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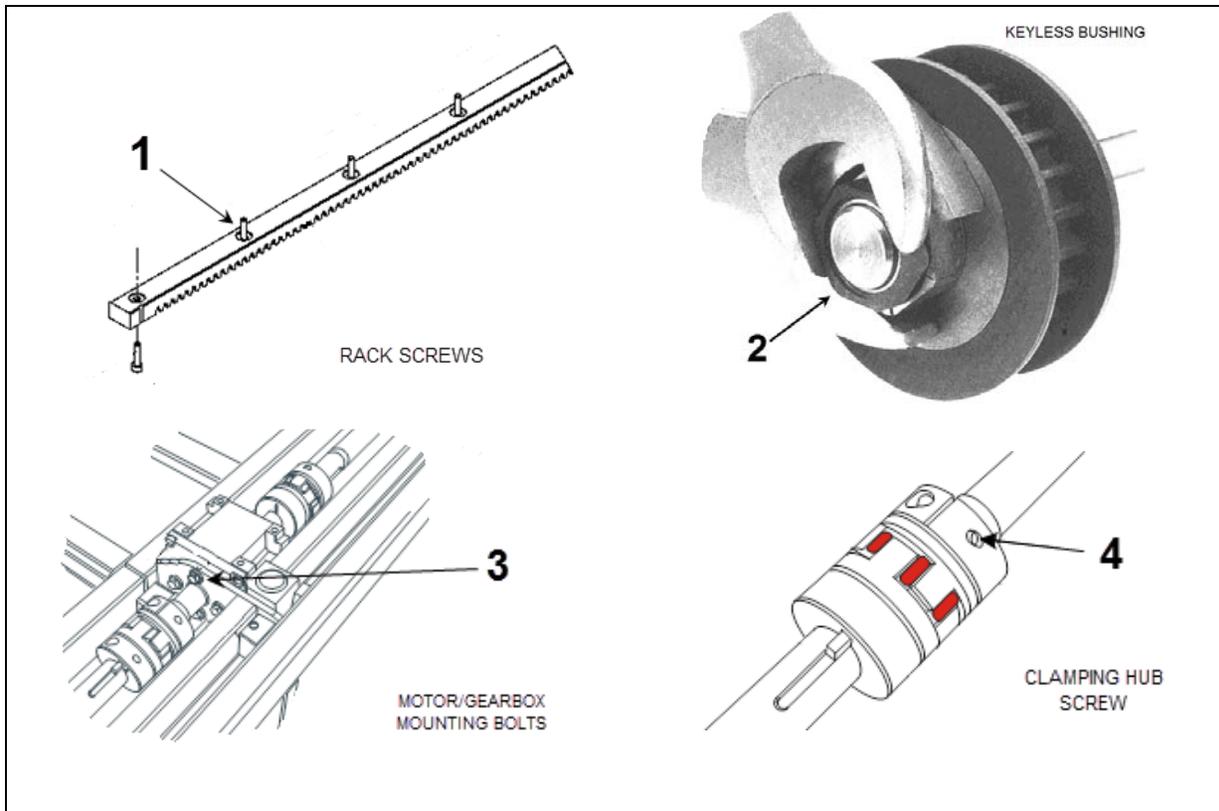
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**SECTION CHANGE LOG**

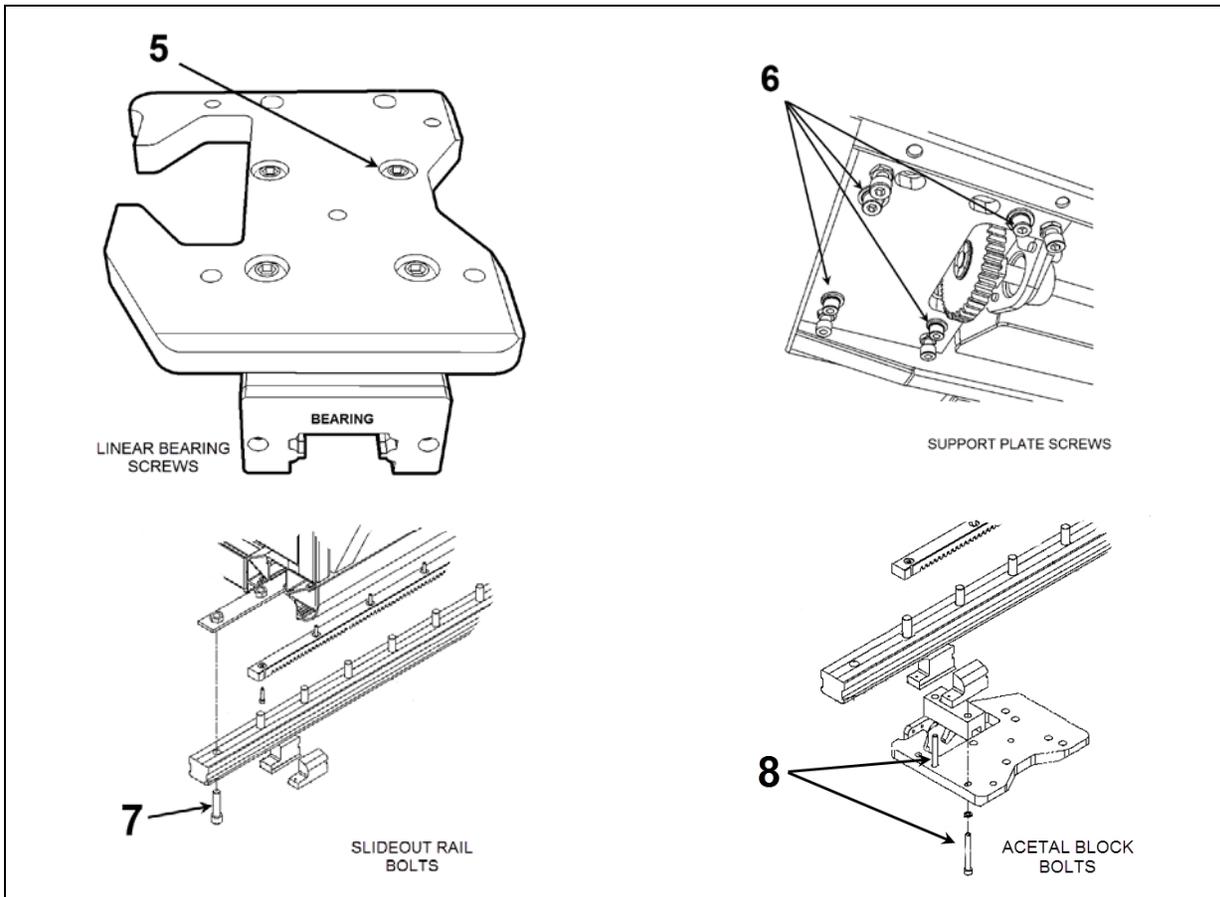
DESCRIPTION		DATE
1		
2		
3		
4		
5		
6		

1 TORQUE TABLES



MISCELLANEOUS

No	DESCRIPTION	TORQUE
1	Rack mounting bolt	1.9-2.1 lb-ft (3-3 Nm) maximum
2	Keyless bushing	120-130 lb-ft (163-176 Nm)
3	Drive motor/gearbox assembly mounting bolts	16-20 lb-ft (22-27 Nm)
4	Jaw coupling clamping hubs screw	16-20 lb-ft (22-27 Nm)



**MISCELLANEOUS**

No	DESCRIPTION	TORQUE
5	Linear bearing mounting screws	59 lb-ft (80 Nm)
6	Linear bearing support plate retaining screws	45-55 lb-ft (61-75 Nm)
7	Rail mounting bolts	90-100 lb-ft (122-136 Nm)
8	Acetal block mounting bolts	6.5-7.5 lb-ft (9-10 Nm)

## 2 OVERVIEW

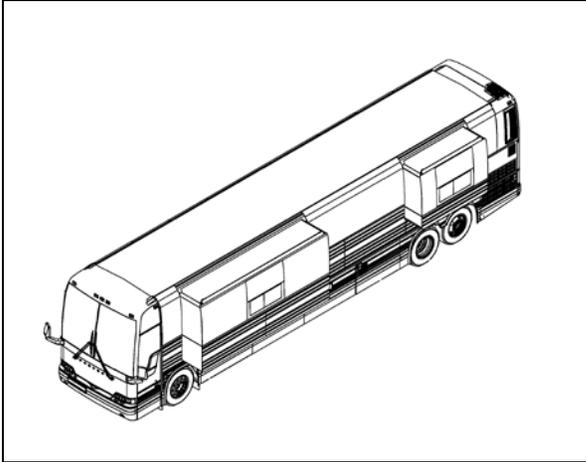


FIGURE 1: X3-45 VIP TYPICAL CONFIGURATION

X3-45 VIP can be fitted with up to two slide-outs.

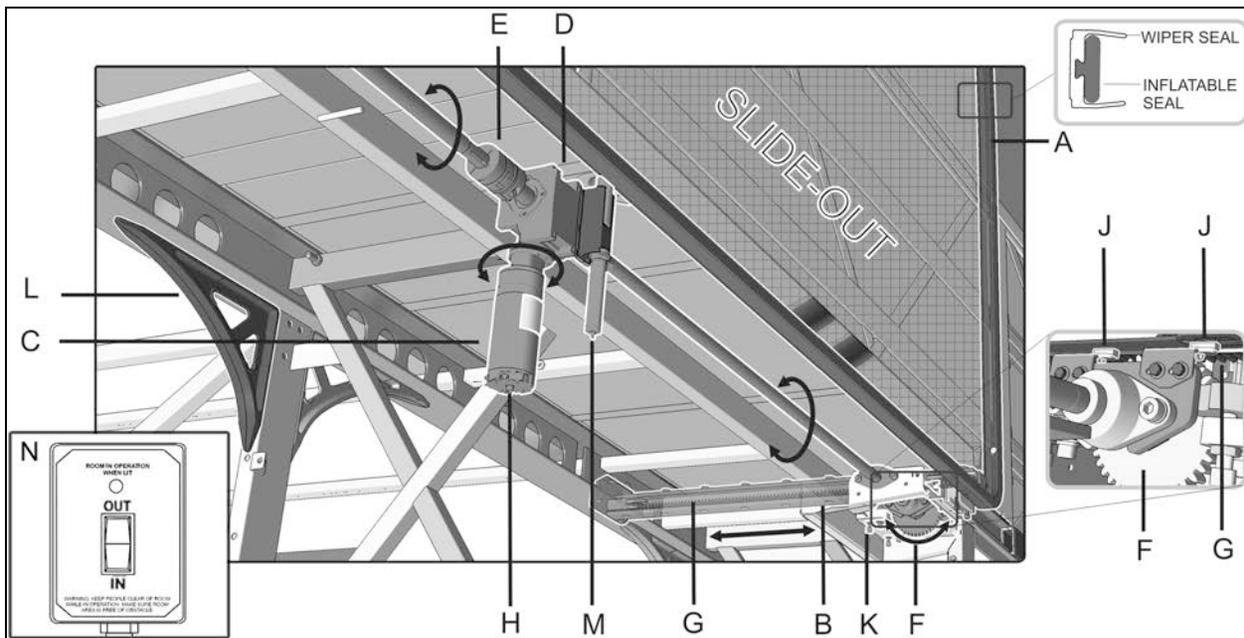


FIGURE 2: TYPICAL MECHANISM OVERVIEW

Each slide-out is moved in and out on rails resting on linear bearings Figure 2, (B). Power comes from one electrical motor (C). It is either oriented vertically or horizontally. The motor drives a right angle speed reducing gearbox (D).

Water tightness of the slide-out is ensured by a wiper seal and an inflatable seal (A).

The gearbox is coupled to a drive shaft with Lovejoy jaw couplings (E) and two pinion gears (F). Rack gears (G) transform pinion gear rotation into horizontal motion. Manual extension or retraction is possible by the motor shaft extension (H). Closely follow instructions provided further in this manual to perform this procedure.

The system includes in and out limit proximity sensors (J) and physical inner and outer stoppers.

Tilt and leveling adjustment is carried-out by the adjustment plate and screws (K).

Structural integrity of the vehicle platform is ensured with stainless steel casting corner reinforcements (L) in the luggage bays and a roof reinforcement rod for the front slide-out.

A security pin locks the slide-out in the retracted or “in” position for road travel. (M)

Extension and retraction of the slide-out room is performed using the Control Pad (N). One control pad per room is provided. Final location of the control pad may vary from one vehicle to another depending on interior layout and vehicle converter.

Logic control and operation is achieved by using the same Volvo multiplex modules found on the vehicle chassis. Troubleshooting is performed through the DID.

The flip-down control panel is typically located in the first road side luggage bay, attached to the ceiling.

## 2.1 INNER STOPPER

The front slide-out is equipped with six inner stoppers laid out in the following way: two stoppers on the top horizontal member of the slide-out, and two stoppers on each vertical upright, while the rear slide-out is equipped with only three stoppers (Figure 3 & Figure 4). The upper inner stoppers are used to provide a support to position perpendicularly the slide-out with the vehicle structure.

The side inner stoppers are used to block the extension of the slide-out. They act as ultimate physical limits but take note that when the “out limit” sensors are properly adjusted, the slide-out extension stops before the side inner stoppers reach the side structure keys (Figure 3 & Figure 4).

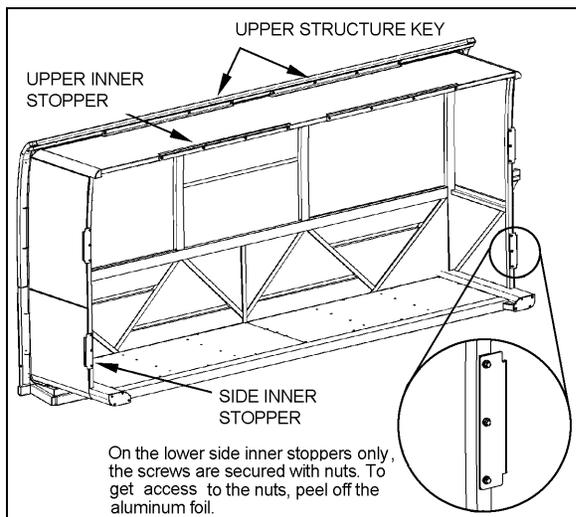


FIGURE 3: FRONT SLIDE-OUT

### 2.1.1 Maintenance

Check that the inner stopper screws are tight and that no damage or deformation has taken place for both the side and the upper stoppers.

