NYRS

Turntable Indexing That Works

PTC Model 5

Programmable Turntable Controller

Controller and Motor Assembly

P/N 03-200

Installation Instructions and Users Manual

New York Railway Supply (NYRS)
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Contents

Quick Start Guide

This one-page checklist gets you up and running quickly with a properly installed and programmed PTC Model 5 turntable controller. For full details, refer to the later sections of this manual.

Bench test first. We highly recommend running the system on the bench, not yet attached to a turntable, so you understand the touchscreen and programming process before final installation.
Install the motor and bracket. Mount the stepper motor using the NYRS motor mount kit or a rigid, well-aligned custom mount. Make sure the motor shaft is square to the turntable shaft with no binding through a full 360° rotation.

WARNING — POWER OFF BEFORE TOUCHING THE MOTOR CONNECTIONS.

Always turn off and unplug the controller and all connected power before plugging in or unplugging the motor. Connecting or disconnecting the motor while power is on can permanently damage the controller and motor.

Mount the controller. Install the controller in the fascia within reach of the turntable. Cut the panel opening to the dimensions in Appendix B and secure the module with the supplied hardware. The display face is glass — handle with care.
Wire the system. Connect the motor (MOTOR / DB9), the 24 V power supply (POWER 24V DC), optional track reversing (ATR terminals A–D), the optional APR2 power router, and the effects relay as shown in Appendix C.

CAUTION — 24 V, 6 A POWER SUPPLY.

The PTC 5 ships with a 24 V, 6 A power adapter. Use it only with the PTC 5, and power the PTC 5 only from this adapter. Plugging this 24 V supply into other equipment rated for a lower voltage can permanently damage that equipment.

Set your scale. Open **Settings** (gear icon) and select **HO Scale** or **O Scale** to match your motor, then **SAVE**.

CAUTION — SET THE SCALE TO MATCH YOUR MOTOR.

Select HO Scale for the HO/N/Sn3 motor and O Scale for the O/On3 motor. The O Scale setting delivers more current: running it with an HO motor can overheat and damage the motor. Running the HO Scale setting with an O motor starves it of current, causing weak, stalling, or unreliable movement.

Program your tracks. Tap **Program Tracks**. Point the bridge head at Track 1 and press **HD → 01 → STORE**. Rotate the tail to Track 1 and press **TL → 01 → STORE**. Then point the head at each remaining track and press **HD → nn → STORE**.
Operate. On the home screen, select **HD** or **TL**, enter the track number, and press **GO**. The bridge ramps to the track using your speed and momentum settings.

1. Introduction

The NYRS PTC Model 5 is a precision programmable turntable controller designed for model railroaders who want reliable, repeatable alignment of a turntable bridge to multiple lead and service tracks. The PTC 5 replaces the keypad and LED display of earlier models with a 5-inch color touchscreen, and drives a closed-loop stepper motor with an absolute encoder. Because the motor knows its true position at all times, the bridge does not need to be re-indexed after a power loss, and there is no lost-step drift or gear backlash to compensate for.

This manual describes how to install the motor and controller, perform a bench checkout, program head and tail positions for each track, operate the controller from the touchscreen or from a DCC throttle, adjust speed and momentum, use automatic track power reversing (ATR), and troubleshoot any conditions that may occur.

1.1 Scope of This Manual

This document covers the PTC Model 5 with firmware Version 0.9.0. The running firmware version is shown on the splash screen at power-up. Refer to the Firmware Change Log (Appendix D) for version details.

1.2 Safety and Regulatory Notices

Read the following notices before installing or operating the PTC 5. The same warnings are repeated at the relevant steps later in this manual.

WARNING — POWER OFF BEFORE TOUCHING THE MOTOR CONNECTIONS.

Always turn off and unplug the controller and all connected power before plugging in or unplugging the motor. Connecting or disconnecting the motor while power is on can permanently damage the controller and motor.

CAUTION — 24 V, 6 A POWER SUPPLY.

The PTC 5 ships with a 24 V, 6 A power adapter. Use it only with the PTC 5, and power the PTC 5 only from this adapter. Plugging this 24 V supply into other equipment rated for a lower voltage can permanently damage that equipment.

CAUTION — THE DISPLAY IS GLASS.

The touchscreen face is glass and can crack or shatter if dropped, struck, or pressed against a hard edge. Handle the controller carefully during installation, and do not rest tools or weight against the screen.

CAUTION — SET THE SCALE TO MATCH YOUR MOTOR.

Select HO Scale for the HO/N/Sn3 motor and O Scale for the O/On3 motor. The O Scale setting delivers more current: running it with an HO motor can overheat and damage the motor. Running the HO Scale setting with an O motor starves it of current, causing weak, stalling, or unreliable movement.

The PTC 5 contains electronic assemblies soldered with lead-based solder. Avoid inhaling fumes if you solder or rework the internal boards, and wash your hands after handling internal components. Follow all applicable electrical safety practices when wiring your layout, power supplies, and any mains-powered devices.

California Proposition 65 Warning: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm.

2. System Overview

A complete PTC Model 5 installation consists of the controller/touchscreen assembly, a closed-loop stepper motor and bracket, the 24 V power supply, optional ATR wiring for bridge track power, an optional APR2 Automatic Power Router for roundhouse track power, and any accessories tied to the effects relay. See the APR2 manual at www.nyrs.com for details on that accessory.

