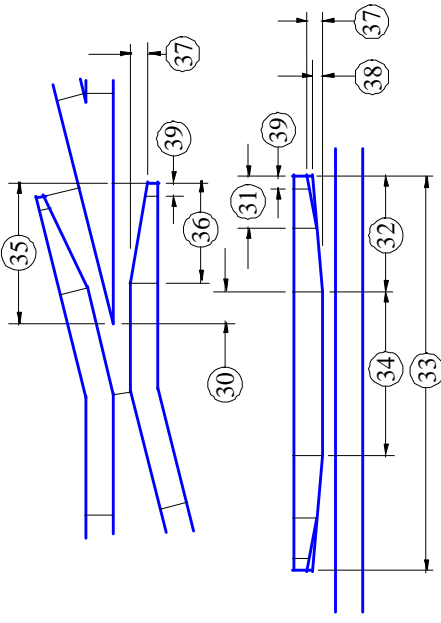


1. The **RP-12.x** series provides recommended dimensions for both curved switch and straight switch turnouts, those being the most common in the prototype. Designed and computed expressly for model railroad use, dimensions in this series adhere as closely as possible to the scaled prototype, while considering the special problems of oversized rail, wider flangeways, and the sharp curvature of the model. They apply to either two-rail or three-rail systems. Frog angles are the same as the prototype, and the lead lengths are scaled from the prototype. Because of oversized wheel flanges and rail, exact scaling of prototype dimensions is not always practical; the dimensions herein will provide prototype appearance and performance for the scales the **RP-12.x** series shows. Commercial model turnout manufacturers may use the dimensions rounded to the nearest 0.001 inches for possible tooling design. Modelers may round the dimensions further, to the nearest 0.01 inches, when scratchbuilding. In no case should the NMRA Standard dimensions be violated (see paragraph 6. below).
2. See **DATA SHEET D3e** for Turnout Types and Terminology. The diagram below labels the key turnout, wing rail and guard rail dimensions using circled numbers. In the **RP-12.x** series, these key dimension numbers appear inside parentheses. Switch point angle, switch heel angle and frog angles are in decimal degrees. All other dimensions are in inches. Turnouts with frogs No. 4-12 appear on page 1 of **RP-12.x**, frogs 13-20 on page 2. See **RP-15.1** for suitable rail sizes.
3. See **RP-11** for recommended minimum permissible numbers for turnouts and crossovers. Turnouts numbered higher than the minimum are recommended wherever space permits, particularly when operating long trains or at high speeds. Preference should always be given to a higher numbered turnout with minimum track gage over a lower numbered turnout with widened track gage.
4. Lead dimensions shown for each scale are to the theoretical point of the frog, which is some distance ahead of the actual point, the prototype distance being the frog number times the width (in inches) of the actual point (typically 1/2-inch). Both gage lines of the frog are straight for the entire distance from toe to heel.
5. Frog toe and heel lengths provided apply to either the bolted rail or rail bound manganese steel insert type, both having the same dimensions. Rail gaps on either side of the frog are often necessary to prevent electrical short circuits when using traditional Direct Current (DC) or Digital Command Control (DCC). There are several methods for maintaining rail alignment across rail gaps, one being the use of traditional insulated rail joiners. Cast or other frogs that are shorter may be used by lengthening the closure rails to conform, or the closure rails and frog wing rails may be made in one piece, the gage lines remaining straight between the points corresponding to those shown for frog toe and heel. The **RP-13.x** series provides alternate dimensions for frog wing rails, guard rails and their associated flares, including the guard rail setback required to ensure protection of the frog point. When implementing the setback, the parallel length must fully protect the flangeway gap. Be aware that the **RP-13.x** series applies only to the standard scale class for scales and frog numbers it lists. Scales and frog numbers not listed should use dimensions from the **RP-12.x** series.
6. The dimensions tabulated in **RP-12.x** apply to the scales and gages shown in **STANDARDS S-1.1, S-1.2** and **S-1.3** for the scale classes identified in **STANDARD S-1**. If the wheelbase of the equipment to be used requires wider track gage for the switch alignment or curvatures shown, the lead and alignment of the curved closure rail shall be maintained, and the inside stock rail and curved rails shall be moved to the required wider spacing as detailed in paragraph 7 immediately following.

