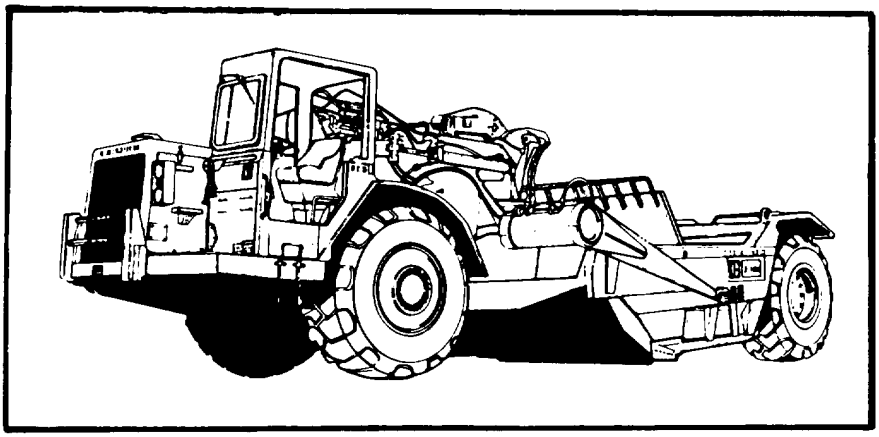
TECHNICAL MANUAL

FOR

SCRAPER, EARTH MOVING, MOTORIZED
DIESEL ENGINE DRIVEN

NSN 3805-011 53-1854



MAINTENANCE

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1985

TECHNICAL MANUAL
NO. 5-3805-248-14&P-3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC 19 Aug 1985

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FOR
SCRAPER, EARTH MOVING, MOTORIZED
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NSN 3805-01-153-1854
MAINTENANCE

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander. US Army Tank-Automotive Command, ATTN:AMSTA-MBP, Warren, MI 48397-5000. A reply will be furnished direct to you.

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PART FOUR
SOMARPI

Supplemental Operating, Maintenance and Repair Parts Instructions i

This technical manual is an authentication of the manufacturers commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

CHAPTER 1
VEHICLE SYSTEMS
COACH AND CAR AIRDRAULIC
SEAT SYSTEM

TOROUE SPECIFICATIONS: You will find instances in this publication where the manufacturer has used "Meter-Kilograms" or "Centimeter-Kilograms" in place of "Newton-Meters" for the metric torque. In these instances, use the following conversion factors to obtain the metric torque in "Newton-Meters."

lb. ft. x 1.355819 = N-m
lb. in. x 0.1129848 = N-m

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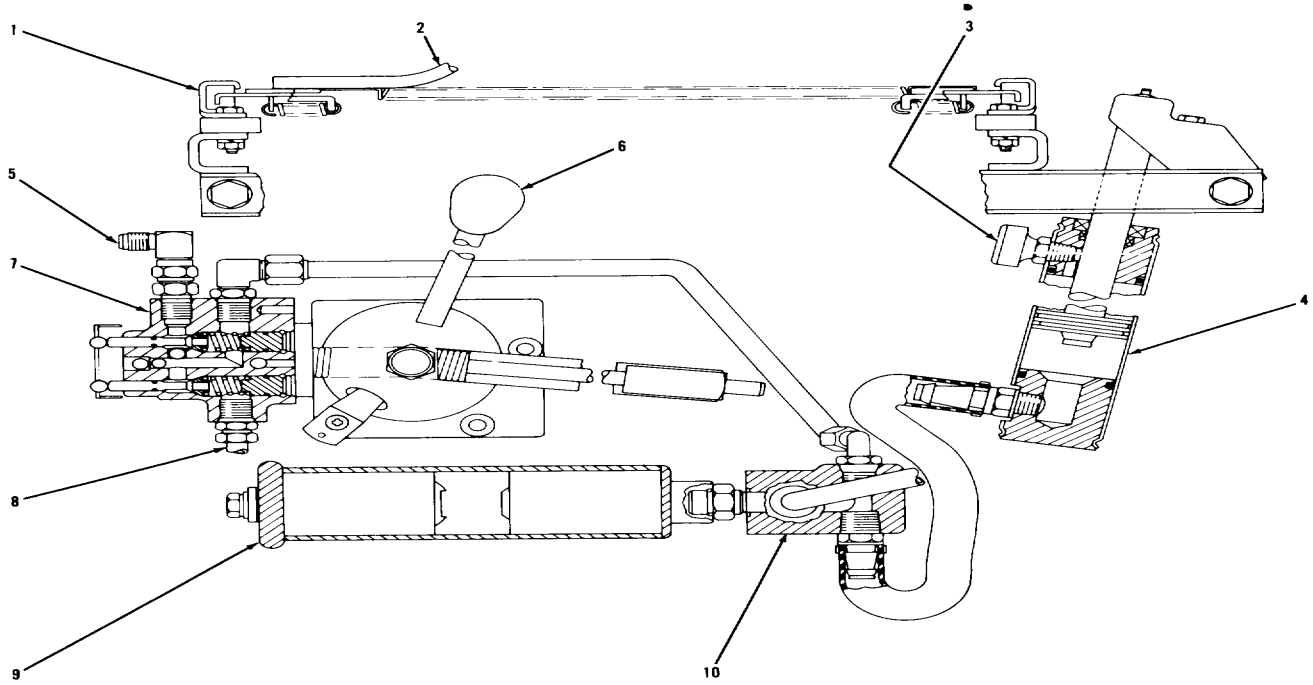
SEAT SYSTEM



