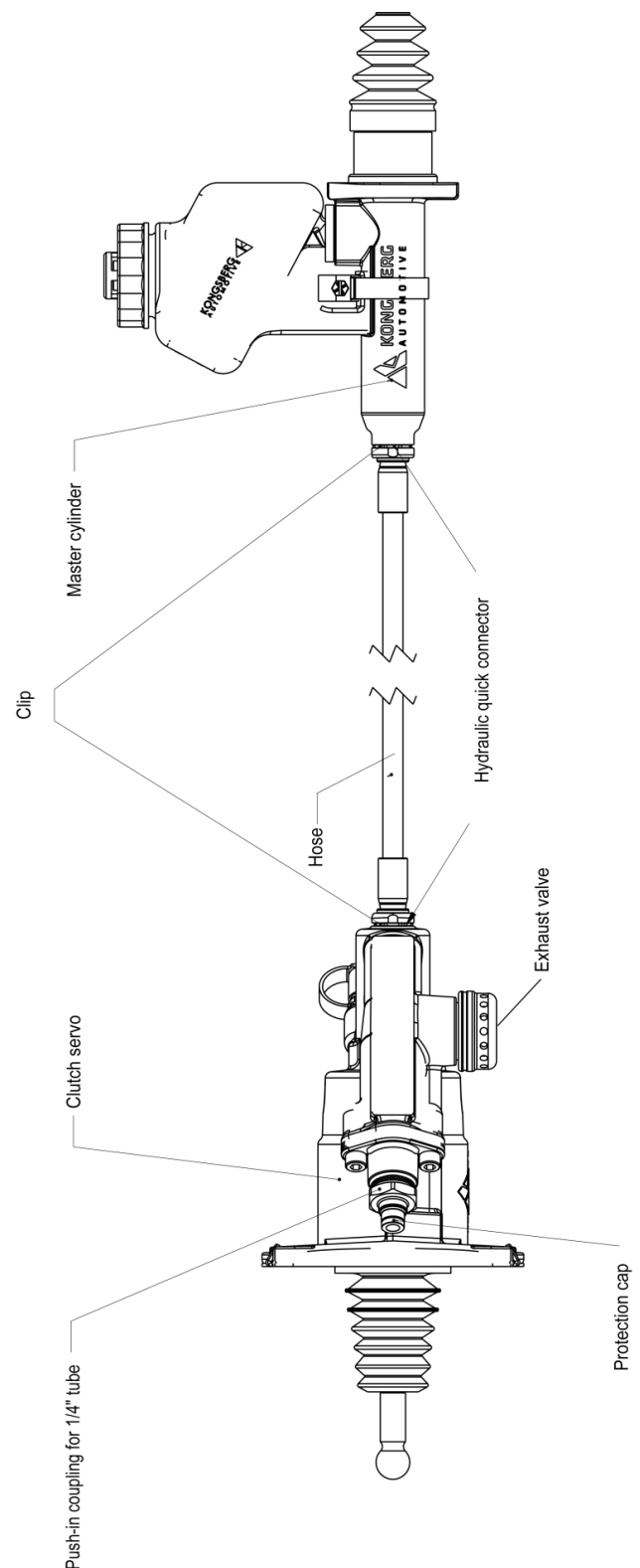
Introduction

The hydraulic clutch system consists of a clutch pedal, which contains a push rod and is mounted to the front wall of the cab. This push rod extends beyond the cab front wall and engages the hydraulic master cylinder mounted to the clutch pedal assembly, on the front wall in the engine compartment. This hydraulic clutch replaces the previous designs which used mechanical linkages and pivots approximately 1/2" to engage the clutch.

