

Technical Bulletin



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Subject: **Bendix® Oil Management Kits for Electric Compressors**



Figure 1 – ESM2 and EVM1

OVERVIEW

Aftermarket service kits are available to enhance the robustness of the oil return channel in Bendix® electric compressors, particularly for instances where the oil separator cartridge exhibits corrosion. The oil management kits are recommended for preventive maintenance to maintain optimal compressor performance and as a corrective action to help prevent oil-related issues for both the Bendix® ESM2™ (Electric Screw Module 2) and Bendix® EVM1 (Electric Vane Module 1). *Refer to Table 1* for available aftermarket service kits.

Kit Part Number	Kit Description
K195909	Oil Separator Cartridge Kit
K263404	Tube Kit
K201902	Oil Separator Support Kit (ESM Only)
K201908	Oil Plug Kit (qty 4)
K250712	5-gallon Oil Kit
K263405	Electric Compressor Oil (1 quart)

Table 1 – Oil Management Kits

NOTE: The Oil Separator Cartridge and Plug are also available in K263406, ESM/EVM Preventive Maintenance Kit.

The ESM and EVM use the same cartridge and tube. Obsolete/older versions of cartridges and tubes may contribute to oil-related issues. Perform the steps in *Cartridge and Tube Identification*. Once the cartridge and/or tube version is identified, the applicable service kit procedure can be followed. Following any of the service kit procedures, perform the steps in the *Oil Top-off Procedure*.

Review all applicable service documentation and safety information before continuing with these procedures. *Refer to B2Bendix.com for available documentation.*

Document Number	Document Title
SD-11-290	Bendix® 400V and 600V ESM2™ (Electric Screw Module 2) Service Data Sheet
BW8213	Bendix® ESM™ Preventive Maintenance Kit
BW8236	Bendix® ESM™ (Electric Screw Module) Handling and Packaging Instructions
TCH-11-003	Bendix® 600-volt Electric Screw Module 1 (ESM1)

Table 2 – Reference Documentation on B2Bendix.com



GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS

TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following guidelines should be observed AT ALL TIMES:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, a Bendix® AD-9si®, AD-HF®, or AD-HFi® air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

WARNING SIGNS USED THROUGHOUT THIS DOCUMENT:
Warning messages in this document draw the reader's attention to the individual risks concerning use of the product. Warning messages and notes generally precede the descriptions of the relevant applications. Warning messages are subdivided into the following hazard levels in this document:



WARNING

Warning: identifies hazardous conditions and actions that could cause bodily harm and/or death.



CAUTION

Caution: identifies conditions and actions that could damage the device, vehicle, other equipment, or cause permanent loss of data.



ELECTRICAL SHOCK

Electrical Shock Hazard: identifies high-voltage electrical conditions, and the user may need special training and high-voltage personal protective equipment (PPE), as mandated by local or national authorities when working in hazardous conditions.



WARNING



ELECTRICAL SHOCK

The ESM and EVM are high-voltage devices. Do not attempt to perform any service to the ESM or EVM without appropriate Personal Protective Equipment (PPE). Service of a high-voltage system on a vehicle is restricted to qualified personnel certified in High Voltage. Follow all vehicle manufacturer instructions for de-energizing the vehicle before performing any service related to the ESM or EVM. Use proper PPE as required by local or national authorities when working in hazardous areas and/or high-voltage devices. Do not attempt to open or disassemble the high-voltage motor or compressor. Failure to follow these instructions may result in serious personal injury and/or death.

CARTRIDGE AND TUBE IDENTIFICATION



Air will depressurize through the fitting.

1. Remove the insulation or cover over the oil-coalescing cartridge by removing either the panel clips or fasteners using the appropriate tool (not included in the kits). See Figure 2.

