NEW FLYER

INSTRUCTION TO SERVICE

ITS: 5172	
SECTION:	549 HVAC
WRITTEN BY:	Kevin Robinson
SUBJECT:	Add an auxiliary condenser to the roof of the bus.

ITS5172

PROCEDURE:

☞ **NOTE: The local Thermo King service agent needs to install the required fittings on the bus condenser lines prior to this rework commencing.**

1. Turn the main battery disconnect switch to the “OFF” position.
2. Go to the rear of the coach and open the AC access door.
3. TK Main unit rework procedure – These steps to be performed by TK technicians only.
   a. Add fittings to the suction and discharge lines at the condenser.
   b. Rework the AC unit main harness to accept the extension harness from the auxiliary condenser.
4. Install the A/C line bracket (NF PN 485324) as shown in Figure 1.
   a. Locate the A/C line bracket against roof panel in the location shown in Figure 1, measuring four inches off of the displayed frame member, and drill pilot holes 0.161 dia. (#20 drill) into the structure using the A/C line bracket (NF PN 485324) as a template.

   ⚠ **WARNING: Ensure the 4.0 inch dimension is accurate before mounting the AC line bracket. All other parts are dependent on this dimension to work properly.**

   b. Mark the square opening of A/C line bracket (NF PN 485324) on the roof and cut the square opening out of the roof panel.
   c. Drill four 0.281 dia. (9/32 inch drill) bolt holes through roof panel using the A/C line bracket (NF PN 485324) as a template.

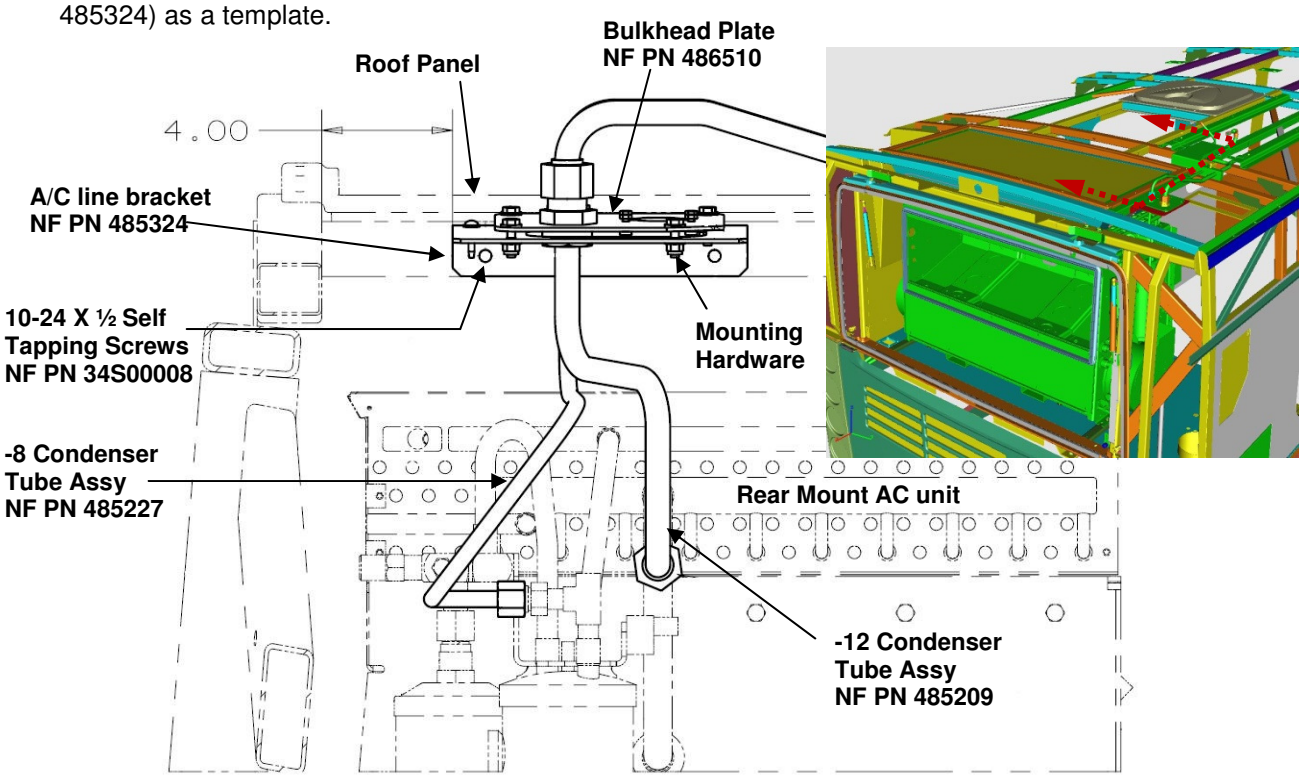

Figure 1: AC Line Bracket Install

d. Apply a bead of Sika (NF PN 055701) between roof panel and A/C line bracket (NF PN 485324) before fastening to the structure with two 10-24 X ½ self tapping screws (NF PN 34S00008).

e. Apply a liberal amount of Sika (NF PN 055701) to the underside, near the outside circumference of the bulkhead plate (NF PN 486510) and mount on top of roof panel with four ¼-20 x 1.0 hex bolts (NF PN 10B04016), four ¼-20 lock nuts (NF PN 40N04000) and eight ¼ flat washers (NF PN 10W04000).