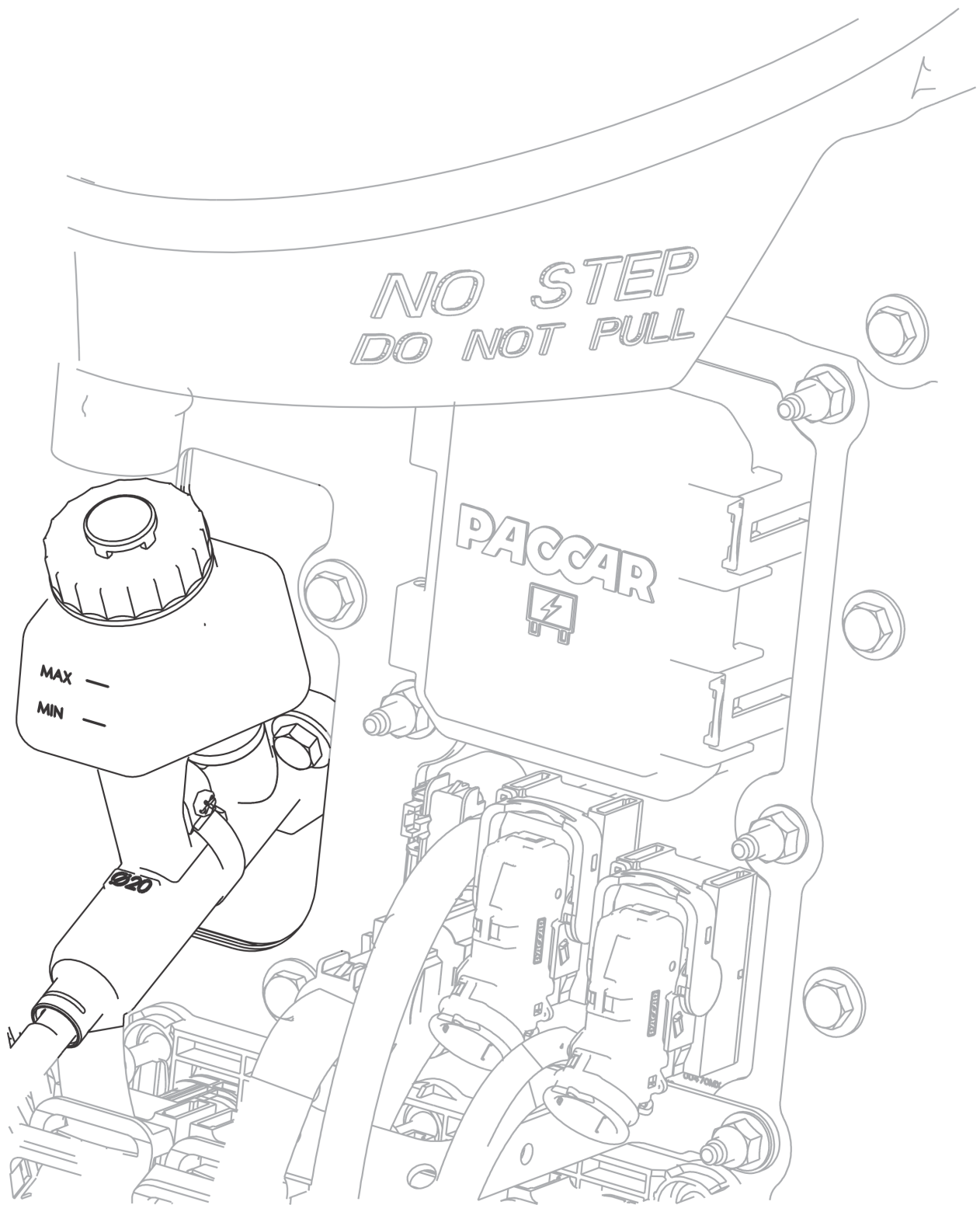
Pressing in the clutch pedal will apply pressure to the hydraulic fluid. The fluid pressure applies force to an air servo, in addition to applying force to the clutch fork actuator, in the clutch servo mounted to the transmission. When the air servo is opened, compressed air is allowed to assist the hydraulic pressure and move the clutch fork actuator.

When the clutch pedal is released, the air servo will close and compressed air will exhaust out the exhaust port.