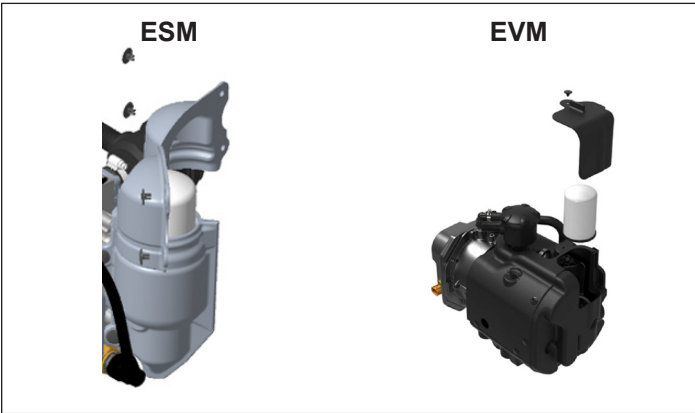


Figure 2 – Insulation Removal

2. Depressurize the compressor by partially unscrewing the vacuum drainage/fill plug (one turn). Wait until the pressure is entirely vented. Retain the insulation and the vacuum drainage/fill plug. See Figure 5.
3. Remove the cartridge using a filter wrench. Identify the cartridge version. See Figure 3 and refer to Table 3.

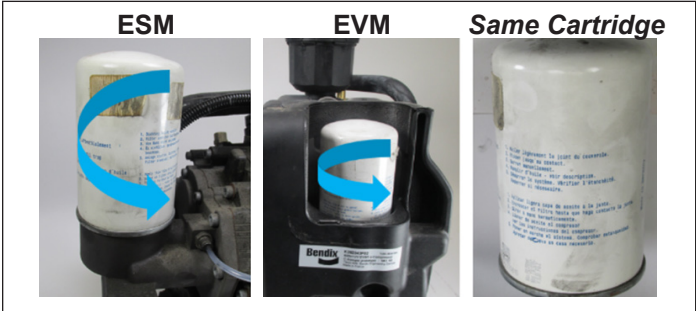


Figure 3 – Cartridge Removal

4. Identify the tube version. See Figure 4.

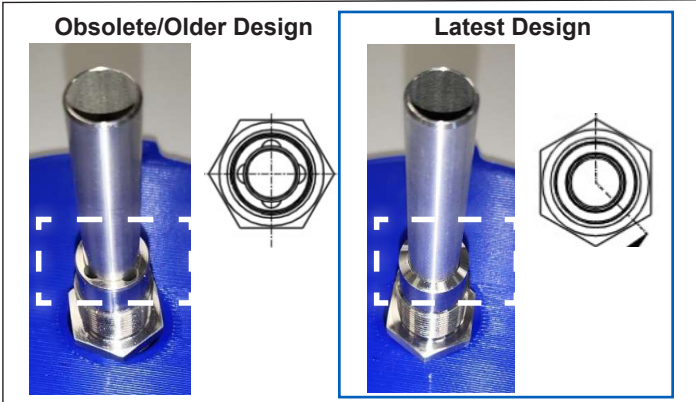


Figure 4 – Tube Version Identification

Obsolete/Older Designs				Latest Design
Part Number	C108898	K268273	K289194	K289194
Identification	Part Number	Part Number	Part Number (may not have date code)	Part Number (with date code)
O-ring	Yes	No	No	Yes
				
Image				

Table 3 – Cartridge Version Identification

OIL SEPARATOR CARTRIDGE KIT AND TUBE KIT PROCEDURE – ESM OR EVM PREVENTIVE MAINTENANCE

Follow these steps to install the new tube (K263404) and change the cartridge (K195909) for the ESM or EVM. Refer to Table 4 and see Figure 5.

Figure Item Number	Description
1	Oil Separator Cartridge Kit (K195909)
2	Tube Kit (K263404)

