

Date	Expiration	Release	Page
11.2018	11.2020	1	1(31)

First Release

11-05-2018

BITZER A/C COMPRESSOR SHAFT SEAL REPLACEMENT

Prevost vehicles

DESCRIPTION

On the vehicles affected by this bulletin, the Bitzer compressor shaft seal must be replaced. Additionally, the compressor oil must be renewed and the oil quantity increased by 10oz (300ml).

MODEL YEAR(S) AND VEHICLES INVOLVED

NOTICE TO SERVICE CENTERS		
Verify vehicle eligibility by checking warranty bulletin status with SAP or via ONLINE WARRANTY SYSTEM available on Service / Warranty tab of Prevost website.		
Model	VIN	Fleet Number
X3-45 Commuter Model Year : 2015 - 2016	From 4RKG3349X <u>E</u> 973 7087 up to 4RKG33491 <u>G</u> 973 7299 incl.	From 2578 up to 2789 , incl.
This bulletin does not necessarily apply to all the above-mentioned vehicles, some vehicles may have been modified before delivery.		

MATERIAL NEEDED

Order **Kit SP18-307** which includes the following parts:

Part No.	Description	Qty
950509	Compressor shaft seal kit	1
950544	Gasket (for compressor strainer/filter)	1
950236	OIL, POE 134A	1

Other parts that may be required:

Part No.	Description	Qty
950968	Kit Sealing	1
950332	Filter dryer	1
680038	Medium Strength Thread Locker (blue)	1
680098	Thread Sealer PTFE	1

NOTE

Material can be obtained through regular channels.

Date	Expiration	Release	Page
11.2018	11.2020	1	2(31)

Tools list:

TOOLS	
1) Refrigerant scale	
2) A/C recovery pump and fittings	
3) A/C service valve wrench	
4) 134A refrigerant recovery bottle	
5) 134A A/C gauges	
6) 2.5 mm Allen T-handle	
7) ½ inch air impact wrench	
8) A/C pulley removal tool #680888	
9) Large adjustable wrench	

	Date 11.2018	Expiration 11.2020	Release 1	Page 3(31)
10) 1/2 inch long ratchet				
11) 3 mm Allen key socket				
12) 6 mm Allen key socket (long)				
13) 3/8 th inch ratchet				
14) 15/16 th half inch hex socket				
15) 13 mm socket				
16) 14 mm socket				
17) 15 mm socket				
18) 3/8 th inch torque wrench				
19) Krikit belt tension gauge				

	Date 11.2018	Expiration 11.2020	Release 1	Page 4(31)
20) Oil compressor oil injector tool / oil pump				
21) High pressure / temperature grease				
22) Medium Strength Thread Locker (blue)				
23) Pipe/Thread Sealer - PTFE				
24) Torque seal - Tamper proof indicator				

PROCEDURE



DANGER

Park vehicle safely, apply parking brake, stop the engine. Prior to working on the vehicle, set the ignition switch to the OFF position and trip the main circuit breakers equipped with a trip button. *On Commuter type vehicles, set the battery master switch (master cut-out) to the OFF position.*

Date	Expiration	Release	Page
11.2018	11.2020	1	5(31)

PART 1

REFRIGERANT RECOVERY



CAUTION

This part of the procedure must only be performed by a certified HVAC Technician.

1. Weight the refrigerant recovery bottle (figure 1).
 - Zero the scale.
 - Put the recovery bottle on the scale.
 - Take note of the bottle weight.

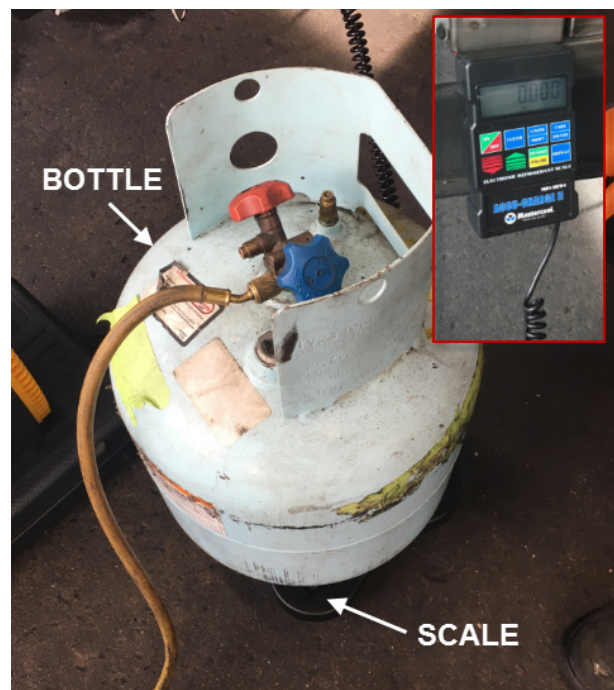


FIGURE 1: WEIGHTING THE RECOVERY TANK

2. Isolate the compressor from the system.
 - Remove the black protective cap from both the high and low shutoff valves (figure 2).
 - With a square service valve wrench, front seat both valves (screw in, see figure 3).

*Do not over torque the valves.
21 lb-ft (28 Nm) max.*

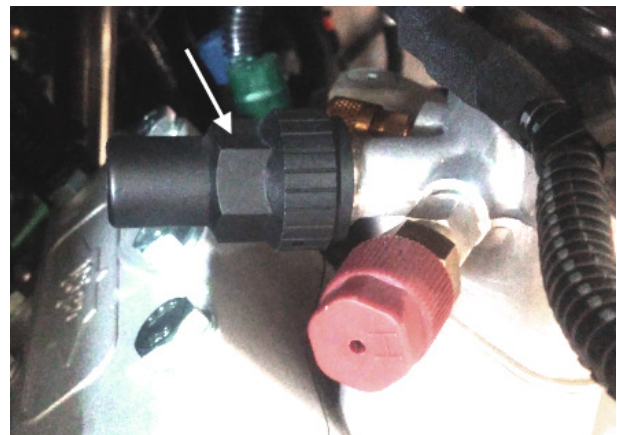
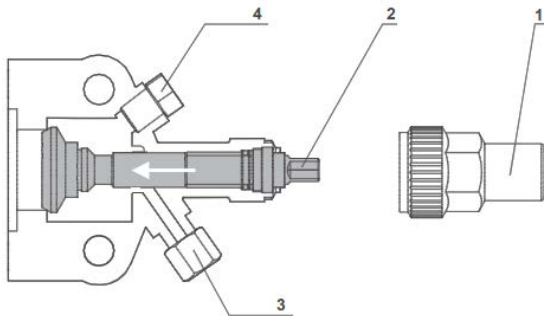


FIGURE 2: SHUTOFF VALVE PROTECTIVE CAP

Date	Expiration	Release	Page
11.2018	11.2020	1	6(31)

FRONT SEATED SHUT-OFF VALVE



- 1 Sealing cap
- 2 Stem
- 3 Service port (shut off when backseated)
- 4 Measurement connection



FIGURE 3: FRONT SEATING SHUTOFF VALVES (LOW PRES. SHOWN)

3. Connect the recovery station to the compressor and tank.
 - Connect the AC gauges low-pressure side (blue hose and gauge) to the compressor low pressure service port (figure 4) (remove blue protective cap).