### 2.1.2 Adjustment

1. Adjust the side inner stoppers at 1/8" from the vehicle side structure keys, and tighten the screws. Make sure there is a minimum gap of 2mm (0.079") between the side inner stopper and the side window pane (Figure 5). Use shim as required.
2. Adjust the upper structure key and the upper inner stoppers according to Figure 4 with the seal deflated. When inflating, the seal presses the roof structure upward and at that moment, the upper inner stopper comes into contact with the upper structure key

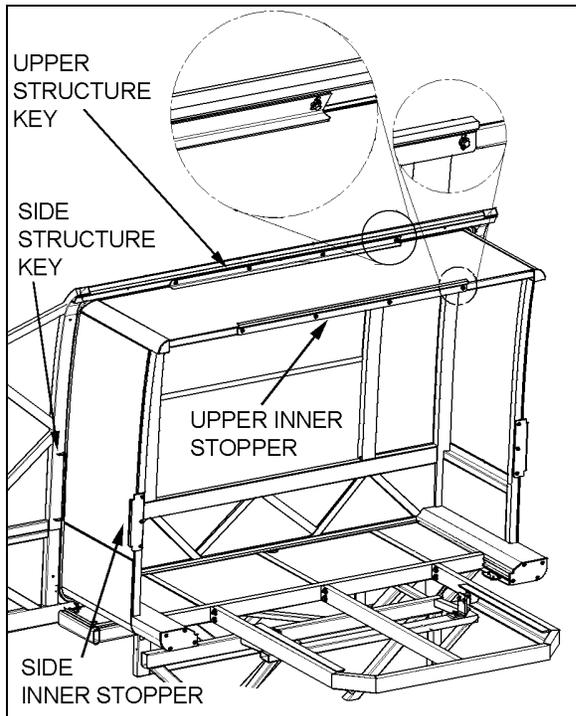


FIGURE 4: REAR SLIDE-OUT

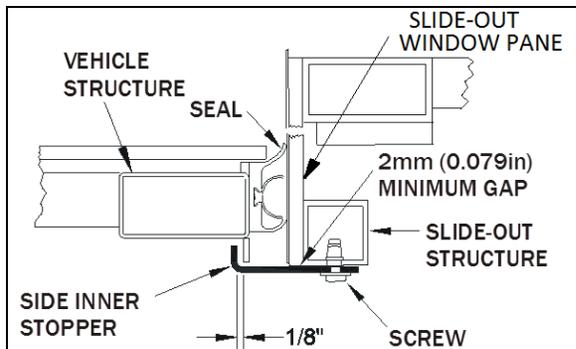


FIGURE 5: SIDE INNER STOPPER ADJUSTMENT

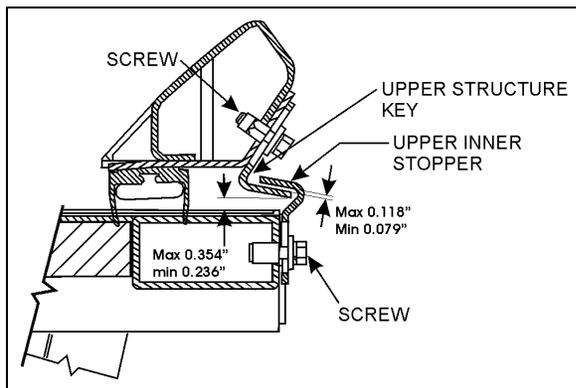


FIGURE 6: UPPER INNER STOPPERS ADJUSTMENT

## 2.2 "IN LIMIT" STOPPER

Each slide-out has four "in limit" stoppers. Two "in limit" stoppers are mounted under the slide-

out, next to the rail (Figure 7) and two other "in limit" stoppers are mounted on the exterior extrusion at the top of the slide-out (Figure 8). These stoppers are used to position the outer face of the slide-out flush with the vehicle body when retracted.

### 2.2.1 Maintenance

Check that the "in limit" stoppers are clean and that there is no foreign matter accumulated between the stopper and their bearing surface. Check that the screws and set screws (where applicable) locking the stoppers in proper position are tight.

### 2.2.2 Adjustment

#### **NOTE**

*To properly adjust the "in limit" stoppers, the slide-out system must be turned off to prevent the "in limit" sensors from stopping the slide-out movement before having the "in limit" stoppers contacting their bearing surface.*

1. Extend the slide-out partially.
2. Set the ignition switch to the OFF position.
3. To adjust the lower "in limit" stoppers, loosen the set screw and then rotate the stopper CW or CCW to move it back or forward depending on the required adjustment. To adjust the upper plastic "in limit" stoppers, add or remove shims as required between the stopper and the extrusion.
4. Using the manual override procedure (paragraph 18), move the slide-out up to its full "in" position.
5. Using a straight edge, check if the outer face of the slide-out is flush with the vehicle body with the stoppers contacting their bearing surface. Readjust the stoppers if necessary.
6. Readjust the "in limit" sensor.

#### **NOTE**

*To make sure that the lower "in limit" stoppers are contacting their bearing surface (the acetal plastic blocks) when the slide-out is closed, put white paint on the "in limit" stopper before and check if the acetal plastic blocks are marked with paint.*

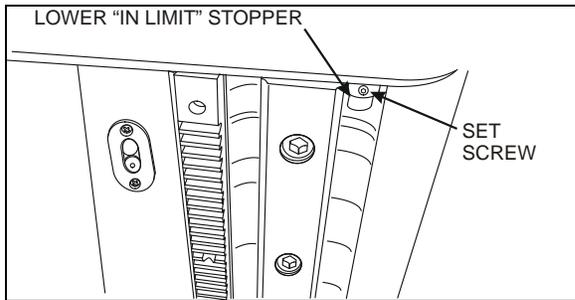


FIGURE 7: LOWER "IN LIMIT" STOPPER

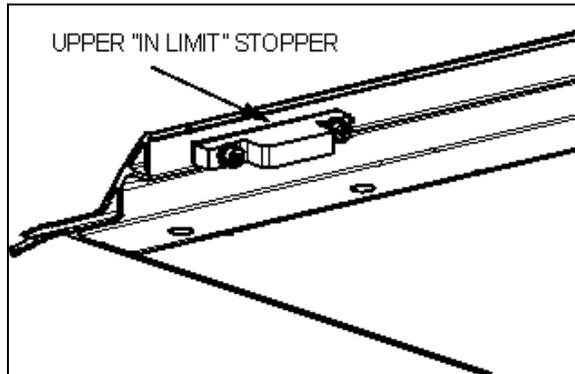


FIGURE 8: UPPER "IN LIMIT" STOPPER

### 2.3 EXTERIOR EXTRUSION

The exterior extrusion function is to provide a leaning surface for the inflatable seal. When inflating, the seal leans against the extrusion and presses the roof structure upward until it rests on the inner side of the extrusion.

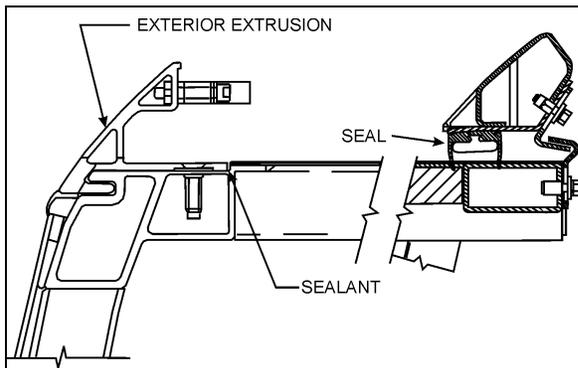


FIGURE 9: EXTERIOR EXTRUSION

#### Maintenance

Inspect the exterior extrusion for any deformation or deterioration. Check that the screws are tight. Inspect sealant condition on screw heads and between the extrusion and the vehicle structure, and also at both ends of the extrusion. If needed, clean old sealant and

replace with Sika 221 sealant or equivalent product.

### 3 SECURITY PIN

During normal ride, the slide-out cannot extend by itself because the 740:1 ratio speed reduction worm gear type gearbox system is not reversible, the output shafts are self-locking. The security pin purpose is to lock the slide-out in retracted position if an accident occurs. It is built to withstand great lateral acceleration of the slide-out.

The system consists of a stainless steel pin connected to a single action/spring return pneumatic cylinder (Figure 10). The pin engages in the slide-out receptacle with releasing of the parking brake. A knocking sound may be heard at this moment. An O-ring is located at the base of the pin housing to reduce knocking when the pin retracts. The lower hole on the pin housing permits water to drain. The upper hole permits to insert a small screwdriver to prevent the pin from rotating when the air cylinder has to be removed.

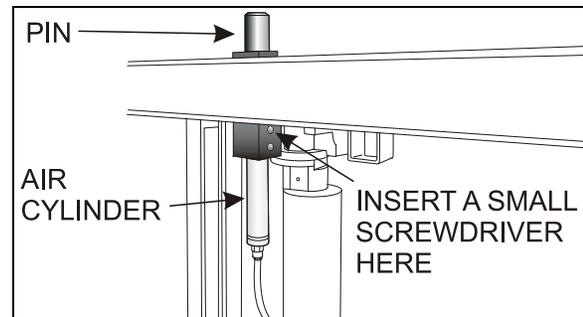


FIGURE 10: SECURITY PIN AIR CYLINDER REMOVAL

#### 3.1 MAINTENANCE

Inspect air cylinder and fitting for air leaks. Periodically, check that the pin retracts and engages in the receptacle as it should when the parking brake is applied or released.

To extend the slide-out, it must be at full "IN" position with the engine running. If the pin produces excessive knocking when it engages upon parking brake release, reduce air cylinder speed by adjusting the air flow regulator on the pneumatic control panel (Figure 32, item 5).

#### 3.2 AIR CYLINDER REPLACEMENT

1. Ensure the parking brake is applied.

2. Disconnect the cylinder air tubing from the 2<sup>nd</sup> baggage compartment (front slide-out) or under the bed structure (rear slide-out).
3. Using a wrench at its lower end, unscrew the air cylinder from the pin housing.
4. Insert a small screwdriver through the pin and housing to prevent rotation of the pin and then, unscrew the cylinder rod from the pin.
5. Transfer the fitting on the new cylinder. Place Teflon on threads.
6. Cylinder installation is like removal but in reverse order.

#### 4 ROOF REINFORCING ROD



### CAUTION

The front slide-out roof reinforcing rod may have to be adjusted after a load variation inside the vehicle or on the top of the vehicle.



### CAUTION

Always lock the turnbuckle using the jam nut to prevent loosening.

The roof reinforcing rod is located on the upper horizontal member of the front slide-out opening and is welded on the roof arches (Figure 11).

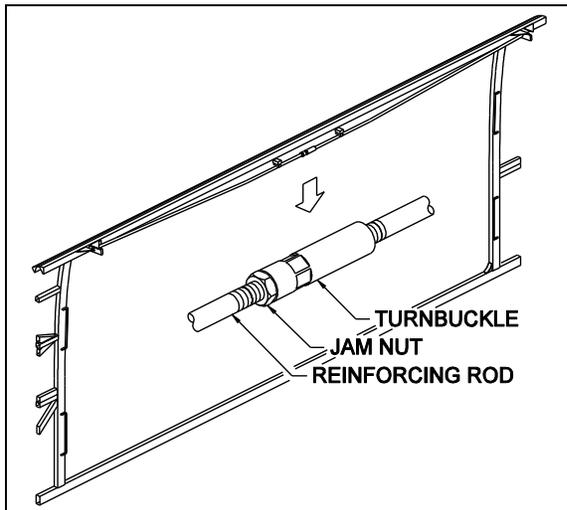


FIGURE 11: FRONT SLIDE-OUT ROOF REINFORCING ROD

This rod allows an adjustment between the slide-out horizontal member and the roof. When screwing the turnbuckle, the roof is moved upward, and vice versa. Maximum allowable

adjustment upward is 3mm (1/8"). Exceeding this value may damage the mechanism.

Use this rod to adjust the horizontal member parallel to the slide-out. A member not parallel with the slide-out may cause the inflatable seal to leave the wiper seal or may reduce the inflatable seal and wiper seal efficiency.



### CAUTION

Do not exceed 3mm (1/8") upward adjustment.

## 5 RACK

Slide-out movement is made by a system of racks and pinions. There are two racks on each slide-out.

### 5.1 MAINTENANCE

Once a year, check the racks for broken or worn tooth, especially the front slide-out racks. Also, check the rack fastening hole teeth that are weaker and might break (Figure 12). Replace the racks if excessive wear is present. Clean racks from sand or other debris. Check that the racks are properly secured. Check the backlash between the gear and the rack. Excessive backlash indicates rack wear.

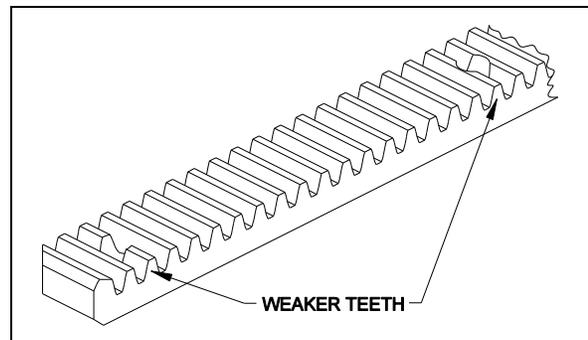


FIGURE 12: RACK

### 5.2 FRONT SLIDE-OUT RACK REPLACEMENT

1. Remove the slide-out from the vehicle (removal must be performed according to the Slide-Out Removal Procedure. Ask your Prevost service representative).
2. From under the slide-out, unscrew all the rack screws and remove the rack.

3. Install a new rack and tighten the screws. Use Loctite™ 242 or equivalent product on threads.

**TORQUE: 1.9-2.1 lb-ft (3-3 Nm)\_MAX**

4. Reinstall the front slide-out inside the vehicle.



## CAUTION

The counter boring required for recessed screw heads reduces plastic thickness. Do not torque higher than specified.

### 5.3 REAR SLIDE-OUT RACK REPLACEMENT

1. Using the slide-out control pad or the manual override procedure (paragraph 18, if using the manual override procedure, do not forget to deflate the inflatable seal completely), extend the slide-out about one foot.
2. From outside, unscrew and remove only the first two screws of the rack to be changed.
3. Using the manual override procedure (paragraph 18) only, retract the slide-out to its fully closed position.
4. Loosen the pinion keyless bushing of the rack to be changed.
5. From under the slide-out, unscrew all the rack screws and remove the rack.
6. Install a new rack between the slide out structural rack seat and the pinion and tighten the screws. Use Loctite™ 242 or equivalent product.

**TORQUE: 1.9-2.1 lb-ft (3-3 Nm)**



## CAUTION

The counterboring required for recessed screw heads reduces plastic thickness. Do not torque higher than specified.

7. Tighten the pinion keyless bushing as described in paragraph 6.4.
8. Using the slide-out manual override procedure only, extend the slide-out about one foot.