SCHEMATIC OF SEAT HYDRAULIC SYSTEM

1. Bottom of seat. 2. Forward and backward adjustment lever. 3. Breather. 4. Cylinder. 5. Inlet for pressure oil from transmission
oil filter housing. 6. Height adjustment lever. 7. Height adjustment valve. 8. Outlet to reservoir. 9. Nitrogen charged accumulator.
10. Ride control valve.

*Breather has been replaced with a vent line to flywheel housing.

The breather line vents the flywheel housing and seat cylinder to the atmosphere, while retaining oil which could bypass the cylinder piston.

The suspension seat is mounted on a linkage assembly. The air-oil system supplies vertical support for the seat, plus keeps shock and vibration from the operator. The seat permits the operator to move up and down a total of four inches. He then has contact with the controls at all times. The seat will automatically adjust for the weight of the operator. Adjustments can be made to the seat for correct height and desired hardness of ride. The seat can be moved forwards and backwards a total of four inches.

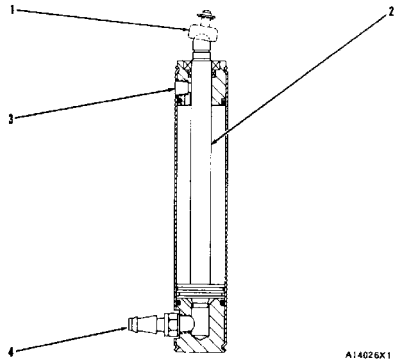
OPERATION

Oil from the transmission oil filter housing flows into inlet (5) of the height adjustment valve (7). The valve is operated by a servo-linkage (6) which opens or closes oil pressure inlet (5) and outlet to reservoir line (8). The servo-linkage is operated by the up and down movement of the seat.

The operator adjusts the seat to height needed. The position of the seat is the same until changed by the operator. When the valve is open, oil will be sent to accumulator (9) and to cylinder (4). When the seat moves up past the position set, the valve will open and oil is free to flow to the reservoir. The valve closes when the seat returns to normal position. When the height adjustment valve is closed, oil moves between the cylinder and accumulator as the seat moves up and down. The oil under pressure in the cylinder supports the weight of the seat and operator.

Cylinder

The cylinder assembly moves the weight on the seat through the oil to the nitrogen in the accumulator, which is the cushion for the seat system.



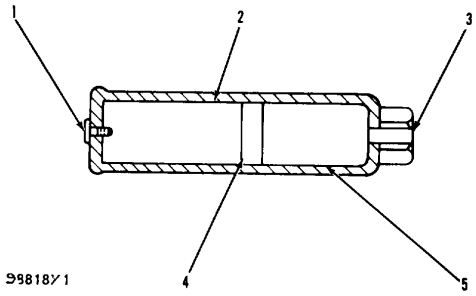
SEAT CYLINDER

1. Bearing assembly. 2. Piston rod end. 3. Opening for breather. 4. Line from ride control valve.

The cylinder is fastened to the rear of the seat frame. The bearing assembly (1) is fastened to the top of cylinder rod (2) and is connected to the seat linkage. This provides a flexible junction so the seat can move up and down freely.

