



INSTRUCTION TO SERVICE

ITS: 5118	
SECTION:	549 HVAC
WRITTEN BY:	Kevin Robinson
SUBJECT:	Remove and replace copper lines at the booster pump

ITS5118

**Complete this ITS for SR1492, SR1493, SR1508, SR1509
and SR1516 ONLY.**

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PROCEDURE:

1. Turn the main battery disconnect switch to the “OFF” position.
2. Access the tubes at the booster pump.
3. Isolate the coolant lines at the engine and booster pump from the rest of the bus by shutting the valve at the lower radiator tube as well as the valve downstream from the auxiliary heater.
4. Place a drain pan beneath the booster pump.
5. Disconnect the inlet and discharge lines from the booster pump by loosening the gear clamps at the booster pump. Retain gear clamps for re-use.
6. Remove the booster pump from the bus by removing the four bolts. Retain all hardware for re-use.
7. Remove the copper discharge tube assembly connecting the booster pump to the auxiliary heater.
 - a. Remove the tube clamp securing the tube assembly to the bus. Retain all hardware for re-use.
 - b. Loosen the gear clamp securing the copper tube assembly to the silicone hose at the auxiliary heater.
 - c. Remove and discard the copper tube assembly.
 - d. Leave the silicone elbow attached to the auxiliary heater and retain the gear clamps for re-use.
 - e. Retain the straight section of silicone hose and the two gear clamps that connected the booster pump to the copper discharge tube assembly.
8. Remove the copper tube assembly, silicone hoses and copper elbow connecting the booster pump to the engine.
 - a. Loosen the gear clamp securing the copper tube assembly to the silicone elbow at the auxiliary heater. Keep the elbow and gear clamps for re-use.
 - b. Loosen the gear clamp securing the silicone hose to the engine block. Discard the gear clamp.
 - c. Remove the tube clamps securing the tube assembly to the bus. Discard the clamps, cover plates and hardware.
 - d. Remove copper tube assembly, silicone hoses and copper elbow assembly and discard it.
9. Remove the existing clamp support bracket by removing the two screws securing it. Discard the hardware.
10. Place the supplied clamp support bracket (NF PN 484987) in the location shown in Figure 1 and secure it in place with two 1/4 inch self tapping screws.(NF PN 34S04012) and two flat washers (NF PN 10W04000). Notch behind the bracket as required for clearance. Apply primer to bare metal revealed by removal of the clamp plate. Refer to Appendix A for primer application instructions.

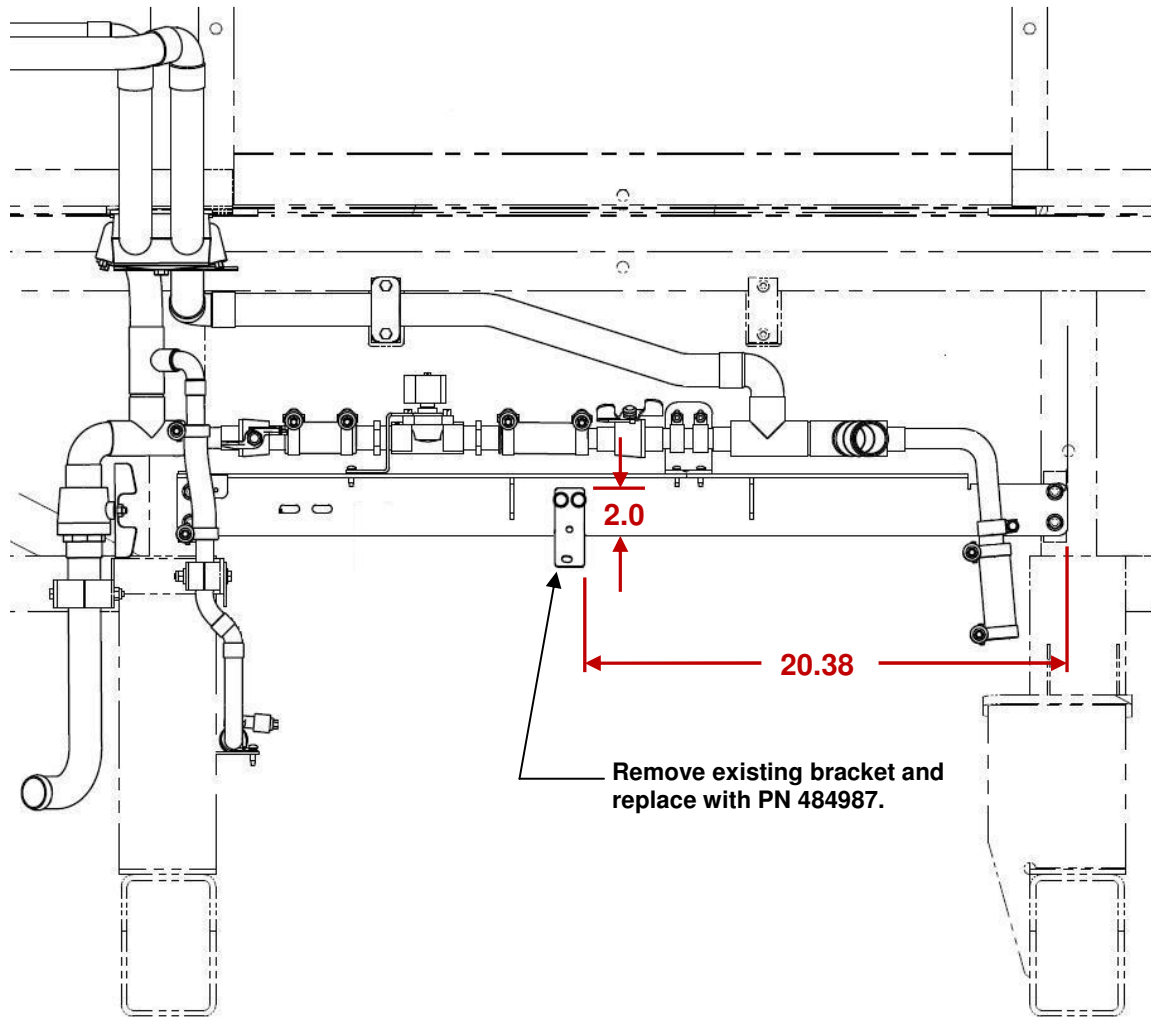


Figure 1 – Clamp Plates (Aux heater and engine removed for clarity)

11. Remove the clamp plate from the tube clamp that supports the vertical tube from the under floor heater lines on the street side of the bus and replace it with the new supplied clamp plate (NF PN 482984). Secure the new plate with the hardware removed from the old one but replace the two nuts with new ones (NF PN 40N04000).

