



# INSTRUCTION TO SERVICE

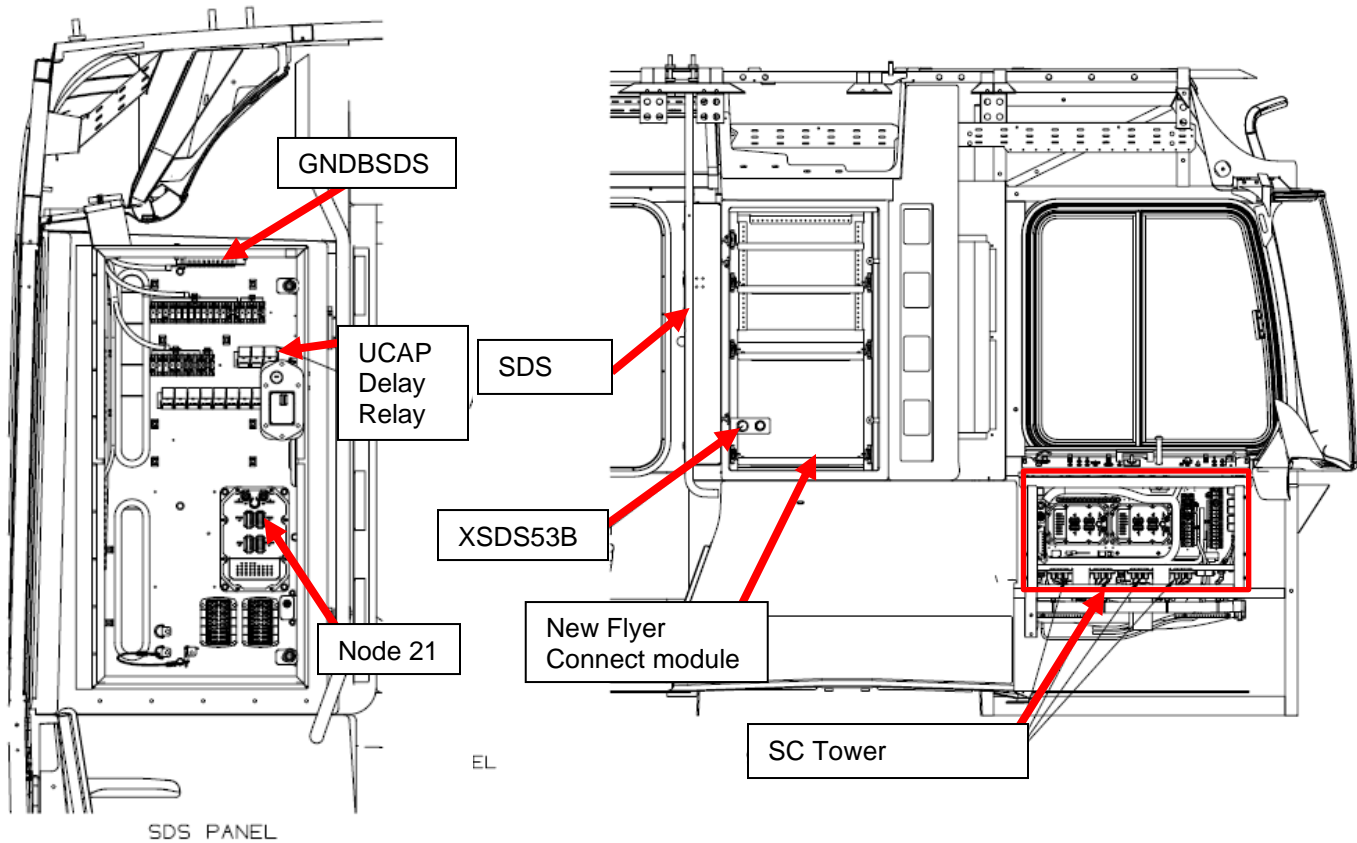
ITS: 60428		May 19, 2022
<b>SECTION:</b>	284-ELECTRICAL PANELS (SC, RR, ED)	
<b>WRITTEN BY:</b>	Curtis Matthews / Filipe Matias	
<b>SUBJECT:</b>	Install ultracapacitor delay relay	
<b>ISSUE:</b>	Ring gear damage causing stalling and inhibiting the bus from starting	
<b>SUMMARY:</b>	Ring gears are being damaged from excessive torque upon startup. Excessive torque occurs when low voltage batteries are fully charged and Ultracap engages upon startup. To remedy this issue, this ITS will add a delay to the Ultracap to lower the impulse when battery charge is greater than 24V.	