2.1 Major Components

- PTC Model 5 controller with a 5-inch color touchscreen and an illuminated power button.
- Closed-loop stepper motor with absolute encoder — a NEMA 17 frame motor for HO/N/Sn3 scales, or a larger NEMA 23 frame motor for O/On3 scales (see Appendix A).
- 24 V, 6 A power supply (NYRS-supplied or equivalent).
- Optional track reversing (ATR) connection to the bridge rails.
- Optional APR2 Automatic Power Router for switching power to roundhouse and stall tracks.
- Effects relay output for auxiliary accessories such as lamps, sound modules, or indicators.

2.2 How You Interact With the PTC 5

All operation is through the touchscreen. From the splash screen you reach the home (operating) screen, and from there you can open Settings, the DCC settings panel, or the Program Tracks screen. There is no separate index mode: the absolute encoder establishes bridge position automatically, and if the bridge is moved while power is off, the controller corrects its position the next time it is powered up.

3. Motor Installation

Proper motor installation is critical to accurate and repeatable turntable performance. Any misalignment, flex, or binding between the motor and the turntable bridge will show up as inconsistent track alignment. Take your time on this step — good mechanics make everything else easy. The PTC 5 closed-loop drive has no gear backlash, so the bridge approaches every track the same way from either direction. To keep the bridge from being pushed out of alignment, make sure locomotives come onto the bridge straight; we recommend at least one engine length of straight track leading onto the bridge.

3.1 Using the NYRS Motor Mount Kit

If you are using the optional NYRS Motor Mount Kit, refer to the separate NYRS Motor Mounting Manual, available at www.nyrs.com, for detailed mounting instructions. Install and test the motor mount before proceeding with the rest of this manual. The kit is designed to provide proper alignment and rigidity for most common turntable installations.

3.2 Designing Your Own Motor Mount

If you are designing your own mount for a scratch-built turntable or special installation, keep these guidelines in mind:

- Do not suspend the motor from the turntable shaft. The motor should be firmly supported by the pit, benchwork, or a rigid bracket — not by the bridge.
- The mount must be rigid. There should be no noticeable flex or twist when you apply moderate hand force to the motor.
- Maintain alignment. The motor shaft must remain coaxial with the turntable shaft to avoid binding.
- Use a common reference surface. The turntable and motor should be mounted to the same structural reference rather than opposite sides of flexible benchwork.

Motor mounting patterns differ by scale. The HO/N/Sn3 motor is a NEMA 17 frame with four tapped M3 holes on a 31 mm square pattern, while the O/On3 motor is a larger NEMA 23 frame with four Ø5 mm through-holes on a 47.14 mm square pattern. See Appendix A for full mounting-hole patterns and shaft dimensions for both motors, and the NYRS Motor Mounting Manual (www.nyrs.com) for step-by-step mounting guidance.

WARNING — POWER OFF BEFORE TOUCHING THE MOTOR CONNECTIONS.

Always turn off and unplug the controller and all connected power before plugging in or unplugging the motor. Connecting or disconnecting the motor while power is on can permanently damage the controller and motor.

4. Controller Installation

The PTC 5 controller is designed for fascia mounting, where the operator has a clear view of the touchscreen and easy access to it. Choose a location that is comfortable to reach and close enough to the turntable for the motor cable and wiring to reach.

4.1 Choosing a Location

- Mount within reach of the turntable using the standard motor cable; extension cables are available for longer runs.
- Treat the turntable like a cluster of turnouts — place the controller where the operator can easily see and reach it.
- Ensure sufficient clearance behind the fascia for the controller, connectors, and cabling.

4.2 Fascia Cutout and Mounting

Refer to Appendix B for the panel cutout dimensions. The opening is 5.6 in. wide by 3.5 in. tall with chamfered corners and a semicircular relief on the right edge for the illuminated button. Cut and de-burr the opening, test-fit the controller, and secure it with the supplied hardware. Do not oversize the opening so far that the bezel cannot fully cover it.

CAUTION — THE DISPLAY IS GLASS.

The touchscreen face is glass and can crack or shatter if dropped, struck, or pressed against a hard edge. Handle the controller carefully during installation, and do not rest tools or weight against the screen.

4.3 Power Button and Supply

The PTC 5 uses an illuminated push button mounted on the right side of the controller. Connect the supplied 24 V, 6 A power adapter to the POWER 24V DC jack on the rear panel (see Appendix C).

CAUTION — 24 V, 6 A POWER SUPPLY.

The PTC 5 ships with a 24 V, 6 A power adapter. Use it only with the PTC 5, and power the PTC 5 only from this adapter. Plugging this 24 V supply into other equipment rated for a lower voltage can permanently damage that equipment.

4.4 Track Reverser (ATR) Wiring Overview

The PTC 5 includes onboard automatic track power reversing (ATR) that keeps locomotive direction consistent as the bridge turns, eliminating the need for a split-ring rail or manual polarity switch. Connect your track (layout) power to terminals A and B, and take bridge power from terminals C and D. Terminals A and B are internally fused. If you are using DCC, connect the DCC bus to A and B; C and D supply the bridge rails only. At the Track 1 home position, A connects to C and B to D; the polarity reverses automatically as the bridge passes ±90° from Track 1. See Chapter 10 and Appendix C for details.