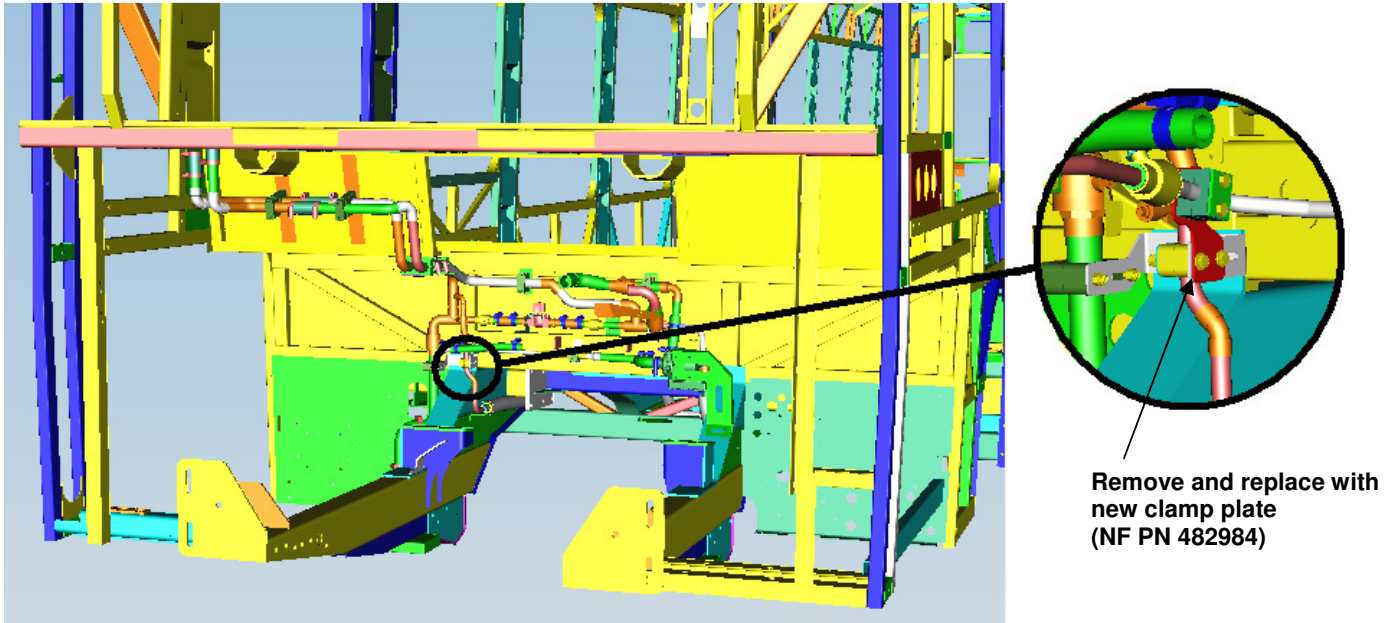


Figure 2: Clamp Plate Swap Out

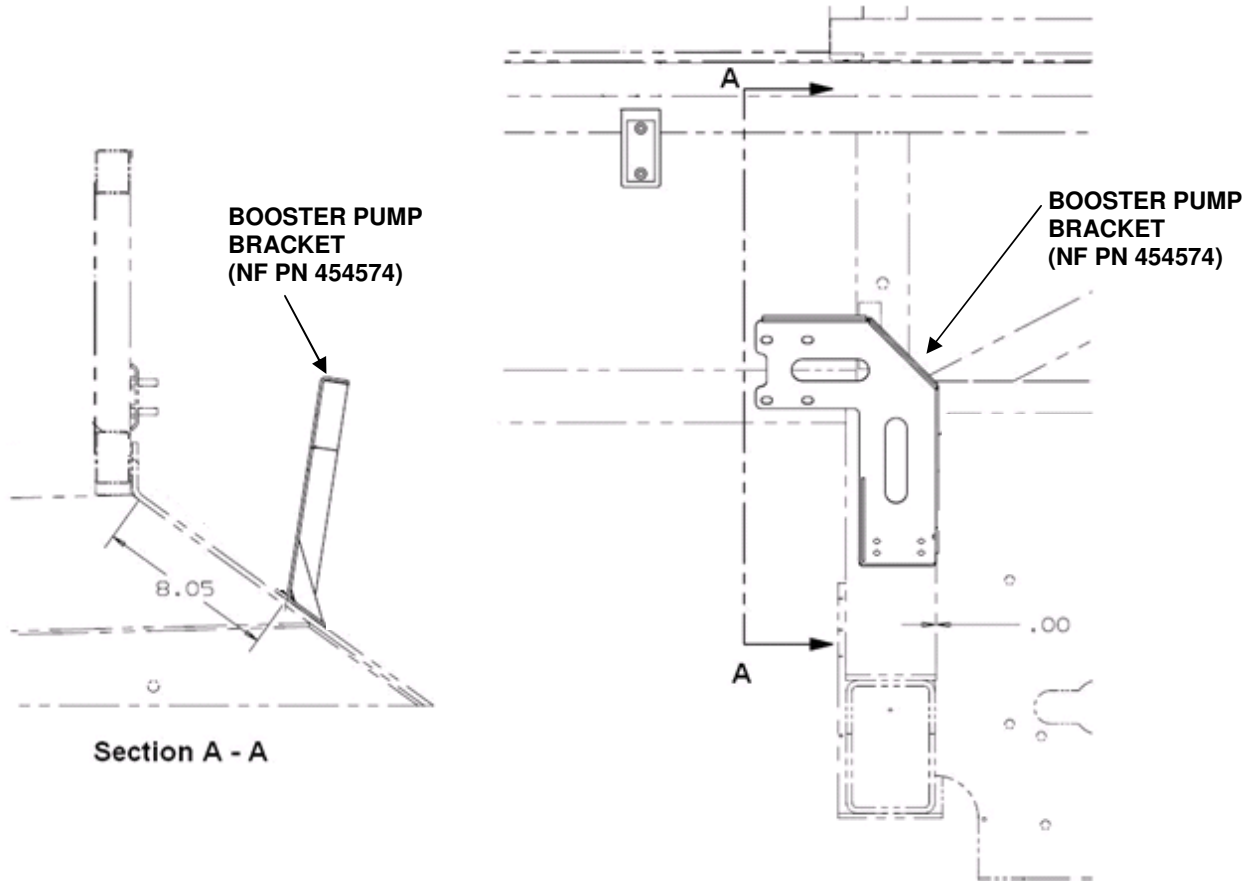



Figure 3: Placement of New Booster Pump Bracket



12. Replace the booster pump bracket.
 - a. Remove the existing booster pump bracket, by grinding, from the bus and discard.
 - b. Place the new booster pump bracket (NF PN 454574) in place where the previous one was removed from using dimensions shown in Figure 3 and mark the centers of the four mounting holes.
 - c. Drill out the four holes using an F sized drill bit (0.257 dia) and then tap 5/16-18 UNC.
 - d. Apply primer to any exposed metal. Refer to Appendix A for primer application instructions. Secure the new booster pump bracket (NF PN 454574) with supplied 5/16-18 bolts (NF PN 20B05012), 5/16 lock washer (NF PN 51W05000) and 5/16 flat washer (NF PN 50W05000). Torque to 27 ft lbs.
 - e. Apply corashield to the bracket and areas cleaned of corashield during removal of the previous bracket. Leave the area where the booster pump mounts clean of corashield. Refer to Appendix A for corashield application instructions.
 13. Secure the booster pump to the newly installed bracket (NF PN 454574) using hardware removed previously.
 14. Reconnect the booster pump to the coach harness.
 15. Remove the 90 degree adapter from the Cummins block and replace it with the new larger supplied copper elbow (NF PN 6409017). Re-use the existing mounting hardware.
 16. Secure the new inlet tube assembly (NF PN 485156) to the bus using the two supplied clamps (NF PN 068060) bolted to the two new clamp brackets, installed in previous steps. Secure the clamps with two ¼-20 x 2.0 inch bolts (NF PN 10B04032) each and use the supplied clamp cover plates (NF PN 068497). The clamp at the under floor heater lines will also require two lock nuts which are supplied (NF PN 40N04000). Leave the bolts loose for now to allow for adjustments once all components are attached.
 17. Secure the new copper tube assembly to the CAC support bracket using the supplied tube clamp (NF PN 068060), two ¼-20 x 2.5 inch bolts (NF PN 10B04040), clamp plate (NF PN 068497) and two ¼-20 nylon lock nuts (NF PN 40N04000). Leave the bolts loose for now to allow for adjustments once all components are attached.
-  **NOTE: Review clamp location on the CAC support bracket. As required ream or drill out the existing holes so that the supplied tube clamp (NF PN 068060) can be secured without stressing the new copper tube assembly**
18. Attach the new inlet tube assembly to the booster pump using the silicone 90 degree elbow and two gear clamps removed in previous steps. Leave the clamps loose for now to allow for adjustments once all components are attached.



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19. Attach the new supplied copper 90 degree elbow (NF PN 482994) between the new engine fitting and the new copper tube assembly, installed in previous steps
