



INSTRUCTION TO SERVICE

ITS: 58777	
SECTION:	292 Electrical Harnesses
WRITTEN BY:	Kristian Melo
SUBJECT:	Rewire TRW steering column to provide a memory power circuit

ITS58777

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PROCEDURE:

1. Turn the main battery disconnect switch to the “OFF” position.
2. Locate the fuse box assembly.
3. Drill a hole 0.5” in diameter into the front door of the fuse box for the new emergency power switch. Exact location shown in Figure 1 below.

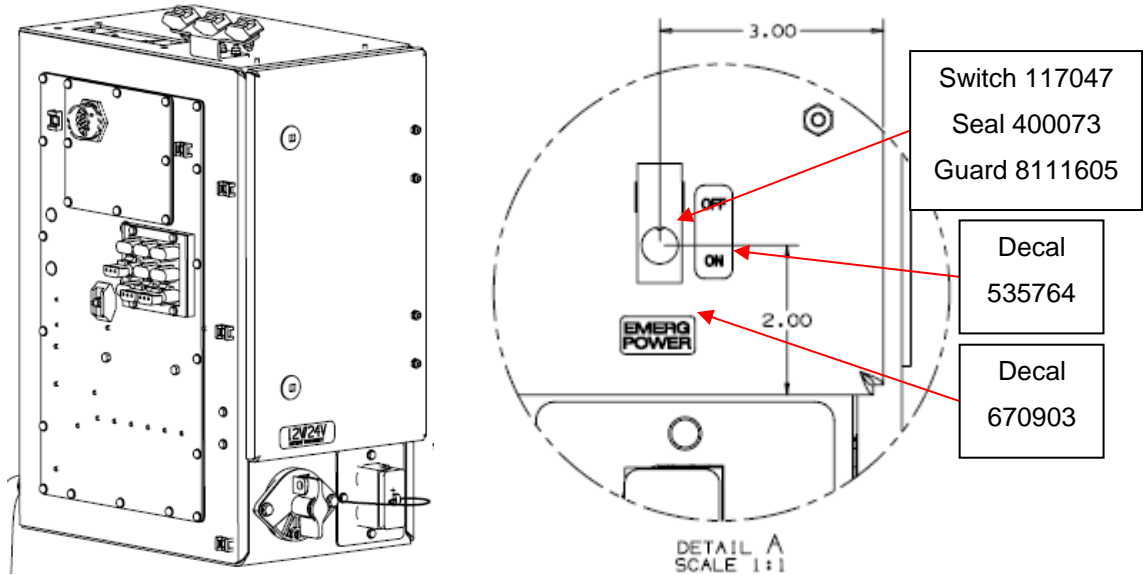


Figure 1: Emergency Power Switch Location

4. Install the provided emergency power switch (PN: 117047), seal (PN: 400073), switch guard (PN: 8111605) and decals (PN: 535764 and 670903). For stack up of switch install see Figure 2 below.

