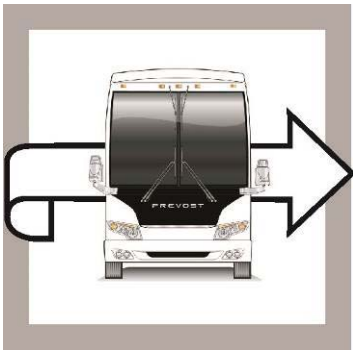


PREVOST

WARRANTY BULLETIN

WB15-48A

DATE :	January 2016	SECTION :	22 - HVAC
EXPIRATION:	January 2018		
SUBJECT :	**BITZER – ADDITION OF A REINFORCEMENT BRACKET – VEHICLES WITH UPWARD BELT TENSIONER.**		

REVISION A: THIS VERSION SUPERSEDES ALL PREVIOUS VERSIONS.

Released : April 2018

Lang electromagnetic clutch extractor/puller was #7770159, changed for #680888.

APPLICATION

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 VIP motorhomes Model Year : 2014	The following individual vehicles: 2PCBS3499***E***C73***5539***; 2PCBS3499***E***C73***5587***
X3-45 VIP commercial use Model Year : 2014	From 2PCCS3497**E**C73***5494*** up to 2PCCS3490**E**C73**5708** 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.

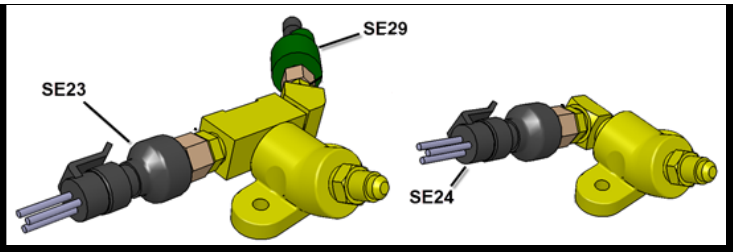
DESCRIPTION

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.

IMPORTANT NOTE FOR VEHICLES INCLUDED IN **WB14-06**:

This previous bulletin must have been completed *before* starting WB15-19.

To confirm, search two fitting *arrangements for sensors and switches SE23; SE29 SE24* on the engine curbside



If required, perform the latest version of WB14-06 is available through Prevost Technical Publications site.

MATERIAL

Order *WB15-48* which includes the following parts:

Part No.	Description	Qty
069206	HARNESS, A/C COMPRESSOR (1x)	1
069356	DECAL (1x)	1
457675	REINFORCEMENT BRACKET, A/C COMPRESSOR (1x)	1
502949	**SCREW, CAP BUTTON HEX M10-1.5 x 25lg SS (2x) [LINNIG CLUTCH]**	**2**
504637	NYLON TIE, BLACK (MEDIUM) 3/16in x 13in (1x)	1
509815	TREE MOUNT, FT (1x)	1
457542	TENSIONER BRACKET	1
500847	NUT HEX N500 M10-1.5	1
5060137	BELT 5VX740	2
5060138	BELT 5VX940	2
5001616	SOCKET HEAD CAP SCREW M10-1.5X25 LG [LANG CLUTCH]	2
950576	COIL, UNLOADER ASSEMBLY	1

Other parts that may be required:

Part No.	Description	Qty
457505	PULLEY ASSY W/BEARING	1
457500	SCREW CAP HEX M12-1.75 x 59, PULLEY SHAFT	1
504637	CABLE TIES, NYLON 3/16" x 13"	20 app.
507664	CABLE TIE, NYLON 3/16" x 11" DOUBLE LOOP HEAD	5 app.
062490	DOUBLE WALL SHRINK TUBE .250" - .125" / BLACK, 6" long	2
562228	BUTT SPLICE16-14 AWG	2
-	MOLYCOTE *G-rapid-plus 400ml spray can (Lang clutch)* (*http://krayden.com/buy/dc-g-rapid-plus-400ml-spray-can.html*)	20ml
950533	COIL, LANG CLUTCH	1

NOTE

Material can be obtained through regular channels.

Tools

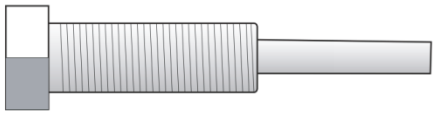


Figure 1 : Lang clutch extractor tool # 680888

REPAIR PROGRESS CHECKLIST

- **MATERIAL**

☐ REQUIRED MATERIAL IN STOCK

☐ ADDITIONAL KIT REQUIRED OR NOT, MATERIAL IN STOCK (IF UPWARD TENSIONER)

☐ OPTIONAL MATERIAL AVAILABLE (IF HARNESS MUST BE REPLACED)

- **REINFORCEMENT BRACKET INSTALLATION**

☐ SHAFT SEAL DRAIN TUBE REINSTALLED ON OPPOSITE SIDE

☐ REINFORCEMENT BRACKET INSTALLED

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

☐ WARNING DECAL AFFIXED

☐ CLUTCH COIL MOUNTING SCREWS TIGHTENED AS PER PRESCRIBED TORQUE

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

☐ BELT TENSION ADJUSTED

☐ BELT TENSIONER SCREW AND NUT PROPERLY TIGHTEN

- **UNLOADER COIL REPLACEMENT**

☐ NEW CLIP-ON COIL INSTALLED

- **HARNESS #069206 INSTALLATION**

☐ BRAND NEW HARNESS INSTALLATION NOT REQUIRED

or

☐ BRAND NEW HARNESS INSTALLED AND PROPERLY SECURED

☐ CONNECTOR L199 SCREW TIGHTEN

☐ CONNECTOR So9 REMOVED

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 the Commuter type vehicles, set the battery master switch (master cut-out) to the OFF position.

REINFORCEMENT BRACKET INSTALLATION

1. Discard the upward belt tensioner bracket and belts. Keep pulley assembly, cap, shaft and bracket mounting hardware.

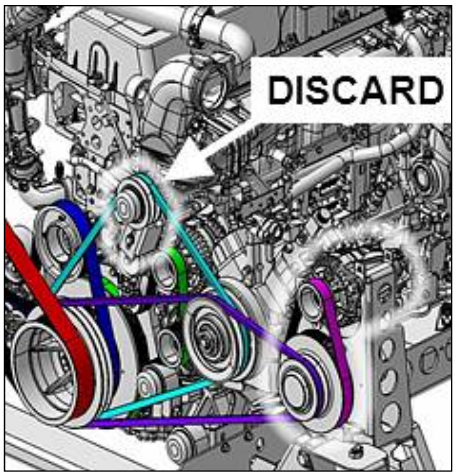
   Make sure they are in working order and can be re-used.