 - a. Secure the elbow to the engine with one length of 0.75 ID silicone hose (NF PN 260695), cut to fit, and two existing re-used gear clamps. Leave the clamps loose for now to allow for adjustments once all components are attached.
 - b. Secure the elbow to the new copper inlet tube assembly with one length of 1.13 ID silicone hose (NF PN 260698), cut to fit, and two supplied gear clamps (NF PN 274971). Leave the clamps loose for now to allow for adjustments once all components are attached.
20. Adjust the system for proper fitment and tighten:
 - a. The three pipe clamps, installed to secure the new inlet tube assembly.
 - b. The gear clamps at the auxiliary heater silicone elbow, securing the new tube assembly. Torque the gear clamps 30-70 in-lbs.
 - c. The four gear clamps near the engine, securing the new copper elbow assembly. Torque the four gear clamps 30-70 in-lbs.
21. Install the new copper discharge assembly (NF PN 445757) between the auxiliary heater and the booster pump.
 - a. Insert the tube assembly into the silicone elbow at the auxiliary heater. Torque the gear clamps at the elbow 30-70 in-lbs.
 - b. Secure the tube assembly to the bus structure with the existing tube clamp, using hardware removed in previous steps. Do not tighten tube clamp completely yet to allow for system adjustment later.
 - c. Install the silicone sleeve, removed in previous steps, at the booster pump end of the copper tube assembly and secure with the gear clamp also removed in previous steps. Torque the gear clamps 30-70 in-lbs.
 - d. Adjust the discharge tube assembly as required and tighten the tube clamp to secure.
22. Remove all tools and debris and return the bus to service condition.
23. Open all valves closed in previous steps.
24. Review the new installation and if any leaks are noted, repair as required.
25. If necessary, lower coach in accordance with the New Flyer Service Manual.
26. Turn the main battery disconnect switch to the "ON" position.
27. Reprogram the booster pump following the steps laid out in Appendix B - WP29 Reprogram Instructions.
28. Fill the system with coolant and de-aerate. Refer to the New Flyer maintenance manual for filling and de-aeration instructions.



Appendix A

CORASHIELD APPLICATION INSTRUCTIONS

Primer Mixing Instructions

- I. Clean area to be primed per painting and priming procedures in the New Flyer Service Manual under section: Chassis and Structure.
- II. Mix 1 part of PPG Catalyst S28079 (PN 108936) with 2 parts of PPG Red Zinc Powder S28080 (PN 115956). Mixture to be applied by brush. No thinner is required. Mix thoroughly.
Cure time is 4 hours at 77 °F (25 °C).
Pot life of mixture is approx. 3 to 4 hours, BUT is significantly reduced with exposure to air (moisture).