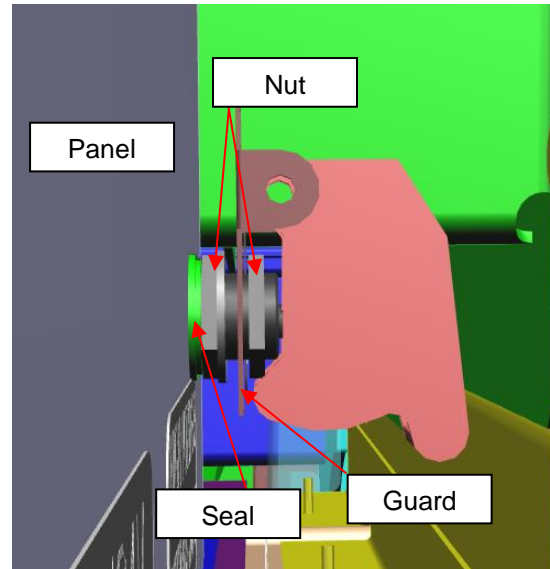


Figure 2: Emergency Power Switch Stack Up

5. Drill and tap 10-24UNC hole on the interior of the fuse box. Details shown in Figure 3 and 4 (different per SR).

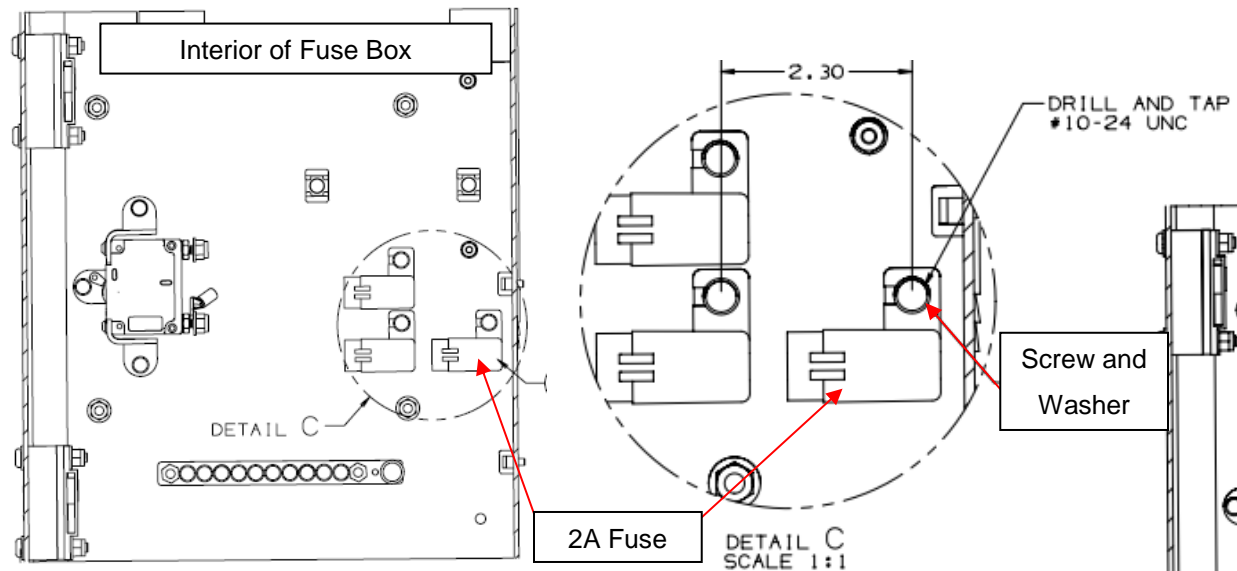
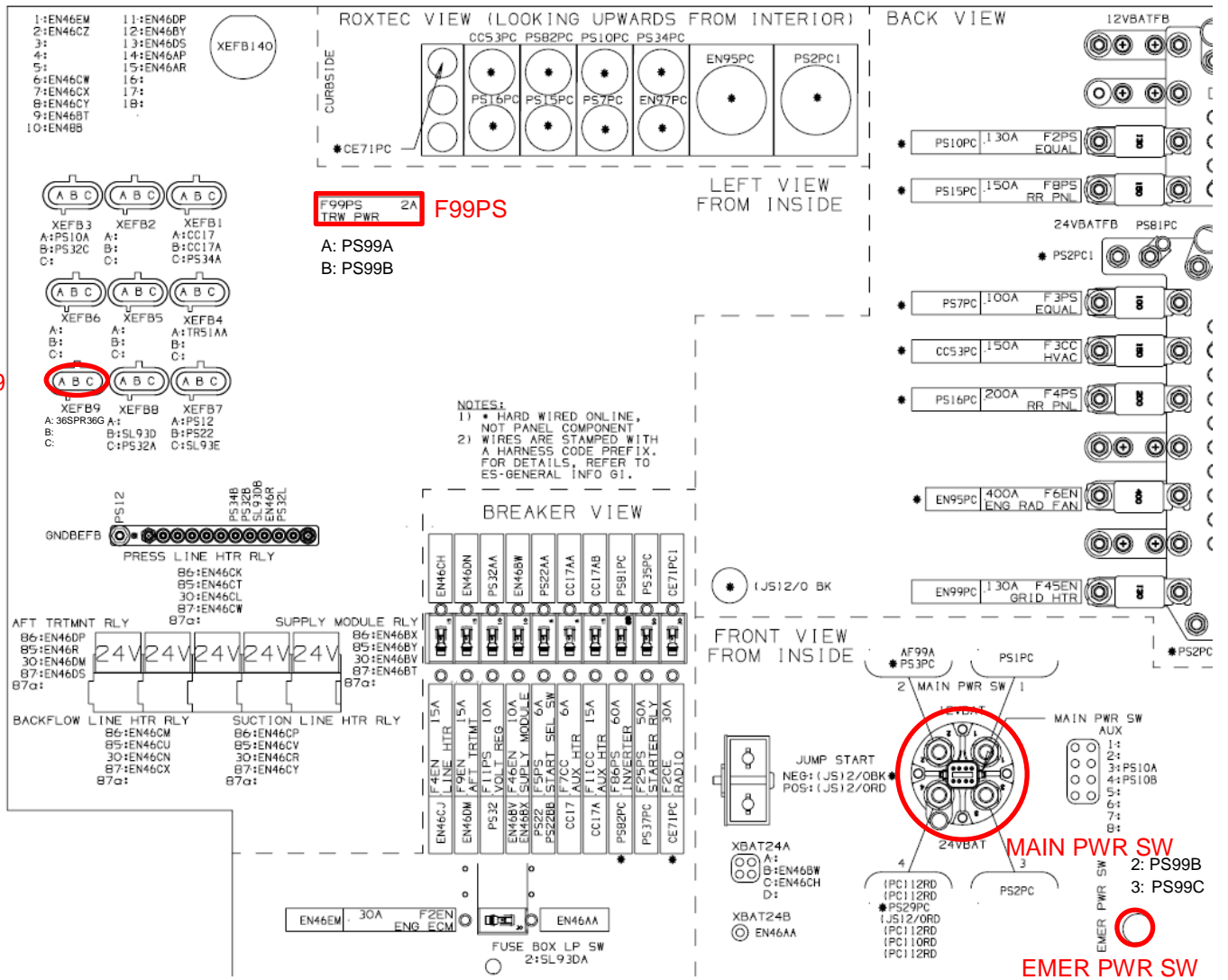
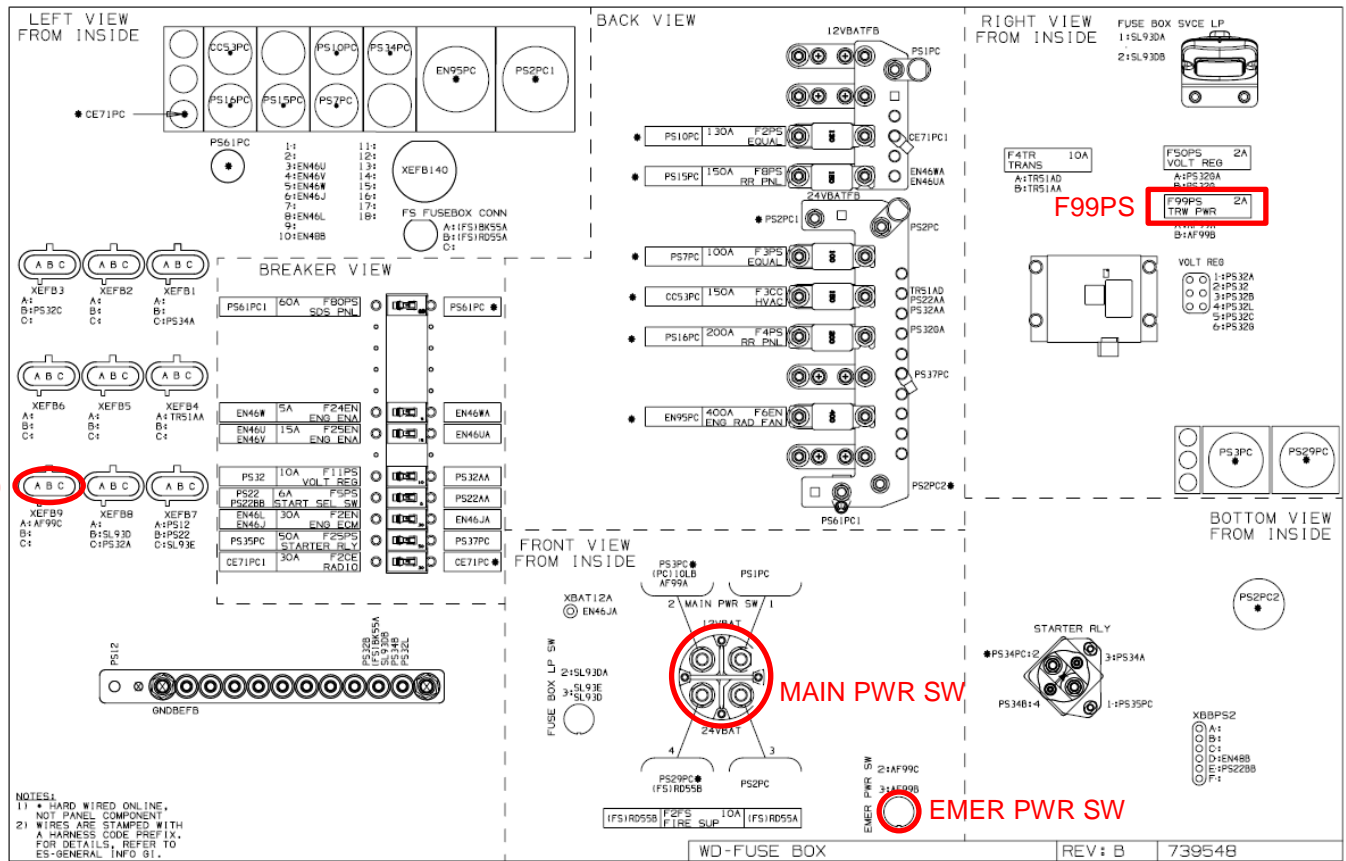


