Special Bulletin SP15-324D

Date	Expiration	Release	Page
10.2015	**10.2017**	**6**	**1(20)**

Revision D: Modified according to comments received

BITZER A/C COMPRESSOR VIBRATION – ADDITION OF A REINFORCEMENT BRACKET TO THE MOUNTING

Prevost vehicles

DESCRIPTION

On the vehicles affected by this bulletin, vibration is causing damage to A/C compressor and compressor harness connectors. Addition of a reinforcement bracket to Bitzer A/C compressor is needed to increase the installation stiffness and reduce vibration amplitude.

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
X3-45 Commuter Model Year : 2014 - 2015	2PCG33495EC73***5590*** 2PCG33498EC73***5602*** and From 2PCG33495EC73***5590*** up to 4RKG33495F973***7109*** incl.

This bulletin does not necessarily apply to all the above-mentioned vehicles, some vehicles may have been modified before delivery. The owners of the vehicles affected by this bulletin will be advised by a letter indicating the Vehicle Identification Number (VIN) of each vehicle concerned.

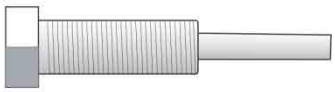
MATERIAL NEEDED

Kit 457770 includes the following parts:

Part No.	Description	Qty
069206	HARNESS, A/C COMPRESSOR	1
069451	WARNING, ALTERNATOR WASHING	1
457675	REINFORCEMENT BRACKET, A/C COMPRESSOR	1
502867	WASHER FL N500 .406X.625X.040	2
504339	RIVET POP DOME SS OE 1/8X3/8	2
504637	CABLE TIES, NYLON 3/16" x 13"	20
507664	CABLE TIE, NYLON 3/16" x 11" DOUBLE LOOP HEAD	5
509815	CABLE TIE MOUNT (FT7 TYPE)	1
561568	TERMINAL, MALE 16-14	2
561690	PED CONNECTOR, WEATHERPACK FEMALE	1
561786	SEAL	2
950533	COIL, LANG ELECTROMAGNETIC CLUTCH	1
950576	COIL 24 VDC, COMPRESSOR UNLOADER	1
950577	O-RING, COMPRESSOR UNLOADER COIL	1
5001616	SCR CAP HEX SOCKET G500 M10-1.5X25 LONG	2
5001775	SCREW, CAP HEX SOCKET M8-1.25x25mm G12.9	4

NOTE
Material can be obtained through regular channels.

REQUIRED TOOLS

LANG ROTOR EXTRACTOR TOOL # 7770159 	**RATCHET AND SOCKET SET – METRIC** 
PHILLIPS SCREWDRIVER 	**TORQUE WRENCH** 
CUTTING PLIERS 	**BELT TENSION GAUGE** 
METRIC OPEN END WRENCH SET 	**1 5/8 OPEN END WRENCH** 
SOFT FACED HAMMER 	**RIVETER** 
HEX BIT SOCKET SET – METRIC 	**STAMP PUNCH SET** 
CRIMPING TOOL 	**FEELER GAUGE** 

REPAIR PROGRESS CHECKLIST

- **MATERIAL**

☐ REQUIRED MATERIAL IN STOCK

- **REINFORCEMENT BRACKET INSTALLATION**

☐ SHAFT SEAL DRAIN TUBE REINSTALLED ON OPPOSITE SIDE

☐ REINFORCEMENT BRACKET INSTALLED

☐ BOLTS **C & E** TIGHTENED AS PER PRESCRIBED TORQUE

☐ PRESSURE WASH WARNING PLATE AFFIXED

☐ CLUTCH COIL MOUNTING SCREWS TIGHTENED AS PER PRESCRIBED TORQUE

☐ ROTOR MOUNTING SCREW **G** TIGHTENED AS PER PRESCRIBED TORQUE

☐ ELECTROMAGNETIC CLUTCH REPLACEMENT DATE CODE ADDED

☐ BELT TENSION ADJUSTED

☐ BELT TENSIONER SCREW AND NUT PROPERLY TIGHTEN

- **UNLOADER COIL REPLACEMENT**

☐ NEW CLIP-ON COIL INSTALLED

- **HARNESS #069206 INSTALLATION**

☐ NEW HARNESS INSTALLED AND PROPERLY SECURED

☐ CONNECTOR L199 SCREW TIGHTENED

PROCEDURE

DANGER

Park vehicle safely, apply parking brake, stop 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.

PRELIMINARY CHECK

1. Before starting the installation, check the air gap (working gap) between the armature and the clutch.

Air gap (working gap) should be:

between 0.024 & 0.035 in (0.60 & 0.90 mm)

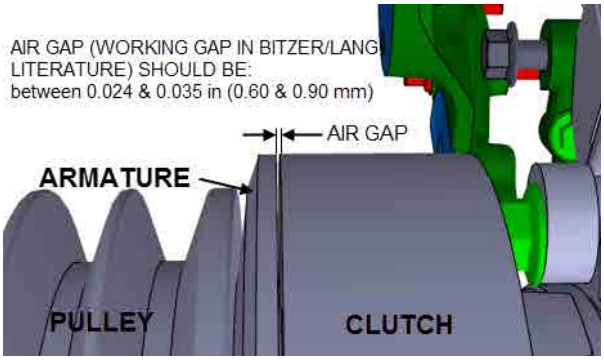


FIGURE 1

REINFORCEMENT BRACKET INSTALLATION

2. Loosen bolt (**A**).
3. Unscrew and remove bolt (**B**).
4. Remove the drive belt tensioner assembly.
5. Remove the drive belts.