Corashield Protective Coating Application

- I. Remove excess dirt, dust and debris from substrate using clean, dry cloth or air stream.
- II. Coating to be applied at ambient air temperature between 50 to 99 °F (10 to 32 °C).
- III. Substrate temperature must not exceed 212 °F (100 °C) during application.
- IV. Keep parts above freezing within first 24 hours after application.
- V. Using a 50:1 ratio or higher stainless steel pump, Reverse-A-Clean tungsten carbide tipped (0.021" to 0.027" in diameter) stainless steel airless spray gun and disposable brush or trowel, apply a single coating of Corashield P7972 (PN 235584). Spray distance 12 to 15" (30 to 38cm).

ALTERNATELY: Apply Corashield by brush.

Allow to air dry at room temperature.



Appendix B

WP29 Reprogram Instructions



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WP29 Reprogram Procedure (Seattle D60LF)

Materials Required:

EMPower Connect Software on Laptop with Programmer Level License

Communication Kit 7500038001, (WP29-EMP TTL-USB)

Software Labels, P/N 1030002229PA35

Software, Calibration File, S0005-00101-001

REPROGRAM PROCEDURE

Connect to the pump with cable 3180001079 through the Deutsch small 6 pin connector



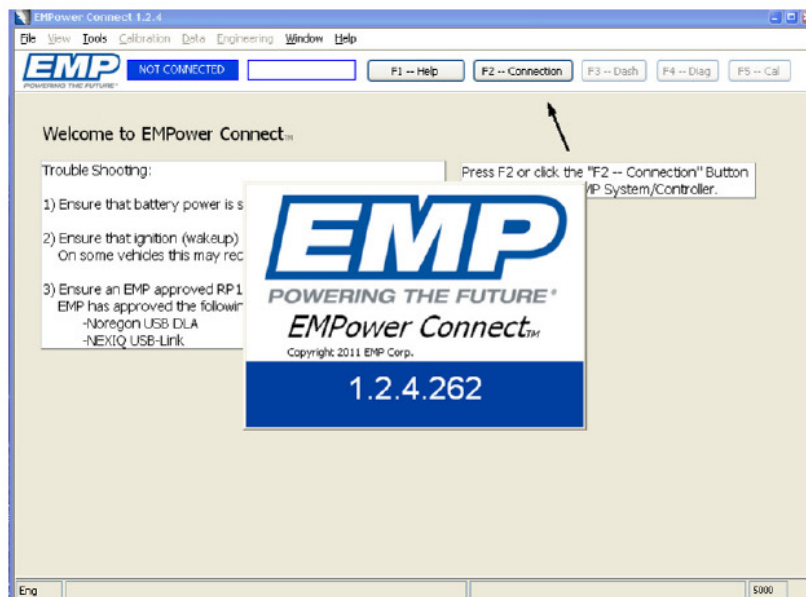
Remove the plug, Connect the harness to the Deutsch connector



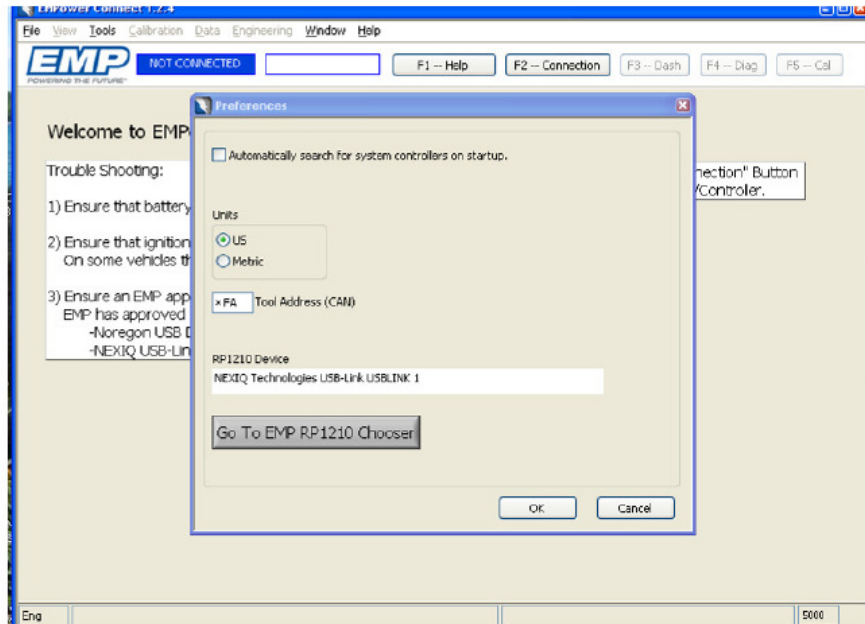


Connect the EMP TTL Converter to the communication cable and plug into the USB port of the computer.