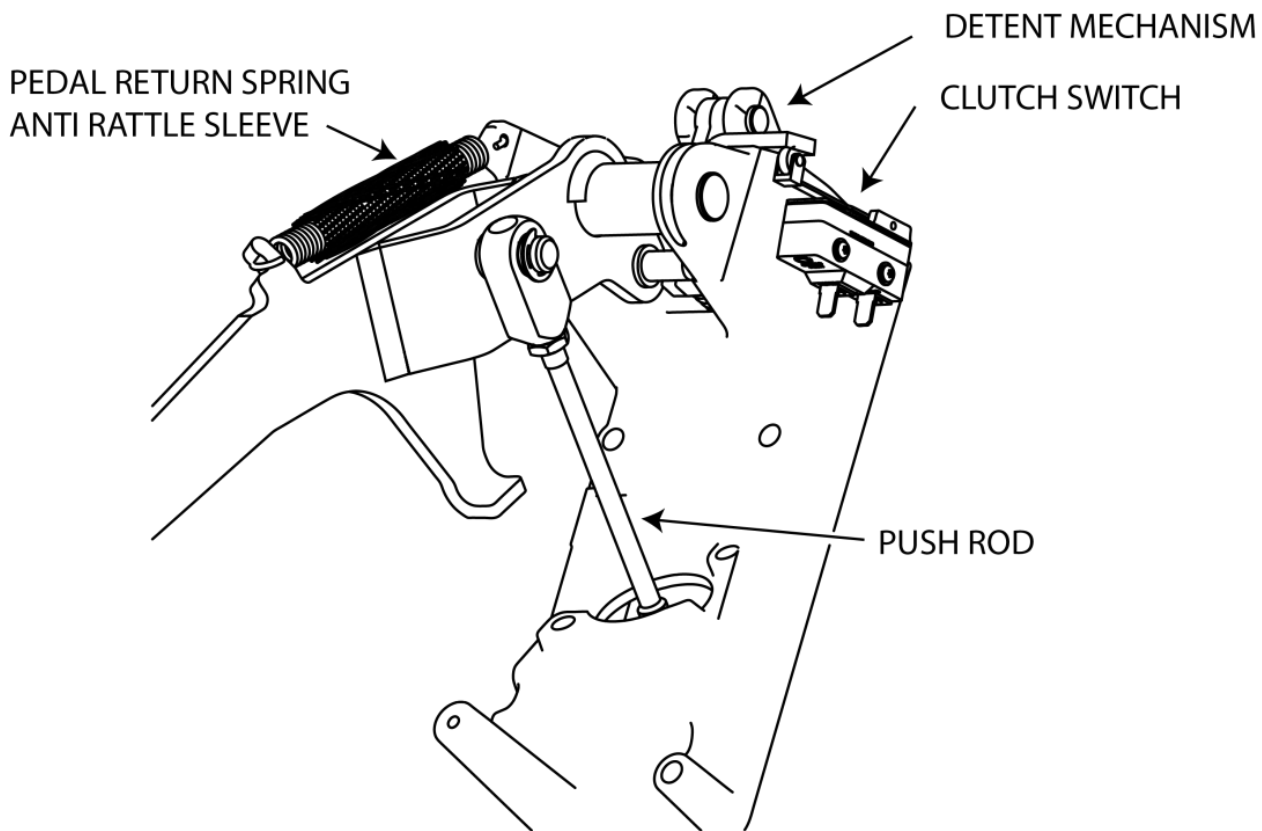
Clutch adjustment (at the clutch pressure plates) is needed when the pedal reaches the furthest down/stop position in the pedal assembly, followed by a decreased effectiveness of the clutch brake.



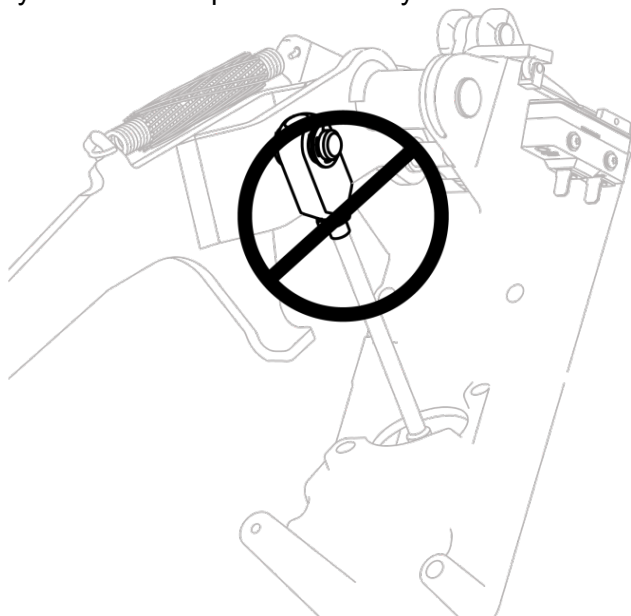
Components of the Hydraulic Clutch system



Hydraulic master cylinder on front wall



Hydraulic clutch pedal assembly details



Do not alter the position of this nut

6 Special Tools

Tools..... 6 - 2

Tools

T40 Torx

Brake and clutch hydraulic system pressure bleeding equipment.

