

TECHNICAL PROPOSAL WORKSHEET FOR ARTICULATED TROLLEY
COACHES

35. Battery
- A. Manufacturer SAFT/FERAK
- B. Size 27" H x 19" W x 13" D
- C. Voltage Rating (12V or 24V) 24V
- D. Ampere Hour Capacity 190 Ah
36. Destination Signs
- A. Manufacturer TWIN VISION
- B. Front Sign Dimensions 9.5 In. by 67.8 In.
- C. Side Sign Dimensions 2.7 In. by 36.0 In.
37. Hot Coach Detector
- A. Manufacturer SKODA
- B. Leakage current and/or voltage trip level & adjustment range 25/30 volt (low)
50/55 volt (high)
- C. Time delay adjustment range NONE
38. Wheelchair Lift
- A. Manufacturer LIFT-U/RICON
- B. Model No. D-199-0048
39. Special Tools
- A. Metric Hand Tools 1 COMPLETE SET
- B. Special Hand Tools Metric Torque Wrenches
- C. Special Test Equipment
- Personal Lap-top computer
 - Oscilloscope
 - Data Logger
 - Bench Test Equipment

FOLLOW-UP SERVICE WORKSHEET FOR ARTICULATED TROLLEY COACHES

Location of Technical Service Representative Nearest to MUNI

Name: Electric Transit Incorporated

Address: 3652 Sacramento St. San Francisco, CA 94118

Telephone: (415) 673-3011

Location of Parts Distribution Center Nearest to MUNI

Name: Electric Transit Incorporated

Address: ETI's San Francisco Final Assembly Facility

Telephone: Address and Telephone to be determined

Policy for Delivery of Parts and Components To Be Purchased for Service and Maintenance

Regular Method of Shipment: As required

F.O.B. Point: ETI's San Francisco Final Assembly Facility

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- | | | |
|----|--|-------------------------------|
| 1. | Coach Manufacturer | <u>Electric Transit, Inc</u> |
| 2. | Axles Driven | <u>Rear</u> |
| 3. | Location of Dual Wheels | <u>Rear</u> |
| 4. | Dimensions | |
| | A. Overall Length: | |
| | i. Over Bumpers | <u>40</u> Ft. <u>7.2</u> In. |
| | ii. Over Body | <u>39</u> Ft. <u>10</u> In. |
| | B. Overall Width: | |
| | i. Over Body excluding mirrors | <u>101.57</u> In. |
| | ii. Over Body including mirrors | <u>115.16</u> In. |
| | C. Roof Height (maximum): | |
| | i. Including Roof-mounted equipment | <u>149.00</u> In. |
| | ii. Excluding Roof-mounted equipment | <u>115.58</u> In. |
| | D. Wheel Base: | |
| | i. Front to Rear Axle | <u>21</u> Ft. <u>10.8</u> In. |
| | E. Overhang, Centerline of Axle Over Bumper: | |
| | i. Front | <u>8</u> Ft. <u>8.4</u> In. |
| | ii. Rear | <u>10</u> Ft. <u>0</u> In. |
| | F. Angle of Approach | <u>10.44</u> Deg. |
| | G. Rubrail Height | <u>61.30</u> In. |
| | H. Breakover Angle | <u>10</u> Deg. |
| | I. Angle of Departure | <u>10.02</u> Deg. |

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J. Minimum Ground Clearance (unkneeled):

- i. Excluding Axles 9.90 In.
- ii. Including Axles 6 In.

K. Horizontal Turning Envelope:

- i. Outside Body Turning Radius (including bumper) 44 Ft. 1.3 In.
- ii. Inside Turning Radius 23 Ft. 7.7 In.

A. Interior Head Room (center of aisle):

- i. Front Axle Location 82.44 In.
- ii. Rear Axle Location 82.44 In.

M. Floor Height Above Ground (at each door):

- i. Front Door (Inches) 32.82 In.
- ii. Rear Door 32.82 In.

N. Step Height Above Ground (at each door)

- i. Front Door, Kneeled 12 In.
- ii. Front Door, Unkneeled 15.5 In.
- iii. Rear Door 15.5 In.
- iv. Step Riser Height 8.66 In.
- v. Step Tread Width 53.94 In.

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O. Floor

i. Interior Length 35 Ft. 5.30 In.
ii. Interior Width 8 Ft. 1.76 In.

P. Doorway Clear Opening (including assist):

i. Front Width 42 In. Height 87.00 In.
ii. Rear Width 42 In. Height 87.00 In.

5. Weight	Curb	SLW	GVWR
A. Front Axle	<u>10,241</u> lbs.	<u>12,133</u> lbs.	<u>14,682</u> lbs.
B. Rear Axle	<u>17,583</u> lbs.	<u>21,979</u> lbs.	<u>25,992</u> lbs.
C. Total	<u>27,824</u> lbs.	<u>34,112</u> lbs.	<u>40,674</u> lbs.

6. Seating Capacity

A. Number of Passenger Seats 42
B. Number of Longitudinal Seats 17
C. Number of Transverse Seats 25

7. Standee Capacity

A. Floor area for Standees (as defined in Subsection 1.2.)
Definition: Free Floor Space 62,745 Sq. Ft.
B. Number of Standees (floor area divided by 1.5 sq. ft.) 42

8. Space for Advertising Frames

A. Front 14 In. by 36 In.
B. Rear 12 In. by 30 In.
C. Street Side 270 In. by 20 In.

5.3.5.1 Pre-delivery Tests

Factory tests shall include those tests specified in Subsection 5.3.3. In addition, the prototypes shall be instrumented during road tests to record time, speed, acceleration, line current, line voltage, motor torque, motor current, brake pressure and distance. The Contractor shall provide an algorithm that will provide an indication of motor temperature. The prototype coaches shall also be instrumented with a plug connected device that measures and records separately energy used and energy returned to the line in kW hr. Equipment used for these measurements and recordings shall be turned over to MUNI when prototype testing is complete. All records of test results shall be readable on an IBM PC-compatible computer, stored on a 3-1/2 inch high-density double-sided disk, and shall be presentable on 8-1/2 X 11 paper.

