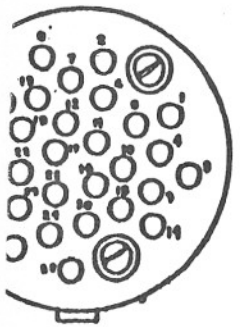


G END DETAIL

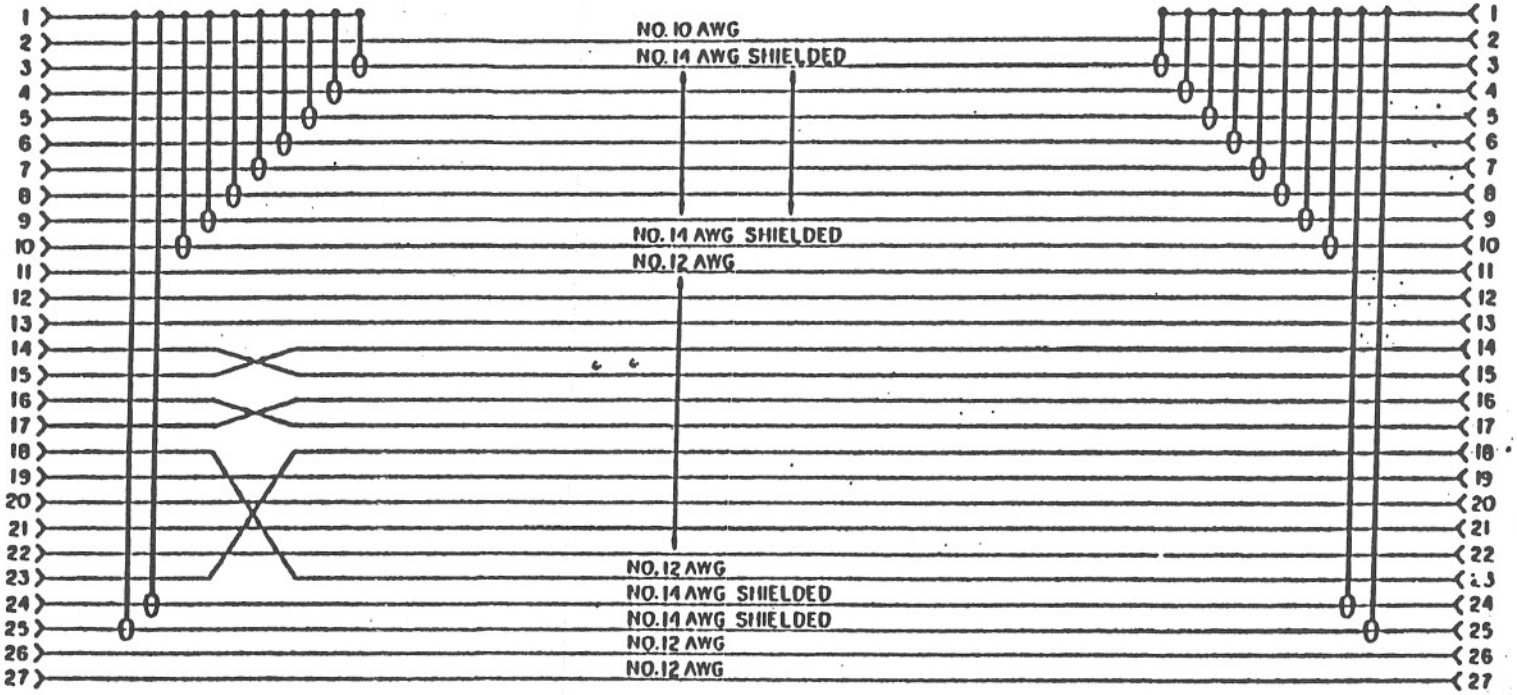


FIGURE 2.31C - WIRING DIAGRAM - 27 POINT COMMUNICATION JUMPER CABLE, CAR - CAR

The 480V jumper cables must be handled with care if they are expected to give good service:

1) Cables should not be left laying on the ground, but rather, be hung up on an appropriate rack.
2) Cables should be kept dry. This is especially true when a cable is being inserted into a receptacle. A wet jumper or receptacle can cause the connection to blow apart when power is applied.
3) Contacts should be kept clean. If dirty, they can be cleaned with the solvents listed in figure 2.33.
4) Cables should be pushed into the receptacle with care, not forced in, nor pounded in. If the cable won't go in, something is wrong-find out why, don't force.
5) Remove the cables by hand. Don't pry them out, and under no conditions uncouple the car and let the train pull the cables loose.
6) If a cable looks defective, don't use it. Label it bad and put it aside for repair or inspection.
7) Test cables periodically per test PO-79-1 test 2.8.