# ITS60428

**THIS ITS DOCUMENT SHOULD BE RETAINED AND REFERRED TO FOR FUTURE MAINTENANCE UNTIL THE NEW FLYER PARTS AND/OR SERVICE MANUAL IS UPDATED TO REFLECT WORK DONE AS A RESULT OF THIS DOCUMENT. ENSURE THAT THIS DOCUMENT IS AVAILABLE FOR PARTS AND MAINTENANCE STAFF GOING FORWARD.**

**PROCEDURE:**

1. Turn the main battery disconnect switch to the “OFF” position.
2. Gain access to the rear facing SDS compartment and find the location of the New Flyer Connect module, Node 21 connector J3, and the upper ground bar GNDBSDS. Gain access to the SC towers in the side console See figure 1. Gain access to the exterior street side SDS cabinet as seen in figure 2.



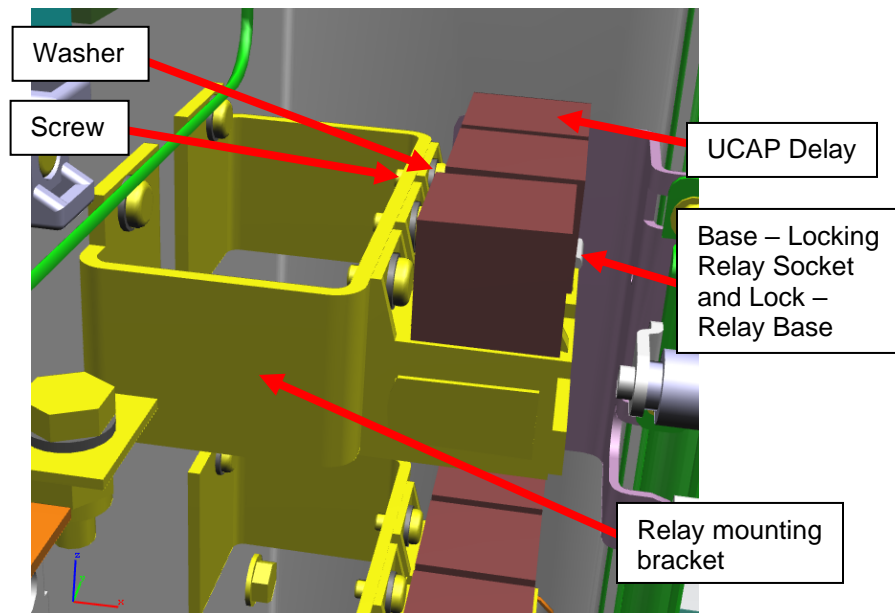
**Figure 1: SDS compartment and side console access view**



**Figure 2: Exterior street side work area access inside SDS cabinet**

NOTE: See figure 2 for exterior street side access to the SDS cabinet for easy access to spare wires located at the bottom of the SDS cabinet.

3. Mount the new relay UCAP DELAY RLY on the relay mounting bracket in SDS cabinet as shown in figure 1 and figure 3. The installation should use the parts listed below as shown in figure 3. Torque screw to 22 IN-LBS (DRY). Apply torque stripe along screw and relay mounting bracket.
  - a. Screw PN: 14S00006
  - b. Washer PN: 659000
  - c. UCAP DELAY RLY PN: 106614
  - d. Base – Locking Relay Socket PN: 685168
  - e. Lock – Relay Base PN: 685169



