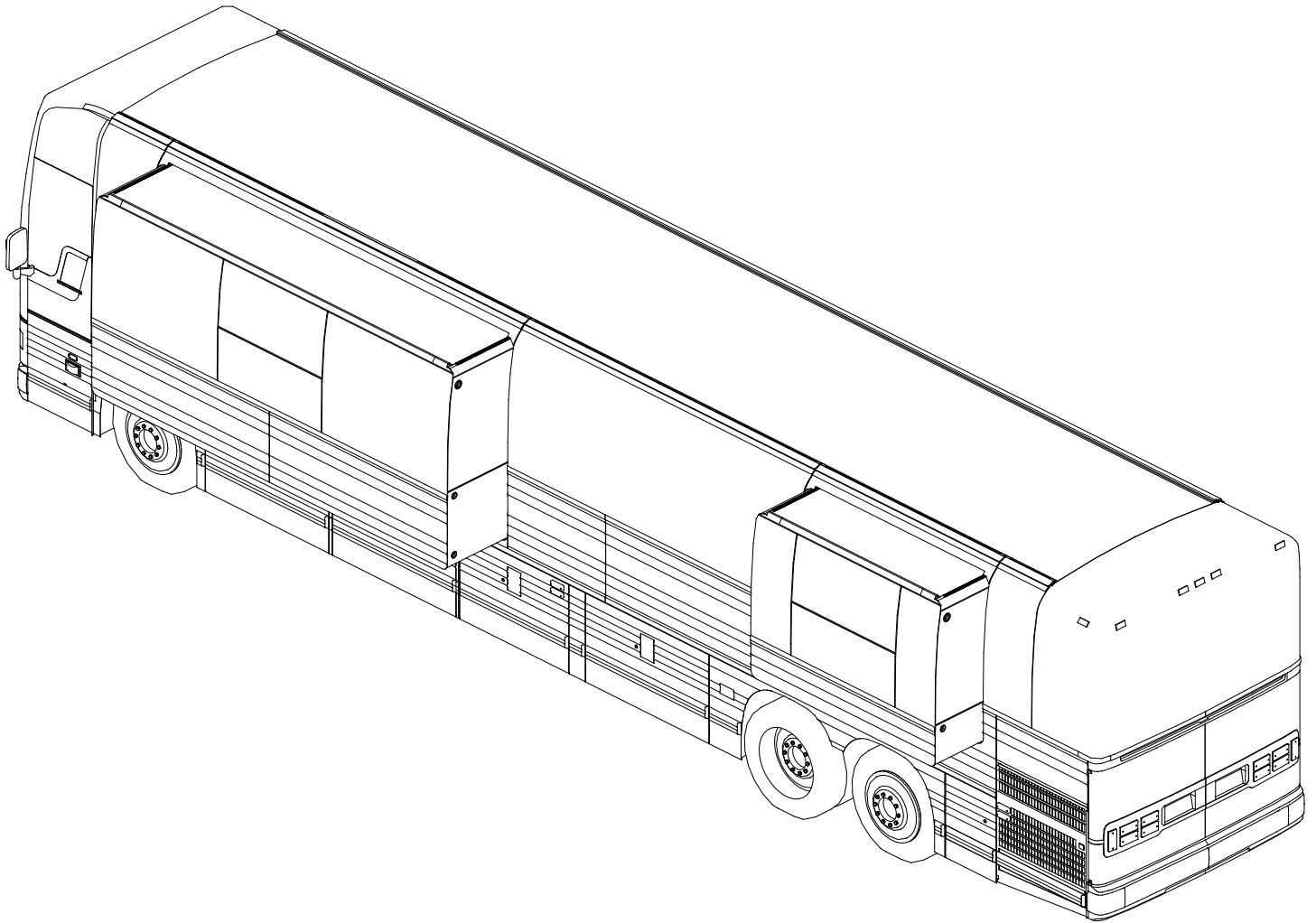


**Le Mirage XL III**

**SLIDE-OUT SERVICE MANUAL RELEASE 3**

**THE "ULTIMATE" CLASS  
CONVERSION BUS SHELLS**



**PREVOST  
SLIDE-OUT TECHNOLOGY**

**PREVOST®**

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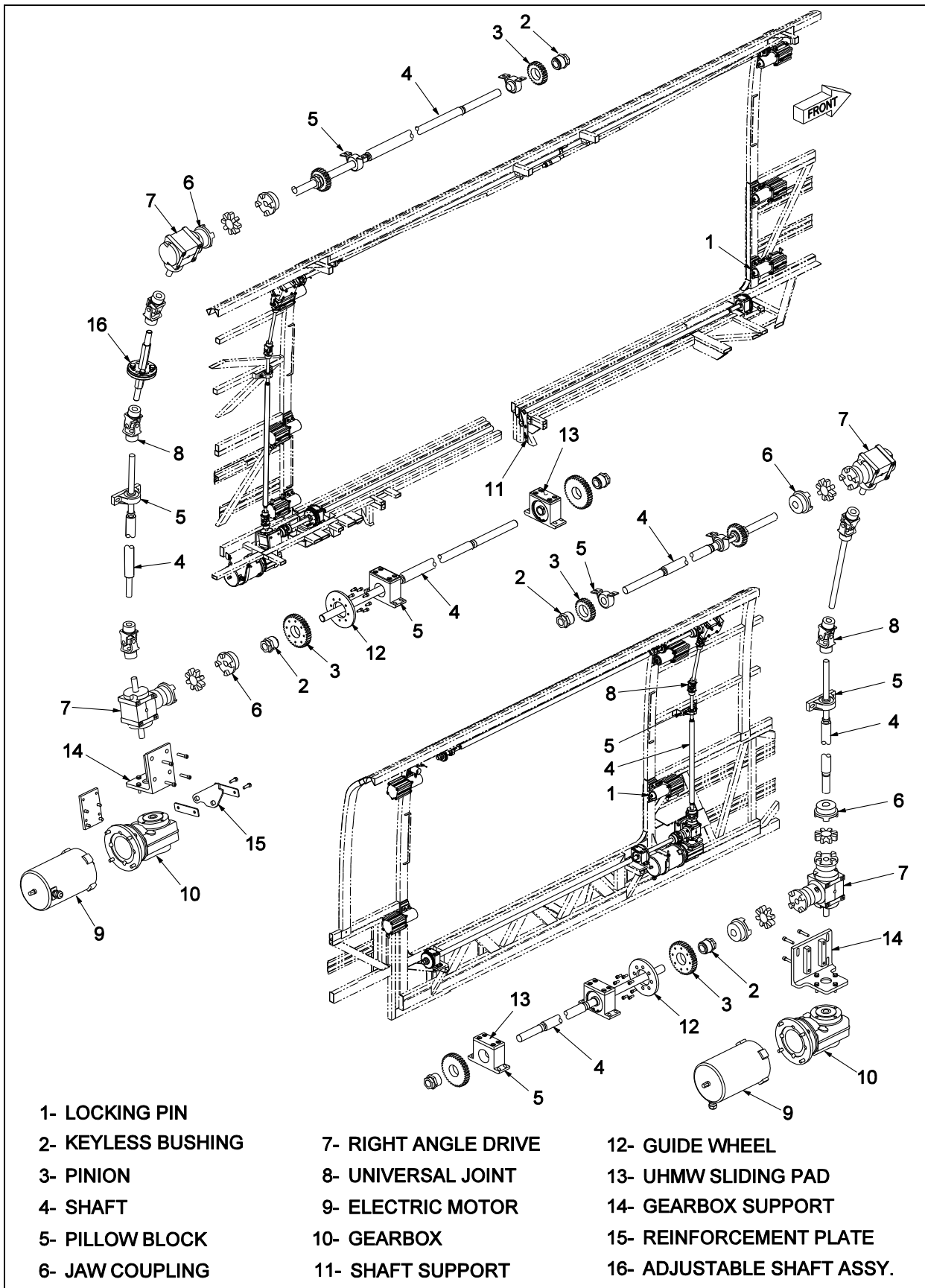


FIGURE 1 : SLIDE-OUT MECHANICAL COMPONENTS

# 1. SLIDE-OUT

## 1.1 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 2 and figure 3). These stoppers are used to block the extension of the slide-out, and to provide a support to position perpendicularly the slide-out with the vehicle structure. It is thus of primary importance that the stoppers remain on the slide-out for the automatic operation. If not, nothing will stop the slide-out during its extension.

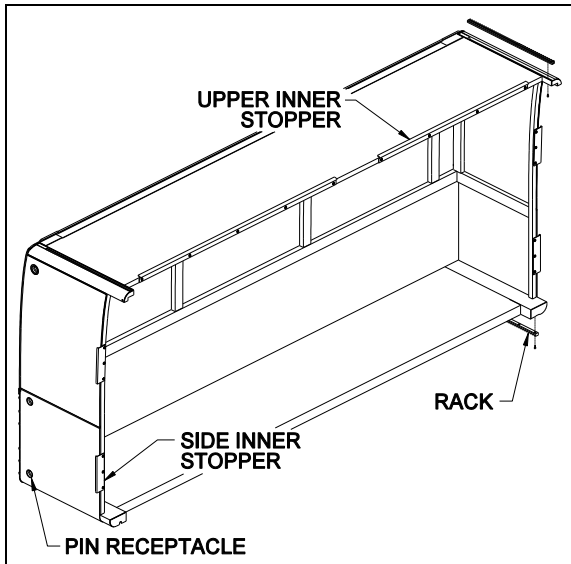


FIGURE 2 : FRONT SLIDE-OUT

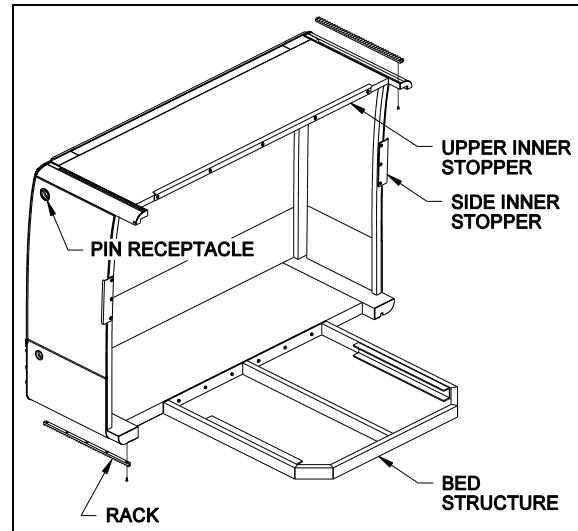


FIGURE 3 : REAR SLIDE-OUT

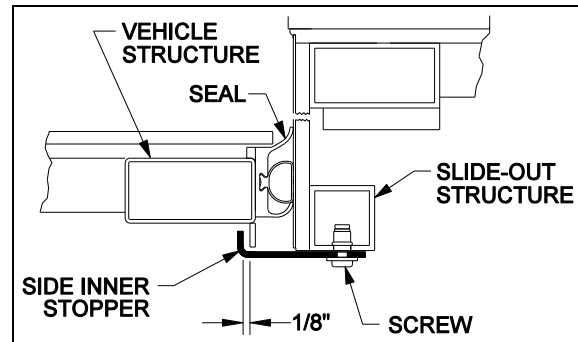


FIGURE 4 : SIDE INNER STOPPER

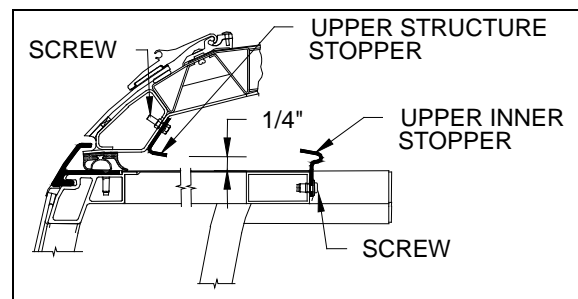


FIGURE 5 : UPPER STOPPERS

### 1.1.1 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.

### 1.1.2 Adjustment

1. Adjust the side inner stoppers at 1/8" from the vehicle structure stoppers, and tighten the screws (figure 4).
2. Adjust the upper structure stopper at 1/4" from the slide-out structure and tighten the screws (figure 5).
3. Adjust the slide-out inner upper stoppers so they rest on structure stopper when the slide-out is extended (figure 6), and tighten the screws.

## 1.2 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. This is to hold back the roof structure (figure 5 and figure 6).

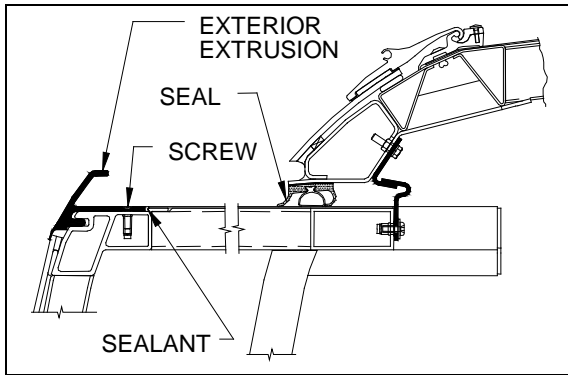


FIGURE 6 : EXTERIOR EXTRUSION

### 1.2.1 Maintenance

Inspect the exterior extrusion for any deformation or deterioration. Check that the screws are tight. Inspect the sealant condition on screw head 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.

### 1.3 FRONT SLIDE-OUT REMOVAL

1. Deflate the air seal completely to prevent any damage (see the slide-out operation manual).
2. Using the slide-out control switch and/or the manual override procedure, move the slide-out to its fully extended position.

**Caution:** Ensure suspension stabilization before using the height adjustable tables to prevent any damage to the vehicle or slide-out structure.

3. Support each end of the slide-out with height adjustable tables. Use plywood panels covered with soft material, such as carpet, to prevent any damage to the slide-out under panels and the exterior panel edge (figure 7). The supporting tables should not obstruct the slide-out bottom racks. Rise up the tables to support the slide-out without lifting it.
4. From inside the vehicle, loosen the upper shaft pillow block nuts and remove the shims behind the pillow blocks. Keep note of the shims position (figure 8).
5. Using the manual override procedure (see the operation manual), retract the slide-out a few inches to disengage the slide-out from its inner stoppers.

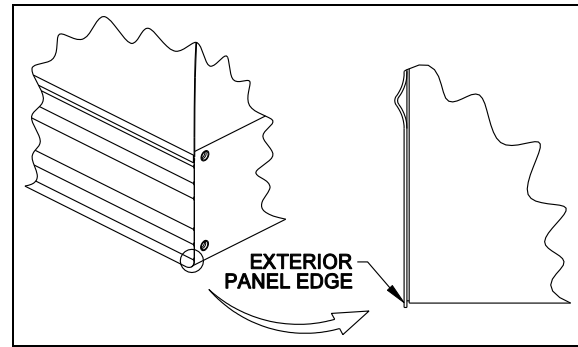


FIGURE 7 : EXTERIOR PANEL EDGE

**Warning:** The inner stoppers are used to stop and straighten the slide-out. The motor drive is controlled in overcurrent for three seconds after reaching its fully extended position. Never use the automatic control without the inner stoppers. The slide-out could fall down and cause serious damage and/or injury.

6. Unscrew and remove the slide-out inner upper and side stoppers. Loosen the upper structure stopper retaining screws and move this stopper to the upward position to allow the slide-out to come out freely (figure 5).

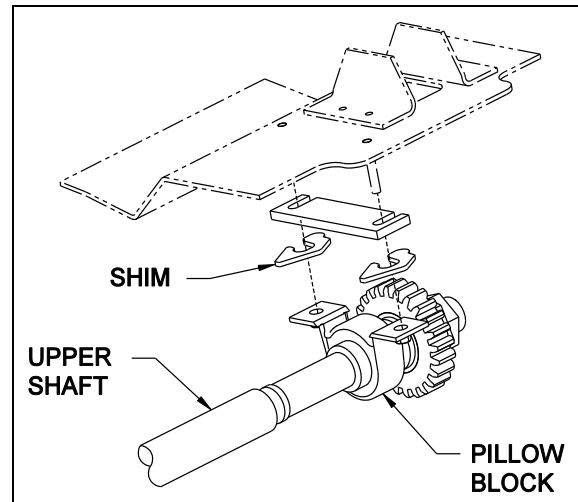


FIGURE 8 : UPPER SHAFT PILLOW BLOCK

7. Unscrew and remove the linear position transducer cable (figure 42). Loosen the transducer adjustment screws and move the transducer away from the slide-out.
8. Disengage both upper and lower shaft jaw couplings (figure 1 item 6).
9. Push the upper shaft to its highest position to allow the slide-out to be removed freely.



**Caution:** Be careful when moving the slide-out to prevent any damage to the slide-out itself and/or its seal. When moving the slide-out, check constantly its four corners from inside and outside the vehicle to avoid contact with the locking pins and/or the vehicle structure.

10. Slightly lift the slide-out and move it outside the vehicle on the supporting tables.
11. Take advantage of the situation to inspect internal mechanical components, UHMW sliding pads (section 10) and seal condition.

### 1.4 FRONT SLIDE-OUT INSTALLATION

Before proceeding with the front slide-out installation, check the following conditions:

- The air seal is completely deflated;
- The upper driving shaft pillow blocks are loose;
- The upper and lower shaft jaw couplings are disengaged;
- The upper and lower shaft keyless bushings located on the driver side are tight;
- The upper and lower shaft keyless bushings located on the motor side are free.

**Note:** The lower shaft keyless bushing located near the driver seat is not accessible unless the slide-out is removed completely from the vehicle, and does not need to be loosened.

**Caution:** Ensure suspension stabilization before using the height adjustable tables to prevent any damage to the vehicle or slide-out structure.

1. Using height adjustable tables, raise the slide-out and center it with the vehicle opening.

**Caution:** Be careful when moving the slide-out to prevent any damage to the slide-out itself and/or its seal. When moving the slide-out, check constantly its four corners from inside and outside to avoid contact with the locking pins and/or the vehicle structure.

2. Bring the slide-out close to the vehicle opening. Check from inside and outside that the four corners do not touch the vehicle structure.
3. Carefully put the slide-out on its UHMW sliding pads and the racks on their pinions

(figure 1 item 3 and 13). Slide the free pinions to center them on their racks. Also, make sure that the guide wheel is in its track (figure 9 and figure 1 item 12).

**Caution:** Put soft material, such as carpet, on the floor of the vehicle in line with the lower racks to prevent slide-out contact when it will be pushed inside.

4. Slowly push the slide-out inside the vehicle keeping it straight. When the slide-out is well seated on its racks and pinions, hold it firmly to prevent it from falling outside or inside the vehicle, and remove the supporting tables. Push the slide-out inside and align the receptacles with the locking pins.

**Caution:** The slide-out receptacles must be perfectly aligned with the locking pins before locking them.

5. Using a compressed air nozzle, lock the pins one by one.

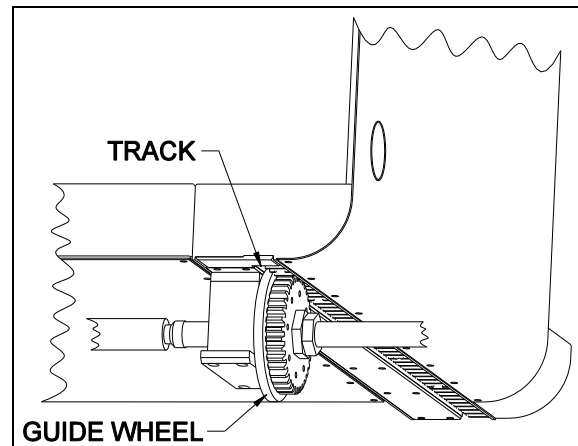


FIGURE 9 : GUIDE WHEEL TRACK

6. Reinstall the upper shaft pillow block shims in their original location (figure 8). Add or remove shims to leave no clearance between the pinion and the rack. Tighten the pillow block nuts.
7. Re-engage respectively the upper and lower shaft jaw couplings (figure 1 item 6). If necessary, realign the right angle drive (see section 8).
8. Tighten and synchronize the upper and lower shaft pinion as described in section 5.6.

9. Reinstall the slide-out side inner stoppers (section 1.1).

**Caution:** Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.

10. Using a compressed air nozzle, manually unlock the pins.
11. Using the manual procedure, extend the slide-out until its interior stoppers come close to the vehicle structure for adjustment.
12. Adjust the slide-out stoppers as described in section 1.1.2.
13. Reinstall the linear position transducer cable on the slide-out and readjust the transducer position (figure 42). Leave a 3/8" gap between the transducer bracket and the slide-out.
14. Readjust the slide-out stroke limits as described in section 13.3.5.
15. Re-inflate the inflatable seal at 10 psi (see operating manual).

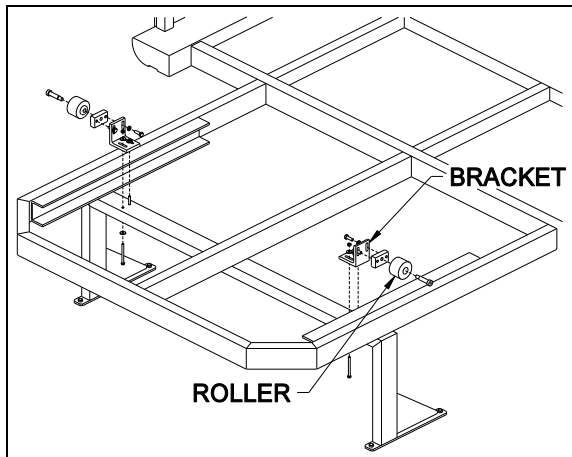


FIGURE 10 : REAR SLIDE-OUT BED ROLLER

### 1.5 REAR SLIDE-OUT REMOVAL

The rear slide-out removing procedure is almost the same as the procedure for the front slide-out. The only difference is the removal of the two rollers from the bed structure (figure 10), which must be done before step 9 of procedure 1.3.