5. Install the copper lines from the condenser coil to the newly installed A/C line bracket.

a. Install the -12 condenser tube assembly (NF PN 485209) between the bulkhead plate, installed in previous steps, and the fitting attached to the condenser lines on the main HVAC unit by the Thermo King technician previously with a -12 O-ring (NF PN 018621).

☞ **NOTE:** Apply clean compressor oil of the same type used inside the system to o-ring. Care must be taken to not apply any oil to the fitting threads.

b. Torque the -12 ORS fitting at the HVAC unit 65-70 ft-lbs using a backup wrench to prevent damage when tightening.

c. Apply Sika (NF PN 055701) around the bulkhead nut (NF PN 018612), to ensure a watertight seal, and tighten the nut down using a backup wrench on the tube assembly to prevent damage when tightening.

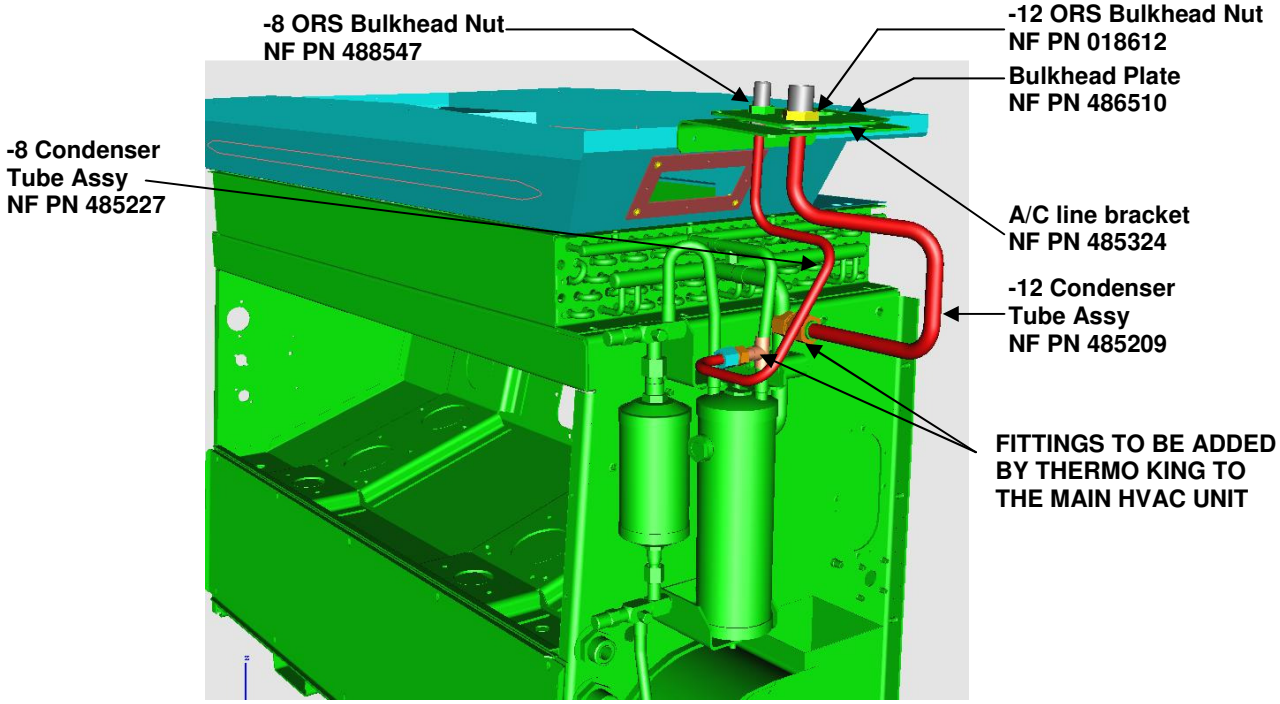

Figure 2: Rear AC Unit – Condenser Lines – Structure Removed for Clarity

d. Install the -8 condenser tube assembly (NF PN 485227) between the bulkhead plate, installed in previous steps, and the fitting attached to the condenser lines on the main HVAC unit by the Thermo King technician previously with a -8 O-ring (NF PN 390245).