7 Specifications

Fluid 7 - 2

Service Interval 7 - 3

Reference Material 7 - 4

Fluid

- SAE J 1703: DOT4 or DOT3
- Capacity 11 oz (320 cc)

**NOTE**

DOT4 has a higher heat resistance. DOT4 and DOT3 can be mixed.

Service Interval

- Replace fluid every 2 years.
- Bleed screw tightening specification: 6-10 Nm
(4 -7 lb-ft)
- Required clearance between push rod and master cylinder piston is 0.5 mm (0.02 in).

Reference Material

Please refer to the Kongsberg service information located on ServiceNet.

10 Disassembly/Assembly

Master Cylinder	10 - 2
Pedal	10 - 3
Servo	10 - 4
Manual Bleeding	10 - 5
Pressure Bleeding	10 - 6

Master Cylinder

There are two 8mm x 40 T40 Torx head screw that hold the hydraulic master cylinder to the clutch pedal assembly from the engine side of the front wall.



NOTE

Refer to the Kongsberg manual for disassembling the various components.

Pedal

There are 6 fasteners that hold the clutch pedal assembly, from the inside, to the front wall. Access to these fasteners is from the engine compartment.



NOTE

Refer to the Kongsberg manual for disassembling the various components.

Servo

Four 8 mm x 25 fasteners hold the clutch servo to the transmission bell housing. There is a plastic retaining clip (snap receiver) that holds the servo push rod ball into a socket on the clutch fork.




NOTE

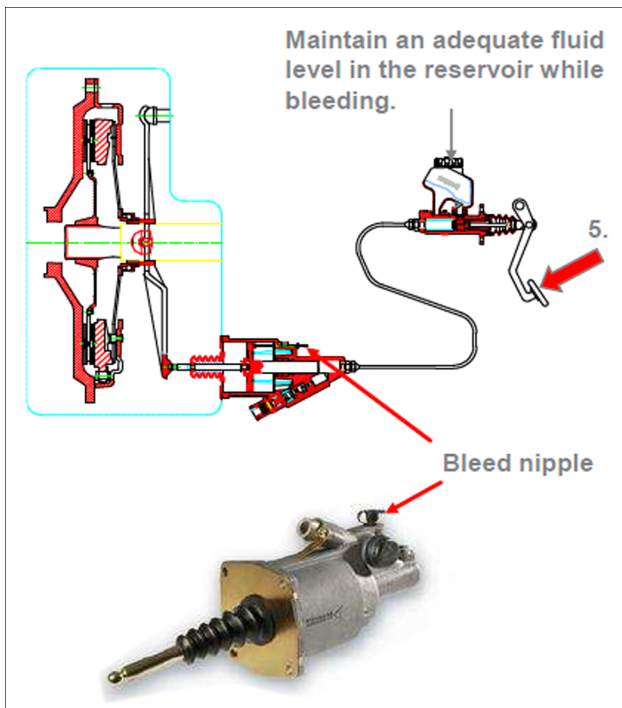
Refer to the Kongsberg manual for disassembling the various components.

Manual Bleeding

1. If starting with an empty system, fill the reservoir with new fluid.
2. Open the bleed nipple on the clutch servo.
3. Continue to fill the reservoir until the fluid starts dripping out of the bleed nipple.
4. Close the bleed nipple.
5. Slowly pump the clutch pedal a few times and keep it pressed to the floor, while opening the bleed nipple.