For DCC users, NYRS recommends a dedicated DCC auto-reverser such as the PSX-AR, which adds circuit-breaker protection. The PTC 5's own ATR works well; the added protection of a DCC reverser can help protect wiring and boosters in the event of a major short.

4.5 APR2 Automatic Power Router

The optional APR2 is a separate accessory board that switches power to roundhouse and stall tracks. It is a distinct function from ATR — ATR handles bridge-rail polarity, while the APR2 controls power to the surrounding tracks. Connect the APR2 to the rear-panel APR2 jack and refer to the APR2 manual at www.nyrs.com for its own installation and configuration.

4.6 Effects Relay Connector

The effects relay provides a switched contact for auxiliary accessories such as lamps, sound modules, or indicators. The relay contacts are brought out to the EFFECTS connector, which provides both normally-open and normally-closed contacts, so you choose the behavior by which terminal you wire to rather than by a software setting. The effects relay is enabled on the Settings screen. See Appendix C for the connector pinout.

5. System Check-Out

Before committing to a permanent installation, verify basic operation on the workbench or with the turntable temporarily in place. This confirms that wiring, motor connections, and the controller are correct before you program track locations.

5.1 Power-Up

Apply power. The display shows the blue PTC 5 splash screen with the running firmware version in the lower-left corner. Tap the screen to continue to the home screen.

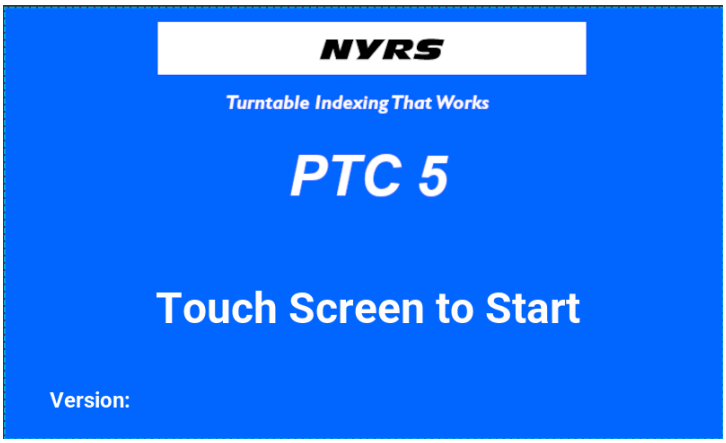

Figure 5-1. Power-up splash screen — tap to start.

If the bridge was moved while power was off, the status line reads CORRECTING POSITION and the bridge drives itself back to its known position before returning to READY. This is normal — the absolute encoder always knows where the bridge is, so no manual re-indexing is required.

5.2 Checking Bridge Motion

Use the Program Tracks screen (Chapter 6) to verify the bridge turns smoothly before programming. In programming the motor is released and the bridge turns freely; the Advance button rotates the bridge continuously and the CW / CCW buttons jog it one step at a time. Rotate the bridge through a full revolution and watch for binding, stiff spots, stuttering, or unusual noises. If you find any, turn off power, correct the mechanical problem, and re-check before programming.

6. Programming the Turntable

Programming teaches the PTC 5 the angular position of every track. Thanks to the absolute encoder, you program the head end of each track plus the head-to-tail offset just once, and the controller derives every tail position automatically. Programming is normally done once after installation, and again only if major mechanical changes occur.

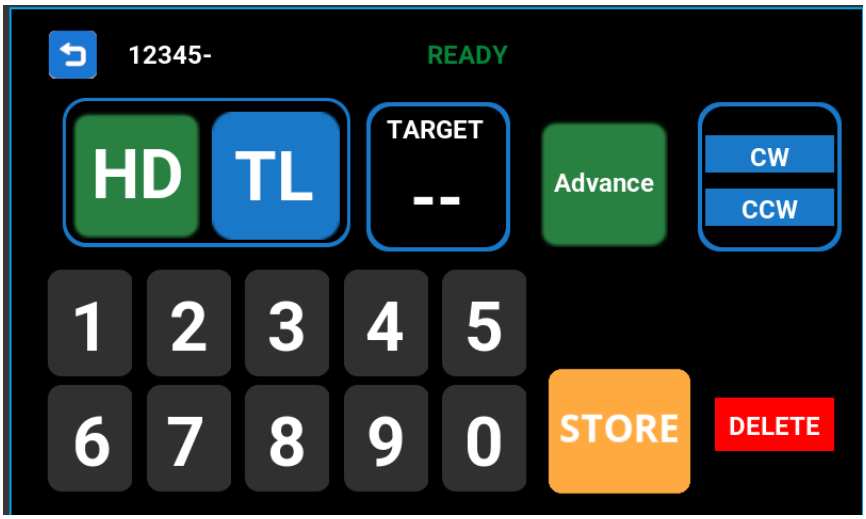

Figure 6-1. The Program Tracks screen.

6.1 Planning Track Numbers

Track 1 is your primary lead track and serves as the angular reference for ATR and for the head-to-tail offset. The remaining tracks may use any numbers from 2 to 99 in any pattern. Many users group numbers logically — for example, 1–3 for lead tracks, 11–15 for roundhouse stalls, and 20–29 for outside storage. Sketch your turntable and write the chosen numbers next to each track, then check them off as you program.

