◇ Automatic Track Power Reversing - Now Standard ◇

PRODUCT OVERVIEW

PTC Model III™

Programmable Turntable Controller

The PTC Model III Controller. *Supports up to 99 selectable tracks, over 14,000 indexing positions. Includes "Power On" LED, Master Power Switch, and Step Cycle Indicator LEDs, Deluxe Enclosure, and optional Track Power Reversing.*

APPLICATIONS

The PTC Model III is designed for users wanting to solve the problem of reliable turntable indexing. Situations where the PTC Model III will be of benefit include:

- Turntables with many lead and service tracks;
- Turntables where the tracks are hard to see, particularly those in corners or near the rear of the layout, or those with dim lighting;
- Layouts with high quality, highly detailed rolling stock and bridge modeling where "hands off" indexing is preferred;
- Any situation where reliable, accurate indexing will enhance layout operation and enjoyment.

"It's a clearly superior way to control a turntable in any model railroad scale"

- Editor Andy Sperandeo,
Model Railroader Magazine, December 1996.

"Your system was easy to install, and has operated flawlessly. I highly recommend it!"

- Paul Scoles,
MMR and widely read Gazette and MR author.

"A VERY WELL MADE AND THOUGHT OUT SYSTEM."

- Editor Bob Brown,
Narrow Gauge and Short Line Gazette, July/Aug 1996.

PTC FEATURES

The PTC Model III includes all of the features needed to accomplish highly reliable, accurate, and realistic indexing operations:

- Fully user programmable indexing for up to 12 tracks (standard)
- Indexes *both* bridge ends
- Expandable up to 24, 48, or 99 tracks
- Track selection using rotary switch, pushbuttons, or keypad
- Automated track selection with C/MRI using the optional Chubb/Universal Track Selector
- Very fine 0.025º indexing resolution
- Easy index programming
- Select from 14,400 possible stopping locations
- Automatic bridge track power polarity control standard
- High torque stepper motor with internal gearing
- Heavy duty motor available for O and G scales
- Quiet, smooth, slow operation
- Programmable maximum speed: 0.15 to 0.50 RPM
- Programmable momentum
- No maintenance required
- Simple, reliable installation- no sensors

The PTC Model III : Turntable operation like you've always wanted.

OVERVIEW

The **PTC Model III (Programmable Turntable Controller)** is a user programmable turntable indexing system for use in new or existing N, HO, S, O, and G scale turntables.

The turntable's indexing positions are programmed into the PTC by the user, who "teaches" the PTC where the lead and service track positions are. The PTC does not use infrared diodes, tab stops, or any mechanical methods for indexing. Once programmed, the PTC remembers the user's track locations-- even when the system power is turned off. During operation, the user selects the desired lead or service track from the control panel. The PTC automatically determines the shortest direction of travel, simulates turntable momentum by ramping up the bridge to a user-determined maximum speed, then ramps it down as it approaches the desired service or lead track location. The PTC then stops the bridge at the exact location desired, within 0.015º.

The PTC Model III system is comprised of five primary components: the Controller, Track Selector Module, Stepper Motor, Motor Mount Kit (optional), and Power Supply.

SYSTEM DESCRIPTION

PTC Controller.

The controller uses an embedded microprocessor with on board software to learn about and control the user's turntable. The controller receives track selection information from the Track Selector Module and intelligently controls the turntable bridge position (indexing) via a DC stepper motor. Additionally, the user can also program different levels of simulated momentum and different maximum speeds.

♦ **Option:** The controller can automatically control track power polarity to the bridge rails, reversing track power whenever the bridge turns +/- 90° from the reference track, or whenever the bridge turns +/- 90° from the starting point of any move. This option is called *Automatic Track Power Reversing ("ATR").* This feature is designed to eliminate the need for a split ring rail, split rail commutator or separate power reversing toggle switch. Rail power is routed through the Controller, which has a reversing relay inside.

Track Selector Modules.

The PTC Model III Controller receives track selection information from the Track Selector Module. There are four track selector module types: a 12 track Rotary Track Selector Module (abbreviated ***RTS***), a 12 track Pushbutton Track Selector Module (abbreviated ***PTS***), a 24 track Chubb/Universal Track Selector Module (abbreviated *CTS*), and a 99 track Keypad Track Selector Module (abbreviated ***KPS***).

The RTS uses a 12 position rotary switch (supplied) to provide selection capability from 2 to 12 tracks. Typically, the rotary switch is mounted in the user's control panel, with the switch positions lining up to the track indications on the track schematic.