### 1.6 REAR SLIDE-OUT INSTALLATION

The procedure for installing the rear slide-out is almost the same as the procedure for the front slide-out. Before adjusting the stroke limits (procedure 1.4 step 14), the bed rollers must be reinstalled (figure 10).

### 2. LOCKING PIN

The locking pin system is used to lock the slide-out when in retracted position and link it with vehicle structure. This is to restore the vehicle structure integrity. This system consists of pneumatic cylinders connected to shafts with variable diameters that move segments located into a sleeve (see figure 11). During the extension of the cylinder, the sleeve penetrates partly into the slide-out receptacle to lock the slide-out. Then, the segments come to immobilize the part of the sleeve in the receptacle and also in the locking pin. Sensors installed on cylinders send a signal to a logic controller to indicate if the cylinder is in locked or unlocked position.

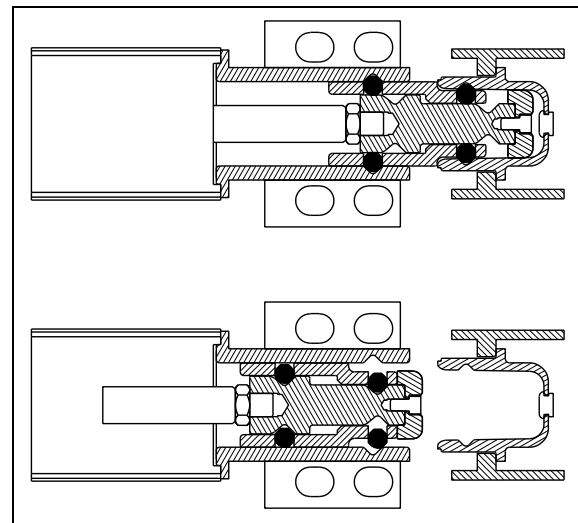


FIGURE 11 : LOCKING PIN MECHANISM

**Note:** The locking pin system optimal air pressure is 90 psi. Below 70 psi, pins may not lock or unlock completely.

### 2.1 MAINTENANCE

**Caution:** The locking pins may have to be adjusted after a load variation in the vehicle and/or the slide-out.

A load variation in the vehicle and/or the slide-out (ex: after the conversion) may affect

structure deflection, therefore the locking pin adjustment, especially for the front slide-out.

After conversion process and twice a year, inspect the locking pins proper movement by manually activating the pins a few times when the slide-out is retracted. Check the inputs LED on each logic controller panel when activating the pins manually. Refer to LED description table and the pin state indicator module (see figure 52 and figure 41)

A locking pin problem may be suspected if an error code is detected on the control switch. This probably means that a locking pin is not aligned or defective, and must be readjusted or fixed. Remove and disassemble the pin mechanism if a malfunction is suspected. Inspect the head, sleeve and segment for wear, deformation or rust, and replace defective parts (figure 53).

A knocking sound may be heard when locking or unlocking the pins. This is normal because of the pneumatic system.

Inspect the locking pin cylinder and the fittings for air leaks. In case a locking pin refuses to lock, check the inlet reducer fitting on the pin side cylinder port for any particle that would cause airflow restriction

**2.2 ADJUSTMENT**

1. The slide-out must be retracted and all the pins locked for pin adjustment.
2. Deflate the air seal completely to prevent any damage (see the slide-out operation manual).
3. **Front slide-out only:** Unload the tag axle using the manual switch located on the left-hand control panel, while the ignition key is switched to the "ON" position. When the tag axle is unloaded, switch the ignition to the "OFF" position.
4. Loosen the locking pin nuts.
5. Align the locking pin with the slide-out receptacle by putting shims between the locking pin base and the vehicle structure (figure 12). The shims must be inserted with a sliding fit. Make sure to put as many shims on the upper studs as on the lower studs to keep the locking pin base parallel to the vehicle structure.

6. Align horizontally the locking pin in the slide-out receptacle and tighten the four nuts.

**Caution:** The locking pin and the slide-out receptacle must be aligned before locking the pin. A locking pin not aligned with its receptacle may seriously damage the slide-out panels or windows.

7. Using a compressed air nozzle, lock and unlock manually a few times the locking pin to check that it does not knock. If it does, correct the alignment repeating step 2 to step 5. Make sure that the locking pin does not force the slide-out to move during all the procedure.
8. Make a final check by activating a few times manually (using compressed air) the locking pin to be sure of a perfect alignment.
9. Tighten the four locking pin nuts to 45 lb-ft.
10. Re-inflate the inflatable seal at 10 psi.

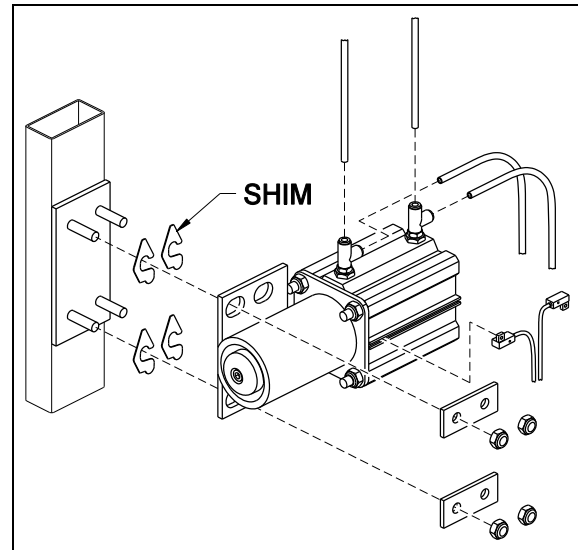


FIGURE 12 : LOCKING PIN INSTALLATION

**2.3 REPLACEMENT**

1. The slide-out must be retracted and all pins locked for pin adjustment.
2. Deflate the inflatable seal completely to prevent any damage.
3. **Front slide-out only:** Unload the tag axle using the manual switch located on the left-hand control panel, while the ignition key is switched to the "ON" position. When the tag

axle is unloaded, switch the ignition to the "OFF" position.

4. Note the pneumatic tubing position, then disconnect the tubing and the electric cable from the locking pin assembly (figure 12).
5. Using a compressed air nozzle, unlock the pin mechanism.
6. Remove the sensor switches. Unscrew and remove the locking pin unit. Keep the shims for further installation (figure 12).

**Note:** Adjust the locking pin sensor switch before installing the pin on the vehicle (refer to section 2.4).

7. Install the new locking pin on its support keeping it loose and lock it manually.
8. Adjust the locking pin as described in section 2.2.
9. Re-connect the tubing and the sensor switch electrical cable.
10. Re-inflate the inflatable seal at 10 psi.

## 2.4 SENSOR SWITCH ADJUSTMENT

1. Using a compressed air nozzle, manually extend the locking pin to be adjusted. Make sure the pin is full extended and locked in the receptacle.
2. Slide the pin locked sensor (PL) in the air cylinder groove (figure 13 and figure 53).
3. Place the PL sensor in the zone where it is activated. Move slowly the sensor toward the back side of the cylinder until it is deactivated. Bring back slowly the sensor (adjustment direction) and when it is activated again, continue to move it on 3/32" to 1/8". Tighten the sensor screw (figure 13).
4. Using a compressed air nozzle, manually retract the locking pin.
5. Slide the pin unlocked sensor (PU) in the air cylinder groove.
6. Place the PU sensor in the zone where it is activated. Move slowly the sensor toward the back side of the cylinder until it is deactivated. Bring back slowly the sensor

(adjustment direction) and when it is activated again, continue to move it on 1/8" to 5/32". Tighten the sensor screw (figure 13).

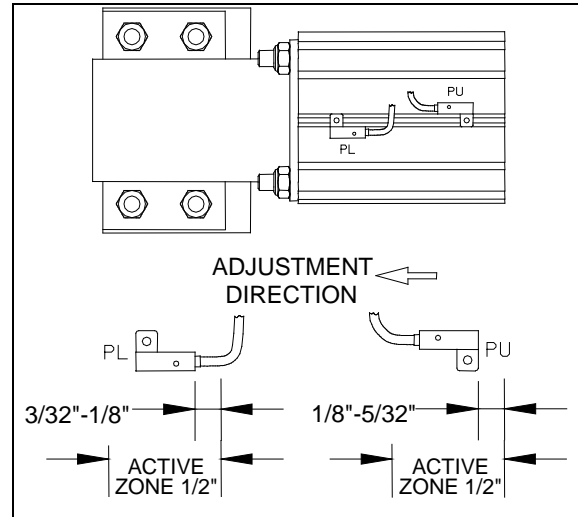


FIGURE 13 : SENSOR SWITCH ADJUSTMENT

**Note:** It is important to adjust the sensor following the adjustment direction figure 13).

## 2.5 PIN RECEPTACLE

The front slide-out has six pin receptacles, and the rear slide-out has only four (figure 2 and figure 3). The pin receptacles installed on exterior panels are different from the pin receptacles installed on windows.

### 2.5.1 Maintenance

Inspect frequently all the pin receptacles to be sure they are not obstructed. The presence of metal chips in the receptacle may be a sign of a pin not aligned properly. Check for any rust on inner edges. Also, make sure the plastic cap is still there and not damaged.

### 2.5.2 Replacement

1. Extend the slide-out.
2. From inside the slide-out, unscrew one of the four screws of the pin receptacle. Keep the washer.
3. Screw an M10-1.5x75 threaded rod through the pin receptacle to hold the bolting plate in place and prevent it from moving.
4. Remove the other screws and replace them with threaded rods.

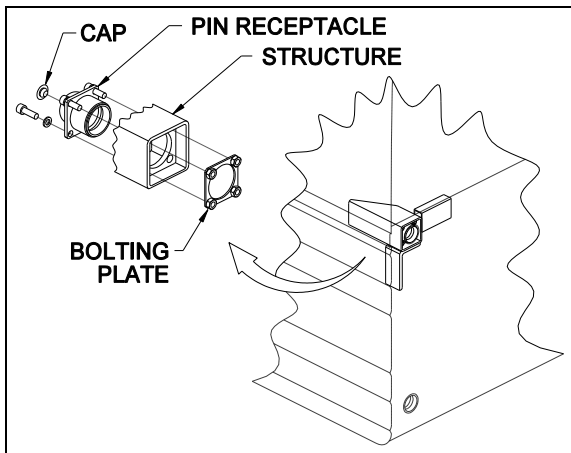


FIGURE 14 : PIN RECEPTACLE INSTALLATION

5. Remove the pin receptacle.

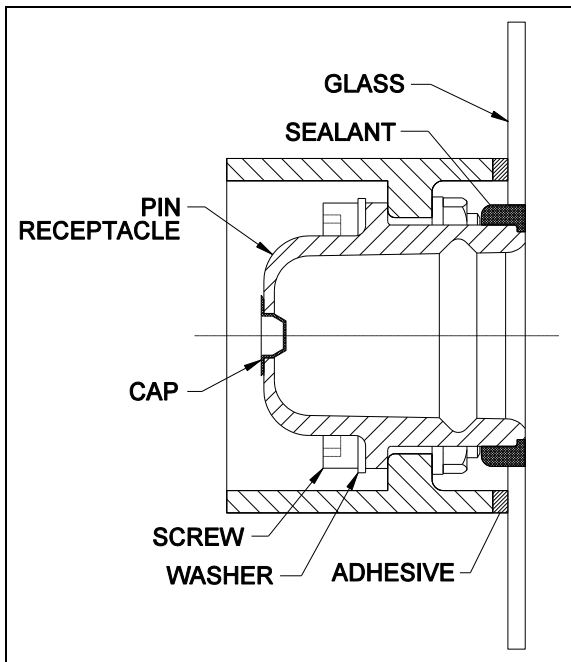


FIGURE 15 : PIN RECEPTACLE ON GLASS

6. Remove the old sealant. Clean the panel or glass inner contact surfaces with alcohol.
7. Apply black Sika 222 UV or equivalent product on the glass surface contact with the pin receptacle (figure 15), and black Sika 221 or equivalent product on the panel surface contact with the pin receptacle (figure 16).
8. Install a pin receptacle on the threaded rods. Put the plastic cap back on.
9. One by one, replace the threaded rods with the washers and the screws.

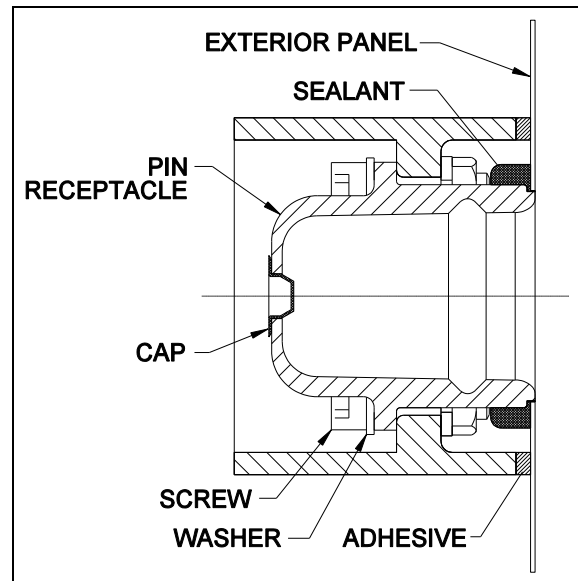


FIGURE 16 : PIN RECEPTACLE ON STAINLESS STEEL PANELS

10. Clean excess sealant with alcohol.
11. Readjust the locking pins as described in section 2.2 (if needed).

### 3. 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 and is welded on the roof arches (figure 17).

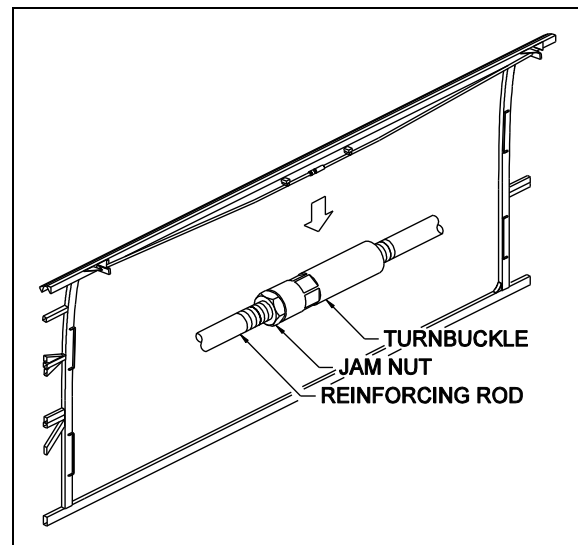


FIGURE 17 : FRONT SLIDE-OUT ROOF REINFORCING ROD

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. 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.

## 4. RACK

Slide-out movements are made by a system of racks and pinions. There are four racks on each slide-out (figure 2 and figure 3). These racks are made of plastic. Because of that, the pinion should never have to be replaced, but only the racks.

### 4.1 MAINTENANCE

Once a year, check the racks for broken or worn teeth, especially the front slide-out racks. Also, check the bottom rack fastening hole teeth that are weaker and might break (figure 18). Replace the racks if excessive wear is present. Clean racks from sand or other debris. Check that the bolts are tight and check the backlash between the gear and the rack. Excessive backlash indicates rack wear.

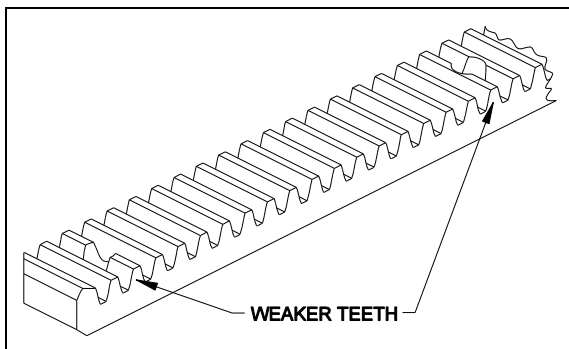


FIGURE 18 : BOTTOM RACK

### 4.2 UPPER RACK REPLACEMENT ON BOTH SLIDE-OUT

The procedure is the same for both units.

1. The slide-out must be retracted and all the pins locked.
2. Deflate the air seal completely to prevent any damage (see the slide-out operation manual).
3. Loosen the pinion keyless bushing of the rack to be changed and slip the bushing out of the pinion.

4. From inside the slide-out, unscrew all the rack screws (figure 2 and figure 3).
5. Move the pinion away from the rack and remove the rack from its location by pulling it out.
6. Remove the old waterproof material from the slide-out structural rack seat.
7. Apply Sika 221 sealant or equivalent product in the rack seat to prevent water infiltration.
8. Install a new rack in the rack seat. Apply sealant Sika 221 or equivalent product on screw thread before screwing them.
9. Reinstall the keyless bushing into the pinion. Tighten the pinion keyless bushing according to the procedure in section 5.6.

**Caution:** Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.

10. Re-inflate the air seal at 10 psi.

### 4.3 FRONT SLIDE-OUT LOWER RACK REPLACEMENT

1. Remove the slide-out from the vehicle as described in section 1.3.
2. From under the slide-out, unscrew all the rack screws and remove the rack.

**Note:** The rack for the pinion and guide wheel assembly is narrower than the other one.

3. Install a new rack. Tighten the screws using Loctite 242 or equivalent product.
4. Reinstall the front slide-out inside the vehicle as described in section 1.4.

**Caution:** Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.

### 4.4 REAR SLIDE-OUT LOWER RACK REPLACEMENT

1. Deflate the air seal completely to prevent any damage (see the slide-out operation manual).

2. Using the slide-out control switch and/or the manual override procedure, extend the slide-out about one foot.
3. From outside, unscrew and remove only the two first rack screws starting from the slide-out panel.
4. Using the manual override procedure only, retract the slide-out to its fully closed position. Lock all the locking pins.
5. Loosen the pinion keyless bushing of the rack to be changed.
6. From under the slide-out, unscrew all the rack screws and remove the rack.

**Note:** *The rack for the pinion and guide wheel assembly is narrower than the other one.*

7. Install a new rack between the slide out structural rack seat and the pinion. Tighten the screws accessible using Loctite 242 or equivalent product.
8. Tighten the pinion keyless bushing as described in section 5.6.

**Caution:** *Make sure the keyless bushing is tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.*

9. Using the slide-out control switch and/or the manual override procedure, extend the slide-out about one foot.
10. Tighten the two remaining screws using Loctite 242 or equivalent product.
11. Using the slide-out control switch and/or the manual override procedure, retract the slide-out to its fully closed position. Lock all the locking pins.
12. Re-inflate the air seal at 10 psi.

## 5. PINION

**Caution:** *The front slide-out upper shaft pinions may have to be readjusted and re-synchronized after a load variation in the slide-out (section 5.6).*

**Caution:** *Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 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.*

### 5.1 MAINTENANCE

**Note:** *One of the two lower shaft pinions is mounted with a plastic guide wheel. When replacing this pinion, it is important to put back the guide wheel (see section 5.7).*

To tighten or loosen the keyless bushing, use those specific tools (see section 1.1):

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

### 5.2 UPPER SHAFT PINION REPLACEMENT

**Note:** *The procedure is the same for the front and rear slide-out, except when specified.*

1. Deflate the air seal completely to prevent any damage (see the slide-out operation manual).
2. Use the slide-out control switch and/or the manual override procedure to extend the slide-out completely.
3. **For the front slide-out only:** retract manually the slide-out on 1" from its fully extended position to release stopper contact.

**Caution:** *Ensure suspension stabilization before using the height adjustable tables to prevent any damage to the vehicle or slide-out structure.*

4. Support each end of the slide-out with height adjustable tables. Use plywood panels covered with soft material, such a carpet, to prevent any damage to the slide-out under panels and the exterior panel edge (figure 7). The supporting tables should not obstruct the slide-out bottom racks. Rise up the tables to support the slide-out without lifting it.

5. Loosen the upper shaft keyless bushing of the rack pinion to be changed.
6. For the motor side pinion, remove the upper jaw coupling and the upper right angle drive (see section 8).
7. From inside the vehicle, loosen the upper shaft pillow block nuts and remove the shims behind the pillow blocks. Keep note of the shims position (figure 8 and figure 1).
8. Remove the pinion with its keyless bushing.
9. Install the new pinion on the driving shaft. Check the keyless bushing condition before putting it back in place; use a new one when necessary. Pre-tighten the keyless bushing to 100 lb-ft, to be able to move the slide-out to its retracted position.
10. Reinstall the pillow blocks shims and tighten the nuts. Leave no clearance between the pinion and the rack. If necessary, use new shims to adjust.
11. Reinstall (when applicable) the angle drive and the universal joints taking care that both jaw couplings are aligned. Re-engage the jaw couplings.
12. With the slide-out on his supporting tables, use the manual override procedure to move it inside the vehicle to its retracted position.

**Caution:** *The slide-out receptacles must be perfectly aligned with the locking pins before locking them.*

13. Using a compressed air nozzle, lock all the locking pins one by one.
14. Synchronize the new pinion as described in section 5.6.
15. Re-inflate the air seal at 10 psi.

**Caution:** *Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.*

### **5.3 FRONT SLIDE-OUT DRIVER SIDE LOWER SHAFT PINION REPLACEMENT**

1. Remove the front slide-out as described in section 1.3.
2. Note, in relation with the structure, the exact position of the pinion located near the driver seat if it has to be changed.
3. Unscrew both lower shaft pillow blocks but:
  - do not change the base plate adjustment screws for the pillow block located near the electric motor (figure 26);
  - take note of the shim location for the pillow block located near the driver seat (figure 26).
4. Loosen the keyless bushing of the pinion to be replaced. Slip the pinion and its bushing out of the shaft. Check the keyless bushing and the guide wheel condition and replace them if needed (see section 5.7).
5. Reinstall the new pinion and the keyless bushing on the shaft without tightening the bushing.
6. Reinstall the driving shaft on the vehicle, making sure the pillow blocks are located at their same previous location and are both at the same distance from the structure. Replace the shims and tighten the bolts.
7. Reposition the pinion located near the driver seat and tighten its keyless bushing as described in section 5.6.
8. Reinstall the slide-out in the coach as described in section 1.4.