6.2 Entering Program Mode

Tap Program Tracks. This button is available from both the home (run) screen and the Settings screen. In programming mode the motor releases and the bridge free-wheels, so you position it by hand. The Advance and CW / CCW buttons are not required for programming; they are provided to test that the bridge rotates smoothly.

6.3 Program Track 1 (Head End)

Choose one end of the bridge as the head end. It is helpful to mark this end, or to model an operator's shack on it, so you can tell the two ends apart. Then:

1. By hand, point the head end of the bridge at Track 1.
2. Select **HD**, enter **01**, and press **STORE**.
3. The status line confirms **HEAD TRACK 01 SAVED**.

Figure 6-2. A head position has been stored.

6.4 Program Track 1 (Tail End)

Next, capture the head-to-tail offset by programming the tail end of Track 1:

4. By hand, rotate the bridge so the tail end points at Track 1.
5. Select **TL**, enter **01**, and press **STORE**.

The controller stores the offset between the head and tail ends from this single move and applies it to every other track. You do not need to program the tail end of any other track.

6.5 Program the Remaining Tracks

For each remaining track, point the head end of the bridge at the track and press HD → the track number → STORE. Repeat for all tracks you intend to use.

> **Optional:** If a particular track ever needs its own tail position, you can program it the same way with

TL → the track number → STORE. This is rarely necessary because the Track 1 offset already covers the whole table.

6.6 Editing a Track

Editing works exactly like programming. Enter Program Tracks, position the bridge at the corrected location, and press HD → the track number → STORE. The new position overwrites the old one. There is no separate track-edit mode.

6.7 Deleting a Track

To remove a stored track, enter its track number and press DELETE.

6.8 Finishing

Use the back arrow to leave the Program Tracks screen and return to normal operation. No separate indexing step is required — the absolute encoder already knows the bridge position.

7. Operating the PTC 5

Once programmed, normal operation is done entirely from the home (operating) screen.

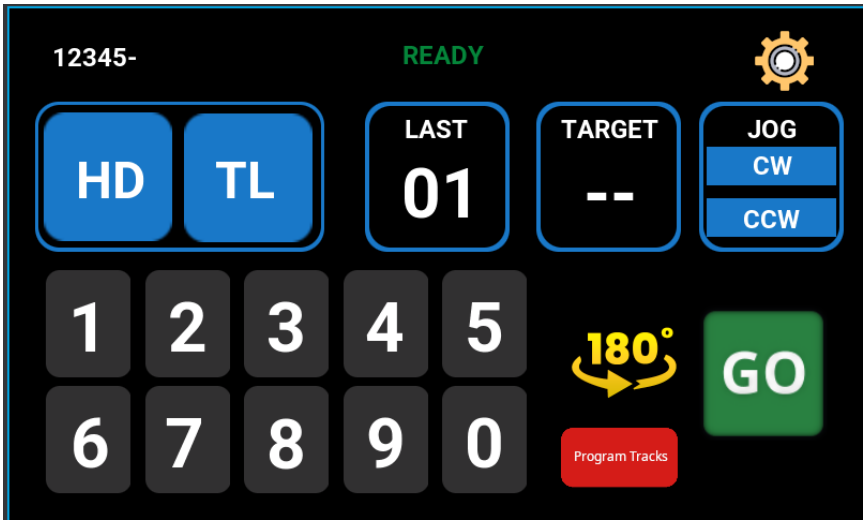

Figure 7-1. The home (operating) screen.

7.1 Home Screen at a Glance

- **Status line** (top center) shows READY when the controller is idle, or a message such as MOVING HEAD TO TRACK 11 during a move.
- **Gear icon** (top right) opens the Settings screen.
- **HD / TL** select whether a move aligns the head end or the tail end of the bridge.
- **LAST** shows the last track reached; **TARGET** shows the track number you are entering.
- **Number keypad** enters the track number.
- **GO** starts the move; **JOG CW / CCW** nudge the bridge one step per press; **180°** turns the bridge a half-revolution to swap a locomotive end-for-end.
- **Program Tracks** opens the programming screen (Chapter 6).

7.2 Selecting and Moving to a Track

6. Press **HD** or **TL** to choose the head or tail end.
7. Enter the track number on the keypad. It appears in the **TARGET** box.
8. Press **GO**. The status line shows the move in progress, and the bridge ramps to the track using the current speed and momentum.

7.3 Stopping a Move (Emergency Stop)

While the bridge is moving, the GO button turns red and reads STOP. Press STOP to halt the bridge immediately. After stopping, press GO to continue to the same target, or enter a new track number to redirect the bridge to a different location.