Oil from the height control valve flows through line (4) to the head end of cylinder. Oil under pressure in the cylinder supports the weight of the seat and operator.

Accumulator



ACCUMULATOR

1. Charging valve. 2. Nitrogen charged chamber. 3. Oil passage. 4. Piston. 5. Oil filled chamber.

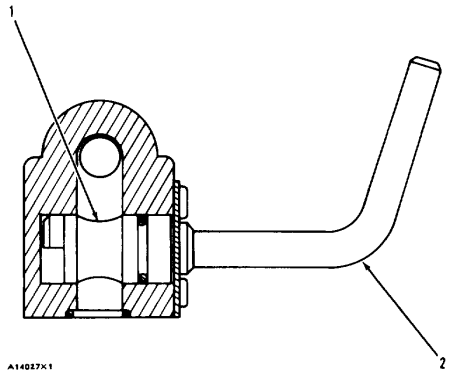
The accumulator location is horizontal across the front of the seat linkage. It is a sealed unit. A piston (4) moves in the bore of the accumulator and keeps the dry nitrogen charge separate from the oil.

A charge of dry nitrogen gas at 95 ± 5 psi (6.7 ±0.4 kg/cm2) is put into chamber (2) through valve (1). Oil from the cylinder under the seat comes in opening (3) into chamber (5). This oil pushes piston (4) toward the nitrogen and puts more force in the accumulator. More oil in the accumulator increases the pressure of the nitrogen charge.

When the height adjustment valve is opened, the correct amount of oil for the weight of the operator goes into the accumulator and cylinder. The pressure in the dry nitrogen then gives the correct spring for that operator.

Ride Control Valve

The ride control valve is a variable orifice valve (1). When lever (2) is turned down, there is a maximum flow of oil between the cylinder and the accumulator. When the lever is turned up, the flow of oil is less and the ride is harder.

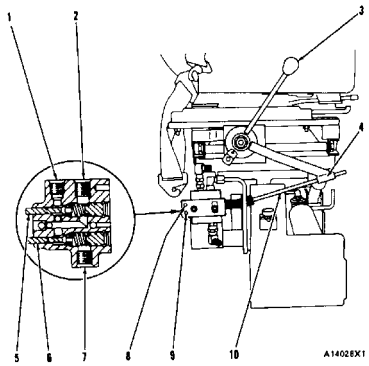


RIDE CONTROL VALVE

1. Variable orifice valve. 2. Lever.

Height Adjustment Valve

The height adjustment valve is on the right side of the seat frame. A linkage assembly is connected from the valve to the seat. When the seat moves up or down, the linkage activates the valve.



HEIGHT ADJUSTMENT VALVE AND LEVER LINKAGE

1. Inlet for pressure oil from transmission filter housing. 2. Outlet for pressure oil to cylinder. 3. Height adjustment lever. 4. Pivot. 5. Valve. 6. Valve. 7. Outlet to reservoir. 8. Valve actuator. 9. Valve actuator. 10. Spring arm.

The height adjustment lever (3) is manually adjusted. The operator adjusts the lever for the height desired. After the lever is adjusted, the height of the seat will remain the same until it is changed by the operator.

When the seat moves up, as the tractor goes over a rough surface, spring arm (10) is pulled upward at pivot (4). This will cause valve actuator (9) to push valve (6) open. Oil from the accumulator cylinder goes to reservoir through outlet (7). This lets the seat move down.

When the seat moves down, spring arm (10) pushes down at pivot (4). This will cause valve actuator (8) to push valve (5) open. Pressure oil, from the transmission filter housing flows through inlet (1) to outlet (2) to the cylinder and will move the seat up.

As the seat moves up and down, each cycle becomes shorter until it returns to the original position set by the operator. The valve is in the closed position and oil flows between the cylinder and the accumulator.

Weight adjustment is automatic. A heavier operator will cause the seat to go down. This will push the spring arm down and activate valve (5). Increased oil will increase the pressure in the cylinder and move the seat up and support the heavier operator.

Forward and Backward Adjustment

FORWARD AND BACKWARD ADJUSTMENT LEVER

1. Forward and backward adjustment lever. 2. Slide rail assembly.

The forward and backward movement of the seat is a mechanical adjustment. To adjust seat, push lever (1) toward the right side of seat. The seat will move along slide rail (2) a maximum of four inches (10.16 centimeters).