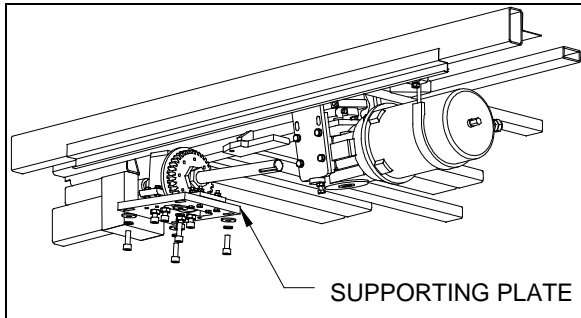
**Caution:** *Make sure the keyless bushing is tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.*

### **5.4 FRONT SLIDE-OUT MOTOR SIDE LOWER SHAFT PINION REPLACEMENT**

1. The slide-out must be retracted and all the pins locked.
2. Loosen the pinion keyless bushing.



3. Disengage the lower shaft jaw coupling.
4. From the baggage compartment, unscrew the pillow block supporting plate screw (figure 19). Do not change the plate adjustment screws for the pillow block (figure 26).



**FIGURE 19 : PILLOW BLOCK SUPPORTING PLATE**

5. Bend slightly the shaft and slip the jaw coupling and the keyless bushing out of the shaft. Slip the pinion and guide wheel assembly out of the shaft and replace them.
6. Replace the keyless bushing. Change it if damaged. Replace the jaw coupling on the shaft.
7. Screw back the pillow block supporting plate on the vehicle structure.
8. Re-engage the jaw coupling.
9. Synchronize the new pinion as described in section 5.6.

**Caution:** Make sure the keyless bushing is tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.

### 5.5 REAR SLIDE-OUT LOWER SHAFT PINION REPLACEMENT

1. The slide-out must be retracted and all the pins locked.
2. Loosen the keyless bushing of the lower shaft pinion to be changed.
3. Disengage the lower shaft jaw coupling.
4. **For the motor side pinion only:** Remove the gearbox support (see section 7.2).

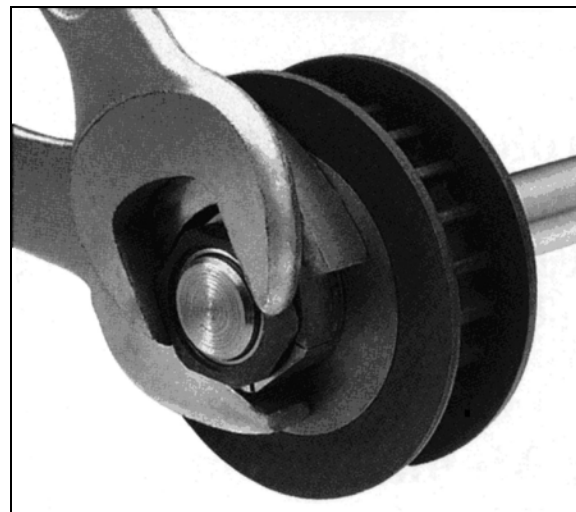
5. Remove the pinion and the keyless bushing from the shaft.
6. Check the keyless bushing and the guide wheel condition and replace them if needed (see section 5.7).
7. Reinstall the new pinion and the keyless bushing on the shaft without tightening the bushing.
8. Re-engage the jaw coupling and adjust the gearbox support if necessary.
9. Tighten the pinion keyless bushing as described in section 5.6.

**Caution:** Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or moving the slide-out. Refer to section 5.6 for torque wrench settings.

### 5.6 PINION SYNCHRONIZATION

**Caution:** The front slide-out upper shaft pinions may have to be readjusted and re-synchronized after a load variation in the slide-out.

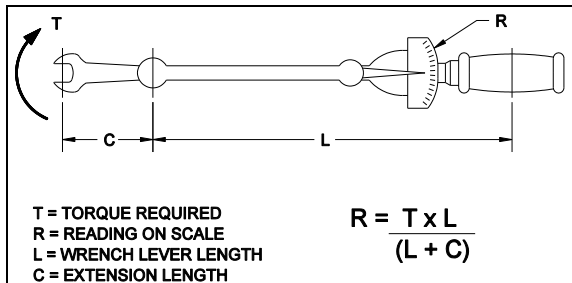
The four pinions need to be synchronized for the slide-out to move straight when extending and retracting. This synchronization is possible with the use of Trantorque keyless bushings. These keyless bushings need a specific tightening torque value to ensure proper pinion transmitting torque. They also need specific tools to be tightened, as described in section 18.2.



**FIGURE 20 : 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 20 shows how to tighten the keyless bushing. When tightening, make sure the pinion does not move or rotate.



**FIGURE 21 : TORQUE WRENCH FORMULA**

**Caution:** Make sure all keyless bushings are tightened to 125 lb-ft before unlocking the pins or 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 21 for wrench size compensation.

**REAR SLIDE-OUT PINIONS**

To adjust and synchronize the rear slide-out pinions, tighten the keyless bushing to 125 lb-ft (refer to figure 21 for wrench size compensation) after having centered the pinion in its rack. Take note that when the keyless bushing nut is tightened, the pinion moves about 1/16" to 3/32" toward the slide-out center.

**FRONT SLIDE-OUT PINIONS**

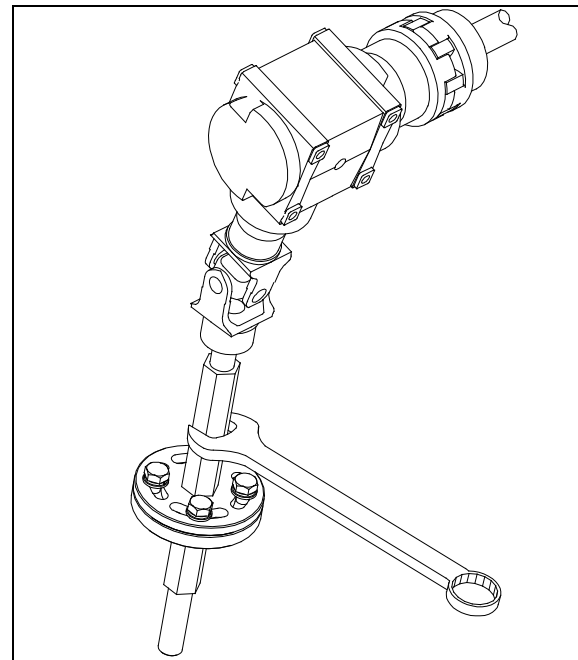
A torque must be applied on the upper shaft to compensate the effect of the center of gravity of the slide-out when inside the vehicle. This gravity effect causes the slide-out to fall down inside the vehicle. The torque applied on the shaft forces the pinions to push the upper part of the slide-out outside the vehicle to counterbalance the gravity effect.

**Note:** The driver side keyless bushing located on the lower shaft is not accessible when the slide-out is installed. Therefore, it must be tightened before installing the slide-out.

Follow these steps to adjust and synchronize the front slide-out pinions.

1. The slide-out must be retracted and all the pins locked.
2. Make sure the adjustable shaft assembly is tightened (refer to figure 22).

3. On the driver side, tighten the upper shaft keyless bushing to 125 lb-ft (refer to figure 21 for wrench size compensation). Make sure the pinion is centered and fits well in its rack to eliminate any possible backlash. Take note that when the keyless bushing nut is tightened, the pinion moves about 1/16" to 3/32" toward the slide-out center.



**FIGURE 22 : FRONT SLIDE-OUT ADJUSTABLE SHAFT ASSEMBLY**

4. Tighten the other side keyless bushing to 125 lb-ft by using the same procedure described in the previous step.
5. On the lower shaft, tighten the left-hand side keyless bushing to 125 lb-ft (refer to figure 21 for wrench size compensation).
6. Once all the keyless bushings are tightened, unplug the air tubing from the locking pins air valve to prevent movement of the slide-out during the verification of the pinion synchronization.
7. Operate the slide-out and check if the exterior panels of the slide-out are parallel with the vehicle panels. If not, rotate the upper part of the adjustable shaft assembly as required to obtain proper alignment (refer to figure 22).

**Caution:** Make sure the adjustable shaft bolts are tightened to 25 lb-ft. This insures that the adjustable shaft assembly is properly locked.

**5.7 GUIDE WHEEL**

A plastic wheel is mounted on one of the lower shaft pinion on each slide-out. This wheel is used to guide the slide-out when extending or retracting. The wheel follows a track between the rack and the slide-out. To replace this wheel, remove the pinion from the shaft and unscrew the guide wheel screws from the pinion (refer to section 5.4 and 5.5).

**5.8 PLASTIC STOPPER**

There is a UHMW plastic stopper used to block any axial movement of the front slide-out lower shaft (figure 26). This stopper must be adjusted 1/32" away from the pinion.

**6. ELECTRIC MOTOR**

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

**6.1 MAINTENANCE**

Inspect the electrical connections and their watertightness. Check that the bolts and the holding metal strap are tight (figure 23).

**6.2 REPLACEMENT**

1. The slide-out must be retracted and all the pins locked.
2. Disconnect the electric wire cable from the motor. Release the motor holding metal strap (figure 23).
3. Remove the motor from the gearbox.
4. Fasten the new motor to the gearbox using screws.

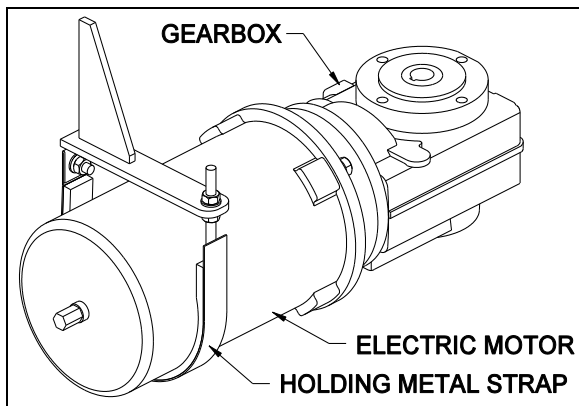


FIGURE 23 : ELECTRIC MOTOR

5. Replace and tighten the motor holding metal strap (figure 23).
6. Re-connect the motor electric cable.

**7. SPEED REDUCTION GEARBOX**

The speed reduction gearbox used is a helical worm gear type. This gearbox has a 140:1 ratio and the output shaft is self-locking. See section 18.3 for gearbox specifications.

**7.1 MAINTENANCE**

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

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

Check the gearbox axle alignment with the right angle drive and adjust it if necessary (section 8).

**7.2 GEARBOX REPLACEMENT**

1. The slide-out must be retracted and all the pins locked.
2. Disengage the lower jaw coupling, and for the front slide-out, remove the universal joint from the right angle drive shaft (figure 1).
3. **For the front slide-out:** Remove the reinforcement plate from the gearbox (figure 24).
4. Remove the motor from the gearbox (see section 6.2).

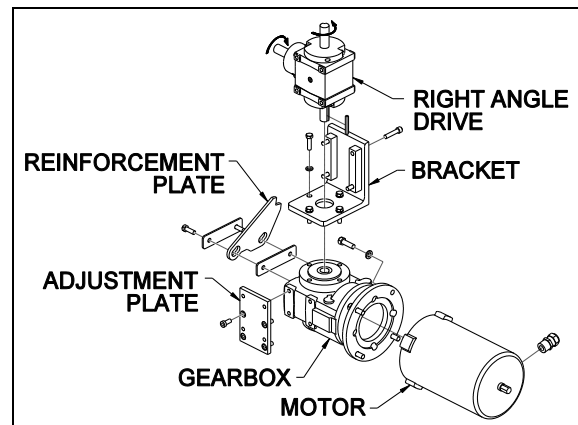


FIGURE 24 : FRONT SLIDE-OUT MOTOR ASSEMBLY

5. Remove the gearbox assembly (figure 24 and figure 25). Note the shim position.
6. Unscrew the right angle drive from its bracket (figure 24 and figure 25).

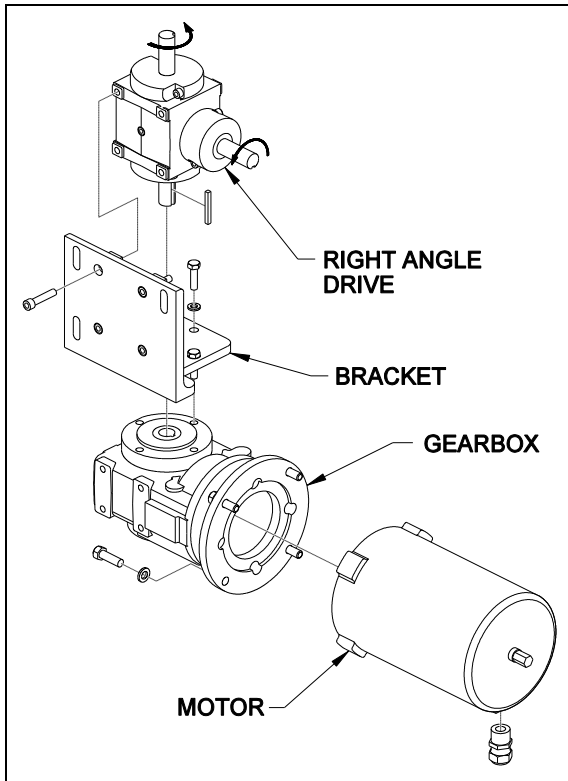


FIGURE 25 : REAR SLIDE-OUT MOTOR ASSEMBLY

7. Remove the right angle drive bracket and for the front slide-out, remove the adjustment plate from the speed reduction gearbox.
8. Install the right angle drive bracket on the new gearbox without tightening the screws. For the front slide-out, install the adjustment plate on the speed reduction gearbox using Loctite 242 or equivalent product.

**Caution:** *The right angle lower vertical key must be welded on its keyseat to prevent it from moving or falling.*

9. Check the right angle drive rotation (figure 24 and figure 25) before installing it on the bracket. Align the right angle drive shaft with the gearbox hollow shaft and tighten all screws.
10. Reinstall the speed reduction gearbox assembly on the vehicle mounting bracket without tightening the screws.

11. Using shims and, for the front slide-out, the vehicle mounting bracket adjustment screw, align the right angle drive shaft jaw coupling with the slide-out lower shaft jaw coupling.
12. Reinstall the motor on the speed reduction gearbox (see section 6.2).
13. Reinstall the universal joint and the jaw coupling on the right angle drive. Use the motor output shaft to align the keyseats.
14. **For the front slide-out:** Reinstall the reinforcement plate

## 8. RIGHT ANGLE DRIVE

**Caution:** *The right angle lower vertical key must be welded or punched on its keyseat to prevent it from moving or falling.*

The right angle drive simultaneously transmits the movement to the lower and upper driving shafts via a vertical shaft. To preserve the same rotating speed, before being transmitted to the upper shaft, the movement coming from the speed reduction gearbox passes through a second right angle drive, which has a 1:1.5 ratio. That is due to the fact that the lower shaft pinions have more teeth than those on the upper shaft.

### 8.1 MAINTENANCE

Inspect the right angle drive to check if there is any leakage or excessive backlash in the box or between the keys and their keyseat. Replace the keys or the right angle drive if excessive wear is present. When replacing, weld the lower vertical shaft key on its keyseat. Check that all bolts are tight.

Check the oil level and lubricate the right angle drive once every three years.

Check the right angle drive axle alignment with the driving shafts and adjust it if necessary, using the shims and/or the adjustment screw.

### 8.2 LOWER SHAFT RIGHT ANGLE DRIVE REPLACEMENT

Use the same procedure as for the speed reduction gearbox (section 7).

### 8.3 UPPER SHAFT RIGHT ANGLE DRIVE REPLACEMENT

**Note:** This procedure is the same for both slide-out.

1. The slide-out must be retracted and all the pins locked.
2. Disengage the jaw coupling and the universal joint from the right angle drive.
3. Remove the right angle drive and keep note of the shims position.

**Caution:** Make sure the new right angle drive revolves in the same direction before installing it.

4. Replace the right angle. Reinstall the half jaw coupling on the right angle drive shaft.
5. Screw without tightening the new right angle drive.
6. Using shims, align the right angle drive jaw coupling with the upper shaft jaw coupling.
7. Reinstall the universal joint and re-engage the jaw coupling.

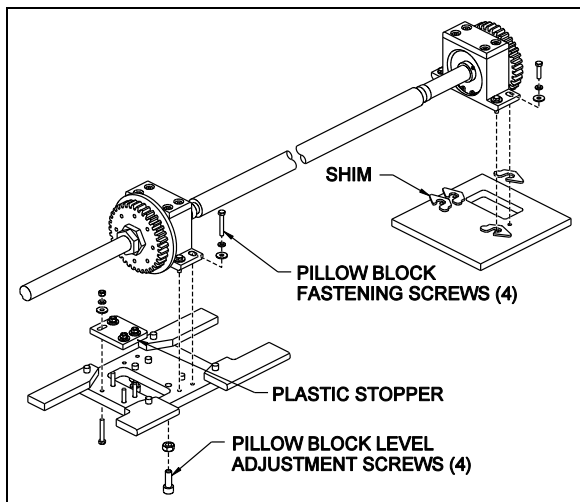


FIGURE 26 : FRONT SLIDE-OUT SLIDING PAD LEVELLING

## 9. JAW COUPLING

### 9.1 MAINTENANCE

Inspect the jaw couplings to check if there is backlash between the key and the keyseat, or between the coupling and the plastic spider. Also, check the spider condition. Check that the setscrews are tight.

### 9.2 REPLACEMENT

The jaw coupling replacement procedure is the same as for the right angle drive, section 8.2 and 8.3.

## 10. UHMW SLIDING PAD

The UHMW sliding pads support the slide-out, and offer a frictionless surface for the slide-out movement.

### 10.1 MAINTENANCE

Check the sliding pad for a non even or abnormal wear, or plastic deterioration. Adjust the sliding pad when its surface is not parallel with the slide-out under panels. Replace it when its thickness is below 11/32" or if the lower racks interfere with the lower shaft pinions.

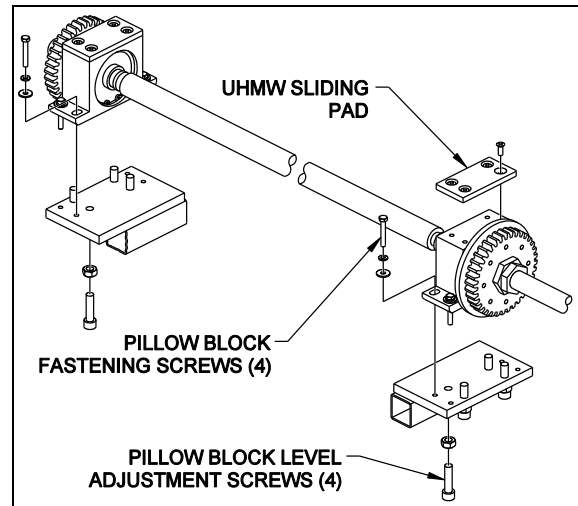


FIGURE 27 : REAR SLIDE-OUT SLIDING PAD LEVELLING

### 10.2 REPLACEMENT & ADJUSTMENT

1. Remove the slide-out as described in section 1.3 and 1.5.
2. Unscrew and remove the used UHMW sliding pad from the pillow block.
3. Check and make sure that the UHMW sliding pad and the vehicle frame structure are parallel and within a distance of 22.2mm (7/8") (figure 50). If not, an adjustment is needed. To adjust the rear slide-out UHMW sliding pads and the front slide-out motor side UHMW sliding pad, use the pillow block adjustment screws located under the fixation plates (figure 26 and figure 27). To adjust the front slide-out UHMW sliding pad located

on the driver side, add or remove shims under the pillow block (figure 26).

4. Make sure both pillow blocks are at the same distance from the structure and tighten the pillow block fastening screws and the adjustment screw jam nut (figure 26 and figure 27).
5. Reinstall the slide-out in the vehicle (see sections 1.4 and 1.6).

## **11. VERTICAL SHAFT AND UNIVERSAL JOINT ASSEMBLY**

### **11.1 MAINTENANCE**

**Note:** *The taper keys used on the vertical shaft assembly are specially made keys with a wider width. Do not replace them with standard taper keys.*

Inspect the universal joints and the shafts to check if there is leakage or backlash between the keys and their keyseat. Replace the keys, the joint or the shaft if excessive wear is present. When replacing key, ensure to block the taper key against the shaft and the universal joint keyseats. Check that all setscrews are tightened.

### **11.2 UNIVERSAL JOINT REPLACEMENT**

1. The slide-out must be retracted and all the pins locked.
2. Unscrew the setscrews and remove the universal joint.

**For the bottom vertical shaft:** unscrew the vertical pillow block keeping note of the shims position.

**For the rear slide-out vertical shaft:** disengage the coupling between the vertical shaft and the lower angle drive.

**Note:** *If possible, use shafts and universal joints that provide same keyseat alignment to avoid pinion re-synchronization.*

3. Install new universal joints.

4. Lock the taper keys against the shaft and the universal joint keyseats to prevent them from moving. Use Loctite 242 or equivalent product on all set screws.

5. Paint the universal joints to prevent rust.

### **11.3 VERTICAL SHAFT REPLACEMENT**

Use the same procedure as for the universal joint (section 11.2).

## **12. SLIDE-OUT PNEUMATIC SYSTEM**

The slide-out is controlled by a pneumatic and electric system. Mainly, the pneumatic system consists of electrical operating valves that control slide-out components and safety operations. Pneumatic schematic diagrams are annexed for better understanding of the system.

### **12.1 DESCRIPTION**

#### **AIR PRESSURE INLET VALVE**

The slide-out air pressure comes from the air pressure inlet valve on the pneumatic panel in the front service compartment (figure 29).

#### **LOCKING PIN VALVE**

The locking pin movement is done using a 5-port 3-position valve with open center. A manual override non-locking button may be used to activate the pin manually in case of trouble. A protection plate covers the locking pin manual override button to prevent accidental activation (figure 51).