   Note: Keep hardware for reuse

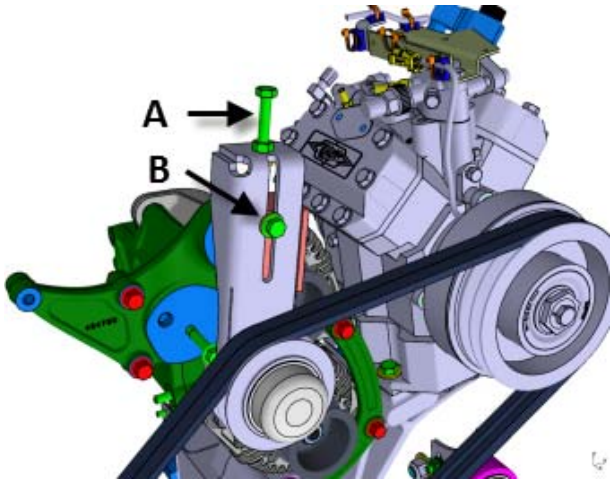


FIGURE 2

6. Unscrew and remove bolt (**C**).
7. Discard block (**D**).

   Note: Keep hardware for reuse

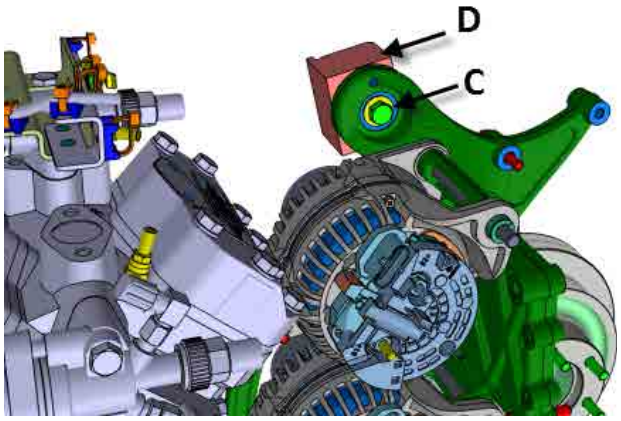


FIGURE 3

8. Remove the LANG electromagnetic clutch assembly.

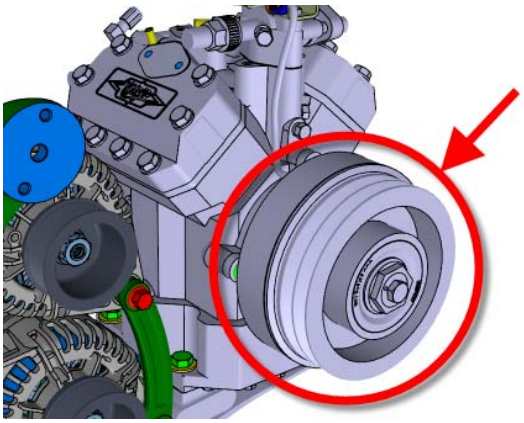
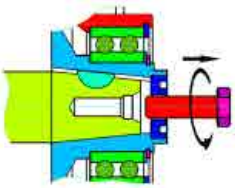


FIGURE 4

9. Hold the rotor with the 1 5/8 wrench. Loosen and remove the M12 rotor mounting screw with a 30mm socket.



REMOVING THE M12 SCREW

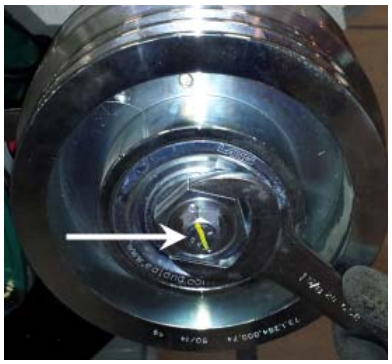
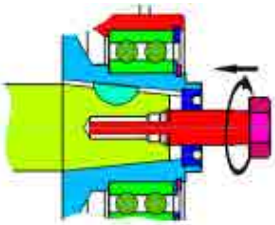


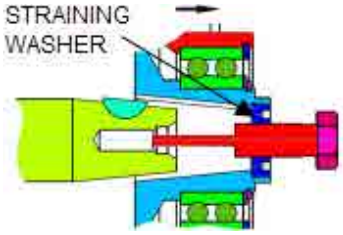
FIGURE 5

For the next step, use rotor extractor tool #7770159. If the tool is not available, use an M16x50 mm hex head bolt. (Prevost #5001372).

10. Screw the extractor tool or bolt into the straining washer only until the rotor pops off the tapered shaft. Then work the rotor off the shaft by hand with help from soft faced mallet as needed.



PULL OFF THE ROTOR WITH TOOL #7770159 (shown) or M16 BOLT



TAKE OFF THE ROTOR

FIGURE 6

11. Use a hex bit socket (6mm) to loosen the coil fastening cap screws (4x).

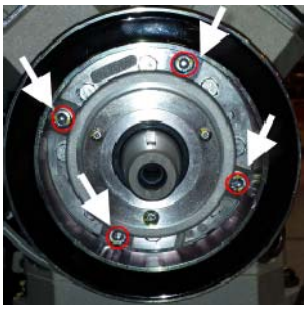


FIGURE 7

12. Remove the existing shaft seal drain tube and support.
13. Reinstall the drain tube and hardware on the opposite side of the compressor as seen on the image on the right.

    Note: Use existing M10 socket head screw (tightening torque 30 lbf-ft / 40 Nm) (8mm hex bit socket) and lock washer. Use blue Loctite 243 on threads.
14. Apply torque seal mark.

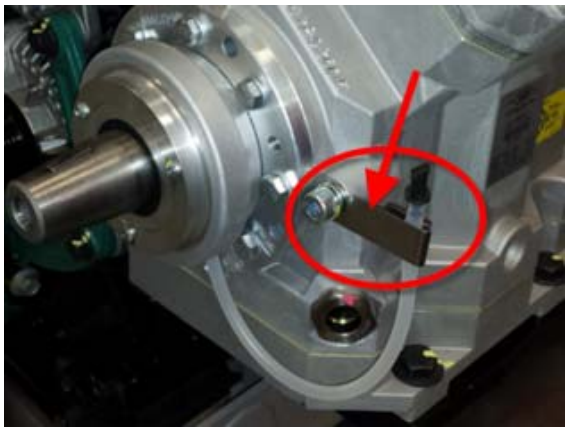


FIGURE 8

15. Install new reinforcement bracket #457675 as shown using previously removed hardware (bolt **C** finger tightened and flat washer). DO NOT apply final torque at this moment.

    Note: Use Blue Loctite 243 on threads.

    Note: Once thread locker is applied, do not wait too long before applying final torque.

