

AMTRAK  
SPECIFICATION #D-77-27

COVERING APPLICATION  
OF ELECTRIC MARKER LIGHTS  
FRA APPROVED

APPROVED BY	DATE
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1. Scope

This specification covers the application of incandescent electric marker lights on Amtrak Conventional Railroad passenger cars, to meet the Federal Railroad Authorization Act of 1976, Public Law 94-348. Amfleet and Superliner cars meet the requirements.

2. Description

This unit is to be used on the rear end of a train as a highly visible marking device.

3. Requirements

Marker device is required to have the following minimum requirements:

- (a) Marker device to have an intensity of not less than 100 candela nor more than 1,000 candela as measured at the center of the beam in accordance with Section 4.
- (b) A horizontal beam with a minimum arch width of fifteen (15) degrees each side of the vertical center line, and a vertical beam with a minimum arc width of five (5) degrees each side of the horizontal center line as defined in terms of the 50 candela intensity points.
- (c) A color defined by the red-orange-amber color range those colors defined by chromaticity coordinates, as expressed in terms of the International Commission on Illumination's 1931 Colormetric System, which lie within the region bounded by the spectrum locus and lines defined by the following equations:

$$\begin{aligned}x + y &= .97 \quad (\text{white boundary}) \\y &= x - .12 \quad (\text{green boundary})\end{aligned}$$

- (d) Minimum 5 inch diameter lens.
- (e) Minimum power requirement (watts)

Color	Power
red or red-orange	20
yellow or orange	10

4. Minimum Test Requirements

- (a) The intensity measurements shall be made with the device mounted in its normal operating position at a distance of 25 feet from the device. Measurements shall be made under dark conditions.
- (b) Intensity (of effective intensity) measurements shall be made at points A, B, C, D, E, F, G, H and I as specified in Table 1.

TABLE 1 - Test Points

Test Point	Distance from Device (ft.)	Location (deg.)	
		Vertical	Horizontal
A	25	0	-15
B	25	0	-10
C	25	0	- 5
D	25	0	0
E	25	0	+ 5
F	25	0	+10
G	25	0	+15
H	25	-5	0
I	25	+5	0

- (c) Intensity shall be at least 100 and not more than 1000 candella at point D and a minimum of 50 candella at points A, B, C, E, F, G, H and I. Table 2 shows the relationship between candella and foot candles at 25 feet from the light source for a steady burning light.

TABLE 2 - Candella - Foot Candle Relationship at 25 feet from Source

Candella	Foot Candles
50	.08
100	.16
200	.32
300	.48
400	.64
500	.80
1000	1.60

## 5. Amtrak Approved Lamps and Fixtures

- a) Lamp GE 60 PAR/2/R 60 Watt, 38 volt, PAR 46 or equal.
- b) Fixtures
  - Translite #FC-3895 (Re-lamp from inside of car)
  - Luminator #0101890-001 (Re-lamp from outside of car)

} See DWG  
D-00-1312  
For Approval  
List

Fixtures are of different design and should be selected according to car construction etc. Both fixtures accept the GE 60 PAR/2/R Lamp.

## 6. Application

Existing marker lights that do not meet FRA requirements are to be replaced.

On cars not presently equipped with approved marker lights, AMTRAK approved marker lights are to be installed at an area approximately 120" from the top of rail and approximately 45" from each side of the centerline of the car. (Two lights at each car end)

