

7.1 (Reserved)

7.2 ELECTRICAL ENERGY

7.2.1 Baseline Energy Allocation

Energy allocation to the individual Cargo Elements shall be defined in the Payload Integration Plan (PIP) for each Cargo Element.

7.3 DC POWER

7.3.1 Orbiter DC Electrical Power System and Distribution

7.3.1.1 Cargo Bay Main DC Power

Orbiter main DC power distribution in the cargo bay is as shown in Figure 7.3.1.1-1.

7.3.1.2 (Reserved)

7.3.1.3 (Reserved)

7.3.1.4 Circuit Protection Criteria

Refer to Section 20 paragraph, 20.2

Note: A non-compliance condition exists between the Orbiter and the MIGHTY. Refer to Section 20 for the definition of the unique interface requirement.

Payload electrical power distribution circuitry shall be designed such that electrical faults do not damage Orbiter wiring nor present a hazard to the Orbiter or crew. Circuit protection devices shall be incorporated into the payload design in compliance with the NASA electrical design criteria for cargo element circuit protection as defined in NSTS 18798.

Orbiter electrical wiring insulation is rated at 200 degrees Celsius.

7.3.1.5 (Reserved)

7.3.2 (Reserved)

7.3.3 (Reserved)

7.3.4 (Reserved)

7.3.5 (Reserved)

7.3.6 (Reserved)

7.3.7 DC Power Ripple and Transient Limits

Ripple and transient limits for electrical power provided by the Orbiter at the indicated interfaces shall not exceed the voltage values specified in the following paragraphs.

During normal equipment operation, for both ground power and fuel cell power, voltage transients of opposite polarity shall not occur simultaneously on the positive and return dc power busses.

7.3.7.1 Inflight DC Power Bus Ripple

Inflight DC power bus ripple at the interface shall not exceed 0.9 volts peak-to-peak narrowband (30 Hz to 7 kHz) falling 10 dB per decade to 0.28 volts peak-to-peak at 70 kHz, thereafter remaining constant to 400 MHz.

The momentary coincidence of 2 or more signals at any one frequency shall not exceed the envelope defined as 1.6 volts peak-to-peak (30 Hz to 7 kHz), falling 10 dB per decade to 0.5 volts peak-to-peak at 70 kHz, thereafter remaining constant to 400 MHz.

Under the conditions of a passive payload (resistive simulation of load), the ripple on the power supplied shall not be greater than 0.8 volts peak-to-peak broadband (DC to 50 MHz); no discrete frequency shall exceed 0.4 volts peak-to-peak. This condition shall apply at the mid-body power interface only.

7.3.7.2 Inflight DC Power Transients

Inflight DC power transients on the Orbiter DC power busses at the cargo element interface measured differential mode (line to line) shall not exceed twice the line voltage relative to the line voltage for either positive or negative transients. A typical positive transient is shown in Figure 7.3.7.2-1.

7.3.7.2.1 (Reserved)

7.3.7.2.2 Hydraulic Circulation Pump and PRI and Cabin and Aux PL Busses

Hydraulic circulation pump produced transient voltages on the PRI PL Bus, Aux PL A, Aux PL B and the Cabin PL Bus, at the payload design interfaces, shall not exceed the voltage envelope of Figure 7.3.7.2.2-1. Payload design shall accommodate sawtooth transient oscillations, having a maximum amplitude of 4 volts peak-to-peak on the PRI PL Bus, Aux PL A, Aux PL B and the Cabin PL Bus, at the cargo element interface. The oscillation has a base frequency between 500 and 700 Hz and contained within the inner envelope shown in Figure 7.3.7.2.2-1. These bus voltage transients (caused by activation of the hydraulic circulation pump connected to that bus) may occur at any time during on-orbit operations, plus activation at touchdown, and shall not be subjected to pre-flight scheduling.

7.3.7.3 Common-Mode Voltage

Common mode voltage, as used here, is defined as the voltage drop across two points of Orbiter structure caused by a current through the impedance between those two points. The common-mode voltage for the longest Cargo Bay dimension (Station Xo585 to Xo1307 bulkhead) shall not exceed 0.3 volts peak-to-peak, when measured in the time domain with an instrument bandwidth of at least 50 MHz (linear function). This is inclusive of the DC component which may exist in the vehicle structural members. Voltages measured at discrete frequencies shall not exceed 0.15 volts peak-to-peak.