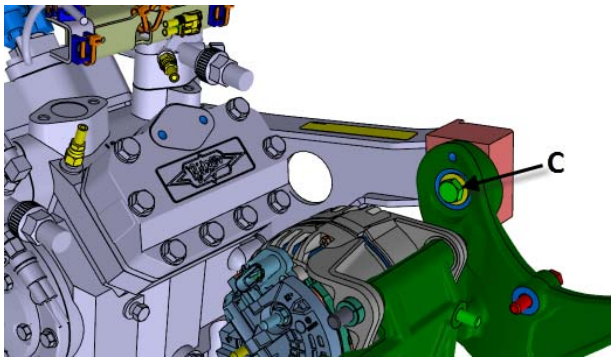


FIGURE 9

16. Continue with the installation of new reinforcement bracket #457675 as shown. Use two socket cap screws #5001616 (**E**) and two flat washers #502867. DO NOT apply final torque at this moment.

    Note: Use blue Loctite 243 on threads.

    Note: Once thread locker is applied, do not wait too long before applying final torque. Final tightening will be done in the next following steps.

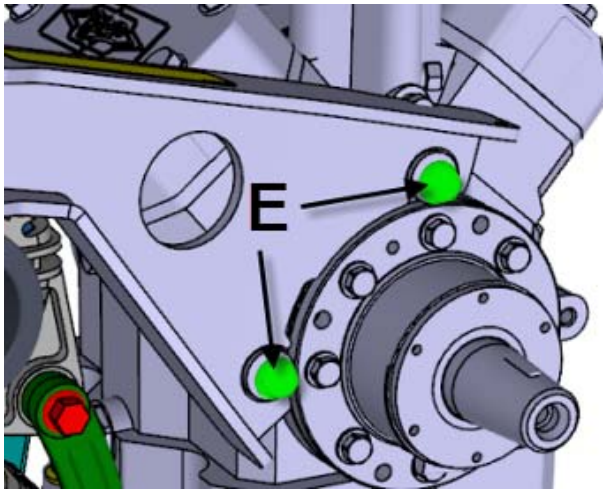
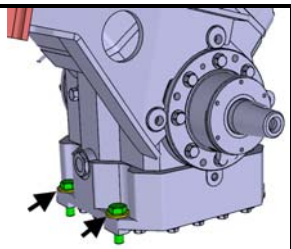
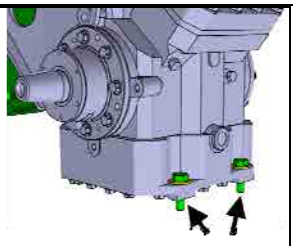


FIGURE 10

17. If bolts **C** & **E** (see two previous steps) are difficult to align in the hole, the compressor may be moved. Loosen the compressor mounting bolts (4x) at the base. (see FIGURE 11).



STREET SIDE COMPRESSOR MOUNTING BOLTS



CURBSIDE COMPRESSOR MOUNTING BOLTS

FIGURE 11

18. It may be necessary to also loosen the bolts (3 bolts) on the bracket shown on FIGURE 12.

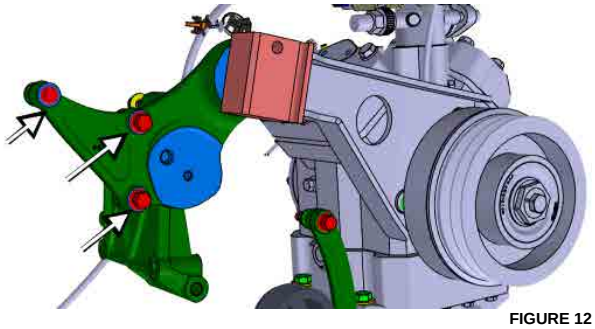


FIGURE 12

19. Snug all previously loosened bolts i.e. bolts **C** & **E**, compressor mounting bolts at the base and 3 bolts indicated with arrows on FIGURE 12.
20. Tighten the compressor mounting bolts to **74 lbf-ft.** (100 N-m).
21. Tighten 3 bolts loosened at step 18. For proper torque, refer to FIGURE 13.
22. Tighten bolts (**C**) and bolt (**E**) (refer to FIGURE 9 & FIGURE 10 to identify bolts C & E).

    E*= *40 lbf-ft *(54 N-m)*

    C*= *74 lbf-ft *(100 N-m)*

    Apply torque seal mark to all bolts

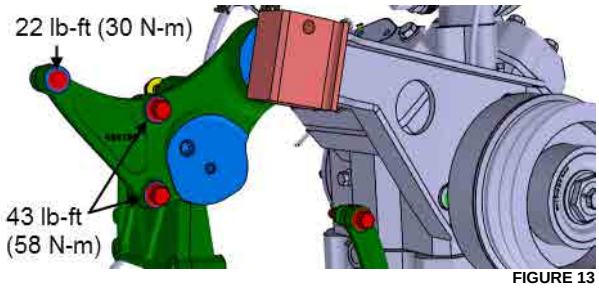


FIGURE 13

23. Reinstall tensioner, bolt and washer (**B**) and bolt and nut (**A**). Do not tighten these bolts at this moment as the belt tension adjustment will be done later in this procedure.

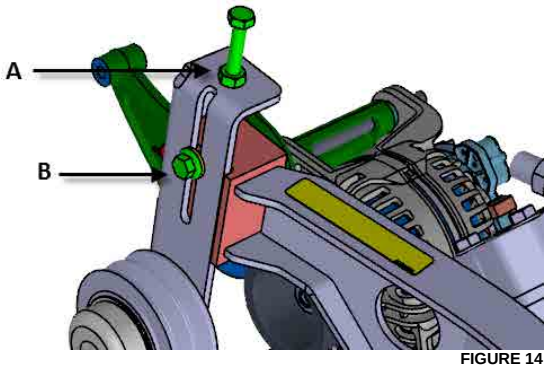


FIGURE 14

24. Install the alternator washing warning plate #069451 using two rivets #504339 as shown on the image at right.
25. Install nylon tie mount #509815 where indicated on the image. This tie mount will be used to secure the electromagnetic clutch cable.

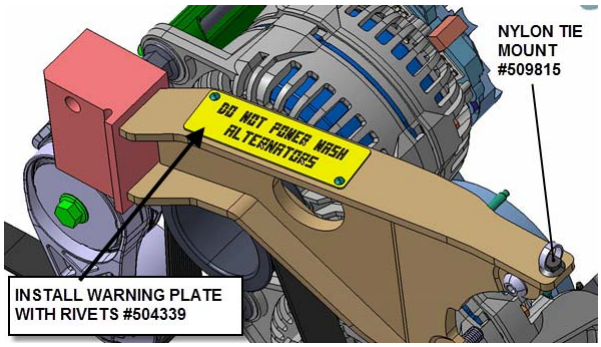


FIGURE 15

26. Install the <u>new</u> electromagnetic clutch coil. Position cable lead near 5 o'clock position. Slip the coil on the retainer on the compressor flange. Fasten the coil with 4 cap screws #5001775 to the compressor.