#### **INFLATABLE SEAL VALVE**

The inflation and the deflation of the seal are done using a 3-port 2-position valve normally opened. An external pilot is used to operate this kind of valve because of the 45 psi minimum operating pressure. The inflatable seal pressure is set at 10 psi and this pressure is always on the seal as long as the accessory air tank (which is the slide-out air supply) is not empty (figure 51).

#### **VACUUM GENERATOR**

A vacuum generator using Venturi principle is controlled by a 2-port 2-position normally closed 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 (figure 51).

**VACUUM SWITCH**

A vacuum switch is mounted on the vacuum generator output port and is used as an input signal when the vacuum reaches the 16" Hg set point. This input signal will detect an inflatable seal failure if the 16" Hg set point is not reached after a 30 seconds delay (figure 51).

**TAG AXLE VALVE**

The automatic control unloading tag axle valve is used to freely lock and unlock the front slide-out pins. The tag axle is not raised during this process. A 3-port 2-position normally closed valve is connected to the air spring valve operator. An air system schematic diagram is annexed to show the modifications. This valve is located in the compartment near the main power compartment (figure 28).

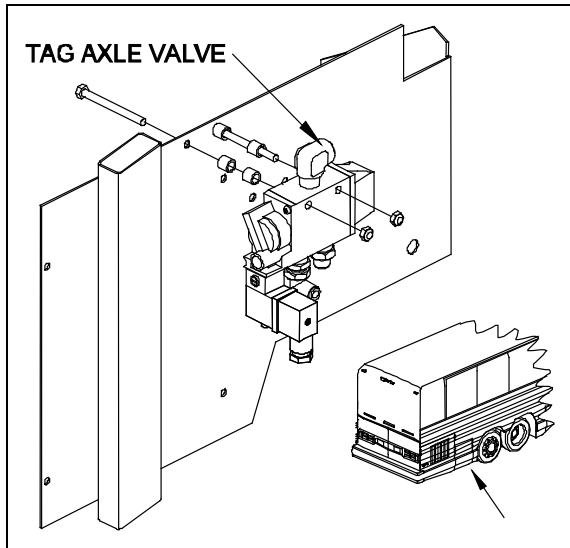


FIGURE 28 : TAG AXLE VALVE

**RACK CLEANING AIR NOZZLE**

Both slide-out upper racks are not protected against foreign material and water when the slide-out is extended. To prevent damage to the rack and pinion mechanism, an air nozzle is placed above each upper rack to clean it when the slide-out is retracted. A 2-port 2-position normally closed manifold valve is use to blow air to nozzles for both nozzles (figure 51).

**INTERLOCK VALVE**

Safety precautions are taken in the slide-out operations to avoid damage to the structure and possible movement of the vehicle when a slide-out is not retracted and pins unlocked. A 3-port 2-position normally open valve is connected in line to the parking brake system and prevents the conductor from releasing the parking brake

as long as both slide-out are not retracted and air pressure is not detected in both slide-out pins by pressure switches (see figure 51 items 17 and 18). This valve is located in the front service compartment (figure 29). To prevent abnormal activation of this valve when the vehicle is moving, a relay is added to power this valve by the speed switch signal (figure 37).

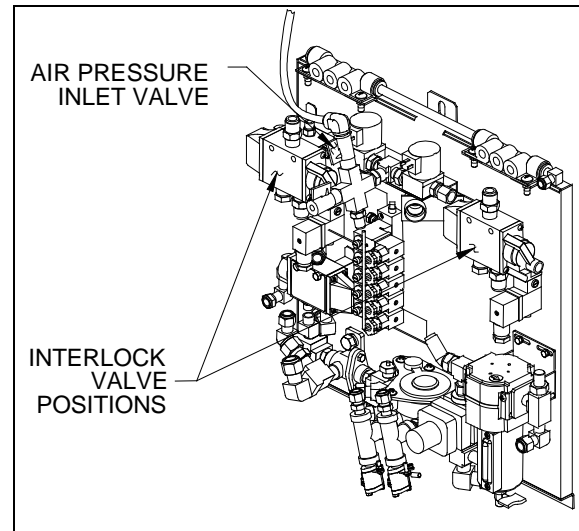


FIGURE 29 : FRONT SERVICE COMPARTMENT

**12.2 PNEUMATIC INTERCONNECTION WITH PREVOST VEHICLE**

The slide-out pneumatic system air supply comes from the converter air supply valve located on the pneumatic panel in the front service compartment (figure 29). A valve is also added on this panel for an interlock with the parking brake. Another valve is added in the compartment next to the main power compartment (figure 28). This valve activates the tag axle unloading when locking or unlocking the front slide-out.

Pneumatic circuit modifications made on the vehicle are shown on pneumatic diagrams annexed.

**12.3 MAINTENANCE**

**COMPRESSED AIR LINE**

Inspect all compressed air line tubing for cut, swelling, kink or other damage or deterioration. Inspect the pneumatic fittings and components for any leak. The slide-out air supply is connected to the accessory air tank and the maintenance is specified in the "brake and air

system" section from the Prevost maintenance manual.

**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 from 7 to 10 psi maximum. It is recommended to check the inflatable seal pressure once a month to ensure sealing efficiency and prevent any infiltration from outside.

**VACUUM SWITCH**

The vacuum switch used to control the vacuum generator valve may have to be adjusted if malfunction is suspected. The vacuum is factory pre-set to 16" Hg. To check the vacuum set point, use a vacuum gage adapter at the seal valve output. Operate the slide-out and check the maximum vacuum value. If needed, adjust the vacuum set point with the adjustment screw located between the electrical tab connectors. Turn the screw clockwise to lower the vacuum set point and counterclockwise to raise it.

**12.4 SEAL**

**Note:** Refer to the slide-out parts manual for descriptions of the sealant and adhesives used.

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.

The front slide-out inflatable seal air inlet is located in the third baggage compartment on the driver side close to the front slide-out electric motor (figure 31). The rear slide-out inflatable seal air inlet is located on the structure post facing the rear of the vehicle (figure 32).

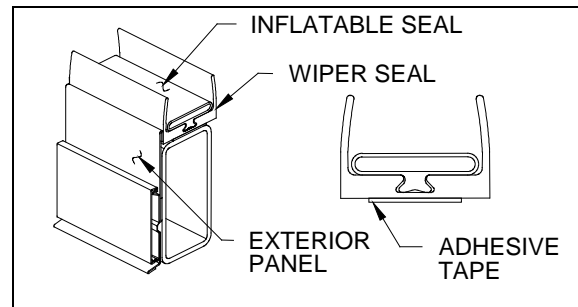


FIGURE 30 : SEAL ASSEMBLY

The inflatable seal deflation is done each time the slide-out is moved. The seal valve is activated (seal deflated) during the slide-out movement and stays activated as long as the slide-out is not completely retracted or extended and as long as **the ignition switch is turned on.**

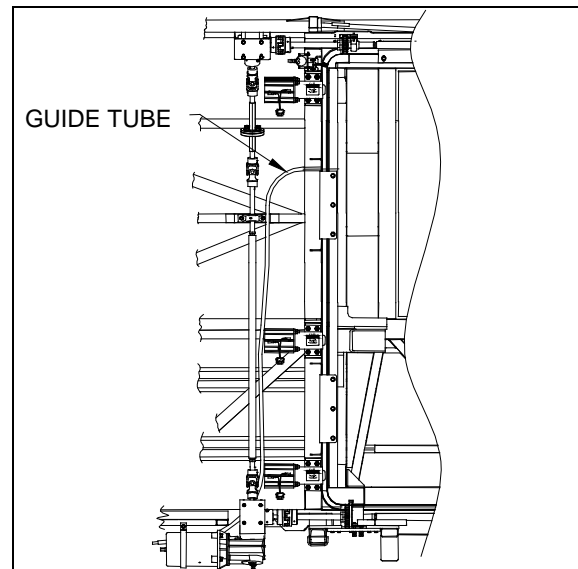


FIGURE 31 : FRONT SLIDE-OUT INFLATABLE SEAL AIR INLET

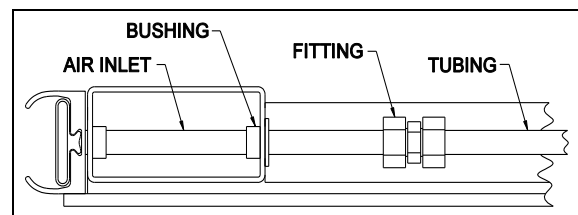


FIGURE 32 : REAR SLIDE-OUT INFLATABLE SEAL AIR INLET

**Caution:** Make sure the inflatable seal is deflated when manually moving the slide-out during service maintenance. The normally opened seal valve supplies air pressure inside the seal if the control module is switched off. When the slide-out is not completely retracted or extended, damage may occur to the exterior panels.



The vacuum generator valve is activated simultaneously with seal valve until the 16" Hg vacuum is reached at the vacuum switch. The vacuum switch will detect an inflatable seal failure if the 16" Hg set point is not reached after a 30 seconds delay. The green LED on the slide-out control switch will blink 3 times every 3 seconds while holding the button depressed. Refer to the slide-out service manual troubleshooting tables.

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

**12.4.1 Maintenance**

The inflatable seal pressure must be set from 7 to 10 psi maximum 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.

**12.4.2 Seal assembly removal**

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

1. Retract the slide-out 2" inside the vehicle (section 12.4.4).
2. Unplug the tubing from the inflatable seal air inlet (figure 31 and figure 32). Keep the bushing.
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.

**12.4.3 Seal assembly installation**

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

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

**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 slide-out parts manual for descriptions of primer, cleaner, sealant and adhesives used.

**Note:** Refer to the product specification for drying time.

1. Retract the slide-out 2" inside the vehicle (section 12.4.4).
2. Clean the part of the structure that will receive the inflatable seal and also the back of the exterior panel and glasses 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 and glasses with a Scotch Brite (or equivalent product).
4. Clean another times the structure and the back of the exterior panel and glasses 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 and glasses with appropriate cleaner. Wait until the product is dry before proceeding.
6. Seal the gap between the structure and the exterior panels and the gap between the glasses and the fiberglass panels with appropriate sealant. Make sure not to put sealant on the structure surface where the inflatable seal will be placed. Wait until the product is dry before proceeding.
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.

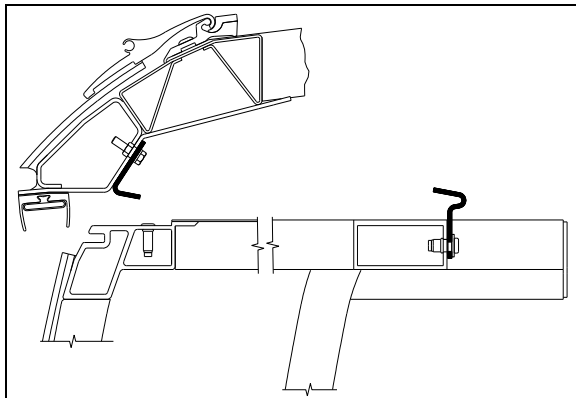
8. Seal the gap between the inflatable seal and the exterior panels and the gap between the glasses and the fiberglass panels with appropriate sealant. Wait until the product is dry before proceeding. Remove excess sealant with appropriate cleaner.
9. Replace the bushing and plug the pneumatic tubing on the inflatable seal air inlet (figure 31 and figure 32).

**12.4.4 Slide-out 2" inside retraction**

1. Manually deflate the seal completely by turning clockwise the relieving shut-off valve (figure 51).
2. Using the manual override procedure, 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 6).
3. Using a knife, cut the sealant between the extrusion and the roof (figure 6). Unscrew and remove the central exterior extrusion and the two end extrusion screws.

**Caution:** Do not use the automatic retraction system to move the slide-out 2" inside the vehicle, because the limits are not recognized over the closed position. The slide-out will not stop and damage may occur.

4. Turn the ignition to the off position. Using the manual override procedure, move the slide-out 2" inside the vehicle, so the seal is accessible from outside (figure 33).



**FIGURE 33 : SLIDE-OUT 2" INSIDE – UPPER PART**

5. To reinstall the exterior extrusion, inverse the procedure sequence. Apply appropriate sealant on the exterior extrusion screws and between the extrusion, the roof and the edges to prevent water infiltration (figure 6).

**13. SLIDE-OUT ELECTRICAL SYSTEM**

**Warning:** Never modify the slide-out electrical wiring without the Prevost Car approval. Any modifications may cause an unexpected slide-out action and could result in personal injury.

The slide-out electrical system is mainly composed of three electronic controllers for each slide-out and a pin state indicator module for both slide-out. The main controller named "logic controller" is used to manage a predefined logic sequences. The second controller is the "motor controller", and is used to supply power to the electric motor. The third controller is the "safety controller", and is used to prevent unexpected actions from the logic controllers. The pin state indicator module is used to define which pins are locked or unlocked.

The slide-out electrical system is interconnected with the Prevost vehicle electrical system to supply electric power and safety signals to the slide-out control system.

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

**13.1 ELECTRICAL INTERCONNECTION WITH PREVOST VEHICLE**

The slide-out power supply comes from the master switch control post (24 volts) in the main power 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 electric diagram annexed.

The input signals coming from Prevost electrical system are:

- parking brake;
- ignition;
- mode drive or leveling system OFF;
- speed switch.

These input signals are used to control safety operation of the slide-out.

**13.2 SLIDE-OUT BREAKERS/FUSE**

The main breaker (for both slide-out) is located in the main power compartment (figure 34). All other slide-out breakers are located on the slide-out electrical component panel located in the third baggage compartment on the driver side (figure 38). A one ampere fuse is located in the front service compartment (figure 37) and is used to protect ignition signal from wire short-circuit. A relay is added to power the interlock valve by the speed switch signal (figure 37).

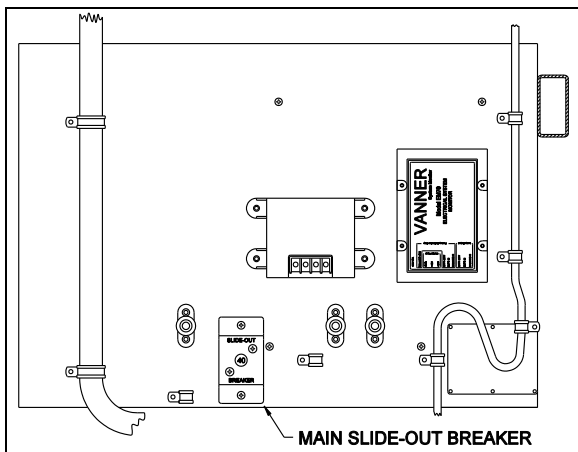


FIGURE 34 : BREAKER IN MAIN POWER COMPARTMENT

**13.3 ELECTRONIC CONTROLLERS**

**Warning:** Never modify the slide-out electrical wiring without the Prevost Car approval. Any modifications may cause an unexpected slide-out action and could result in personal injury.

The slide-out electronic control system consists of three electronic control modules for each slide-out. Each slide-out has a logic controller and a motor controller plugged together. The third controller is the “safety controller”, and is used to prevent unexpected actions from the logic controllers. They are located in the third baggage compartment on the driver side (figure 35).

**LOGIC CONTROLLER**

The slide-out logic controller is used to analyze the input signal conditions and activate outputs like the pneumatic valves and a predefined sequence programmed in a memory EPROM. An analog input signal comes from the linear position transducer (potentiometer) linked to the slide-out and is used to transmit the slide-out

position. The slide-out logic controller is also used to command the motor controller (drive) to transmit power to the slide-out electric motor.

**MOTOR CONTROLLER**

The motor controller is a pulse width modulation (PWM) type controller. This controller controls the motor speed variation and the overload current protection.

Each controller has a sticker to identify the following information for further tracking:

- serial code number beginning with "BS" or "BT", and followed by 4 digits (XXXX);
- hardware revision "RV:" and followed by 2 digits (X.X);
- software revision beginning by "V:" and followed by 3 digits (X.XX).

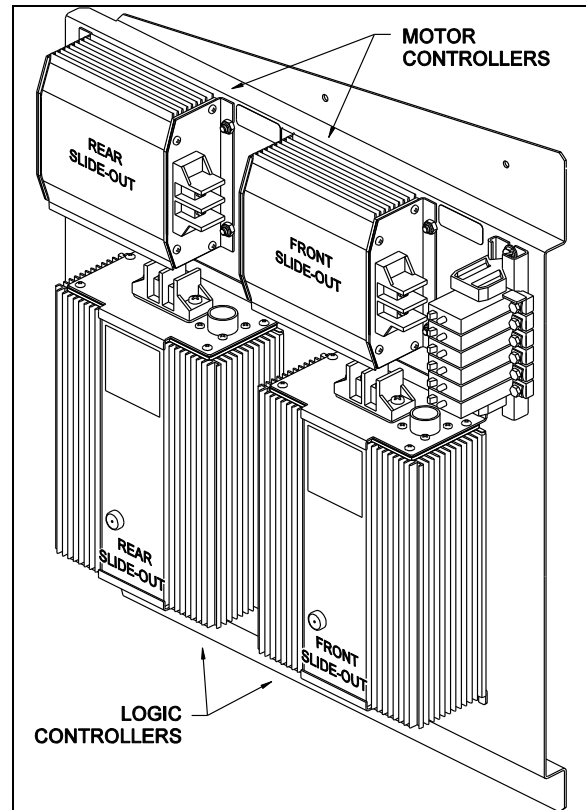


FIGURE 35 : SLIDE-OUT ELECTRICAL PANEL

**SAFETY CONTROLLER**

The safety controller is used to prevent unexpected actions from the logic controllers. This controller uses relays to interlock the valves and the slide-out motor. Those relays are activated by either “Retracting” or “Extending” buttons. One contact relay cuts off the power to the motor. Two others relays cut off the power to the pin unlock valve and to the tag axle valve.

With this protection, the slide-out cannot operate accidentally if either retracting or extending button is not pressed.

### 13.3.1 Motor controller replacement

The procedure is the same for both motor controllers.

1. Turn the ignition key to the "OFF" position. For added security, trip the slide-out breakers (figure 38).

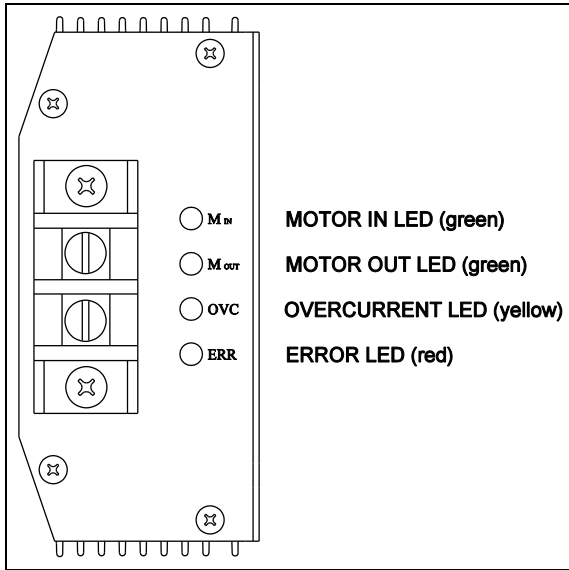


FIGURE 36 : MOTOR CONTROLLER LED PANEL

1. Take note of the electric cable localization and disconnect all of them from the motor controller.
2. Unscrew mounting nuts and remove the controller.

**Caution:** The power polarity must be respected to prevent permanent damage to the controller.

3. Reinstall the new motor controller by reversing the procedure.

Take note of the new serial number with revision (RV:) and version (V:) identifications to inform Prevost service department for controller tracking.

### 13.3.2 Logic controller replacement

**Caution:** All new electronic controllers are programmed for the front slide-out. When installing a new controller for the rear slide-out, it is necessary to set up its memory (section 13.3.4).

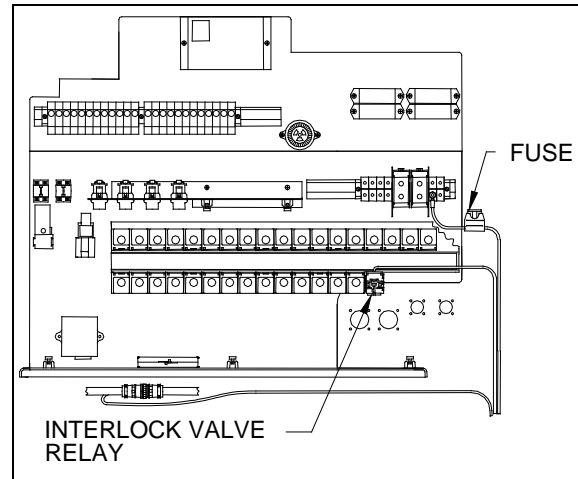


FIGURE 37 : FUSE AND INTERLOCK VALVE RELAY

**Note:** The stroke limits and the rear slide-out information are programmed in an EEPROM. Then, it is not necessary to set-up stroke limits and rear slide-out program when the EPROM memory chip is changed.

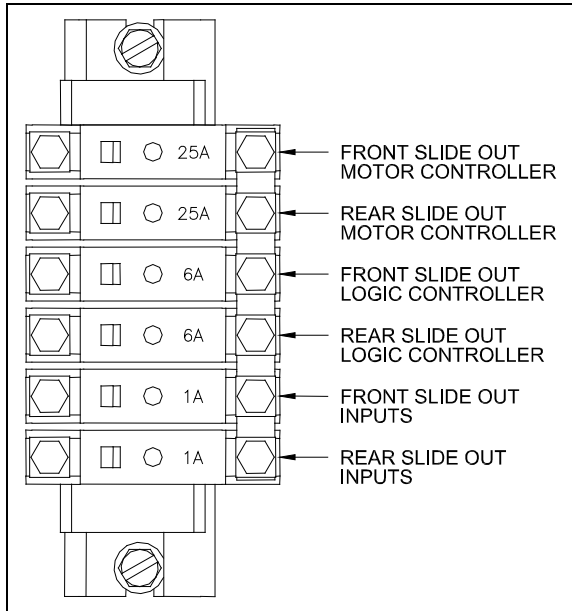
**Warning:** Never install a used logic controller or invert front and rear slide-out logic controllers without resetting up the stroke limits (section 13.3.5). Serious damage or injury may result.