   If required, order the following replacement parts:

   457505 PULLEY ASSY W/BEARING

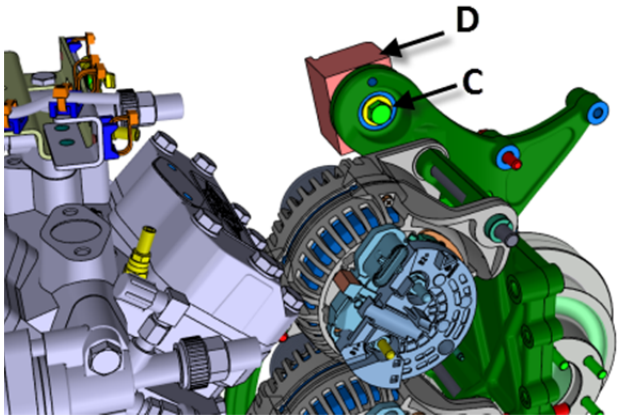
   457500 SCREW M12-1.75 x 59, PULLEY SHAFT

2. Discard any spare belts present on the vehicle. Belt length will change once bulletin is completed. They will be replaced by new spares of the proper length.

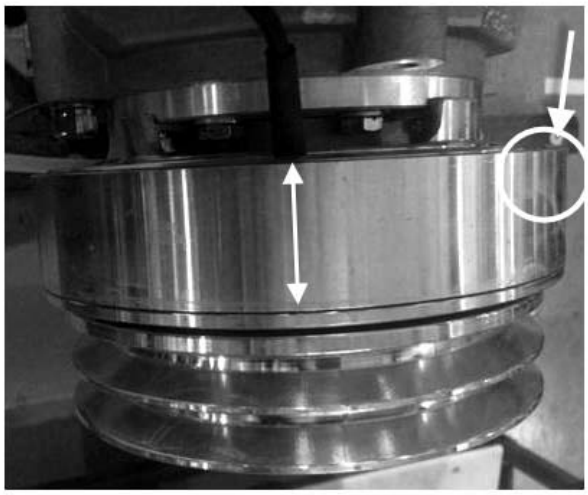


3. Unscrew and remove bolt (**C**) and flat washer.
4. Discard block (**D**).

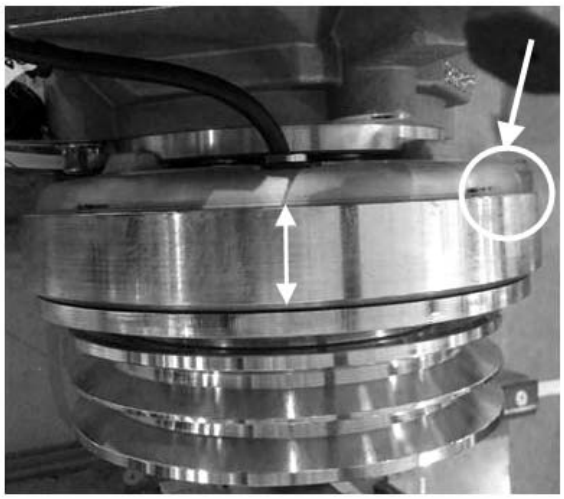
   Note: Keep hardware for later use



5. AT THIS POINT, IDENTIFY THE TYPE OF CLUTCH INSTALLED ON YOUR VEHICLE.



LANG TYPE: SHARP EDGE COIL

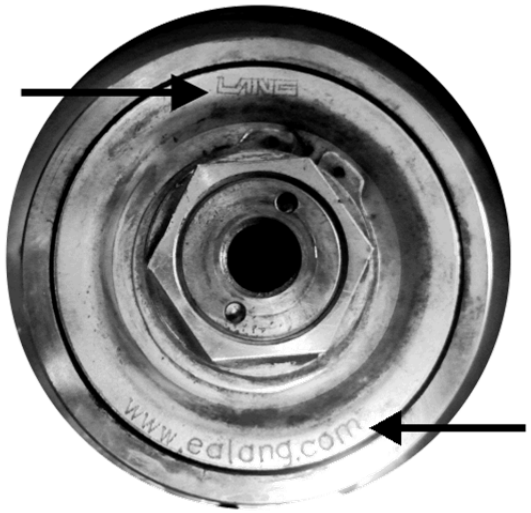


LINNIG TYPE: ROUND EDGE COIL

6. *As an alternate way to confirm **LANG** Type clutch, locate "LANG" engraving on the hub center.*

   Note for this type:
   In addition to kit #457769, confirm you have two #**5001616** socket head cap screws in your available material.

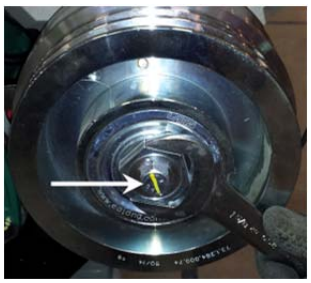
   These additional screws will be *used to install the reinforcement bracket* on the compressor.

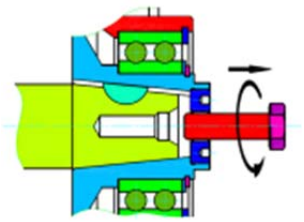


7. *If a LINNIG Type clutch is installed, refer to "LINNIG ELECTROMAGNETIC CLUTCH INSTALLATION / REMOVAL" at the end of this document.*

LANG clutches only

7.1. Hold the rotor with the appropriate wrench. Loosen and remove the M12 rotor mounting screw.





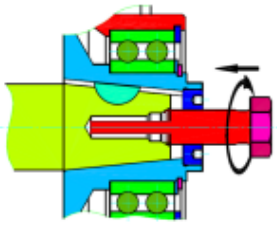
REMOVING THE M12 SCREW

LANG clutches only

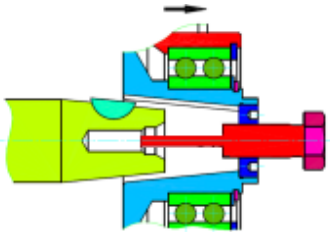
7.2. Use tool #680888 and screw it in the straining washer.

Tap with a soft hammer. The rotor will detach from the compressor shaft.

7.3. Remove the rotor.



PULL OFF THE ROTOR WITH TOOL #680888



TAKE OFF THE ROTOR

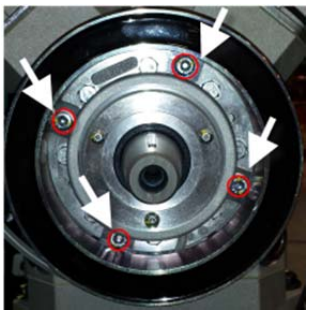
LANG clutches only

7.4. Loosen the fastening screws (4x) of the coil and pull the coil off the retainer.

7.5. Check the date code on the clutch pulley. If it is before S05 (May 2015), a new coil #950533 with date code starting *from* S05 (May 2015) will have to be installed in replacement of this one. **(CLEAN POINT IS MAY 2015)**.