    Coil mounting cap screws (**F**): **22 lbf-ft**. *Use blue Loctite 243.*

    <u>Apply torque seal</u>

    Caution: *Pay attention to the precise seat of the coil. All parts should be clean and free from debris. Pay attention to the precise seat of coil. The coil should sit flush with the face of the compressor.*

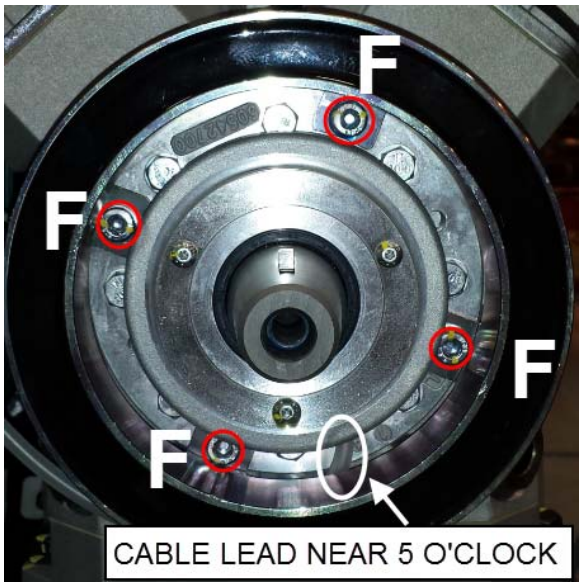


FIGURE 16

27. To provide a clear indication that the coil has been replaced, using a steel punch set, engrave a date code on the pulley as follows:

    Engrave the current month and year on the <u>outside face of the pulley</u> with a format similar to the one found on 2nd generation clutch assembly.

    ex.: S11
    S=2015
    11= November

    February 2016 would give date code **T02.**

Pulley of 1st generation clutch – replacement date code added

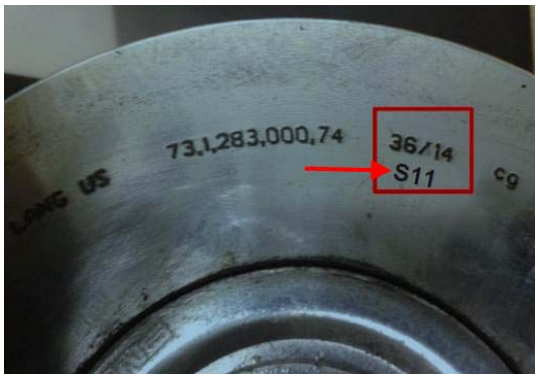


FIGURE 17

Pulley of 2nd generation – replacement date code added

FIGURE 18

28. Mount the clutch on the shaft end.

The flange and the shaft end of the compressor must be clean and free from dirt.

29. Carefully mount the rotor on the shaft end by hand.

Never use a hammer for pressing the rotor on.

Align the key on the compressor shaft with the keyway on the pulley bore. To avoid damaging the bore of the rotor, feel the engagement of the key in the keyway and slip the rotor on the shaft end of the compressor till reaching the stop.

The Woodruff key on the shaft end and the groove in the location hole of the rotor must be flush.

FIGURE 19

30. Fasten the rotor to the shaft end by using the M12 screw and by holding-up with a wrench on the rotor.

*Rotor mounting screw (**G**):* **60 lbf-ft** *(81 N-m) Use blue Loctite 243 on threads. Apply torque seal.*

31. Turn rotor by hand and pay attention to the free run and the generation of noises. In case of grinding or similar noises, dismount the clutch and check installation.

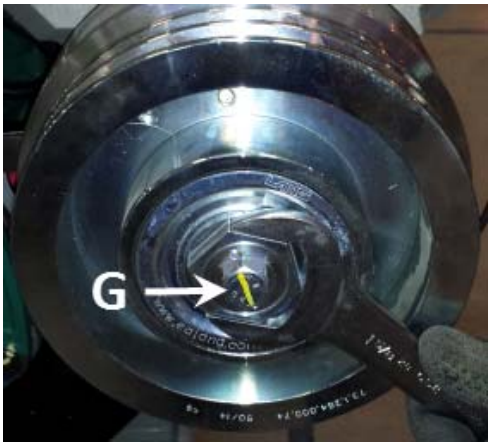


FIGURE 20

32. Reinstall the drive belts.

    A belt strand tension gauge is needed. Belt tension should be within this range:

    90-100 lbs new belts (mean of 2 belt values)

    75-85 lbs used belts (mean of 2 belt values)

33. Apply blue Loctite 243 on bolt (**B**) threads and then hand-tighten bolt (**B**). Adjust belt tension using bolt (**A**). Use the jam nut to prevent rotation of bolt (**A**).

    Note: Once thread locker is applied, do not wait too long before applying final torque.

    When proper tension is achieved, tighten bolt (**B**) to **43 lbf-ft**. (58 N-m). *Apply torque seal*

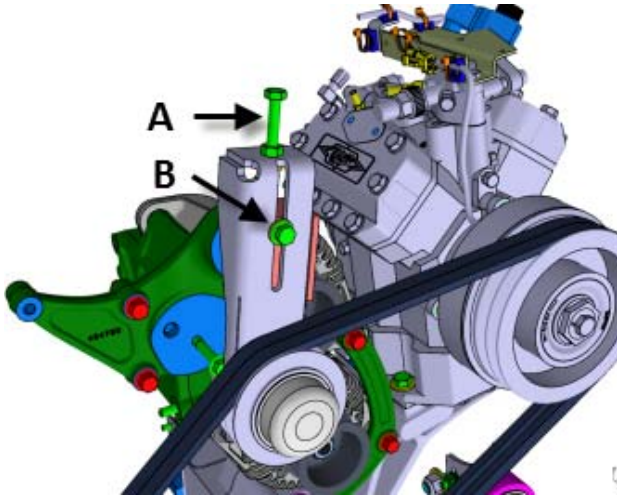


FIGURE 21

34. Prepare the clutch coil cable for hooking up to the compressor harness.

    Crimp and solder the terminals to the clutch coil cable using the following parts:

561568 TERMINAL, MALE 16-14 qty: 2

561690 PED CONNECTOR, WEATHERPACK qty: 1

561786 SEAL qty: 2

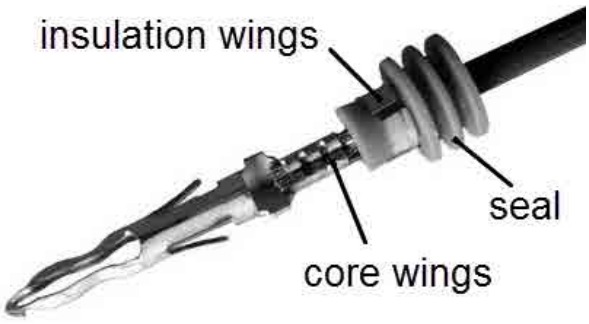


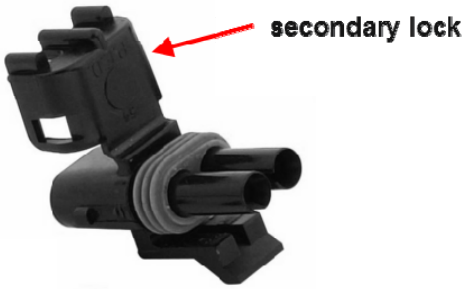
FIGURE 22

35. Open the Weatherpack connector secondary lock. Insert terminals into connector cavities as follows:

    Circuit 77AC in cavity A (red wire)

    Circuit 0RA2 in cavity B (green wire)

36. Snap the Weatherpack connector secondary lock closed.



WEATHERPACK CONNECTOR WITH SECONDARY LOCK OPENED

FIGURE 23

UNLOADER COIL REPLACEMENT

A new “clip-on” type unloader coil must be installed in order to avoid unloader failure.

1. Loosen the screw securing the connector to the coil and then unplug the connector (**A**). Keep the screw and the connector rubber gasket for reuse.
2. Unscrew the aluminum cap and discard.
3. Remove the plastic capture nut and discard.
4. Remove the coil, the O-ring and discard.

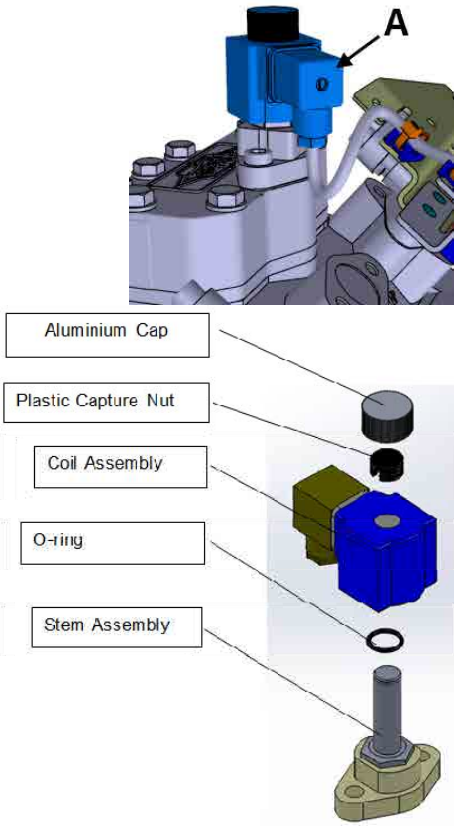


FIGURE 24

5. Install the new clip-on coil on the stem. To do so, slide the coil over the stem assembly with the O-ring #950577 at the base of the stem. Ensure the coil snaps in place.

FIGURE 25

HARNESS #069206 INSTALLATION

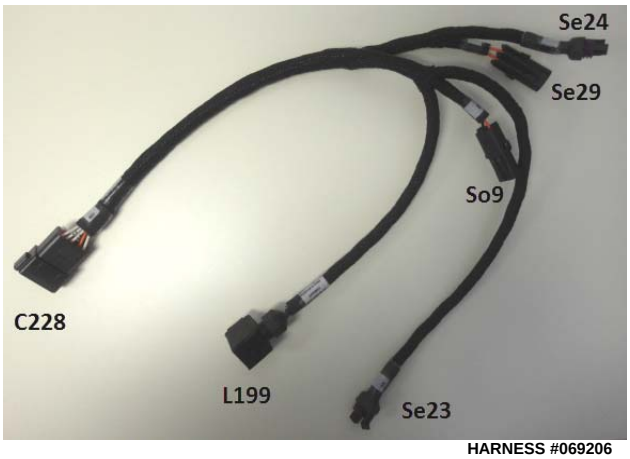
1. While proceeding with one connector at a time, remove the existing A/C compressor harness simultaneously as you install the new harness. The new harness should be installed and routed like the one being removed.

So9: A/C compressor electromagnetic clutch
Se29: A/C pressure switch
L199: R.H. side cylinder unloader coil
Se23: high side pressure transducer
Se24: low side pressure transducer
C228: other C228 connector half

Take special care to route the harness according to the following figures.

Refer to best practices at the end of this document. Prefer larger, heat resistant cable ties over small cable ties to limit the “pinch effect”.

Secure the cable on the cable tie mounts where applicable.



HARNESS #069206

FIGURE 26

2. Install new harness **069206.** Connect **L199** to the unloader coil. Tighten the screw securing connector L199 to the coil.
3. Secure the cable on the cable tie mounts as shown on FIGURE 27.

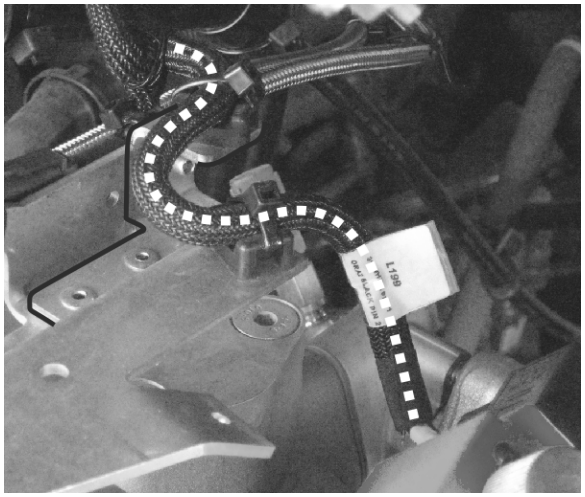


FIGURE 27

4. Route the electromagnetic clutch cable as shown on FIGURE 28 and connect to compressor harness S09 connector. Secure connector SO9 as shown on FIGURE 29 using two nylon ties.