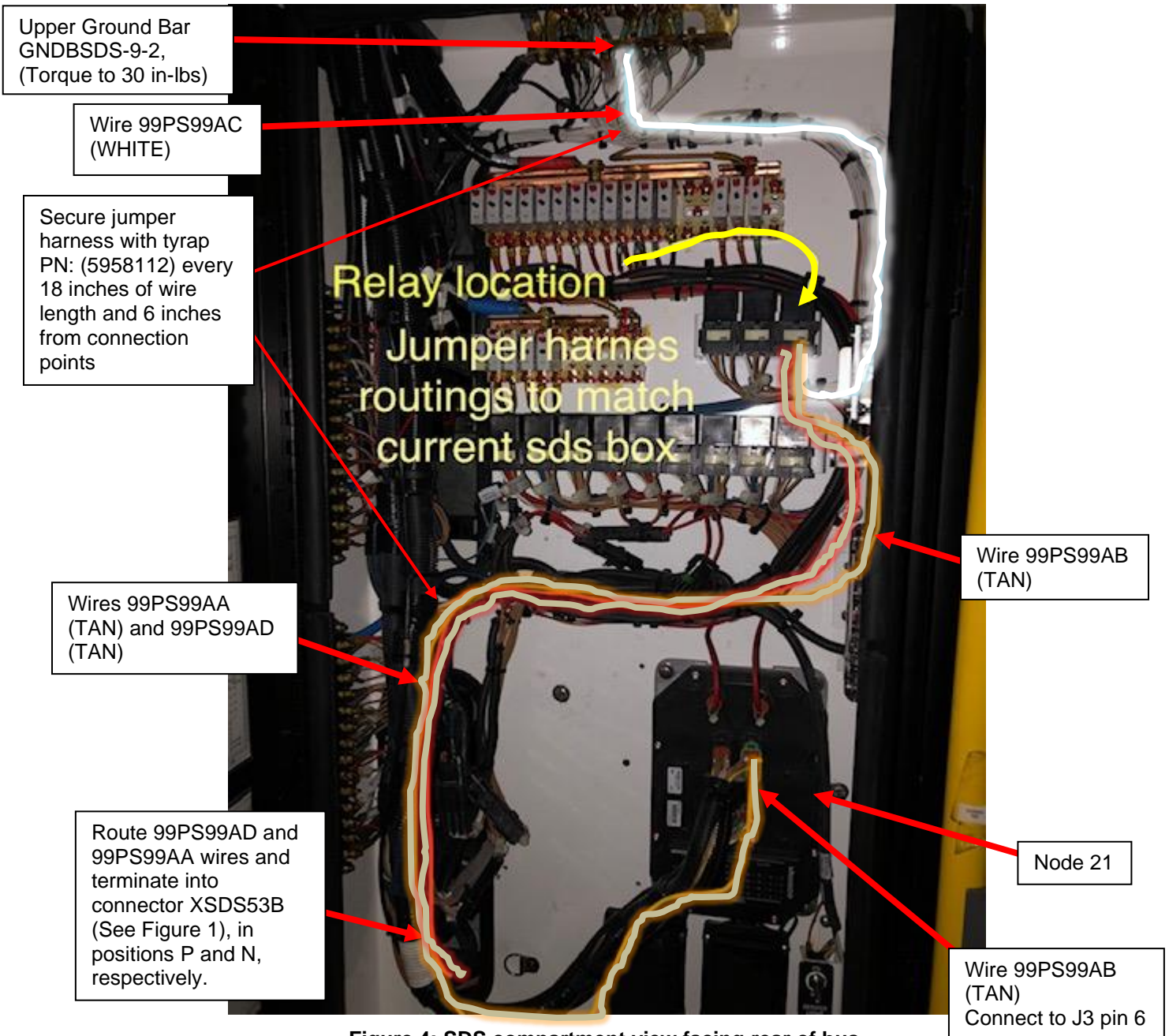
**Figure 3: New relay install inside SDS cabinet**

4. Using the supplied jumper harness PN: 908517, route the harness to the respective locations according to the table 1 below, figure 4 figure 5 and figure 6. Secure harness with tyrap PN: (5958112) every 18 inches of wire length and 6 inches from connection points. For further reference, you can also view the schematic in figure 13.

**Table 1: Jumper harness PN: 908517 pinouts**

Wire Code	X end terminal positions	UCAP terminal positions	X end terminals	UCAP terminals	Wire color
99PS99AA	XSDS53B-SHR-N	UCAP DELAY RLY-30	034795	682919	Tan
99PS99AB	NODE 21-J3-6	UCAP DELAY RLY-86	034794	682919	Tan
99PS99AC	GNDSDS-9-2	UCAP DELAY RLY-85	170794	682919	White
99PS99AD	XSDS53B-SHR-P	UCAP DELAY RLY-87a	034795	682919	Tan

**NOTE:** X end terminal positions are an arbitrary name given to denote the connecting point on the other end of the wire, opposite the ultracapacitor. I.e.: X end terminal “034795” terminates one end of wire “99PS99AA” and inserted into X end terminal position “XSDS53B-N”, see figure 1 for location of the XSD53B connector. The other end of wire “99PS99AA” is terminated with UCAP terminal “682919” and inserted into UCAP terminal position “UCAP DELAY RLY-30”.