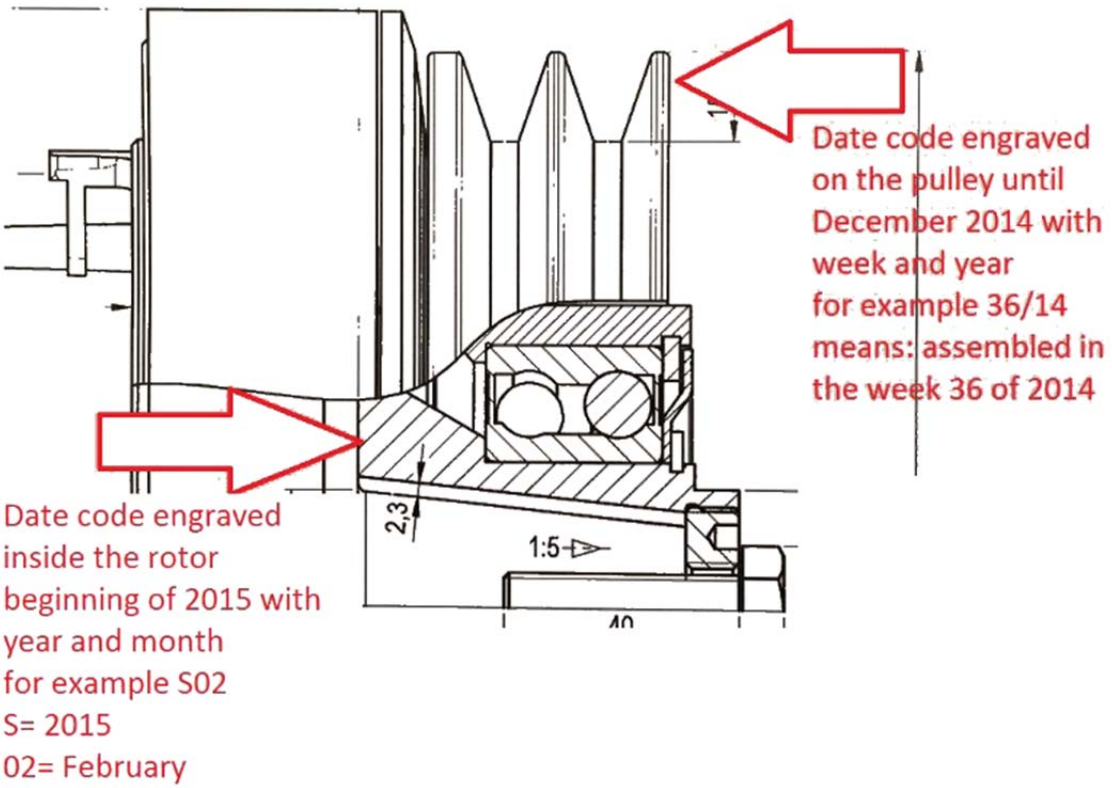
Do not install the clutch at this step. This will be done further in the bulletin.

Date code engraving location has changed beginning of 2015 (image below).



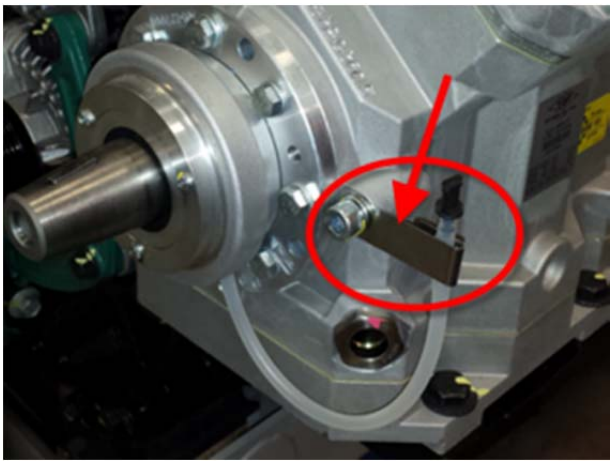
LANG clutches only

7.6. IF CLUTCH DOES NOT HAVE A DATE CODE, OR CODE FORMAT IS DIFFERENT FROM BELOW, **DO NOT REPLACE THE COIL.**



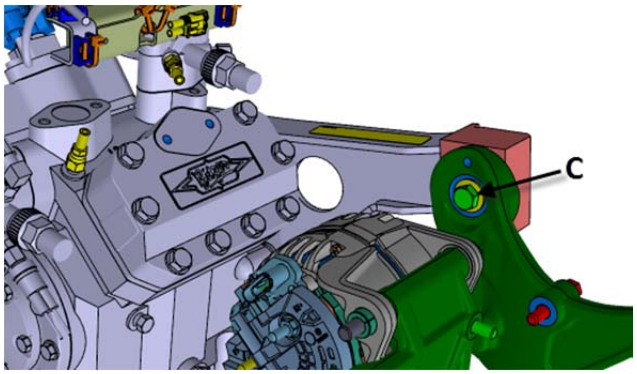
8. Remove the existing shaft seal drain tube and support.
9. Reinstall on the opposite side as seen on the image on the right.

   Note: Use existing hex socket head bolt and lock washer. Use blue Loctite 243 on threads.



10. Install new reinforcement bracket #457675 as shown using previously removed hardware (bolt (**C**) and flat washer). DO NOT tighten at this moment.

    Note: Use blue Loctite 243 on threads.

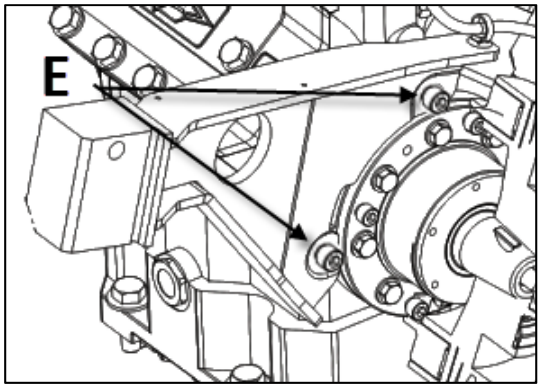


***LANG** clutches only*

10.1. Carry on with the installation of new reinforcement bracket #**457675** as shown. Use two "cylindrical head" socket cap screws #**5001616** (**E**).

*Tighten to **40 lbf-ft** (43 N-m)*

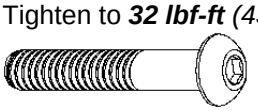
Note: Use blue Loctite 243 on threads.