9. Tighten the two remaining screws. Use Loctite™ 242 or equivalent product.

**TORQUE: 1.9-2.1 lb-ft (3-3 Nm) MAX**

10. Using the slide-out control pad key or the manual override procedure, retract the slide-out to its fully closed position.
11. Re-inflate the air seal and confirm pressure is around 11 psi on the pressure gage. (Item 7, Figure 32)

## 6 PINION



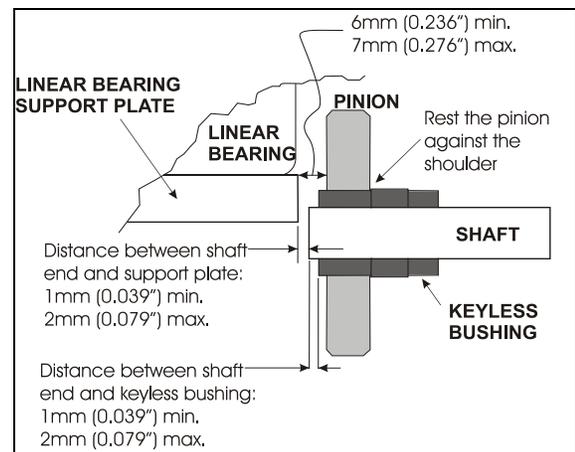
## CAUTION

Make sure all keyless bushings are tightened to specification before moving the slide-out. Refer to paragraph 6.4 for torque wrench settings. A lower torque value may cause the bushing to slip on the shaft, and a higher torque value may break the bushing.

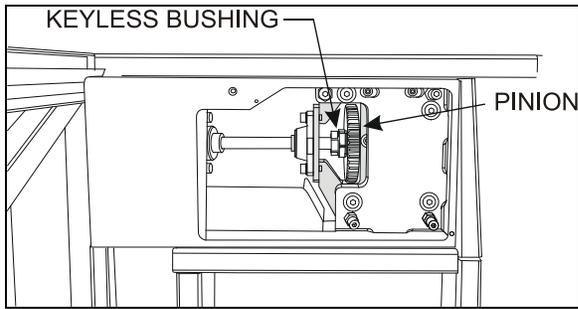
**TORQUE: 120-130 lb-ft (163-176 Nm)**

### 6.1 PINION AND KEYLESS BUSHING POSITIONING

For trouble-free operation, respect the dimensions and configuration shown on the following figure.



**FIGURE 13: PINION AND KEYLESS BUSHING POSITIONING**



**FIGURE 14: PINION AND KEYLESS BUSHING AS SEEN FROM EVAPORATOR COMPARTMENT**

## 6.2 FRONT SLIDE-OUT SHAFT PINION REPLACEMENT



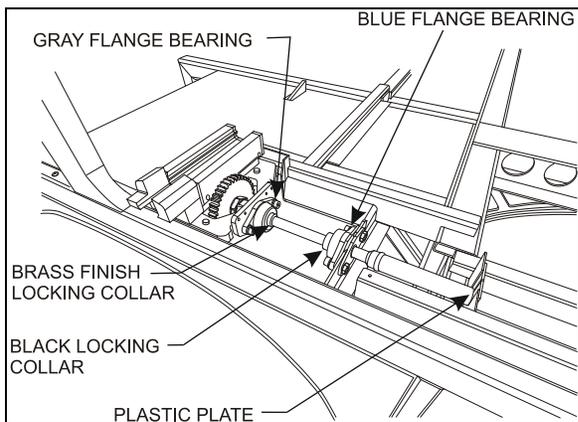
### CAUTION

Before reinstalling the pinion, clean the following surfaces with alcohol to prevent slippage.

- Pinion bore;
- Keyless bushing I.D. and O.D.;
- Shaft.

Before proceeding with the front slide-out shaft pinion replacement, check the following conditions:

- The locking collars located on the side of the pinion being replaced are disengaged;
- The drive motor/gearbox assembly is removed (see paragraph 8.2);



**FIGURE 15: MECHANICAL COMPONENTS (TYPICAL)**

1. Loosen the keyless bushing (see paragraph 6.4) of the pinion to be replaced. Slide the pinion and its bushing out of the shaft. Check the keyless bushing condition and replace if needed.

### NOTE

*If necessary, loosen the blue and gray flange bearing to move the pinion away from the rack.*

2. Assemble new pinion on the keyless bushing and then slide on the shaft. Do not tighten the bushing at this moment.
3. Properly position the shaft end in relation to the linear bearing support plate (See Figure 13) and then tighten the locking collars to maintain the shaft in that position.
4. Position pinion and keyless bushing as shown on Figure 13 and tighten the keyless bushing as described in paragraph 6.4.
5. Reinstall the drive motor/gearbox assembly.



### CAUTION

Make sure the keyless bushing is tightened to specification before moving the slide-out. Refer to paragraph 6.4.1 for torque wrench settings.

**TORQUE: 120-130 lb-ft (163-176 Nm)**

## 6.3 REAR SLIDE-OUT SHAFT PINION REPLACEMENT

The procedure is similar to the front slide-out shaft pinion replacement. Gain access to the mechanism from under the bed structure. Refer to paragraph 6.2.

## 6.4 KEYLESS BUSHING

The keyless bushings need a specific tightening torque value to ensure proper pinion transmitting torque. They also need specific tools to be tightened.

To tighten or loosen the keyless bushing, use those specific tools:

- crowfoot wrench 1 ½";
- torque wrench;
- combination wrench 1 ¾";
- pipe wrench;
- drive extension 5";
- socket 1 ½".

## 6.4.1 Installation

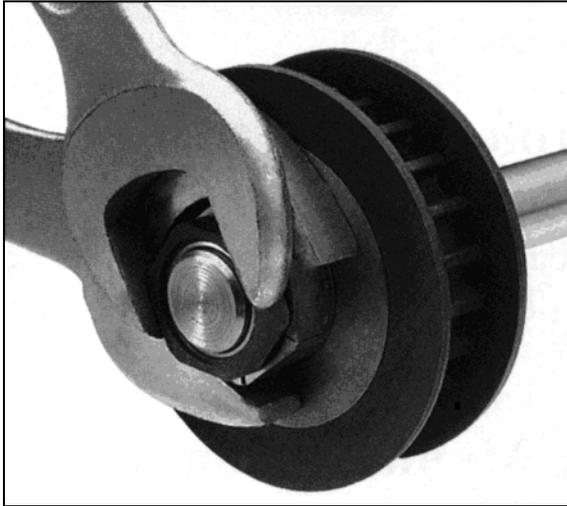


FIGURE 16: KEYLESS BUSHING TIGHTENING

To tighten the keyless bushing, use a special open-end wrench to retain the yellow part and another wrench to tighten the black part. Figure 18 shows how to tighten the keyless bushing. When tightening, make sure the pinion does not move or rotate.

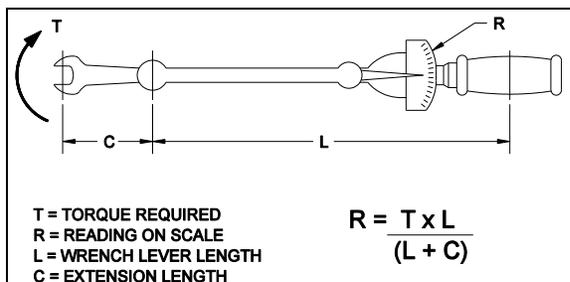


FIGURE 17: TORQUE WRENCH FORMULA

**CAUTION**

Make sure all keyless bushings are tightened to specification before moving the slide-out. A lower torque value may cause the bushing to slip on the shaft, and a higher torque value may break the bushing. The torque may need to be recalculated depending of the wrench size. Refer to Figure 17 for wrench size compensation.

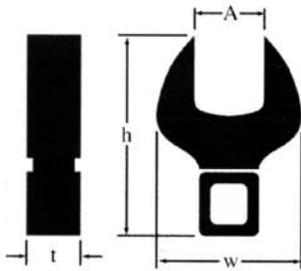
**TORQUE: 120-130 lb-ft (163-176 Nm)**

Take note that when the keyless bushing nut is tightened, the pinion moves about 1/16" to 3/32" toward the slide-out center.

**NOTE**

*On the front slide-out, the driver side keyless bushing is not accessible for tightening or removal unless you remove the front left wheel. If the slide-out has been removed, this keyless bushing should be tightened before reinstalling the slide-out.*

**WRENCHES FOR INSTALLATION**



**Style C  
Installation Nut**

Fenner Drives offers a complete line of high-quality crowfoot wrenches for installation and to provide counter-torque. These wrenches are much narrower than earlier designs and are specifically for use with Trantorque GT units. It is recommended that both wrenches be used when installing a Trantorque GT unit.

**1/2" SQUARE DRIVE**

Shaft Size	Part Number	Wrench Style	Dimensions (inches)			
			A	h	w	t
13/16 to 1	6202990024	C	1-1/2	3.44	2.75	0.75

## INSTALLATION INSTRUCTIONS

A Trantorque GT Keyless Bushing offers flexible and easy installation while providing exceptional holding power. To ensure a Trantorque GT unit performs as specified, it must be installed properly.

**Warning: Use no lubricants in this installation.**

1. Shaft and component bore must be within  $\pm 0.003"$  ( $\pm 0.08\text{mm}$ ) [ $\pm 0.0015"$  ( $\pm 0.04\text{mm}$ ) Mini Series] of stated bore diameter and must have a surface finish of 32-125 Ra (roughness average). If the surface finish is outside these specified values, consult Fenner Drives.

2. Both shaft and component bore must be completely free of paint, grease, oil, and dirt. If necessary, clean the surfaces with a non-petroleum based solvent, such as isopropyl alcohol.

**Warning: Do not lubricate the Trantorque GT bushing or shaft. The use of any lubricant on the contact surfaces could result in bushing failure and will void all warranties.**

3. Insert the Trantorque GT unit into the component to be mounted, making sure the mating hub is flush against the shoulder at the hex flats.

4. Position the assembly at the desired location on the shaft and hand-tighten the nut (clockwise) until the assembly becomes snug on the shaft.

**Warning: Do not hammer or use any type of impact to force the Trantorque GT assembly along the shaft.**

**Warning: The shaft must fully engage the shaft gripping area (Figure 1) of the Trantorque GT unit. Figure 2 illustrates minimum shaft engagement.**

5. Using a torque wrench, tighten the nut to the proper installation torque. See table for torque value. (Note: Fenner Drives has available crowfoot wrenches for square drives in sizes from 1/2" to 3-1/2".) The hex flats on the outer ring are provided for counter-torque, eliminating the need to hold the component or shaft while applying installation torque.

Note: At full installation torque, the assembly will have moved approximately  $\pm 0.075"$  ( $\pm 1.9\text{mm}$ ) [ $\pm 0.045"$  ( $\pm 1.1\text{mm}$ ) Mini Series] axially along the shaft away from the nut. If axial position is critical it may be necessary to loosen the nut and reposition the assembly.

**Warning: Over-tightening the nut could damage the Trantorque GT unit and/or the mounted component.**

**Do not use an impact wrench in the installation.**

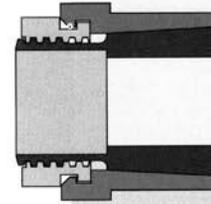


Figure 1

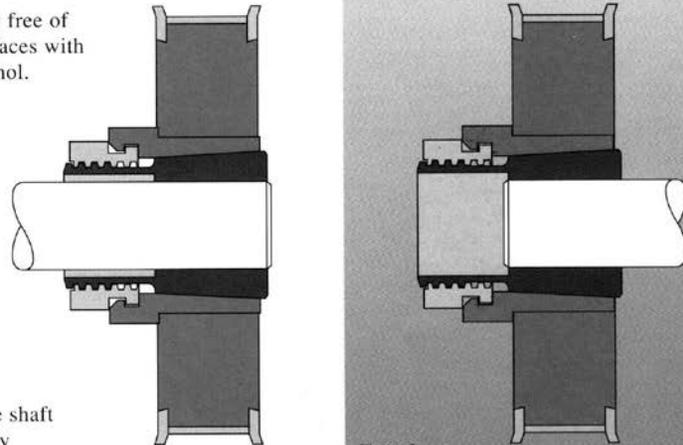


Figure 2

### Installation Torque on Nut

	Inch Pound System		Metric System	
	Shaft Size	In. Lbs.	Shaft size	N-m
MINI SERIES	3/16-1/4	125	5-6mm	14.1
	5/16-3/8	150	7-9mm	17.0
	7/16-1/2	175	10-12mm	19.8
	9/16-5/8	200	14-16mm	22.6
	3/4	700	17mm	80.0
STANDARD SERIES	5/8-3/4	1200	15-19mm	136
	13/16-1	1500	20-25mm	170
	1-1/16-1-1/4	2000	28-32mm	225
	1-5/16-1-1/2	2300	34-38mm	260
	1-9/16-1-3/4	2800	40-42mm	316
1-13/16-2	4900	45-50mm	554	
LARGE SERIES	2-1/16-2-1/4	5300	55mm	600
	2-5/16-2-1/2	5600	60mm	635
	2-9/16-2-3/4	6000	65-70mm	680
	2-13/16-3	6600	75mm	750

FIGURE 18: KEYLESS BUSHING INSTALLATION INSTRUCTIONS

## 7 ELECTRIC MOTOR

The power is supplied by a 24V, 1/3 HP electric motor coupled with a speed reduction gearbox.

Opposite to the gearbox, the motor is equipped with a 10 mm hexagonal socket shaft extension allowing slide-out movement without the control pad.

This shaft extension is used to move the slide-out at low speed during the inner stoppers adjustment, the tilt adjustment or the 2" inside retraction.

See paragraph 18 for the manual override procedures.



### CAUTION

When moving the slide-out with a cordless power drill as described in the manual override procedure, be careful as the slide-out approaches the open or closed position, in order not to overload the mechanism.

### 7.1 MAINTENANCE

Inspect the electrical connections and water seal condition. Check that the mounting bolts are tight (Figure 20).

### 7.2 REPLACEMENT

1. The slide-out must be retracted half way in.

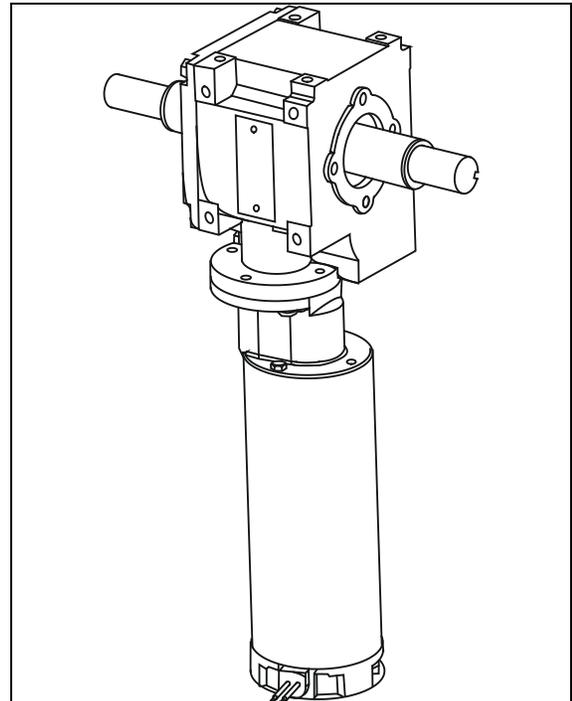


FIGURE 19: ELECTRIC MOTOR AND SPEED REDUCTION GEARBOX

2. Unplug the electric cable connector.
3. Remove the motor from the gearbox.
4. Fasten the new motor to the gearbox using screws.
5. Re-connect the electric cable connector.