**Figure 4: SDS compartment view facing rear of bus**

## Quick Connect

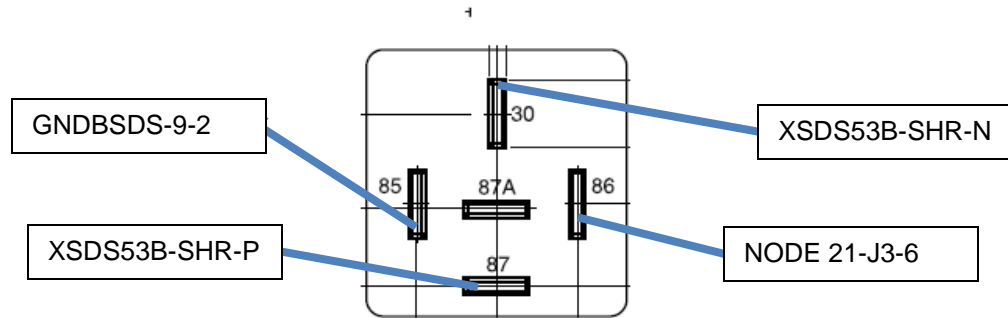


Figure 5: Relay pinout diagram (bottom view)

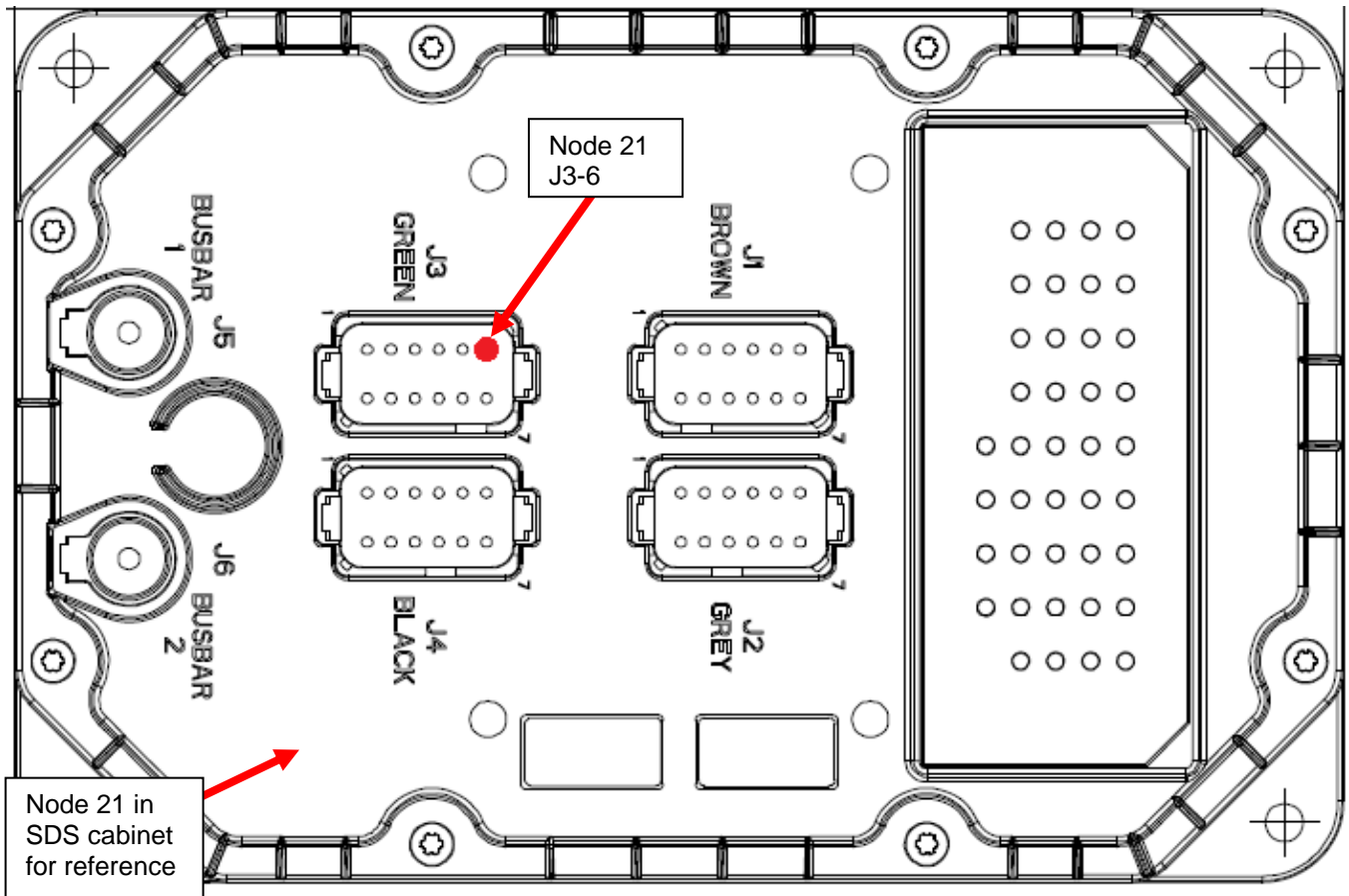


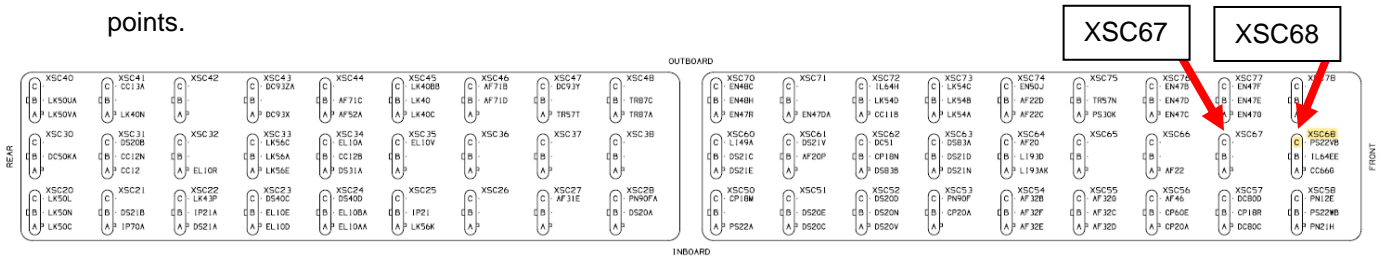
Figure 6: Module Node 21

5. In SC Tower (shown in figure 1), find location of connector XSC67 and XSC68 inside the side console panel. See figure 7 for XSC67 and XSC68 location and figure 9 and 10 for spare harness location/routing.