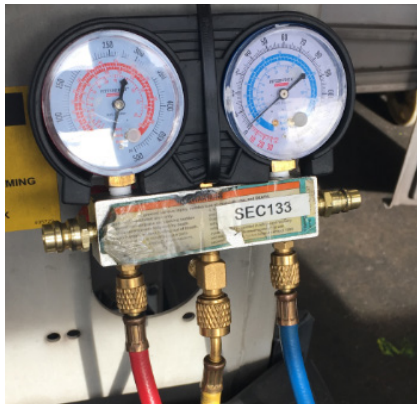


FIGURE 4: GAUGE CONNECTION (LOW PRESS. SIDE)

- Connect the AC gauges high-pressure side (red hose and gauge) to the compressor high pressure service port (figure 5) (remove red protective cap).
- Connect the gauges yellow hose to the recovery station inlet connection (figure 6).

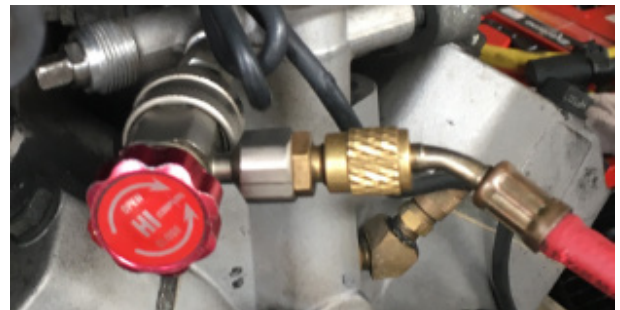


FIGURE 5: GAUGE CONNECTION (HIGH PRESS. SIDE)

Date	Expiration	Release	Page
11.2018	11.2020	1	7(31)

- Connect the outlet connection of the recovery station to the liquid (blue) connection of the recovery tank, see (figure 7).

Make sure that all valves are at the closed position (AC gauges, tank and recovery station).



FIGURE 6: RECOVERY STATION CONNECTIONS



FIGURE 7: TANK CONNECTION (LIQUID)

4. Start the recovery process.

- Open both gauge valves (figure 8 & figure 9).
- Open the inlet and outlet connection of the recovery station (figure 10).
- Open the tank valve.
- Start the recovery station and let it run until gauge reading is equal to ambient atmospheric pressure (run time is estimated to approximately 45min).
- Weight the tank at the end of the recovery process and compare to the original weight (close the tank valve).

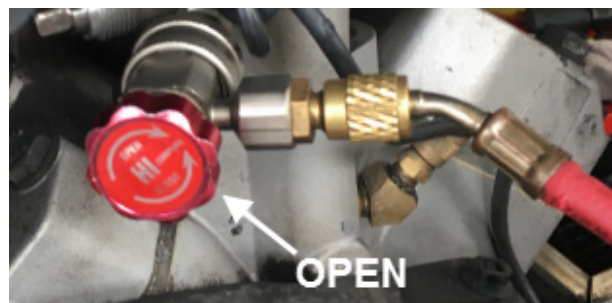


FIGURE 8: GAUGE VALVE OPENED (HIGH PRESSURE)

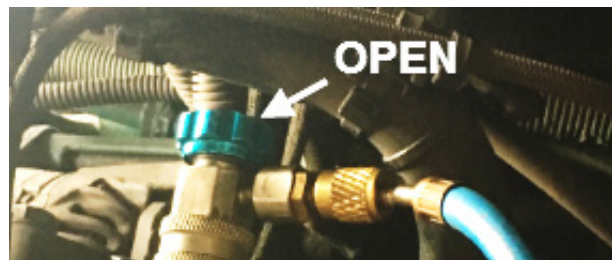


FIGURE 9: GAUGE VALVE OPENED (LOW PRESSURE)

Date	Expiration	Release	Page
11.2018	11.2020	1	8(31)



This measurement is the amount of refrigerant that will need to be put back in the compressor at the end of this procedure.

- Remove the gauges from the compressor; do not back seat the compressor shutoff valves.

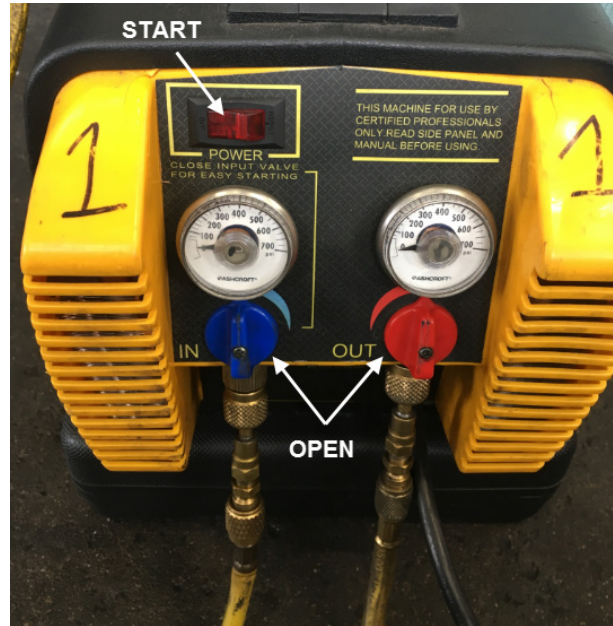


FIGURE 10: RECOVERY STATION OPEN VALVES

PART 2

AC Clutch removal

1. Remove both AC compressor drive belts.

- Unscrew the AC belt tensioner and remove it from the vehicle (figure 11).
- Slide belts off the compressor and crankshaft pulleys (figure 12).



FIGURE 11: REMOVE BELT TENSIONER BOLT

Date	Expiration	Release	Page
11.2018	11.2020	1	9(31)



FIGURE 12: REMOVED TENSIONER & BELTS

- Using a large adjustable wrench to hold the hexagonal part of the clutch rotor, remove the central M12 clutch mounting screw (figure 13).

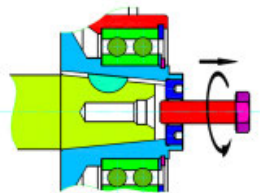


FIGURE 13: REMOVE M12 BOLT

- Screw extractor tool #680888 in the center of the clutch (figure 14).

Do not use a standard M16 screws, doing so may damage the shaft end bore or threads for the M12 screw.



FIGURE 14: EXTRACTOR TOOL IN PLACE

Date	Expiration	Release	Page
11.2018	11.2020	1	10(31)

4. Using a large adjustable wrench to hold the hexagonal part of the clutch rotor, screw the extractor tool to pull out the clutch from the compressor shaft (figure 15).