☞ **NOTE:** Apply clean compressor oil of the same type used inside the system to o-ring. Care must be taken to not apply any oil to the fitting threads.

e. Torque the -8 ORS fitting at the HVAC unit 32-35 ft-lbs using a backup wrench to prevent damage when tightening.

f. Apply Sika (NF PN 055701) around the bulkhead nut (NF PN 488547), to ensure a watertight seal, and tighten the nut down using a backup wrench on the tube assembly to prevent damage when tightening.

6. Mount the new auxiliary condenser (NF PN 484856) to the roof of the bus.

a. Paint the two mounting channels (NF PN 484898) and the auxiliary condenser (NF PN 484856) to match the bus color and allow appropriate drying time before installing.

b. Mount the new auxiliary condenser (NF PN 484856) with six 3/8 stainless steel washers (NF PN 50W06000) and six locknuts (NF PN 40N06000) to the two mounting channels (NF PN 484898), torque the locknuts to 20 ft lbs.

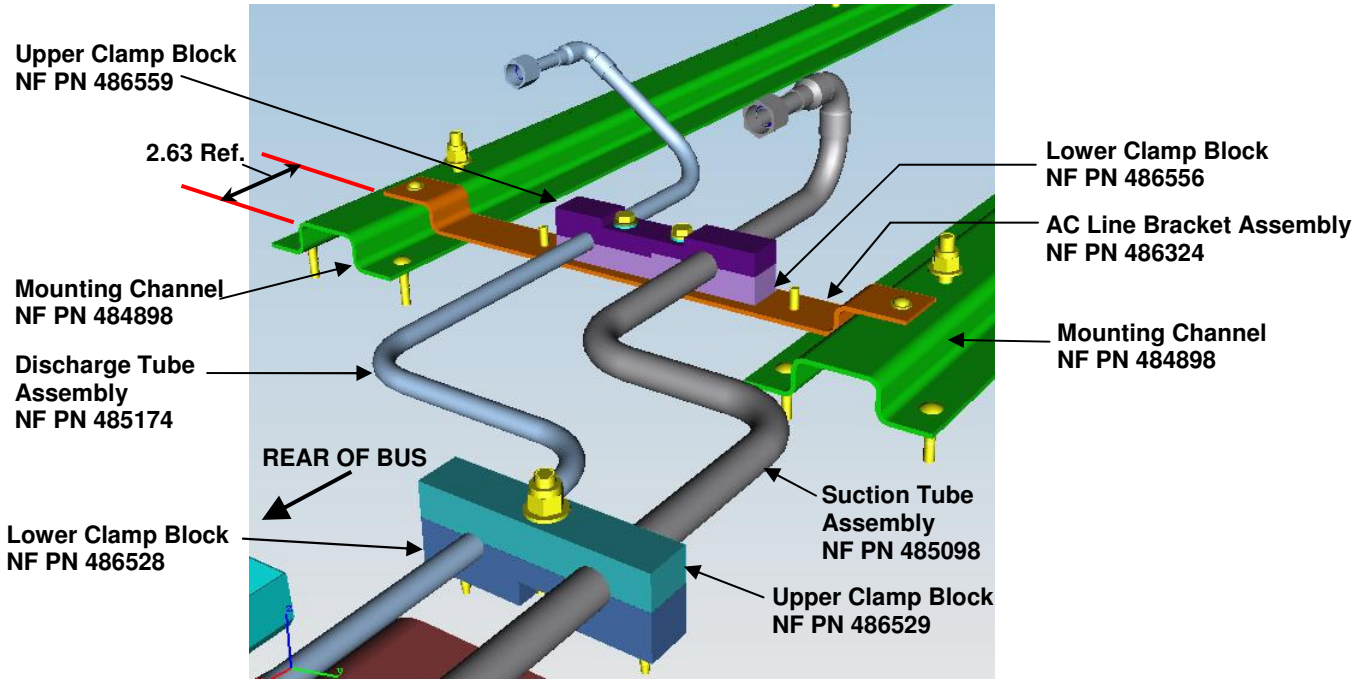

Figure 3: Rooftop Line Clamps – Auxiliary Condenser Removed for Clarity

c. Mount the suction (NF PN 485098) and discharge (NF PN 485174) tube assemblies to the new auxiliary condenser assembly using the supplied O-rings (NF PN 0486452 and NF PN 486460). Do not tighten until further secured in the next step.

☞ **NOTE:** Apply clean compressor oil of the same type used inside the system to o-ring. Care must be taken to not apply any oil to the fitting threads.

d. Torque the -8 ORS fitting 32-35 ft-lbs and the -12 ORS fitting at the new auxiliary condenser 65-70 ft-lbs.

e. Align assembly on roof by using bulkhead tube connection and dimensions shown in Figure 4.