Alternatively, **the PTS** is designed to enable users to select desired tracks by using individual pushbuttons, which are individually wired to the PTS. You supply the pushbuttons to match existing buttons on the your layout schematic, or purchase Pushbutton Switch Packs. The standard PTS supports selection from 2 to 12 tracks. The switches are situated one per service or lead track, with the desired track selected by pushing the specific button on the control panel track schematic. The PTS is expandable to support up to 36 tracks; see *Options*.

Like the PTS, the CTS is designed to use pushbuttons but has additional track capacity (24 tracks). In addition, it has additional signal inputs and outputs to interface the controller to computer based control systems such as those utilizing the Chubb C/MRI protocol. If you are using a Chubb USIC or C/MRI type computer control, the inputs and outputs of the C/MRI can be used to emulate the action of the pushbutton switches, as well as the action of the Head/Tail and Run/Stop switches. Request (or download) Application Note #3, "*PTC Computer Interfacing*" for details on accomplishing this.

Three other functions are common to the RTS, PTS, and CTS selectors:

- A *Head/Tail* toggle switch. The *Head/Tail* switch tells the controller which end of the bridge you want lined up with the selected track-- the head end or the tail end.
- A *Start/Stop* momentary push button switch. The *Start/Stop* switch initiates bridge movement following track selection, and also provides a "panic button" stop function if the bridge is in motion.
- A *Status Indicator*. The *Status Indicator* is a red/green bi-color LED that provides feedback to the user as to what mode the controller is in while in operation. It also provides confirmation indications during the setup and programming of the controller.

The RTS, PTS, and CTS selectors support 4 standard speed and momentum ranges.

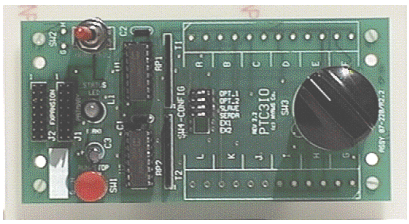
♦ **Option: Pushbutton Track Selector Expansion.** If you are using the Pushbutton Track Selector Module, you can expand the track selection capability by 24 tracks by adding a Track Selector Expansion Module. The Track Selector Expansion Modules do not include the toggle switch, pushbutton switch, and LED found on the base module. One additional Expansion Module can be added to the 12 track PTS or 24 track CUS to achieve capacities up to 36 or 48 tracks, respectively.

♦ **Option: Diamond Scale® Rotary Selector Conversion.** If you currently have a Diamond Scale® system equipped with a "dual stack" rotary switch used for simultaneous indexing and turntable track power control, it is possible to convert the switch for use with the PTC Model III, if desired. The indexing deck of the switch is wired to a Pushbutton Track Selector Module, or the Chubb/Universal Track Selector if doing 24 tracks. On the order form, order a Pushbutton Selector (or the optional Chubb/Universal Track Selector) and request (or download) a copy of *Application Note #1, "Diamond Scale® Rotary Switch Conversion".*

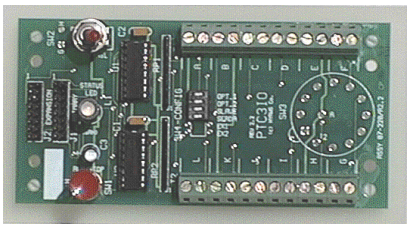
"The PTC turntable controller is very elegant in design and provides excellent and accurate turntable indexing. It features a good user interface and installs easily… the PTC is a very good solution."

- Editor and MMR Doug Geiger, Model Railroading, August 2000

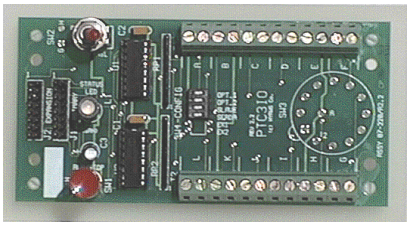
***Rotary Track Selector Module (RTS)**. Shown with Head/Tail Switch, Status LED, and Run/Stop Switch; 2.5" wide x 5" long. Supports 12 selectable tracks, 4 speed ranges, and 4 momentum ranges.*



***Pushbutton Track Selector Module (PTS).** Also shown with Head/Tail Switch, Status LED; and Run/Stop Switch. 2.5" x 5". Requires pushbutton switches (optional). Supports 12 selectable tracks (expandable to 48), 4 speed ranges, and 4 momentum ranges.*



24 Track Chubb/Universal Track Selector Module (CTS). Shown with Head/Tail Switch, Status LED, Run/StopSwitch, and computer interface connection terminals. 2.5" x 5". Requires pushbutton switches (optional) or computer driver and receiver modules (customer supplied). Supports 24 selectable tracks, expandable to 48. Supports 4 speed ranges, and 4 momentum ranges.