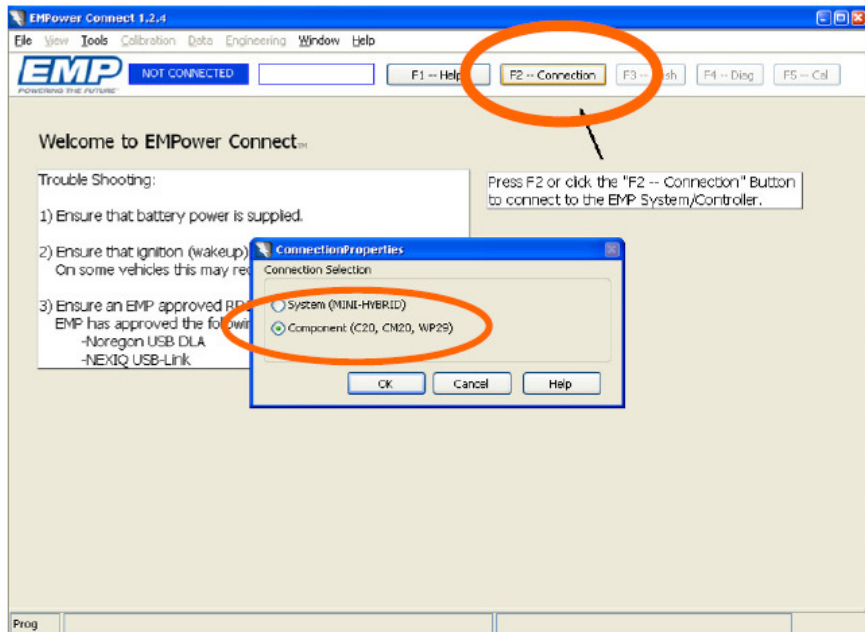
Start the service tool, EMPower Connect



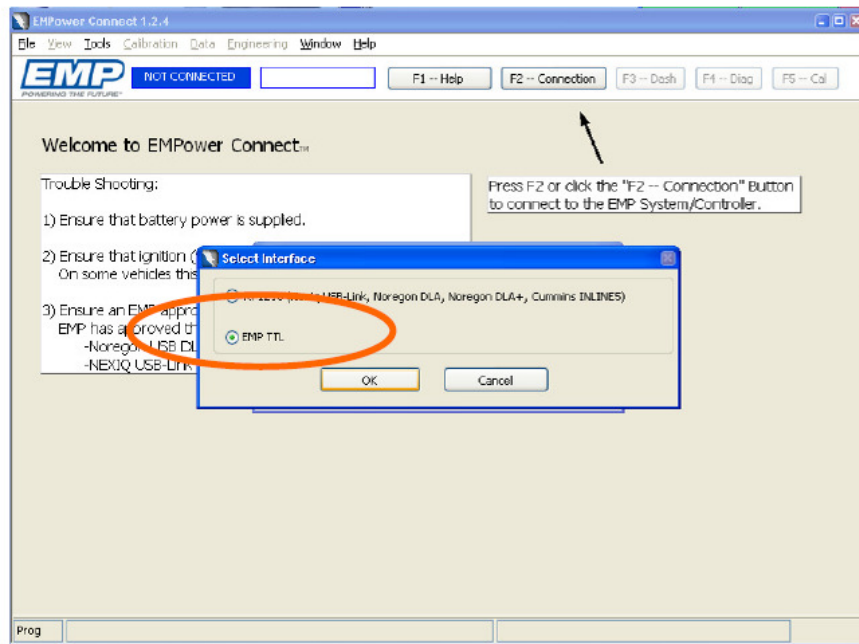
Make sure the Preferences are set to search for components. Under the file tab, select preferences, make sure the top box is not selected, and OK



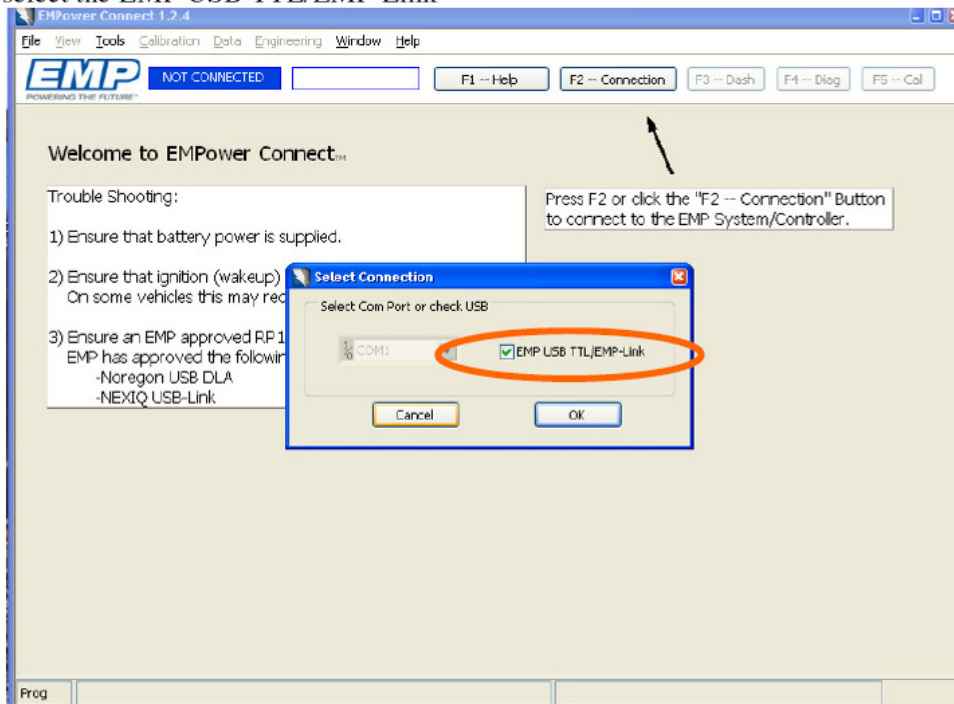
Connect to the pump by selecting the “F2 - Connection” tab. Select the Component (C20, CM20, WP29) in the ConnectionProperties pop-up. At this time, the WP29 pump must be powered. Follow the cooling system fill procedure on the belt guard to initiate pump operation using the switch on the rear run box.