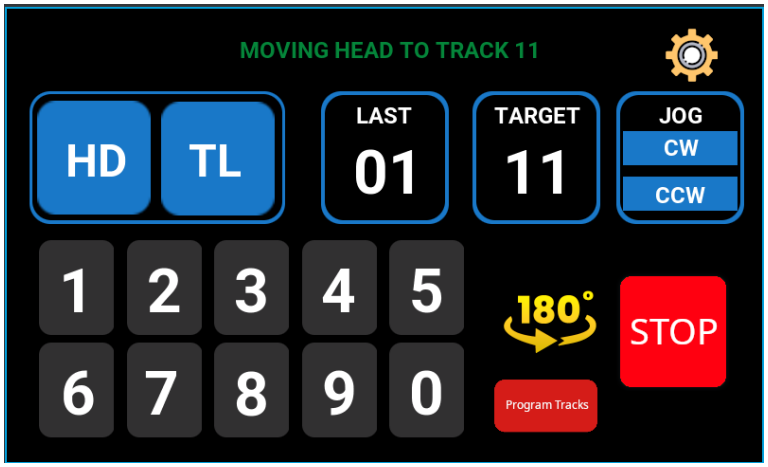

Figure 7-2. During a move, GO becomes a red STOP button.

7.4 Operating Hints

- The 180° button is handy for turning a locomotive without selecting a specific track.
- JOG CW / CCW move the bridge a single small step per press, useful for spotting equipment precisely.
- If the bridge was moved with power off, the controller corrects its position automatically at the next power-up; no re-indexing is needed.

8. Settings

The Settings screen, reached from the gear icon, collects the controller's adjustable options on a single page. Changes do not take effect until you press SAVE; CANCEL discards them.

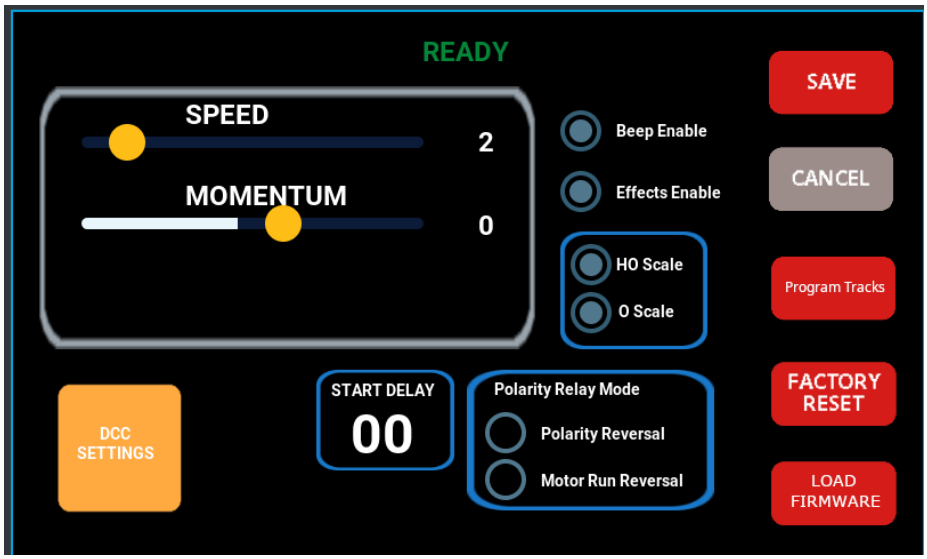

Figure 8-1. The Settings screen.

8.1 Speed

The SPEED slider sets the maximum rotational rate of the bridge. Lower values turn the bridge more slowly and smoothly; higher values are faster. Very large bridges generally look best at lower speeds.

8.2 Momentum

The MOMENTUM slider controls how gradually the bridge accelerates and decelerates, simulating the inertia of a heavy prototype turntable. A setting of zero starts and stops abruptly; higher settings produce longer, smoother ramps. Momentum is scaled to the selected speed.

8.3 Start Delay

START DELAY inserts a pause between the moment a move is commanded and the moment the bridge begins to turn, which is useful for triggering pre-move sound or lighting through the effects relay. The range is 00 to 03 seconds. Tap the field to open the Number Entry screen (Section 8.9), enter the value, and SAVE.

8.4 Polarity Relay Mode

Polarity Relay Mode selects how the onboard relay behaves:

- **Polarity Reversal** — standard ATR operation. The relay reverses bridge-rail polarity automatically as the bridge passes ±90° from Track 1 (see Chapter 10).
- **Motor Run Reversal** — the relay energizes whenever the motor is running. This mode supports a two-wire servo or other device used as a bridge lock or auxiliary mechanism. The Start Delay applies to this output as well.

8.5 Effects Enable

Effects Enable turns the effects relay function on or off. Whether an accessory acts when the relay is open or closed is determined by which EFFECTS terminal you wire to (Appendix C), not by a software setting.

8.6 Beep Enable

Beep Enable turns the touchscreen feedback beep on or off.

8.7 Scale (HO / O)

The Scale selector sets the motor drive current to match the motor supplied with your scale. Select HO Scale for the HO/N/Sn3 (NEMA 17) motor or O Scale for the larger O/On3 (NEMA 23) motor. This setting is retained through a factory reset (Section 8.8).

CAUTION — SET THE SCALE TO MATCH YOUR MOTOR.

Select HO Scale for the HO/N/Sn3 motor and O Scale for the O/On3 motor. The O Scale setting delivers more current: running it with an HO motor can overheat and damage the motor. Running the HO Scale setting with an O motor starves it of current, causing weak, stalling, or unreliable movement.

8.8 Factory Reset

Factory Reset restores the controller's settings to their defaults. Use it only when you want to start fresh. The Scale setting (Section 8.7) is deliberately preserved through a factory reset, so you do not have to remember it when resetting everything else; set it manually only if it needs to change.