Figure 3: Location of 10-24UNC Hole for Fuse

6. Secure the provided 2A fuse (PN: 198196) to the inside of the fuse box using the hole drilled in step 5 and the provided screw (PN: 14S00006) and washer (PN: 659000).
7. Locate wire 36SPR36G in the engine fuse box.
8. Apply provided socket (PN: 102879) to 36SPR36G and load 36SPR36G into cavity A of XEFB9 (PN: 104043), location shown in Figure 4, using the provided connector seal (PN: 102877) to seal open cavities.



a) SR-2293,2294



b) SR-2218,2285

13. Insert the wire into cavity A of the connector XSC50-TWR on the underside of the side console panel.

For SR-2293, SR-2294, SR-2218 or SR-2274 SKIP TO STEP 21

14. Locate connector XJ20 at the joint bulkhead.

15. Load the other end of 20SPR20J into cavity 3 of XJ20.

16. Secure wires neatly along the routing paths.

17. Locate XJ21 at the joint bulkhead.

18. Identify the end of wire 21SPR21C terminated with an end cap at the joint. Cut and trim the wire and then re-terminate with the provided socket (PN: 102879).

19. Insert the wire into cavity 3 of the connector XJ21 at the joint bulkhead.

20. Secure wiring neatly along routing paths using tyraps (PN: 5958112).

21. Locate XBHR3 at the rear curbside bulkhead shown below in Figure 5.

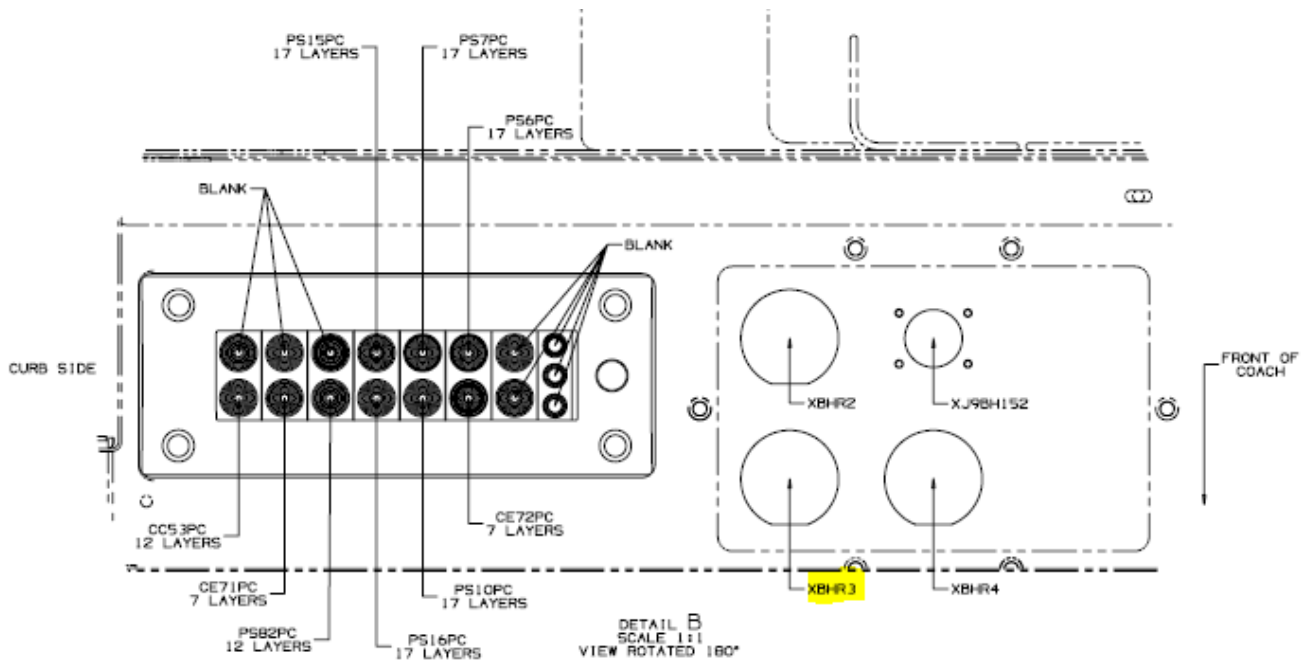


Figure 5: Rear bulkhead with connector XBHR3 indicated.

22. In connector XBHR3, locate wires “A” and “B” shown in Table 2 below. Swap these wires with each other.

Table 2: XBHR3 Wires Swap

SR	2293, 2294, 2218, 2274	2285
Wire A Label	20SPR20F	21SPR21C
Wire A Location	XBHR3-16	XBHR3-16
Wire B Label	20SPR20G	21SPR21D
Wire B Location	XBHR3-14	XBHR3-14

23. Secure wiring neatly along the paths inside the paths with tyrap (PN: 5958112).
24. Identify end of wire 51AF92A terminated within the side console panel at position 2 of breaker F20AF. Cut and trim the wire. Re-terminate the wire with the provided ring terminal (PN: 8110713) and connect it to terminal strip XSC4 at the position indicated in Table 3 below.

Table 3: XSC4 Position for Wire 51AF92A

SR	2293, 2294	2218, 2274, 2285
XSC4 Position	XSC4-1	XSC4- 7

25. Secure wiring neatly along the paths inside the paths with tyrap (PN: 5958112).
26. Locate the provided power relay (PN: 133915) and attach it to the provided connector (PN: 133916).
27. Install this new relay assembly using the provided screw (PN: 14S00006) and washer (PN: 659000). This relay will be installed in the next position above the 24V relays on the right side of the panel, refer to Figure 6.