Table 4 – Oil Separator Cartridge Kit and Tube Kit

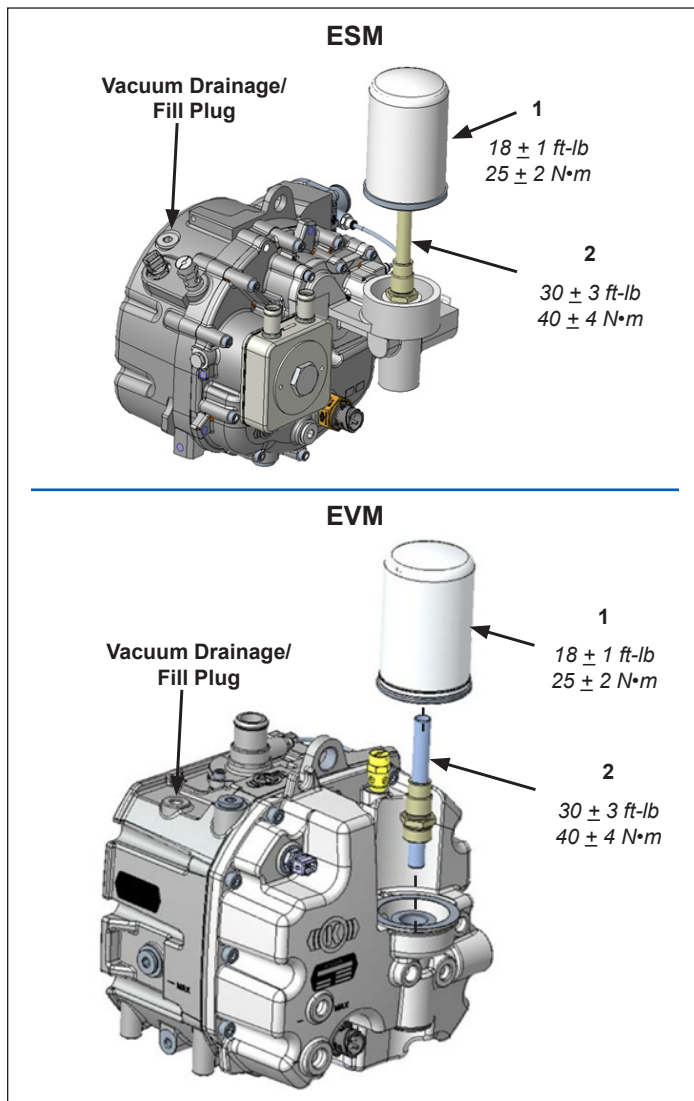


Figure 5 – Oil Separator Cartridge Kit and Tube Kit Contents - ESM and EVM

1. Complete the *Cartridge and Tube Identification* procedure on page 3.
2. Unscrew the filter tube using a 27-mm socket or wrench and discard the tube. See Figure 6. **NOTE:** Obsolete/older designs of tubes may contribute to oil-related issues. See Figure 4 to assist in identifying the tube version and replace the tube if it is the obsolete/older design.

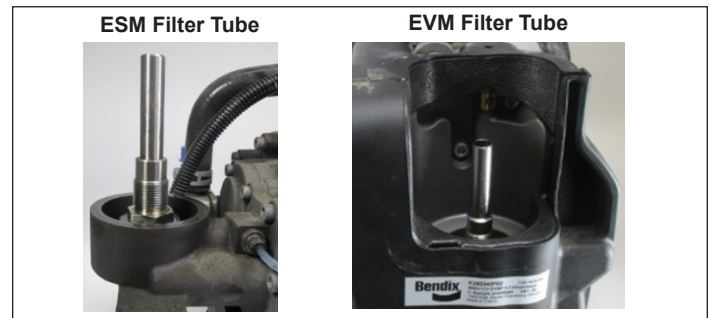


Figure 6 – Discard Filter Tube

3. Install the new tube and tighten it to 30 ft-lb (40 N·m) with a 27-mm socket or wrench.
4. Lubricate the o-ring of the new cartridge and hand tighten the new cartridge, adding an extra quarter turn. See Figure 7.

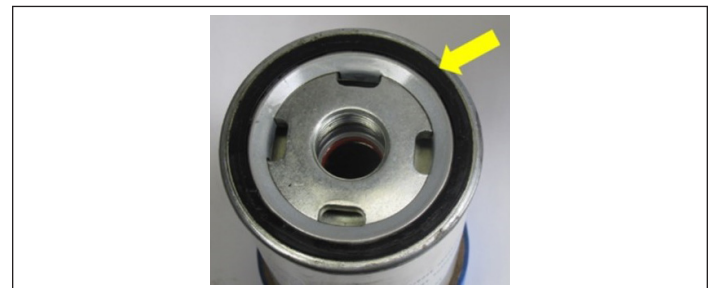


Figure 7 – Lubricate O-ring

5. Reinstall the insulation over the new cartridge.
6. Complete the *Oil Top-Off* procedure on pages 6-7.

OIL SEPARATOR CARTRIDGE KIT PROCEDURE – ESM OR EVM PREVENTIVE MAINTENANCE

Follow these steps to change the cartridge (K195909) for the ESM or EVM. Refer to Table 5 and see Figure 8.