Train Length Limits

Train length is limited by a combination of locomotive (or yard) generating capacity and the coldest or hottest weather the train will experience during its run. Refer to figure 2.32.

When the train is on shop power, either the generating capacity or the 480V yard cables are the limiting factor. Since yard power is normally supplied, the train via 2 cables, the current must not exceed 800 amps, the rating of 2 cables (400 amps each). Refer to figure 2.37.

Refer to figure 2.35 for jumper cable installation instructions, section 6.2 for 480V system details, and test spec. PO-79-1 tests 2.3, 2.7 and 2.8 for trainline and jumper tests.

Trainline Jumper Repairs

Pyle National jumper cables are field repairable. Refer to "Trans-Power Jumpers Assembly Manual PN-12," fig. 2.34 for details.

POWER REQUIREMENTS – HEP CONVERTED SINGLE LEVEL CARS						
HEP POWER UNIT	CAPACITY @0.8 PF	WINTER			SUMMER	REMARKS
		DOWN TO 0° F	0°F TO -10°F	-10°F TO -20°F		
P30 OR POWER CAR (1 HEP UNIT)	375 KW	9 CARS	8 CARS	7 CARS	13 CARS	
F40 PH, AEM7 OR SDP 40 W/ HEP UNIT	500 KW	12 CARS	10 CARS	9 CARS	18 CARS	
E60, P30 OR POWER CAR (2 HEP UNITS)	750 KW	18 CARS	16 CARS	14 CARS	18 CARS	HEP CAPABLE OF 21 CARS IN SUMMER
F 40 (R)	800 KW	18 CARS	17 CARS	15 CARS	18 CARS	HEP CAPABLE OF 25 CARS IN SUMMER
(2) P30'S W/ 3 HEP UNITS	1125 KW	18 CARS	18 CARS	18 CARS	18 CARS	HEP CAPABLE OF 22 CARS IN WINTER & 34 CARS IN SUMMER

NOTES:
1. ALL CONSISTS INCLUDE ONE DINER, ONE LOUNGE, AND THREE BAGGAGE CARS.
2. COACHES (INCLUDING AMFLEET) AND SLEEPERS (INCLUDING SLUMBERCOACHES AND BAGGAGE DORMITORY CARS) CAN BE CONSIDERED TO IMPOSE EQUAL LOADS UNDER SAME CONDITIONS.
3. POWER LOADS

	WINTER	SUMMER
1 BAGGAGE CAR =	1/2 OF COACH CAR	1/10 OF 1 COACH CAR
1 DINER =	2 COACH CAR LOADS	3 COACH CAR LOADS
1 LOUNGE =	1 1/2 COACH CAR LOADS	2 COACH CAR LOADS

4. MAXIMUM CONSISTS LENGTHS ARE BASED ON:
   A. CARS BEING PRE-HEATED OR PRE-COOLED
   B. SEQUENCE (MANUAL) STARTING DURING HEATING SEASON (INCLUDING RESTART AFTER PROLONGED TIME OFF POWER)
   C. 18 CAR LIMIT FOR OPERATING REASONS

CHART: LRB1021
[REVISED 10/27/80]

FIGURE 2.32 TRAIN LENGTH LIMITS

Figure 2.33A

CHEMICAL PRODUCTS APPROVED LIST

CLASSIFICATION: Petroleum Distillate Electrical Cleaner (125°F minimum flash point)

GROUP: 2-A
AMTRAK ITEM NUMBER: 47N9003465
AMMS STOCK NUMBER: 4778803005
UNIT OF MEASURE: Gallon
SOLUTION STRENGTH: As received
PROCEDURE: May be used in a dip tank of wiped on.