***Keypad Track Selector Module (KPS).** Includes soft green Dual Digit Numeric Display, Status Indicator LED, 12 Key Keypad, and Integral Mounting Panel. Supports up to 99 selectable tracks, 10 speed ranges, 10 momentum ranges, and alphanumeric status feedback.. 3.8" x 6".*

The **KPS (Keypad Selector)** features a telephone style keypad, a status indicator LED, a soft green dual digit display for indicating the current track location, and an integrated mounting panel. The KPS can index up to 99 tracks in its standard configuration, as well as provide 10 speed and momentum ranges. The KPS is an upgrade option to the standard controller configuration.

Note that the overall minimum and maximum speeds achievable by the controller are the same for all selectors (0.15 to 0.50 RPM). The Keypad Selector simply provides more selectable ranges. The same applies to momentum simulation: the minimum and maximum momentum periods are the same, the Keypad Selector simply provides more selectable ranges between minimum and maximum.

DC Stepper Motor.

Stepper motors have the unique capability to stop at pre-defined angular increments ("steps"). This is unlike a regular DC motor that rotates freely with no particular angular control or stopping position. This stepping capability provides the motor with a high degree of repeatable positional accuracy.

The PTC is available with two high quality motor options, both capable of superior accuracy and long life: a Standard Motor applicable to most installations, and a Heavy Duty Motor for larger "O" and "G" gauge applications. The heavy duty motor features larger motor windings and heavier gearing. If your turntable bridge is O scale or larger and your bridge is longer than 18", use of the heavy duty motor is recommended.

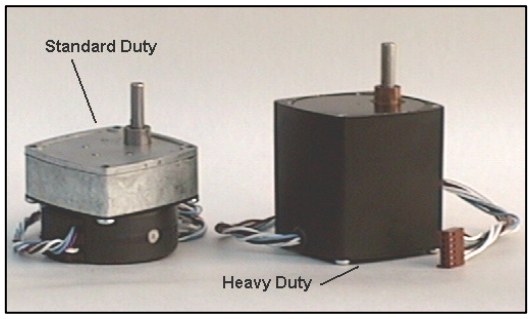


Figure 1: Microstepping Motors, Standard and Heavy Duty (0.025° base step angle)

The motor gearhead mounting dimensions are the same for both motors: approximately 2.4" square. Overall dimensions are 2.4" square by 2.8" long for the Standard Motor; 2.4" square by 3.5" long overall for the Heavy Duty Motor. The dimensions include the 1" long, ¼" diameter shaft. Both motors are supplied with 24" leads.

For larger scales and turntable installations that may have curved lead tracks we have integrated an optional shaft brake. Although in most applications this is not an issue, we do recognize that in the larger scales and longer bridges it can be a problem. The problem stems from gear backlash internal to the motor. To solve this we have added an output on the controller that drives a power off shaft brake. The motor shaft runs through this device and it is controlled by the PTC III, effectively holding the bridge immobile. The mounting insturctions with photos are available on the www.nyrs.com website.

We have also added a set of dry contacts for the user to use as he pleases. These contacts are closed when the motor is running to facilitate a sound module or lights to be switched on when the turntable is turning.

Another new feature is an RS-232 comm port. In the future we will offer a power routing unit that will route the power for your turntable leads so the power will be routed to only the lead that the bridge is pointed to. The power routing unit and the PTC controller will communicate through this port.

Power Supply.

The Power Supply provides +12VDC power to drive the controller, track selectors, and stepper motor. The Power Supply plugs into a USA standard 115VAC outlet but now accepts up to 220v for international customers.

You can download this overview, User Manuals, Application Notes, and other information from our web site at

www.nyrs.com

INSTALLATION CONSIDERATIONS

There are a few considerations in determining if the PTC Model III can be installed on your layout:

- The size of your turntable and its shaft
- Installation of the motor to the turntable shaft
- Installation of the Track Selector controls in the layout control panel, and
- Programming of the PTC Controller.

These activities are discussed in detail in the PTC Model III *Installation Instructions and User's Manual*, so only an overview will be provided here.