Do not use an impact wrench

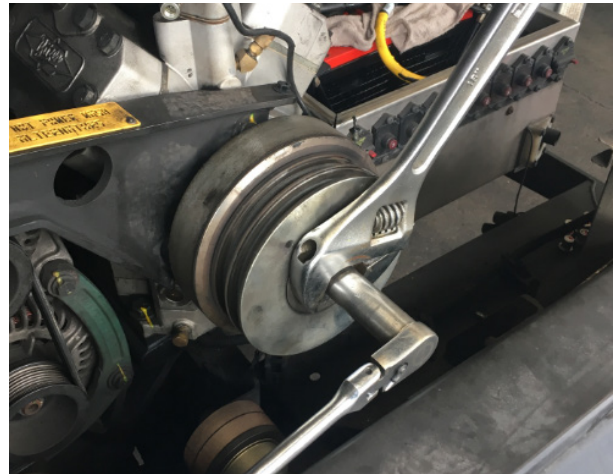
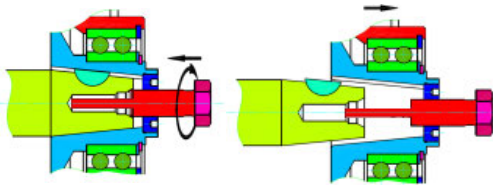


FIGURE 15: REMOVING THE CLUTCH

5. Remove the clutch coil from the compressor
 - Disconnect the coil
 - Remove the four M8 mounting screws using a long tip 6mm Allen hex socket (figure 16).
 - Remove coil from compressor (figure 17).

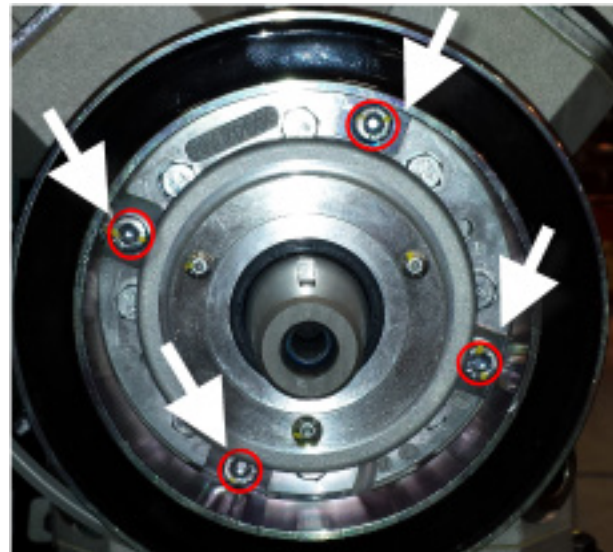


FIGURE 16: COIL MOUNTING BOLTS



FIGURE 17: CLUTCH & COIL REMOVED

Date	Expiration	Release	Page
11.2018	11.2020	1	11(31)

PART 3

SEAL REPLACEMENT

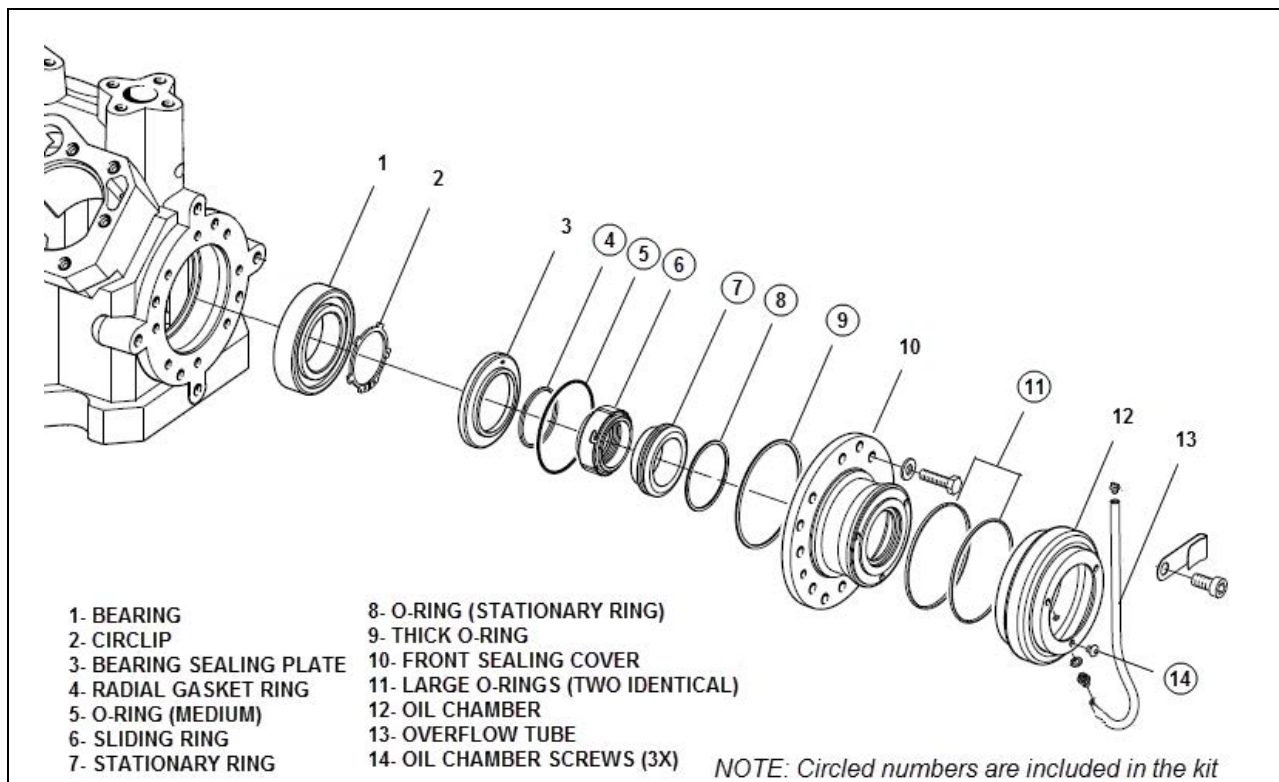


FIGURE 18: BITZER COMPRESSOR FRONT COMPONENTS (USE THIS DRAWING FOR PART IDENTIFICATION)



FIGURE 19: BITZER COMPRESSOR SHAFT SEAL KIT COMPONENTS

Date	Expiration	Release	Page
11.2018	11.2020	1	12(31)

1. Remove the oil chamber (# 12) and the overflow tube (# 13) from the compressor by unscrewing the three M5 mounting screws (# 14) (figure 21).

Oil chamber and tube may be partially filled with compressor oil, dispose properly.

- Discard oil chamber mounting screws and O-ring (# 11) inside the chamber (figure 20).
- Clean the inside of the oil chamber.



FIGURE 20: REMOVING OIL CHAMBER SCREWS

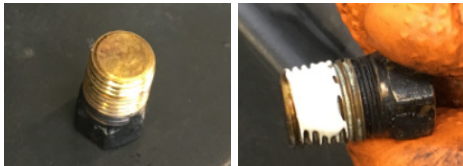


FIGURE 21: REMOVING OIL CHAMBER

Date	Expiration	Release	Page
11.2018	11.2020	1	13(31)

2. Drain the oil from the compressor.

- Remove both left and right drain plugs and dispose of the oil in a graduated container (figure 22 & figure 23)
- Note the amount of oil drained from the compressor.
- Clean the threads of both drain plugs and apply a coat of PTFE pipe sealant to the threads.



- Clean the drain holes and reinstall the drain plugs.