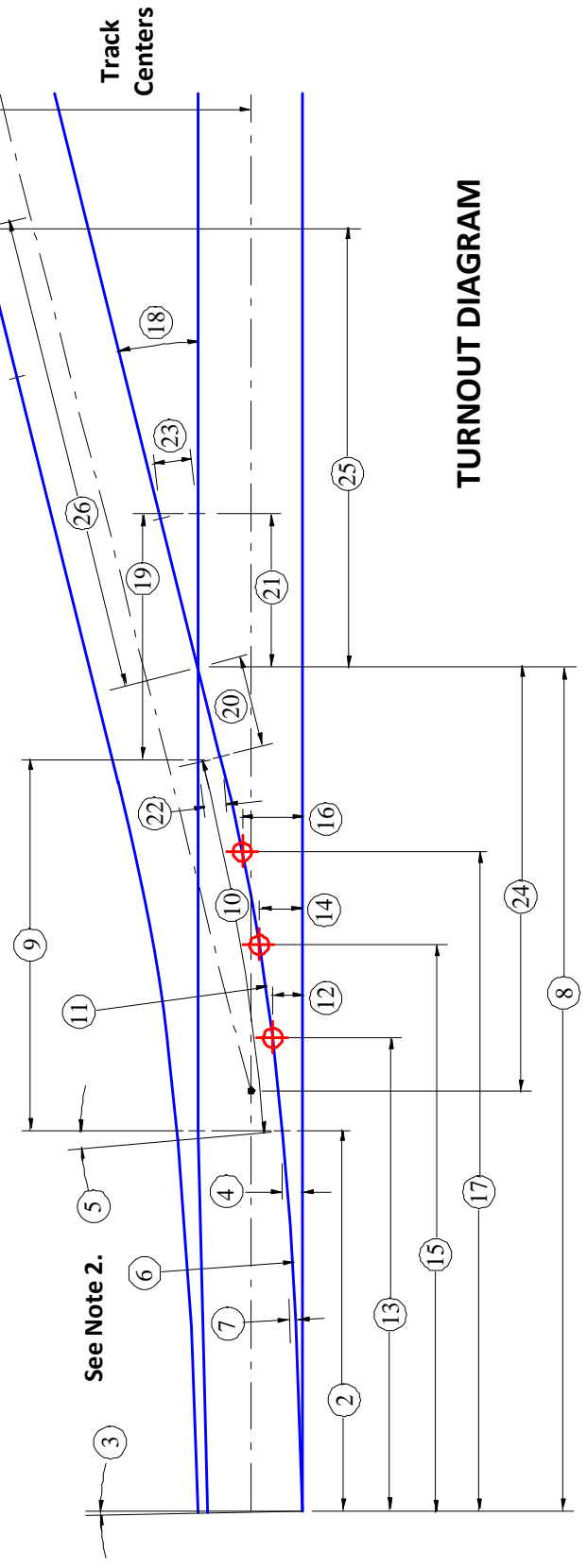
7. During construction of a turnout, all the limitations of **STANDARDS S-3.1, S-3.2 or S-3.3** (appropriate to scale class) must be scrupulously observed, using the **NMRA STANDARDS GAGE of RP-2** for the Standard class scales O, On3, On30, HO, HOn3, Sn3 and N only to make these dimensional checks. At this time there are no Standard Gages available for the other scale classes or modeling scales, so their dimensions must be checked with other precision measuring tools that are accurate to 0.001 inches. For best results it is recommended that construction start with location of the frog, wing rails and closure rails assembled. Then locate the straight stock rail at close to minimum track gage **G** from the straight closure rail and frog rail. Next locate the guard rail at close to minimum track check gage **C** from the frog rail, and with the setback given in the **RP-12.x** series. Use the standards gage across guard and wing rails to ascertain that maximum span **S** has not been exceeded. The curved side of the turnout follows the same sequence, except that track gage **G** may have to be widened to pass long wheelbase equipment through the curve. In this case, increase track gage **G**, track check gage **C** and both flangeways **F** as necessary to accommodate the long equipment without exceeding the maximum limits of **G**, **S**, or **F**. These limitations will automatically control the maximum limit of **C**. Any such widening of track gage **G** must carry the entire length of the curved sections, including the switch point, so **G** must be widened even for the straight side of this point. Adjust the straight closure rail accordingly, bending it to true alignment in advance of the frog.
8. At the switch end of the turnout note that the curved stock rail must be bent by the amount of the switch point angle of the tables in the **RP-12.x** series. Similarly, each point rail must be tapered by this same angle so that when thrown, its tapered length lies parallel to and is supported by the stock rail. The spread between point rails must not exceed dimension **P** of **STANDARDS S-3.1, S-3.2 or S-3.3** (appropriate to scale class) lest the back of a wheel contact the back of the open switch point rail.
9. Turnouts from curved track should be avoided whenever possible. If necessary to place a turnout leading from the outside of a curve, the dimensions shown for the length of lead and gage line offsets may be used, but the closure rail radius shown will not apply. Good results may be obtained by choosing a turnout whose closure rail radius approximates that of the main track curve, in which case the sidetrack lead will be virtually straight. Turnouts based on these dimensions should never be placed on the inside of a curved main track unless the radius of the main track is at least three times the radius shown in the data for the curved closure rail for the turnout selected.