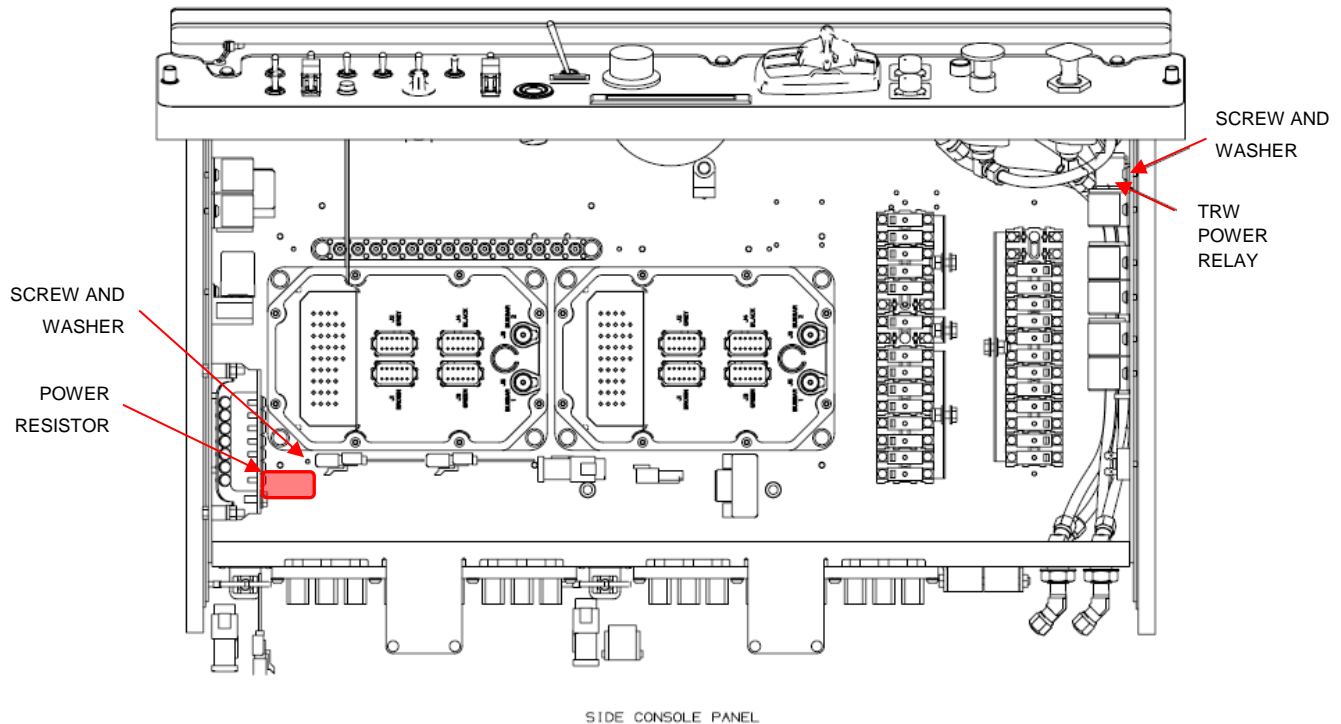


Figure 6: Side Console Panel Locations

28. Locate the provided power resistor (PN: 627976). Using the provided screw and washers, (same parts as above) install below node 9. See Figure 6.
29. Locate the HRNS-JMPR SIDE CONSOLE PNL (PN: 813084) to be installed. Locations indicated in Figure 7.
 - a. Identify wire 99AF99G. Insert the appropriate end to cavity A of TRW PWR RESISTOR-SHR. Insert the opposite end to cavity A of connector XSC38-SHR.

- b. Identify wire 99AF99H. Insert the appropriate end to cavity B of TRW PWR RESISTOR-SHR. Connect the opposite end to terminal strip XSC4.

SR-2293 or SR-2294	SR-2218 or SR-2274 or SR-2285
Position 1	Position 7

- c. Identify wire 99AF99J. Connect the appropriate end to position 87 of TRW PWR RELAY. Connect the opposite end to terminal strip XSC4.

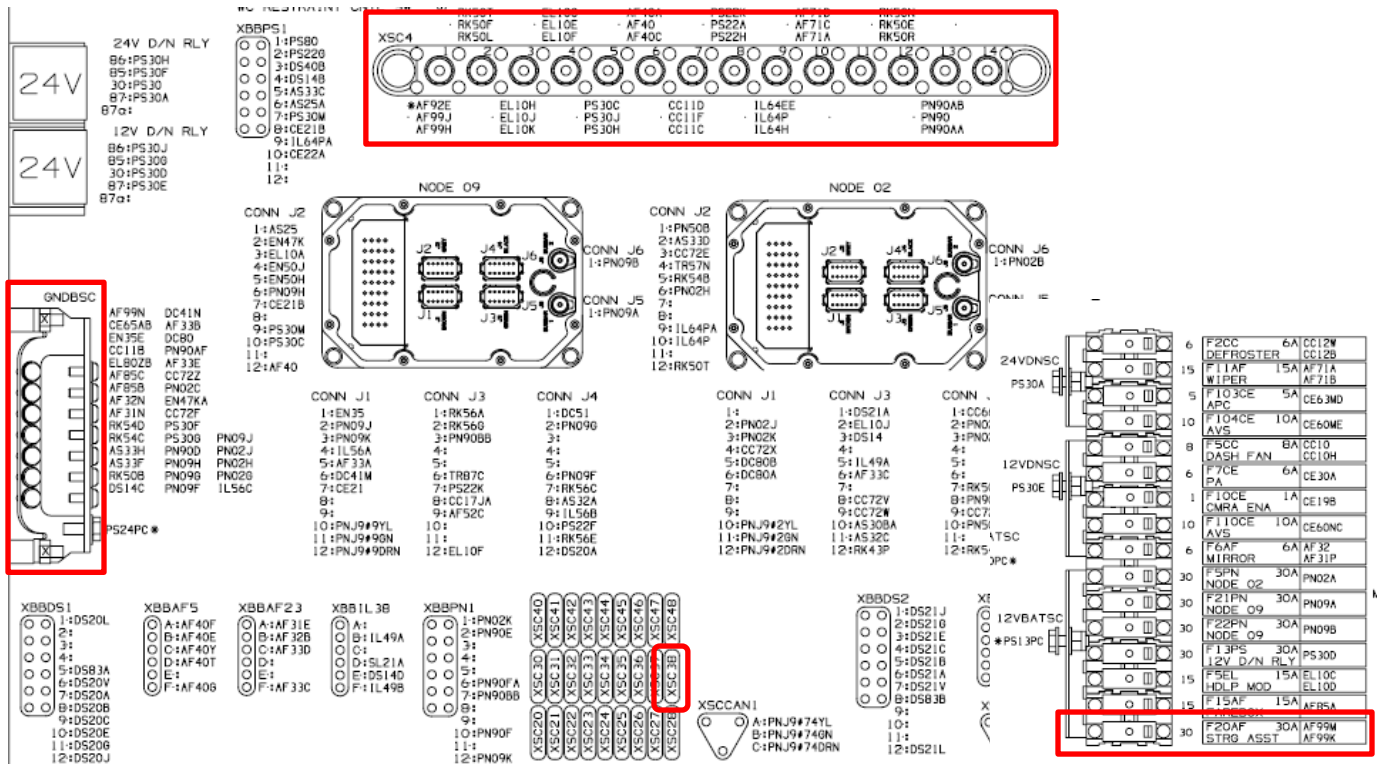
SR-2293 or SR-2294	SR-2218 or SR-2274 or SR-2285
Position 1	Position 7

