NMRA STANDARDS	
TRACTION POWER COLLECTION	
Sheet No. S-5	Revised: Aug. 1982

NMRA STANDARDS
S-5 Traction Power Collection

1. GENERAL:
Motive power units and current collection devices shall meet the dimensional requirements herein.

2. OVERHEAD:
a. The wire heights specified (equivalent to 21' for city/interurban and 23' for heavy RR type operation) will accommodate the widest practical range of car and locomotive types. A height other than that specified may be used to simulate a specific prototype or a limited class of equipment, but may limit interchange of equipment.

b. Normal wire height may be lowered thru underpasses and other obstructions, with consideration for the clearances of equipment to be operated.

c. Contact wire height is measured perpendicular to the plane of the tops of the rails. Contact wire offset for pantograph operation is measured from the perpendicular center line of the track.

d. For trolley frogs having side flanges the clearance between side flanges shall pass a maximum tolerance trolley wheel.

3. CURRENT COLLECTION DEVICES:
a. When pantographs are not mounted over truck centers the contact shoes shall be extended from the minimum dimensions shown to the extent necessary for operation on curves of minimum radius.

b. The maximum and minimum forces of the trolley wheel against the contact wire as specified below shall not be exceeded at any pole angle between 30 and 45 degrees to the horizontal.

4. ELECTRICAL
a. Motors in traction power units shall have both brushes insulated from the frame or must be capable of easy conversion to that state.

b. Traction motive power units shall have current collectors insulated from frame and body.

c. Traction layouts operated with cars equipped for pole reverse shall have positive potential on the overhead or third-rail.

d. On traction layouts using remote reversing positive potential on the overhead or third-rail shall produce forward motion in single-ended cars.

e. Traction motive power units shall be designed for optimal performance when operated from power supplies meeting the requirements of Standard S-9.

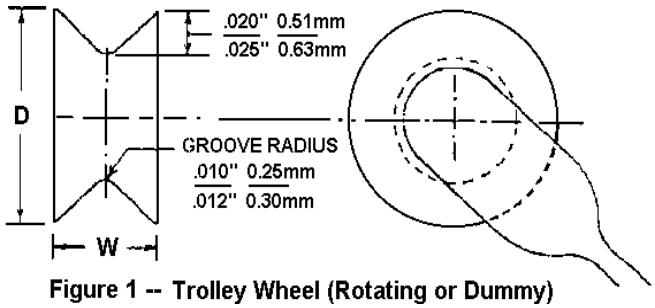

Figure 1 -- Trolley Wheel (Rotating or Dummy)

SCALE:	1/2" (1/2" or 17/32")	0 (1/4" or 17/64")	S	HO	N
OVERHEAD:					
CONTACT WIRE GAGE:					
Gage No.(AWG):	24	24	26	26	30
Diameter	.020" 0.51mm	.020" 0.51mm	.016" 0.41mm	.016" 0.41mm	.010" 0.25mm
NOMINAL WIRE HEIGHT:		(1)			
City & Interurban	10 1/2" 267mm	5 1/4" 133mm	3 15/16" 100mm	2 7/8" 73mm	(3)
Heavy Traction:	11 1/2" 292mm	5 3/4" 146mm	4 5/16" 110mm	3 3/16" 81mm	1 23/32"44mm
MAXIMUM OFFSET:					
(Pantograph Operation):	3/4" 19.0mm	3/8" 9.5mm	5/16" 7.9mm	7/32" 5.6mm	1/8" 3.2mm
COLLECTORS:					
PANTOGRAPH CONTACT SHOE:					
Minimum Length:	2" 50.8mm	1" 25.4mm	3/4" 19.0mm	9/16" 14.3mm	11/32" 8.7mm
TROLLEY WHEEL (See Fig. 1):					
(Tolerance: + or - 5 percent)					
Width (W):	1/16" 1.6mm	1/16" 1.6mm	1/16" 1.6mm	1/16" 1.6mm	(3)
Diameter (D):	1/4" 6.3mm	1/8" 3.2mm	1/8" 3.2mm	1/8" 3.2mm	(3)
CONTACT FORCE AGAINST WIRE.					
Maximum:	0.5oz 0.14 N	0.5oz 0.14 N	0.4oz 0.11 N	0.3oz 0.08 N	0.3oz 0.08 N
Minimum:	0.4oz 0.11 N	0.3oz 0.08 N	0.3oz 0.08 N	0.2oz 0.06 N	0.15oz 0.04 N
POLE BASE MOUNTING:					
Pole Base:	pin 2-56 screw (1/2" L) 5/32"D 3.97mmD	2-56 screw (3/8" L)	#60 pin (3/8" L)	(3) (1/4" L) .040"D 1.02mmD	
Car Receptacle:	#21 drill .159"D 4.04mmD	threaded 2-56 or #44 drill .086"D 2.18mmD	threaded 2-56	#58 drill .042"D 1.07mmD	(3)
THIRD RAIL POSITION (See Fig. 2): (2)					
Height Above Raihead (E):	1/8" 3.2mm	1/8" 3.2mm	3/32" 2.4mm	1/16" 1.6mm	(3)
Offset From Gage Line (R):	1 1/8" 28.6mm	11/16" 17.5mm	7/16" 11.1mm	5/16" 7.9mm	(3)

Figure 2 -- Third Rail Location

Note 1. Trolley wire height of 5" (20')is used on some 0-scale layouts.

Note 2. **No. 1 Scale**: E - Third Rail Height 3/16" (4.7mm) **OO Scale:** E - Third Rail Height 5/64" (2.0mm)
R - Third Rail Distance 7/8" (22.2mm). R - Third Rail Distance 25/64" (9.9mm).

Note 3. There has not been sufficient experience with pole trolley operation in N-scale to justify a standard for the "City & Interurban" category, or for third rail operation, at this time.