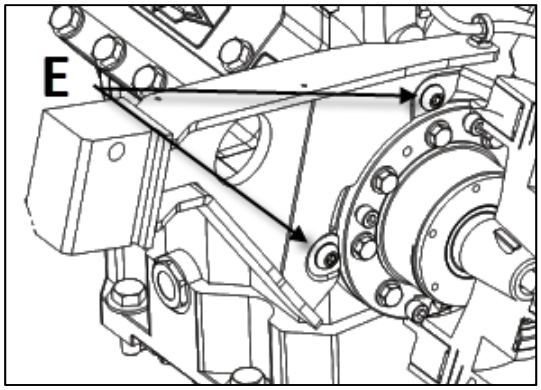
***LINNIG** clutches only:*

10.2. Carry on with the installation of new reinforcement bracket #**457675** as shown.

10.3. Any standard bolt head would interfere with the coil body, therefore use two button head cap screws #**502949** provided in the kit (**E**).
Tighten to ***32 lbf-ft** (43 N-m)*



Note: Use blue Loctite 243 on threads.

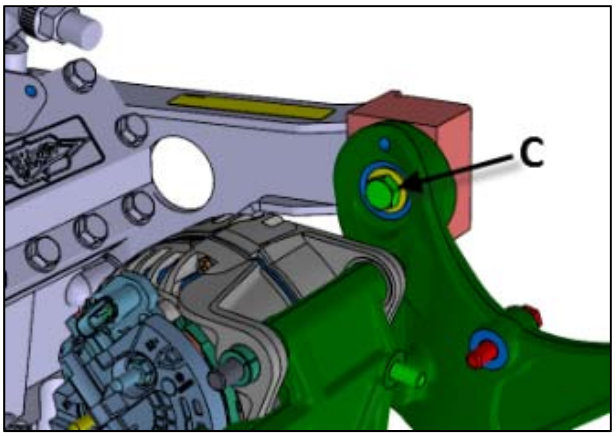


11. Tighten bolt in location (**C**).

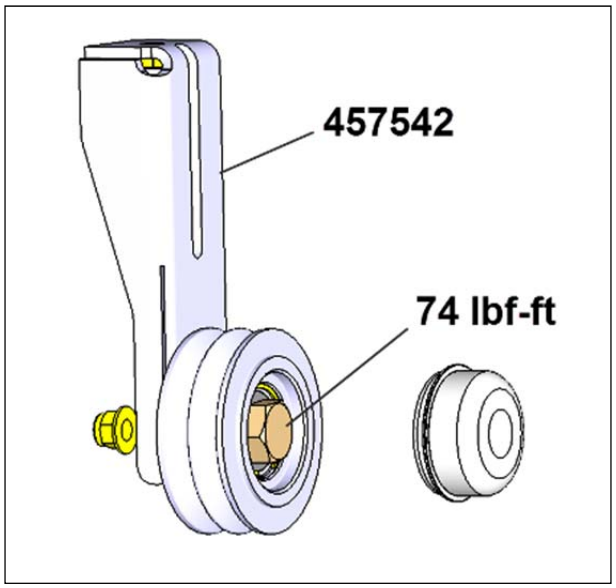
C*= *74 lbf-ft *(100 N-m)*

*Note: If bolts **C** & **E** are difficult to drive in hole, the compressor may be moved slightly to allow assembly. Loosen the compressor mounting bolts (4x) at the base.*

Once installed, tighten compressor mounting bolts to **74 lbf-ft.** *(100 N-m)*



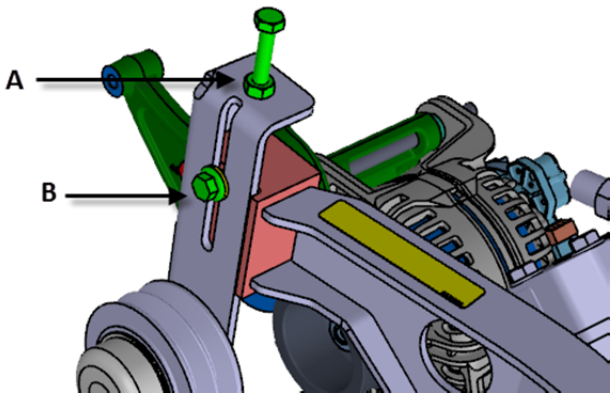
12. Pre-assemble the pulley on the new tensioner bracket #457542.
13. Tighten to **74 lbf-ft. (100 N-m)** and install dust cap.



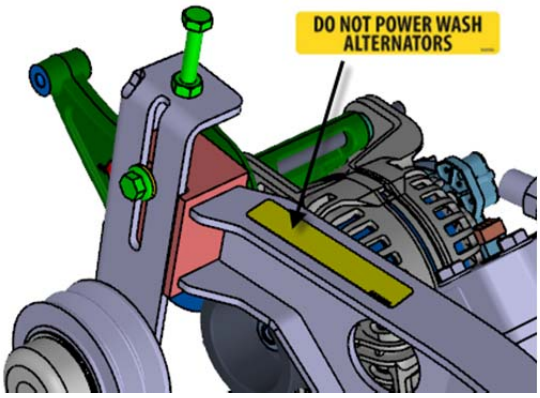
14. Reinstall tensioner, bolt and washer (**B**) and bolt and nut (**A**).

    Do not tighten these bolts yet.

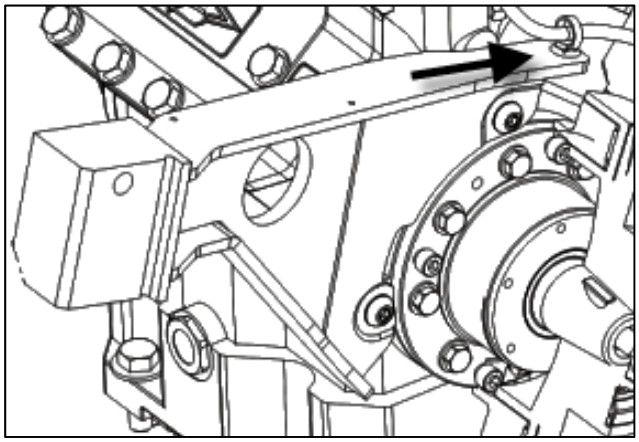
    Belt tension adjustment will be done later in this procedure.



15. Apply decal #069356 were indicated on the image.



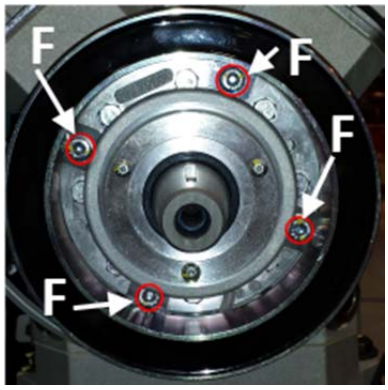
16. Install nylon tie mount #509815 where indicated on the image.



17. Reinstall the electromagnetic clutch coil. Slip the coil on the retainer on the compressor flange. Fasten the coil with 4 screws to the compressor. Do not buckle the cable.