- d. Identify wire 99AF99N. Connect the appropriate end to position 85 of TRW PWR RELAY. Connect the opposite end to GND BSC.

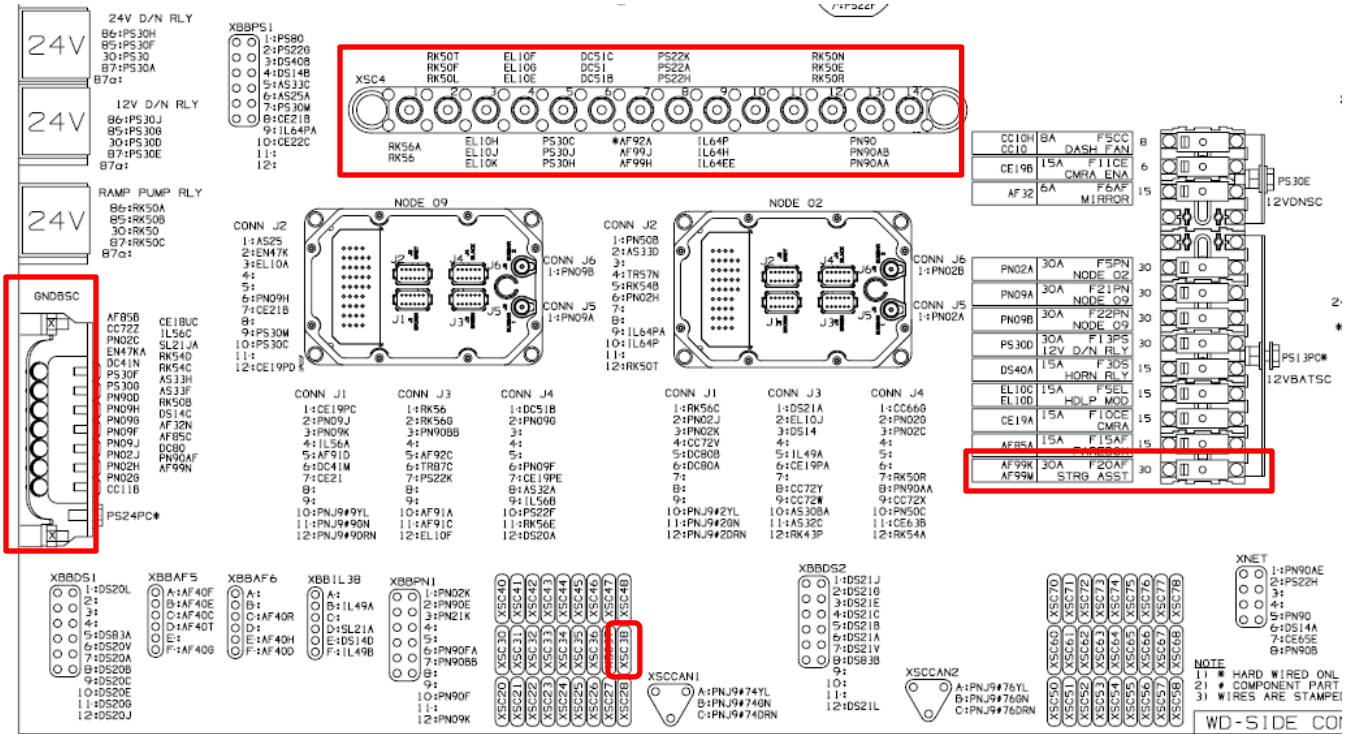
- e. Identify wire 99AF99M. Terminate the appropriate end to position 86 of TRW PWR RELAY. Terminate the opposite end to terminal 2 of breaker F20AF.

- f. Identify wire 99AF99K. Terminate the appropriate end to terminal 30 of TRW PWR RELAY. Terminate the opposite end to terminal 2 of breaker F20AF.