Turntable Size, Turntable Shaft Size

The PTC Model III can be installed on any turntable with a center shaft accessible for direct connection to the stepper motor, up to 30", including products from Diamond Scale Construction®, Bowser®, Model Masterpieces®, and others. The PTC is supplied with a high quality clear anodized standard shaft coupling; see order sheet for available sizes.

♦**Option:** If you are using the Walthers® turntable, order the *Walthers Turntable Shaft Adaptor,* which includes a 1" shaft extension and application note describing the modifications necessary to extend the turntable shaft for connection to the motor (*Application Note #3, "Walthers® Turntable Adaptor Installation"*). Installation will be easier if the modifications are completed prior to final assembly and installation of the turntable.

Figure 2: Standard Shaft Couplers

Motor Installation.

In addition to the shaft coupler, the motor is supplied with hardware for mounting the motor to a support system. The actual motor support system can be one you design (the *User Manual* includes full motor dimensions) or you can use the optional Basic Motor Mount Kit. The Motor Mount Kit includes a machined bracket with hardware and is suitable for most turntables with pit diameters up to 18", or larger turntables if the pit bottom is sufficiently sturdy to support the motor (3/8" or thicker plywood or particle board).

Track Selector Installation.

The Track Selectors are intended to be mounted in your layout's existing front panel. The Rotary and Pushbutton selectors can be mounted in panels up to 1/8" thick, although a thickness of 1/16" is recommended. The Keypad selector can be mounted in panels up to ¾" thick. Templates are supplied for locating necessary mounting hole patterns.

For the Rotary Selector, a four hole pattern is required for the Rotary Switch, the Head/Tail Switch, the Status LED, and the Run/Stop Switch. The Pushbutton Selector requires a 5 hole pattern, plus whatever holes you need for the actual track selection pushbuttons.

♦**Option:** If you are using the Rotary Track Selector Module and your panel is thicker than 1/8", or you do not want to drill the hole pattern yourself, a pre-drilled front panel is available. The panel is supplied plain; you finish and letter it to match your layout.

Cable Length. The PTC comes standard with cable lengths suitable for most turntables, which are generally less than 3' feet from the layout front panel. The location relationship of the different components is shown in Figure 3:

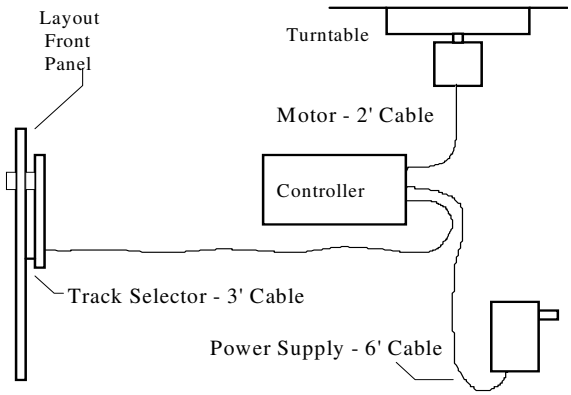


Figure 3: Cabling Lengths

♦**Option:** If your layout requires longer cables, optional 6' and 10' Controller-to-Track Selector and 3', 6', and 10' Controller-to-Motor cables are available.

PROGRAMMING

Programming the PTC Model III with your track's locations involves putting the controller in "Learn Mode" and single stepping the bridge through a full circle. As you "single step" the bridge, you indicate where the track locations are, and the PTC remembers them. You also select the maximum speed and momentum you want. The system is reprogrammable if you add more tracks later on.

An important feature of the *PTC Model III* has to do with programming of your bridge's stopping points. Although many bridges are identical at both ends, most are not-- the tracks do not line up *exactly* through the center of the turntable, and are frequently offset. In addition, most turntables have concentricity or other manufacturing variances that must be compensated for. The PTC has the unique ability to learn where the correct locations are for positioning both the so-called "head end" and "tail end" of the bridge. In this way, the PTC treats the head and tail ends of the bridge locations "separately" and their respective concentricity and offset errors are accounted for automatically. Operations like full 180 degrees turns from any track location are easily achievable, and reliable.

Lastly, note that no real "programming" skill is required, and all programming control is done through the Track Selector Module. The only thing really necessary for successful programming is access to the turntable to view the track and bridge alignments up close-- plus a smoothly operating turntable. Full instructions are included in the *User's Manual.* Programming takes about 10 to 15 minutes.

FREQUENTLY ASKED QUESTIONS

Here are answers to some of the most frequently asked questions regarding the PTC Model III. Additional *Frequently Asked Questions* can be found on our web site at www.nyrs.com.