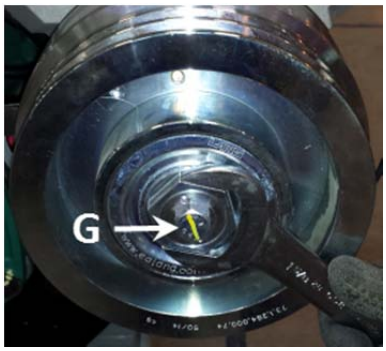
    Coil mounting screws (**F**): **22 lbf-ft** (30 N-m). *Use blue Loctite 243.*

    Caution: *Pay attention to the precise seat of the coil. A non-observance may cause damage to clutch components during operation.*



18. Mount the clutch on the shaft end.

    The flange and the shaft end of the compressor must be free from dirt. Apply high temperature approved assembly grease on the shaft end for easy dismounting of the clutch. Lang recommends the use of Molykote G-rapid-plus or Molykote P 40.



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

    Never use a hammer for pressing the rotor on.

    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.

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

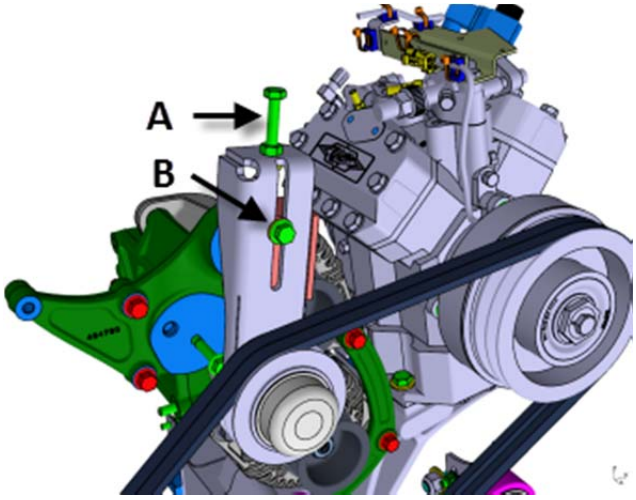
    *Rotor mounting screw (**G**):* **60 lbf-ft** *(81 N-m) Use blue Loctite 243.*

21. 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.

22. Reinstall the drive belts.

    On vehicles equipped with an auxiliary alternator (i.e. 2 different belts), the belts tension should be within this range:

    A belt strand tension gauge is needed
    150-160 lbs new belts (mean of 2 belt values)
    120-130 lbs used belts (mean of 2 belt values)

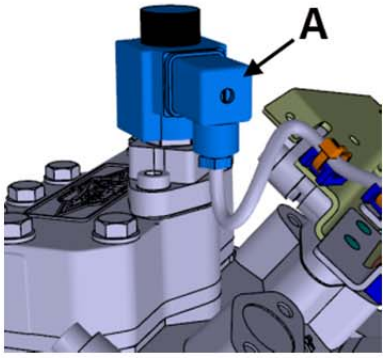


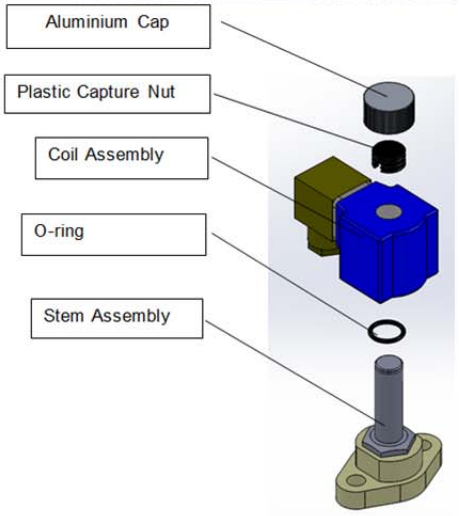
    Adjust belt tension using bolt (**A**). Use the jam nut to prevent rotation of bolt (**A**). When proper tension is achieved, tighten bolt (**B**) to **43 lbf-ft**. (58 N-m)

UNLOADER COIL REPLACEMENT

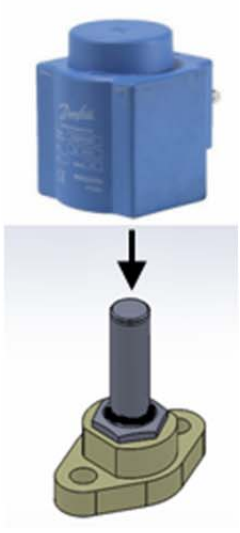
A new “clip-on” type unloader coil must be installed in order to avoid unloader failure.

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 later use.
2. Unscrew the aluminum cap and discard.
3. Remove the plastic capture nut and discard.
4. Remove the coil and discard
5. **Keep** the O-ring on the stem.





6. Install the new clip-on coil on the stem.
7. Slide the coil over the stem assembly with the O-ring at the base of the stem.



HARNESS #069206 INSTALLATION

Skip the harness installation if a brand new harness has been installed recently while performing WB14-06.

If you're not installing a new harness, DO NOT throw it away. Keep it as spare part for later use if required.

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 electromagnetic clutch

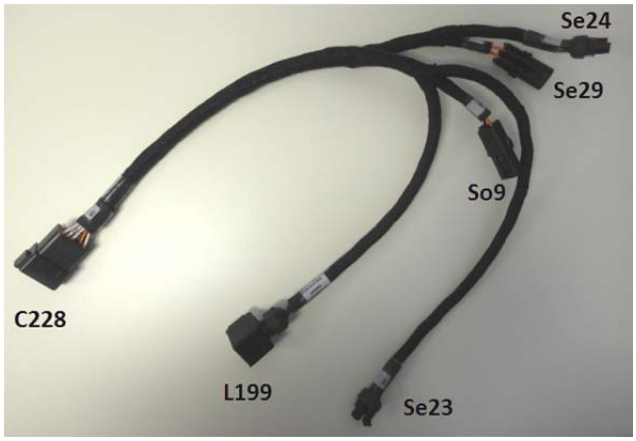
Se29: A/C pressure switch

L199: the R.H. side cylinder unloader coil

Se23: high side pressure transducer

Se24: low side pressure transducer

C228: other C228 connector half

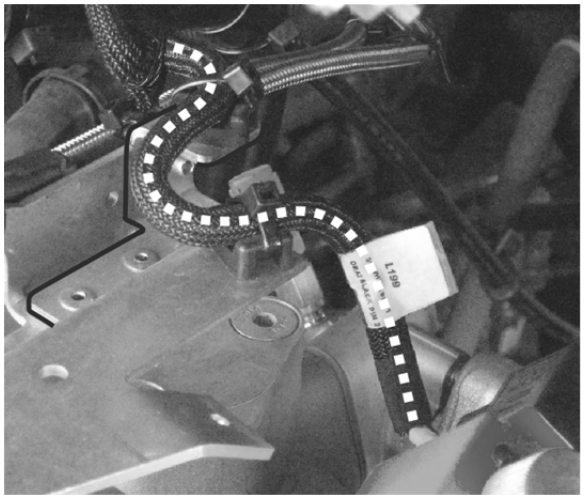


Take special care to route the harness according to the following figures.