## 8 SPEED REDUCTION GEARBOX

The speed reduction gearbox used is a helical worm gear type. This gearbox has a 2-stage 740:1 ratio and the output shafts are self-locking. Keys on output shafts are glued into keyseats.

### 8.1 MAINTENANCE

Inspect the gearbox to check if there is any leakage or backlash in the box. Replace the gearbox if excessive wear is present. Check that all bolts are tight.

The gearbox is lubricated for life and the oil should not have to be changed.

### 8.2 GEARBOX REPLACEMENT

1. The slide-out must be retracted half way in.
2. Disengage the shaft jaw couplings (refer to paragraph 9: JAW COUPLING).

3. Remove the 4 cap screws securing the drive motor/gearbox assembly and dismount the assembly.
4. Remove the gearbox from the motor and install the new one.
5. Reinstall the drive motor/gearbox assembly on the vehicle mounting bracket. Tighten mounting bolts in a criss-cross pattern.

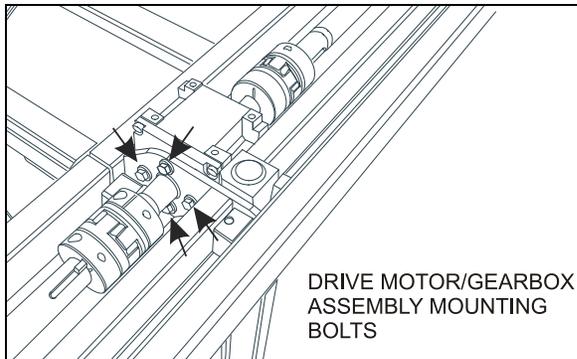
**TORQUE: 16-20 lb-ft (22-27 Nm)**



## CAUTION

To prevent damaging threads, use your fingers to drive the bolts into the aluminum gearbox housing mounting holes.

6. Reinstall the jaw couplings.



**FIGURE 20: DRIVE MOTOR/GEARBOX ASSEMBLY MOUNTING BOLTS**

## 9 JAW COUPLINGS

### 9.1 MAINTENANCE

Inspect the jaw couplings to check if there is backlash between the key and the keyway. Also, check the spider condition. Check that the clamping screws are tight.

### 9.2 REPLACEMENT & ADJUSTMENT

1. The slide-out must be retracted.
2. Disengage the jaw coupling: loosen the clamping screw on each clamping hub. If required, rotate the motor shaft extension as described in the manual override procedure (paragraph 18) to get to the clamping screws.
3. Separate both clamping hubs.

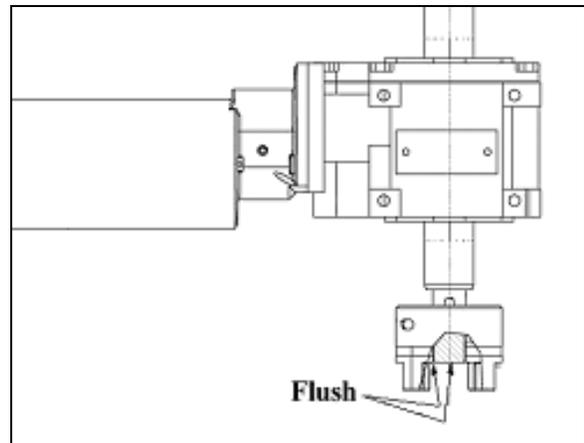
**NOTE**

*It may be necessary to loosen the blue flange bearings to move the shaft out of the way.*

4. Clean and degrease the hub bore and the shaft.
5. Push the new clamping hubs onto the shaft (pinion side).
6. Install a clamping hub on one of the gearbox shaft (opposite side of gearbox mounting bolts) flush with the shaft extremity (Figure 21) and tighten the clamping screw.

**TORQUE: 16-20 lb-ft (22-27 Nm)**

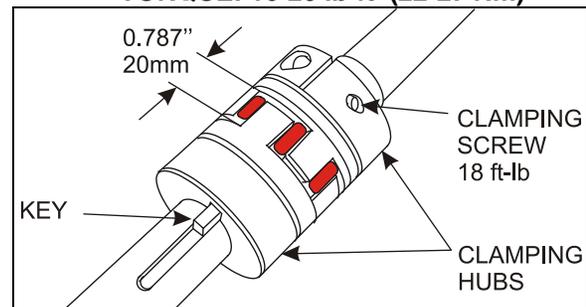
7. Install the second clamping hub on the gearbox shaft. Position the clamping hubs so that they are flush with the shafts extremity (Figure 21).



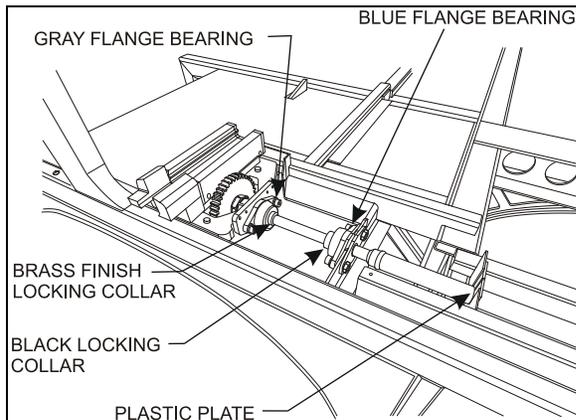
**FIGURE 21: CLAMPING HUB POSITION ON GEARBOX SHAFT**

8. Reconnect the clamping hubs with the spider. Leave a gap of 20mm (0.787inch) between each clamping hubs as shown on Figure 22. Use the motor hexagonal output shaft to align the keyways.
9. Tighten clamping screws.

**TORQUE: 16-20 lb-ft (22-27 Nm)**



**FIGURE 22: JAW COUPLING**

**10 FLANGE BEARING****FIGURE 23: MECHANICAL COMPONENTS (TYPICAL)**

There are two different types of flange bearing on the slide-out mechanism (Figure 23). Their purpose is to maintain the shaft in position while permitting rotation. The gray flange bearings are fixed to the linear bearing support plate and are not adjustable. The blue flange bearings are fixed to a support with oblong holes allowing vertical adjustment to follow the linear bearing support plate position as it is being adjusted.

The flange bearings are pre-lubricated and no subsequent lubrication is required due to the very low extending and retracting speed of the slide-out system.

**11 locking collar**

The locking collar secures the shaft and the flange bearing together using friction. Once locked, it prevents axial translation and rotation of the shaft in the flange bearing bore.

**11.1 INSTALLATION**

Slide the locking collar along the shaft up to the flange bearing (Figure 15). Turn the locking collar clockwise while maintaining it pressed against the flange bearing. Knock the collar with a punch to lock it in place, there is a cavity on the collar made for that purpose. Tighten the set screw.

To remove, loosen the set screw and release the locking collar using groove joint pliers or a small pipe wrench.

**12 LINEAR BEARING AND RAIL**

Rail and linear bearing system provide precise frictionless linear movement together with high

load carrying capacity and high stiffness. This standardized equipment is fully interchangeable.

To prevent corrosion, an electrolytic black film treatment is performed to the rail. Do not strike the rail with metal tools, this could damage the treatment.

After the rail is mounted to the slide-out base, a cap is used to cover the bolt hole to prevent foreign matters from clogging up the hole or from entering into the ball slide. The cap for the bolt hole is made of synthetic resin which has very high resistance to oil and wear.

**12.1 BEARING MAINTENANCE**

Make every effort not to allow dust and foreign objects to enter inside the linear bearing.

The linear bearings are pre-lubricated and no subsequent lubrication is required.

**12.2 BEARING REPLACEMENT & ADJUSTMENT**

1. Remove the slide-out from the vehicle (removal must be performed according to the Slide-Out Removal Procedure. Ask your Prevost service representative).
2. Disconnect the jaw coupling on the side of the linear bearing being replaced (refer to paragraph 9).
3. Dismount the blue flange bearing.
4. From the mechanism access panel, remove the retaining screws A, B, C & D (see Figure 26).
5. Remove the support and bearing assembly. Turn the assembly upside down to access the bearing mounting screws (Figure 24) Dismount the linear bearing and install the new one.

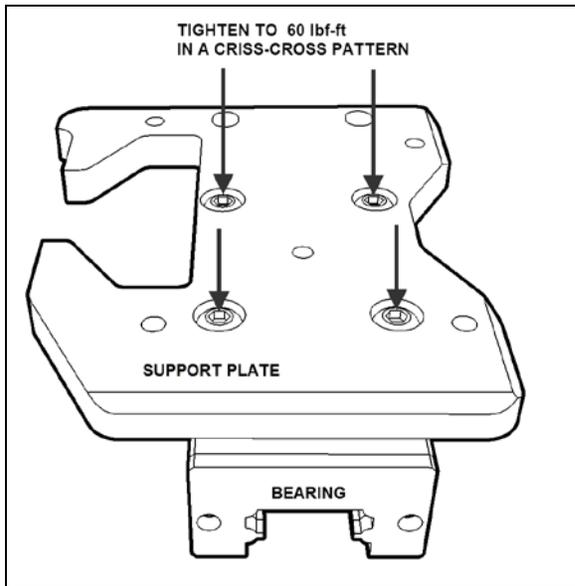


FIGURE 24: BEARING MOUNTING SCREWS

6. Tighten the mounting bolts in a crisscross pattern.

**TORQUE: 59 lb-ft (80 Nm)**

7. Reinstall the support plate, retaining screws, blue flange bearing and reengage the jaw coupling. Refer to the specific procedures.

### 12.3 LEVEL & TILT ADJUSTMENT

Leveling of the slide-out is done by changing the linear bearing support plate height using the leveling screws 1, 2, 3, 4 (Figure 26). When proper level is attained, the retaining screws A, B, C & D maintain the support plate seated on the leveling screws. Also, the retaining screws prevent the slide-out from tipping inside the vehicle when it is retracted.

The slide-out is slightly tilted. When retracting, the upper "in limit" stoppers touch first the vehicle structure, followed by the lower "in limit" stoppers. Tilt adjustment is done by changing the linear bearing support plate inclination using the leveling screws 1 & 2 as pivot and 3 to adjust the angle (Figure 26).

#### 12.3.1 Procedure

**NOTE**

For the **front slide-out**, the front linear bearing leveling screws are accessible from the access panel located over the front wheel while the rear linear bearing leveling screws are accessible from the access panel in the evaporator compartment. For the **rear slide-out**, access the linear bearing from under the bed structure or the radiator compartment.



### WARNING

The slide-out must be retracted when the level and tilt adjustment is performed.

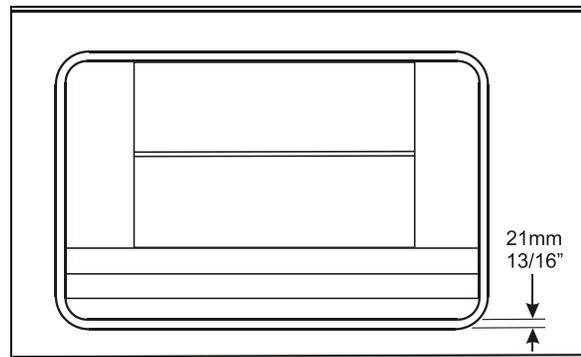


FIGURE 25: SLIDE-OUT LEVEL ADJUSTMENT

Before proceeding with the level and tilt adjustment, check the following conditions:

- The slide-out is retracted;
  - The 2 lower "in limit" stoppers are perfectly adjusted, that means that the lower edge of the slide-out outer panel is flush or slightly in by 2mm (3/32") with the vehicle body when retracted;
  - The 2 upper "in limit" stoppers are removed from the slide-out (see Paragraph 1.2).
1. Loosen the blue flange bearings mounting screws (Figure 15).
  2. For front slide-out only, loosen the two plastic plates mounting screws along the shafts (Figure 15).
  3. With the lower edge of the slide-out outer panel flush with the vehicle body, adjust the slide-out level. The distance between the top of the horizontal member under the slide-out and the slide-out under panel must be 21mm (13/16" approximately).

**WARNING**

Never unscrew completely retaining screw A, B, C, D or the slide-out may tip inside.

**To raise the linear bearing support plate,** turn leveling screw 1 & 2 clockwise. Slightly and gradually, loosen the retaining screws A & B as the support plate elevates, but keep the retaining screws tighten.

**To lower the linear bearing support plate,** turn screw 1 & 2 counterclockwise. As the support plate goes down, maintain the retaining screw A & B tighten.

4. Loosen retaining screws C & D. Unscrew leveling screw 4. Now, the support plate should be resting on leveling screw 1, 2 & 3.
5. Using leveling screw 3, adjust the tilt in order to have the top of the slide-out recessed by 5mm (7/32") (see Figure 27).
6. When proper tilt is attained, tighten leveling screw 4 so that it comes into contact with the support plate.
7. Loosen slightly leveling screw 3 and then tighten it so it is perfectly in contact with the support plate. Make sure screws 1, 2, 3 & 4 are in contact with the support plate.
8. Loosen retaining screw A & B.
9. Using a crisscross pattern, tighten progressively (3 rounds) the retaining screw A, B, C & D.

**TORQUE: 45-55 lb-ft (61-75 Nm)**

10. Ensure that the leveling screw 1, 2, 3 & 4 are firmly leaning on the support plate and then firmly tighten the jam nuts.
11. Verify that the tilt is still properly adjusted (7/32").

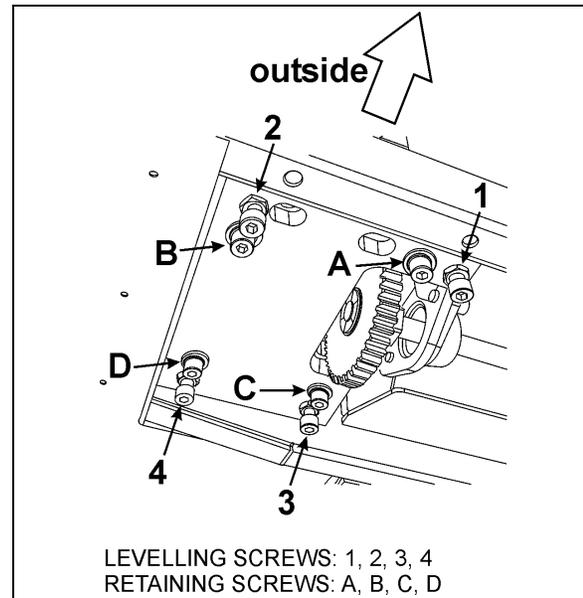


FIGURE 26: SLIDE-OUT LEVELING

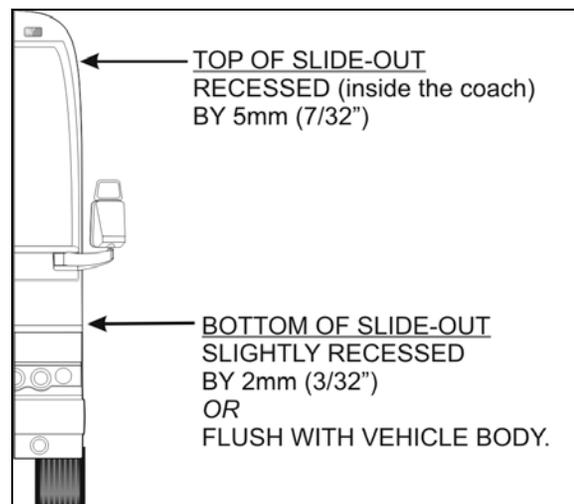


FIGURE 27: TILT ADJUSTMENT

#### 12.4 RAIL MAINTENANCE

Check that all the caps for the bolt hole are present. Missing caps must be replaced. To insert a cap into the rail bolt hole, use a flat tool. Pound the cap gradually until its height becomes flush with the rail top face.