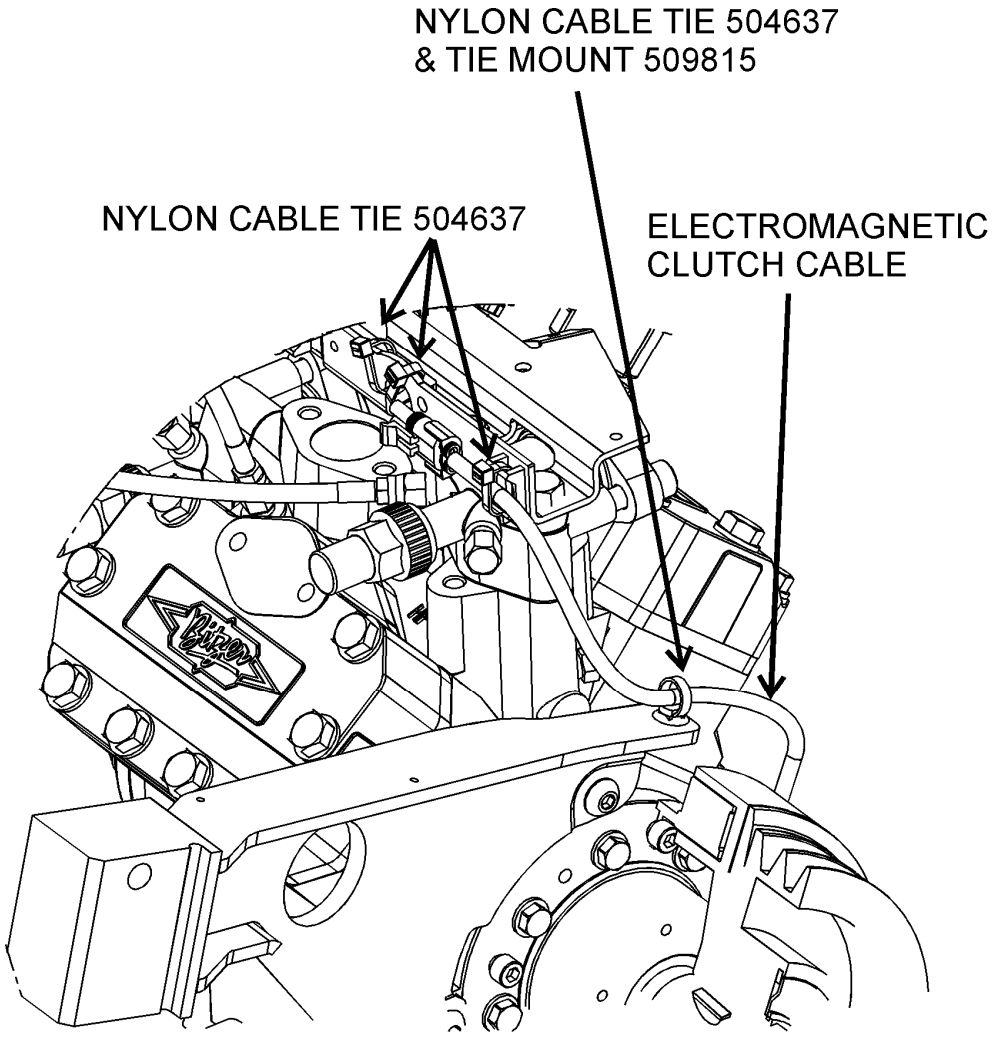
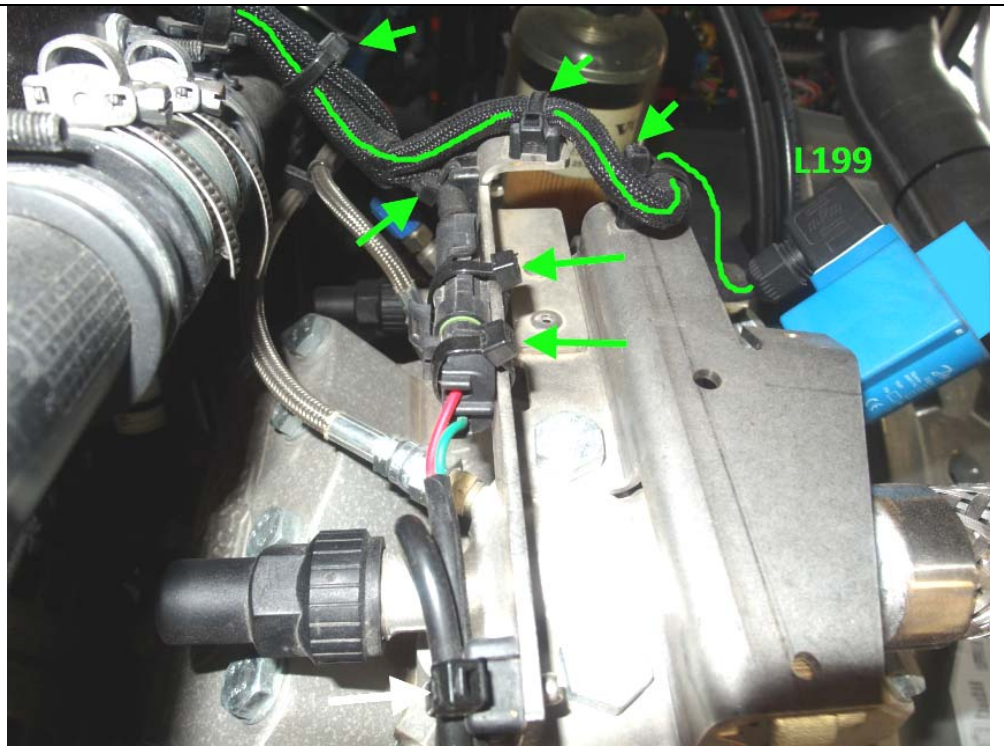
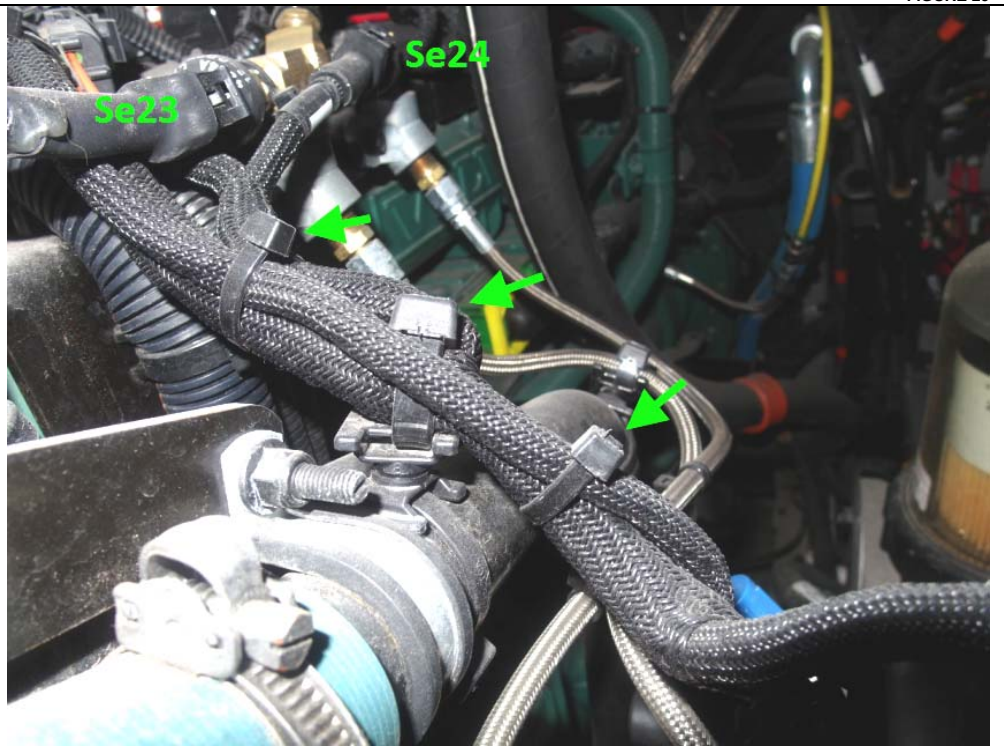


