7.0 ELECTRICAL POWER INTERFACES

7.0.1 PAYLOAD DEFINITION

7.0.1.1 (Reserved)

7.0.1.2 Fusing Diagram

STS/Cargo Element electrical power-fusing diagram shall be as shown in Figure 7.0.1.2-1.

7.0.2 UNIQUE MISSION SPECIFIC REQUIREMENTS

7.0.2.1 Pyrotechnic Initiation

Orbiter PRI Pl or Auxiliary PL DC power can be utilized by each payload for pyrotechnic initiation under the following conditions:

a. Payload pyrotechnic initiations, either singly or grouped, shall require no more than 80 amps. (peak) per initiation from the Orbiter PRI power source measured at the interface defined in the cargo element unique-ICD (the initiator(s) should be assumed shorted "0"ohms" for this calculation). Current limiting shall be included in each initiator firing circuit which limits current to 10 amps (peak) per initiator firing circuit. When using the Orbiter Auxiliary PL DC power, the total current limit is 20 amps (peak). When a payload utilizes pyrotechnic initiation via the PRI PL source and one or both Auxiliary buses, the total power utilized per initiation shall not exceed 80 amps (peak) measured at the Orbiter to payload interface.

b. The capability to turn-off firing circuits within 10 seconds after utilization via timer or crew command shall be provided in order to preclude continous draw if the initiator(s) shorts.

c. Figure 7.0.2.1-1 shows the voltage reduction for the firing transient and subsequent "on" time, which shall be applied (subtracted) from the minimum interface voltage levels defined for the PRI PL Bus and Auxiliary PL Busses, in their respective tables.

d. A minimum of 10 seconds shall elapse between pyrotechnic inititaion commands.

e. Power consumption due to pyrotechnic inititaion shall be included as part of the peak power allocated, via the PRI PL Bus or Auxiliary PL DC busses, to the specific payload.

7.0.3 SMALL PAYLOAD UNIQUE INTERFACES

7.0.3.1 ORBITER DC ELECTRICAL POWER DISTRIBUTION FOR SMALL PAYLOADS

7.0.3.1.1 STS/Payload Electrical Power Interfaces

Payload power interface characteristics at STS/Cargo Element Interface shall be as shown in Table 7.0.3.1.1-1.

7.0.3.1.2 (Reserved)

7.0.3.1.3 Cargo Bay Power

Orbiter DC power distribution in the cargo bay is as shown in Figure 7.0.3.1.3-1. The standard electrical power allocation provided by the Orbiter for each mission phase, shall be as specified in Table 7.0.3.1.3-1. The Small Payload electrical interfaces are located at the termination of SPAT extender cables at the STS/Cargo Element interface. On-Orbit voltage level at the payload interface is shown in Figure 7.0.3.1.3-2 for all cargo bay locations except Bay 13 port side. On-Orbit voltage level at the Payload interface for a Bay 13 port side location of a Small Payload is shown in Figure 7.0.3.1.3-3.

7.0.4 (Reserved)

TABLE 7.0.3.1.1-1
CARGO ELEMENT POWER CHARACTERISTICS AT TERMINATION OF SPAT EXTENDER CABLE(S)

ORBITER SERVICE BY FLIGHT PHASE	MAX CONT POWER (W)	PEAK POWER (W)	TIME LIMIT ON PEAK POWER	NOTES
ON-ORBIT STANDBY	175	325	15MIN/3HRS	1
ON-ORBIT OPERATIONS	200	500	15MIN/3HRS	1

TABLE 7.0.3.1.1-1 CARGO ELEMENT POWER CHARACTERISTICS AT TERMINATION OF SPAT EXTENDER CABLE(S)
(CONCLUDED)

Note: (1) Interface voltage requirement is 24 - 32 VDC.

TABLE 7.0.3.1.3-1 POWER ALLOCATION AT THE END OF TWO 8 AWG FEEDERS

MISSION PHASE	VOLTS RANGE (VDC)	POWER (WATTS) CONT. MAX.	POWER (WATTS) PEAK	TIME LIMIT ON PEAK POWER	REMARKS
GROUND OPERATION	(2)	250 1500	375 1500	15 min/3 hr N/A	(1) (3)(4)
ON-ORBIT	(2)	1500	1500	N/A	(4)(5)

NOTES:

(1) Orbiter systems powered to greater than on-orbit levels.