Figure Item Number	Description	Quantity
1	Oil Separator Cartridge	1

Table 5 – K195909 Contents

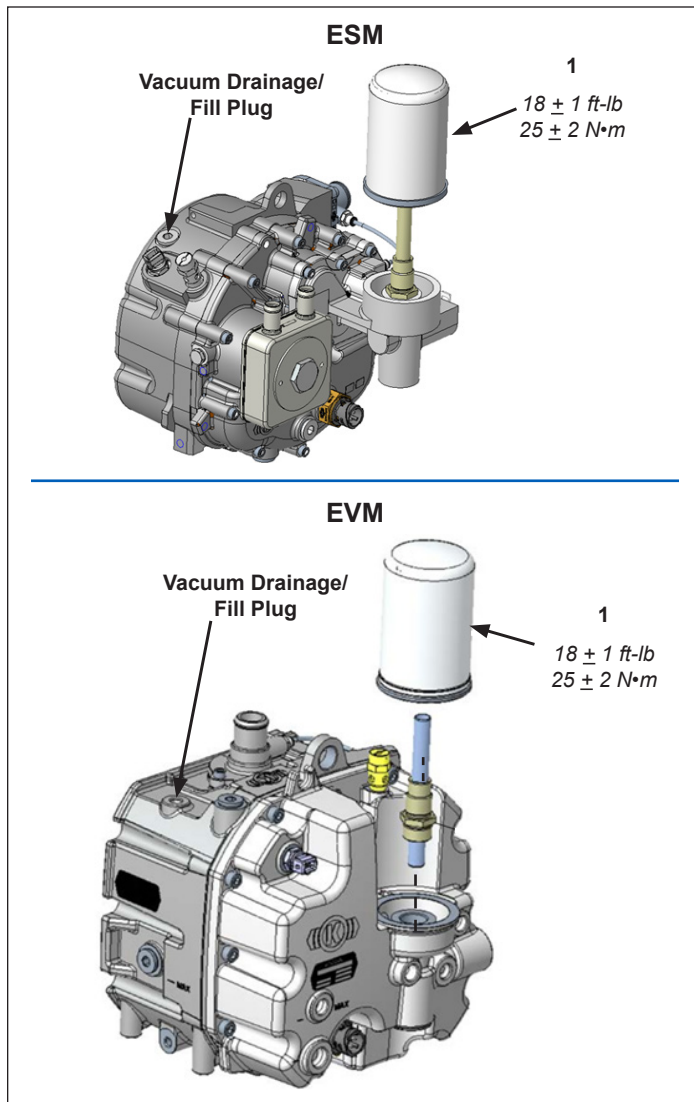


Figure 8 – Oil Separator Cartridge Kit Contents - ESM and EVM

1. Complete the *Cartridge and Tube Identification* procedure on page 3.
2. Verify whether the tube is the old or new design. The new design is modified to help avoid corrosion particles from entering the oil return channel. See Figure 4.
 - If the tube is the old design, follow the instructions in the *Tube Kit Procedure* section of this document to replace the tube. The tube kit (no cartridge included) is Bendix part number K263404.
 - If the tube is the new design, clean the tube by removing any particles from the tube and nut. Ensure that the oil clearance passage (where the tube and nut meet as shown in Figure 4) is free and clear of debris while exercising caution to not push debris into the tube.
3. Lubricate the o-ring of the new cartridge and hand tighten the new cartridge, adding an extra quarter turn. See Figure 9.

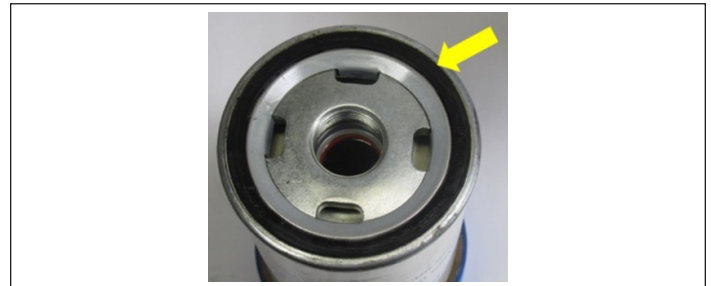


Figure 9 – Lubricate O-ring

4. Reinstall the insulation over the new cartridge.
5. Complete the *Oil Top-Off* procedure on pages 6-7.

OIL SEPARATOR SUPPORT KIT PROCEDURE – *ESM ONLY WITH ORIGINAL TUBE SHOWING OIL CARRYOVER*

Follow these steps to install the new oil separator kit (K201902) for the ESM. *Refer to Table 6 and see Figure 10.*