Transient excursions shall be limited to $\pm 50 \times 10^{-6}$ volt-seconds with rise and fall rates not greater than 56 volts/microsecond; peak voltage shall not exceed ± 2 volts when measured between station Xo585 and Xo1307 bulkhead.

7.3.7.4 Ground DC Power (via Orbiter EPDS) NOT APPLICABLE

7.4 (Reserved)

7.5 LIMITATIONS ON CARGO UTILIZATION OF ELECTRICAL POWER

7.5.1 (DELETED)

7.5.2 (DELETED)

7.5.3 Cargo Element Activation/Deactivation and Isolation

Each cargo element shall be able to disconnect via crew-operated controls all Orbiter power supplied to the cargo element, except for a total amount not to exceed one (1) amp. A maximum of 500 Watts of power shall be latched on, such that if inadvertent power disconnection to the cargo element occurs, all cargo element loads except for a maximum of 500 Watts shall be disconnected.

7.5.4 (Reserved)

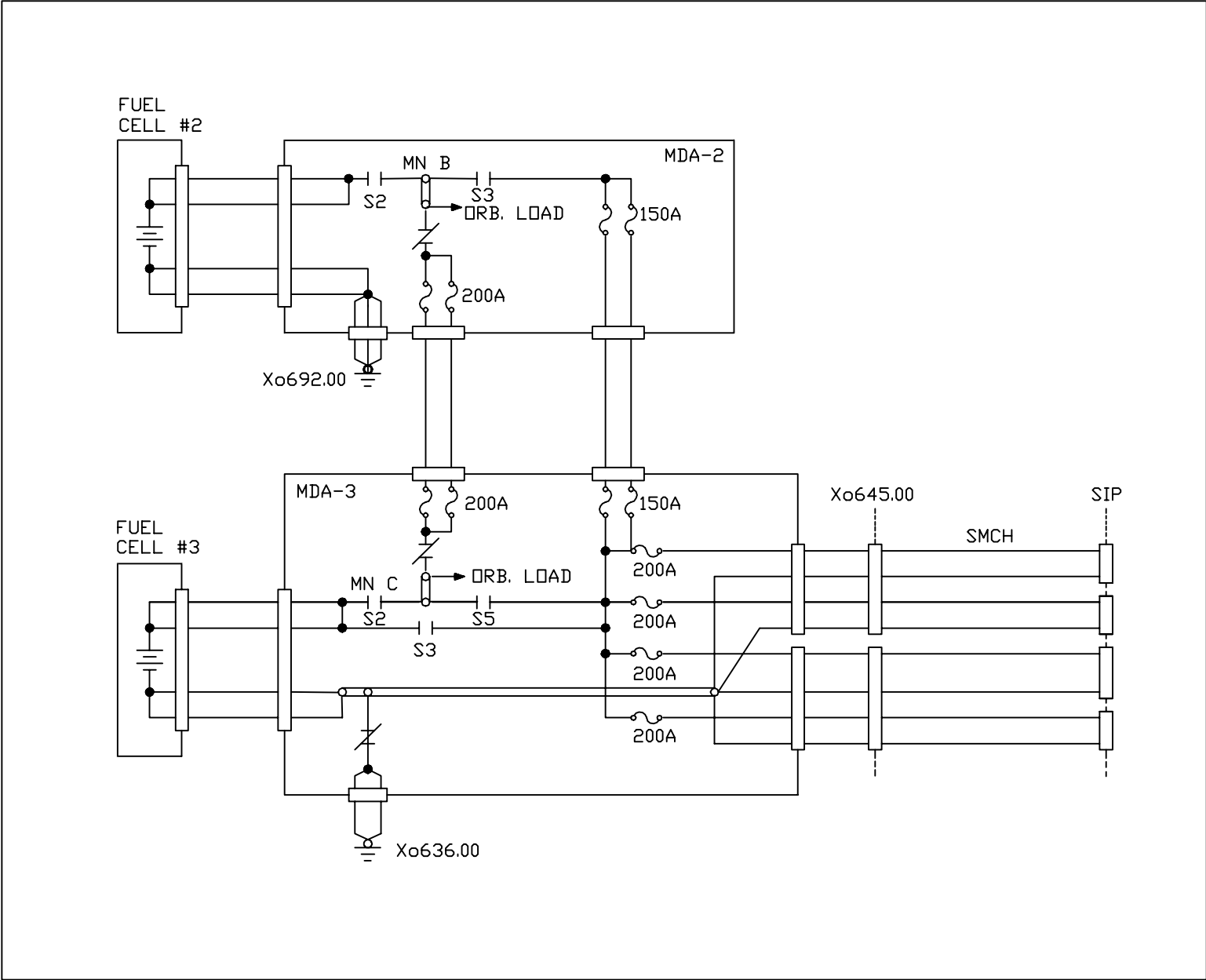
7.5.5 Emergency Power Availability

During Orbiter emergency conditions, power will be provided temporarily to payloads as required for payload safing up to the power level agreed to in the Unique Payload PIP.