  - a. Identify the wire 11PS22VB currently inserted into terminal C of XSC68-SHR and inserted at the other end into terminal 4 of the front start push button. De-pin wire 11PS22VB at both ends. See figure 8 for connection locations. For further reference, you can also view the schematic in figure 13.
  - b. Using the supplied jumper harness PN: 908525, follow original routing of wire 11PS22VB and insert the wires in their respective locations per Table 2 below.

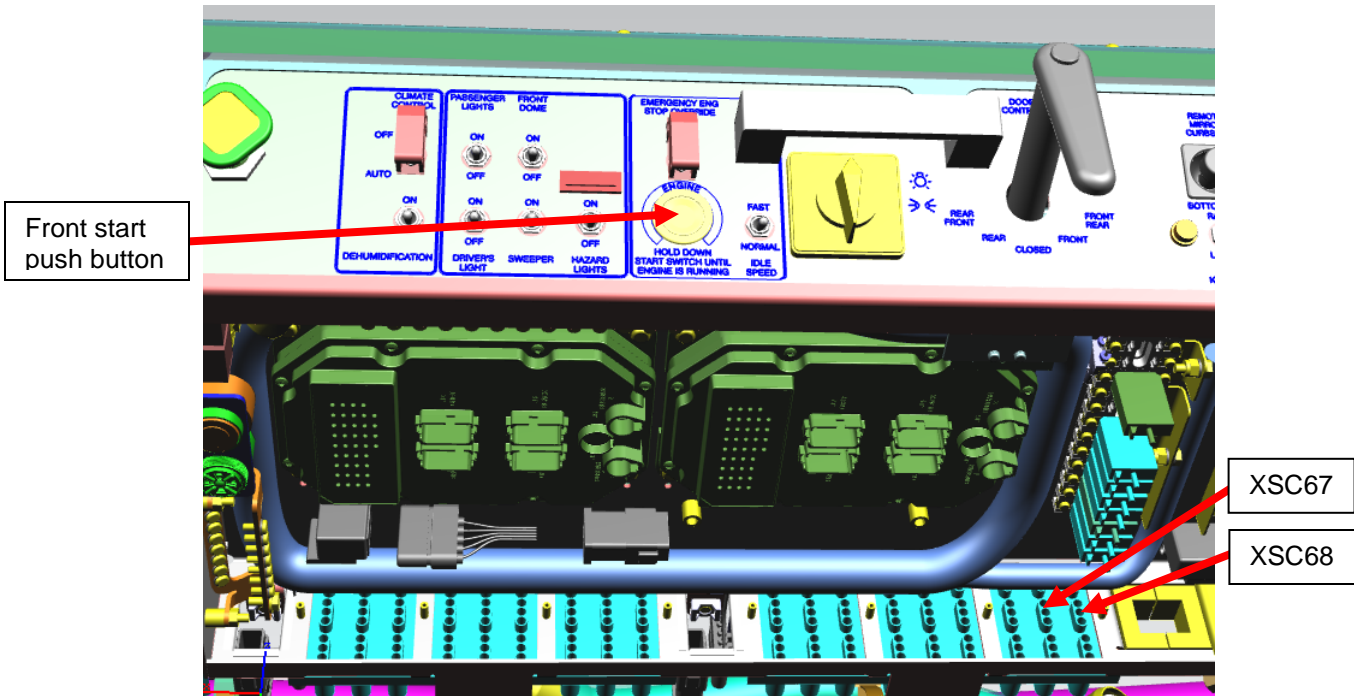
**Table 2: Jumper harness PN: 908525 pinouts**