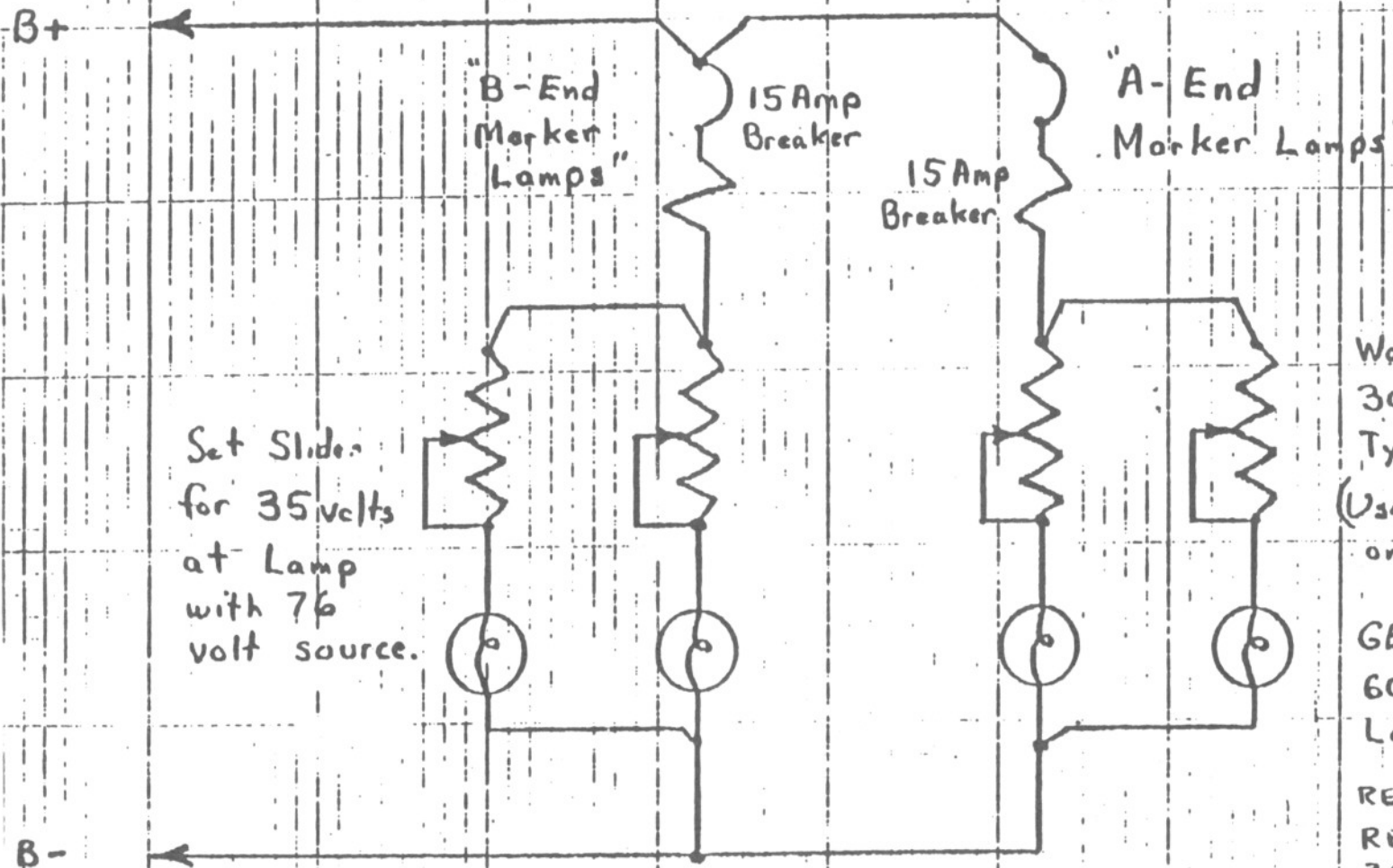
A separate switch to control each end of car is to be provided.

A voltage dropping resistor is required for each lamp on 64 and 110 volt systems. The resistors are to be adjusted to provide 35 volts at the lamps when the battery charging system is normally operating.

Resistor to be Ward Leonard type 130, 30 ohm, 100 Watt, Type #805 with adjustable slide #604 (or equivalent) (2 resistors per bracket, 2 brackets per car, to be used on 64 volt system)

On 110 volt cars the use of 2 of the above resistors connected in series for each marker light is required.

Cars to be selected for this modification must have the authorization of the Chief Mechanical Officer.



Ward Leonard #130  
30 ohm 100 Watt  
Type # 805 Resistor

(Use 2 per lamp  
on 110 volt coss)

GE 60 PAR/2/R  
60 Watt 38 Volt  
Lamp

RESISTORS NOT  
REQUIRED ON  
32 VOLT CARS.

SK-A-120177  
TYPICAL MARKER  
LIGHT WIRING

TYPICAL 32V CARL  
RESISTOR NOT REQUIRED.

TYPICAL 64V. CARLS

D.P.D.T SWITCH  
RATED MINIMUM  
5 A D.C.

TO  
FEED SIDE  
OF MAIN  
LIGHT SW.

MARKER C.B. 15A

NOTE

LOCATE C.B. IN ELECTRIC  
LOCKER ADD D.P.D.T.  
SWITCH IN VESTIBULE  
APPLY PERMANENT  
TYPE LABELS.

MARKER LIGHTS  
'A' END  
'OFF'  
MARKER LIGHTS  
'B' END

TYPICAL 110V. CARLS.  
(2 RES. 60Ω)

30Ω - 100WATT

TYPICAL 64V. CARLS.  
(1 RES. 30Ω.)

2  
W  
D  
C.

TOTAL LOAD  
APPROX. 6 AMPS  
REGARDLESS OF CAR VOLTAGE

SK-A-120177-1

MARKER LIGHT WIRING.  
(ALTERNATE METHOD 1)

REFER SPEC #D-7

G.E. 60 PAR 1/2/12  
LAMPS

VESTIBULE  
LIGHTS

VESTIBULE  
LIGHTS

MARKER  
LIGHTS  
"ON" "OFF"

1  
2  
3  
TYPICAL 32V CARS  
RESISTOR NOT RECD

D.R. SWITCH  
MIN. RATING  
5A. D.C.