Figure Item Number	Description	Quantity
1	Gasket	1
2	Oil Separator Support	1
3	Screw	7

Table 6 – K201902 Contents

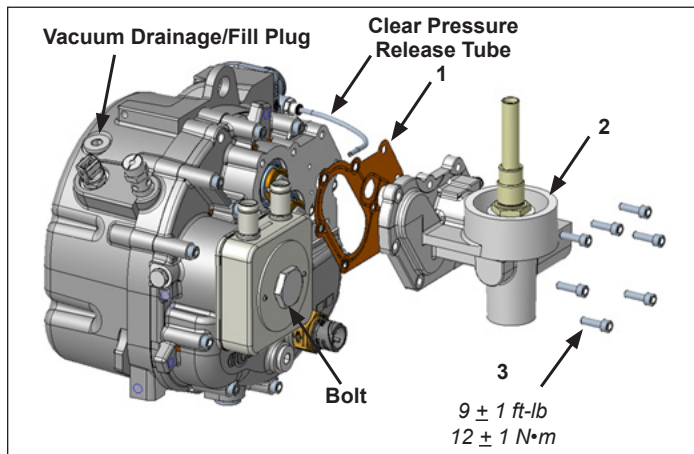


Figure 10 – Oil Separator Cartridge Kit Contents - ESM

1. Complete the *Cartridge and Tube Identification* procedure on page 3.
2. Disconnect the clear pressure release tube (quick disconnect) from the oil separator support.
3. Loosen the oil cooler bolt by ½ turn and rotate it to provide access to the oil trap support screws.
4. Remove and discard the screws, oil separator support, and gasket.
5. Install the new gasket, oil separator support, and screws.
6. Rotate the oil cooler to a vertical orientation and tighten the bolt to 30 ft-lb (40 N·m) using a 30-mm (1 ¼-in.) socket or wrench.
7. Reconnect the clear pressure release tube (quick disconnect) to the new oil separator support.
8. Follow the instructions in the *Oil Separator Cartridge Kit Procedure* section of this document to install a new cartridge using K195909 (Oil Separator Cartridge Kit).
9. Reinstall the insulation over the cartridge.
10. Complete the *Oil Top-Off* procedure on pages 6-7.

OIL TOP-OFF PROCEDURE

Oil should be topped off only when:

- The vehicle is level when it is parked on level ground so that the tilt of the truck does not cause the oil to be filled too much or too little; and
- The compressor has been powered off.

Kit Part Number	Kit Description
K201908	Oil Plug Kit (qty 4)
K250712	5-gallon Oil Kit
K263405	1-quart Oil Kit

Table 7 – Oil Kits



WARNING

There is a possibility of pressure build-up in the compressor housing. Particles flung outwards may cause serious eye or other injuries. Cautiously unscrew the vacuum drainage plug.

NOTE: Oil may run out while the oil inspection plug is being unscrewed. See Figure 11.

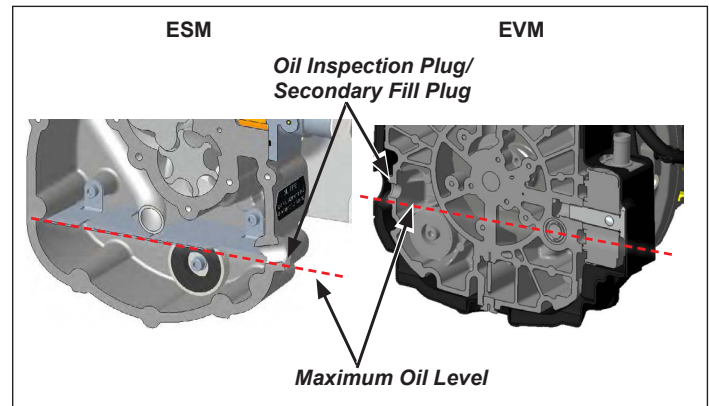


Figure 11 – Oil Level Check

1. Ensure the compressor is off (ignition key off). Disconnect the low-voltage vehicle connector to prevent the module from restarting. See Figure 12.
2. See Figure 13. Unless already completed, perform the following steps:
 - a. Partially unscrew the filling plug (one turn).
 - b. Wait until the pressure is entirely vented.
3. Unless already completed, unscrew oil inspection plug/secondary fill plug.
4. Fill the compressor with Chevron® Cetus® PAO 46 oil until the oil reaches the bottom of the thread shown in Figure 11.
5. Screw in both the vacuum drainage plug/filling plug and the oil inspection plug/secondary filling plug, including new sealing washers. Tighten to 29.5 ± 3 ft-lb (40 ± 4 N·m).