FIGURE 28



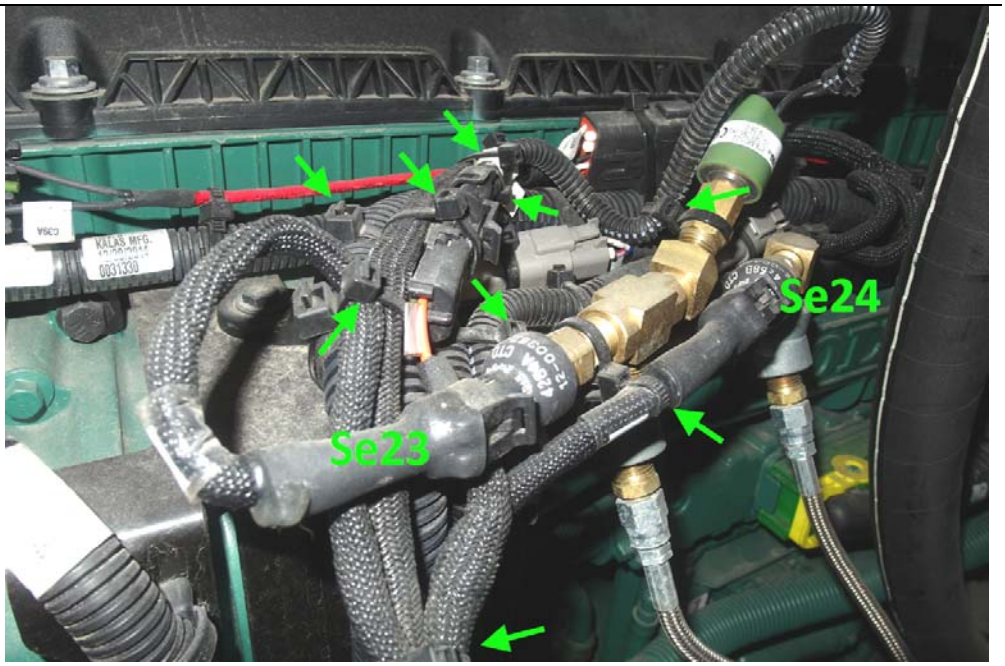
UNLOADER CABLE – NYLON TIES LOCATION SHOWN BY ARROWS
ELECTROMAGNETIC CLUTCH CONNECTOR SECURED WITH TWO NYLON TIES

FIGURE 29



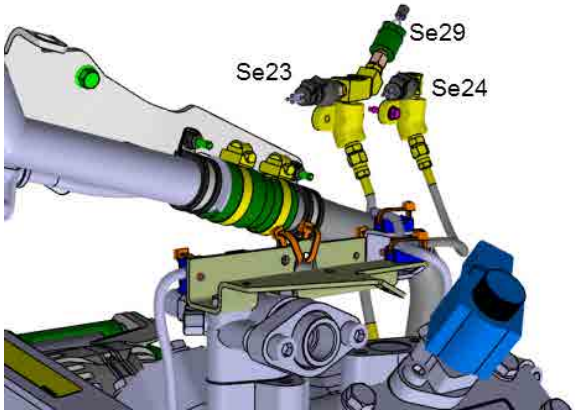
ATTACH THE EXCESS LENGTH OF CABLE ALONG MAIN STRAND OF HARNESS AS SHOWN– NYLON TIES LOCATION SHOWN BY ARROWS