SWITCHES LOCATED  
IN VESTIBULE  
WITH PERMANENT  
LABEL APPLIED

TYPICAL 64V. CARS

← G.E. 60PAR/2/12 LAMPS



EXISTING WIRING MUST  
BE VESTIBULE OR DUMMY END  
LIGHTS ONLY, MINIMUM #12AWG.

TYPICAL 110V. CARS  
(2 RES. 60Ω)

TYPICAL 64V. CARS  
(1 RES. 30Ω)

30Ω - 100 WATT 2

NOTE

VESTIBULE C.B. TO BE MARKED  
"VESTIBULE AND MARKER LIGHTS  
TO BE ON AT ALL TIMES"

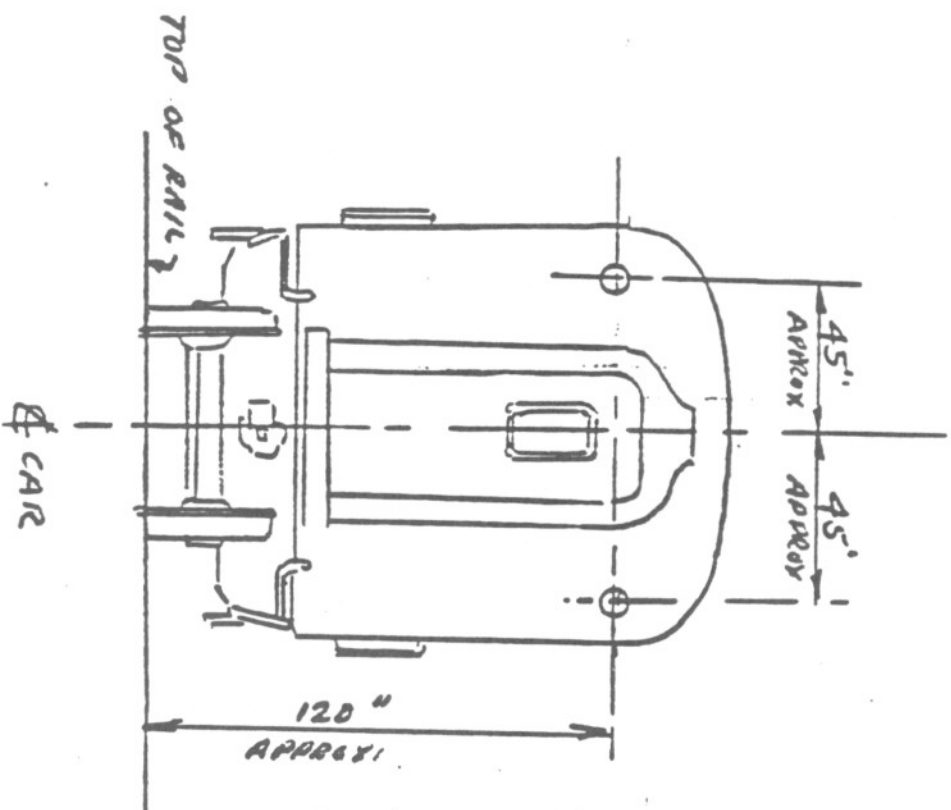
CABLE RATING OF C.B. MUST ACCEPT  
ADDED LOAD OF 6AMPS, RESIDUALS  
OF CABLE VOLTAGE, MIN. RATING 15A

SK-A-120177-2

MARKER LIGHT WIRING.  
(ALTERNATE METHOD)  
REFER SPEC # D-77-27

# NOTES

1. REFER TO AMTREC SPECIFICATION 0-77.
2. REPLACE MARKER LIGHTS THAT DO NOT HAVE "G" & "H" "GO PNE/JO"IE
3. FRA APPROVED MARKER LIGHTS ARE (A) TRANSILITE "FM-3895-1" (RELAND INSIDE) (B) LUMINAID "C101890-001" (RELAND OUTSIDE) SELECT MARKER FIXTURE ACCORDING TO CAR CONSTRUCTION. LUMINAID REPAIR FOR HIGH LEVEL CAR.
4. FOR WIRING REFER TO SK-A-120177
5. LOCATE NEW MARKER LIGHTS IN EXISTING CUMPTION, IF CAR DOES NOT HAVE MARKERS LOCATE AS SHOWN ON THIS SKETCH. THEIR DIMENSIONS ARE APPROXIMATE AND CAN BE VARIED BECAUSE OF CAR CONSTRUCTION, ETC. MAX. 55" THE 45" DIMENSION MIN. 40" THE 120" DIMENSION MAX 130" MIN. 100"
6. MARKER LIGHTS TO BE SYMMETRIC GENERAL NOTES (A) PREFER FLUSH MOUNTING. (B) EXTENSION BOX ACCEPTABLE IF CAR CONSTRUCTION DOES NOT PERMIT FLUSH MOUNTING.



SK-A-050378  
MARKER LIGHT  
APPLICATION  
FRA APPROVED