TROUBLESHOOTING

Troubleshooting can be difficult. On the following pages there is a list of possible problems. To make a repair to a problem. make reference to the cause and correction.

This list of problems, causes, and corrections. will only give , an indication of where a possible problem can be, and what repairs are needed. Normal, more or other repair work is needed beyond the recommendations in the list. Remember that a problems not normally caused only by one part, but b the relation of one part with other parts. This list can not give all possible problems and corrections. The serviceman must find the problem and it source, then make the necessary repairs.

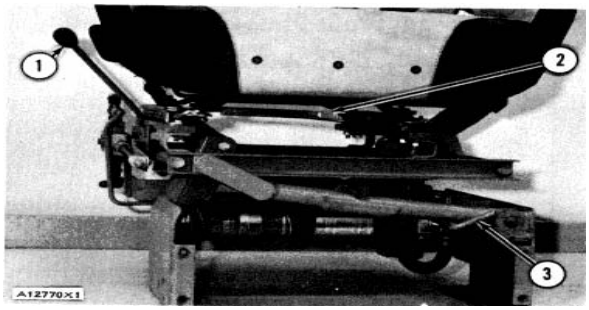
Item	Problem
1.	Constant Drift Up From RIDE Position.
2.	Constant Drift Down From RIDE Position.
3.	Ride is Too Hard.
4.	Ride is Too Soft.
5.	Seat Will Not Move When Height Adjustment is Made.

Problem	Cause	Correction
1. CONSTANT DRIFT UP FROM RIDE POSITION	Expansion of Oil Because of Hot Outside Temperature or Difficult Work Conditions	Make adjustment with height adjustment lever.
	Leakage Past the Seal Between Pressure Inlet and Outlet to Cylinder	Check for dirt and clean valve. Check for worn or damaged seals. Check for weak spring in valve. Install new valve if needed.
	Linkage Adjustment Not Correct	Make adjustment to linkage.
2. CONSTANT DRIFT DOWN FROM RIDE POSITION	Oil Volume Gets Smaller Because of Cold Outside Temperature	Make adjustment with height adjustment lever.
	Leakage Past the Seal Between Outlet to Cylinder and Outlet to Reservoir	Check for dirt and clean valve. Check for worn or damaged seal. Check for weak spring in valve. Install new valve if needed.
	Linkage Adjustment Not Correct	Make adjustment to linkage.
	Leakage in Cylinder	Install new cylinder.

Problem	Cause	Correction
3. RIDE IS TOO HARD	Ride Control Valve in Wrong Position	Make adjustment to valve setting.
	Accumulator Gas Pressure Low	Check accumulator pressure and put in new charge. Install new accumulator if needed.
	Frame of Suspension Not in Correct Alignment When Assembling Seat	Make correct alignment of suspension, so seat moves freely.
	Bearings or Slides in Assembly Damage	Install new bearings or slides.
4. RIDE IS TOO SOFT	Ride Control Valve in Wrong Position	Make adjustment to valve setting.
	Cylinder is Worn	Install new cylinder.
5. SEAT WILL NOT MOVE WHEN HEIGHT ADJUSTMENT IS MADE	Linkage Adjustment Not Correct	Make adjustment to height control lever.
	Leakage Past the Seal Between Outlet to Cylinder and Outlet to Reservoir	Install new seals and spring.

ADJUSTMENTS TO SEAT AFTER ASSEMBLY

1. Sit in seat normally, start engine and let transmission oil pressure get to operating pressure.



LEVERS FOR ADJUSTMENT OF SEAT

1. Height adjustment lever. 2. Forward and backward adjustment lever. 3. Ride control lever.

2. Turn lever (3) on ride control valve to bottom position (valve completely open).

3. Adjust the height adjustment lever (1) to the ride position desired.

4. Cause the seat to move up and down by changing the force on it. The seat must move back to the same position setting. If the system does not work correctly check for:

   a. Low hydraulic pressure.
   b. Restriction in the hydraulic lines.
   c. Pressure and return lines installed backwards.
   d. Seat linkage damaged.