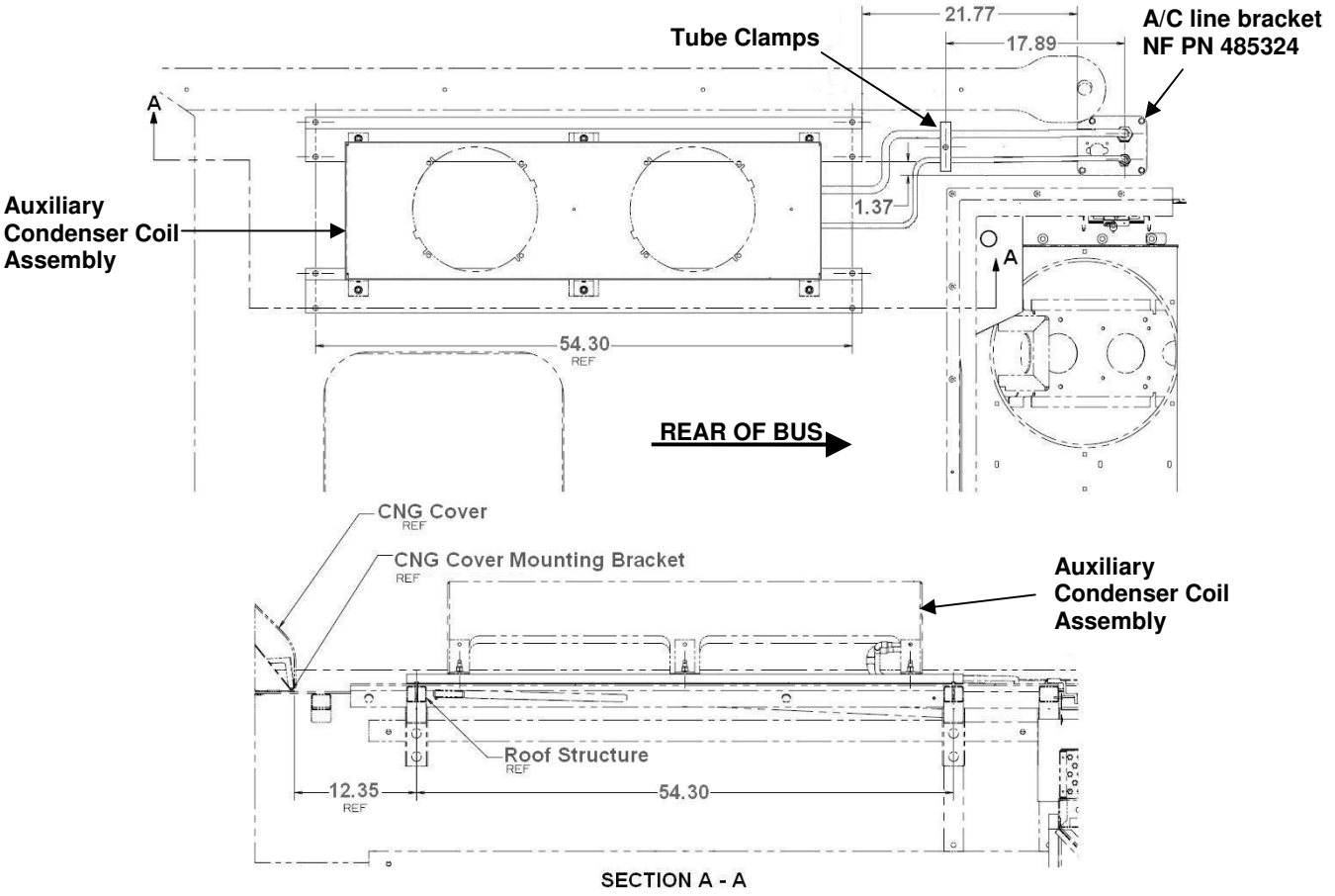

Figure 4: Auxiliary Condenser Location – Looking Down at the Top of the Bus

f. Drill .261 diameter (letter G drill) holes through roof using the mounting channels (NF PN 484898) as templates.

g. Apply a liberal amount of Sika (NF PN 055701) under the mounting channels around the roof mounting holes and the whole length of the mounting flange.

h. Attach the mounting channels (NF PN 484898) to the roof with ¼ inch monobolt rivets (NF PN 8410600).

i. Insert the supplied 3/8-16 X 2.0 hex bolt (NF PN 10B06032) into the lower tube clamp block (NF PN 486528) from underneath. The faces of the hex bolt will sit against the notch in the block to prevent it from spinning when the upper block is installed and the nut is tightened down on the bus roof.

j. Place the lower tube clamp block (NF PN 486528), assembled with the 3/8 bolt, under the new copper tube assemblies in the location shown in Figure 4.

k. Drill two 5/32 diameter holes, using the lower tube clamp block (NF PN 486528) as a template.