Clean accumulated dirt from the rails with a soft cloth.

#### 12.5 RAIL REPLACEMENT

1. Remove the slide-out from the vehicle (removal must be performed according to the Slide-Out Removal Procedure. Ask your Prevost service representative).

2. Remove the bolt hole cap covers. To do so, pierce a hole in the center and hook them out. They will not be reusable.
3. Remove the rail mounting bolts.
4. Wipe off the rust preventive oil applied to the new rail. Remove burrs and small bumps on the slide-out mounting face with an oilstone.
5. Carefully place the rail on the bed on its mounting face.

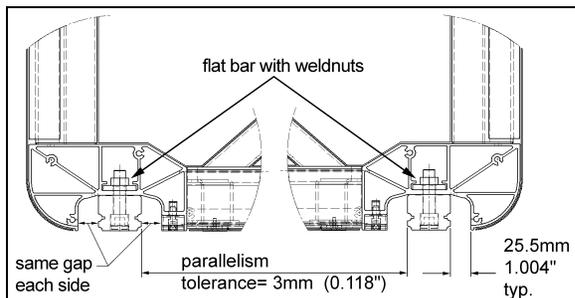
**NOTE**

The rail is bolted to a flat bar on which weldnuts are mounted. The flat bar is inserted in the slide-out lower body extrusion and can be removed through the end cap (Figure 28).

6. Adjust the flat bar position to align the weldnuts with the rail mounting holes.
7. Temporarily tighten the bolts.
8. Adjust the rail position per Figure 28. For each rail, make sure the gap is the same on both sides of the rail. Use acetal blocks to inspect the gap.
9. For final tightening of the bolts, tighten on either end of the rail and then start to the other end. Use blue Loctite™ on threads.

**TORQUE: 90-100 lb-ft (122-136 Nm)**

10. Install the bolt caps.

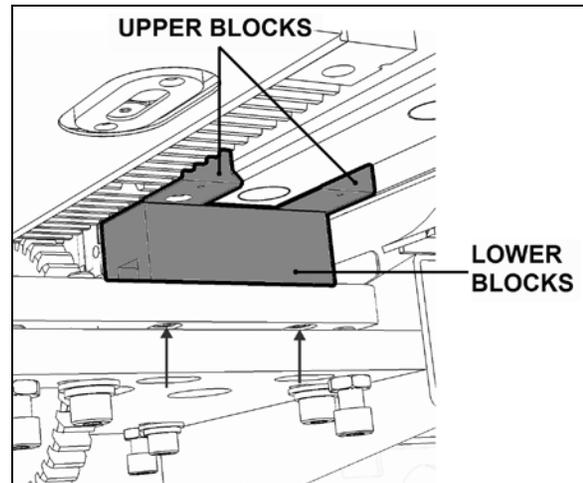


**FIGURE 28: RAIL POSITIONING**

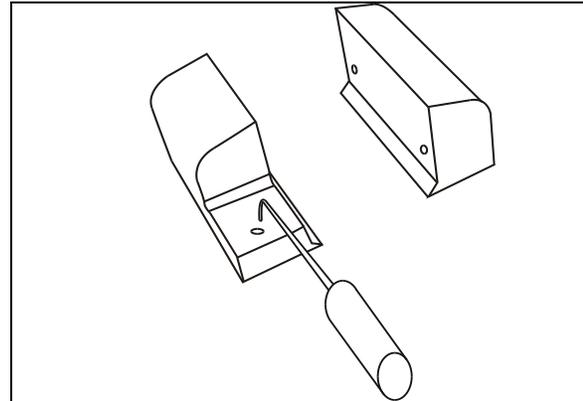
### 13 acetal plastic blocks

Three different acetal plastic blocks are installed next to each linear bearing to prevent dirt and foreign matter from entering inside the vehicle. They also serve as a support surface for:

1. The inflatable seal each side of the rail.
2. The “in limit” stoppers.



**FIGURE 29: ACETAL PLASTIC BLOCKS**



**FIGURE 30: REMOVE THE UPPER ACETAL PLASTIC BLOCKS WITH A PICKING TOOL**

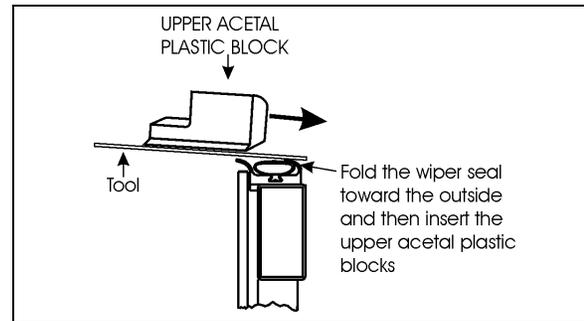
#### 13.1 REMOVAL / INSTALLATION

1. Gain access to the linear bearing support plate.
2. From under the support plate, remove the acetal plastic block mounting screws (see the oblong holes on Figure 26 and arrows, Figure 29).
3. Remove the 2 upper acetal plastic blocks. They have holes so they can be removed with a picking tool (Figure 30) from outside the vehicle. If the acetal plastic blocks are too hard to reach, slightly extend the slide-out, the movement of the slide-out should bring them out.
4. To remove the lower acetal plastic block, gain access to the compartment under it. Slide the acetal plastic block toward the center of the slide-out. Proceed the same way to reinstall it.

## SECTION 26b: X3 SERIES SLIDE-OUT

- Reinstalling the upper acetal plastic blocks. Fold the wiper seal toward the outside with a flat tool to ease installation (Figure 31) and tighten the mounting screws. Leave no gap between the blocks and the rail.

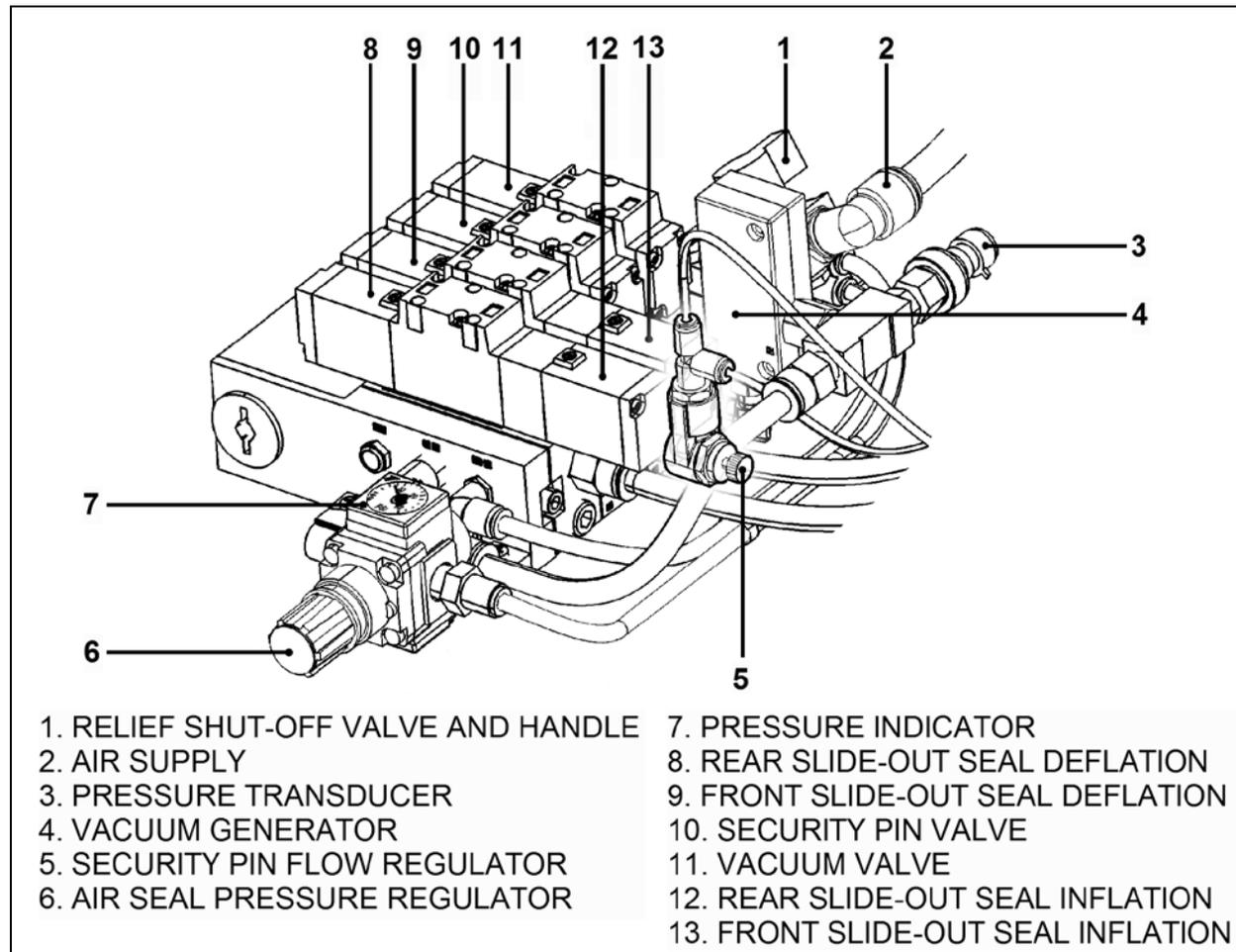
**TORQUE: 6.5-7.5 lb-ft (9-10 Nm)**



**FIGURE 31: LOWER ACETAL PLASTIC BLOCK INSERTION**

### 14 SLIDE-OUT PNEUMATIC SYSTEM

The slide-out is controlled by a pneumatic and electrical system. The pneumatic system consists of electrically controlled valves that operate slide-out components and control safety operations.



**FIGURE 32: PNEUMATIC COMPONENT PANEL**

#### 14.1 DESCRIPTION

##### AIR PRESSURE INLET VALVE

The slide-out air supply comes from the accessory tank.

The supply line for the pneumatic component panel (Item 2, Figure 32) is connected to the air pressure inlet valve on the pneumatic panel in the front service compartment.

### INFLATABLE SEAL VALVE

Seal inflation and deflation is done using a 5-port 2-position manifold valve with two solenoids. One solenoid is used for inflating of the seal and the other for deflating of the seal. When one of the solenoids is activated (seal deflating valve for example), the valve will keep its state even if the solenoid is deactivated. The inflating valve solenoid is activated to re-inflate the seal when the slide-out reaches its inner or outer limit. The inflatable seal pressure is set to between 10-12 psi. In full "IN" or full "OUT" position, this pressure is continuously applied to the seal as long as the accessory air tank (which supplies the slide-out) is not empty.

### VACUUM GENERATOR

A vacuum generator using Venturi principle is controlled by a 5-port 2-position manifold valve and is used to evacuate the air faster from the seal and to ensure that the seal surface does not stay in contact with the slide-out.

The vacuum generator valve is activated simultaneously with seal deflating valve solenoid for 10 seconds. A pressure transducer will detect a seal, vacuum valve or generator failure if -5 psig is not reached after the 10 seconds delay. In that situation, an error code will be stored in the DID. In normal operating condition, -5 psig is a necessary condition to consider the seal as deflated.

#### NOTE

*When air pressure is relieved using the shut-off valve, the normal extending and retracting operation cycle is disabled. This is due to the pressure transducer reading 0 psig and that is higher than -5 psig (vacuum). For that reason the slide-out cannot be moved with the control pad.*

### 14.2 MAINTENANCE

#### COMPRESSED AIR LINE

Inspect all compressed air line tubing for cuts, swelling, kinks or other damage or deterioration. Inspect the pneumatic fittings and components for any leak.

The slide-out air supply comes from the accessory air tank. For maintenance information, refer to Section 12, "Brake and air system".

### INFLATABLE SEAL CIRCUIT

The efficiency of the seal could be affected by impurities, such as white powder in the pneumatic control valve. It is recommended to inspect the inflatable seal control components once a year to prevent malfunction. In this case, remove the seal valves and clean the interior valve components using a compressed air nozzle. Do the same thing with the vacuum generators.

The inflatable seal pressure must be set between 10 to 12 psi maximum. It is recommended to check the inflatable seal pressure once a month to ensure sealing efficiency and prevent any infiltration from outside. The needle on the pressure gage should indicate between the two small green arrows on the dial (Figure 42).

### 14.3 SEAL

The slide-out sealing device is used to prevent any type of infiltration that may occur between the structure body and the slide-out itself. It is composed of an inflatable seal which is used as a primary sealing device for both retracted and extended slide-out position and a wiper seal as a secondary sealing device which is used to wipe water out and to ensure sealing during slide-out movement.

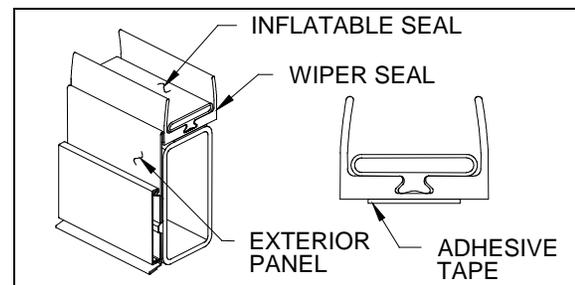


FIGURE 33: SEAL ASSEMBLY

Seal deflation is performed each time the slide-out is moved. The deflating valve solenoid is activated before and during slide-out movement. The deflating solenoid is deactivated upon reaching the retracted or extended position. Then the inflating solenoid is activated to re-inflate the seal.

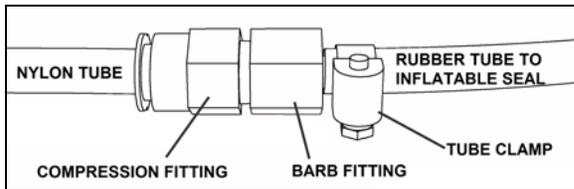


FIGURE 34: TYPICAL INFLATABLE SEAL AIR INLET

### CAUTION

Make sure the inflatable seal is deflated when manually moving the slide-out during service maintenance. Deflate inflatable seals completely by turning the relief shut-off valve handle clockwise (see Figure 32, Item 1).

### CAUTION

Check before using any cleaning or adhesive product on seal, panel or glass to prevent alteration or damage.

#### 14.3.1 Maintenance

The inflatable seal pressure must be set between 10 and 12 psi with the pressure regulator. It is recommended to check the inflatable seal pressure once a month to ensure sealing efficiency and prevent any infiltration from outside. Check both seals for air leaks or cracks. Check the sealant between the inflatable seal and the exterior panels and glasses. Add sealant if necessary.

