

2011 Standards for Wiring and Connectors

Based on the 2005 RP Changes in Wiring and Connectors

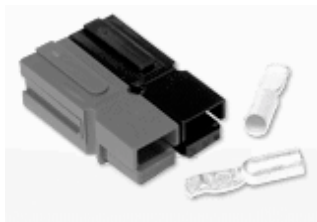
Powerpole connector and heavier wire are now the standard for ALL NEW construction, refurbished modules and where DCC is often used. However, the Cinch Jones low voltage connectors are still allowed on 1974 Standard NTRAK modules.

In 2005, NTRAK adopted a "Recommended Practice" (RP) for track wiring on modules. A different type connector and heavier gauge wire were used. In 2011 the Anderson Powerpole 30 amp connectors and 12 gauge wiring were made the Standard for NTRAK modules. The 1974 Standard, using Cinch Jones connectors and 18 ga & 16 ga wiring sizes, have been "Grandfathered in" and are still acceptable.

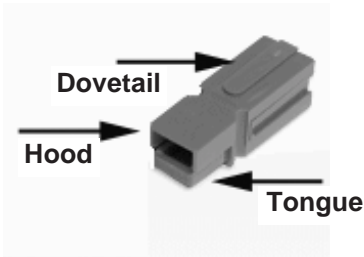
Thousands of NTRAK modules have been constructed using the original 1974 NTRAK electrical standards as then defined in the NTRAK manual. These standards were based on the use of special throttles developed for NTRAK where a single train occupied an electrical block and the throttle controlled only that train. An NTRAK layout was divided into electrical blocks, and there was one NTRAK throttle per track per block. Thus an NTRAK layout with 5 electrical blocks and the three NTRAK main lines would require 15 NTRAK throttles. The NTRAK throttles received their power from a white-coded wire that connected all modules to a high capacity 12V DC supply.

When the 1974 NTRAK Electrical Standard was initially established, a 100-plus module layout probably seemed inconceivable. Now, 500-plus module layouts are setup at national gatherings, and voltage drop has become a significant factor with the higher constant voltage and amperage of DCC power supplies. For this reason, any modules undergoing significant repair or renovation — **and ALL new construction modules** — must conform to the current (2011) NTRAK Electrical Standard, particularly as they apply to wiring bus and track feeders, even if you and/or your club are not currently using DCC. This will help guarantee that your module will not be the "weak link" in a large multi-club layout where DCC may be run on one or more lines.

Anderson Powerpole 30 Amp Connectors



Shells and Contacts



Purpose of the 2011 Standard

The original NTRAK 1974 Standard specifying 18 gauge stranded "zip wire" for main track buses, 16 gauge for the "White" coded DC power bus and Cinch-Jones 302 Series two pin connectors are now 1974 Standards for existing NTRAK modules. As of 2011 all new construction and refurbishing of existing modules should use the Powerpole connector and 12 gauge wire. This reduces wire and connector losses and increases the number of power feeds to the tracks. An added benefit is that the overall cost of wire and connectors is lower.

Standard — Track Bus

Each NTRAK track (red, yellow, blue, green, etc.) shall have a continuous (unbroken) electrical bus running the length of the module. The bus shall be 12-gauge stranded copper zip wire (red/black zip wire, outdoor low-voltage lighting wire or speaker wire), or equivalent. This wire has a thin section between the two wires and can be "zipped" apart. One side of the covering has a rib molded along its length; connect the ribbed wire (or red wire in the case of red/black zip wire) to the front rail of the associated track and to the red or colored connector at the end of each bus. The length of the bus wire is the length of the module plus 12" at each end.

Standard — Connectors

Each bus will be connected to other modules using Anderson PP30 30 Amp Powerpole connectors at each end of the module, as follows:

Standard — Color Coding

If red/black pairs of Powerpole connectors are used, they shall be color coded with tape or paint in accordance with NTRAK color standards, as shown in the 2nd column of the color chart above. Alternately, appropriate colored Powerpole housings may be used as shown in the 3rd column below.

Color Coding of Connectors / Tape

| Track Designation | Color Designation | Cinch-Jones or Red/Black Powerpoles Taped or Painted | Powerpole Colored Shells (Front / Rear Rail) |
|-------------------------|-------------------|--|--|
| Front Passing Track | Orange | Orange | Orange / Black |
| Front Main | Red | Red | Red / Black |
| Inner Main | Yellow | Yellow | Yellow / Black |
| Branch Line 1 | Blue | Blue | Blue / Black |
| Branch Line 2 | Alternate Blue | Blue / Yellow | Blue / Yellow |
| Mountain Division | Green | Green | Green / Black |
| Set-Up Track | Green / Yellow | Green / Yellow | Green / Yellow |
| Nn3 Front Track | Red / Green | Red / Green | Red / Green |
| Nn3 Center Track | Yellow / Green | Yellow / Green | Yellow / Green |
| Nn3 Rear Track | Blue / Green | Blue / Green | Blue / Green |
| DC Supply | White | White | White / Black |
| Throttle/Booster Output | None | Purple | Purple / Black |