l. Apply Sika (NF PN 055701) under the lower tube clamp block and around the roof mounting holes.

m. Secure the lower tube clamp block, under the copper lines, to the roof of the bus using two 10-24 x 1.0 self tapping screws (NF PN 34S00016) with a #10 flat washer (NF PN 10W00000) under each screw and clean away any excess Sika.

n. Place the upper tube clamp block (NF PN 486529) over the lower block and its 3/8 bolt to secure the copper tube assemblies to the roof of the bus. Use a 3/8-16 lock nut (NF PN 40N06000) and a 3/8 flat washer (NF PN 10W06000) to secure all components together.

o. Torque the -8 ORS fitting 32-35 ft-lbs and the -12 ORS fitting at the new bulkhead fittings 65-70 ft-lbs using supplied O-rings (NF PN 018621 and NF PN 390245).

☞ **NOTE:** Apply clean compressor oil of the same type used inside the system to o-ring. Care must be taken to not apply any oil to the fitting threads.

7. Attach electrical connections.

a. Route the harness, supplied with the auxiliary condenser, from the auxiliary condenser to the AC compartment

b. Secure the bulkhead plate, on the harness, to the bulkhead plate previously installed on the bus roof using four 10-24 x 5/8 bolts (NF PN 22S00010), four flat washers (NF PN 10W00000) and four #10 lock nuts (NF PN 40N00000). Apply Sika (NF PN 055701) under the harness bulkhead plate to prevent leaks. Clean any excess Sika after tightening the hardware. Refer to Figure 5.

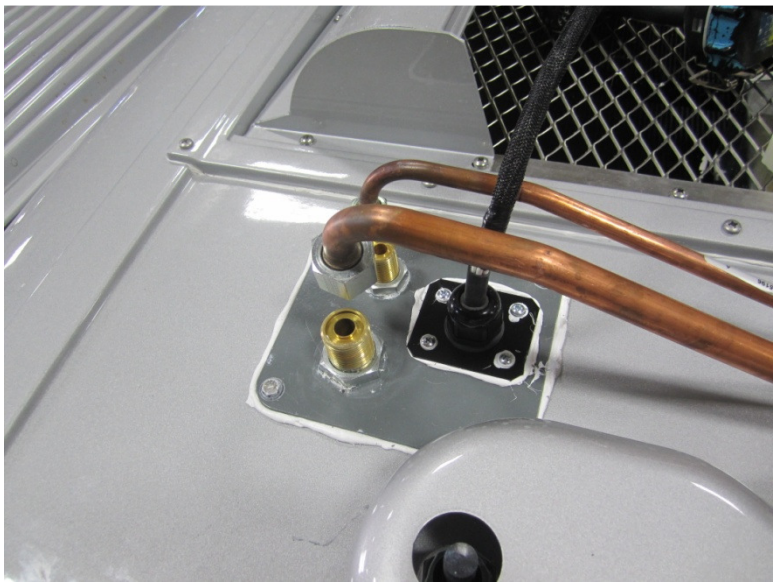

Figure 5: Harness Transition Roof Through Bulkhead

c. Secure the auxiliary condenser harness to the suction line using cable ties to prevent vibration.

d. Route the jumper harness (NF PN 487935) from the rear PLC panel inside the bus, to the AC compartment.

e. Connect the ring terminal on the jumper harness (NF PN 487935) to the open terminal block as shown in Figure 6. Torque the hardware to 10.6 in-lbs.