8.9 Number Entry Screen

Whenever a numeric value is required away from the home screen — for example, a Start Delay or a DCC address — the controller shows a shared Number Entry screen. Enter the value on the keypad and press SAVE, or press CANCEL to leave it unchanged.

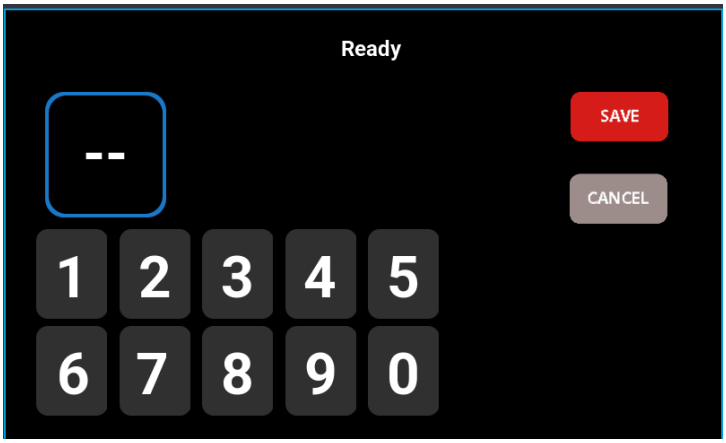

Figure 8-2. The shared Number Entry screen.

8.10 DCC Settings and Load Firmware

The DCC SETTINGS button opens the DCC settings panel (Chapter 9). The LOAD FIRMWARE button begins a firmware update (Chapter 11).

9. Operating From a DCC Throttle

The PTC 5 can be driven directly from your DCC system. The controller appears to the system as a locomotive: you acquire its address on any throttle — handheld or software such as JMRI —

then use the speed control to choose a track and a function button to send the bridge there. No accessory decoder or programming track is required.

9.1 The DCC Settings Panel

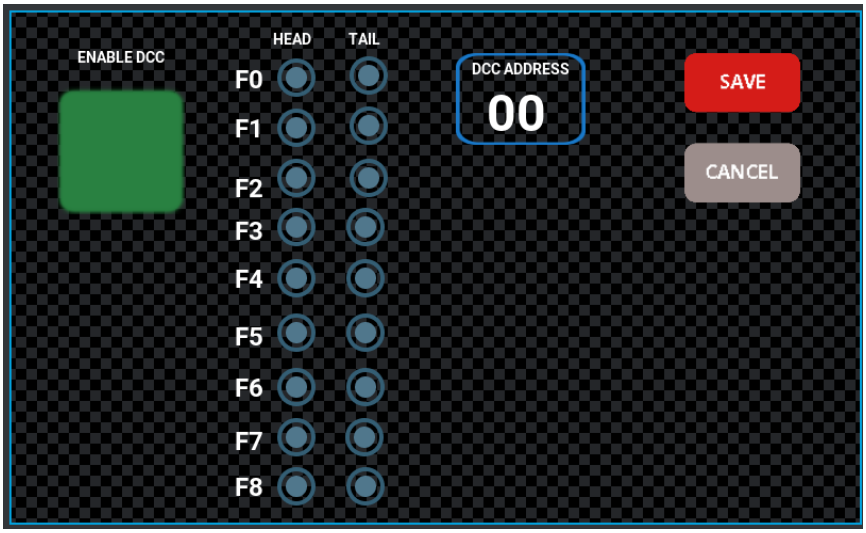

Figure 9-1. The DCC settings panel (DCC enabled).

- **ENABLE DCC** turns DCC operation on or off. The button is green when enabled, which is the default.
- **DCC ADDRESS** sets the address the controller answers to, in the range 1–99. Tap the field to enter it on the Number Entry screen.
- **Head / Tail function assignment** — the F0–F8 grid selects which function button sends the bridge head-end leading and which sends it tail-end leading. The defaults are F0 for Head and F1 for Tail. Reassign these only if F0 or F1 conflict with other equipment.

9.2 Set or Check the DCC Address

Acquire the controller's address on your throttle exactly as you would select a locomotive. Set your throttle to 128 speed steps for access to the full range of tracks; in 28-step mode you can still reach tracks 1 through 28.

9.3 Select a Track With the Speed Control

The throttle's speed setting chooses the destination track — it does not set how fast the bridge turns. Bridge speed and momentum are configured separately on the Settings screen. The speed step matches the track number: speed step 1 selects Track 1, speed step 2 selects Track 2, and so on.

Destination track	Speed step
1	1
2	2
3	3
…	…
N	N

Set the speed to the step that matches your target track before sending the bridge.

9.4 Send the Bridge With the Head and Tail Buttons

Two function buttons decide which end of the bridge is sent to the selected track:

- **Head** — default function F0
- **Tail** — default function F1

Press Head to drive the bridge to the selected track head-end leading, or Tail to send it tail-end leading. The move begins as soon as you press the button.

9.5 Stop the Bridge

To halt a move already in progress, press any function button.

9.6 Example — Send the Bridge Head-First to Track 4

9. Acquire the controller's DCC address on your throttle.
10. Set the speed to step 4.
11. Press F0 (Head).

The bridge turns to Track 4 with its head end aligned. To stop it before it arrives, press any function button.