7.6 (Reserved)

7.7 ELECTRICAL CONNECTORS NOT APPLICABLE

FIGURE 7.3.1.1-1 ORBITER MAIN DC POWER DISTRIBUTION TO THE CARGO BAY



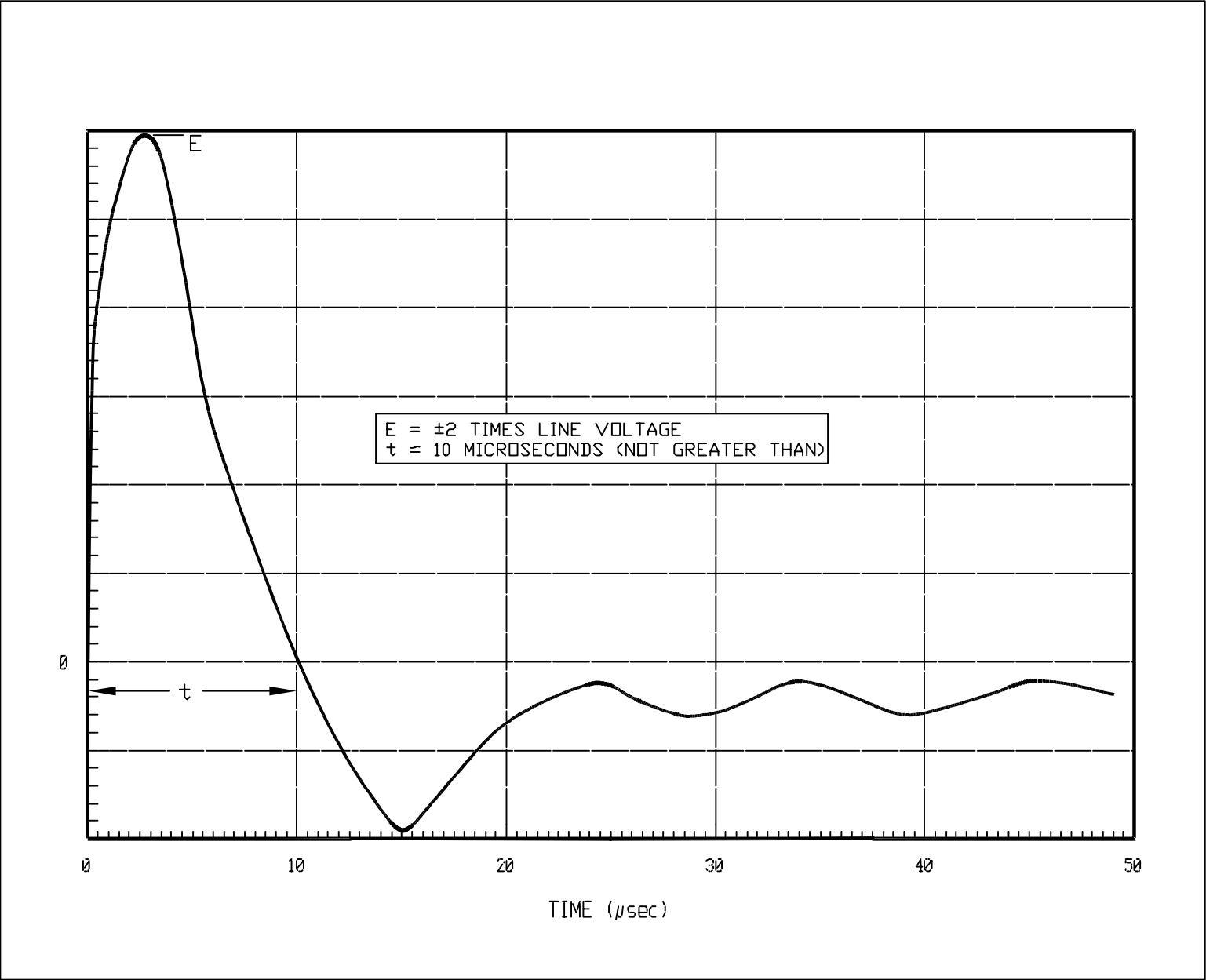


FIGURE 7.3.7.2-1 INFLIGHT DC POWER TRANSIENTS (MEASURED LINE-TO-LINE) AT ALL CARGO ELEMENT DC POWER INTERFACES

