

TEST SPECIFICATION

PQ-79-1

Section 6.2.6B

Name: Private Car
Electrical Load/Phase Balance

Date: February 18, 1986

REVISIONS

Level	Date	Authorized

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1. Scope

1.1 Name of Test

Private Car Electrical Load/Phase Balance

1.2 Cars to be Tested

Private cars intending to operate on Amtrak Head End Power.

1.3 Reason for Test

- a) To ensure car power demand does not exceed Amtrak guidelines.
- b) To ensure car has phase balance on HEP within Amtrak guidelines.

1.4 Test Limitations

N.A.

2. Timing of Test

2.1 When

- A. When car is undergoing initial inspection for Amtrak HEP compatibility.
- B. When car has changes made to its electrical system which change phase balance or total connected load by more than 3KW.
- C. This test should be done every three years. Car must be "IN DATE" to operate on HEP in an Amtrak consist.

2.2 Prerequisites for Test

2.2.1 Current Amtrak Equipment Engineering approved drawings must be on file at Corporate Headquarters.

2.2.2 Car must have passed test PQ-79-1, #6.1.2 "Megger."

2.3 Location of Test

Any major Amtrak facility as designated by Corporate Mechanical Department.

3. Reference Documents

3.1 Manuals

N/A

3.2 Drawings

Current Amtrak Equipment Engineering approved single-line schematic of car.

4. Utilities and Test Instruments

4.1 Utilities

480V HEP Yard Power (or locomotive)

4.2 Test Fixtures

N/A

4.3 Test Instruments

Clamp on Ammeter - Amprobe # ACD-2, RS3
or equal

5. Precautions

5.1 Human

Use particular care around car electrical system; car may not follow Amtrak standards.

5.2 Equipment

N/A

6. Preparation

6.1 Inspect car HEP system for:

- a) Good general electrical practice; deficiencies must be corrected.
- b) Defects; inspect all systems operating on 480V trainline power, including;
 - 1. Trainline receptacles and plugs.
 - 2. Trainline cable and cleats.
 - 3. 480V Junction box.
 - 4. 480V Circuit Breaker Panel.
 - 5. 480V Transformers.
 - 6. Any other 480V loads.

6.2 Check that car conforms to drawings - are all existing car loads included on the drawing? Are the load charts up to date and correct?

7. Test Procedure

7.1 Using the supplied drawings and load charts, measure car power consumption as follows, and record it on the data sheet.

7.2 Turn on all car loads which can be on simultaneously. Note this is not limited to "normal car operation", but by what can realistically be on. For example, it is not realistic to expect heating and A/C on together, but it is reasonable to expect full heat or A/C load with all lighting on and full kitchen load. Create the worst load so available.

7.3 Read the load current on each phase of each 480V load and record on the data sheet. Compare measured values with load chart; if there are inconsistencies, determine why. In taking the reading ensure the load is not artificially low by something cycling off, such as a water heater, oven element, etc.

7.3 Measure and record the load current on the main 480V circuit breaker.

8. Completion

8.1 Perform the following calculations to determine if the car meets Amtrak requirements:

- a. Max load of 85 KW
- b. Max phase imbalance of 5%

Use formula on the data sheet and record results.

8.2 When calculations are completed, make a copy for the car owner, to stay on the car. Send the other copy to Supt. Car Maintenance, Mechanical Department, in Washington, DC.

9.0 Illustration

None

Location: _____ Witnessed By: _____

Check

2.2.2 Car has passed megger test, PQ-79-1, 6.1.2

.6.1a Car is wired according to good general electrical practice

6.1b Car has no electrical defects in the following 400v systems:

1. Trainline receptacles and plugs
2. Trainline cable and cleats
3. 480V Junction Box
4. 480V Circuit Breaker Panel
5. 480V Transformer
6. All other 480V loads

6.2 Car conforms to drawings and load charts

7.3 480V Loads:

Name	PHASE CURRENTS		
	A	B	C
Main 480V Breaker	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
	:	:	:
Total	:	:	:

(Continue as required)

Data Sheet (cont'd)

8.1.1 Maximum Car Load

Main breaker current (A+B+C) x 277

$$\text{Total } \begin{array}{c} \phi A \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{c} \phi B \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{c} \phi C \\ \underline{\hspace{1cm}} \end{array} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}} \text{ kw}$$

(must be less than, or equal to 85 kw)

8.1.2 Phase Balance (at maximum 480V load)

$$\text{Total } \begin{array}{c} \phi A \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{c} \phi B \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{c} \phi C \\ \underline{\hspace{1cm}} \end{array} \div 3$$

Average Phase current =

Obtain the greatest difference between the average and the 3 phase currents. This number must not exceed 5% of the total current.

Maximum difference

5 % of total =

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