TORQUE: 15-17 lb-ft (20-23 Nm)



FIGURE 22: OIL DRAIN (1)



FIGURE 23: OIL DRAIN (2)

Date	Expiration	Release	Page
11.2018	11.2020	1	14(31)

3. Remove the compressor front sealing cover.

- Remove the 8 screws holding the cover to the compressor (figure 24)
- Slide the cover out-of-the-way, taking care not to nick or scratch the compressor shaft (figure 25).

TIP: Screw two of the mounting screws in the cover threaded holes to disengage the cover from the compressor.



- Discard both cover O-Rings (front and rear, # 9 and 11).
- Clean both front cover and compressor mating surfaces and threads.



FIGURE 24: SEALING COVER REMOVAL



FIGURE 25: REMOVED SEALING COVER EXPOSING SLIDING RING

Date	Expiration	Release	Page
11.2018	11.2020	1	15(31)

4. Remove the stationary ring and O-Ring inside the front part of the sealing cover (# 7 and 8).

- Slide the stationary ring and O-Ring assembly out of the cover (figure 26).
- Discard stationary ring and O-Ring.



FIGURE 26: STATIONARY RING REMOVAL

5. Remove the compressor sliding ring (# 6).

- Using a long 2.5mm hex wrench (Allen T-handle), unscrew the two set screws securing the sliding ring to the compressor shaft.
- Remove and discard the sliding ring (and set screws) (figure 27).

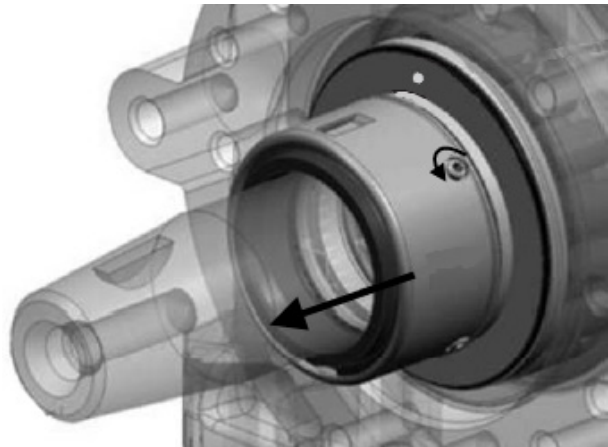


FIGURE 27: SLIDING RING REMOVAL

6. Remove the bearing sealing plate from the compressor (figure 28).

- Pull the sealing plate off (# 3).
- Remove and discard sealing plate O-Ring (# 5).
- Clean the sealing plate prior to reassembly.



FIGURE 28: BEARING SEALING PLATE

Date	Expiration	Release	Page
11.2018	11.2020	1	16(31)

7. Replace the slit radial gasket ring located behind the bearing sealing plate (# 4).
 - Remove and discard the old ring just before the circlip # 2 (figure 29).
 - Slightly lubricate the new ring with compressor oil.
 - Install the new ring in the groove of the compressor shaft (figure 30).

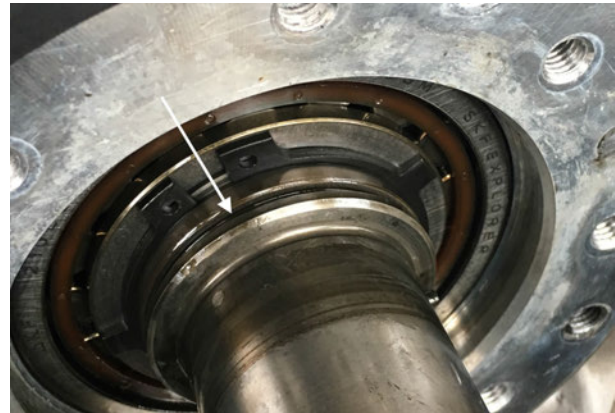
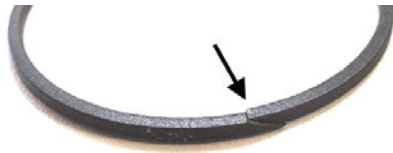


FIGURE 29: RADIAL GASKET RING LOCATION



FIGURE 30: NEW RADIAL GASKET RING IN PLACE

8. Reinstall the bearing sealing plate on the compressor (figure 31).
 - Install the O-Ring (#5) on the bearing cover. Do not oil this O-Ring.
 - Slide back in place the sealing plate.

IMPORTANT: The bearing sealing plate oil hole must be on top (12 O'clock position).

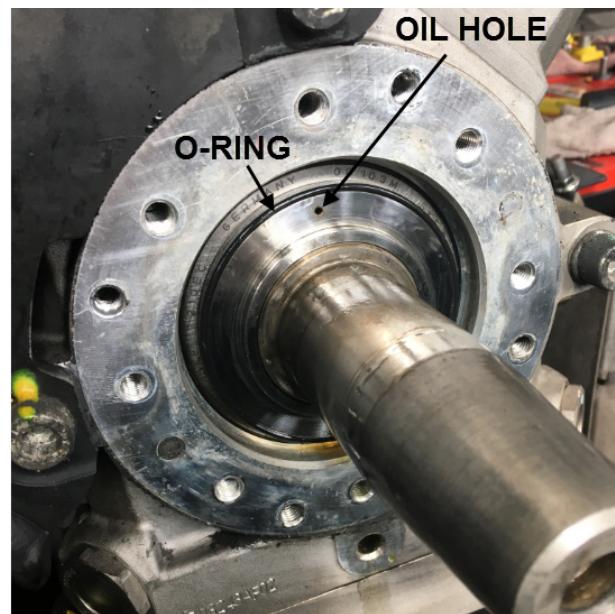


FIGURE 31: BEARING SEALING PLATE O-RING & OIL HOLE LOCATION

Date	Expiration	Release	Page
11.2018	11.2020	1	17(31)

9. Install the new sliding ring on the compressor shaft.

- Lubricate the inner of the new sliding ring with fresh compressor oil.



- Push the sliding on the compressor shaft up to the shaft shoulder (figure 32).
- Make sure that the shaft pin engages in one of the sliding ring recesses (figure 33).
- Secure the sliding ring to the shaft with the two set screws (figure 34). *Thread locker is pre-applied to the set screw threads.*

TORQUE: 18 lb-in (2.5 Nm)

Push the sliding ring toward the shaft shoulder while tightening the set screws.