PRODUCT NAME	MANUFACTURER	EMERGENCY PHONE NO.
FO-425 (Pure-Solv.)	Hexcel Fine Organics	(201) 472-6800
TPC Solvent	Penetone Corp.	(201) 567-3000

NOTE DO NOT ATOMIZE.
Avoid open flame or sparks. Use with adequate ventilation (120 cu.ft./min. minimum air movement) or with respiratory protection. (two hour maximum exposure per employee per day when respiratory protection is required).

HEALTH/HAZARD DATA

Effects of Overexposure (Threshold Limit Value - 300 ppm)
Eyes-can burn.
Skin - can cause dermatitis.
Breathing - can cuase dizziness.
Swallowing - can cause damage to mucous membranes.

Emergency/First Aid Procedures
Eyes - Flush with water.
Skin - Wash with soap and water.
Breathed - Fresh air; oxygen; get medical attention.
Swallowed - Do not induce vomiting; get midical attnetion.

Fire/Explosion Hazards
Do not use welding or cutting torch in vicinity.
Avoid open flame or sparks.

Spill Procedures
Add absorbent to spill area. Ventilate enclosed space.
Dispose of waste by supervised incineration or in chemical disposal area in compliance with regulations.

PROTECTIVE EQUIPMENT	AMTRAK ITEM NO.	AMMS STOCK NO.
Rubber Gloves	46A9000110	4695208905
Rubber Apron	45A9000809	4601501407
Respirator	47H6000564	4708505507

Figure 2.33B

CHEMICAL PRODUCTS APPROVED LIST

CLASSIFICATION: Electrical Parts Spray Cleaner
(Must not attack plastic)

GROUP: 2-B
AMTRAK ITEM NUMBER: 47A9001063
AMMS STOCK NUMBER: 4704508601
UNIT OF MEASURE: Can
SOLUTION STRENGTH: As received
PROCEDURE: Apply directly to component and allow to evaporate.

PRODUCT NAME	MANUFACTURER	EMERGENCY PHONE NO.
Electrical Safety Solvent	Clarkson Laboratories	(609) 966-5200
Inhibisol	Penetone Corp.	(201) 567-3000

NOTE: Use with adequate ventilation (120 cu.ft./min. minimum air movement) or with respiratory protection.

HEALTH/HAZARD DATA

Effects of Overexposure (Threshold Limit Value - 300 ppm)
Eyes-can burn.
Skin - can cause dermatitis.
Breathing - can cuase dizziness.
Swallowing - can cause damage to mucous membranes.

Emergency/First Aid Procedures
Eyes - Flush with water.
Skin - Wash with soap and water.
Breathed - Fresh air; oxygen; get medical attention.
Swallowed - Do not induce vomiting; get medical attention.

Fire/Explosion Hazards
None.

Spill Procedures
Add absorbent to spill area. Ventilate enclosed space. Dispose of waste by supervised incineration or in chemical disposal area in compliance with regulations.

PROTECTIVE EQUIPMENT	AMTRAK ITEM NO.	AMMS STOCK NO.
Rubber Gloves	46A9000110	4695208905
Rubber Apron	45A9000809	4601501407
Respirator	47H6000564	4798505507

Figure 2.35
480V JUMPER CABLE APPLICATION INSTRUCTIONS

CAUTION: Observe all Railroad Safety Rules and precautions in making connections. Report any receptacles that are damaged; tag defective jumpers.

NOTE The HEP system must be shut down AT THE SOURCE by its controls before any 480V CABLES are touched at all.

I. INTERCAR MAKE-UP

480 volt jumpers to be securely inserted into the 480 volt "RED" receptacles opposite each other. (Four jumpers required between all cars).

II. REAR END OF TRAIN MAKE-UP

480 volt jumper to be securely inserted into and interconnect the adjacent 480 volt "RED" receptacles (two jumpers required.

III. CAR TO LOCOMOTIVES OR POWER CAR MAKE-UP

480 volt jumpers supplied with locomotive must be used and securely inserted in corresponding receptacles (color coded "RED"). (Four jumpers required between car and locomotive, and between locomotives.)