5.3.5.2 Post-delivery Tests

Post-delivery tests shall include all of the test in Subsection 5.3.4 and after successful completion shall include the following two phases. During Phase I, the prototype shall be instrumented as required in Subsection 5.3.5.1 and loaded with weights to simulate passenger load. While instrumented and loaded, the coach shall be tested throughout all of the trolley routes in San Francisco to verify that the performance requirements in these specifications are being achieved. Interfaces with MUNI-provided equipment shall also be tested at this time.

In Phase II, the prototypes shall be placed into revenue service or simulated revenue service on routes determined by MUNI. To complete this phase, each prototype shall meet or exceed the requirements of Subsection 5.4.1.3 for a distance of at least 9000 miles.

MUNI will approve the prototype test program after each prototype has successfully passed a MUNI audit of its conformance with the specified configuration, has successfully completed Phase I and Phase II post-delivery tests, and other requirements as described in Subsection 5.1.8

5.4 RELIABILITY, MAINTAINABILITY, SAFETY

5.4.1 RELIABILITY

The reliability requirements for the trolley coach and major subsystems shall be as specified in this subsection. These requirements have been established by MUNI to ensure procurement of reliable equipment capable of meeting the performance criteria and operational requirements of the MUNI trolley coach system, over the entire specified vehicle service life.

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15. Passenger Windows

- A. Manufacturer EXCEL
- B. Dimensions of Single Windows 51.97 In. by 39.37 In.
(ALL WITH 5" RADIUS CORNERS)
- C. Number of Windows (INCLUDES DRIVER'S SIDE WINDOW) 14
- D. Total Window Area (street side) 15,684.2 Sq. In.
- E. Total Window Area (curb side) 11,630.21 Sq. In.

I. Rear Window

- A. Dimensions Width 72.22 In. Height 25.06 In.
- B. Height of bottom of window above ground 65.55 In.

17. Operator's Side Window

- A. Number of Glass sections (2 or 3) EXCEL (2)

18. Mirrors

- A. Exterior Mirrors Manufacturer ROSCO
- B. Interior Mirrors Manufacturer ROSCO

19. Main Propulsion

- A. Manufacturer SKODA
- B. Propulsion Controller Type CHOPPER
- C. Motor Model No. ALS 3046 FmM
- D. Motor Horsepower 240 hp
- E. Chopper Frequency (if applicable) N/A
- F. Brake Resistor Location Roof

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20. Auxiliary Propulsion

- A. Battery Manufacturer SAFT/FERAK
- B. Battery Charger Manufacturer SKODA
- C. Battery Weight 1,296 lbs.
- D. Battery Charger Weight 660 lbs.
- E. Total Battery Rating 90 Ah
- F. Battery Charger Rating 120 V 530 AMPkW

21. Auxiliary Inverter

- A. Manufacturer SKODA CONTROLS
- B. Weight 750 lbs.
- C. Inverter Technology IGBT

22. Retriever

- A. Manufacturer and Model No. DELACHAUX - 54417Q

23. Low Voltage Power Supply

- A. Manufacturer SURE POWER
- B. Weight 22 lbs.
- C. Converter Technology Battery Equalizer

24. Base and Poles

- A. Manufacturer and Model No. SKODA

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25. Suspension

A. Manufacturer:	<u>Firestone - 1TISM-6</u>
B. Number of Air Springs (each axle):	
i. Front	<u>2</u>
ii. Rear	<u>4</u>
C. Air Volume of Air Springs (total, each axle):	
i. Front	<u>2,403 Cu. In.</u>
ii. Rear	<u>4,806 Cu. In.</u>

26. Steering

A. Pump:	
i. Manufacturer and Model No.	<u>EATON #26001-RZJ</u>
ii. Type	<u>Gear Pump</u>
iii. Relief Pressure	<u>3.5 GPM at 1325 psi</u>
B. Motor	
i. Manufacturer	<u>WARFIELD</u>
ii. Type	<u>Open Internal Fan cooled</u>
iii. Voltage	<u>27 volt</u>
iv. Direct or Belted Drive	<u>Direct</u>
v. Power Requirement	<u>130 amp</u>

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C. Steering Gear

SHEPPARD M110PDD-1

i. Manufacturer and Model No.

23:1

ii. Ratio

1.25 Gals.

D. Power Steering Fluid Capacity 4.23 - 6.60 Galspm

9.8 lbs.

E. Effort at Steering Wheel (unloaded stationary coach on dry asphalt pavement)

6.0

27. Brakes

A. Manufacturer
Size (each axle):

RABA Magyar-Vagon

i. Front

Diameter 16.53 In.

Width 7.08 In.

ii. Rear

Diameter 16.53 In.

Width 7.08 In.

B. Axle Front

i. Manufacturer

RABA Magyar Vagon -
es Gepgyar Gyor

ii. Type

Rigid Portal Front Axle

iii. Model #

#A 701.00-3100

iv. Gross Axle Weight Rating

15,432 lbs.

C. Axle Rear

i. Manufacturer

RABA Magyar Vagon -
es Gepgyar Gyor

ii. Type

Full floating Axle

iii. Model #

A 518.26-3300

iv. Gross Axle Weight Rating

28,660 lbs.