#### 14.3.2 Seal assembly removal

### DANGER

Always wear the appropriate safety equipment. Maintain adequate ventilation at all time.

1. Retract the slide-out 2" inside the vehicle (paragraph 14.3.4).  
*Heed the cautionary notes before retracting.*
2. Unplug the nylon tubing from the compression fitting (Figure 34).
3. Unstick and remove the wiper seal from the structure.
4. Scrape remaining tape from the structure. Remove old sealant that was between the

wiper seal and the exterior panels and glasses.

#### 14.3.3 Seal assembly installation

##### **NOTE**

*This procedure is to install the inflatable seal assembly on the structure.*

### CAUTION

Always apply product in the same direction to prevent dirt from being brought back.

### CAUTION

Check before using any cleaning or adhesive product on seal, panel or glass to prevent alteration or damage.

##### **NOTE**

*Refer to the product specification for drying time.*

1. Retract the slide-out 2" inside the vehicle (paragraph 14.3.4). *Heed the cautionary notes before retracting.*
2. Clean the part of the structure that will receive the inflatable seal and also the back of the exterior panel with a chix cloth and thinner. Use another cloth to dry the surfaces. Wait at least 2 minutes for drying.
3. Rub the structure and also the back of the exterior panel with a Scotch Brite (or equivalent product).
4. Clean another time the structure and the back of the exterior panel with a chix cloth and thinner. Use another cloth to dry the surfaces. Wait at least 2 minutes for drying.
5. Clean the structure and the back of the exterior panel with appropriate cleaner. Wait until the product is dry before proceeding.
6. Seal the gap between the exterior panels and the seal wiper.
7. Install the inflatable seal on the structure, placing it as close as possible from the exterior side of the structure. Position the air inlet first. Then remove locally the inflatable seal adhesive tape protection, and press the upper corners on the structure and hold

them in place for 90 to 120 seconds. Install the lower corners next, then the straight section. Press the straight inflatable seal sections on the structure for at least 15 seconds. Use a small roller to ensure a good adhesive contact on the structure.

8. Connect the nylon tubing back on the fitting. (Figure 34).

#### 14.3.4 Slide-out 2" inside retraction



### CAUTION

For each rail, remove all acetal blocks and limit sensors. (Figure 35)

Refer to paragraph 13 "ACETAL PLASTIC BLOCKS"

Do not retract slide-out room too far in. Retract just past the wiper seal. (Figure 37)

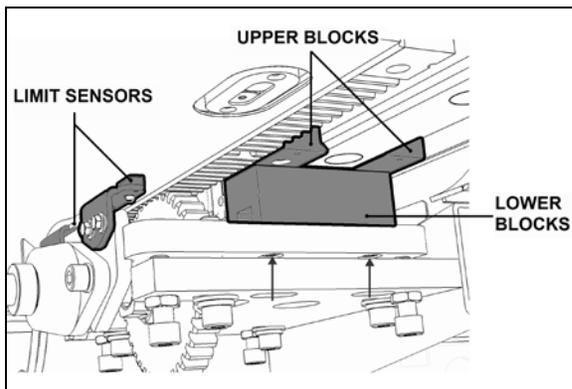


FIGURE 35 ACETAL BLOCKS & LIMIT SENSORS



### CAUTION

*Do not use the slide-out control pad to move the slide-out inwards. The limits are not recognized over the closed position. The slide-out will not stop and damage may occur.*

1. Fully deflate the air seal by turning the shut-off valve clockwise (Item 1, Figure 32). Make sure the pressure indicator is at "0 psi".
2. Turn the ignition to the off position. Using the manual override procedure (Paragraph 18), extend the slide-out a few inches so the exterior extrusion screws located on the top of the slide-out are accessible from outside (Figure 9).

3. Using a knife, cut the sealant between the Top extrusion and the roof. (Figure 36) Unscrew and remove the central exterior extrusion screws and the two end extrusion screws.

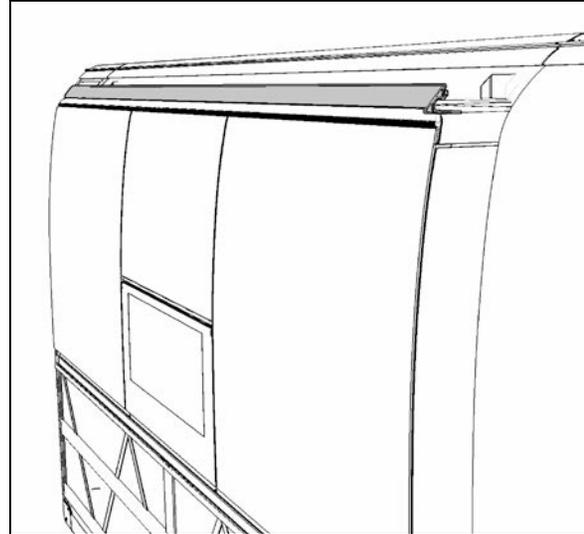


FIGURE 36 TOP EXTRUSION REMOVAL

4. Using the manual override procedure (paragraph 18), move the slide-out 2" inside the vehicle, just so the seal becomes accessible from the outside (Figure 37).

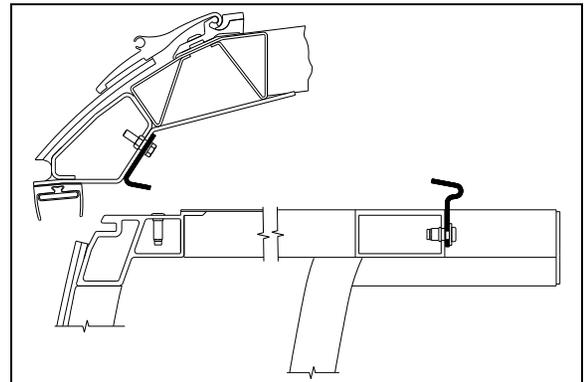


FIGURE 37: ROOM 2" INSIDE – UPPER SECTION VIEW

5. Once completed, use the manual override procedure to extend the slide-out to reinstall the exterior extrusion. Apply appropriate sealant on the exterior extrusion screws and between the extrusion, the roof and the edges to prevent water infiltration (Figure 37).
6. Using the manual override procedure, retract the slide-out to its closed position.
7. Finally, the seal can be re-inflated by turning the shut-off valve handle counterclockwise. Check the pressure gage on the inflatable

seal regulator to see if the pressure is increasing to around 11 psi.

## 15 SLIDE-OUT ELECTRICAL SYSTEM



### DANGER

Never modify the slide-out electrical wiring. Any modifications may cause an unexpected slide-out action and could result in personal injuries.

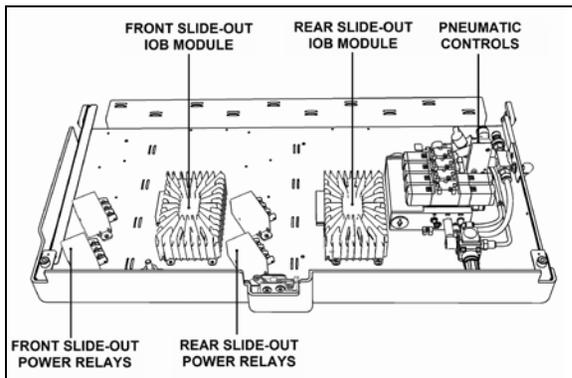


FIGURE 38: SLIDE-OUT CONTROL PANEL

The multiplexed slide-out electrical system is mainly composed of the MCM module, the VEC module and one I/O-B module per installed slide-out.

Each I/O-B has two power relays assigned. I/O-B modules analyze the input signal conditions and activate outputs like pneumatic valves, retraction and extension sequence, etc. The power relays are used to supply power coming from the I/O-B module to the electric motor and to change polarity to reverse motor rotation.

I/O-B modules input signals are:

- Control pad switch IN;
- Control pad switch OUT;

Also, the following input signals are required for a safe operation of the slide-out:

- Pressure transducer;
- Parking brake;
- "in limit" sensor;
- "out limit" sensor;

I/O-B modules output signals are:

- Control pad green indicator light;
- Power relay current reversing;

- Seal valve inflating solenoid;
- Seal valve deflating solenoid;
- Vacuum generator valve solenoid;
- Security pin valve solenoid;
- Electric motor, first power output 15 amps;
- Electric motor, second power output 15 amps;



### DANGER

Before working on the slide-out electrical system, turn the ignition key to the "OFF" position.

#### 15.1 Electrical interconnection with Prevost vehicle

The slide-out power supply comes from the 24-volt circuit breaker in the rear electrical compartment. The other interconnections are located on the pneumatic panel and the electrical panel in the front service compartment. All the interconnections are shown on the electrical diagrams of your vehicle.

A blinking green light on the control pad means that an error condition or a missing operation condition is present on a slide-out.

#### 15.2 Slide-out breakers / fuses

The main breakers for the slide-out electrical system are located in the rear electrical compartment.

For X3-45 VIP models: CB4.

##### 15.2.1 Multiplex fuses

The multiplex module outputs are protected in current by an internal "soft-fuse". Each output is programmed to specific maximum amperage. When an output is shorted, the current gets above the limit and the soft-fuse intervenes to turn the output OFF. The output stays OFF until the "soft-fuse" is reset.

Turn the ignition key to the OFF position and turn to the ON position again. This resets all "soft-fuses".



### CAUTION

Never put grease, Cortec VCI-238 or other product on the multiplex modules connector terminals.

### 15.3 PROBING VOLTAGE ON THE MULTIPLEX CIRCUITS

Multiplex modules are supplied by 24 volts.

Inactive Multiplex output = Residual voltage of 18% to 33% of supply voltage.

Inactive Multiplex input = Residual voltage of 50% of supply voltage.

#### **NOTE**

*For a 24V module: an active voltage would be 24V or 0V but not in between. If you measure the intermediate tensions (ex. 12V, 4V, or 8V) this must be interpreted as if the input or the output is inactive.*

### 15.4 Module replacement

I/O-B modules can be replaced and reprogrammed without having to connect a computer to the vehicle.

Refer to Section 06 under heading "MULTIPLEX MODULES REPLACEMENT" for the detailed procedure.

### 15.5 SLIDE-OUT LIMIT SENSORS

Two Hall-Effect sensors are used on each slide-out to define end limit positions. The "in limit" and "out limit" sensors detect two pairs of permanent magnets fixed on the slide-out underbody.

#### 15.5.1 Maintenance and adjustment

The rear slide-out sensors are accessible from inside of the vehicle, under the bed structure while the front slide-out sensors can be reached from the 3<sup>rd</sup> baggage compartment access panel. To remove the sensors, unsnap them from the mounting bracket.

#### **To adjust the "in limit" sensors:**

Prior to adjusting the "in limit" sensors, ensure that the "in limit" stoppers are perfectly adjusted (see paragraph 2.2.2).

1. Retract the slide-out to its full "IN" position with the "in limit" stoppers in contact with their bearing surface.

2. Loosen the "in limit" sensor mounting bracket screws and move back the sensor completely (toward the inside of the vehicle).
3. Bring slowly the sensor toward the outside of the vehicle until the LED turns on. When it does, move it 0.079" (2mm) further in the same direction and tighten the mounting bracket screws.
4. Check if the "in limit" sensor is properly adjusted. At the moment when the slide-out stops during normal retraction, the "in limit" stoppers must contact their bearing surface (lower acetal plastic block). Put white grease on the "in limit" stopper beforehand to visually confirm the system stops the motion before hitting the blocks. There should be a grease mark on the block.

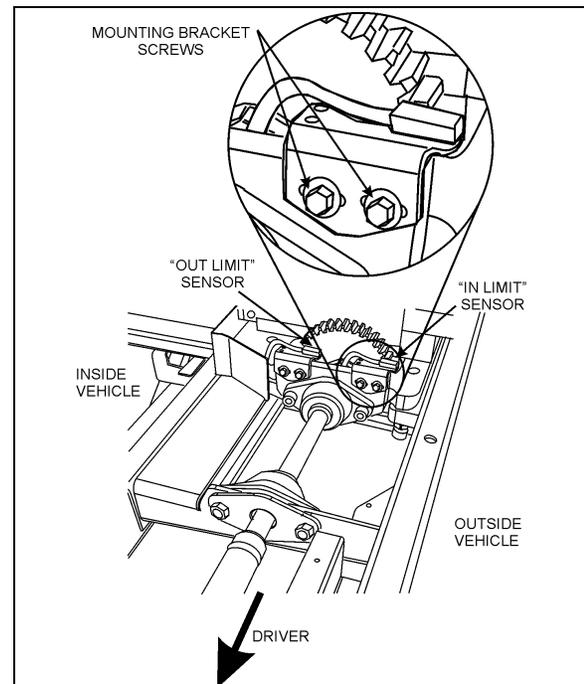


FIGURE 39: SLIDE-OUT SENSORS

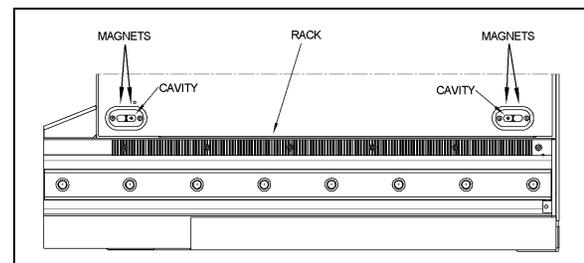


FIGURE 40: MAGNETS ON SLIDE-OUT UNDERBODY

#### **To adjust the "out limit" sensors:**

Prior to adjusting the “out limit” sensors, ensure that the inner stoppers are perfectly adjusted (see paragraph 2.1).

1. The slide-out is slightly tilted except when it is in its full “IN” or “OUT” position. Extend the slide-out near its full “OUT” position. When the slide-out straitens up and that it is perpendicular with the vehicle body, stop the slide-out.
2. Loosen the “out limit” sensor mounting bracket screws and move back the sensor completely (toward the inside of the vehicle).
3. Bring slowly the sensor toward the outside of the vehicle until the light emitting diode (LED) turns on. When it does, tighten the mounting bracket screws.

**NOTE**

*When the “out limit” sensors are properly adjusted, the slide-out extension stops before the side inner stoppers reach the vehicle structure.*

**16 SLIDE-OUT EXTERIOR FINISHING PANELS & WINDOWS****NOTE**

*The removal and installation procedures are all based on standard service methods described in section 18: BODY. Refer to this manual for procedures, tools, cleaner, adhesives and other product needed.*

**17 WELDING PRECAUTION****CAUTION**

Prior to arc welding on the vehicle, refer to the Welding Precautions Procedure Prior To Welding” in section 00 GENERAL of this manual to avoid serious damage to the vehicle components.

**18 SLIDE-OUT MANUAL OVERRIDE PROCEDURES****CAUTION**

Never use an impact wrench to manually operate the slide-out. Doing so would damage the various mechanical components of the slide-out.

In case of power retracting system failure, it is possible to use the manual override procedure to retract or extend the slide-out.