Wire Code	X end terminal positions	Y end terminal positions	X end terminals	Y end terminals	Wire color
99PS99AE	FRT START PB-TWR-4	XSC67-SHR-A	477408	102878	Red
99PS99AF	XSC67-SHR-C	XSC68-SHR-C	102878	102878	Tan

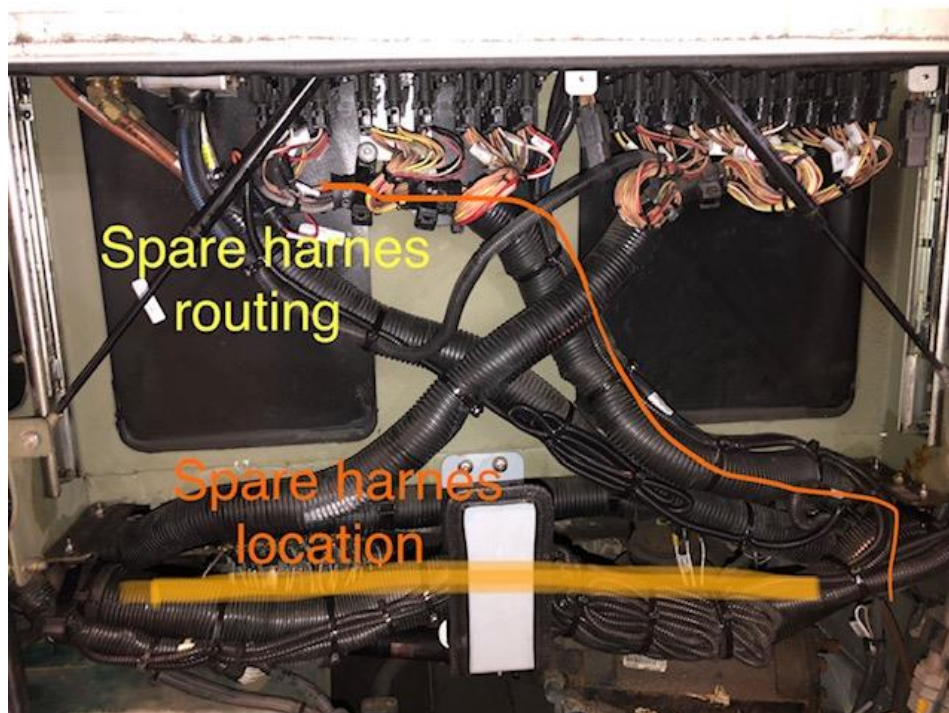
- c. Identify the spare wire 53SPR53J, locate the end by the side console panel, terminate that end with socket PN: 102879, and insert the wire into terminal A of XSC67-TWR. Wrap wire with 1/8" loom PN: 666993.
- d. Identify the spare wire 53SPR53K, locate the end by the side console panel, terminate that end with socket PN: 102879, and insert the wire into terminal C of XSC67-TWR. Wrap wire with 1/8" loom PN: 666993.
- e. Secure wires with tyrap PN: (5958112) every 18 inches of wire length and 6 inches from connection points.