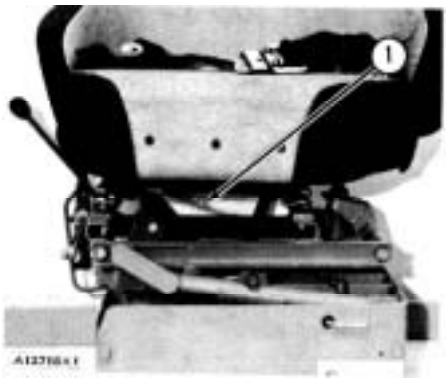
WARNING: Never remove oil lines, accumulator, or cylinder until the pressure in the hydraulic system of the seat is removed.

5. If there is a constant drift up or down from the ride position check:

   a. For dirt in or damage to height adjustment valve.
   b. Adjustment of height adjustment linkage.
   c. Leakage in cylinder assembly.
   d. Clearance between actuator valve in the height linkage and the stem of the valve in the height adjustment valve.'

NOTE: For the procedure to make adjustment and alignment of height adjustment valve and linkage see the subject, ADJUSTMENT OF HEIGHT CONTROL VALVE LINKAGE.

ADJUSTMENT TO FORWARD AND BACKWARD POSITION OF SEAT

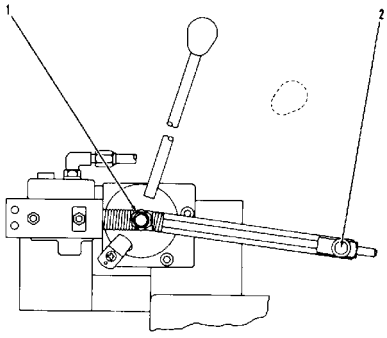


FORWARD AND BACKWARD ADJUSTMENT

1. Forward and backward adjustment lever.

To adjust seat, push lever (1) towards the right side of seat and slide seat forward or backward to desired position.

ADJUSTMENT OF HEIGHT CONTROL VALVE LINKAGE



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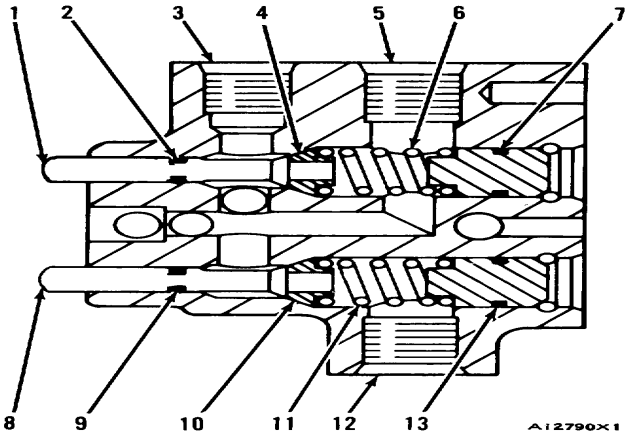
ADJUSTMENT OF HEIGHT CONTROL LINKAGE

1. Nut. 2. Spring arm.

Tighten nut (1). Put a 8 lb. 2 oz. (3.69 kg) weight at spring arm (2). Loosen nut (1) until spring arm moves down. Do not tighten nut.

HEIGHT CONTROL VALVE



HEIGHT CONTROL VALVE

1. Valve poppet. 2. Seal. 3. Pressure inlet. 4. Seal on valve guide. 5. Opening to cylinder. 6. Spring. 7. Seal. 8. Valve poppet. 9. Seal. 10. Seal on valve guide. 11. Spring. 12. Outlet to reservoir. 13. Seal.

If there is a constant drift of the seat up from the ride position, check for leakage around the seal (4) in the valve. Leakage here can be a result of:

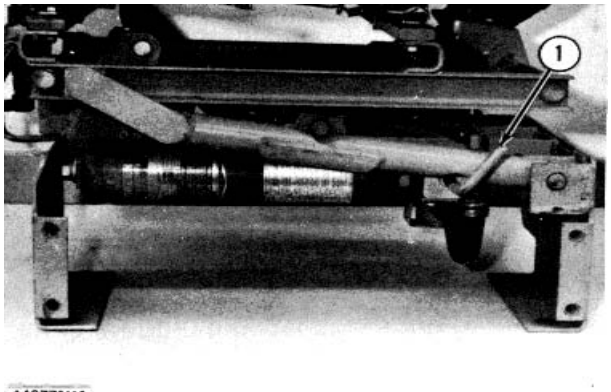
a. No clearance between the valve actuator and valve poppet (1).
b. Dirt in the valve.
c. Worn poppet (1), or worn seals (2), (4) and (7).
d. A weak spring (6).