(2) See Figure 7.0.3.1.3-2 or 7.0.3.1.3-3 for voltage levels.

(3) Orbiter systems powered to on-orbit levels.

(4) Power levels shown in table are for the sum of two 8 AWG feeders. Power levels for one 8 AWG feeder shall not exceed 750 watts.

(5) The SPA payload shall be limited to 300 watts peak during on-orbit 1 and 3 (after primary payload operations are complete), reference Table 7.0.3.1.1-1.

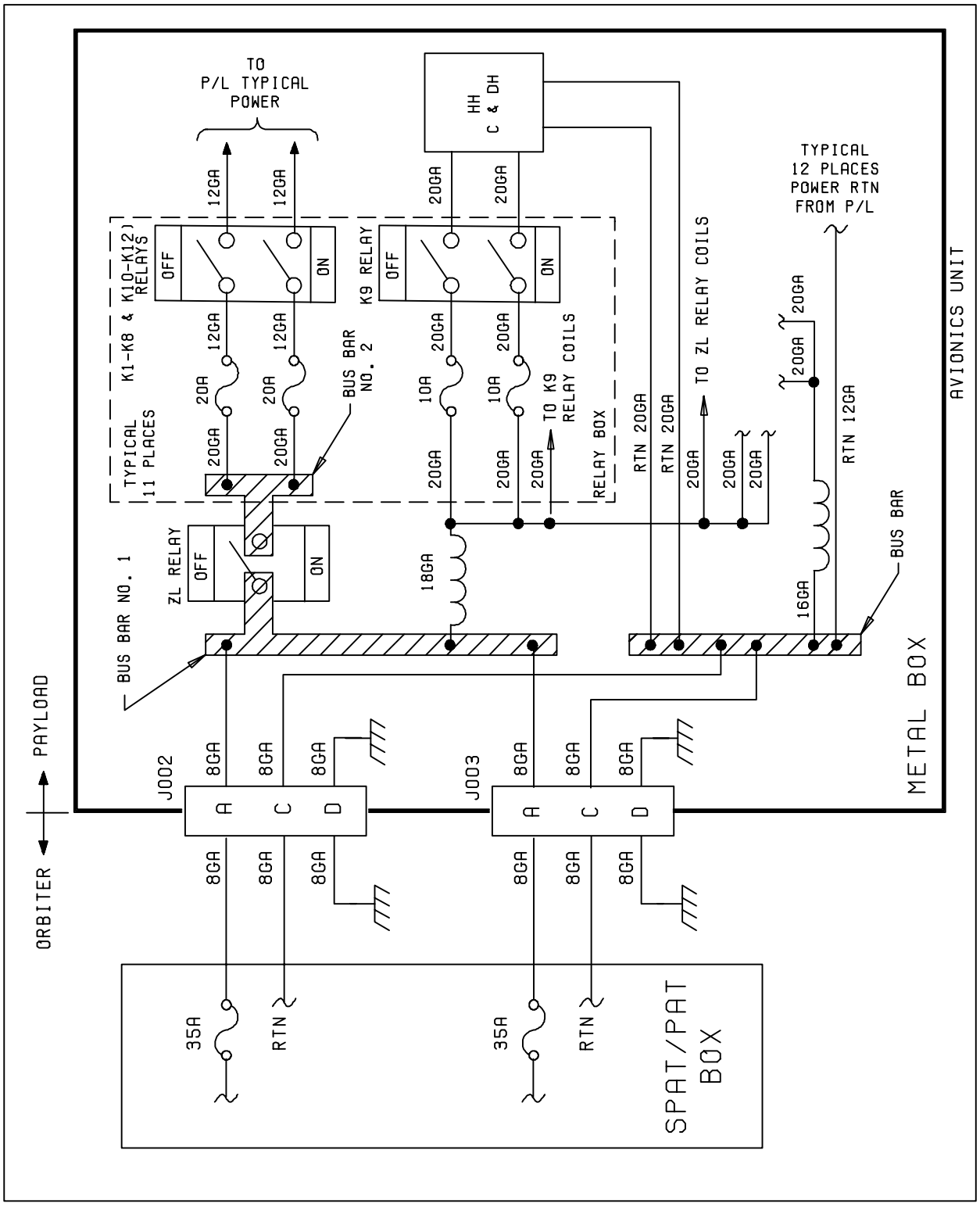


FIGURE 7.0.1.2-1 FUSING DIAGRAM

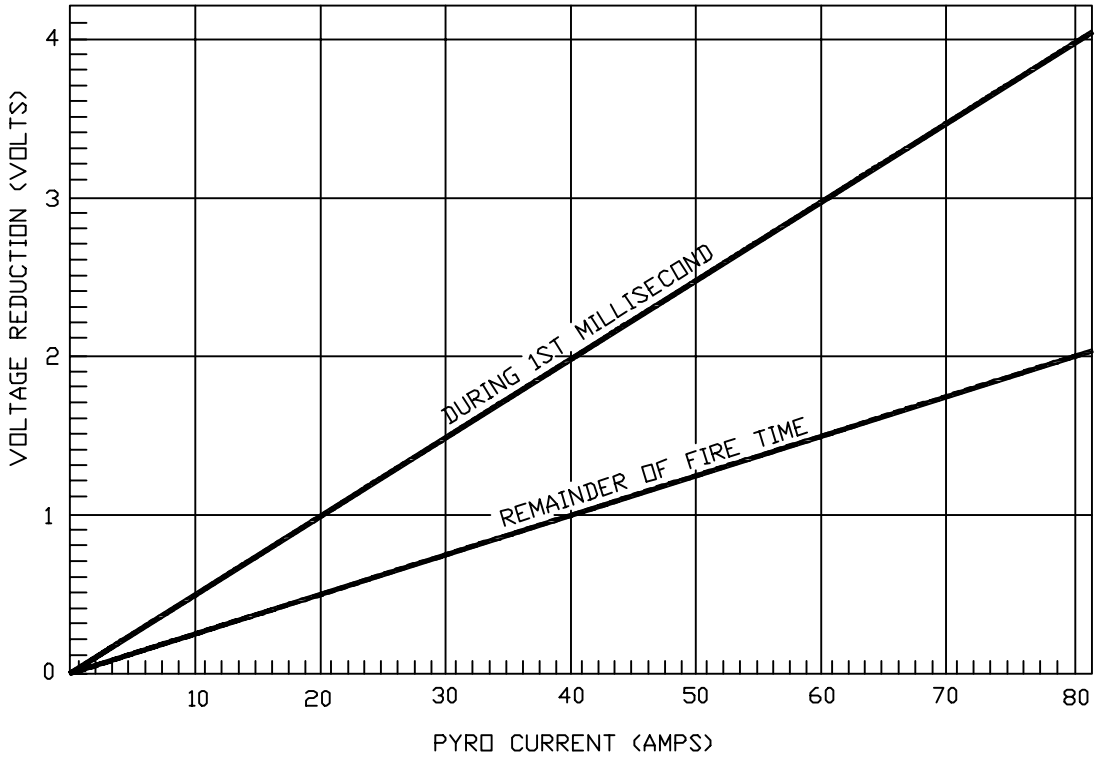