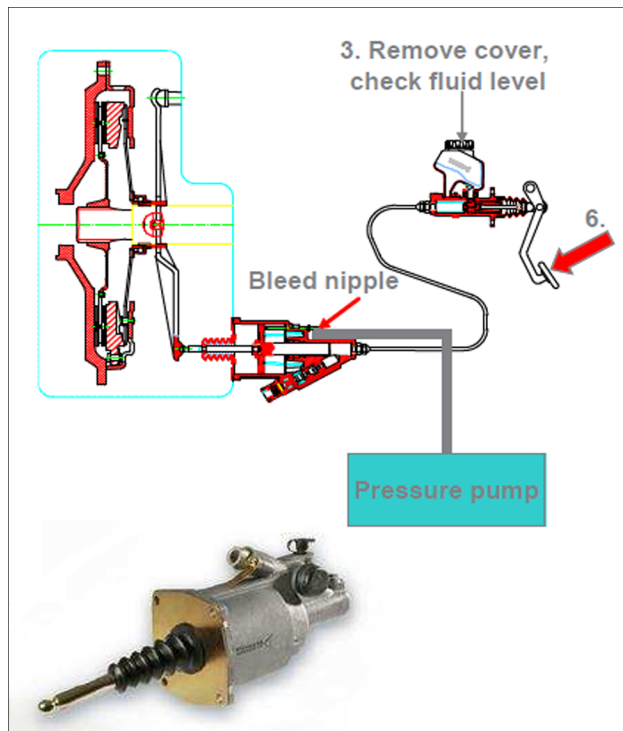
	NOTE
Do not press the pedal too quickly in order not to pump up the hydraulic system.	

6. Close the bleed nipple while still holding the pedal to the floor.
7. Repeat steps 5 and 6 until a firm pedal is obtained (all the air is evacuated). Make sure to adjust the fluid level in the reservoir to the appropriate level before replacing the reservoir cap.



Pressure Bleeding

1. Open the bleed nipple.
2. Connect hose from the pressure filling equipment to the bleed nipple.
3. Start the pump and run it until the fluid level is rising in the reservoir (see fig 2).
4. Stop the pump.
5. Close the bleed nipple and disconnect the hose from the bleed nipple.
6. Press the clutch pedal, it should be firm. If the pedal feels spongy, air exists in the system, and a manual bleeding procedure needs to be done. See the procedure "Manual Bleeding".



11 Inspection

Clutch System 11 - 2

Clutch System

At the top of the clutch pedal travel, there should be ½" (13 mm) of movement before the operator feels resistance.

At the bottom of the clutch pedal travel there should be 1" to 1 1/2 " (25-40 mm) of movement past the pedal detent, before the clutch brake being engaged.

Ensure that the air servo unit is clean and free of dirt and grime. In particular, there is a air exhaust valve on the servo. Be sure this area is clean and allowed to exhaust air.

Ensure there are no air leaks in the air lines for the hydraulic clutch air servo. Be sure there are no air leaks in the vehicle's air system.

Check to be sure the reservoir has enough fluid for service. Fluid level in the reservoir should be above the MIN line and below the MAX line.

12 Troubleshooting

General Troubleshooting Information 12 - 2

General Troubleshooting Information

Symptom	Action
Clutch pedal is pushed in but cannot shift	There is no adjustment at the clutch pedal. If the clutch pedal does not actuate the clutch, and the vehicle does not have a self-adjusting clutch, then the clutch and clutch brake need to be inspected for service. Please refer to the clutch service manuals to inspect, adjust and/or service the clutch in the transmission.
Clutch pedal is heavy or stiff	Verify that there is enough air pressure at the clutch servo. If there is less than 60 psi, there will not be enough air pressure to assist the servo in pushing the clutch fork.
Cruise control keeps disengaging	With a multimeter, verify that the clutch switch is open when the clutch is depressed and closed when the clutch is in the up position. If the CECU sees an open, it will disengage the cruise control as it thinks the operator has pushed in the clutch.
Clutch engagement or release is inconsistent	Verify that the exhaust valve is functioning and not blocked with dirt and grime. If the exhaust valve is blocked or inoperative, air will build up in the servo unit and may result in inconsistent clutch actuation.
Clutch does not release until the very top of the clutch travel	Verify that the exhaust valve is functioning and not blocked with dirt and grime. If the exhaust valve is blocked or inoperative, air will build up in the servo unit and may result in inconsistent clutch actuation.
Clutch pedal has a 'mushy' feel when pressing on the clutch pedal	The hydraulic system may have air in it. Bleed the system to remove air.

Index

A

Applies To
Model Chart 2-2

F

Filling and Bleeding
Manual Bleeding 10-5
Pressure Bleeding 10-6

G

General Information
Introduction 5-2

I

Inspection
Clutch System 11-2

S

Safety
General Safety
Instructions 1-2
Warnings, Cautions
and Notes 1-3
Special Tools
Tools 6-2
Specifications
Fluid 7-2
Service Interval 7-3

T

Troubleshooting
General
Troubleshooting
Information 12-2

W

What's New
Introduction 4-2