The procedure is the same for both slide-out logic controllers.

1. Turn the ignition key to the "OFF" position. For added security, trip the slide-out breakers (figure 38).
2. Disconnect both cable connectors located under the logic controller and the cable connector located on the top of the logic controller.
3. Loosen the two retaining nuts at the base of the controller. Unscrew the two nuts at the top of the controller.
4. Take note of the electric cable location. Tilt out the logic controller on its base and remove remaining electric cables at the top. Remove the used logic controller and replace it by a new one.
5. To reinstall the new logic controller, reverse the procedure. To change the processor, see section 13.3.3.

6. Take note of the new serial number with revision (RV:) and version (V:) identifications to inform Prevest service department for controller tracking.

**Caution:** The new slide-out logic controller must be programmed as described in section 13.3.4 and 13.3.5.



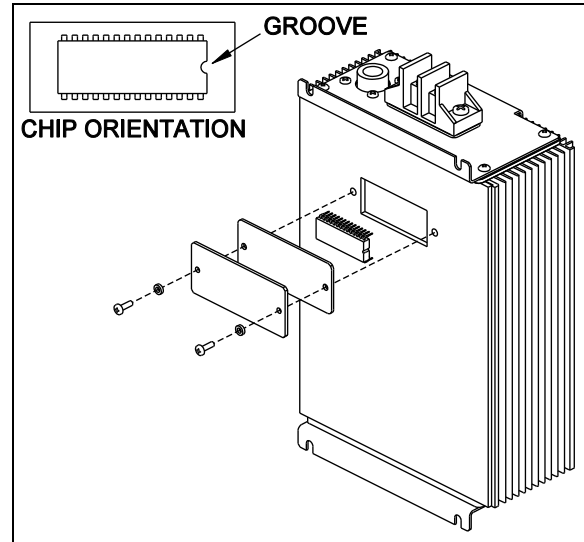
**FIGURE 38 : SLIDE-OUT BREAKERS**

**13.3.3 EPROM memory chip replacement**

**Caution:** Do not leave the EPROM memory chip installed on the wrong side for a long time. The EPROM is installed on the wrong side when the logic controller power LED is slightly light.

1. Remove the logic controller from the electrical panel (13.3.2).
2. From behind the controller, unscrew the two cover screws. Keep the screw washer (figure 39).
3. Remove the back cover and the gasket.
4. With a small screwdriver, remove gently the chip from its socket.
5. Install a new chip so the groove is on the right side. Make sure each terminal is well seated in its socket. Beware not to bend the processor terminals. Press the chip in place.
6. Replace the gasket and the cover, and screw them back.

7. Write the new software version (written on the chip) on the controller sticker (if it had changed), and inform Prevest service department for controller tracking.



**FIGURE 39 : EPROM MEMORY CHIP LOCALIZATION**

8. Reinstall the controller on the electrical panel.

**13.3.4 Rear slide-out program set-up**

**Caution:** Never press the slide-out control switch and the controller black push-button simultaneously. This will change the controller bit mode and make the controller non functional.

1. The slide-out must be retracted and all the pins locked.
2. Trip the 4<sup>th</sup> breaker from the top (there are six breakers). It will cut off the rear logic controller electrical power (see figure 38).
3. Without starting the engine, turn the ignition key to the "ON" position.
4. With a small screwdriver, push and hold the logic controller black push-button and set the 4<sup>th</sup> breaker (see figure 38 and figure 40). Hold the push-button depressed until the logic controller "OUT6" green LED goes on (see figure 52). The green LED confirms that the rear slide-out program is set in the logic controller memory.

**Note:** If by error, the rear slide-out logic controller program is loaded in the front slide-out logic controller memory, it becomes necessary to set-up the front slide-out logic controller. The

procedure is the same as above except that the 3<sup>rd</sup> breaker must be used.

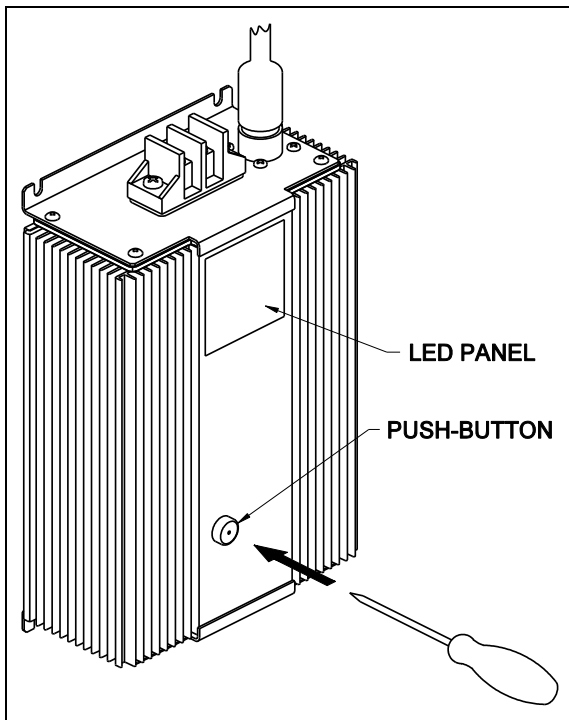


FIGURE 40 : SLIDE-OUT LOGIC CONTROLLER SET UP

### 13.3.5 Slide-out stroke limits set-up

**Caution:** Always set-up one slide-out at a time to prevent possible confusion between rear and front slide-out controllers.

**Note:** When a new controller is installed, it is not possible to operate the slide-out until the stroke limits are programmed. In that case, when depressing the slide-out switch control, the green light will flash rapidly (5 Hz). This protection is used to prevent any damage from the locking pins automatic program activation.

1. Deflate the inflatable seal completely to prevent any damage.
2. Retract both slide-out to prevent any errors.
3. Turn the ignition key to the "ON" position without starting the engine.

**Caution:** To prevent any damage to the slide-out, unplug the air tubing from the locking pins air valve.

4. Manually unlock the locking pins using the pin valve manual operating button located on the left hand side (figure 51).

5. Memorize the slide-out inner limit by pushing once the logic controller black push-button (see figure 40). The green LED "OUT6" confirms that the stroke limit is set in the logic controller memory (see figure 52).
6. Using the manual override procedure, extend the slide-out completely until the slide-out reaches the inner stoppers.
7. Memorize the slide-out outer limit by pushing once the logic controller black push-button (see figure 40). The green LED "OUT6" confirms that the stroke limit is set in the logic controller memory (see figure 52).
8. Using the slide-out control switch, retract the slide-out completely in, keeping depressed the slide-out control switch button. The air will flow out from the locking pins valve fitting.
9. **For the rear slide-out only:** Check if the rear slide-out set-up is correct after the stroke limits set-up. The rear slide-out should move after the seal deflation (3 to 4 seconds), while the front slide-out moves after a 20 seconds delay for tag axle unloading. If there is any problem, run through the rear slide-out program set-up again.

**Note:** When the vehicle engine is running, the alternator produces a higher voltage resulting in a faster slide-out motor speed and could affect the precision of the final position. In addition, when the slide-out is loaded, its weight (inertia) may keep it from stopping right on the programmed limits. It may become necessary to adjust the limits slightly before the slide-out reaches its retracted position.

10. Run the engine and move the slide-out in and out a few times. Check if the slide-out exterior panels are perfectly aligned with the bus panels. To get more precision, readjust the slide-out limit by extending manually the slide-out (see slide-out operation manual).
11. When the limit adjustment is completed, manually lock the slide-out. Re-connect the two air tubes on the locking pin valve.
12. Re-inflate the inflatable seal.

- Run tests using the slide-out control switch (automatic cycle), to be sure everything goes right.

### 13.3.6 Pin state indicator module

An electronic module is used to define which pins are locked or unlocked (see figure 41 and figure 51). Two LEDs per pin are used to indicate the position of the pin. The green LEDs inside both rectangles specify that the pin is locked. The red LEDs outside both rectangles specify that the pin is unlocked. When all the pins are locked, the green LED "ALL PINS LOCKED" is on. When all the pins are unlocked, the red LED "ALL PINS UNLOCKED" is on. This module is powered by the front slide-out 6 amperes breaker (figure 38). The green LED "PWR" must be "ON" for proper functionality of this module.

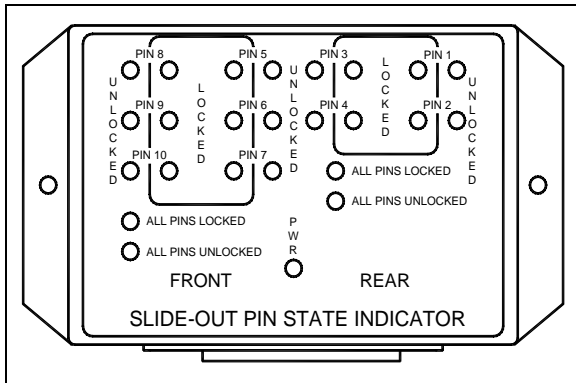


FIGURE 41 : SLIDE-OUT PIN STATE INDICATOR MODULE

### 13.3.7 Safety controller replacement

The procedure is the same for both slide-out safety controllers.

- Turn the ignition key to the "OFF" position. For added security, trip the slide-out breakers (figure 38).
- Disconnect the connector located on the right side of the logic.
- Loosen two metal screws on one side of the controller. Unscrew the other side screws. Remove the used safety controller and replace it by a new one.
- To reinstall the new safety controller, reverse the procedure.
- Take note of the new serial number with revision (RV:) to inform Prevest service department for controller tracking.

- Turn the ignition key to the "ON" position. Reset all breakers to power on the slide-out controllers.

### 13.4 LINEAR POSITION TRANSDUCER

The linear position transducer indicates the slide-out position to the slide-out logic controller (figure 42) with the use of a 1000Ω potentiometer.

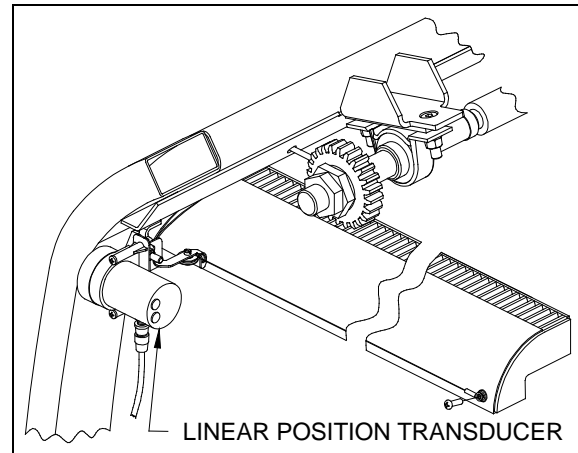


FIGURE 42 : LINEAR POSITION TRANSDUCER

#### 13.4.1 Maintenance

Inspect the wire rope and replace it if damaged or worn. Check that the wire rope screw and the mounting screws are tight. The transducer pulley should be at least 3/8" from the slide-out. Check the electrical connector condition.

## 14. SLIDE-OUT EXTERIOR FINISHING PANELS

**Note:** The removal and installation procedures are all based on standard service methods described in the body section of the Prevest maintenance manual. Refer to Prevest manual for procedures, tools, cleaner, adhesives and other product needed.

### 14.1 SIDE PANEL REMOVAL

Use the same procedure as described in the body section of Prevest service manual for MTH side panel removal, and:

- Keep the slide-out retracted and all pins locked;
- Make sure not to damage the finishing molding supports to be able to re-use them;

- Remove the old adhesive on the finishing molding supports and clean them before re-using;
- Check where adhesive, sealant and double face adhesive tape are on the structure and the panel back side, in order to be able to stick the new panel in the same way;
- Check the tape width and use same width tape when installing new panels.

3. Remove the fixed windows from the slide-out as described in section 15.1.
4. Remove panel upper rivets (figure 44) and lower rivets (figure 45) with a 1/8" drill bit, a hammer and a punch.
5. Insert a flat screwdriver between the panel and the slide-out structure, in the top left and right corners of the panel, and unstick the panel from the structure.

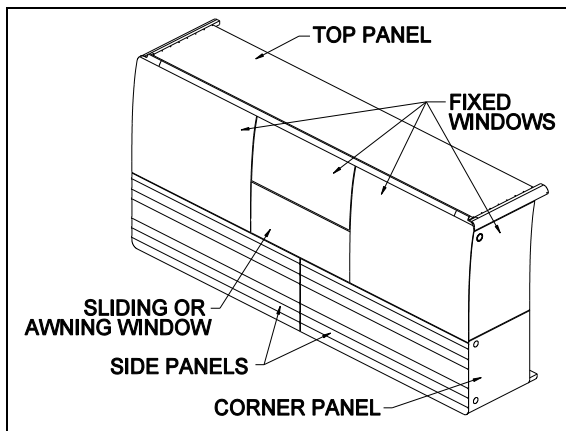


FIGURE 43 : SLIDE-OUT PANELS AND WINDOWS

### 14.2 SIDE PANEL INSTALLATION

For surface cleaning, and preparation, panel installation and products needed, use the same procedure as the MTH side panel installation described in Prevost service manual, and:

- Keep the slide-out retracted and all pins locked for panel alignment;
- Make sure to apply sealant between the side panels and the corner panels, and also between side panels and bottom and top panels. Apply sealant both inside and outside the slide-out panels.

### 14.3 CORNER PANELS REMOVAL

**Note:** The corner panels are made of aluminum, or of stainless steel in option.

**Caution:** Be careful not to damage the adjacent surfaces.

1. Remove the slide-out as described in section 1.3 and 1.5.
2. Remove all the pin receptacles as described in section 2.5.2.

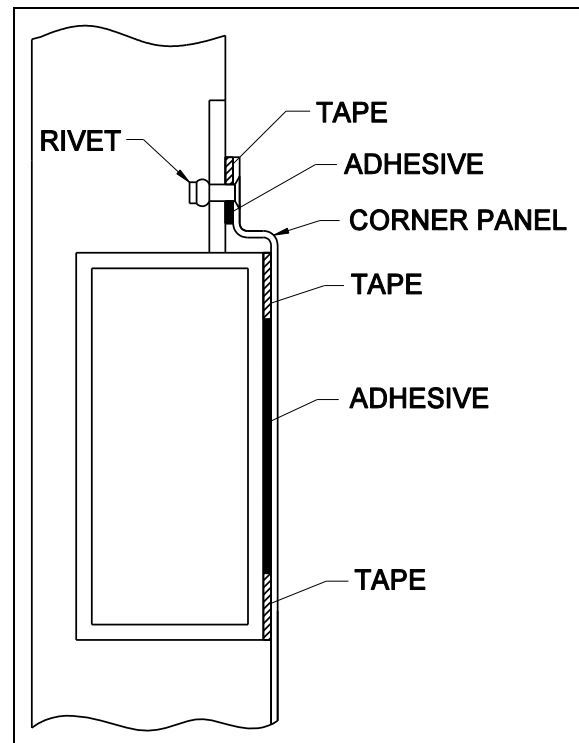


FIGURE 44 : CORNER PANEL INSTALLATION – UPPER PART

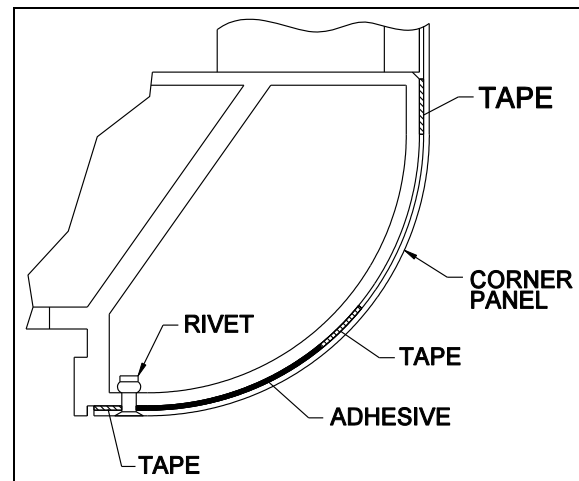


FIGURE 45 : CORNER PANEL INSTALLATION – LOWER PART



6. Use C-clamp to peel the panel from the slide-out structure.
7. Check where adhesive, sealant and double face adhesive tape are on the structure and the panel back side, in order to be able to stick the new panel in the same way.
8. Check the tape width and use same width tape when installing new panels.

**Caution:** Make sure the heat gun nozzle tip is at least 4" from surface.

9. Use a heat gun and putty knife to remove the dried off adhesive and tape residue from the structure.

**Warning:** Because of the adhesive toxicity, never use a buffer or other sanding method to remove it.

#### 14.4 CORNER PANELS INSTALLATION

**Note:** The corner panels are made of aluminum, or of stainless steel in option. Use rivet of same material as the panels.

For surface cleaning and preparation, panel installation, and products needed, refer to the MTH side panel installation procedure described in Prevost service manual, and:

- Protect adjacent surfaces with appropriate material;
- Make sure to apply sealant between the pin receptacles and the corner panels (figure 15 and figure 16);
- Make sure to apply adhesive around the pin receptacle
- Cut in the panel before installing the panel on the slide-out (figure 15 and figure 16);
- Refer to figure 44 and figure 45 for adhesive, tape and rivet position.

#### 14.5 TOP AND BOTTOM PANELS REMOVAL

**Note:** The top and bottom panels are made of aluminum sheets.

1. Remove the slide-out as described in section 1.3 and 1.5.
2. Remove panel rivets with a 1/8" drill bit, a hammer and a punch (figure 46).
3. Insert a flat screwdriver between the panel and the slide-out structure, and unstick the panel from the structure.
4. Use C-clamp to peel the panel from the slide-out structure.
5. Check where adhesive, sealant and double face adhesive tape are on the structure and the panel back side, in order to be able to stick the new panel in the same way.
6. Check the tape width and use same width tape when installing new panels.
7. Use a heat gun and putty knife to remove the dried off adhesive and tape residue from the structure.

**Warning:** Because of the adhesive toxicity, never use a buffer or other sanding method to remove it.

#### 14.6 TOP AND BOTTOM PANELS INSTALLATION

**Note:** The top and bottom panels are made of aluminum sheets and need aluminum rivet.

For surface cleaning and preparation, panel installation, and products needed, refer to the MTH side panel installation procedure described in Prevost service manual, and:

- Protect adjacent surfaces with appropriate material.
- See figure 46 and figure 47 for both bottom and top panel adhesive, sealant and tape position.

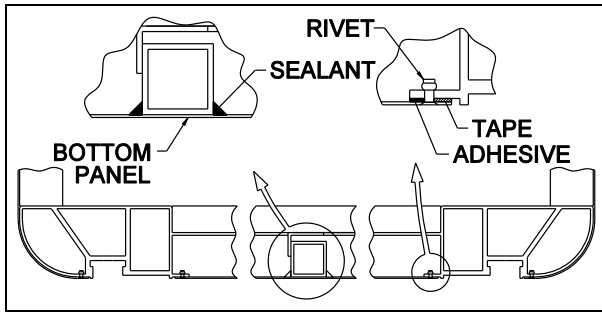


FIGURE 46 : TOP AND BOTTOM PANEL INSTALLATION

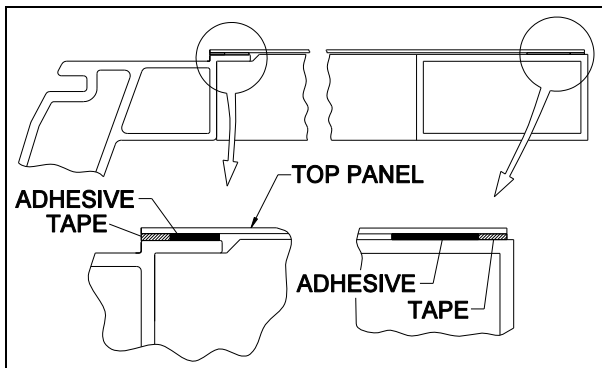


FIGURE 47 : TOP AND BOTTOM PANEL INSTALLATION

## 15. SLIDE-OUT FIXED, AWNING AND SLIDING WINDOWS

**Note:** The removal and installation procedures are based on standard service methods described in the body section of the Prevest maintenance manual. Refer to these procedures for tools and adhesives specifications.

**Warning:** Always wear safety equipment when working with glass and chemical adhesives.

### 15.1 WINDOWS REMOVAL

1. Remove the slide-out as described in section 1.3 and 1.5.
2. If needed, remove the exterior extrusion as described in section 12.4.4 step 3.

**Caution:** Be careful not to damage the adjacent surfaces.

3. With a knife or a wire, cut the sealant and the adhesive between the windows and the structure. Make sure not to damage the rubber seal between the windows.
4. With a helper, remove the window from the slide-out.

**For awning and sliding windows:** unscrew the window frame from the structure, and cut the sealant. Remove the window.

### 15.2 WINDOWS INSTALLATION

Refer to procedures described in Prevest maintenance manual. Refer to figure 48 for tape, sealant and adhesive position.

1. Clean and prepare the windows and the slide-out structure surfaces with appropriate cleaner, abrasives and primers.
2. Apply appropriate double face self adhesive tape on the slide-out structure (figure 48).
3. Apply appropriate adhesive on the slide-out structure surfaces.