30. Secure wiring neatly along the paths inside the paths with tyrap (PN: 5958112).



a) SR-2293, 2294, 2218, 2285



b) SR-2274

Figure 7: Side Console Connection Locations

31. Install the provided decals.

SR	SR-2293, SR-2294	SR-2218	SR-2274	SR-2285
DECAL-SIDE CONSOLE PNL	753029	740484	734734	748217
DECAL-FUSE BOX	753033	740477	734730	748221

32. Remove all tools and debris and return the bus to service condition.

33. Turn the main battery disconnect switch to the "ON" position.

34. After installation of the ITS is complete, the *Straight Ahead* position of the steering column will need to be reset. To do this, you will need the adapter to communicate with the steering column. The column communicates at a 250k baud rate.



Figure 8: Adapter harness

35. The figure below shows the screen you will see after you open the TRW ReAx Diagnostic Tool, select the adapter that you are using from the drop-down menu. Then connect to the column by clicking the “Connect” button. The bus must be running to communicate with the column, not just key on. (Note how the Position Index Valid is “False”, this is normal.)

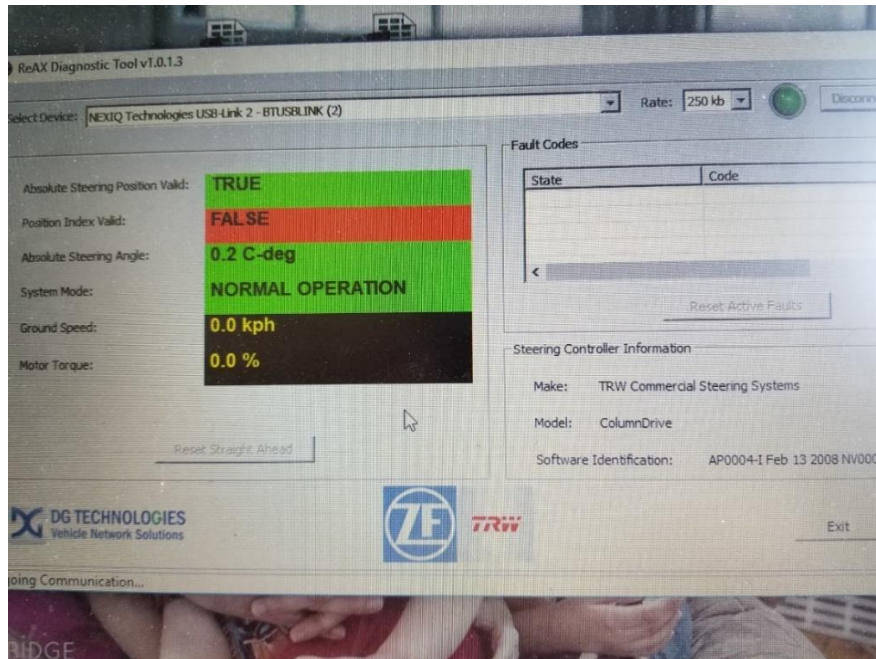


Figure 9: TRW Software

36. Once you have set the wheels straight ahead by looking at the tires, you will then click the “Reset Straight Ahead” button. (Note how the Position Index Valid is now “True”, this is because the steering wheel was turned past straight ahead when making sure the wheels were facing straight ahead.)

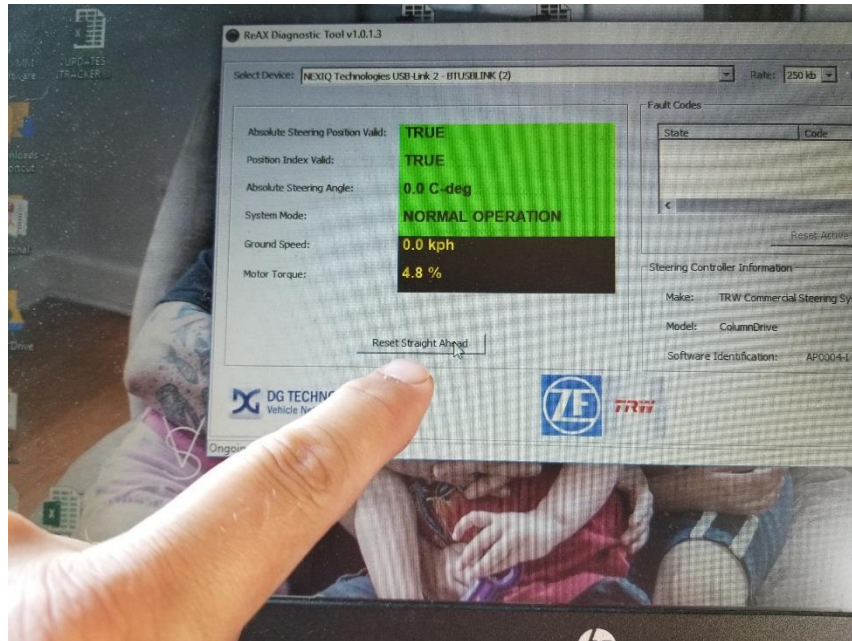


Figure 10: TRW Software Calibration Setup

37. After clicking the “Reset Straight Ahead” button this is the screen you will see. Follow the instructions on the screen. (NOTE: The bus must be running, not just key on, to communicate with the steering column.)