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".

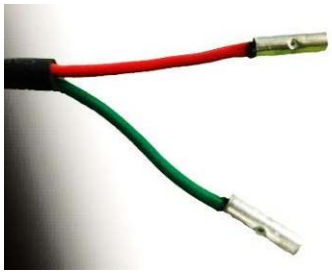
Secure the cable on the cable tie mounts where applicable.

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.



Electromagnetic clutch connector So9. The clutch should be connected directly (hard wired) to the harness without using So9.

4. Write down wire color matching then cut the clutch connectors **So9** on harness and compressor.
5. Slip shrink tube #062490 over each wire. Slip

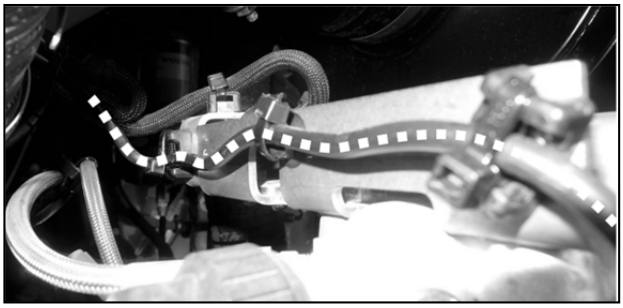


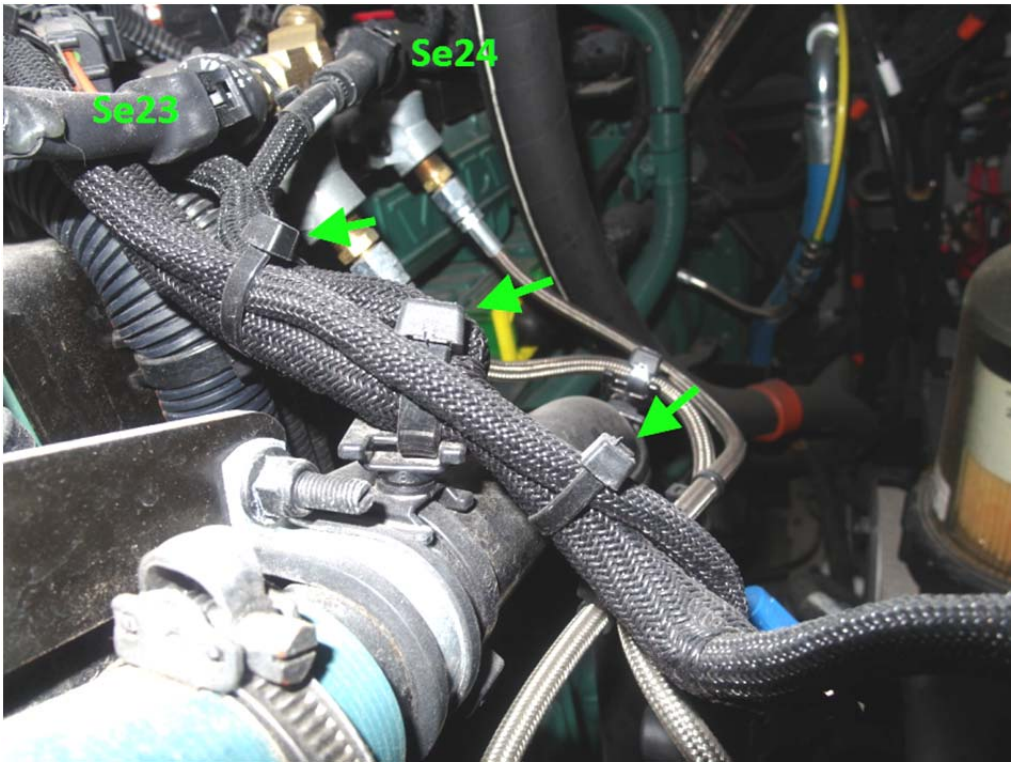
an additional shrink tube over cable insulation.

6. Refer to table below if required to match wire colours. (According to VIN of vehicle).

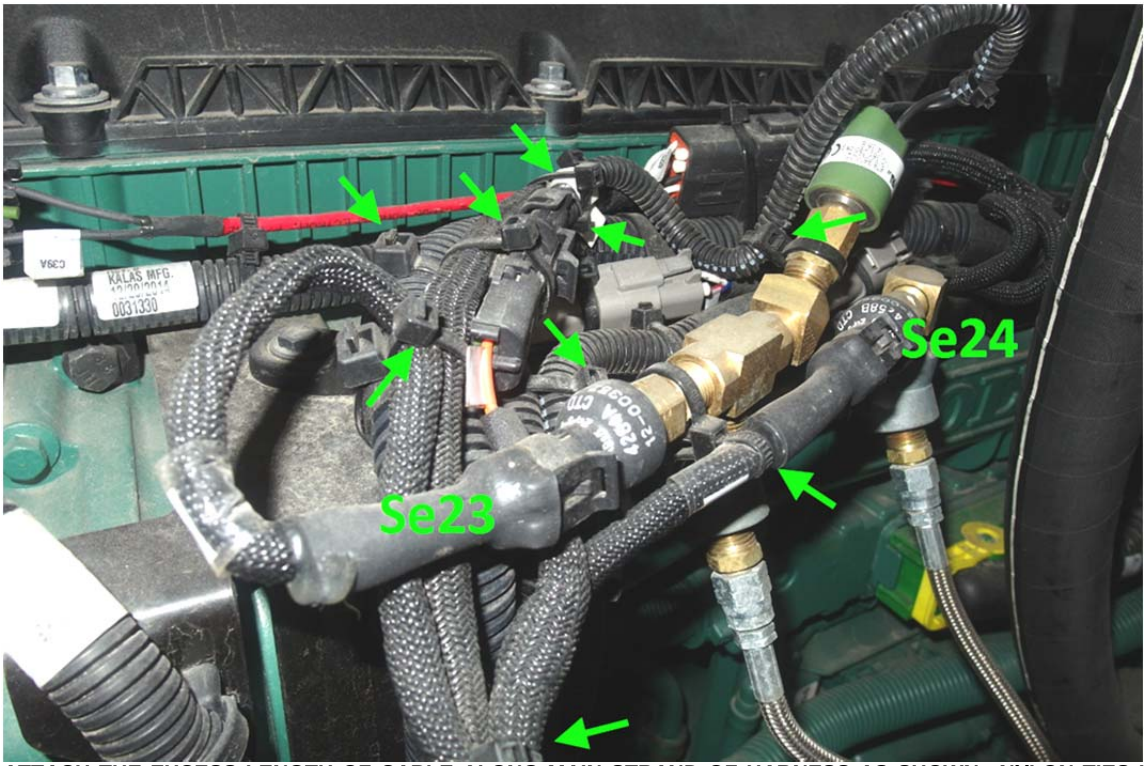
	Clutch side	**Harness** side
Up to E-5698 / E-2648 Excluded	Blue →	White
	Brown →	Orange
From E-5698 / E-2648 And up	Red →	Orange
	Green →	Black

7. According to table, splice wires with butt slice #562228. Crimp and solder. Inspect to make sure you have a good crimp and solder.
8. Seal each wire with shrink tube. Seal over the two wires and cable isolation with shrink tube.
9. Attach clutch cable along bracket as shown.