IV. FRONT END OF TRAIN MAKE-UP

Jumpers must be looped across both sides of the locomotive or power car (excepton F40, LRC, P-30, and 693-696 power car, which require none).

V. 480 VOLT TRAINLINE CONTROL CIRCUIT

These cars are equipped with an interlock circuit that requires that all jumpers between cars be connected, plus on the last car of a train, each of the two adjacent receptacles must also be interconnected with jumpers, in order that the 480 volt trainline becomes energized. If any one of the 480 volt jumpers is disconnected or slightly unseated, the power to all cars will be shut off. When all jumpers are secure, the green "trainline complete pilot light(s) in the locomotive will light. (E-60, AEM-7, FL-9 have two, one for each side of the train.)

When a jumper is fully seated in the receptacle, the receptacle cover lie will close against the cable; it should touch or be within 1/16". A troublesome receptacle/jumper can

VI. TROUBLE SHOOTING

A. If a train loses power on the road, the most likely cause is a loose 480V jumper. Check the green "trainline complete" pilot light. If it is on, the trouble is in the locomotive or power car.

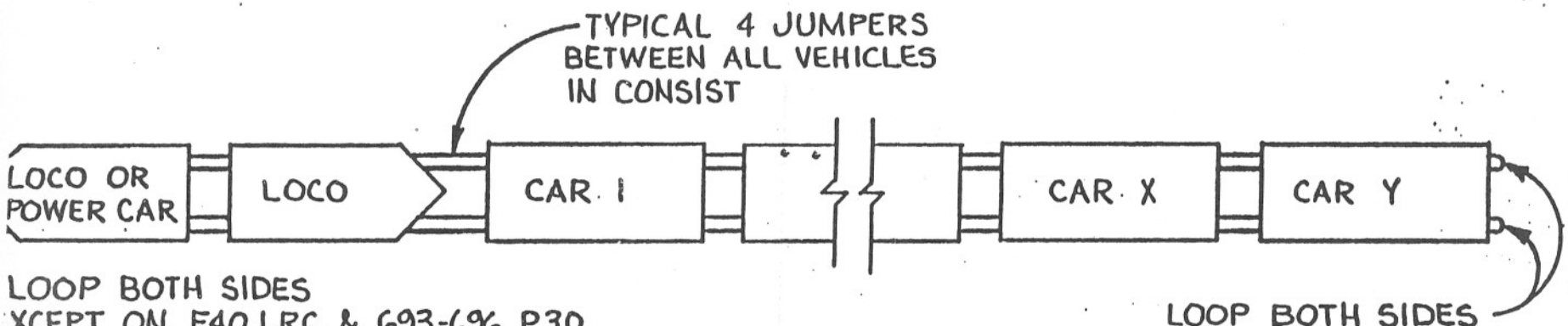
B. If the "trainline complete" light is out, there is a loose jumper. To locate it, inspect each jumper and receptacle for an unseated or loose jumper.

C. If there are no loose jumpers obvious, the fault can be located by looping one side of the train behind the locomotive. If the green light comes on by doing this, the fault is on that side of the train. Since the train should not be run short looped," (except in an emergency) the fault should be located.

D. Restore the locomotive jumpers to the train and sectionalize the train to find the defect. For example, you could short loop behind a car at the middle of the train - it will tell if the fault is in front of or behind that point.