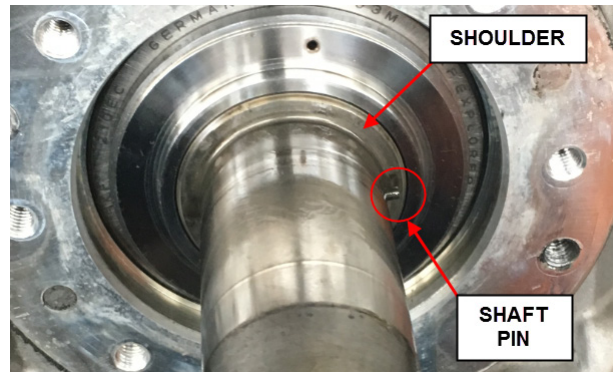


FIGURE 32: COMPRESSOR SHAFT PIN AND SHOULDER

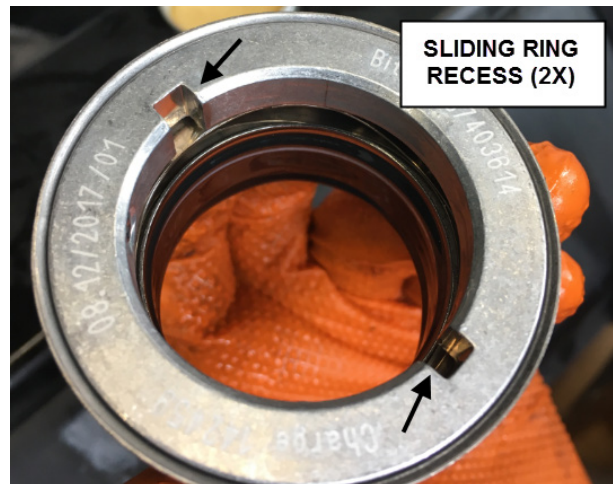


FIGURE 33: SLIDING RING RECESSES

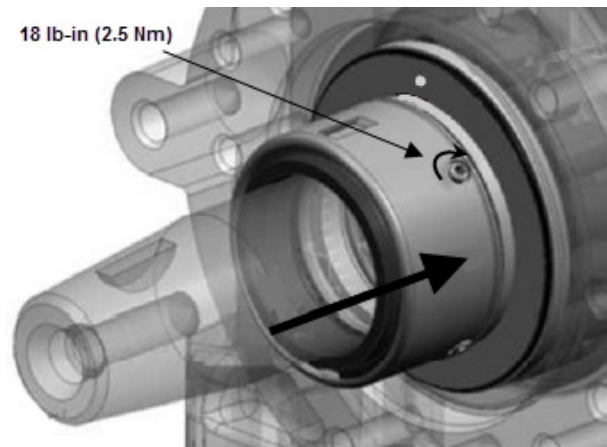


FIGURE 34: INSTALLING NEW SLIDING RING

Date	Expiration	Release	Page
11.2018	11.2020	1	18(31)

10. Install the new stationary ring in the sealing cover (figure 35).

- Lubricate the stationary ring and O-Ring with fresh compressor oil.
- Push the stationary ring in the sealing cover making sure that the O-Ring groove is pointing toward the inside of the sealing cover.

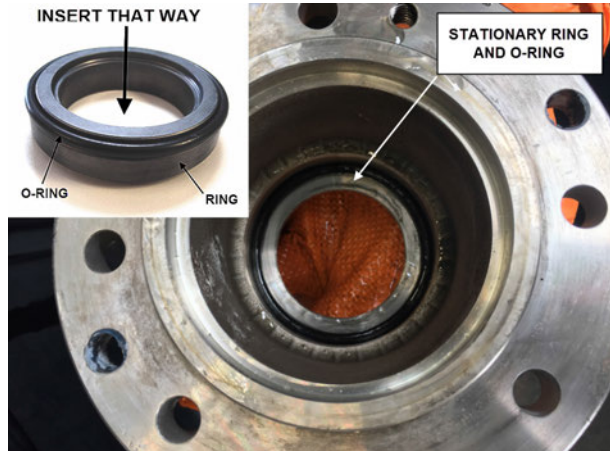
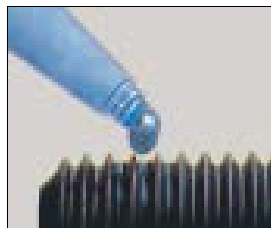


FIGURE 35: STATIONARY RING INSTALLATION IN SEALING COVER

11. Reinstall the compressor front sealing cover.

- Lubricate the thickest O-Ring in the kit with fresh compressor oil (# 9).
- Install the thick O-Ring on the backside (compressor mounting surface) of the sealing cover (figure 36).
- Also put some compressor oil to the sealing tip of the sliding ring (figure 37).
- Slide the sealing cover in position.
- Put medium strength (blue) thread locker on the screw threads and secure the cover to the compressor by uniformly (cross pattern) tightening the mounting screws (figure 38).



TORQUE: 18.5 lb-ft (25 Nm)



FIGURE 36: O-RING INSTALLATION

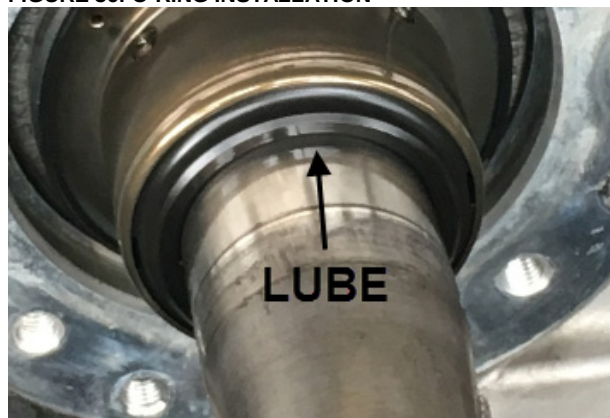


FIGURE 37: SLIDING RING AREA TO BE LUBED

- Apply a stripe of *tamper proof indicator paint* (Torque Seal) to all screw heads.



IMPORTANT: The sealing cover oil hole must be at the 1 O'clock position (figure 39).



FIGURE 38: INSTALLED FRONT SEALING COVER

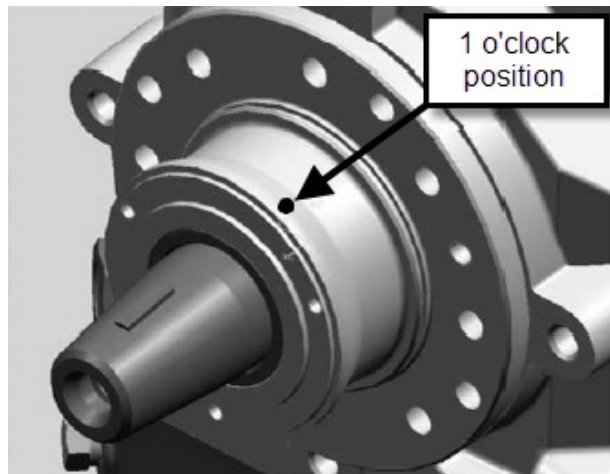


FIGURE 39: SEALING COVER OIL HOLE POSITION

12. Install a new O-Ring on the sealing cover front face (figure 40).

- Slightly lubricate the O-Ring (# 11) with compressor oil.
- Install the O-Ring in the sealing cover groove.

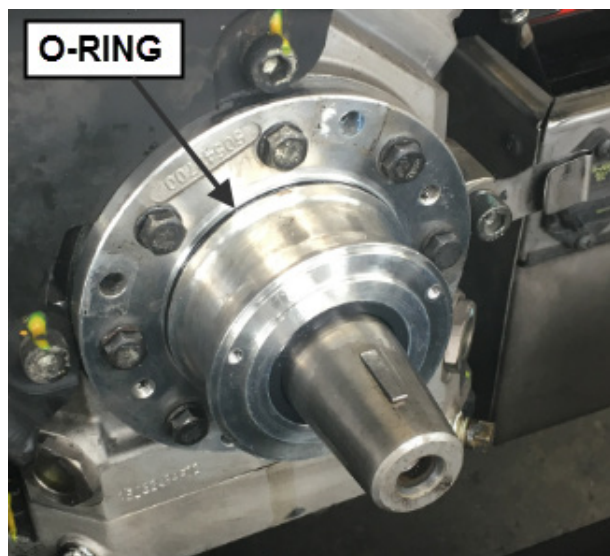


FIGURE 40: O-RING LOCATION ON SEALING COVER

Date	Expiration	Release	Page
11.2018	11.2020	1	20(31)

13. Install a similar O-Ring inside the oil chamber (figure 41).

- Slightly lubricate the O-Ring (# 11) with compressor oil.
- Install the O-Ring at the bottom of the oil chamber.