FIGURE 7.0.2.1-1 VOLTAGE REDUCTION DUE TO PYROTECHNIC FIRING

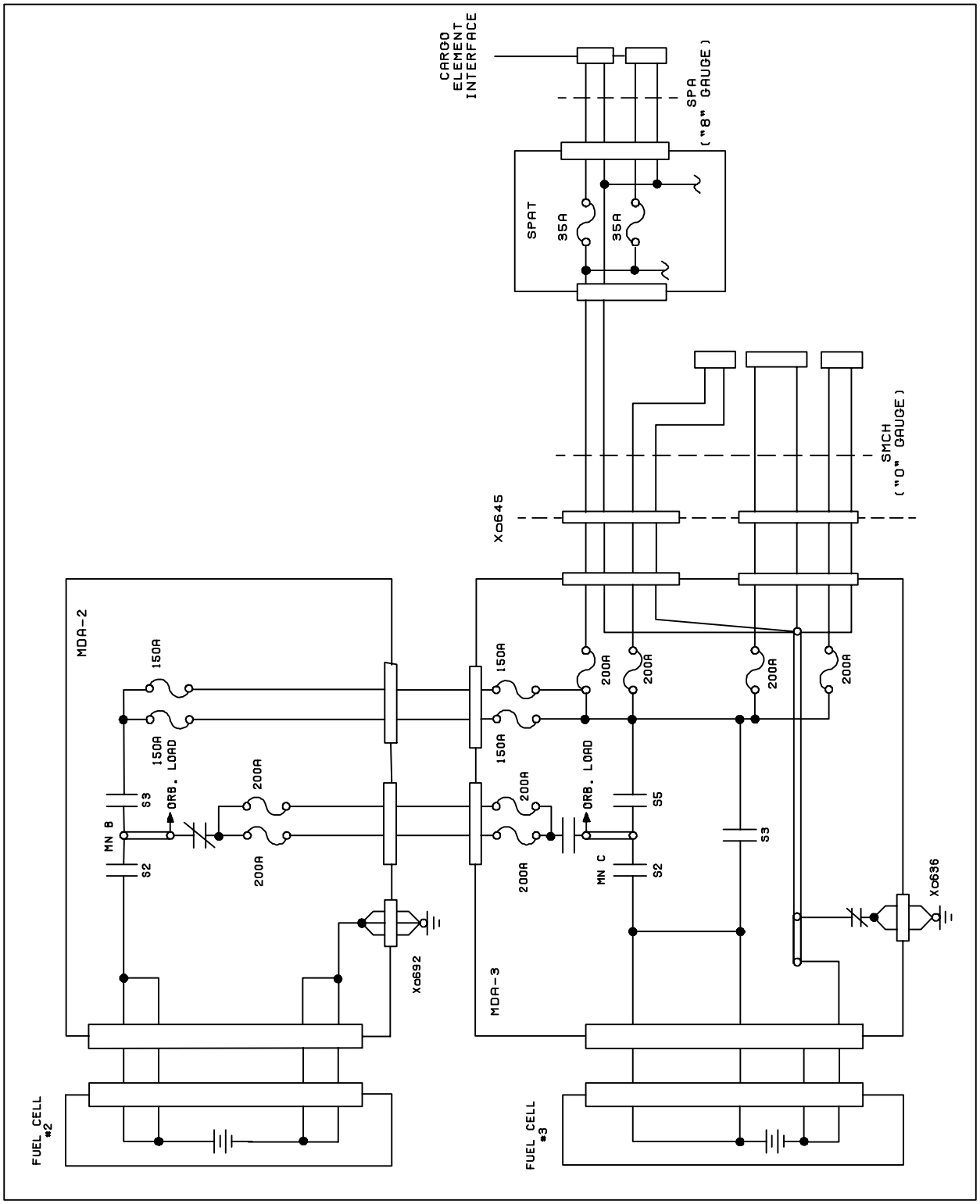
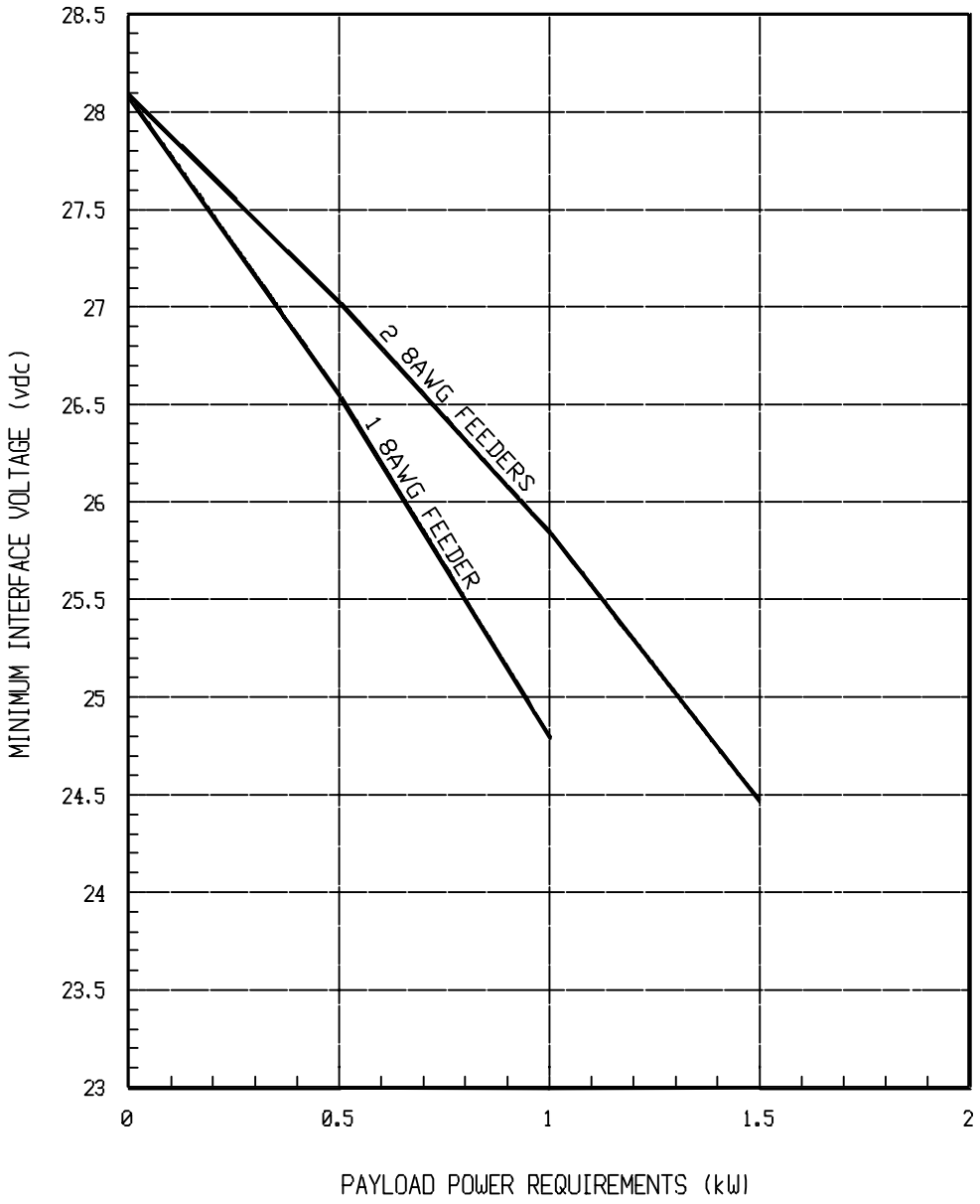