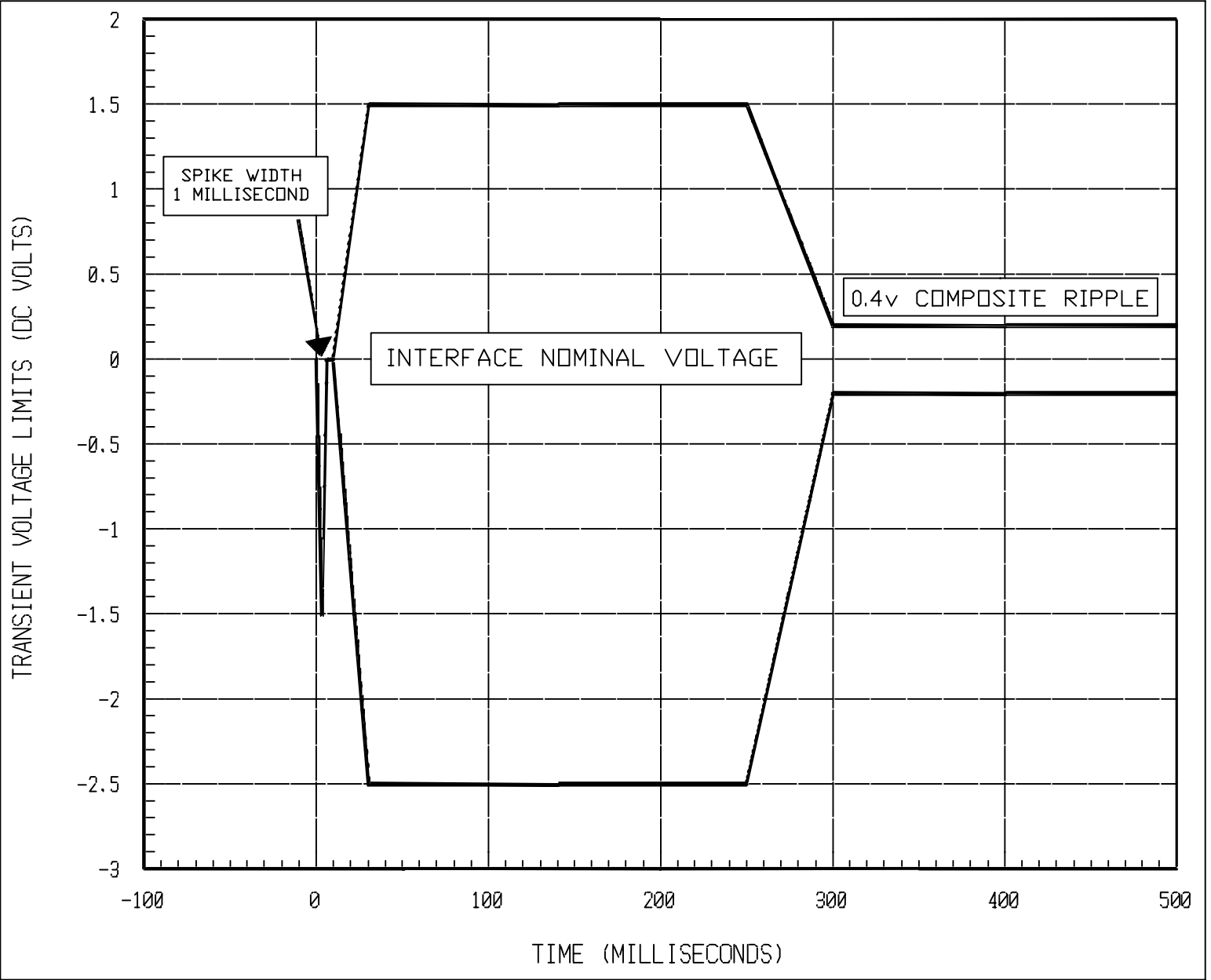


FIGURE 7.3.7.2.2-1 TRANSIENT VOLTAGE ON THE PRI PL BUS, AUX PL A, AUX PL B AND THE CABIN PL BUS AT THE CARGO ELEMENT INTERFACE PRODUCED BY OPERATION OF THE HYDRAULIC CIRCULATION PUMP

THIS PAGE INTENTIONALLY LEFT BLANK