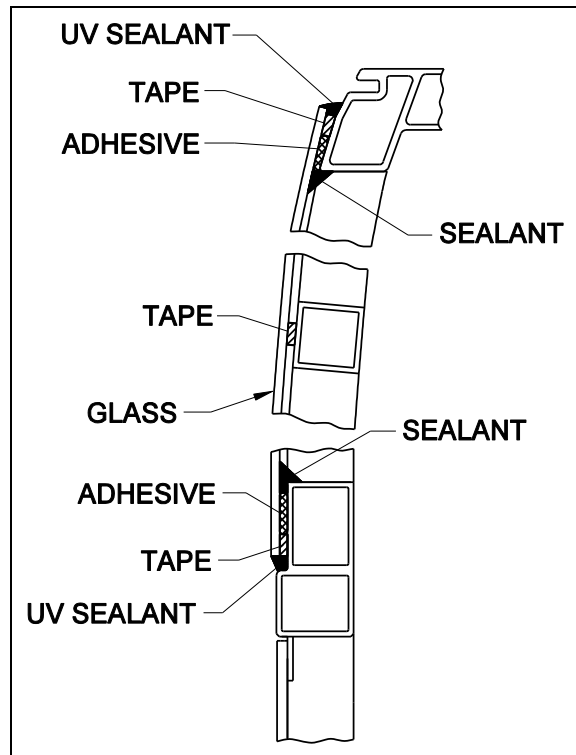


FIGURE 48 : WINDOWS ABOVE SIDE PANELS

4. Install the windows on the slide-out. Press the jigs on the windows and wait for the adhesive to dry.

**For awning and sliding windows:** install the window in its frame and screw it. Wait for the adhesive to dry.

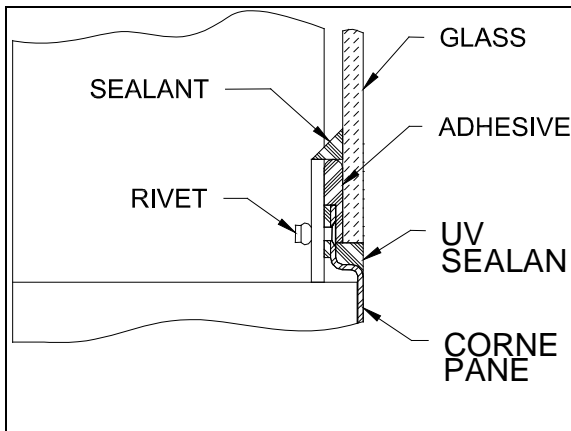


FIGURE 49 : WINDOW LOCATED OVER THE CORNER PANEL

5. From inside the slide-out, apply appropriate sealant between the windows and the structure.
6. Install the exterior extrusion as described in section 12.4.4 step 5.
7. Install the finishing molding supports and the molding.

## 16. WELDING PRECAUTION

1. Disconnect logic controller wiring connectors, the ground wire (black), and trip all breakers (figure 38).
2. Disconnect motor controller ground wire (black).
3. Refer to the welding precaution section in the maintenance manual.

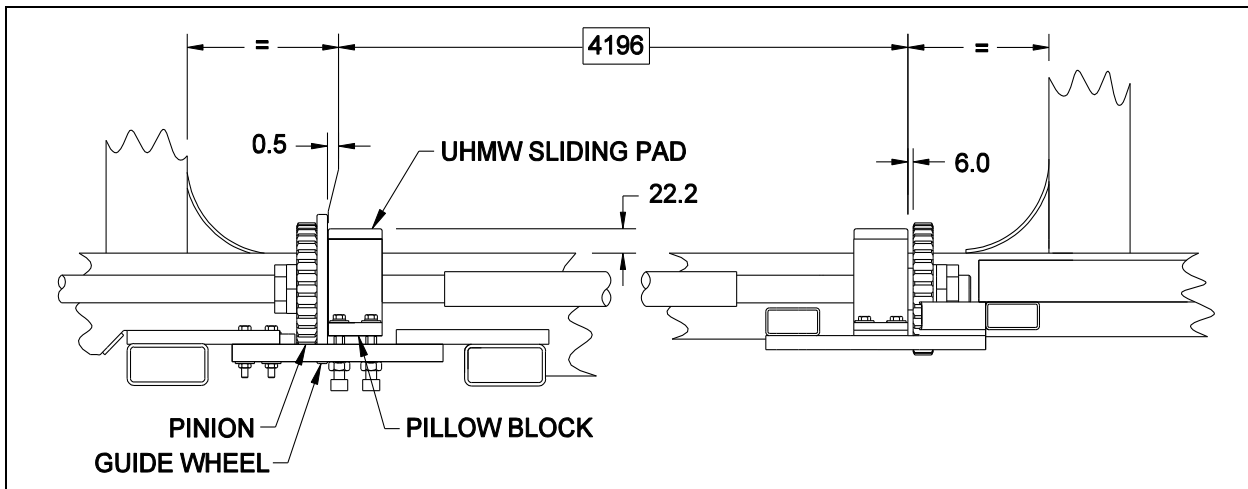


FIGURE 50 : PINION & PILLOW BLOCK ADJUSTMENT (DIMENSIONS ARE IN MILLIMETRES)

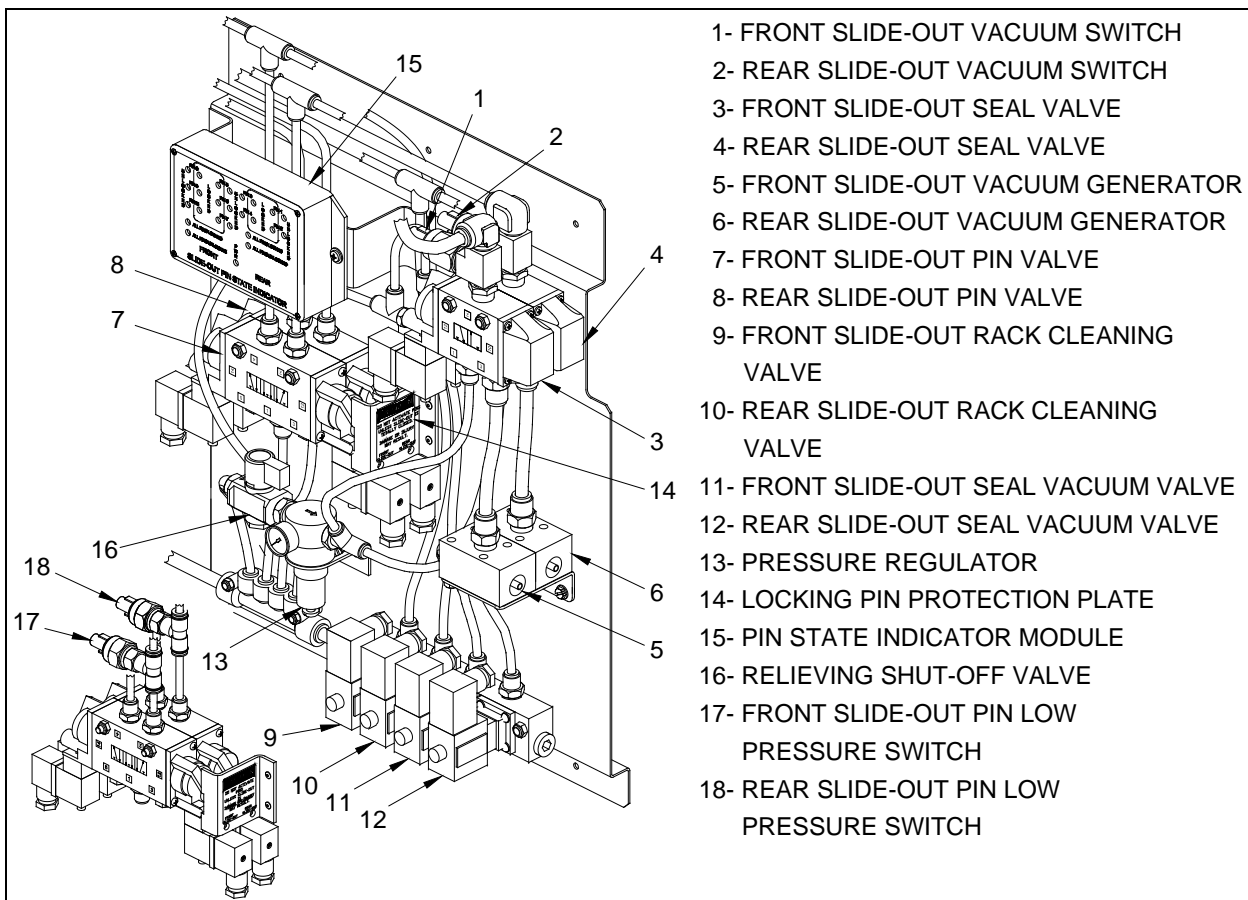


FIGURE 51 : PNEUMATIC COMPONENT PANEL

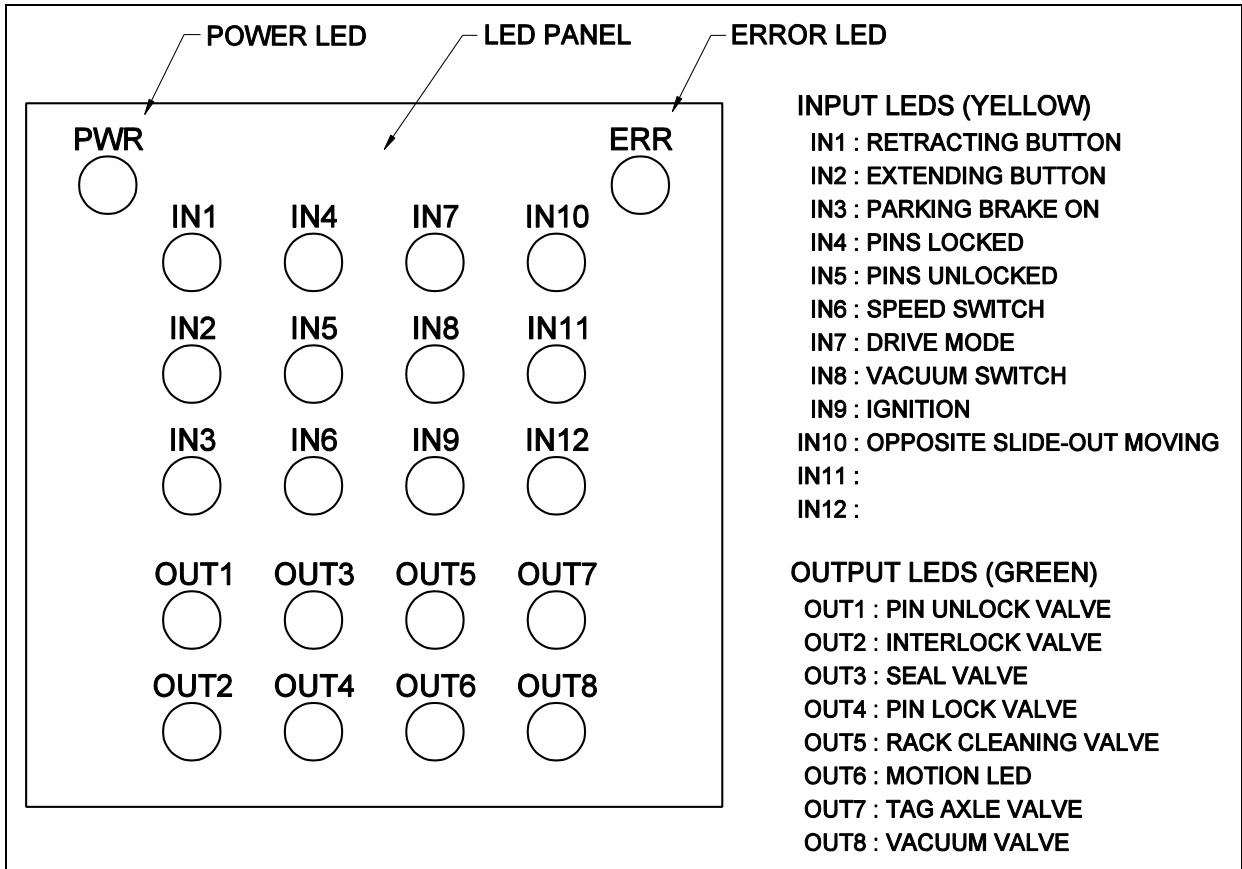


FIGURE 52 : SLIDE-OUT LOGIC CONTROLLER LED PANEL

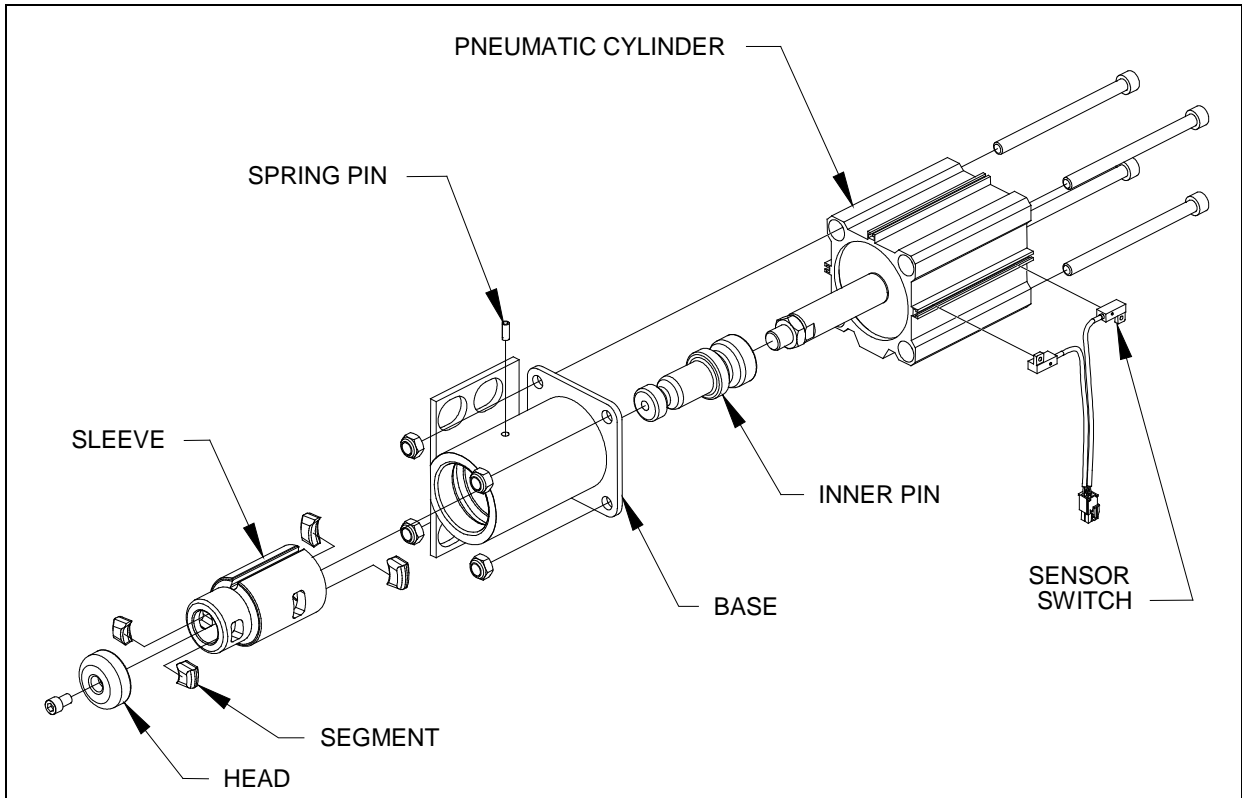


FIGURE 53 : LOCKING PIN ASSEMBLY

## 17. TROUBLESHOOTING

### 17.1 SLIDE-OUT CONTROL SWITCH

The green LED on the slide-out control switch identifies error code when it flashes while holding the button depressed. The output LED identified "MOTION LED" gives the same information as the control switch LED.

SIGNAL	PROBLEM	CAUSE	CORRECTIVE ACTION
Regular flashing: one short flash every second (1 Hz) .9 sec ON .1 sec OFF	Safety operation condition not met before or during slide-out displacement	<ul style="list-style-type: none"> <li>The ignition switch is not in the "ON" position;</li> <li>The level low selector is not in the "OFF" position (for the front slide-out);</li> <li>The parking brake is not applied;</li> <li>The vehicle is moving.</li> </ul>	<p>Make sure all the conditions are met and try again.</p> <p>Check that all the breakers are set and the ignition fuse is good.</p> <p>Check the condition of the input LED (IN3, IN6, IN7, IN9) on the logic controller (figure 52).</p> <p>Check wiring and Prevest electrical components.</p>
Regular flashing: five flashes every second (5 Hz)	Stroke limits set-up error	<p>A. Logic controller changed without stroke limits set-up or wrong stroke limits set-up;</p> <p>B. Linear position transducer malfunction;</p>	<p>A. Set-up the stroke limits (section 13.3.5).</p> <p>B. Check the linear position transducer potentiometer condition.</p>
Regular flashing: ten flashes every second (10 Hz) and <b>no abnormal LED flashing on the motor controller</b> (refer to section 17.2 and 17.3).	Linear position transducer error	<p>Transducer wire rope not moving:</p> <ul style="list-style-type: none"> <li>Wire rope detached or damaged;</li> <li>Mechanical component failure.</li> </ul> <p>Transducer wire rope moving faster than 4.7 in/sec:</p> <ul style="list-style-type: none"> <li>Wire rope cut while slide-out was moving;</li> <li>Mechanical component failure.</li> </ul>	<p>Check the transducer condition and the wire rope condition.</p> <p>Check the mechanical component condition.</p>
	Communication error	Linear position transducer malfunctions or wire cable damaged.	<p>Check the linear position transducer wiring and electrical connections.</p> <p>Check the linear position transducer potentiometer condition.</p>
Regular flashing: ten flashes every second (10 Hz) and <b>one long flash every three seconds of the motor controller error LED (ERR)</b> (refer to section 17.3).	Electric motor error	<p>A. Motor power supply cable damaged;</p> <p>B. Motor defective;</p> <p>C. Safety controller defective or bad electrical connections.</p>	<p>A. Check the power supply cable.</p> <p>B. Check the motor condition.</p> <p>C. Check the safety controller and the electrical connections conditions. Change the safety controller if necessary (refer to section 13.3.7).</p> <p>Reset the power on the controllers and try again.</p>

<b>SIGNAL</b>	<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Regular flashing: ten flashes every second (10 Hz) and <b>abnormal flashing of the logic controller error LED (ERR)</b> (refer to section 17.2).	Motor controller error	A. Motor controller power supply cable damaged or breaker tripped; B. Motor controller communication cable damaged; C. Motor controller defective;	A. Check the power supply cable and breaker. Reset the power and try again. B. Check the communication cable condition. C. Change the motor controller (section 13.3.1). Reset the power and try again.
Two consecutive flashes every two seconds	Inflatable seal not completely deflated within the 30 sec delay.	A. Accessory air tank pressure insufficient (lower than 70 psi); B. Vacuum switch set point higher than 16" Hg; C. Air line, inflatable seal, seal valve, vacuum valve or vacuum generator obstruction, malfunction or leakage;	A. Make sure the system air pressure is at least 110 psi before operating the slide-out. B. Check the vacuum switch set point (section 12.3). C. Check the component condition for obstruction, malfunction or leakage.
Three consecutive flashes every two seconds	Locking pin not unlocked within the 20 seconds delay.	A. Accessory air tank pressure insufficient (lower than 70 psi); B. Slide-out air pressure inlet valve not completely opened; C. Locking pin not adjusted properly; D. Air line, pin cylinder or pin valve obstruction, malfunction or leakage; E. Locking pin sensor switch malfunction or wrong adjustment; F. Pin state indicator module malfunction or bad electrical connection; G. Tag axle valve malfunction; H. Safety controller defective or bad electrical connections.	A. Make sure the system air pressure is at least 110 psi. B. Open the valve completely. C. Check locking pin adjustment (section 2.2) D. Check that all the breakers are set. Check the component condition for obstruction, malfunction or leakage. E. Check the locking pin sensor switch condition and adjustment, and the sensor switch wiring. F. Check the pin state indicator module and the wiring condition. G. Check tag axle valve component condition. H. Check the safety controller and the electrical connections conditions. Change the safety controller if necessary (refer to section 13.3.7).
Control switch LED does not come on when depressing the button	Electrical problem	A. Ignition key turned off; B. Breaker tripped; C. Bad electrical connection of the switch control unit or power supply; D. Slide-out controller defective;	A. Turn on the ignition key. B. Check the control breakers in slide-out compartment and the main slide-out breaker in main power compartment. C. Check the switch control unit connections and the wiring condition. D. Change the logic controller (section 13.3.2).

<b>SIGNAL</b>	<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
One long flash each second .9 sec ON .1 sec OFF	Motor controller software or hardware protection activated (refer to section 17.3)	A. Excessive weight; B. Obstruction to the slide-out movement; C. Slide-out inner stopper interference with structure; D. Slide-out exterior extrusion interference with structure; E. Mechanical component failure; F. Slide-out movement restriction caused by air volume variation inside the vehicle; G. Controller temperature over 248°F;	A. Reduce the weight in the slide-out. B. Remove any obstacle that may obstruct slide-out movement. C. Check the stopper adjustment (section 1.1.2). D. Check the roof reinforcing rod adjustment (section 3). E. Check the mechanical component condition. F. Open door or window. G. Check the controller compartment for abnormal temperature.

**17.2 LOGIC CONTROLLER**

The slide-out logic controller has 7 input LED, 10 output LED, 1 power LED, 1 communication LED (ERR) and 1 diagnostic LED (figure 52). When the ignition key is turned to the "ON" position, the power LED comes on. A slow flashing of the communication LED (0.1 sec ON, 2.9 sec OFF) indicates a normal operation. The output LED "MOTION LED" gives the same information as the slide-out control switch green LED (see section 17.1).

<b>SIGNAL</b>	<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Power LED slightly light	EPROM error	EPROM memory chip installed on the wrong side.	Reinstall the chip (section 13.3.3)
Regular flashing: two flashes every second (2 Hz)	Communication error	A. Bad electrical connection with the motor controller; B. Motor controller turned off or defective;	A. Check the communication cable between the two controllers. B. Check the motor controller condition (section 17.3).
Error LED not lit, constantly lit or flashing irregularly	Hardware error	A. EPROM or RAM missing or defective; B. Program corrupted; Internal clock error; Board or component defective; Processor chip reset or defective;	A. Change the EPROM memory chip (section 13.3.3); B. Change the logic controller (section 13.3.2).