The manual override procedures consist in rotating the slide-out motor shaft extension using a cordless power drill with a 10 mm hexagonal bit.

Follow all instructions carefully to avoid damaging the inflatable seal or the retraction mechanism.

**18.1 Preliminary conditions for manual override procedure**

Before using the slide-out manual override procedures, make sure that the problem cannot be solved by one of the following simple checks:

- Make sure the circuit breaker is not tripped. See paragraph 15.2.
- Make sure the parking brake is applied and that transmission is in the “NEUTRAL” position.

**NOTE**

*The slide-out control system inhibits transmission range selection to prevent the vehicle from moving if the slide-out is not in its full “IN” position.*

- Make sure the voltage is high enough by running the engine at fast idle or having a battery charger connected.

**CAUTION**

Before extending or retracting the slide-out, always open a window to avoid movement restriction and to prevent the motor from stopping in overcurrent because of a vacuum or pressure build up inside the vehicle.

### 18.1.1 Manual retracting procedure – Front and rear slide-out

1. Turn the ignition switch to the "OFF" position, and remove the ignition key for more safety.
2. Deflate the inflatable seal by using the relieving shut-off valve located on the pneumatic component panel (Item 1, Figure 32).
3. Turn the handle clockwise to deflate the seal. Make sure the pressure indicator reading is "0 psi".



#### CAUTION

The pressure in the inflatable seal must be completely relieved to prevent any damage to the seal.

#### NOTE

*When air pressure is relieved using the shut-off valve, the normal extending and retracting operation cycle is disabled, for that reason the slide-out cannot be moved using the control pad.*

4. To move the slide-out, use a cordless power drill with a 10 mm hexagonal socket on the shaft extension of the slide-out motor.
5. Rotate the slide-out motor shaft extension with the power drill until the slide-out comes to its closed position. (Figure 41)

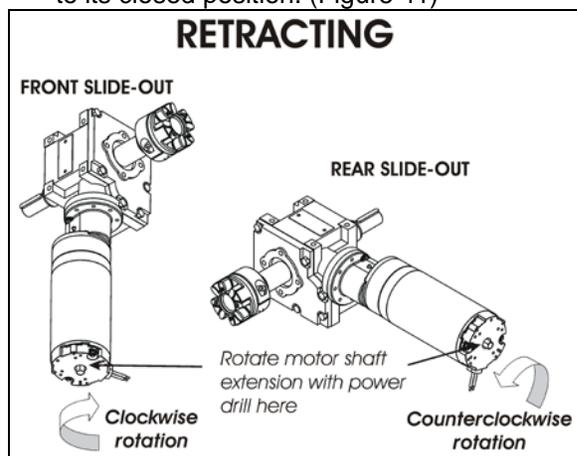


FIGURE 41: SLIDE-OUT MOTOR ROTATION

6. Once the slide-out room is lined up to its closed position, remove the tool from the motor.



#### CAUTION

Slow down the closing speed as the slide-out approaches its closed position. As soon as the "in limit" stoppers come in contact with their bearing surface, stop immediately the power drill rotating movement. Not doing so could overload the drive mechanism and cause damage to the reduction gearbox.

4. Finally, the inflatable seal can be re-inflated by turning the shut-off valve handle counterclockwise. Check the pressure gage on the inflatable seal regulator to see if the pressure increases to around 11 psi (Figure 42). Needle should be pointing between the two small green marks on the dial.

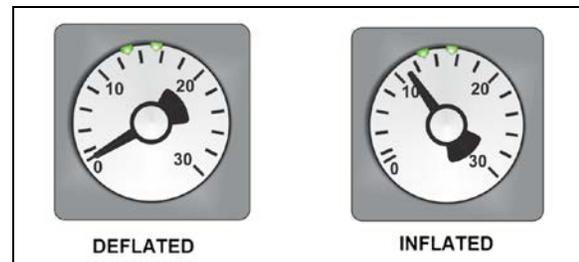


FIGURE 42: INFLATABLE SEAL PRESSURE GAGE

### 18.1.2 Manual extending procedure – Front and rear slide-out

1. Apply parking brake to disengage the security pin from the receptacle.
2. Turn the ignition switch to the "OFF" position, and remove the ignition key for more safety.
3. Deflate the inflatable seal by using the relieving shut-off valve located on the pneumatic component panel (Figure 32, Item 1). Turn the handle clockwise to deflate the seal. Make sure the pressure indicator reading is "0 psi".



#### CAUTION

The pressure in the inflatable seal must be completely relieved to prevent any damage to the seal.

**NOTE**

When air pressure is relieved using the shut-off valve, the normal extending and retracting operation cycle is disabled, for that reason the slide-out cannot be moved with the control pad.

4. To move the slide-out, use a cordless power drill with a 10 mm hexagonal bit on the shaft extension of the slide-out motor.
5. Rotate the slide-out motor shaft extension with the power drill until the slide-out comes to its opened position.
6. Once the slide-out is lined up to its opened position, remove the tool from the motor.

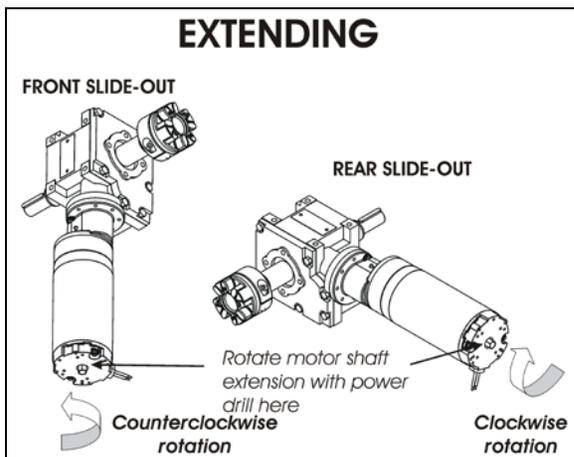


FIGURE 43: SLIDE-OUT MOTOR ROTATION

**NOTE**

The **front slide-out motor** is located inside the 2<sup>nd</sup> baggage compartment while the **rear slide-out motor** is accessible from inside the vehicle, under the bed structure.



**CAUTION**

Slow down on the closing speed as the slide-out approaches its extended position. As soon as the “out limit” stoppers come in contact with their bearing surface, stop immediately the power drill rotating movement. Not doing so could overload the drive mechanism and cause damage to the reduction gearbox.

7. Finally, the inflatable seal can be re-inflated by turning the shut-off valve handle counterclockwise. Check the pressure gage

on the inflatable seal regulator to see if the pressure is increasing to 11 psi (Figure 42).

**19 SLIDE-OUT MAXIMUM LOAD**

**Front slide-out:**

Maximum load with vehicle at stand still (retracted or extended) .....1500 lb  
 Maximum load with vehicle moving or slide-out moving .....1200 lb<sup>1</sup>

**Rear slide-out:**

Maximum load with vehicle at stand still (retracted or extended) .....1500 lb  
 Maximum load with vehicle moving or slide-out moving .....1000 lb<sup>1</sup>

**NOTE**

Maximum load includes occupant weight and equipment added by the converters in the slide-out

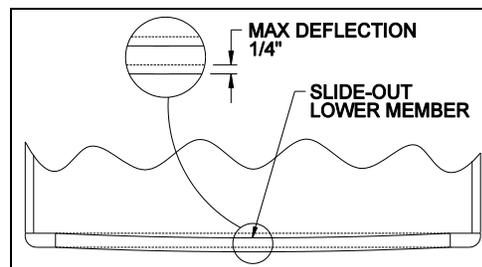
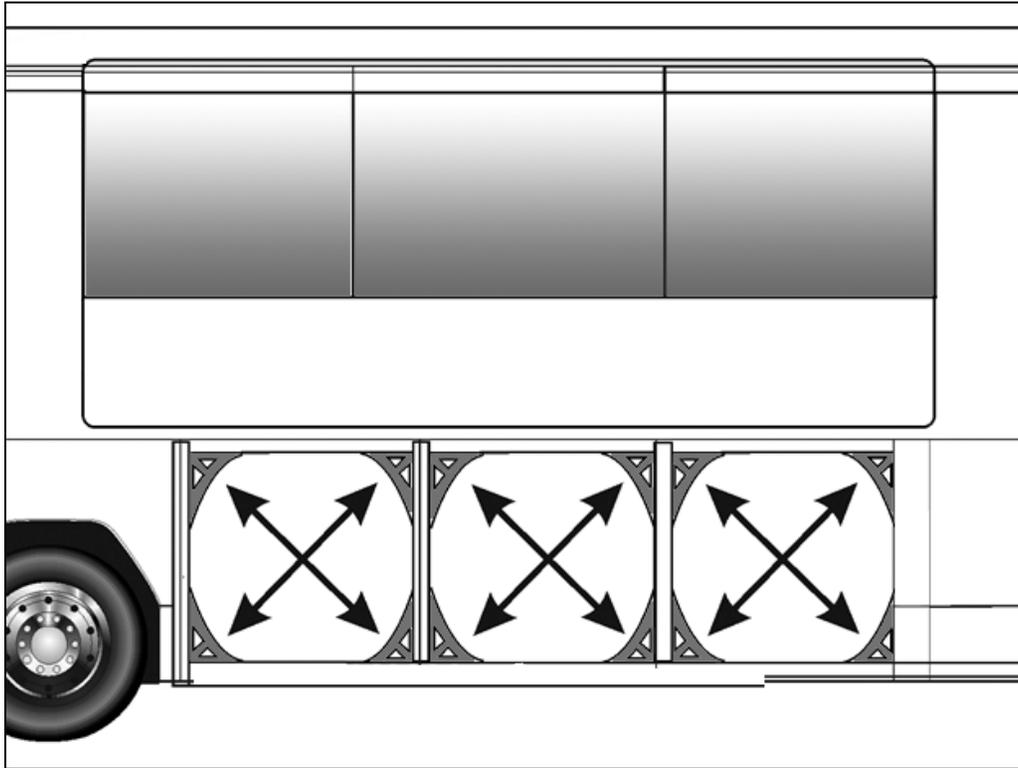


FIGURE 44: FRONT SLIDE-OUT DEFLECTION

<sup>1</sup> Value is for an equally distributed load to prevent seal damage by excessive deflection.

**CAUTION**

Never remove the structural reinforcement angle brackets inside the baggage compartments. Doing so could lead to termination of the warranty coverage concerning the structural integrity.

**20 CONVERSION CHECKLIST**

The converter should check these points before closing the walls covering the roof reinforcing rod and the pinions:

1. Check that the front slide-out exterior panels are parallel with the vehicle panels when retracted. If not, readjust the tilt.
2. Check that the slide-out is straight when completely extended, and that it leans against all inner stoppers.
3. Make sure the vehicle upper member is parallel with the front slide-out structure. If not, readjust the roof reinforcing rod. This may be affected by the loading on the roof.
4. Slide-out lower member deflection should be within 1/4". If not, redistribute the load.
5. Check slide-out operation. The slide-out should retract and extend smoothly without vibration.

Final check:

- Make sure the slide-out air pressure inlet valve is completely opened.
- Check the inflatable seal air pressure on the pressure regulator. The pressure should be 11 psi.

## 21 TROUBLESHOOTING

### 21.1 ERROR CONDITION OR MISSING OPERATION CONDITION

When an error condition or a missing operation condition is present on a slide-out, the green indicator light on the corresponding control pad starts blinking upon releasing of the IN/OUT rocker switch.

Turning the ignition OFF and ON again, will stop the blinking and reset the fault. If the error condition or a missing operation condition is still present, the blinking will start again the next time that the slide-out is operated.

To initiate fault diagnostic, use the DID right after operating the slide-out without cycling the ignition switch.

#### **NOTE**

*The DID is the main tool for troubleshooting a multiplex vehicle. It is essential to have it in working condition.*

To get detailed information about the error condition or the missing operation condition, request a diagnostic using the dashboard Driver's Info Display (DID). Check if there are active errors in the slide-out electrical system. With the DIAGNOSTICS menu, highlight VIEW ACTIVE FAULTS and then highlight ELECTRICAL SYSTEM to request a diagnostic of the electrical system from the MCM.

Press the enter key. If applicable, the DID shows the device ID, the fault messages or fault codes recorded. When more than one fault is recorded, an arrow pointing down appears on the right of the display. Use the down arrow to see all the fault messages.

Once the problem is corrected, the DID will still shows the fault as being active. Leave VIEW ACTIVE FAULTS up to the main menu. Then return to DIAGNOSTICS, VIEW ACTIVE FAULTS, and then ELECTRICAL SYSTEM. The DID should not display any faults

### Fault diagnostic

### 21.2 TROUBLESHOOTING – OPERATING CONDITIONS & CONTROL

PROBLEM	CAUSE	CORRECTIVE ACTION
The slide-out functions normally but the control pad green indicator light blinks	<p>Something is defective and may eventually create an issue if not repaired. The problem may be:</p> <ul style="list-style-type: none"> <li>A. Faulty limit sensor causing the slide-out to stop in overcurrent;</li> <li>B. CAN network problem causing the transmission inhibit safety to be non-operational;</li> <li>C. Vacuum pressure transducer disconnected or damaged (vacuum is applied for a fixed time of 7 seconds);</li> <li>D. Seal inflating valve solenoid open circuit (the seal is not re-inflated and water can penetrate in the vehicle);</li> <li>E. Security pin valve solenoid open circuit (the security pin is not extended while vehicle is riding).</li> </ul>	Request a diagnostic from the electrical system using the DID DIAGNOSTICS menu and refer to the Fault Message list in paragraph 21.4.