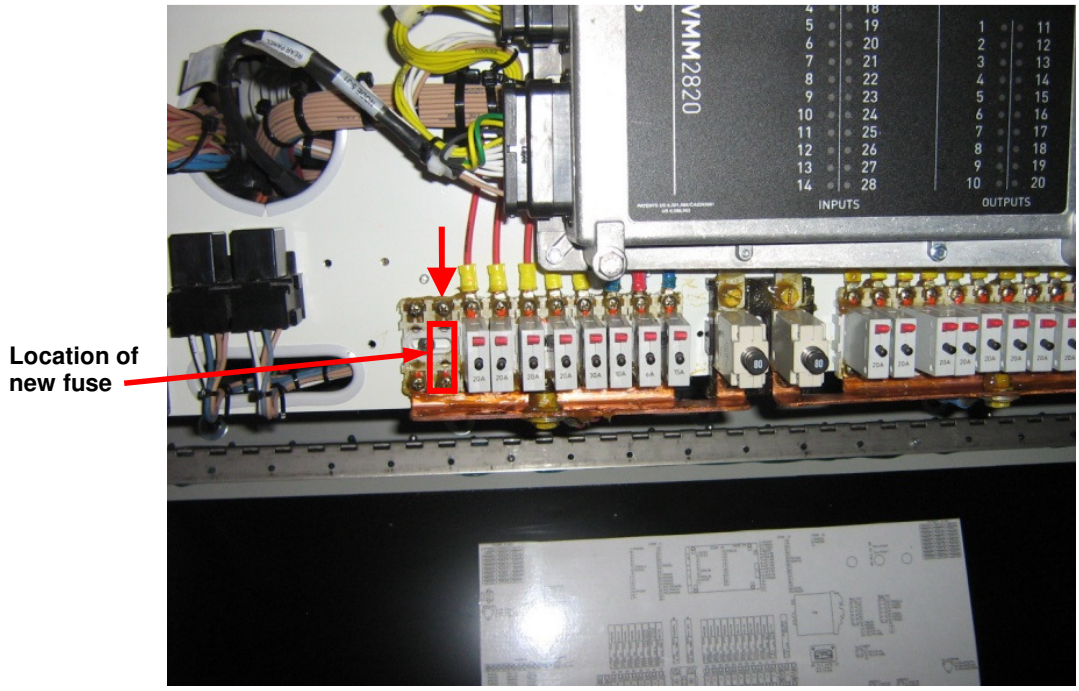

Figure 6: Rear PLC Panel – Shown Opened

f. Install the supplied 30 amp breaker (NF PN 022382) on the terminal block populated with the auxiliary condenser jumper harness.

g. Populate shroud 1 at the harness on the main HVAC unit that the auxiliary condenser plugs into.

h. Plug the main HVAC side harness into the auxiliary condenser harness and secure the cables out of the way using cable ties.

8. Install rooftop covers

a. Paint the three rooftop covers (NF PN 486293, NF PN 486307 and NF PN 489272) to match the bus color and allow appropriate drying time before installing.

b. Place the long AC line cover (NF PN 486293) and the short AC line cover (NF PN 486307) in the positions as shown in Figure 7.

c. Drill eight 0.161 diameter (#20 drill bit) pilot holes through roof panel and structural tubes beneath using the covers as a template.

d. Position the AC line bracket assembly (NF PN 486324), with the short AC line cover (NF PN 486307), under the AC lines and drill two 0.161 diameter (#20 drill bit) pilot holes into the auxiliary condenser mounting channels. Do not penetrate the roof panel.

e. Mount the AC line bracket assembly with two 10-24 x ¾ screws (NF PN 34S00012) and two #10 washers (NF PN 10W00000) to the auxiliary condenser mounting channels.