10. Automatic Track Power Reversing (ATR)

Automatic Track Power Reversing eliminates the need for a split-ring rail or manual polarity switch to keep locomotive direction consistent as the bridge turns. When ATR is enabled (Polarity Relay Mode set to Polarity Reversal), the PTC 5 monitors the head-end angle relative to Track 1 and reverses bridge-rail polarity when necessary.

10.1 Standard ATR Operation

The controller treats Track 1 as the reference. ATR behaves as though a split-ring commutator were used, with the splits located 90° to either side of Track 1: when the head end is within ±90° of Track 1 one polarity is applied to the bridge rails, and beyond ±90° the polarity is automatically reversed. As the bridge continues around, the polarity toggles again at the next ±90° crossing.

10.2 Wiring

Connect your track (layout) power to terminals A and B, and take bridge power from terminals C and D. Terminals A and B are internally fused. For DCC, connect the DCC bus to A and B; C and D feed the bridge rails only. In the Track 1 home position, A connects to C and B to D. See Appendix C for the full wiring reference.

10.3 Using an External Auto-Reverser

If you prefer to use a separate DCC auto-reverser, simply leave the ATR terminals unconnected. For DCC installations NYRS recommends a dedicated auto-reverser such as the PSX-AR for added short-circuit protection, although the internal ATR works well and most boosters provide their own short-circuit protection.

11. Firmware Update

Firmware updates for the PTC 5 are handled through NYRS. To obtain an update or arrange to have one installed, contact NYRS support at support@nyrs.com. The LOAD FIRMWARE button on the Settings screen begins the update and displays the warning shown below before anything is changed.

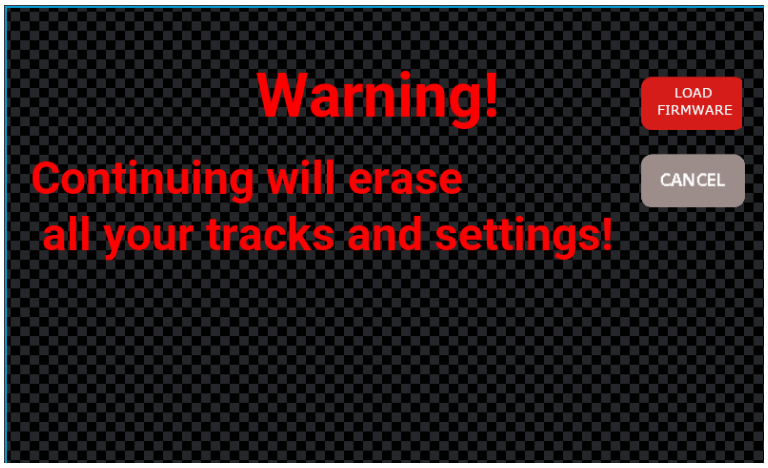

Figure 11-1. The firmware update warning.

WARNING — UPDATING FIRMWARE ERASES ALL TRACKS AND SETTINGS.

Loading new firmware clears every stored track position and all settings. Only perform an update with guidance from NYRS support, and be prepared to re-program your tracks and settings afterward.

Because an update clears all stored tracks and settings, only proceed with guidance from NYRS support, and re-program your tracks and settings after the update is complete (Chapters 6 and 8).

12. Troubleshooting

The PTC 5 shows plain-language status messages on the touchscreen. Below are some common symptoms and actions.

Symptom	Possible cause / action
Status reads CORRECTING POSITION at power-up.	Normal if the bridge was moved with power off. The controller drives the bridge back to its known position, then shows READY. No action needed.
Bridge does not move when a track is selected.	Confirm the 24 V supply is connected, the motor (DB9) is plugged in, and the controller is on the home screen (not in Program Tracks). Check that the track has been programmed.
Bridge stops short of or overshoots a track.	Verify the bridge turns smoothly with no binding, then re-store that track from the Program Tracks screen (HD → nn → STORE).
Motor is weak, stalls, or runs hot.	Verify the Scale setting matches your motor (HO Scale for the HO motor, O Scale for the O motor). See the scale-matching caution in Chapter 8.

Symptom	Possible cause / action
Shorts when leaving certain tracks.	Check ATR wiring and track gapping at the turntable entrance, and your DCC auto-reverser setup. If a track sits very near 90° or 270° you may need to reverse the polarity of that track's feeders.
Selected track will not store / nothing happens.	Make sure Track 1 has been programmed first, then store the remaining tracks. Track 1 is the reference for the whole table.

Appendix A — Motor Dimensions

A.1 HO / N / Sn3 Motor (NEMA 17)

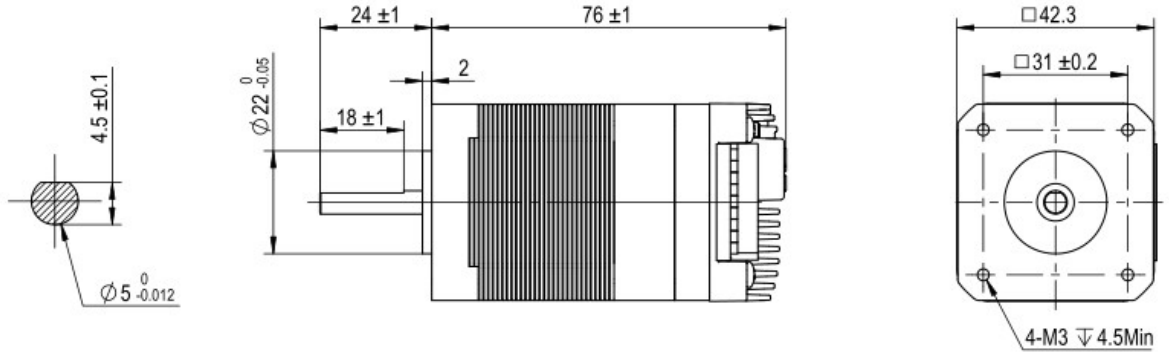

Figure A-1. HO/N/Sn3 motor mounting dimensions (mm).