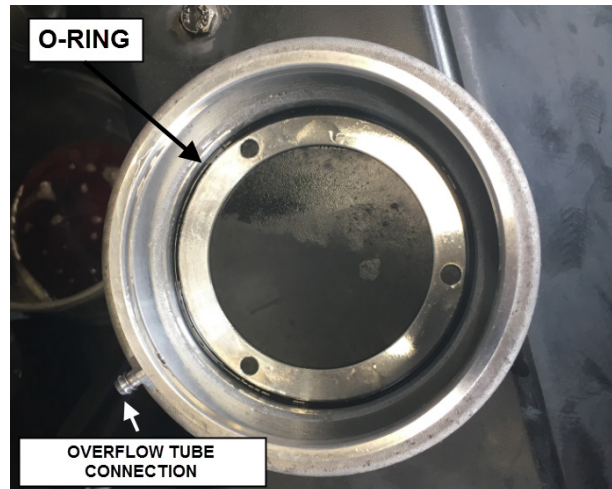


FIGURE 41: O-RING LOCATION INSIDE OIL CHAMBER

14. Reinstall the oil chamber an overflow tube.

- Slide the oil chamber in position over the sealing cover. *Make sure that both O-Rings are properly engaged* (figure 42).
- Secure the oil chamber using the 3 new supplied M5 screws (# 14). Put medium strength (blue) thread locker on the screw threads.



TORQUE: 35 lb-in (4 Nm)

- Apply a stripe of *tamper proof indicator paint* (Torque Seal) to the screw heads.



- Reinstall the overflow tube at the bottom of the oil chamber. Secure to the tube to the compressor bracket (figure 43).
- Rotate the compressor shaft several times by hand to ensure correct installation.



FIGURE 42: OIL CHAMBER INSTALLATION

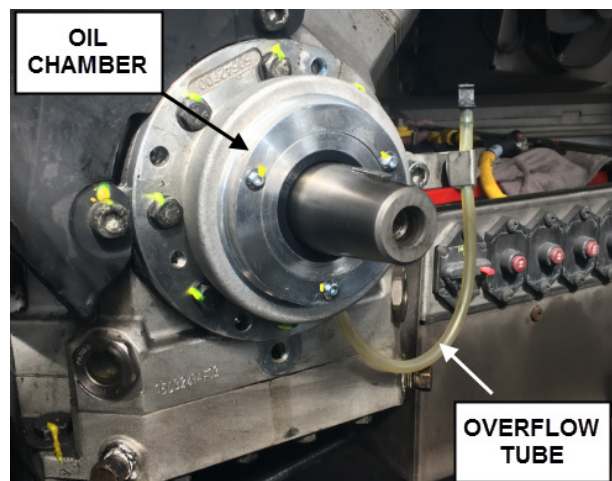


FIGURE 43: INSTALLED OIL CHAMBER & OVERFLOW TUBE

Date	Expiration	Release	Page
11.2018	11.2020	1	21(31)

PART 4

AC CLUTCH INSTALLATION

1. Make sure that the compressor shaft and the coil mounting flange are clean (free from grease or dirt) (figure 44).

- Apply a thin coat of high temperature approved assembly grease on the shaft end for easy dismounting of the clutch.



Use of Molykote G-rapid-plus or Molykote P 40 is recommended by the manufacturer

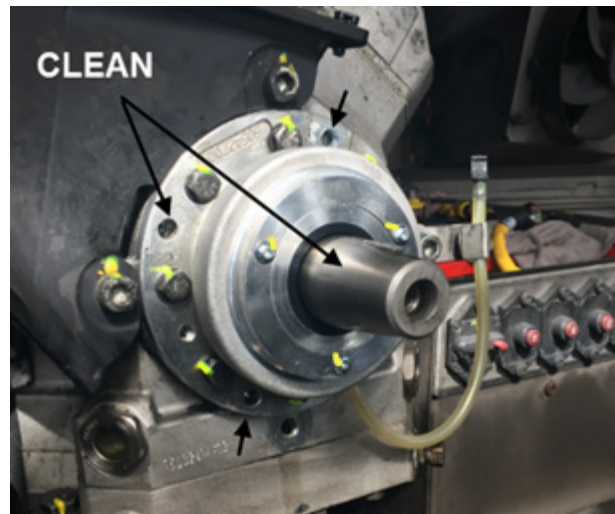


FIGURE 44: CLEANED AREA

2. Reinstall the coil (figure 45).
 - Slip the coil on the compressor flange
 - Position the coil connector at 5 o'clock (lower right position).

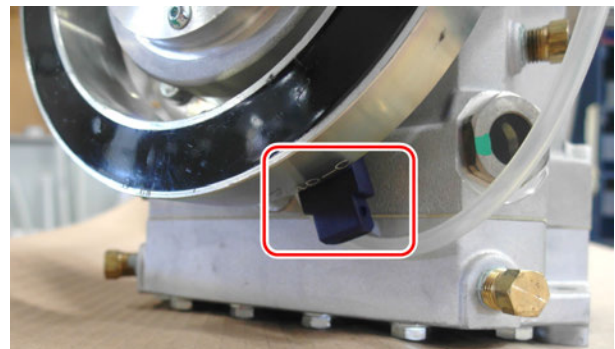


FIGURE 45: CONNECTOR LOCATION

Date	Expiration	Release	Page
11.2018	11.2020	1	22(31)

3. Fasten the coil to the compressor using the four M8 mounting screws (figure 46).

- Put medium strength (blue) thread locker on the screw threads.



- Hand tight the screws.
- Apply final torque in a cross pattern.



Coil mounting screws: 22 lb-ft (30 n-m).

- Apply a stripe of *tamper proof indicator paint* (Torque Seal) to all screw heads.



CAUTION: Pay attention to the precise seating of the coil. Improper seating may cause damage to the clutch components during operation.



FIGURE 46: INSTALLED COIL

Date	Expiration	Release	Page
11.2018	11.2020	1	23(31)

4. Reconnect the coil (5 o'clock position connector) (figure 47).

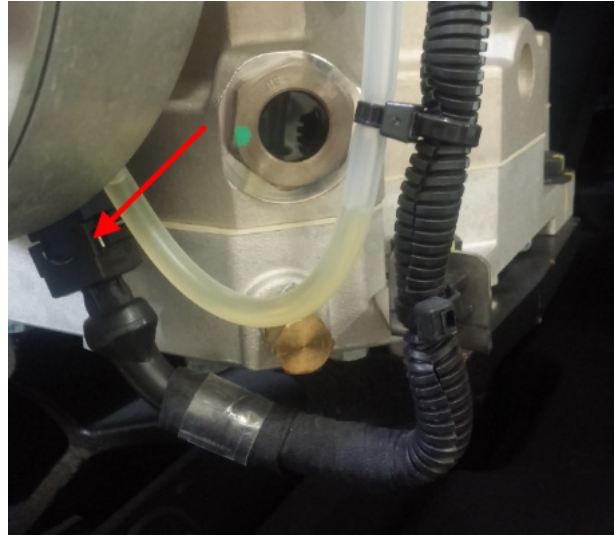


FIGURE 47: CONNECTED COIL

5. Install the clutch on the compressor shaft (figure 48).

- Make sure that the woodruff key is correctly positioned on the shaft; otherwise it could move when inserting the clutch (see image below).