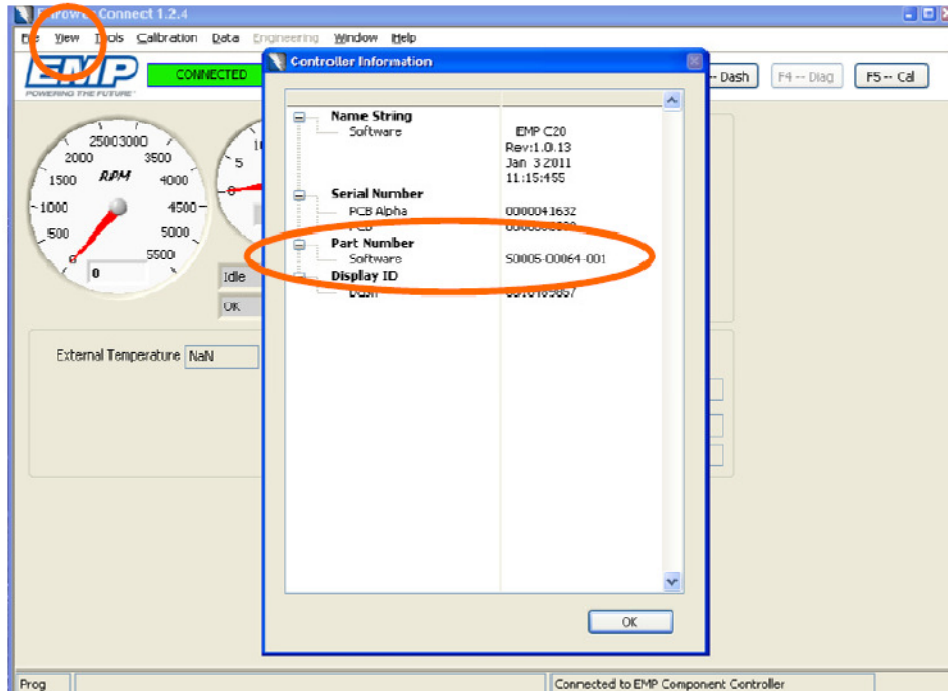
Select the EMP TTL Interface



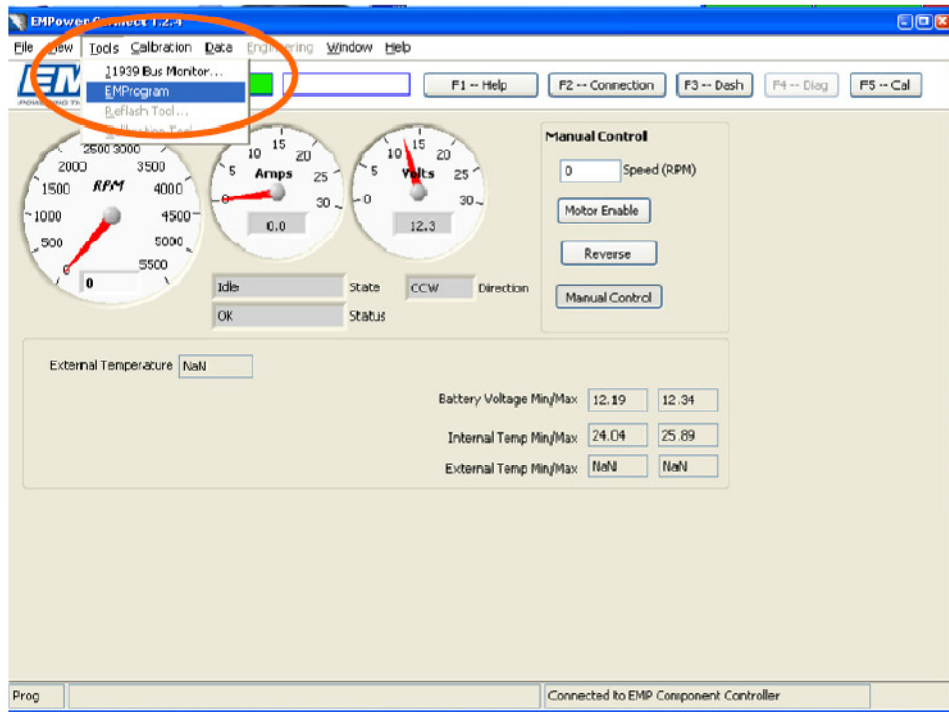
Finally select the EMP USB TTL/EMP-Link



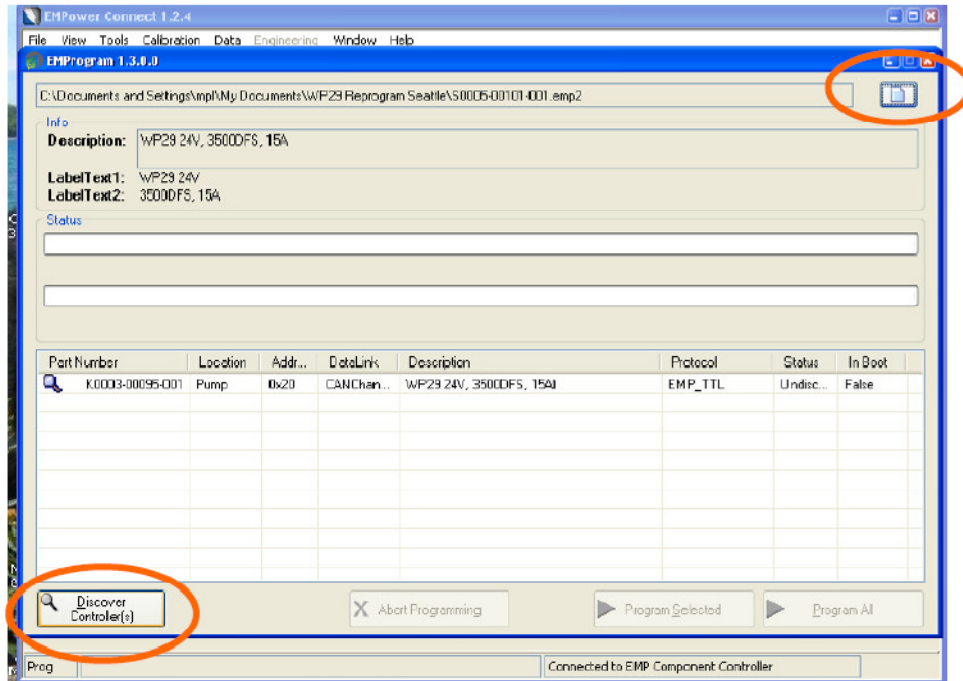
Upon Connection, the component Dashboard will appear. Select View banner and Controller information from the dropdown menu. The pump software part number is displayed and should be S0005-00064-001 upon initial connection. The following steps will load the new 3500 rpm control software.