**17.3 MOTOR CONTROLLER**

The motor controller has 4 LED to show the controller activity and indicate errors (figure 36). The error LED flashes once every 2 seconds when the controller is in operation. When retracting the slide-out, the "Motor In" LED comes on, and when extending the slide-out, the "Motor Out" LED comes on. When the motor is in motion activity, the error LED is disabled. In that state, if a communication error is detected, the motor is stopped 2 seconds after the detection.

<b>SIGNAL</b>	<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Error LED fast flashing: one flash every second (1 Hz)	Communication error	A. Bad electrical connection with the logic controller.  B. Logic controller turned off or defective;	A. Check the communication cable between the two controllers.  B. Check the logic controller condition (section 17.2).
Error LED: one long flash every three seconds 2.9 sec ON .1 sec OFF	Communication error	A. Opened connection to motor;  B. Defective power transistor.  C. Safety controller defective or bad electrical connections.	A. Check communication cable and motor power supply wiring.  B. Change the motor controller (section 13.3.1).  C. Check the safety controller and the electrical connections conditions. Change the safety controller if necessary (refer to section 13.3.7).  Reset the power on the controllers.
Overcurrent LED comes on and stays on only one second.	Software protection activated	Software overcurrent detected (threshold at 34 A): A. Excessive weight;  B. Obstruction to the slide-out movement;  C. Mechanical component failure;  D. Motor controller defective;	A. Reduce the weight in the slide-out.  B. Remove any obstacle that may obstruct slide-out movement.  C. Check the mechanical component condition.  D. Change the motor controller (section 13.3.1).
Overcurrent LED and error LED come on and stay on only one second.	Hardware protection activated	Hardware overcurrent detected (threshold at 40 A): A. Excessive weight;  B. Obstruction to the slide-out movement;  C. Mechanical component failure;  D. Motor controller defective;  Overheat detected (threshold at 120°C): E. Controller internal temperature over 120°C (248°F).	A. Reduce the weight in the slide-out.  B. Remove any obstacle that may obstruct slide-out movement.  C. Check the slide-out driving component condition.  D. Change the motor controller (section 13.3.1).  E. Check the controller compartment for abnormal temperature.  Reset the power on the controllers.

**17.4 SLIDE-OUT OPERATION**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Slide-out does not retract or extend when depressing the control switch.	A. Driving mechanism failure; B. Electrical problem;	A. Check driving mechanical components. B. Refer to section 17.1 to 17.3.
Slide-out is not straight <b>when retracting or extending</b> .	A. Slide-out inner stopper loosened or not correctly aligned; B. Slide-out exterior extrusion interference with structure; C. Pinion bad synchronization (pinion keyless bushing loosened); D. Pinion keyless bushing slipping; E. Driving mechanism failure;	A. Check stopper adjustment and condition (section 1.1.2). B. Check exterior extrusion and roof reinforcing rod adjustment (section 1.2 and section 3). C. Tighten or re-synchronize the pinion (section 5.6). D. Change faulty keyless bushing (section 5). E. Check driving mechanical components.
Slide-out is not straight <b>once retracted or extended</b> .	A. Pinion bad synchronization or absence of synchronization after significant load variation; B. Bad stroke limit adjustment;	A. Re-synchronize the pinion (section 5.6). B. Readjust the stroke limits (section 13.3.5).
Slide-out stops before having reached the limits without control switch LED light.	A. Bad stroke limit adjustment;	A. Readjust the stroke limits (section 13.3.5).
Slide-out vibrating when extending or retracting.	A. Upper racks worn or damaged; B. Too many shims on upper shaft pillow block; C. UHMW sliding pad worn or damaged; D. Objects in upper racks;	A. Replace the upper racks (section 4.2). B. Remove shim and readjust the pillow block (section 5.2). C. Replace the UHMW sliding pad (section 10.2). D. Clean the upper racks and check the rack cleaning air nozzle orientation and condition.
Parking brake can not be released.	A. No air pressure in the cylinder pins of both slide-out; B. Pressure switch malfunction or bad set point adjustment; C. Bad stroke limit adjustment or stroke limits are not programmed; D. No air pressure in the slide-out pneumatic system;	A. Check pin valve operation on both slide-out.  Check the information given by the logic controller LED (figure 52). Output LED 4 must be lit on both logic controllers. B. Check pressure switch on both slide-out C. Readjust the stroke limits (section 13.3.5). D. Check the slide-out air pressure inlet valve condition and the accessory air tank pressure.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Watertightness problem	<p>A. Inflatable seal and/or wiper seal damaged or unstuck;</p> <p>B. Insufficient air pressure in the seal;</p> <p>C. No air pressure in the slide-out pneumatic system;</p> <p>D. Sealant missing;</p> <p>E. Windows or exterior panel damaged;</p>	<p>A. Check both seals condition.</p> <p>B. Check the pressure regulator, the relieving shut-off valve and the seal valve condition.</p> <p>C. Check the slide-out air pressure inlet valve condition and the accessory air tank pressure.</p> <p>D. Check the racks, the exterior extrusion, the windows and the exterior panels sealant condition. Check the racks and the exterior extrusion screws</p> <p>E. Check the windows and exterior panels condition.</p>
Inflatable seal damaged or removed, or wiper seal unstuck from the structure.	<p>A. Slide-out retracted or extended with the manual procedure without having deflated the inflatable seal;</p> <p>B. Vacuum switch malfunction or bad set-up;</p> <p>C. Excessive load on roof or bad roof reinforcing rod adjustment;</p> <p>D. Guide wheel excessive wear;</p> <p>E. Plastic stopper bad adjustment;</p> <p>F. Seal valve malfunction;</p> <p>G. Excessive seal air pressure (over 10 psi);</p> <p>H. Excessive load in the slide-out;</p> <p>I. Slide-out not centered in the structure opening;</p> <p>J. Object or ice on the slide-out exterior panels;</p>	<p>A. Always deflate the seal when manually retracting or extending the slide-out.</p> <p>B. Check the vacuum switch condition for replacement or adjustment (section 12.3).</p> <p>C. Readjust the roof reinforcing rod (section 3).</p> <p>D. Replace the guide wheel (section 5.7).</p> <p>E. Readjust the plastic stopper (section 5.8).</p> <p>F. Check the seal valve condition.</p> <p>G. Check the air pressure regulator adjustment (section 12).</p> <p>H. Respect the slide-out load capacity.</p> <p>I. Reinstall and readjust the slide-out in the vehicle (section 1.4 and 1.6)</p> <p>J. Remove ice and objects before retracting the slide-out.</p> <p>For all situations, check the seal condition. Refer to the seal section annexed for replacement.</p>

## 18. SPECIFICATIONS

### 18.1 SLIDE-OUT MAXIMUM LOAD

**Front slide-out:**

Maximum load (retracted or extended).....2000 lb  
 Maximum load when moving.....1200 lb\*

**Rear slide-out:**

Maximum load (retracted or extended) .....2000 lb  
 Maximum load when moving.....1200 lb\*

\* When the load is distributed in the slide-out to prevent a deflection of the inside lower member over 1/4" that could damage the seal.

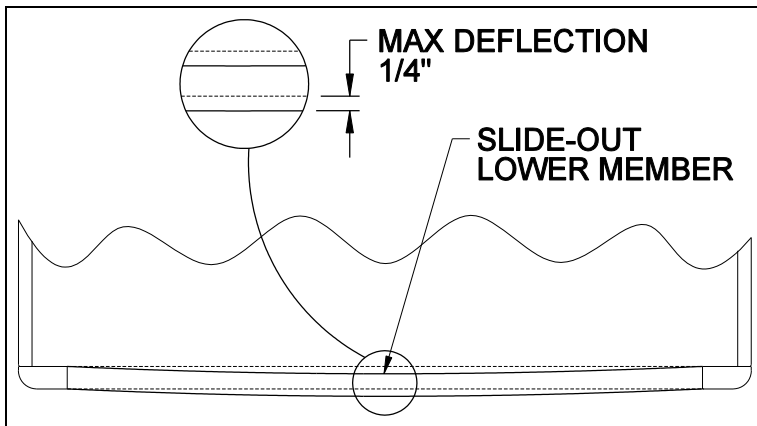


FIGURE 54 : FRONT SLIDE-OUT DEFLECTION

### 18.2 TRANTORQUE KEYLESS BUSHING

Make.....Fenner Drives  
 Type.....Trantorque GT  
 Shaft size.....1"  
 Installation torque max.....125 lb-ft

#### 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

FIGURE 55 : WRENCHES FOR KEYLESS BUSHING INSTALLATION

## 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.**

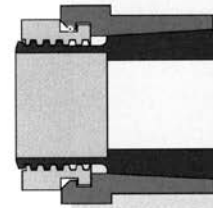


Figure 1

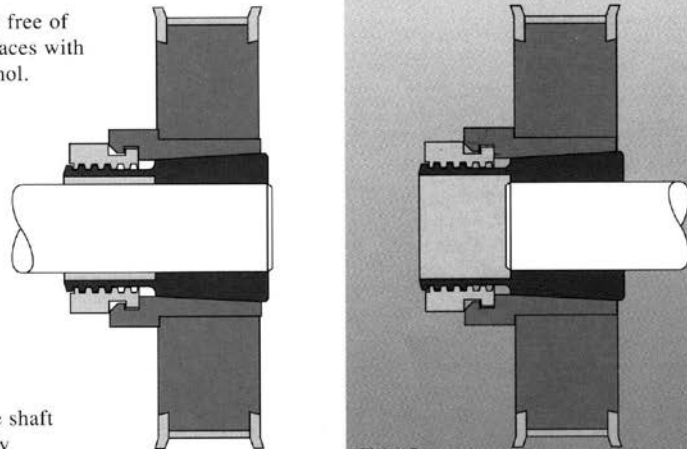


Figure 2

### Installation Torque on Nut

	Inch Pound System		Metric System	
	Shaft Size	In. Lbs.	Shaft size	N-m
<b>MINI SERIES</b>	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
<b>STANDARD SERIES</b>	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
<b>LARGE SERIES</b>	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 56 : KEYLESS BUSHING INSTALLATION INSTRUCTION

**18.3 SPEED REDUCTION GEARBOX**

Make.....David Brown  
 Type.....Series C Radicon helical worm gear  
 Unit size.....C0320  
 Ratio.....140 : 1

**Lubrication**

Oil grade.....6G (polyglycol synthetic)  
 Temperature range.....14°F to 86°F  
 Quantity.....0.6 Litres  
 Oil change.....Lubricated for life

**18.4 LINEAR POSITION TRANSDUCER**

Make .....UniMeasure  
 Type .....Series JX-PA  
 Measurement range .....40"  
 Sensing device.....Precision potentiometer  
 Wire rope..... 0.018" Ø Nylon jacketed stainless steel  
 Life .....250,000 full stroke cycles  
 Input impedance.....1000Ω ±15%  
 Output impedance .....0 to 1000Ω  
 Operating temperature.....-25°C to 60°C  
 Operating humidity.....100% R.H.

**18.5 RIGHT ANGLE DRIVE**

Make.....Curtis Machine  
 Type.....Series 200M, spiral bevel gear  
 Ratio for lower right angle drive.....1.5 : 1  
 Ratio for upper right angle drive.....1 : 1

**Lubrication**

Oil grade.....AGMA 5EP  
 Quantity.....Refilling cap level  
 Oil change.....Every three years  
 (If grease .....Lubricated for life)

**18.6 ELECTRIC MOTOR**

Make.....Leeson  
 Type .....Permanent magnet 24 volts DC  
 Power .....1/3 HP  
 RPM.....1800  
 Frame.....Nema S56C

**18.7 LOGIC CONTROLLER**

The heart of this unit is constituted of a micro-controller with a permanent memory in which the tasks of the function are implanted.

**TECHNICAL AND PHYSICAL DESCRIPTION**

- 12 "High Side" inputs with high impedance, filtered and protected against peak voltage;
- 6 outputs "High Side" of continuous 2A with protection against spike voltage peaks produced by inductive loads;
- 2 high side output, relay device, 10A continuous;
- Operating supply voltage between 7 and 28 volts;
- Reverse polarity protection included;
- 1 analog input with its own voltage reference;
- 1 push-button for factory software set-up;
- Operating temperature range -40°C to 80°C;
- A witness led on each input indicates that this input is activated, the led works even if the module is not powered;
- A witness led on each output indicates that this output is activated;
- A witness led indicates that the module is in process (PWR);
- A witness led indicates when the module has a problem (ERR);
- A test program is incorporated to the module to ease its maintenance;
- Communication protocol: SAE J1708 (RS-485).

**18.8 MOTOR CONTROLLER**

This unit is a high pulsed current drive with PWM variable speed control. It is in communication with the logic controller.

**TECHNICAL AND PHYSICAL DESCRIPTION**

- Power supply range: 15V DC up to 28V DC;
- Maximum output current drive: 30A (4 minutes continuous), 60A peak repetitive (20KHz);
- Variable speed capability with PWM drive;
- Hardware overcurrent protection: 40A;
- Programmable software overcurrent protection;
- Overheat protection: +85°C;
- Motor direction activity, overcurrent and network activity status LED;
- Communication protocol: SAE J1708 (RS-485);
- Operating temperature range: -40°C to 70°C.

**18.9 SAFETY CONTROLLER**

This module is used to prevent unexpected actions from the logic controllers. This controller uses relays to interlock specific functions of the slide-out.

- Power supply range: 14.4 Vdc up to 32 Vdc;
- 5 relays series VF4, PC Board type;
- Coil 12 volts DC;
- 40 A continuous contact rating @ +85°C.

**18.10 ELECTRICAL CONTROL SWITCH**

Type.....Momentary contact  
(ON-OFF-ON)  
Rating.....1A @ 28V DC

**18.11 CONVERSION CHECKLIST**

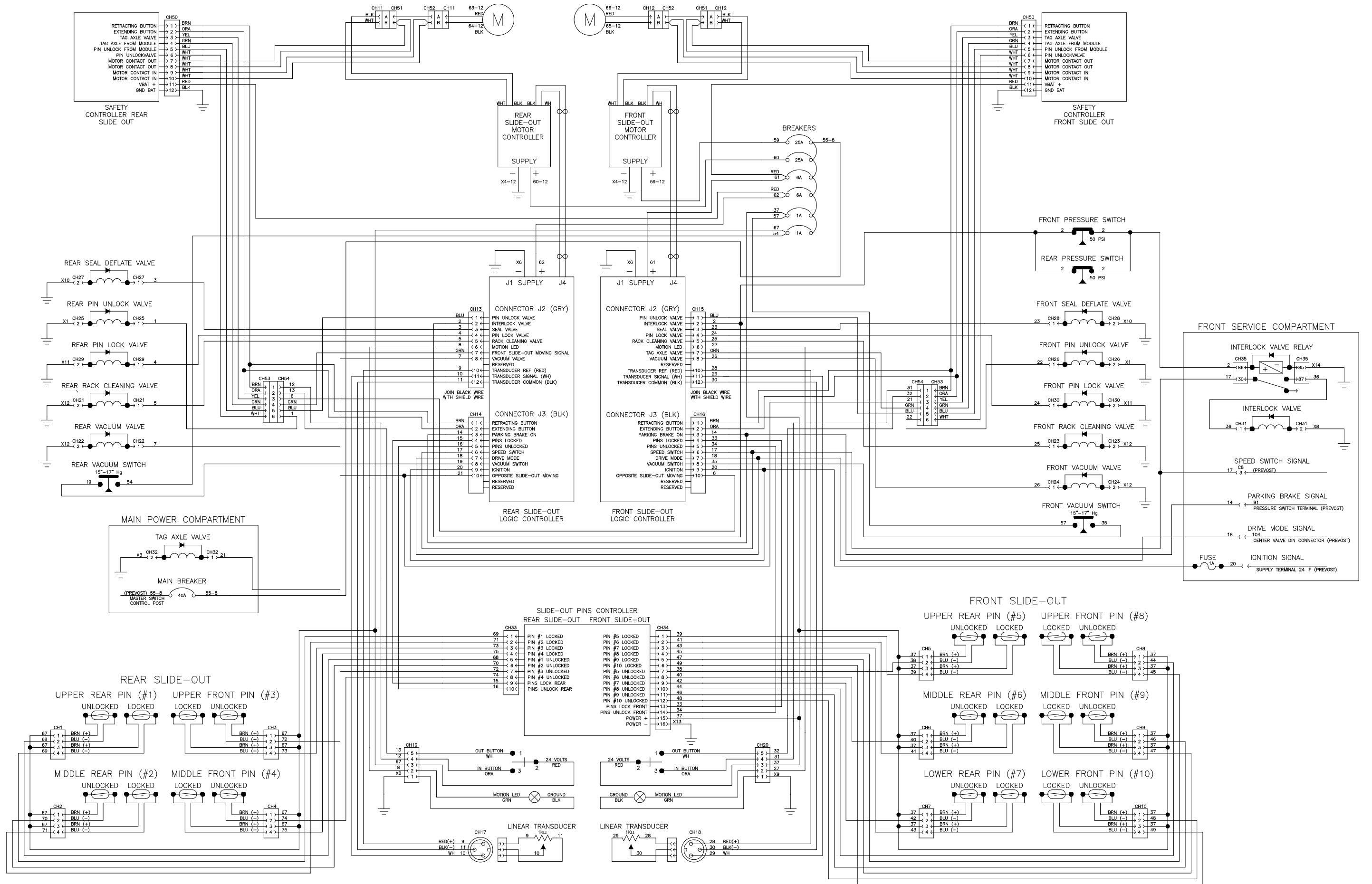
The converter should check these points before closing the walls covering the locking pins, the roof reinforcing rod and the pinions:

- Make sure all the pins are locking and unlocking properly by checking the pin sensor switches, the logic controller LED or the pin state indicator module (see figure 41 and figure 52).
- Check that the front slide-out exterior panels are parallel with the vehicle panels when retracted. If not, re-synchronize the upper shaft pinion.
- Make sure the slide-out does not move when locking or unlocking the pins. If necessary, readjust the locking pins.
- Make sure the pin receptacle plastic caps are present and properly installed.
- Check that the slide-out is straight when completely extended, and that it leans against all inner stoppers.
- 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.
- Make sure the front slide-out lower member deflection is within 1/4". If not, redistribute the slide-out load.

- Check the whole slide-out mechanism good functioning. The slide-out should retract and extend smoothly without vibration.

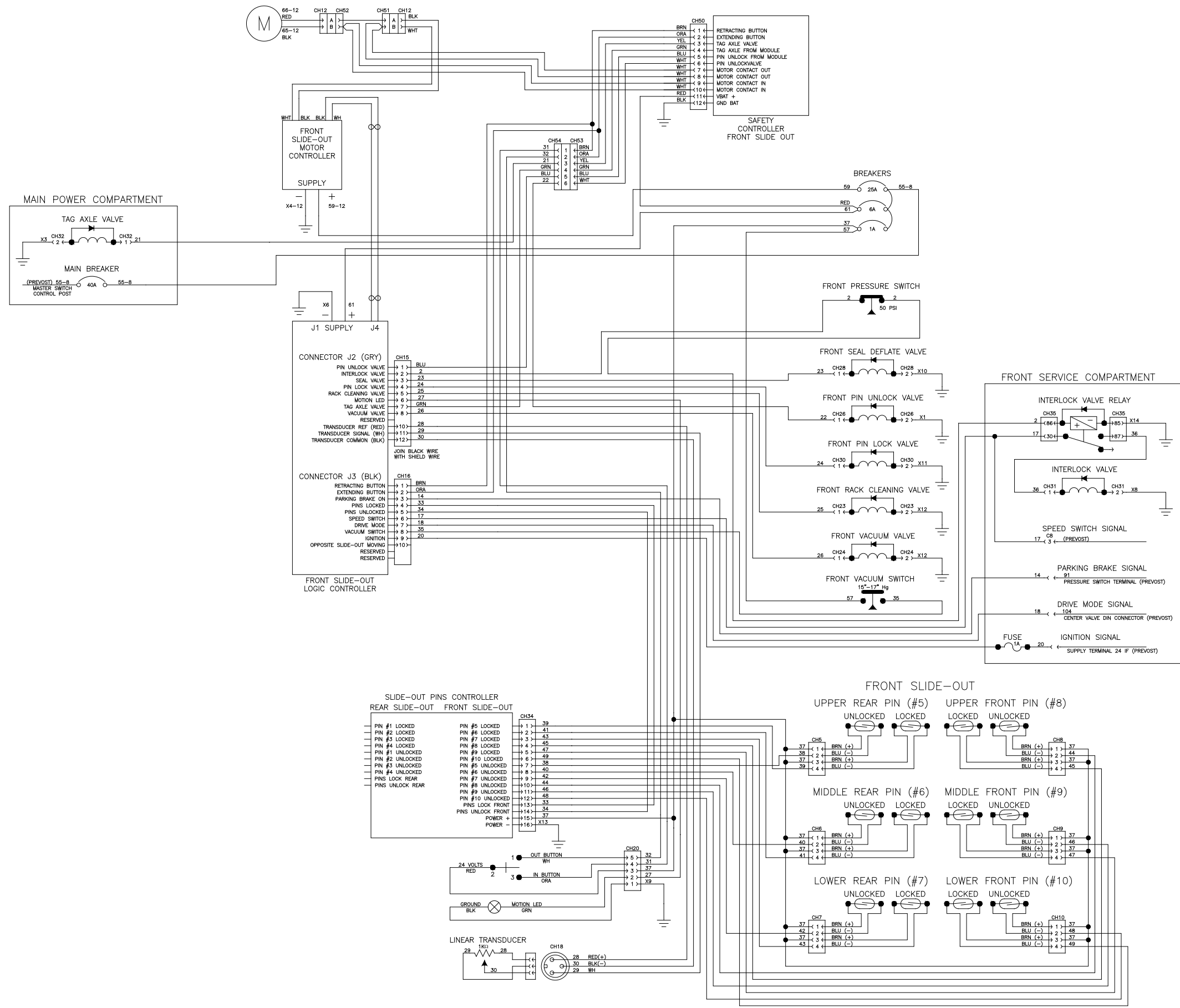
Final check:

- 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 between 7 and 10 psi.
- Clean the upper racks of any sand, dust or other foreign material. Check the rack cleaning air nozzle alignment and proper functioning.