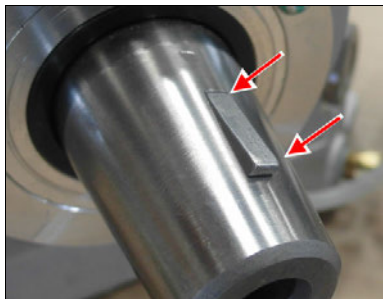


FIGURE 48: INSTALLING THE CLUTCH

- Carefully slide the clutch on the shaft, making sure of the correct engagement of the woodruff key

Do not use a hammer or hit the clutch body to install the clutch. Press with both hands until the clutch "bottoms out" on the shaft.

Date	Expiration	Release	Page
11.2018	11.2020	1	24(31)

6. Fasten the clutch to the compressor shaft using the M12 bolt (figure 49).

TORQUE: 60 lb-ft (81 Nm)

- Use a large adjustable wrench to hold the hexagonal part of the clutch rotor while tightening (figure 50).
- Apply medium strength (blue) thread locker on the screw threads.



- Apply a stripe of *tamper proof indicator paint* (Torque Seal) to the screw head.



FIGURE 49: INSTALLED CLUTCH



FIGURE 50: CLUTCH HOLD DOWN BOLT

7. Turn the clutch by hand and pay attention to grinding noises, the clutch must spin freely.

Working gap between the clutch and the coil must be: 0.024 in - 0.035 in 0.60 mm - 0.90 mm (figure 51)

During cleaning or other work on the compressor, the clutch must be covered to prevent the penetration of greasy liquids, grease or dirt particles in the working gap.

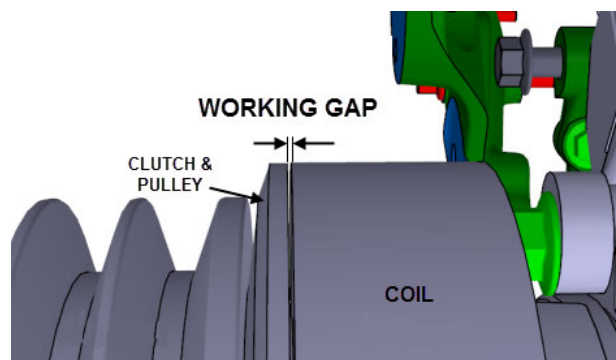


FIGURE 51: CLUTCH WORKING GAP

8. Reinstall the two drive belts (crank and clutch pulleys) (figure 52).



FIGURE 52: COMPRESSOR BELTS REINSTALLATION

9. Reinstall the belt tensioner and put some tension to the belts (figure 53).

- Apply medium strength (blue) thread locker on bolt (B) and hand tighten snugly.



- Put tension to the belts using bolt (A).

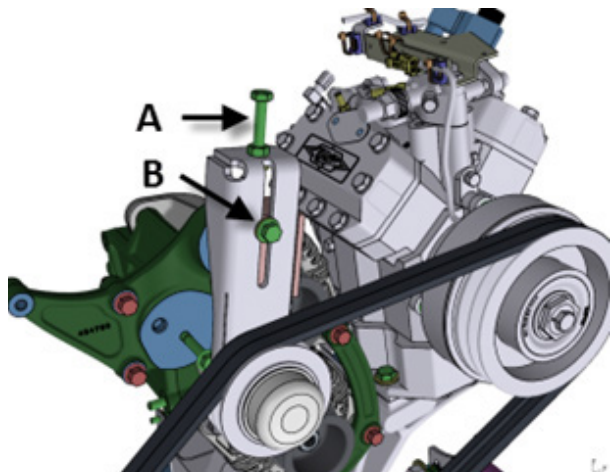


FIGURE 53: BELT TENSIONNER INSTALLATION

10. Adjust the belt tension to its final value using a suitable *belt tension gauge* (figure 54).

- Adjust tension to value below using bolt (A).

Proper tension for the belts should read as follows:

90-100 lbs with new belts
75-85 lbs with used belts



FIGURE 54: CHECKING BELT TENSION

Date	Expiration	Release	Page
11.2018	11.2020	1	26(31)

- When proper tension is achieved, lock bolt (A) in place with the jam nut and tighten bolt (B) to **43 lb-ft. (58 N-m)**.
- Apply a stripe of *tamper proof indicator paint* (Torque Seal) to the bolt heads (figure 55).



FIGURE 55: TORQUE SEAL ON INSTALLED AND ADJUSTED BELT TENSIONER

PART 5

AC COMPRESSOR OIL & REFRIGERANT FILLING



CAUTION

This part of the procedure must only be performed by a certified HVAC Technician.

1. Remove and clean the compressor pan filter/strainer and the magnetic drain plug (figure 56).

- Remove drain plug (use a suitable container to catch residual oil).
- Pull out filter/strainer.
- Clean with suitable degreaser.
- Replace gasket with part # **950544** included
- Reinstall filter/strainer and drain plug.

Do not put sealant on the drain plug thread.

TORQUE: 37 to 52 lb-ft (50 to 71 Nm)

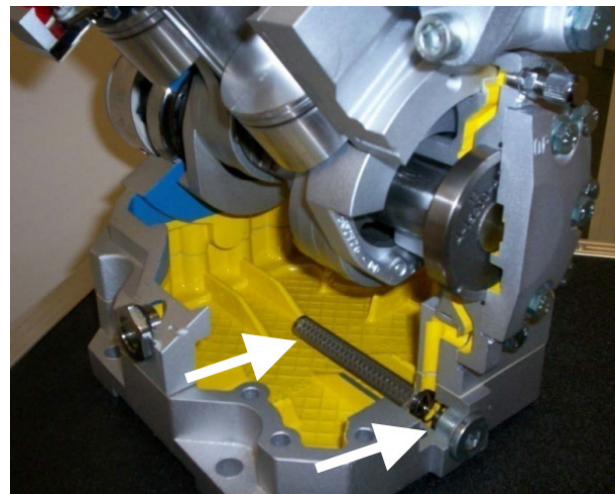


FIGURE 56: FILTER/STRAINER AND THE MAGNETIC DRAIN PLUG LOCATION

2. Fill the compressor with fresh compressor oil.

- Fill a compressor oil pump with the same oil quantity that was previously removed.