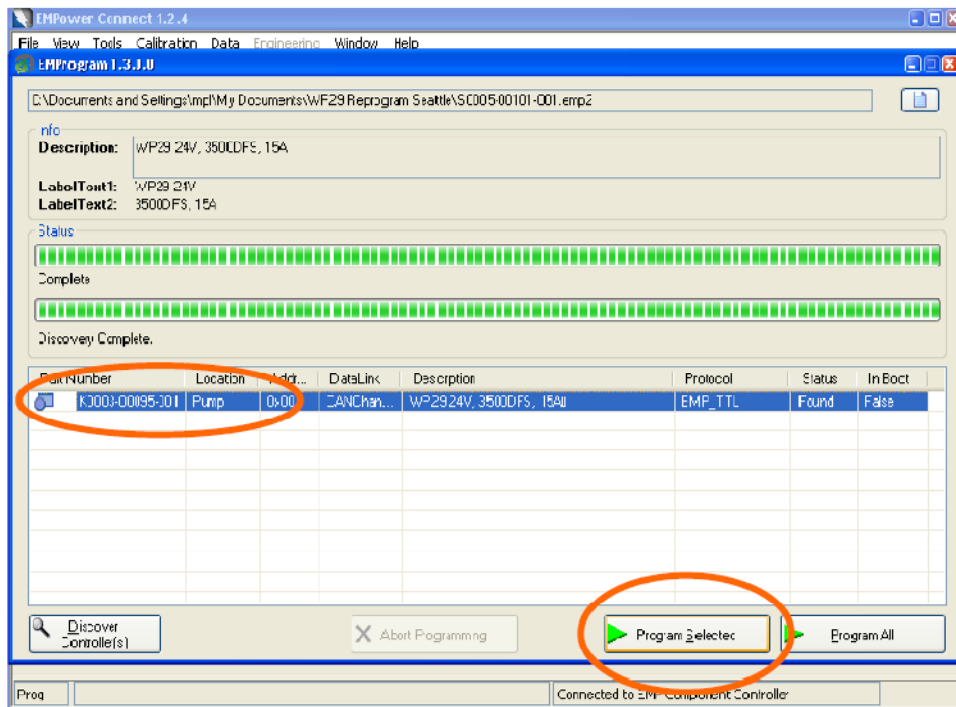
Launch EMProgram from the Tools Menu. A programmer level access is required enable the option.



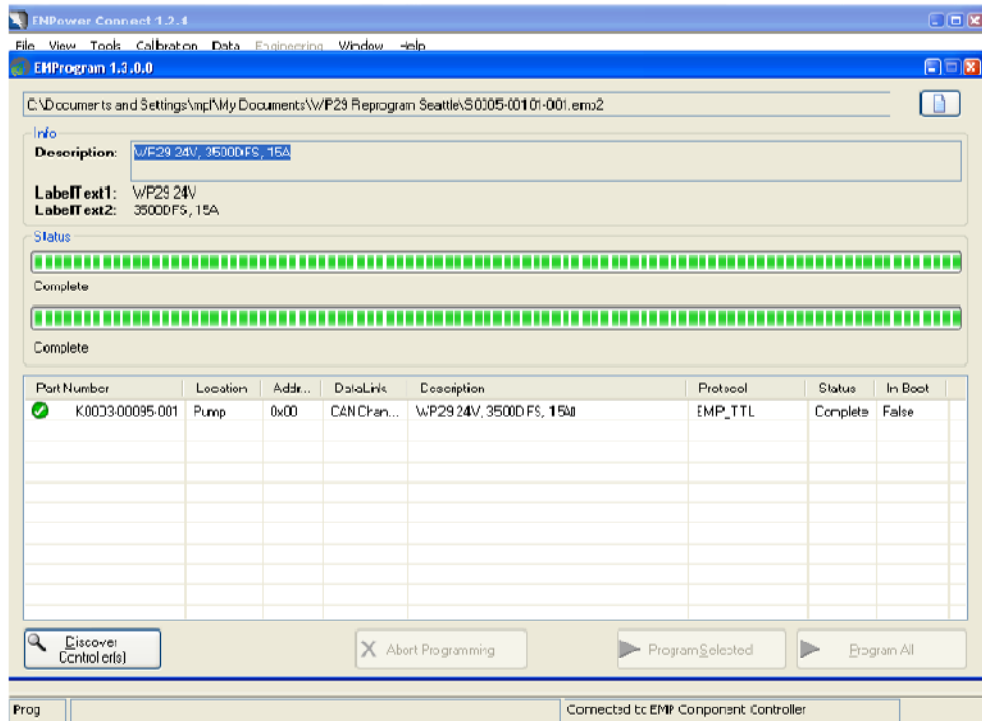
Use the file selection button on the top of the EMProgram window to select the new software, S0005-00101-001.emp2. Software file was provided, and must be accessed from the location the operator saved the file.



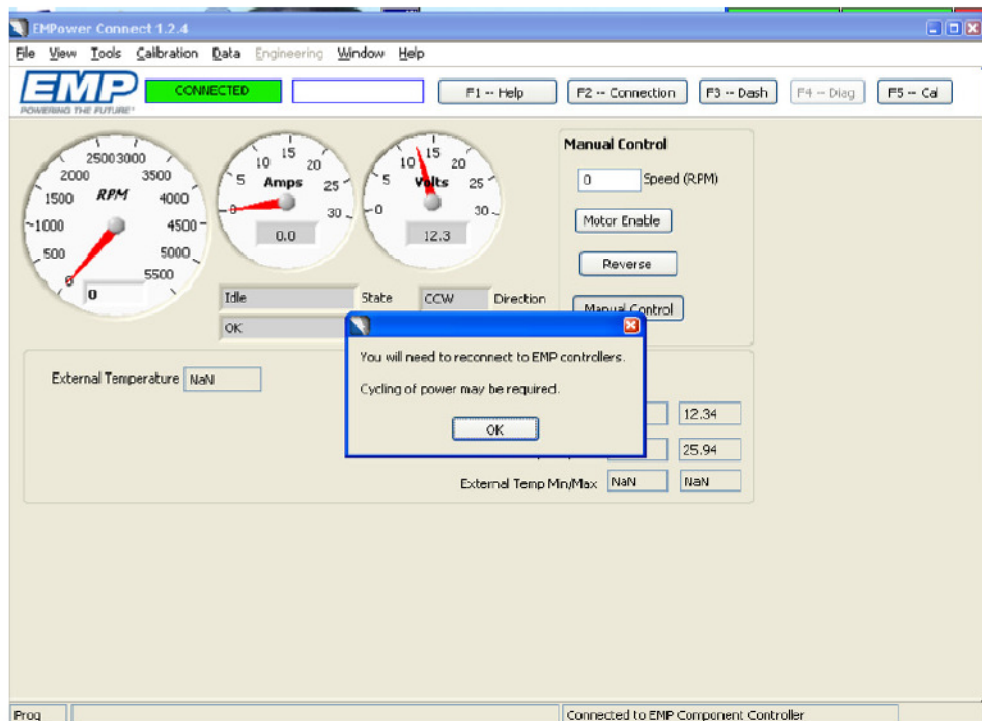
Once the file has been selected, Discover Controller(s) to enable the tool locate controllers for reprogramming.