**XL2 DOUBLE SLIDE-OUT ELECTRIC DIAGRAM (RETROFIT)**  
**EFFECTIVE FROM SERIAL NUMBER Y-7450 TO 1-7718**  
**AND FROM 1-7724 TO 1-7773**  
 (ALL WIRES ARE 18 AWG EXCEPT WHEN SPECIFIED)



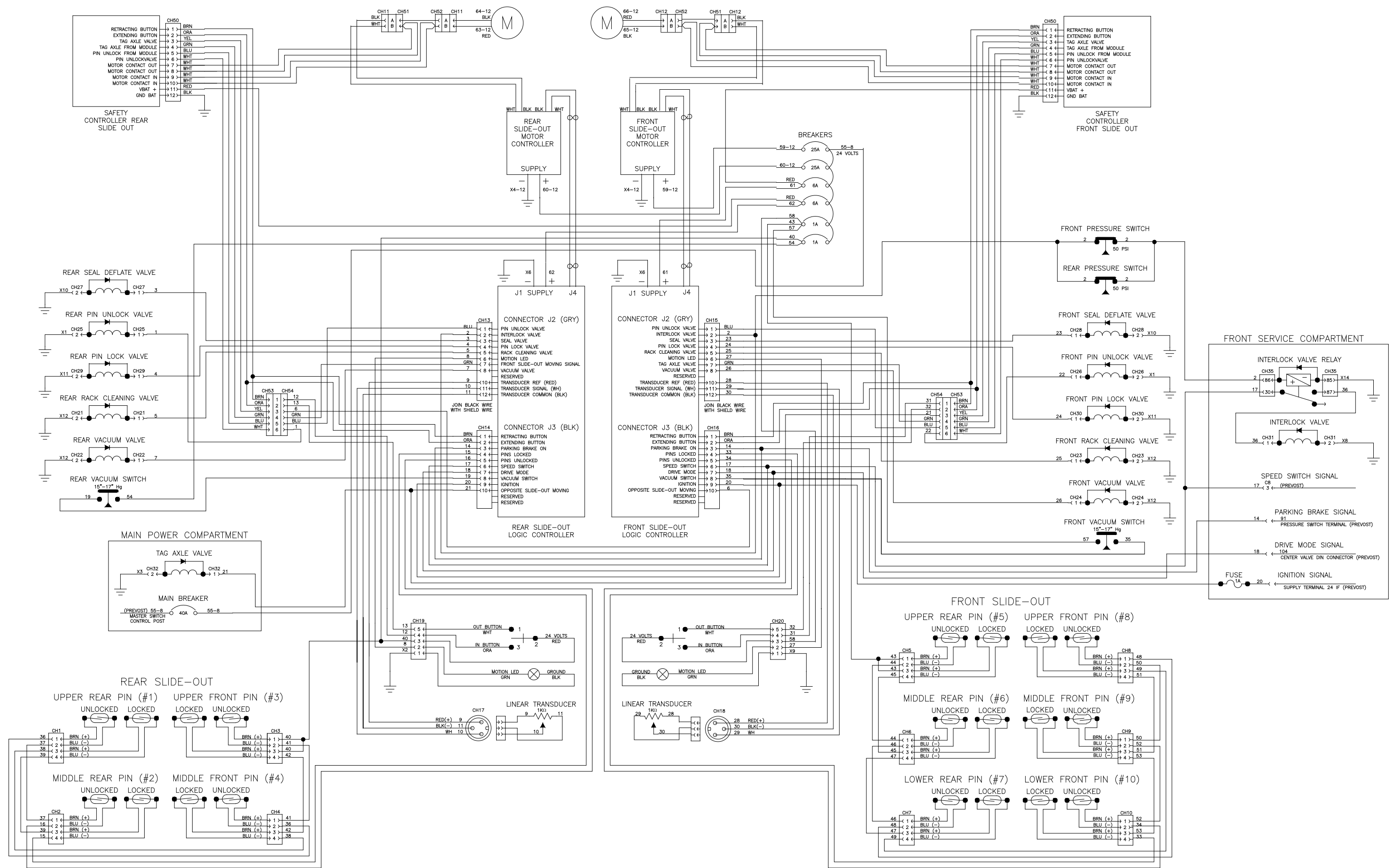


**XL2 SINGLE SLIDE-OUT ELECTRIC DIAGRAM (RETROFIT)**

EFFECTIVE FROM SERIAL NUMBER Y-7450 TO 1-7718

AND FROM 1-7724 TO 1-7773

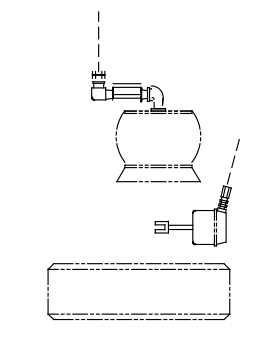
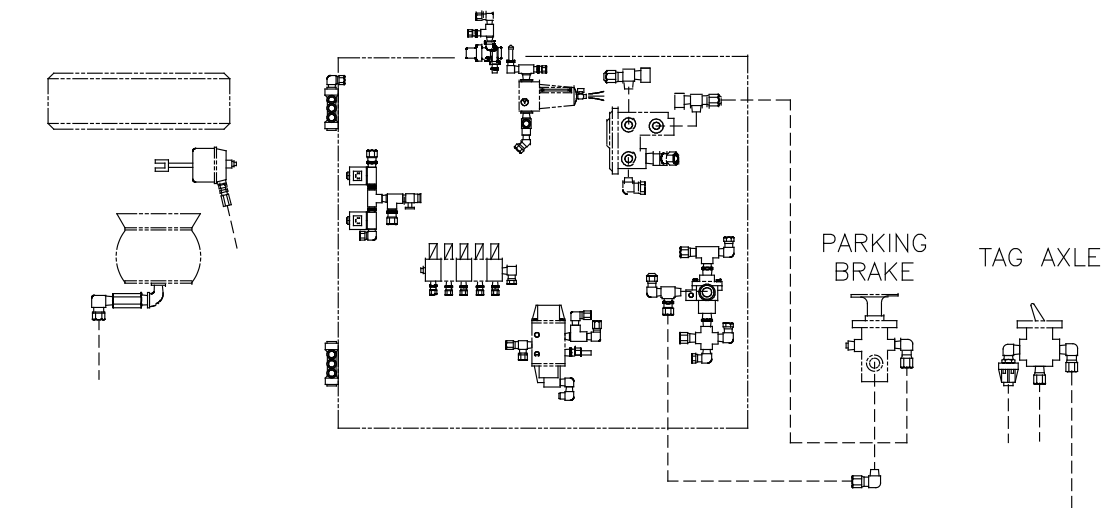
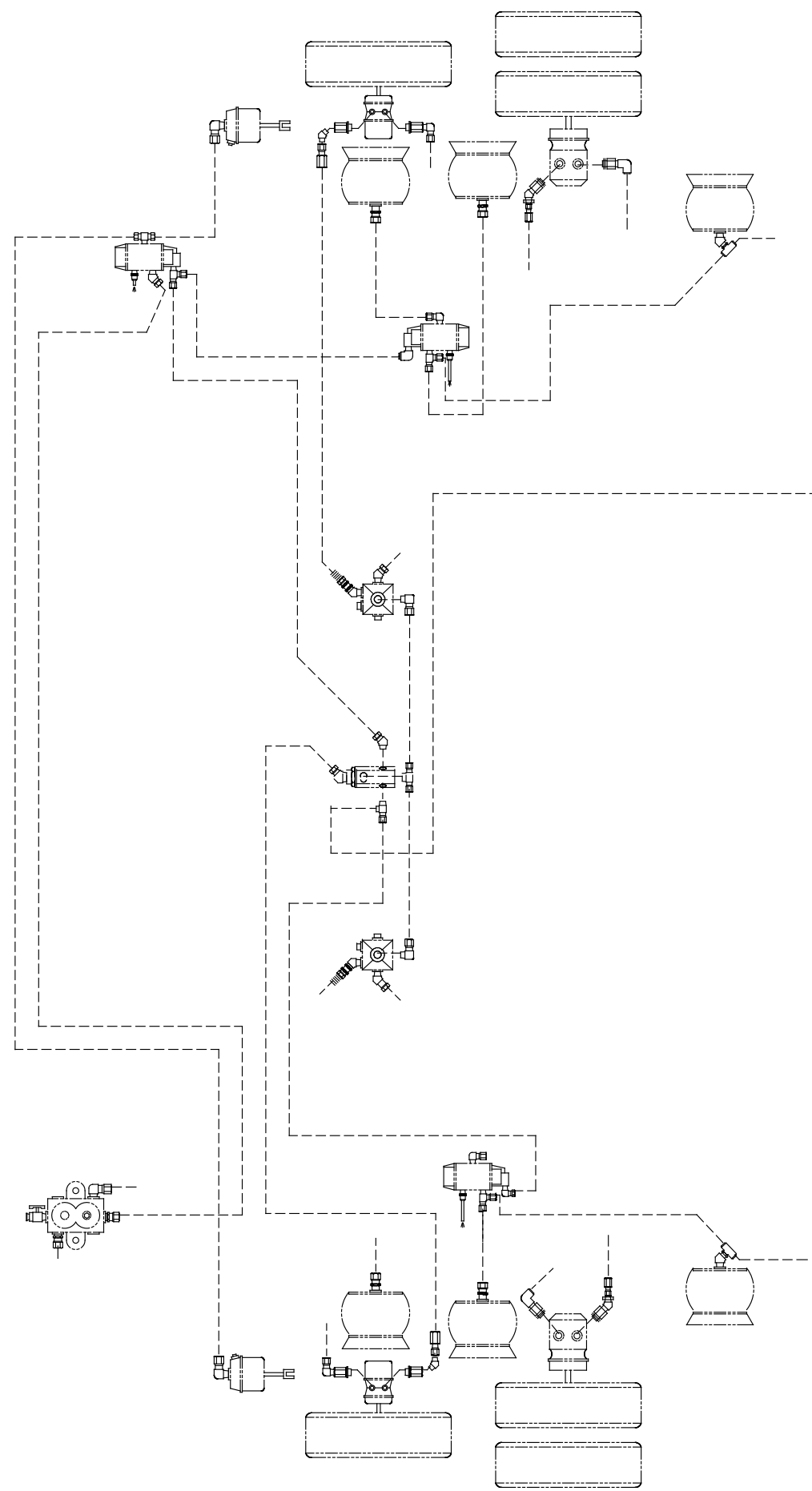
(ALL WIRES ARE 18 AWG EXCEPT WHEN SPECIFIED)



**XL2 DOUBLE SLIDE-OUT ELECTRIC DIAGRAM (RETROFIT)**

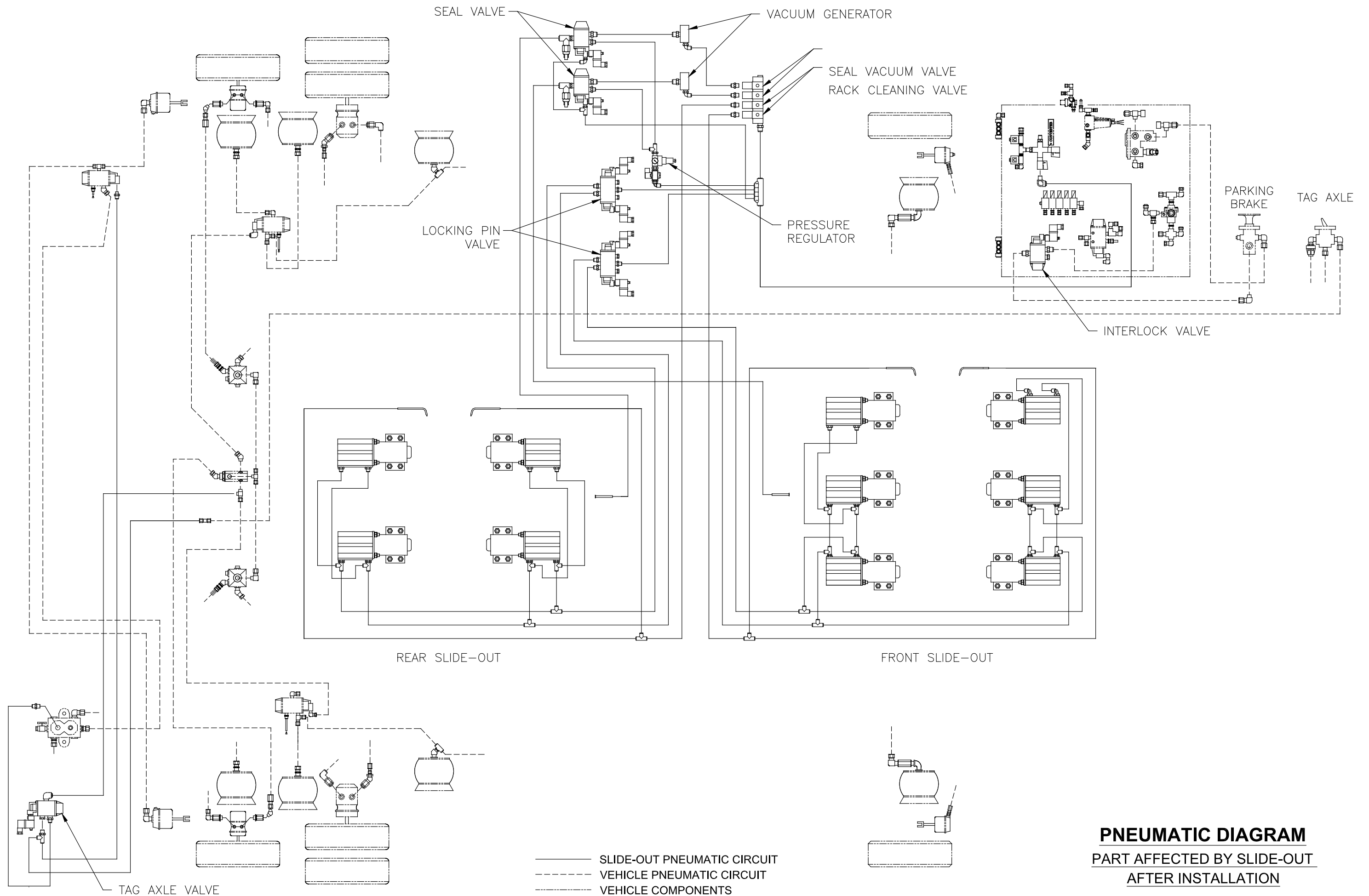
**EFFECTIVE FROM SERIAL NUMBER Y-7003 TO Y-7446**

(ALL WIRES ARE 18 AWG EXCEPT WHEN SPECIFIED)



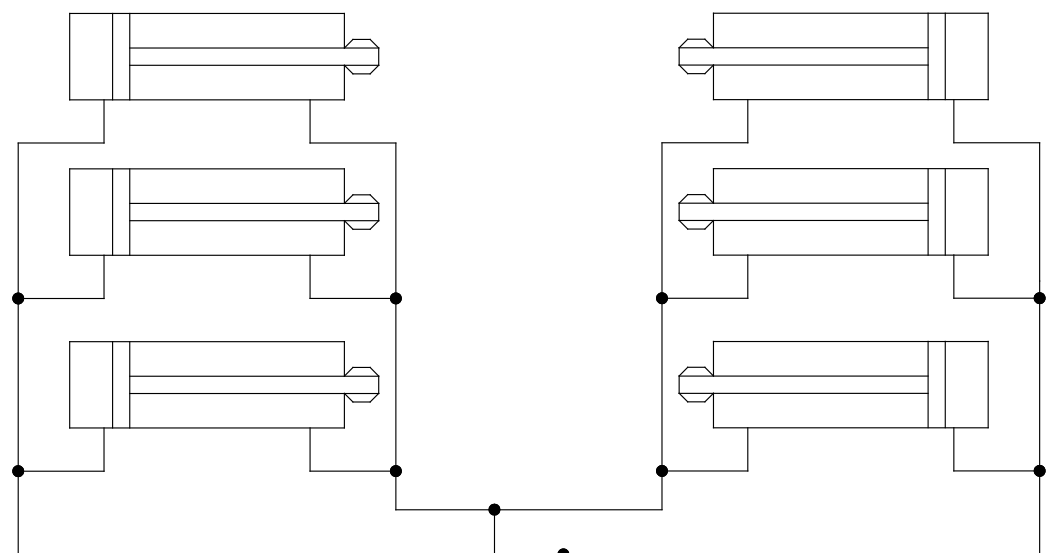
- - - - - VEHICLE PNEUMATIC CIRCUIT  
 \_\_\_\_\_ VEHICLE COMPONENTS

**PNEUMATIC DIAGRAM**  
**PART AFFECTED BY SLIDE-OUT**  
**BEFORE INSTALLATION**

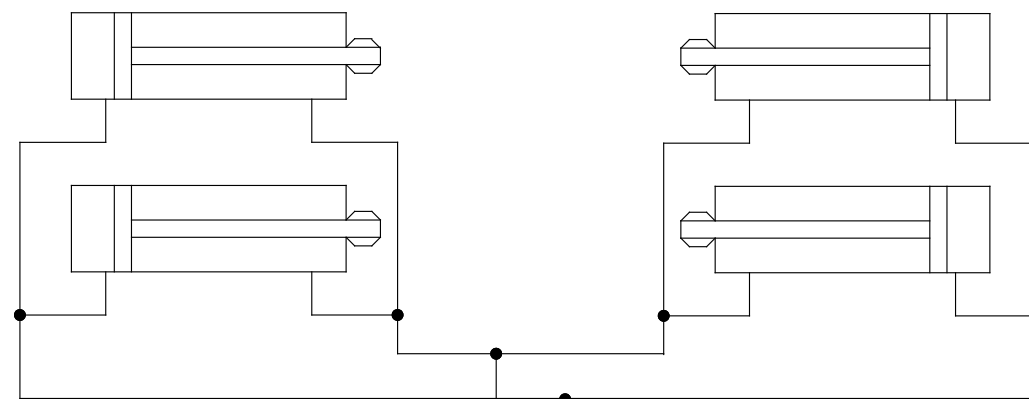


**PNEUMATIC DIAGRAM**  
 PART AFFECTED BY SLIDE-OUT  
 AFTER INSTALLATION

FRONT SLIDE-OUT LOCKING PINS



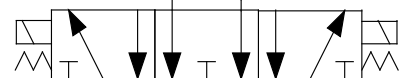
REAR SLIDE-OUT LOCKING PINS



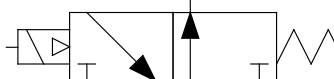
FRONT SLIDE-OUT PIN VALVE



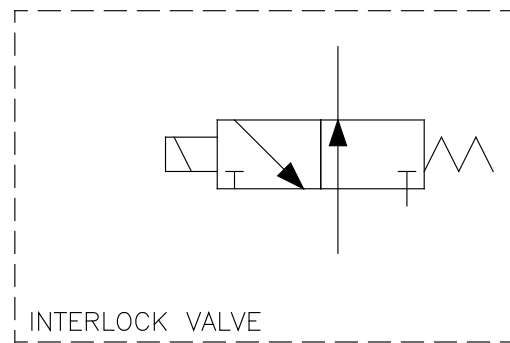
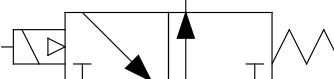
REAR SLIDE-OUT PIN VALVE



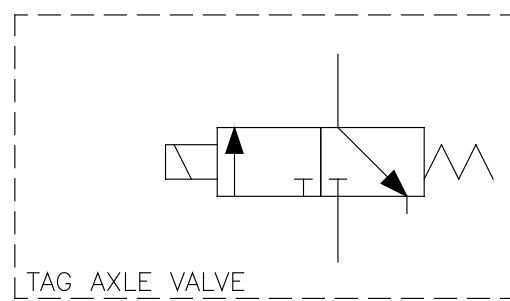
FRONT SLIDE-OUT SEAL VALVE



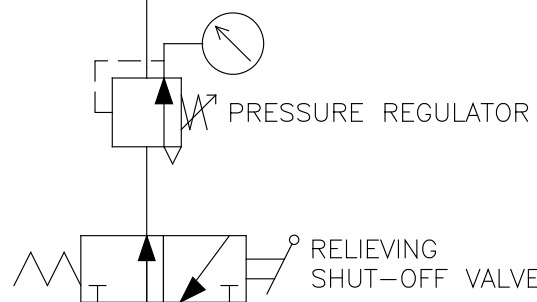
REAR SLIDE-OUT SEAL VALVE



INTERLOCK VALVE



TAG AXLE VALVE



PRESSURE REGULATOR

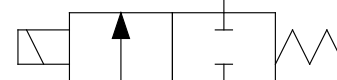
RELIEVING SHUT-OFF VALVE

AIR PRESSURE INLET

FRONT SLIDE-OUT RACK CLEANING VALVE



REAR SLIDE-OUT RACK CLEANING VALVE



FRONT SLIDE-OUT SEAL VACUUM VALVE



REAR SLIDE-OUT SEAL VACUUM VALVE



REAR SLIDE-OUT SEAL VACUUM GENERATOR

FRONT SLIDE-OUT SEAL VACUUM GENERATOR

4 VALVES MANIFOLD

**XL2 PNEUMATIC SCHEMATIC DIAGRAM**