FIGURE 2.36

480 V TRAINLINE CABLE CONNECTIONS
LOCOMOTE & POWER CAR POWER SOURCE



LOOP BOTH SIDES
XCEPT ON F40,LRC, & 693-6%, P30
HICH DO NOT REQUIRE ANY)
EE FIGURE 2.38 FOR LOCO
ET UP SWITCHES

FIGURE 2.37A

480V TRAINLINE CABLE CONNECTIONS - TRAIN ONLY ON YARD POWER

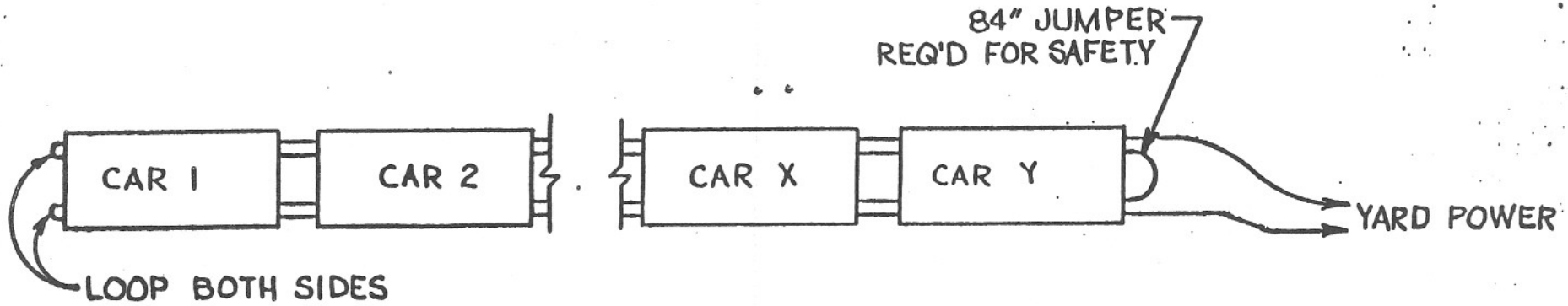
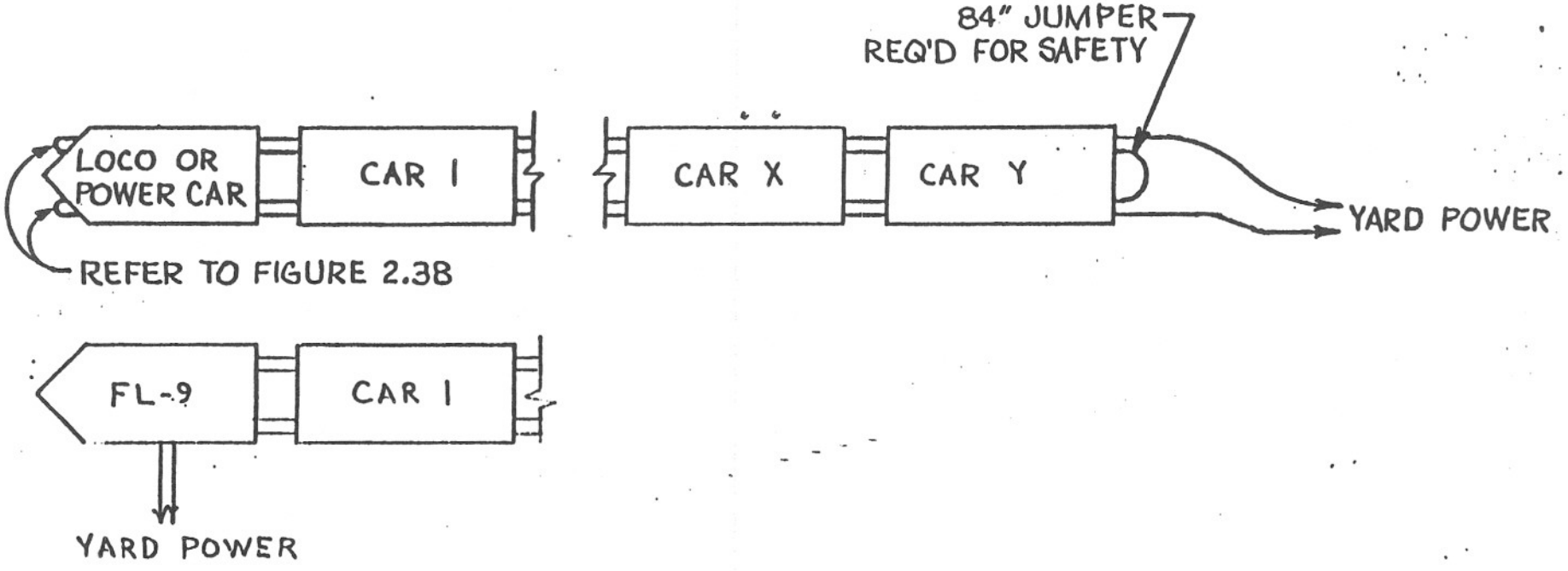


FIGURE 2.37B

480V TRAINLINE CABLE CONNECTIONS: CARS AND LOCO OR POWER CAR ON YARD POWER.