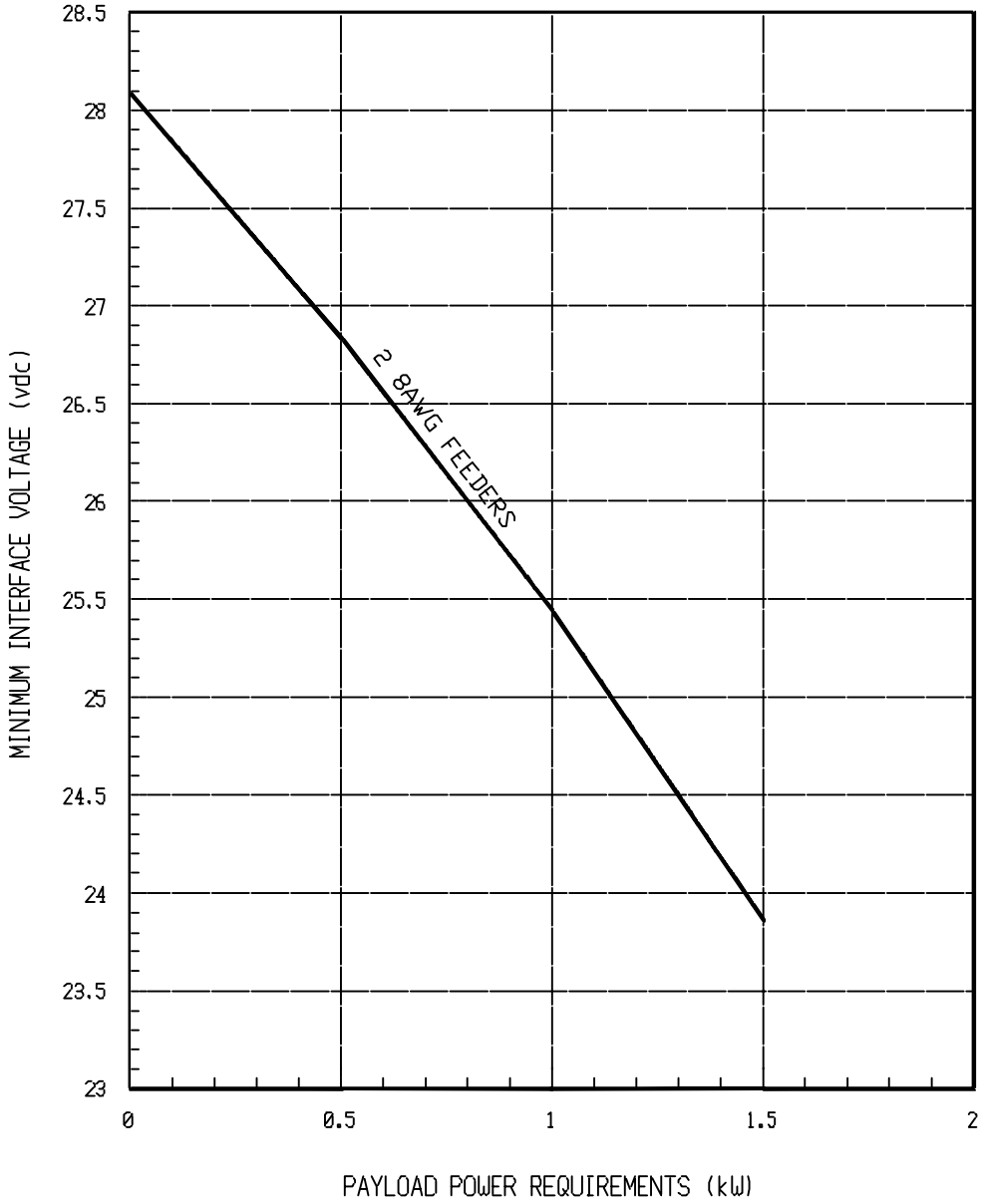
FIGURE 7.0.3.1.3-1 ORBITER DC POWER DISTRIBUTION TO A SMALL PAYLOAD



CURVE CRITERIA:

1. CURVE BASED ON END-OF-LIFE (LCC) FUEL CELL (NSTS 16007, LAUNCH COMMIT CRITERIA, FIG. 25-02 REV. E FUEL CELL POWERPLANT MINIMUM LAUNCH PERFORMANCE LIMITS)
2. ORBITER LOADS = 17.5kW +2kW (HYDRAULIC CIRCULATION PUMP "ON")
3. ASSUME ONE POWER LOAD (PRIMARY PAYLOAD) AT 5kW
4. ASSUME MAIN B AND MAIN C BUS TIED
5. ASSUME VARIED LOAD (0 - 1.5kW SPA PAYLOAD) AT END OF ONE OR TWO 30 FT. 8-AWG SPAT/PAT BOX HARNESSES. SPAT/PAT BOX FED BY 57 FT. SMCH HARNESS

FIGURE 7.0.3.1.3-2 SPA INTERFACE VOLTAGE LEVEL



CURVE CRITERIA:

1. CURVE BASED ON END-OF-LIFE (LCC) FUEL CELL (NSTS 16007, LAUNCH COMMIT CRITERIA, FIG. 25-02 REV. E FUEL CELL POWERPLANT MINIMUM LAUNCH PERFORMANCE LIMITS)
2. ORBITER LOADS = 17.5kW +2kW (HYDRAULIC CIRCULATION PUMP "ON")
3. ASSUME ONE POWER LOAD (PRIMARY PAYLOAD) AT 5kW
4. ASSUME MAIN B AND MAIN C BUS TIED
5. ASSUME VARIED LOAD (0 - 1.5kW SPA PAYLOAD) AT END OF ONE OR TWO 40 FT. 8-AWG SPAT/PAT BOX HARNESSES. SPAT/PAT BOX FED BY 57 FT. SMCH HARNESS

FIGURE 7.0.3.1.3-3 SPA INTERFACE VOLTAGE LEVEL (BAY 13 PORT)

THIS PAGE INTENTIONALLY LEFT BLANK