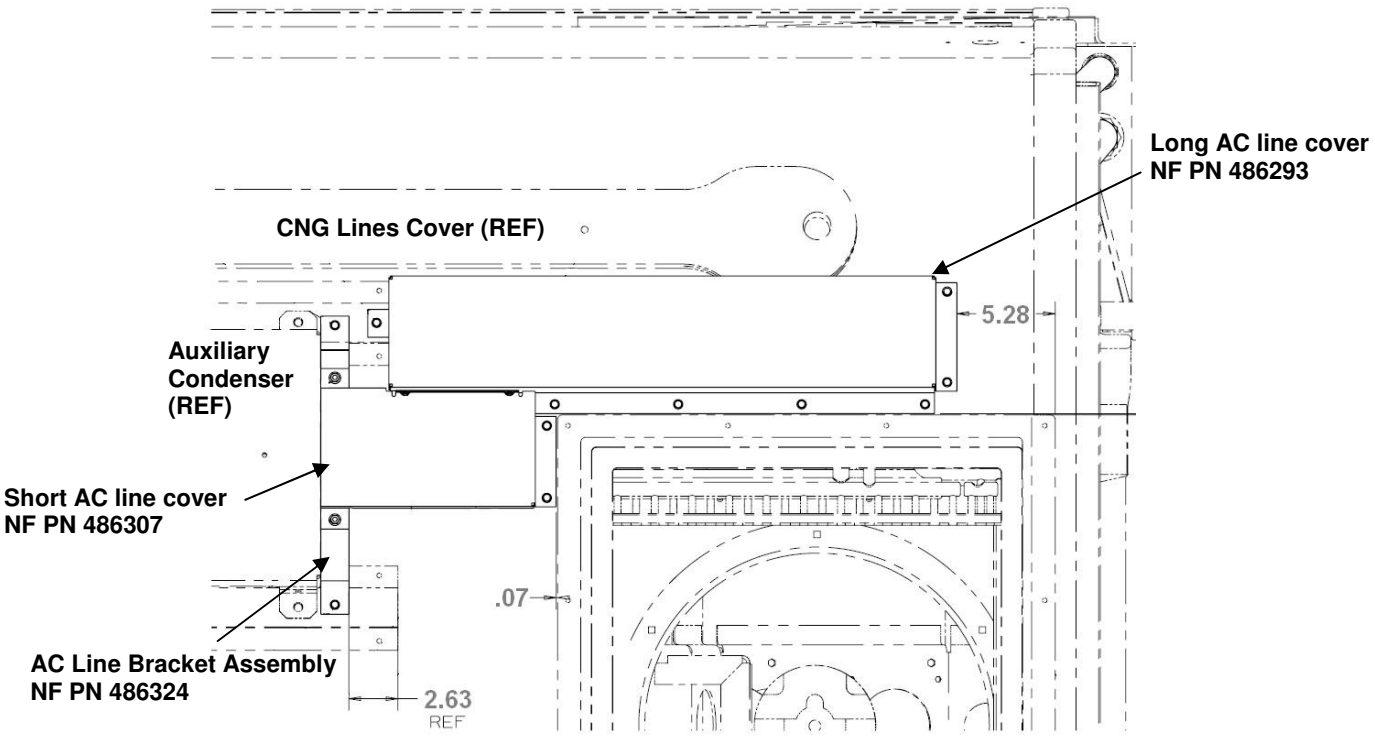

Figure 7: AC Line Covers Installation – View Looking Down at Bus Roof

f. Secure the two tube assemblies to the AC line bracket assembly (NF PN 486324) with clamp blocks (NF PN 486559 and NF PN 486556) held by two ¼-20 x 1.5 bolts (NF PN 10B04024) and four ¼ flat washers (NF PN 10W04000). Apply Loctite (NF PN 8110440) to the threads of the bolts before tightening.

g. Apply a bead of Sika (NF PN 055701) to the underside of the mounting flanges of the two covers where they contact the roof.

h. Mount the covers to the roof panel with eight 10-24 x 1 screws (NF PN 34S00016) and eight #10 washers (NF PN 10W00000).

i. Finish mounting the long AC line cover (NF PN 486293) by drilling a 0.161 diameter (#20 drill bit) pilot hole through the auxiliary condenser mounting channel and securing it with one 10-24 x ¾ screw (NF PN 34S00012) and one #10 washer (NF PN 10W00000).

j. Secure the short AC line cover (NF PN 486307) to the long AC line cover by drilling two 0.161 diameter (#20 drill bit) pilot holes through the long cover and fasten it with two 10-24 x ¾ screws (NF PN 34S00012) and two #10 washers (NF PN 10W00000).

k. Secure the short AC line cover to the studs on the AC line bracket assembly with ¼-20 lock nuts (NF PN 40N04000) and ¼ washers (NF PN 10W04000). Qty 2 ea.

l. Place the harness cover (NF PN 489272) on the rear face of the auxiliary condenser, aligning the top and curbside faces as shown in Figure 8.

m. Drill six 0.161 diameter (#20 drill bit) pilot holes using harness cover (NF PN 489272) as a template. Ensure the drill does not penetrate too far during this operation.

n. Fasten the harness cover to the auxiliary condenser housing and the short AC line cover with six 10-24 x ¾ screws (NF PN 34S00012) and six #10 washers (NF PN 10W00000).