2.6.2 Communication Trainline (Same as Amfleet)

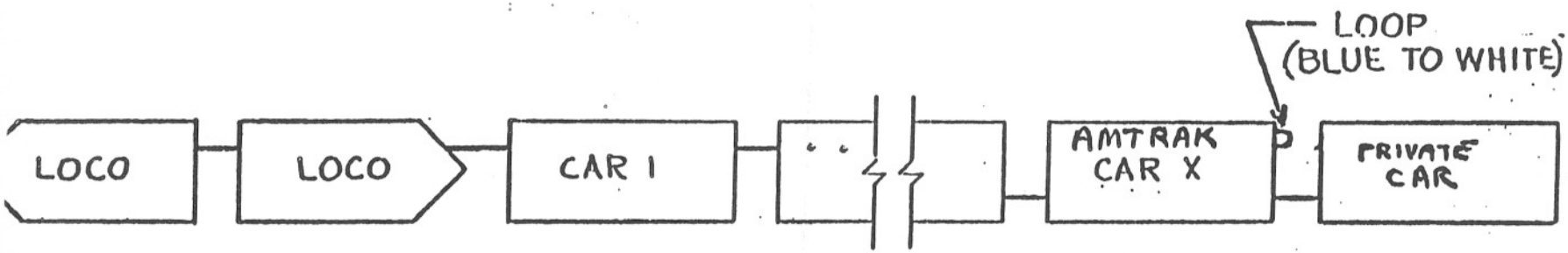
One twenty-seven point jumper and receptacle is provided at each end of the car for trainlining the following circuits from car to car and car to locomotive: All HEP cars use the same 27 point pin arrangement, and thus can be used together. However, the different car groups, (such as Amfleet) have different internal circuit requirements, and on the converted cars, a number of the trainline wires merely pass through the car end to end without connecting to any car equipment; for example, the door control wires.

The 27 point cable system contains the conductor signal, brake applied and released light, PA and intercom trainlines to the locomotive and between all cars, as well as the PA, intercom and music system car to car.

Refer to figure 2.30 for car end connections and 2.31 for jumper cable part list. Refer to figure 2.44 and 2.45 for jumper connections and application instructions. Refer to chapter 6.3 for system details, and test spec. PQ-79-1 tests 2.4 and 2.8.

FIGURE 2.44

27 POINT COMMUNICATIONS CABLE CONNECTIONS



ONE JUMPER BETWEEN EACH CAR, LOCOMOTIVE, AND CAR TO LOCOMOTIVE. JUMPER CAN BE ON EITHER SIDE OF CAR.

Figure 2.45
27 POINT JUMPER CABLE APPLICATION INSTRUCTIONS

CAUTION: Observe all Railroad Safety Rules and precautions in making connections. Report any receptacles that are defective; tag defective jumpers.

NOTE If 480 cables will be touched during 27 point cable application, the HEP system must first be shut down at the locomotive by its controls.

I. INTERCAR MAKE-UP

Communication Jumper (27 point) to be securely inserted into the "Blue" receptacles identified "CAR CNT". One jumper required between cars.

II. REAR END OF TRAIN MAKE-UP

Communication Jumper (27 point) to be securely inserted into the adjacent "BLUE & WHITE" receptacles (one jumper required).

III. CAR TO LOCOMOTIVE MAKE-UP

Communication jumper supplied with the locomotive must be used and securely inserted into corresponding receptacles (color coded "BLUE"). (One jumper required between car and locomotive, and between locomotives.

IV. TROUBLE SHOOTING

A defective car, PA Unit or jumper cable can cause the entire train PA system to be inoperative. Defective T/L cable or jumper will usually show up as all the PA units in the train will only work on local, but not on trainline. The 27 point jumpers can be removed one at a time to locate the fault.

NOTE: All 27 point jumpers must be in place for the conductor signal system to work.