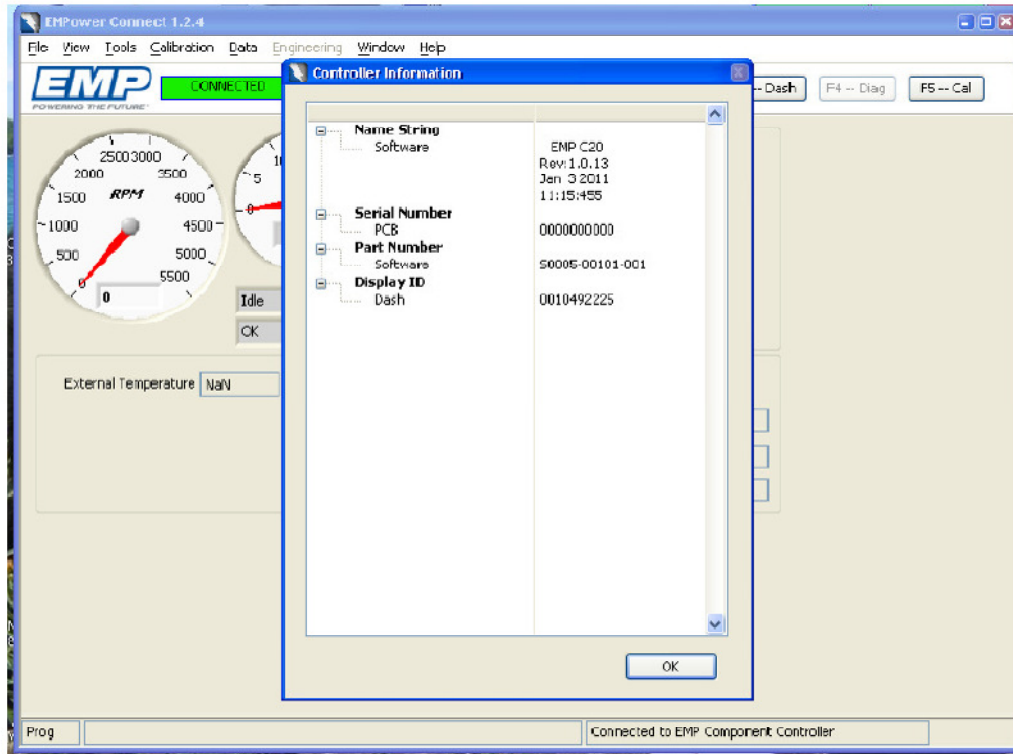
Select the Pump, and press the Program Selected Button. Both Status bars will show complete when the programming has been completed. Close the EMProgram window with the X in the top right corner of the window.



Upon ending EMProgram, the service tool will ask you to reconnect to the controller. Repeat the process to the connect to the controller.

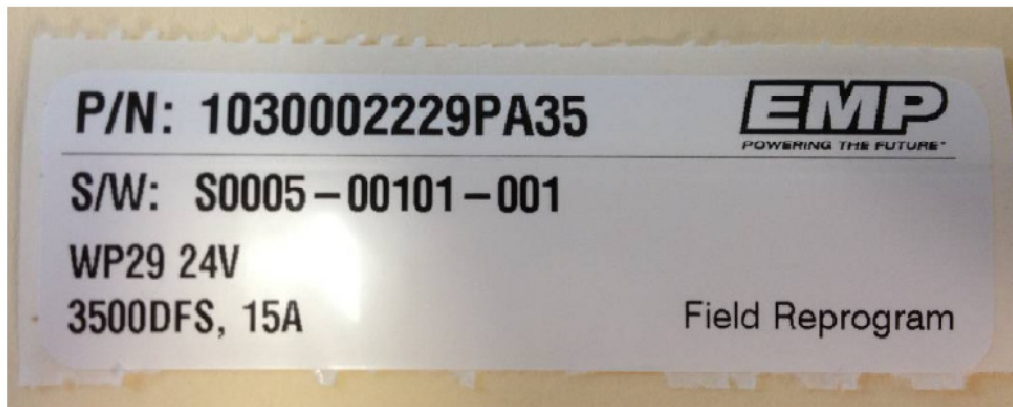


Once connected, View, Controller Information, and verify the new software loaded into the controller.



Unplug harness, and reinstall connection plug on the pump.

Install the new software label on the pump.





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LABOUR ESTIMATE				
	Operation	Men	Hours	Labour Time M X HR
1	Remove and replace copper lines at the booster pump	1	6.0	6.0

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6409457	KIT BOOSTER PUMP REWORK 1	1	EA	

6409457 – KIT PARTS					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6409017	ELBOW, 90 DEGREE, COOLANT	1	EA	
2	484987	ASSY-BPUMP LINE SUPPORT	1	EA	
3	34S04012	SCREW TPG-1/4X3/4 LG	2	EA	
4	10W04000	WASHER-FLAT 1/4 NOM	2	EA	
5	482984	BRACKET-CLAMP MTG	1	EA	
6	40N04000	LOCKNUT 1/4" 20 UNC	6	EA	
7	454574	ASSY-BPUMP BRACKET EMP	1	EA	
8	20B05012	BOLT HEX SS 5/16" 18 UNC X 3/4" LG	4	EA	
9	51W05000	WASHER LOCK SS 5/16	4	EA	
10	20W05000	WASHER FLAT HARDENED 5/16"	4	EA	
11	485156	ASSY-1.13 DIA CU	1	EA	
12	10B04032	BOLT HEX 1/4" 20 UNC X 2" LG	4	EA	
13	068497	PLATE CLAMP COVER GR 4	3	EA	
14	068060	CLAMP-1.125 DIA TUBE	3	EA	
15	10B04040	BOLT HEX 1/4" 20 UNC X 2 1/2" LG	2	EA	
16	260695	HOSE – 0.75 ID	0.5	EA	
17	260698	HOSE - 1.125 ID	0.5	EA	
18	445757	ASSY-1.38 DIA CU	1	EA	
19	482994	ASSY-1.13 DIA CU	1	EA	
20	274971	CLAMP-BREEZE .8125-1.75	2	EA	