Table courtesy of Glenn McLain & Doug Stuard

Standard — Track Feeders

Each track shall be connected to its corresponding electrical bus by pairs of feeder wires located every two feet beginning one foot from the module end. One or two foot long modules

require only one feeder per track located at the center of the module. Solid core 18–22 gauge insulated wire shall be soldered to the outside or bottom of the rails and to the electrical bus. Feeder wires should be kept as short as possible. Alternatively, the track feeder may be soldered to the rails as described in the paragraph above and connected to a terminal strip. The unbroken track bus shall connect to the terminal strip by wrapping the electrical bus around one screw or by a drop wire soldered to the bus which is then terminated on the terminal strip for distribution. This will permit correcting any wiring errors easily. Screw terminals shall be securely tightened and checked for tightness before each train show.

Note 1: Turnouts shall have feeders installed at both ends for all mainline tracks, with appropriate insulated joiners/gaps at the frog end.

Note 2: If unsoldered rail joints are used at any location on the mainline tracks, a feeder shall be present on both sides of the unsoldered joints.

Standard — Private Tracks

If the track(s) will only be powered from the connecting NTRAK track, then simply connect a pair of feeders from the connecting track bus to the private track. (If the turnouts are Electrofrog be sure to gap both (2) frog rails at the frog end of the turnout.) If it is desired to provide alternate local power for private tracks (DC power pack or separate DCC booster), use a DPDT switch. This is, in effect, two cab wiring with the connecting NTRAK track as the primary cab and the local DC power pack or DCC booster as the “local” cab.

Standard — White Wire

The White Wire is NOT required for DCC operation; however, for compatibility with existing NTRAK modules the white wire must be included in the module wiring. While the NTRAK Electrical Standard specifies 16-gauge stranded “zip cord” with Cinch-Jones connectors on each end this Recommended Practice recommends the same 12-gauge wire used for the Electrical Bus. For the White Wire, Powerpole connectors at both module ends shall be arranged horizontally, red (DC+) on the left and black (DC-) on right, as shown below.

The use of the White Wire for 16VAC supply to DCC Boosters is not permitted, for safety reasons. Boosters shall be powered per manufacturer’s specifications and DCC voltage to the rails shall not exceed 14 volts DCC

Standard — Adapter Cables

With the use of Anderson Powerpole connectors as the standard NTRAK connector, any adapters from Powerpole connectors to Cinch-Jones connectors shall be provided for modules (or module sets) wired with Cinch-Jones connectors. The two types of connectors could be wired in parallel for a lower cost optional adaption. 16-gauge stranded wire should be used for the adapters with a maximum length of six (6) inches. At least one of the connections to the Cinch-Jones wire terminals should be

insulated using either electrical tape or heat-shrink tubing to ensure no stray wires inside the shell can touch and cause a short.

Color-coding should be applied to the adapter cables — white tape, paint or use of a white Powerpole housing in place of the red housing.

Where to get Powerpole Connectors

Powerpole connector pairs are available through the NTRAK Model Railroading Society’s business office. An online Order Form and pricing is available at www.ntrak.org/order_form.htm. All sets include an instruction sheet. Set “Red/Black:” has 10 Red/Black housing pairs and two extra contacts. Set “NTRAK Colors” has housings with molded in colors for Red, Yellow, Blue and White. Black is used as the other pair color. Two extra contacts are included in the set. Two pair sets are available for the Mountain Div track (Green/Black); Front passing track (Orange/Black); Alternate Branchline (Blue/Yellow). These sets include an extra contact. Other custom color sets will be made up on request at the two pair price.

Note: NTRAK pricing includes shipping cost and there is no minimum order amount. Other sources often have extra shipping costs or an order minimum. Some other sources are the following “on line” electronic supply firms:

- Cablexperts at www.cablexperts.com
 - Connex Electronics at www.connexelectronics.com
 - Hometek at www.cheapham.com
 - Powerwerx at www.powerwerx.com
 - Quicksilver Radio Products at; www.qsradio.com
- Powerpoles are also carried by major industrial electronics distributors, including
- Newark InOne (www.newark.com)
 - Allied Electronics (www.alliedelec.com).

Since the 30A Powerpoles are also used in the R/C model aircraft hobby they may be available at R/C oriented hobby shops. They may be known as SB connectors or Sermos connectors in these shops.

Material for this RP furnished by Doug Stuard and John Wallis. September 2005 Revised February 2011



Left end Track Bus
Black over Red



Right end Track Bus
Red over Black



Power Bus
Side by Side
White for
12V DC

Cinch-Jones 1974 Std.