If there is a constant drift of the seat down from the ride position, check for leakage around seal (10) in the valve. Leakage here can be a result of:

a. No clearance between the valve actuator and valve poppet (8).
b. Dirt in the valve.
c. Worn poppet (8) or worn seals (9), (10) and (13).
d. A weak spring (11).

If the valve still leaks after new seals are installed, replace the valve.

RIDE CONTROL VALVE ADJUSTMENT



RIDE CONTROL ADJUSTMENT VALVE

1. Ride control lever.

Turn the lever (1) on the ride control up for a harder ride.

Turn the lever (1) down for the softest ride. The valve will permit a very small oil flow through it in this position. There will be a slow drift of the seat when the lever is in this position.

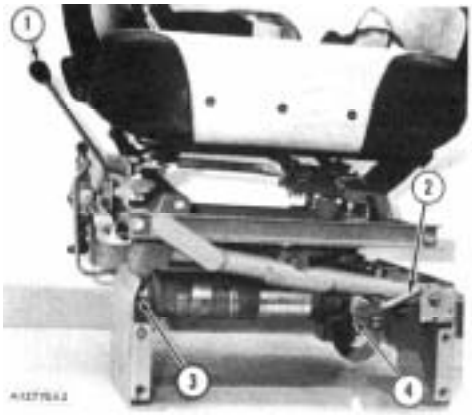
CHECK OF PRESSURE OF NITROGEN CHARGE IN ACCUMULATOR (On Machine)

Tools Needed: 7S5437 Charging Group.
5P2963 Charging Adapter.

1. Turn lever (2) on ride control valve to bottom position (down).

2. Pull height control lever (1) back. This will permit the oil in the cylinder to go back to the reservoir.

WARNING: Never remove oil lines, accumulator, or cylinder, until the pressure in the hydraulic system of the seat is removed.



PREPARATION TO CHECK THE PRESSURE) IN THE ACCUMULATOR

1. Height adjustment lever. 2. Ride adjustment lever. 3. Bolt. 4. Screw.

3. Remove two screws (4) from the ride control valve. Remove bolt (3) and plastic cap inside the hole. If there are two rubber washers in the hole, remove one.

NOTE: One rubber washer is needed to give a seal for adapter (5).

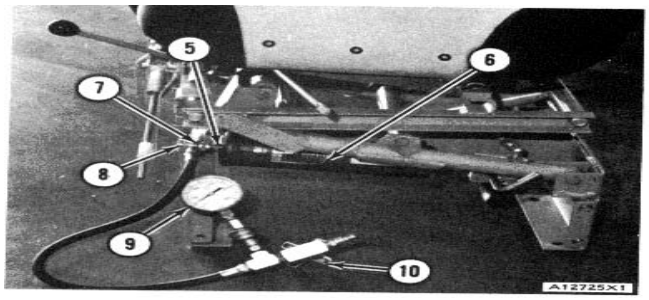
CHARGING ADAPTER

5. 5P2963 Charging Adapter.

4. Install the 5P2963 Charging Adapter (5) in the valve of the accumulator. Install chuck (7) on adapter (5).

5. Use the 0 to 1000 psi (0 to 70.3 kg/cm2) gauge (9) to check the nitrogen charge in the accumulator.

6. Close valve (10).



CHECK OF PRESSURE OF NITROGEN CHARGE IN ACCUMULATOR

5. 5P2963 Charging Adapter. 6. Accumulator. 7. Chuck. 8. Valve handle. 9. Pressure gauge. 10. Valve.

7. Turn valve handle (8) on chuck (7) completely in (clockwise).

8. If the pressure on the gauge is too high, slowly open valve (10) to lower the pressure.

Gas pressure is variable with temperature. The accumulator must be at the same temperature as the air around it before it can be checked or a charge put into it. To get the correct nitrogen charge, use the chart that follows.