FIGURE 30

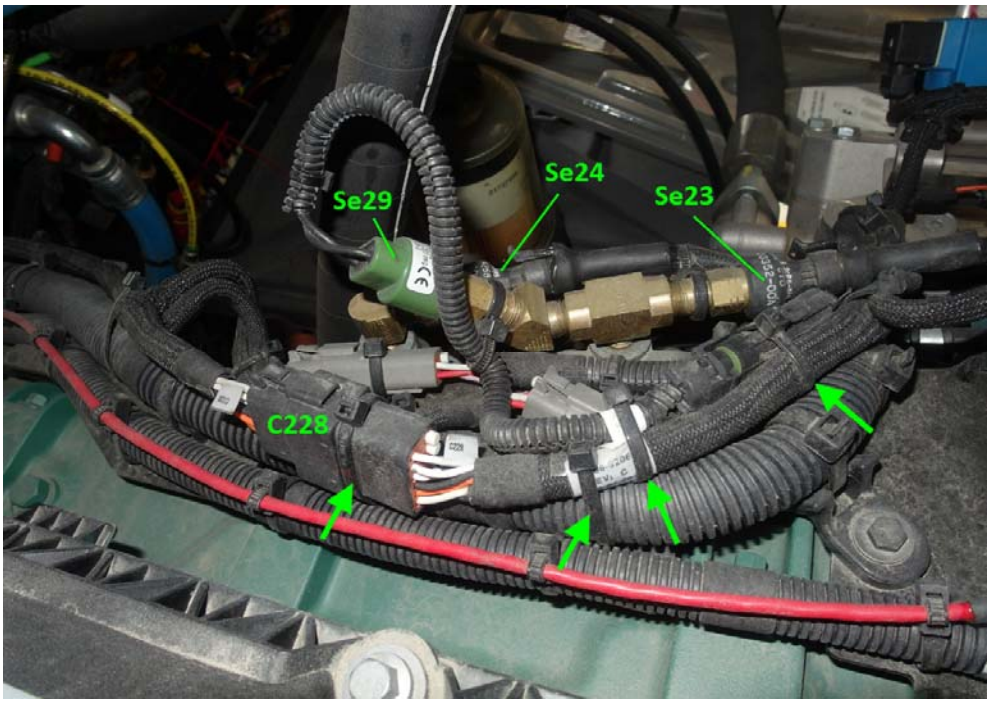


ATTACH THE EXCESS LENGTH OF CABLE ALONG MAIN STRAND OF HARNESS AS SHOWN– NYLON TIES LOCATION SHOWN BY ARROWS

FIGURE 31



SENSOR IDENTIFICATION FIGURE 32



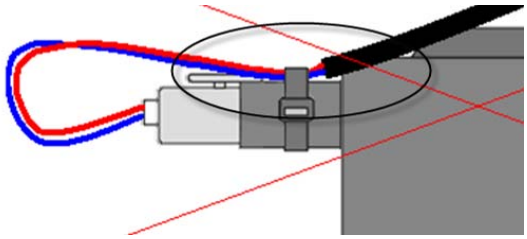
ATTACH THE EXCESS LENGTH OF CABLE ALONG MAIN STRAND OF HARNESS AS SHOWN– NYLON TIES LOCATION SHOWN BY ARROWS

FIGURE 33

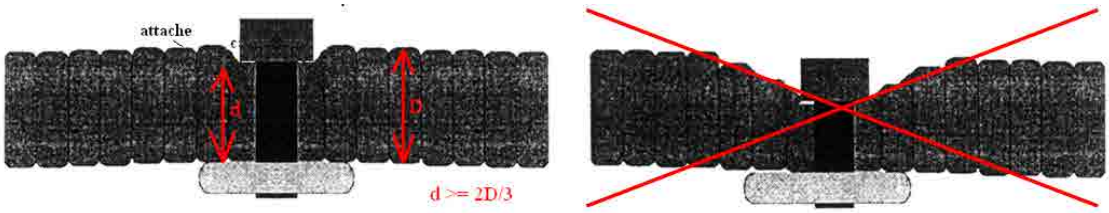
BEST PRACTICES FOR CABLE SECUREMENT AND ROUTING

(Source: engineering Spec 20.0)

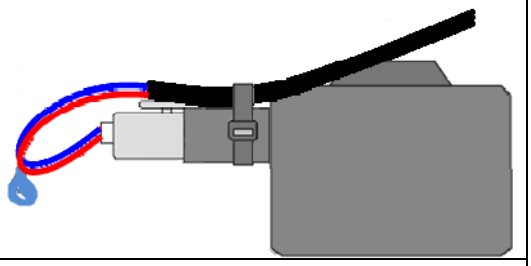
- Prefer larger cable ties over smaller cable ties in your assembly to limit local pinch effect.
- Avoid sharp edges to prevent chaffing and abrasion.
- Always attach over harness loom or corrugated tubes, not on the bare cables themselves.



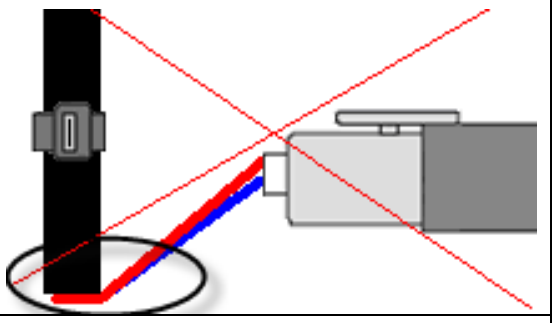
- No over-tightening of cable ties. (Must only prevent harness movement)



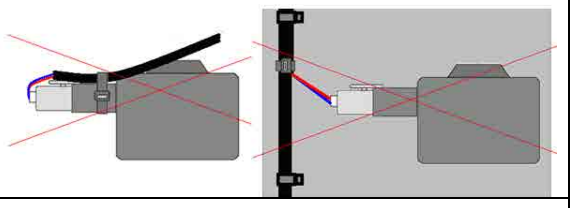
- Perform smart harness routing to prevent water intrusion in the connectors. (nearest low point: below connector)



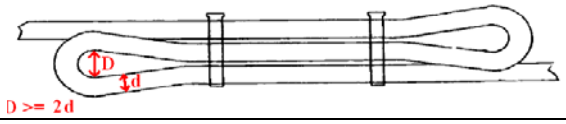
- Also avoid sharp edges of plastic corrugated tubes.



- No pulling or tension on connections.



- Avoid sharp radius routing paths. (routing path *inside* diameter = 2 X cable diameter)



PARTS / WASTE DISPOSAL

Discard waste according to applicable environmental regulations (Municipal/State[Prov.]/ Federal)

ESTIMATED TIME

The time required to perform this special bulletin is approximately 1 ½ hour.

OTHER

VBC Bulletin	N/A
Fail Code	22.00
Defect Code	09
System Condition	B
Causal Part	950570

Prevost engages in a continuous program of testing and evaluating to provide the best possible product. Prevost, however, is not committed to, or liable for updating existing products.