Bitzer A/C compressor – oil specification:

Oil type : Polyester ISO68 for R134a

Recommended : Bitzer BSE55 (POE)

- Connect the pump to the pressure port at the back of the compressor (figure 57).
- Pump the oil in the compressor up to the full level. The driver side sight glass must be filled to the top and the curb side sight glass up to the max level mark (figure 58 & figure 59).
- *When the normal oil level is reached, **add 10oz (300 ml) of extra oil** to the compressor as per new Prevost requirement.*

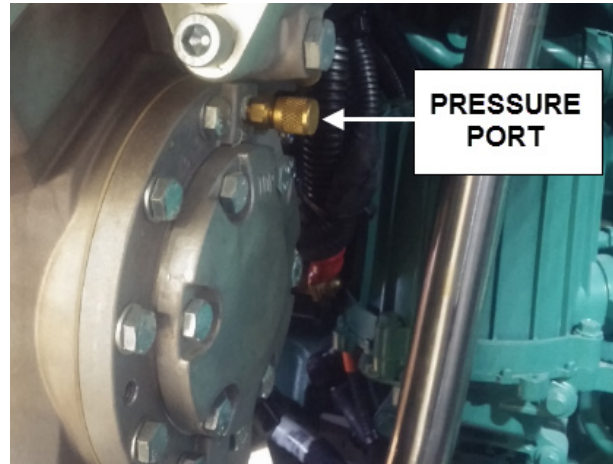


FIGURE 57: OIL PUMP CONNECTION (BACK OF THE COMPRESSOR)

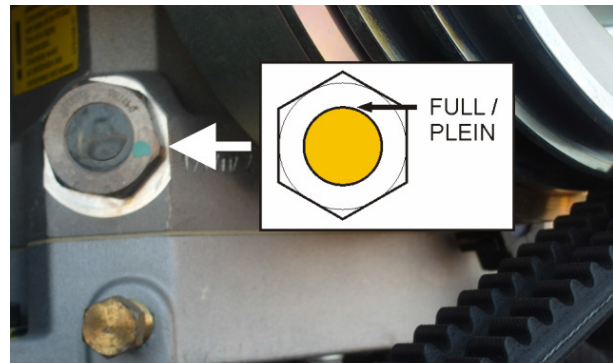


FIGURE 58: DRIVER SIDE OIL LEVEL BEFORE 10oz ADD-ON

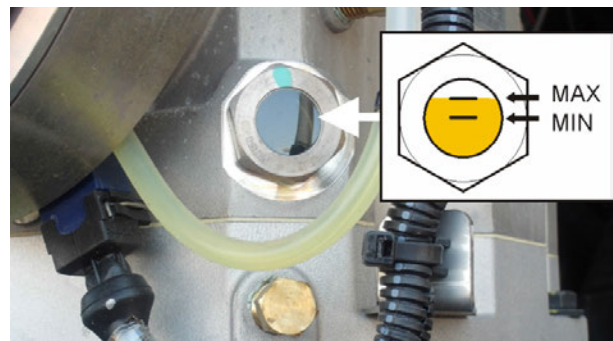


FIGURE 59: DRIVER SIDE OIL LEVEL (BEFORE 10oz ADD-ON)

Date	Expiration	Release	Page
11.2018	11.2020	1	28(31)

3. Reconnect the AC gauges to the high and low pressure service ports of the compressor.

- Red hose to the red high pressure service port (figure 60)
- Blue hose to the blue low pressure service port (figure 61).

Make sure both valves are closed



FIGURE 60: CONNECTED HIGH-PRESSURE SIDE

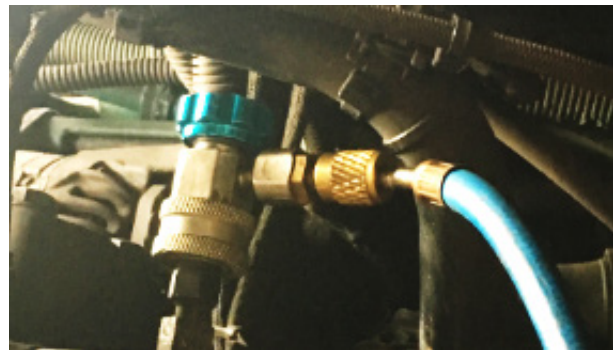


FIGURE 61: CONNECTED LOW-PRESSURE SIDE

4. Connect the recovery station to the gauges and vacuum the compressor 30psi below atmospheric pressure.

- Connect the yellow hose coming from the gauges to the inlet of the recovery station.
- Start the recovery station.
- When vacuum reaches the correct value, close the gauge valves to maintain vacuum and stop the recovery station (figure 62).



FIGURE 62: 30PSI VACUUM READING

Date	Expiration	Release	Page
11.2018	11.2020	1	29(31)

5. Connect the recovery station to the fill tank and add refrigerant to the compressor (figure 63).
 - Connect the yellow hose coming from the gauges to the outlet of the recovery station.
 - Connect the inlet of the recovery station to the tank.
 - Put the fill tank on the scale
 - Start the recovery station and add the same amount of R134A refrigerant that was previously removed (the weight of the tank should reach its initial value) (figure 64).



FIGURE 63: RECOVERY STATION CONNECTION



FIGURE 64: FILL TANK CONNECTION

6. With the compressor filled, disconnect the hoses from the compressor ports.

Close all valves on gauges, recovery station and tank.

 - Put back the red and blue protective caps on the service ports (the red high pressure cap in front the blue cap at the rear of the compressor) (figure 65)



FIGURE 65: PROTECTIVE CAPS ON HIGH & LOW SERVICE PORTS

Date	Expiration	Release	Page
11.2018	11.2020	1	30(31)

7. Back seat both compressor high and low pressure service valves to reconnect the compressor to the system (figure 66).

- With a square service valve wrench, back seat both valves (screw out).

Do not over torque the valves (12 lb-ft (16 Nm) max).

- Put back the black protective cap on both the high and low shutoff valves.

BACK SEATED SHUT-OFF VALVE

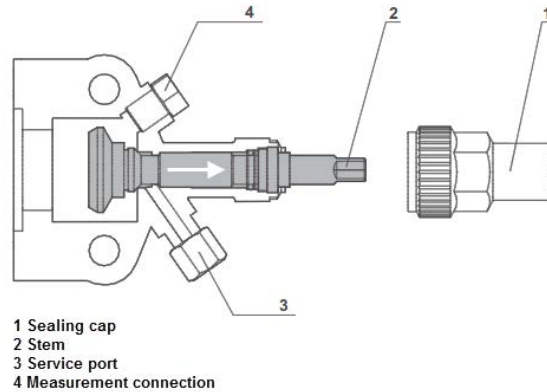


FIGURE 66: BACK SEATED SHUTOFF VALVE

8. Start the vehicle and check for proper operation of the HVAC system (figure 67).



FIGURE 67: RUNNING HVAC SYSTEM

PARTS / WASTE DISPOSAL

Return replaced parts to Prevost with A.F.A. for full reimbursement.
Discard waste according to applicable environmental regulations (Municipal/State[Prov.]/ Federal)

Date	Expiration	Release	Page
11.2018	11.2020	1	31(31)

ESTIMATED TIME

The time required to perform this special bulletin is approximately 3.5 hours.

OTHER

VBC Bulletin	N/A
Fail Code	22.05
Defect Code	09
Syst. Cond	B
Causal Part	950002

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