10. A crossover consists of two turnouts placed in adjacent parallel tracks, facing in opposite directions, with a short connecting track between the frogs. The data given herein for crossovers apply to tangent track only, with both frogs being the same number, and the connecting track is straight the entire distance between the toes of the two frogs. Parallel track spacing varies widely with era, railroad, track gauge, and location. The straight and crossover distances given in the **RP-12.x** series are based on a prototype parallel track spacing of 13 feet. Incremental values, based on a prototype 1-foot increment in parallel track spacing, are also given. These increments enable calculation of the straight and crossover distances for any other track parallel spacing. Crossovers between concentric curved tracks should be used only when unavoidable, and subject to the limitation of paragraph 7 above; crossover dimensions given in the **RP-12.x** series will not apply, and special study must be made of each case. Consideration should be given to the use of a smaller numbered frog in the inside curved main track.
11. These dimensions are not intended to replace special trackwork, where each piece is especially designed and handmade to fit a particular situation.

DIAGRAM OF TURNOUTS ALL TRACK GAUGES CURVED OR STRAIGHT SWITCH RAILS



WING AND GUARD RAIL DIAGRAM

1. The heavy lines of the Turnout Diagram represent the railhead gauge lines only. The Wing and Guard Rail Diagram includes an exaggerated railhead width to clarify the flare dimensions.
2. Circled numbers refer to the line numbers contained in parentheses in the **RP-12.x** series. Circle 3, circle 6 and circle 7 apply only to curved switch rails. For straight switch rails the Point Angle is the same as the Switch Angle, circle 5. All other circle numbers apply to turnouts with either type of switch rails.
3. Turnouts with continuous curved closure rail and switch rail use Rail Length (circle 2) for the straight leg only. All other dimensions apply with the switch in thrown position.
4. "High Speed" turnouts with closed frog points should follow these dimensions for the thrown position.
5. Stub switches are considered special work and are not covered by these specifications.
6. For the scales and frog numbers it includes, the **RP-13.x** series details alternate dimensions for wing rails, guard rails, and their flares, supplementing the **RP-12.x** series.



TURNOUT DIAGRAM