PROBLEM	CAUSE	CORRECTIVE ACTION
The slide-out does not extend	<p>A. The parking brake is not seen by the controller as being applied;</p> <p>B. Not enough air pressure in the accessory air tank to permit proper operation of the vacuum generator;</p> <p>C. Faulty vacuum generator, connection to the vacuum generator open, seal deflating valve solenoid open circuit;</p> <p>D. I/O-B module output defective, regulated 5-volt supply to sensors shorted to ground, "out limit" sensor shorted to ground, connection to the motor negative relay solenoid open circuit;</p>	<p>A. Make sure the parking brake is applied. Confirm parking brake application with the parking brake light on the telltale panel.</p> <p>B. Run the engine at fast idle a few minutes to increase air pressure in the accessory air tank and try again.</p> <p>C. Turn the relieving shut-off valve handle clockwise to deflate the inflatable seal, disconnect the pressure transducer. Do not forget to reconnect the pressure transducer and to close the relieving shut-off valve. Failure to do so could damage the seal and lead to water infiltration;</p> <p>D. Operate the slide-out with the manual override procedures.</p>
The slide-out does not retract	<p>A. Not enough air pressure in the accessory air tank to permit proper operation of the vacuum generator;</p> <p>B. Faulty vacuum generator, connection to the vacuum generator open, seal deflating valve solenoid open circuit;</p> <p>C. I/O-B module output defective, "in limit" sensor shorted to ground, connection to the motor positive relay solenoid open circuit;</p>	<p>A. Run the engine at fast idle a few minutes to increase air pressure in the accessory air tank and try again.</p> <p>B. Turn the relieving shut-off valve handle clockwise to deflate the inflatable seal, disconnect the pressure transducer. CAUTION, do not forget to reconnect the pressure transducer and to close the relieving shut-off valve. Failure to do so could damage the seal and lead to water infiltration;</p> <p>C. Operate the slide-out with the manual override procedures.</p>
When extending, the slide-out stops after having extended by 1 inch	<p>A. The security pin valve solenoid circuit is shorted to (+) 24-volt and the pin remains engaged;</p>	<p>A. Disconnect air supply from the safety pin cylinder;</p>
Transmission DRIVE range or REVERSE cannot be selected (the slide-out telltale light is illuminating).	<p>A. Slide-out not in full "in" position;</p> <p>B. Faulty "in limit" sensor. The slide-out is retracted but the controller doesn't not see it as retracted.</p>	<p>A. Retract slide-out.</p> <p>B. Confirm that all slide-out are retracted. On the slide-out control panel, disconnect the 5 pins green connector on the I/O-B module to disable the transmission inhibit. CAUTION, this is a temporary measure, the vehicle must be serviced as soon as possible.</p>

## 21.3 TROUBLESHOOTING - MECHANICAL COMPONENTS

PROBLEM	CAUSE	CORRECTIVE ACTION
Slide-out does not retract or extend when depressing the control switch.	<ul style="list-style-type: none"> <li>A. Electrical motor failure;</li> <li>B. Speed reduction gearbox failure;</li> <li>C. Security pin still engaged in receptacle;</li> </ul>	<ul style="list-style-type: none"> <li>A. Replace motor.</li> <li>B. Inspect gearbox components, particularly: bronze wheel or first reduction stage output shaft. Replace damaged components.</li> <li>C. Disengage pin and check if air cylinder is damaged.</li> </ul>
Slide-out is not straight once retracted or during retracting or extending operation.	<ul style="list-style-type: none"> <li>A. Broken rack tooth;</li> <li>B. Faulty rack attachment;</li> <li>C. Faulty shaft key at speed reduction gearbox or jaw coupling;</li> <li>D. Pinion keyless bushing slipping;</li> <li>E. Shaft breaking;</li> <li>F. Flange bearing attachment loosen;</li> </ul>	<ul style="list-style-type: none"> <li>A. Replace rack.</li> <li>B. Tighten mounting bolts, apply proper torque and use Loctite threadlocker (replace rack if necessary).</li> <li>C. Replace key or component having a damaged keyway.</li> <li>D. Realign slide-out and apply proper torque to keyless bushing.</li> <li>E. Replace shaft.</li> <li>F. Reposition shaft and tighten flange bearing mounting bolts.</li> </ul>
Slide-out moves out slightly when vehicle is traveling.	<ul style="list-style-type: none"> <li>A. Lower "in limit" stoppers are not leaning against the structure at the moment when the "in limit" sensor detects the magnet;</li> </ul>	<ul style="list-style-type: none"> <li>A. Adjust the sensor position in order to have contact of the stoppers against the structure at the time when the system stops the slide-out retraction.</li> </ul>
Slide-out moves when vehicle is moving.	<ul style="list-style-type: none"> <li>A. Inflatable seal not inflated</li> </ul>	<ul style="list-style-type: none"> <li>A. Check seal condition and seal air supply system.</li> </ul>
Slide-out retracts or extends difficultly.	<ul style="list-style-type: none"> <li>A. Foreign matters accumulated in the linear bearing;</li> </ul>	<ul style="list-style-type: none"> <li>A. Inspect the linear bearing end seals to see if they are in good condition. If not, replace the end seals and clean the inside of linear bearing.</li> </ul>
Slide-out oscillates vertically when retracting or extending	<ul style="list-style-type: none"> <li>A. Linear bearing balls hardened due to a too heavy load;</li> <li>B. Linear bearing mounting bolts loosen;</li> </ul>	<ul style="list-style-type: none"> <li>A. If balls clearance is excessive, replace linear bearing.</li> <li>B. Tighten mounting bolts.</li> </ul>
Slide-out vibrating or noisy when extending or retracting	<ul style="list-style-type: none"> <li>A. Acetal plastic block rubbing against the slide-out structure;</li> <li>B. Worn-out anti-friction coating on wiper seal around slide-out;</li> <li>C. Lower acetal plastic block rubbing against rail;</li> </ul>	<ul style="list-style-type: none"> <li>A. Realign acetal plastic block.</li> <li>B. Replace wiper seal.</li> <li>C. Remove lower acetal plastic block and machine down 1mm (0.039").</li> </ul>

PROBLEM	CAUSE	CORRECTIVE ACTION
Top of slide-out moves sideways when vehicle is moving	A. Roof reinforcing rod misadjusted;	A. Readjust as per procedure.
Slide-out does not retract up to its full "in" position	A. Interference between the exterior extrusion and the vehicle upper horizontal member above the slide-out;	A. Check for straightness of horizontal member and adjust the roof reinforcing rod. B. Check for outer wiper seal lip straightness on the slide-out roof.
Bottom of slide-out not flush with vehicle body	A. Broken or misadjusted lower "in limit" stopper; B. Lower "in limit" stoppers are not leaning against the structure at the moment when the "in limit" sensor detects the magnet; C. Acetal plastic block serving as leaning surface for lower "in limit" stopper broken or moved;	A. Replace or adjust lower "in limit" stopper. B. Adjust the sensor position in order to have contact of the stoppers against the structure when slide-out is stopped. C. Replace or adjust acetal plastic block proper position.
Top of slide-out not flush with vehicle body	A. Broken or misadjusted leveling or retaining screw; B. Faulty upper "in limit" stopper;	A. Check and replace screw. B. Replace upper "in limit" stopper.
Lower edge of slide-out not parallel with vehicle body opening	A. Faulty leveling and retaining screw (8 screws each side).	A. Inspect screw, replace and adjust slide-out level.
Watertightness problem	A. Inflatable seal and/or wiper seal damaged or unstuck; B. Insufficient air pressure in the seal; C. No air pressure in the slide-out pneumatic system; D. Sealant missing; E. Wiper seal draining hole clogged; F. Faulty water recovery pan; G. Faulty internal gutter;	A. Check both seals condition. B. Check the pressure regulator, the relieving shut-off valve and the seal valve condition. C. Check the slide-out air pressure inlet valve condition and the accessory air tank pressure. D. Check the exterior extrusion screws, the windows and the exterior panels sealant condition. E. Unclog draining hole. F. Check the recovery pan. G. Check internal gutter.
Knocking sound at end of travel when extending slide-out	A. Inner stoppers misadjusted;	A. Readjust the inner stoppers.

**SECTION 26b: X3 SERIES SLIDE-OUT**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Knocking sound when parking brake is released	A. Security pin retracts too rapidly;	A. Adjust security pin air flow regulator.
Inflatable seal damaged or removed, or wiper seal unstuck from the structure.	A. Slide-out has been retracted or extended with the manual procedure with the inflatable seal not deflated; B. Pressure transducer malfunction; C. Faulty roof reinforcing rod adjustment; D. Seal valve malfunction; E. Excessive load in the slide-out; F. Slide-out not centered in the structure opening;	A. Always deflate the seal when manually retracting or extending the slide-out. B. Check the pressure transducer condition, replace if necessary. C. Readjust the roof reinforcing rod. D. Check the seal valve condition. E. Reduce load or distribute load evenly in order to respect the deflection criterion and slide-out load capacity. F. Readjust the slide-out height and center horizontally in opening.
Friction at end of travel when in full OUT position or at beginning of retraction	A. Interference between upper structure key and upper inner stopper;	A. Readjust the upper inner stopper.

## 21.4 SLIDE-OUT FAULT MESSAGE ON DID

SID #	FAULT MESSAGE	TEXT	PROBABLE CAUSE	CORRECTIVE ACTION
1	Voltage Module A56	Value Too Low	Module A56 sees a Voltage less than 18 V on its power supply connector. Breaker, fuse or wiring harness open.	Check/ reset circuit breaker CBSo and CBSo1. Check/ replace fuse FSo5 Fix wiring harness
2	No Response Mod A56	Data Error	MCM module does not receive CAN communication from module A56. CAN connector A56 J3 Disconnected or CAN wiring harness open, or module A56 is defective.	Check connection A56 J3 Fix CAN wiring harness Replace module A56
3	Voltage Module A57	Value Too Low	Module A57 sees a voltage less than 18 V on its power supply connector. Breaker, fuse or wiring harness open.	Check/ reset circuit breaker CBSo and CBSo2. Check/ replace fuse FSo2 Fix wiring harness
4	No Response Mod A57	Data Error	MCM module does not receive CAN communication from module A57. CAN connector A57 J3 disconnected or CAN wiring harness open or module A57 is defective.	Check connection A57 J3 Fix CAN wiring harness Replace module
5	SldO Vacuum Sensor	Open Circuit	Pressure transducer disconnected. Faulty pressure transducer. Connection or wiring harness open.	Check/ replace vacuum transducer Check/ reconnect the connector SESo1 Fix wiring harness
		Shorted High	Pressure transducer is faulty Wiring harness shorted to 12v or 24v	Check/ replace vacuum transducer Fix wiring harness
6	SldO Seal Deaf Vac	Mechanical Fault	Does not reach vacuum level (-5 PSIG). Slide-out seal damaged or air leak in the seal deflating pneumatic circuit.	Check the seals and the pneumatic circuit.
7	SldO Motor/Limit se	Mechanical Or Electrical Fault	Slide-Out motor is activated for more than 5 seconds and the limit sensor from the departing end is still seen as active. Either the motor is defective and the slide-out is not moving or the limit sensor from the departing end is broken active.	If the slide-Out is not moving, then check the motor and its wiring.  If the slide-out is moving, then check the limit sensor from the departing end. (If problem occurs when extending, check the in-limit sensor. If the problem occurred when retracting, then check the out-limit sensor).

**SECTION 26b: X3 SERIES SLIDE-OUT**

<b>SID #</b>	<b>FAULT MESSAGE</b>	<b>TEXT</b>	<b>PROBABLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
8	SldO Park Br Signal	Mechanical Or Electrical Fault	Parking brake is not applied. Wire between parking brake switch and MCM is open.	Make sure the parking brake is applied and the parking brake telltale illuminates. Check / replace parking brake switch. Fix wiring harness.
		Shorted High	Wire between parking brake switch and MCM is shorted to 12v or 24v.	Fix wiring harness.
9	SldO Mot SpeedA Ctr	Shorted High	Wiring harness shorted to 12v or 24v	Fix wiring harness
		Current Above normal	Security pin or object stop the movement of a slide-out	Check / fix security pin functionality. Check / remove any object around the slide-out.
10	SldO Mot SpeedB Ctr	Shorted High	Wiring harness shorted to 12v or 24v	Fix wiring harness
		Current Above normal	Security pin or object stop the movement of a slide-out	Check / fix security pin functionality. Check / remove any object around the slide-out.
11	SldO Remote Led	Shorted High	LED or wiring harness shorted to 12v or 24v	Fix LED or wiring harness
		Shorted Low	Led or wiring harness shorted to ground	Fix LED or wiring harness
		Open Circuit	LED is broken. Bad connection on control pad. Wiring harness is cut.	Check / fix remote LED or connection Check /fix wiring harness
		Current Above normal	Led or wiring harness shorted to 12v or 24v	Fix Led or wiring harness
12	SldO Seal Inf Sol	Shorted High	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
		Shorted Low	Solenoid or wiring harness shorted to ground	Fix solenoid or wiring harness
		Open Circuit	Solenoid is broken or open. Bad connection on solenoid or bloc valve. Wiring harness is cut.	Check / fix solenoid or connection Check /fix wiring harness
		Current Above normal	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
13	SldO Seal Def Sol	Shorted High	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
		Shorted Low	Solenoid or wiring harness shorted to ground	Fix solenoid or wiring harness
		Open Circuit	Solenoid is broken or open. Bad connection on solenoid or bloc valve. Wiring harness is cut.	Check / fix solenoid or connection. Check /fix wiring harness
		Current Above normal	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
14	SldO Vacc Gen Sol	Shorted High	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
		Shorted Low	Solenoid or wiring harness Shorted to ground	Fix solenoid or wiring harness
		Open Circuit	Solenoid is broken or open. Bad connection on solenoid or bloc valve. Wiring harness is cut.	Check / fix solenoid or connection Check / fix wiring harness

SID #	FAULT MESSAGE	TEXT	PROBABLE CAUSE	CORRECTIVE ACTION
		Current Above normal	Solenoid or wiring harness shorted to 12v or 24v	Fix Solenoid or wiring harness
15	SldO Mot Neg Rly	Shorted High	Relay coil or wiring harness shorted to 12v or 24v	Fix relay coil or wiring harness
		Shorted Low	Relay coil or wiring harness shorted to ground	Fix relay coil or wiring harness
		Open Circuit	Relay coil is broken or open. Bad connection on relay. Wiring harness is cut.	Check / fix relay coil or connection Check / fix wiring harness
		Current Above normal	Relay coil or wiring harness shorted to 12v or 24v	Fix relay coil or wiring harness
16	SldO Mot Pos Rly	Shorted High	Relay coil or wiring harness shorted to 12v or 24v	Fix relay coil or wiring harness
		Shorted Low	Relay coil or wiring harness shorted to ground	Fix relay coil or wiring harness
		Open Circuit	Relay coil is broken or open. Bad connection on relay. Wiring harness is cut.	Check / fix relay coil or connection Check / fix wiring harness
		Current Above normal	Relay coil or wiring harness shorted to 12v or 24v	Fix relay coil or wiring harness
17	SldO Open Sw	Shorted High	Switch or wiring harness shorted to 12v or 24v	Fix switch or wiring harness
18	SldO Close Sw	Shorted High	Switch or wiring harness shorted to 12v or 24v	Fix switch or wiring harness
19	SldO Limit In Se	Shorted High	Sensor or wiring harness shorted to 12v or 24v	Fix sensor or wiring harness
20	SldO Limit Out Se	Shorted High	Sensor or wiring harness shorted to 12v or 24v	Fix sensor or wiring harness
21	SldO Secu Pin Sol	Shorted High	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
		Shorted Low	Solenoid or wiring Harness shorted to ground	Fix solenoid or wiring harness
		Open Circuit	Solenoid is broken or open. Bad connection on solenoid or bloc valve. Wiring harness is cut.	Check / fix solenoid or connection. Check / fix wiring harness
		Current Above normal	Solenoid or wiring harness shorted to 12v or 24v	Fix solenoid or wiring harness
22	SldO Limit In Out	Mechanical Or Electrical Fault	In Limit and Out Limit are seen at the same time. In Limit or Out Limit problem.	Check / replace in limit or out limit sensors Fix wiring harness.
23	Limit Sensor 5 V supply	Shorted Low	5v IO-B output is less than 2v. Wiring harness is open or shorted to ground.	Check 5v output on IO-B / replace IO-B module. Fix wiring harness.