CHARGING PRESSURE AND TEMPERATURE RELATIONSHIP for the 95 psi (6.7 kg/cm2) ACCUMULATOR

AMBIENT TEMPERATURE		PRESSURE*	
°F	°C	psi	kg/cm2
20	-7	85	6.0
30	-1	87	6.1
40	4	89	6.3
50	10	91	6.4
60	16	93	6.5
70	21	95	6, 7
80	27	97	6.8
90	32	99	7.0
100	38	101	71
110	43	103	7.2
120	49	105	7 4

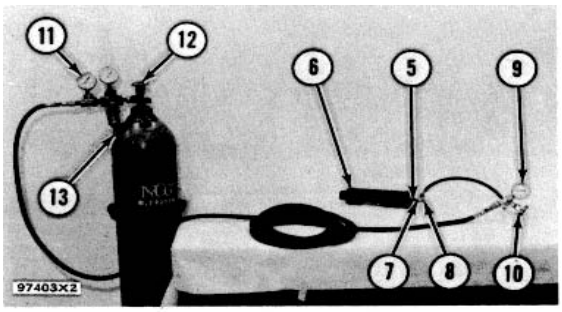
+ 5 psi (+ 0.35 kg/cm2) tolerance permitted.

Every 10°F causes approximately 2 psi change.
Every 5.6°C causes approximately 0.1 kg/cm^2 change

9. If the pressure on the gauge is too low, put a charge in the accumulator. See the subject, CHARGING THE ACCUMULATOR.

CHARGING THE ACCUMULATOR

WARNING: Dry nitrogen is the only gas approved for use in the accumulators. Charging the accumulators with oxygen gas will cause an EXPLOSION. This danger will not happen if nitrogen cylinders with standard CGA (Compressed Gas Association, Inc.) No. 580 connections are used. When you order nitrogen gas be sure that the cylinders are equipped with CGA No. 580 Connections. Do not use color codes or other methods of identification to tell the difference between nitrogen and oxygen cylinders. In any application, never use an adapter to connect the nitrogen charging equipment to a valve that can be used on nitrogen, oxygen or other gas cylinders. BE SURE YOU ARE USING DRY NITROGEN.



CHARGING THE ACCUMULATOR

5. 5P2963 Charging Adapter. 6. Accumulator. 7. Chuck. 8. Valve handle. 9. Pressure gauge. 10. Valve. 11. Pressure gauge. 12. Nitrogen cylinder valve. 13. Pressure regulating screw.

NOTE: If charging a new accumulator, put clean hydraulic oil in the oil end of the accumulator. This lets the bag in the accumulator get lubrication to prevent damage while charging the accumulator. Leave the oil in for one minute.

1. Connect the hose from the nitrogen cylinder to valve (10).

2. Close valve (10) and open valve (12) on the nitrogen cylinder. Make an adjustment to screw (13) on the regulator assembly until gauge (11) is at the pressure needed for the correct charge in the accumulator. Use the respective chart as a reference for the correct charging pressure.

3. Open valve (10) and put a charge in the accumulator. Turn valve (12) off. If the pressure on gauge (9) is the same as gauge (11) and does not change, the accumulator has the correct charge. If there is a decrease in pressure on gauge (9), open valve (10) and let more nitrogen go to the accumulator. Do this procedure as many times as necessary until the pressure on gauge (9) is the same as gauge (11) and does not change when valve (10) is turned off.

4. Turn off valve (10). Turn off valve (12) on the nitrogen cylinder.

5. Turn valve handle (8) on chuck (7) completely out (counterclockwise).

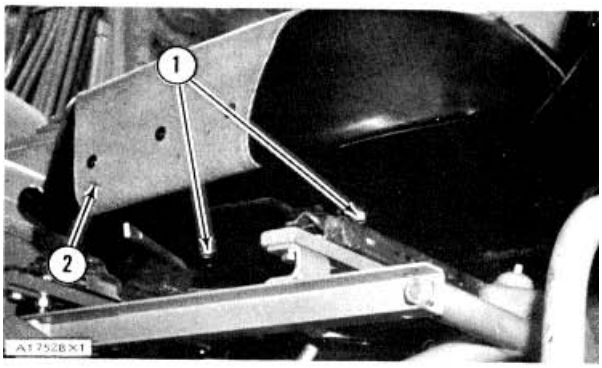
6. Remove the test and charging equipment.