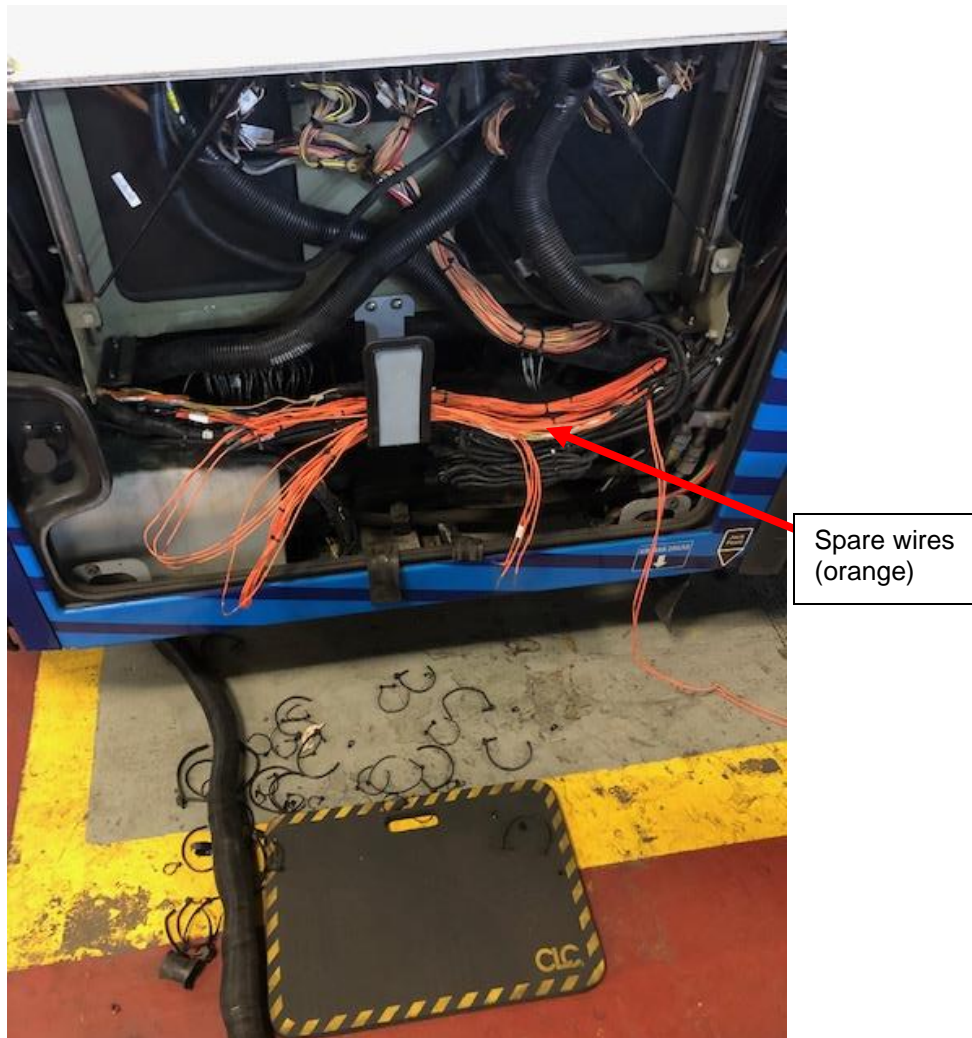
**Figure 7: XSC Connectors in the side console panel**