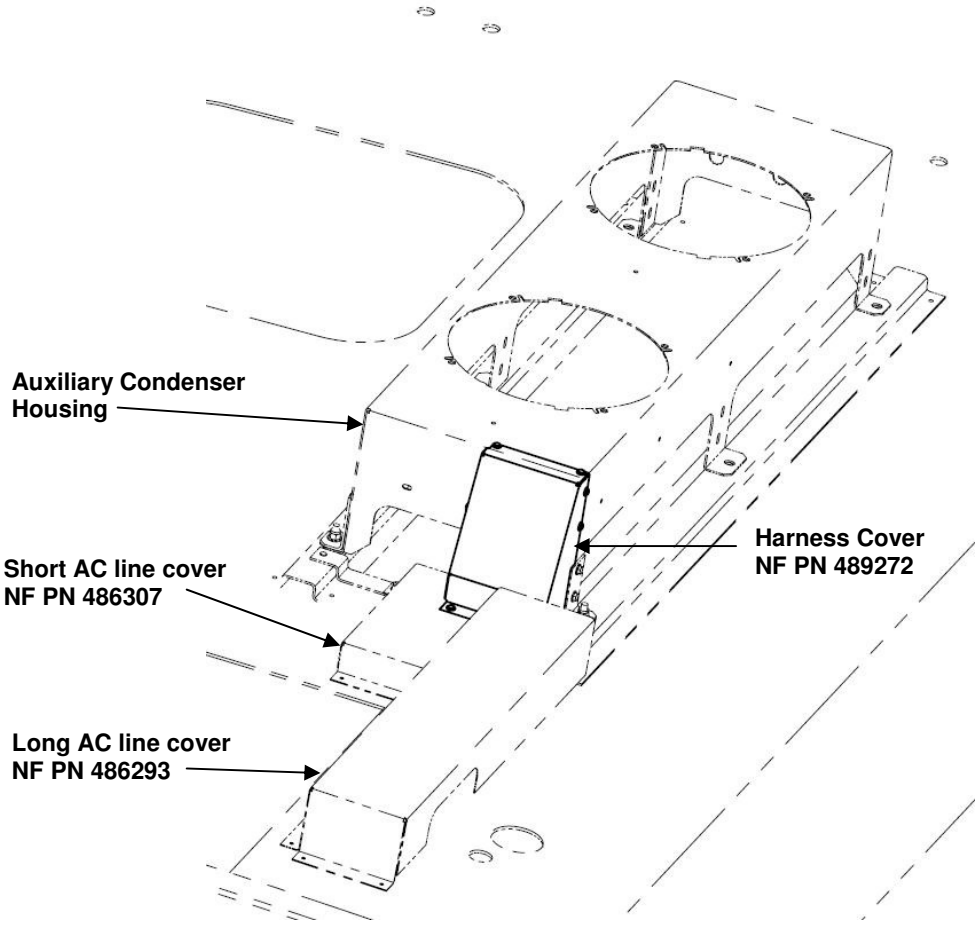

Figure 8: AC Line Covers Installation – Harness Cover Installed

9. Reprogram the Thermo King unit with the latest software available from the local Thermo King dealer.
10. Test the AC system for proper operation.
11. Remove all tools and debris and return the coach to service condition
12. Turn the main battery disconnect switch to the “ON” position.

NEW FLYER

LABOUR ESTIMATE

	Operation	Men	Hours	Labour Time M X HR
1	Add an auxiliary condenser to the roof of the bus.	1	9.0	9.0

PARTS REQUIRED

Item	Part Number	Description	Qty. per Coach	Units	Notes
1	485324	BRACKET-A/C LINES	1	EA	
2	055701	ADHESIVE-SIKA 221 WHITE	2.5	EA	
3	34S00008	SCREW PH X RECESS TPG. TYPE F	2	EA	
4	486510	PLATE-BULKHEAD	1	EA	
5	10B04016	BOLT HEX 1/4" 20 UNC X 1" LG	4	EA	
6	40N04000	LOCKNUT 1/4" 20 UNC	6	EA	
7	485209	ASSY-TUBE CONDENSER-12	1	EA	
8	018621	O-RING TK 11/16ID-12	2	EA	
9	485227	ASSY-TUBE CONDENSER-08	1	EA	
10	390245	O-RING-TK 1/2ID-08	2	EA	
11	488547	NUT-ORS BLKHD -08	1	EA	
12	484856-1204	CONDENSER-AUXILARY TK	1	EA	
13	484898-1204	ASSY-WELD MTG CHANNEL	2	EA	
14	50W06000	WASHER FLAT SS 3/8"	6	EA	
15	485098	ASSY- TUBE CONDENSER-12	1	EA	
16	485174	ASSY-TUBE CONDENSER-08	1	EA	
17	8410600	MONOBOLT 1/4 STEEL	8	EA	
18	486529	CLAMP-BLOCK	1	EA	
19	10B06032	BOLT HEX 3/8" 16 UNC X 2" LG	1	EA	
20	10W00000	WASHER-FLAT #10 NOM	25	EA	
21	486556	BLOCK-CLAMP	1	EA	
22	40N06000	NUT-HEX LOCK 3/8 NC	7	EA	
23	10W06000	WASHER FLAT 3/8 NOM	1	EA	
24	22S00010	SCREW-HEX SST #10 24UNC X 5/8" LG	4	EA	
25	40N00000	NUT LOCK NYLON #10 24 UNC	4	EA	
26	487935	HRNS-AUX CONDENSER JUMPER	1	EA	

27	022382	BREAKER-30A ETA MAN	1	EA	
28	486293-1204	COVER-AC LINES	1	EA	
29	486307-1204	COVER-AC LINES	1	EA	
30	486324-1204	ASSY-WELD AC BRACKET	1	EA	
31	34S00012	SCREW-NO 10-24 X 0.75	11	EA	
32	486559	BLOCK-CLAMP	1	EA	
33	10B04024	BOLT HEX 1/4" 20 UNC X 1 1/2" LG	2	EA	
34	10W04000	WASHER-FLAT 1/4 NOM	14	EA	
35	8110440	LOCTITE-242	.01	EA	
36	018612	NUT-BULKHEAD -12S	1	EA	
37	34S00016	SCREW PH X RECESS TPG. TYPE F	10	EA	
38	486528	CLAMP-BLOCK	1	EA	
39	5958112	TYRAP-7.0 BLACK	10	EA	
40	489272-1204	COVER-HARNESS	1	EA	
41	NPN	TK fitting - Suction	1	EA	
42	NPN	TK Fitting – Discharge	1	EA	
43	486452	O-RING (-08)	1	EA	
44	486460	O-RING (-06)	1	EA	