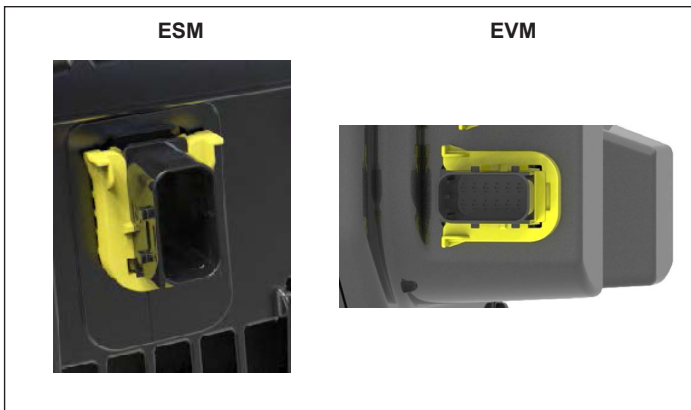


Figure 12 – Low-Voltage Connector

**CAUTION**

All insulation components removed during maintenance must be properly reinstalled and secured after servicing the component. Some parts, such as clips, may need to be replaced. Refer to B2Bendix.com.

TECHNICAL ASSISTANCE

For additional assistance, the Bendix Tech Team can be reached by phone at 1-800-AIR-BRAKE (1-800-247-2725) or by email at techteam@bendix.com. Bendix Tech Team representatives are available Monday through Thursday, 8:00 a.m. – 6:00 p.m., and Friday, 8:00 a.m. – 5:00 p.m. ET.

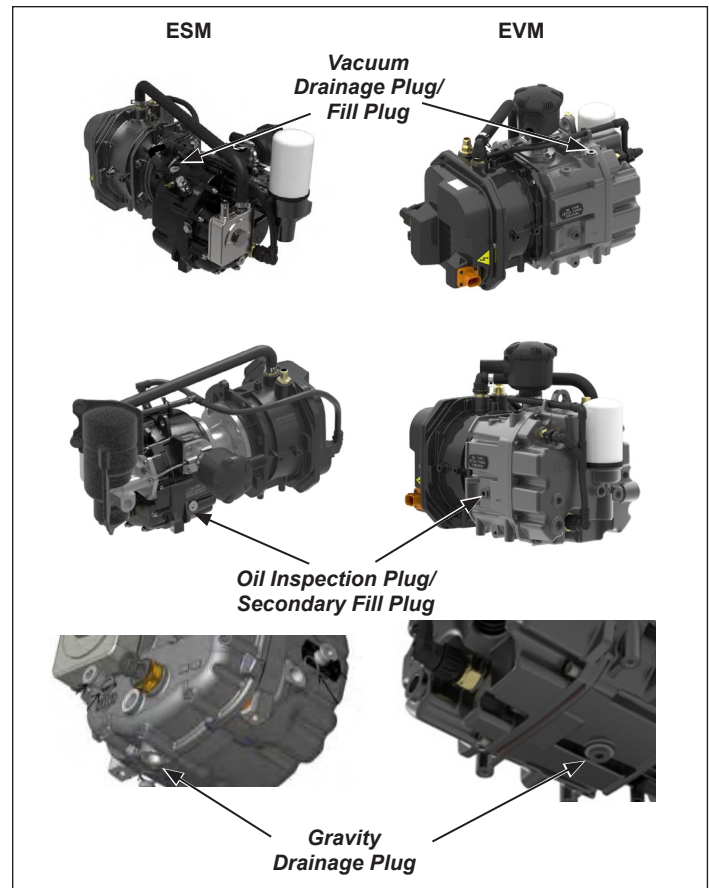


Figure 13 – Drainage and Filling Plugs

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