**Figure 8: Side console panel**



**Figure 9: Exterior side console view (spare harness location/routing)**



**Figure 10: Exterior side console view spare harness (loom removed)**

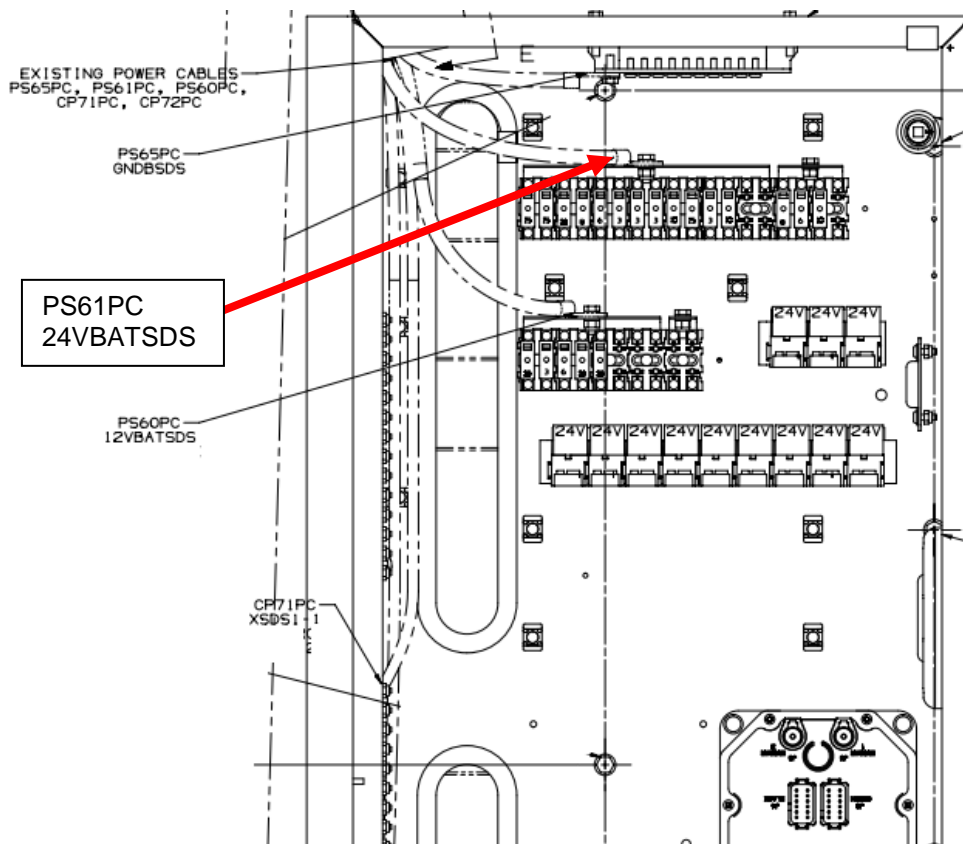
6. Identify the other end of spare wire 53SPR53J at the base of the SDS panel, see figure 11. Terminate the wire with socket PN: 034793 and insert the wire into terminal N of the XSDS53B-TWR which the location can be seen in figure 1.
7. Identify the other end of spare wire 53SPR53K at the base of the SDS panel, see figure 11. Terminate the wire with socket PN: 034793 and insert the wire into terminal P of the XSDS53B-TWR which the location can be seen in figure 1.



Figure 11: Exterior, street side work area access, inside bottom of SDS cabinet



9. Ensure all connectors are connected. Remove all tools and debris and return the bus to service condition.
10. Turn the main battery disconnect switch to the “ON” position.
11. Turn 4way flashers on, then download the latest released PLC program “765061C.vmm” onto the bus. Then turn 4way flashers off once PLC program has finished downloading.
12. Test bus after ITS procedure is complete:
  - a. Assure that the main battery disconnect switch has been in the “ON” position for at least 15 seconds for ultracapacitor to charge.
  - b. To test the ultracapacitor delay relay, the bus batteries will need to be below 24V. Use a multimeter to check voltage of the 24V system on the 24VBATSDS in the SDS cabinet and assure the battery voltage is below 24V. Turn on bus lights to drain battery below 24V if necessary. See location of 24VBATSDS in figure 14.
  - c. Once the voltage is under 24V, with a multimeter connected to pins 30 and 87a of Ultracap delay relay, there should be continuity across. See schematic in figure 13 and figure 5.
  - d. With the multimeter still connected, press the Front Start push button, wait at least 1 second and check continuity across pins 30 and 87a of Ultracap delay relay, again. There should be no continuity across pins 30 and 87a at this point. If there is continuity, then please contact New Flyer service.



**Figure 14: SDS compartment view facing front of bus**



LABOUR ESTIMATE				
	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	Install ultracapacitor delay relay	1	3.5	3.5

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	908517	HRNS-JUMPER SDS PANEL	1	EA	
2	908525	HRNS-JUMPER SC PANEL	1	EA	
3	14S00006	SCREW MACHINE NO 10 PN HD	1	EA	
4	659000	WASHER FLAT SST 10	1	EA	
5	106614	RELAY 24V SPDT	1	EA	
6	685168	BASE- LOCKING RELAY SOCKET	1	EA	
7	685169	LOCK- RELAY BASE	1	EA	
8	034793	SOCKET DEUTSCH 16-14AWG	2	EA	
9	5962614	TYRAP MIN 4" BLACK	20	EA	Use as necessary
10	5958112	TYRAP-7.0 BLACK	20	EA	Use as necessary
11	5955945	TYRAP-HVY 14" BLACK	20	EA	Use as necessary
12	351161	CABLETIE-WIDE HEAVY-DUTY	4	EA	Use as necessary
13	102879	SOCKET-FEM TERM	2	EA	
14	666994	SPLIT LOOM - 1/4"	10	FT	
15	666993	SPLIT LOOM - 1/8"	4	FT	

SPECIAL TOOLS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	NPN	DELPHI CRIMPER	1	EA	
2	NPN	MULTIMETER	1	EA	