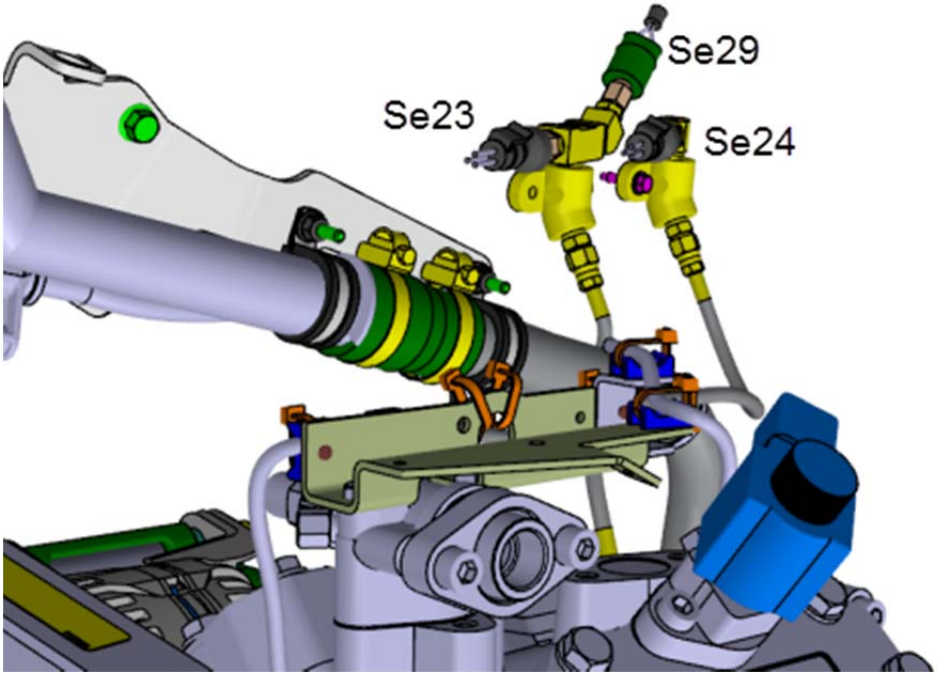




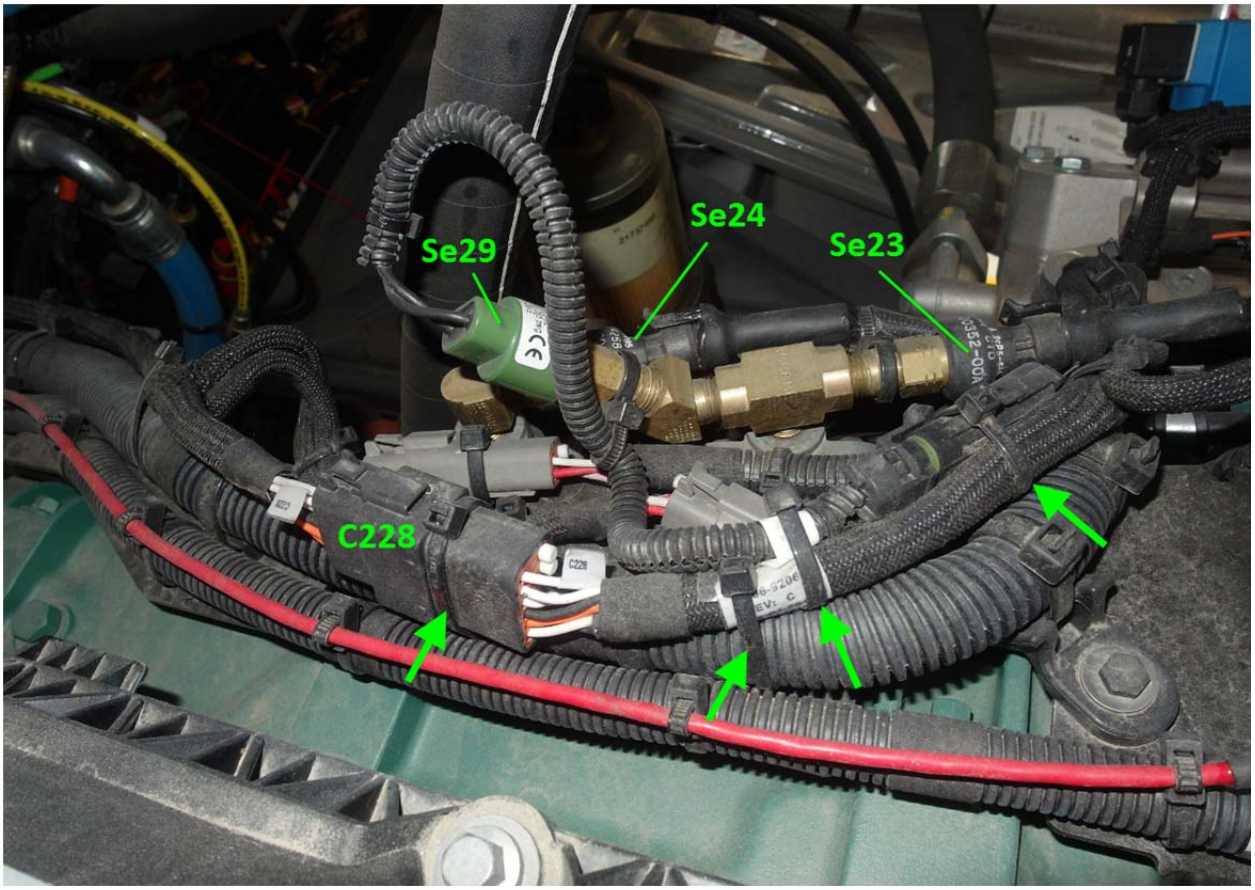
ATTACH THE EXCESS LENGTH OF CABLE ALONG MAIN STRAND OF HARNESS AS SHOWN– NYLON TIES LOCATION SHOWN BY ARROWS