7. Install the accumulator back on the seat assembly.

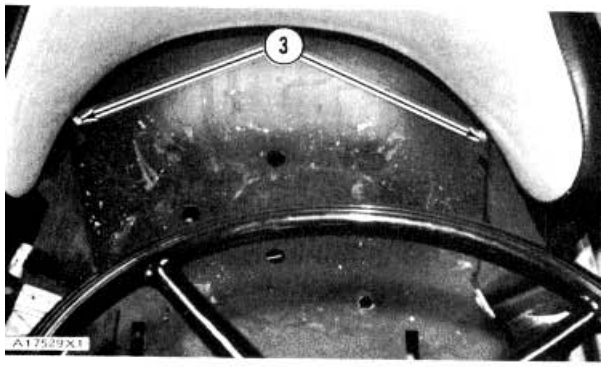
SEAT BELTS

REMOVE AND INSTALL SEAT BELTS

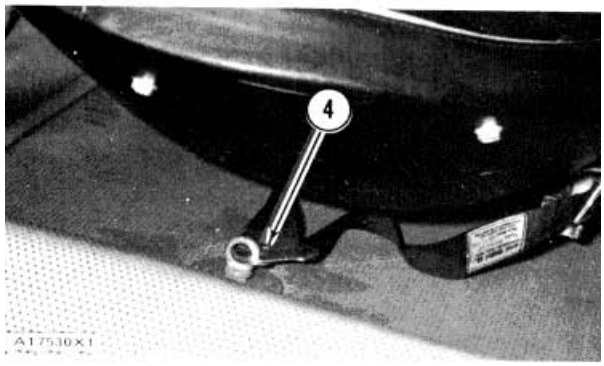
1. Remove two bolts (1) that hold seat cushion (2) to seat frame.



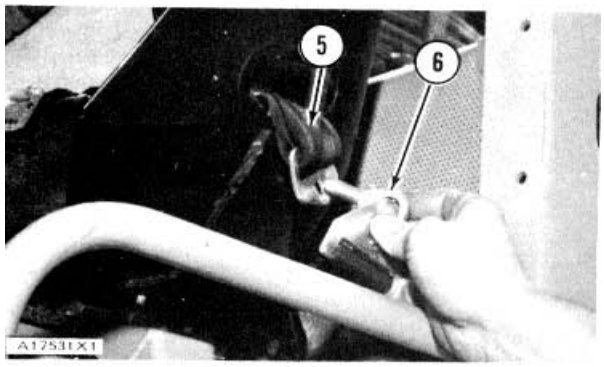
2. Remove nuts (3) that hold eyebolts to seat frame.



3. Remove pins (4) that fasten seat belts.

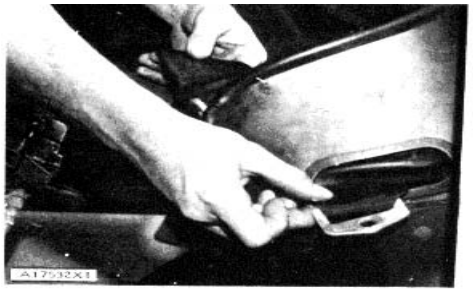


4. Remove eyebolts (6) and remove seat belts (5).

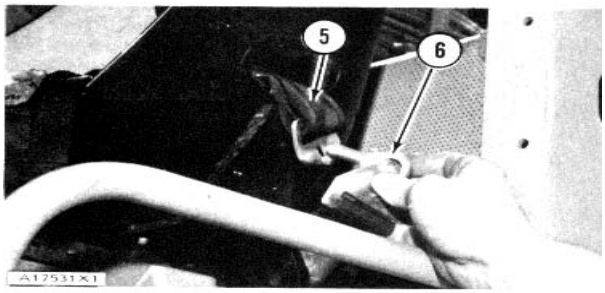
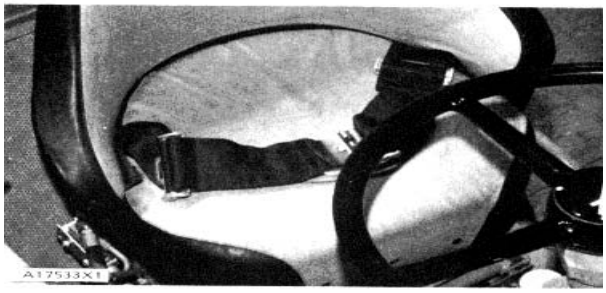


SEAT BELTS

5. Install new seat belts.



6. Install seat belts to seat frame with eyebolts (6).



7. Install seat cushions, and check seat belts to see that they are not twisted.