Q: **TRACK SENSING.** What does your system use to index (what kind of switches or sensors)?

A: This is an important point: no sensors are used! The PTC Model III is unique in that is does not use mechanical or optical sensors of any kind, and therefore, much easier to install. There is no need to build or mount sensor brackets, sensors, or any of the associated hardware and wiring. As a result, the system is completely maintenance free.

Q: **PROGRAMMING THE SYSTEM**. Do I need any programming skill to program the system? Do I need to use a PC?

A: No. All programming is done through the standard operating controls-and no actual "programming" experience is needed. Programming takes about 5 to 10 minutes, depending on the number of tracks you have.

Q: **SYSTEM MEMORY**. Does power need to be "on" all the time to keep the programming stored?

A: No, the system uses a non-volatile memory.

Q: **WHICH TRACK SELECTOR SHOULD I USE?** You have several Track Selector Modules available... how do I choose which one is best for me?

A: We offer several selectors primarily to satisfy the varied requests for functionality we have received over the years. For the most part, the track selector that is best for you is a matter of personal operating preference. To start, identify how many tracks you will ultimately be indexing, and then decide if you have a preference for using rotary switches, pushbutton switches, or keypad buttons for operation. Then, you can narrow your selection:

- If you have less than 12 tracks to index, then the standard Rotary or Pushbutton Selectors will probably be your best choice. The Rotary is the easiest to install, and the most intuitive. The Pushbutton Selector is designed to work with an array of discrete momentary pushbuttons, one for each track (you supply your own momentary pushbuttons, or purchase NYRS Switch Packs).

- If you have up to 24 Tracks, then the Chubb/Universal Selector will be a good choice. You would also choose the Chubb/Universal if (a) you want to interface your turntable controller to an automatic Chubb control system, or (b) If you want to index more than 24 tracks (up to 48 tracks) using pushbuttons, or (c) if you have an existing 24 position rotary switch (like the double stack rotary switch supplied by Diamond Scale) and you want to use it with the PTC.

- Choose the Keypad Selector if you have more than 12 tracks to index (up to 99 tracks), and you don't want to go with the Pushbutton route. The Keypad selector is more 'hi-tech' looking, and comes supplied with a 12 key keypad, dual digit display, and integrated face plate included. The Keypad Selector has the added convenience of enabling the operator to change speed, momentum, and ATR modes from the operating keypad, rather than by DIP switches on the controller as is the case with the Rotary, Pushbutton, and Chubb/Universal selectors.

WARRANTEE

The PTC Model III system is warranted against defects in material and workmanship for a period of 1 year. If your system develops any problems, New York Railway Supply will repair or replace your system at no charge to you. This warrantee is void if the system has been used outdoors, if the system has been used or modified with other than the recommended options, or if the controller enclosure has been opened.

SPECIFICATIONS

Controller	
Dimensions	5½"L x 5¼"W x 2"H
Selectable Tracks (standard)	12 tracks
Selectable Tracks (maximum, Chubb/Universal Selector)	48 tracks
Selectable Tracks (maximum, Keypad Selector)	99 tracks
Indexing Positions possible	14,400
Reversing Relay Rating (optional)	1.5 Amps (max)
Microstepping Motor	
Motor Dimensions (Standard)	2.4" square x 2.8" long
Motor Dimensions (Heavy Duty)	2.4" square x 3.5" long
(Motor dimensions include shaft length)	
Motor Shaft	1/4" diam. x 1.0" long
Turntable Shaft Diameter	1/8" to 1/2"diam.
Turntable Shaft Length *(Coupling Surface)*	1/4" long (min)
Step angle	0.025° base step
Torque	400 oz.-in., minimum
Track Selector Modules	
Dimensions	
Rotary, Pushbutton, & Univ. Sel.	5.0" L x 2.5" W x 0.75" H
Keypad Selector	6.0" L x 3.8" W x 1.0" H
Power Supply - Wall plug-in style	
Input Rating	115-230VAC
Output Rating *(under load)*	12VDC @ 1.5A
Cabling	
Control panel (track selector) to controller	3 ft
Controller to stepper motor	2 ft
Controller to power supply	6 ft
Turntable Pit Diameter	
For Basic Motor Mount Kit, Standard Installation	18" max.
(Note: motor mount bracket may optionally be mounted to pit bottom for larger turntables)	

FOR MORE INFORMATION

This document and others are available in downloadable Adobe® Acrobat format form our web site, or call or write us at:

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