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



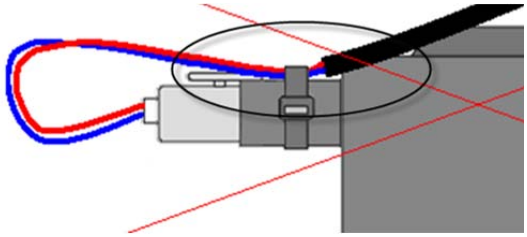
SENSOR IDENTIFICATION



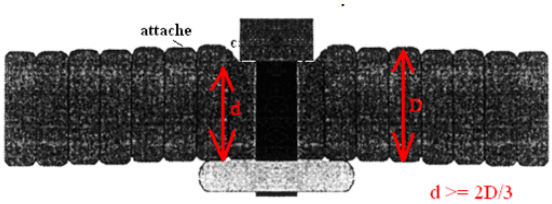
ATTACH THE EXCESS LENGTH OF CABLE ALONG MAIN STRAND OF HARNESS AS SHOWN– NYLON TIES LOCATION SHOWN BY ARROWS

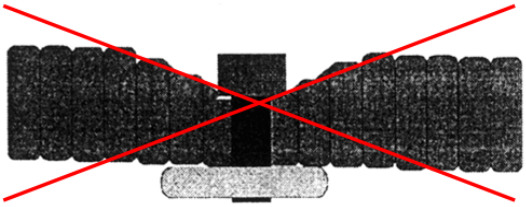
BEST PRACTICES FOR CABLE SECUREMENT AND ROUTING

(Source: engineering Spec 20.0)

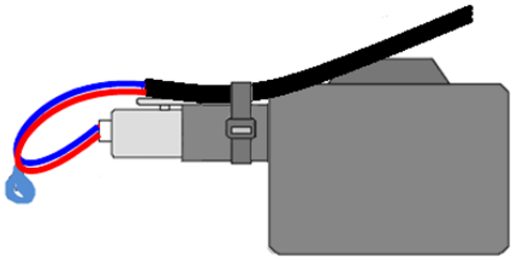


- Prefer larger cable ties over smaller cable ties in your assembly to limit local pinch effect.
- Avoid sharp edges to prevent chaffing and abrasion.
- Always attach over harness loom or corrugated tubes, not on the bare cables themselves.
- No over-tightening of cable ties. (Must only prevent harness movement)

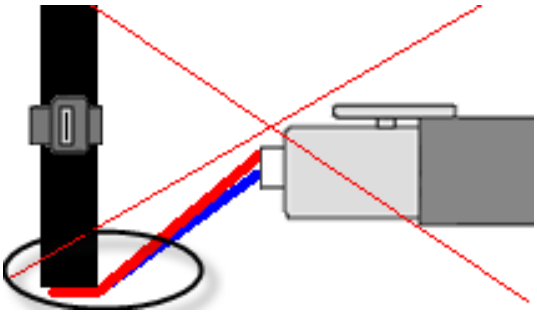




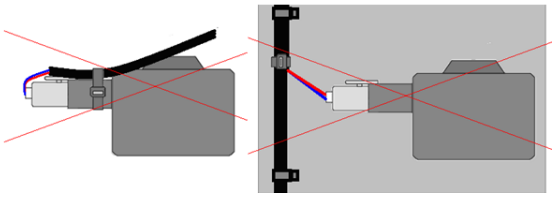
- Perform smart harness routing to prevent water intrusion in the connectors. (nearest low point: below connector)



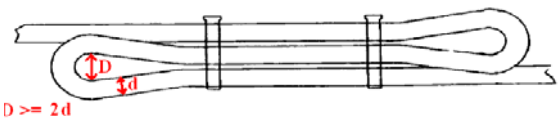
- Also avoid sharp edges of plastic corrugated tubes.



- No pulling or tension on connections.



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



Assembly instructions for electromagnetic clutches series LA16

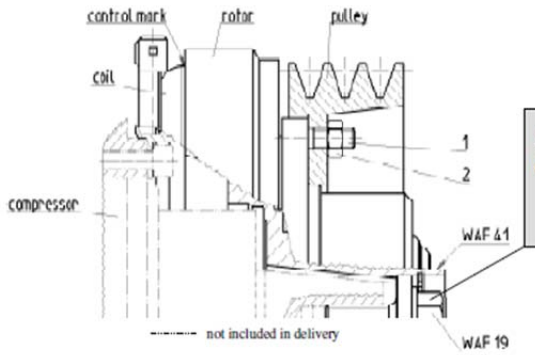
LINNIG®
Antriebstechnik

P.O.Box 1430
88672 Markdorf
Tel. +49 7544 / 9640
Fax. +49 7544 / 6218
Internet: http://www.linnig.com
Mail: webinfo@linnig.com

LINNIG-No.: 142.081
Revision: E
Rev.-Date: 22.11.2005

Assembly instruction:

1. Attach coil according to instruction manual of the compressor manufacturer. Connect cable in a way that avoids contact with hot components (only if coil contents a cable). t_{max} = 105°C
2. **Remove circlip and holding-down bolt** from clutch-assembly. Slide clutch-assembly onto compressor shaft. Look through the center-hole for a correct position of the compressor shaft key in the rotor-keyway. Rotor should turn freely **without touching the coil.** Consider the control mark! Insert and tighten holding-down bolt M12 **(tightening torque Ma = 85 Nm , Ma = 63 lbs.ft).** Hold down the rotor with an open-ended spanner or ring spanner WAF41. Insert circlip.
3. Slide pulley over the stud screws (1) and bolt on with nuts M8 DIN 934-8 (2) (only for LA16.3; for other LA16 is pulley integrated part of the clutch).
4. Connect cable respectively connector. The connection is independent of polarity. Allowed operating voltage 21 – 32 VDC.



very important !!!
holding-down bolt
Ma = 85 Nm
Ma = 63 lbs.ft

Disassembly instruction:

For disassembly **grease** circlip (do not romove circlip) and turn the holding-down bolt left to loosen. Hold down the rotor with an open-ended spanner or ring spanner WAF41. In this way the clutch will be disconnected from the cone-shaft.

! With any other method of disassembly (press or hammer) you risk a damage of the clutch. Clutch damages in this mode are outside any warrenty. !

PARTS / WASTE DISPOSAL

DO NOT RETURN THE REPLACED PARTS. Discard waste according to applicable environmental regulations (Municipal/State[Prov.]/ Federal)

WARRANTY

This modification is covered by Prevost's normal warranty. We will reimburse you the parts and 2 hours (2.0) of labor upon receipt of a warranty claim. Please submit claim via our Online Warranty System, available at www.prevostcar.com (under Service \ Warranty section). Use Claim Type: "Bulletin/Recall" and select ''Warranty Bulletin WB15-48".

OTHER

VBC Bulletin	N/A
Fail Code	22.00
Defect Code	09
Syst. Cond	B
Causal Part	950002

Access all our Service Bulletins on *https://secureus5.volvo.com/technicalpublications/en/pub.asp* or scan the QR-Code with your smart phone.

E-mail us at **technicalpublications_prev@volvo.com** and type "ADD" in the subject to receive our warranty bulletins by e-mail.