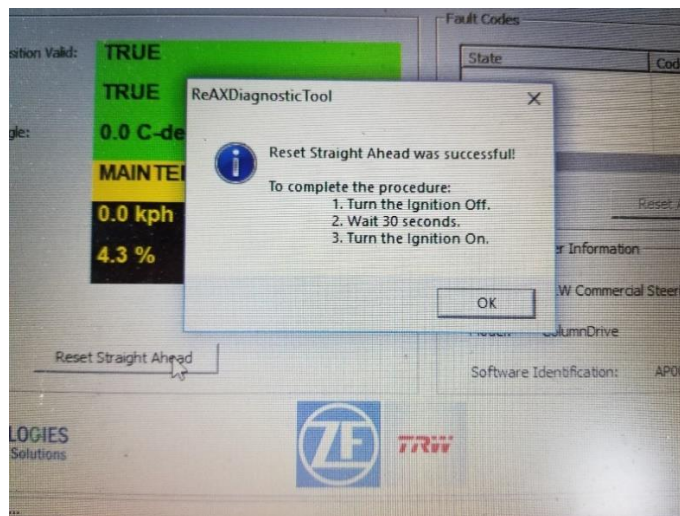


Figure 11: TRW Software Calibration Setup

38. After you have waited 30 seconds and restarted the bus, you will need to reconnect to the column as you did initially. Once you are connected the “Absolute Steering Angle” should be 0.0 degrees if you have not turned the steering wheel after performing the procedure. Also, the “Position Index Valid” will be red and FALSE, until the steering wheel is turned past straight ahead. At this point the ITS is complete.

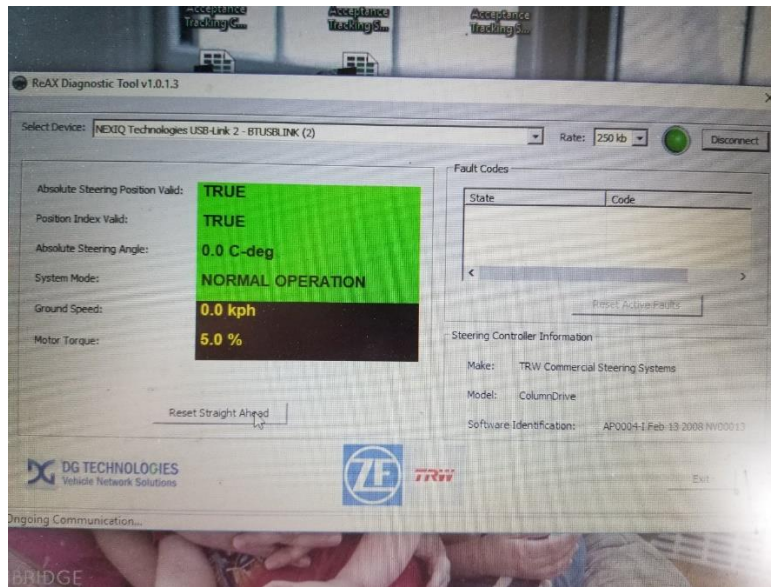


Figure 12: TRW Software Calibration Setup

LABOUR ESTIMATE				
	Operation	Men	Hours	Labour Time M X HR
1	Rewire TRW steering column to provide a memory power circuit	1	3.5	3.5

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	8111605	GUARD KNEELING SW	1	EA	
2	813086	HRNS-JMPR FUSE BOX	1	EA	
3	813084	HRNS-JMPR SIDE CONSOLE PNL	1	EA	
4	670903	DECAL-EMERG POWER	1	EA	
5	659000	WASHER FLAT SST 10	3	EA	
6	627976	ASSY-RESISTOR PACK 1K OHMS/.5W	1	EA	
7	535764	DECAL-ON OFF TOGGLE	1	EA	
8	400073	SEAL-SWITCH RING	1	EA	
9	198196	ASSY-2A FUSE M/PACK CAP	1	EA	
10	14S00006	SCREW MACHINE NO 10 PN HD	3	EA	
11	133916	CONN-POTTER&BRUMFIELD	1	EA	
12	133915	RELAY-12V, 70A	1	EA	
13	117047	SWITCH SPST WP MAINTAIN	1	EA	
14	104043	CONN-3CCT TWR WEATHERPACK	1	EA	
15	102879	SOCKET-FEM TERM	3	EA	
16	102877	SEAL-CONN 14 16 AWG	1	EA	
17	8110713	TERM-R #10 8AWG IN	1	EA	
18	5958112	TYRAP-7.0 BLACK	20	EA	
19	753029	DECAL-SIDE CONSOLE PNL	1	EA	SR-2293,2294
20	753033	DECAL-FUSE BOX	1	EA	SR-2293,2294
21	740484	DECAL-SIDE CONSOLE PNL	1	EA	SR-2218
22	740477	DECAL-FUSE BOX	1	EA	SR-2218
23	734734	DECAL-SIDE CONSOLE PNL	1	EA	SR-2274



NEW FLYER

24	734730	DECAL-FUSE BOX	1	EA	SR-2274
25	748217	DECAL-SIDE CONSOLE PNL	1	EA	SR-2285
26	748221	DECAL-FUSE BOX	1	EA	SR-2285

SPECIAL TOOLS REQUIRED

Item	Part Number	Description	Qty. per Coach	Units	Notes
1		Laptop with TRW ReAx Diagnostic Tool	1	EA	
2		TRW adapter harness	1	EA	