Dimension	Value
Frame	42.3 mm square (NEMA 17)
Mounting holes	4 × M3, 31 mm square pattern, 4.5 mm min. depth
Pilot boss	Ø22 mm (0 / −0.05)
Shaft	Ø5 mm (0 / −0.012), 4.5 mm flat (D-cut)
Overall length	76 mm (±1)

A.2 O / On3 Motor (NEMA 23)

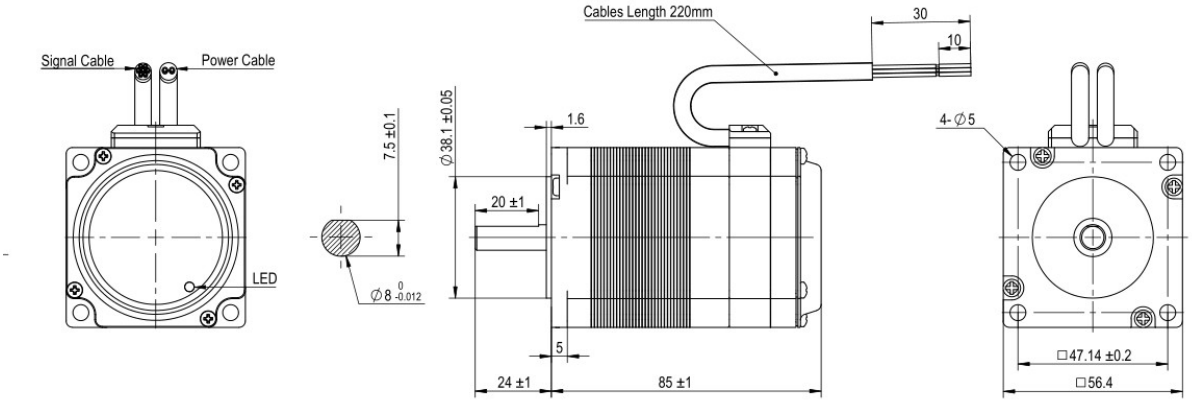

Figure A-2. O/On3 motor mounting dimensions (mm).

Dimension	Value
Frame	56.4 mm square (NEMA 23)
Mounting holes	4 × Ø5 mm through-holes, 47.14 mm square pattern
Pilot boss	Ø38.1 mm (±0.05)
Shaft	Ø8 mm (0 / −0.012), 7.5 mm flat (D-cut)
Overall length	85 mm (±1)
Cables	Signal and power, 220 mm; status LED on rear

Appendix B — Panel Cutout

Cut the fascia opening to the dimensions below. The opening is 5.6 in. wide by 3.5 in. tall with chamfered corners. The semicircular relief on the right edge clears the illuminated button and is located 0.9 in. from the top edge and 1.9 in. from the bottom edge. Dimensions are in inches.

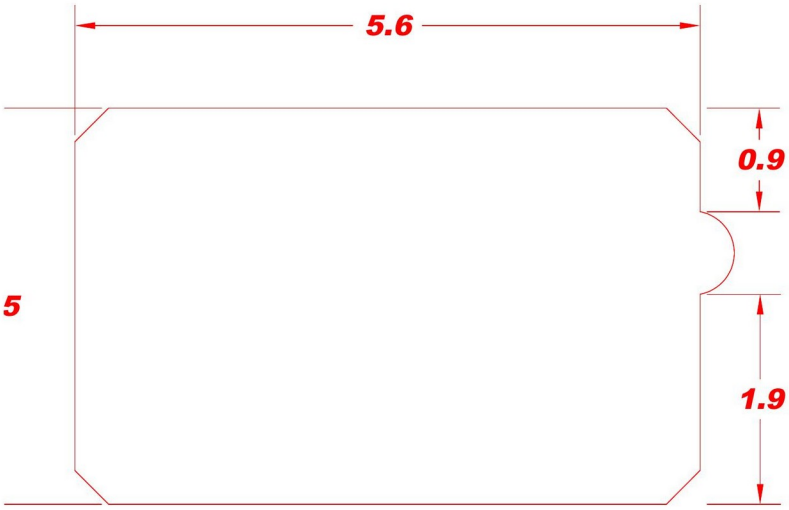

Figure B-1. PTC 5 panel cutout (inches).

Appendix C — Connectors and Wiring

The rear panel connectors are shown below, left to right.

Figure C-1. Rear-panel connectors.

Connector	Function
D · C · B · A	Track reversing (ATR). Track (layout) power connects to A and B (internally fused); bridge power comes from C and D. For DCC, connect the bus to A and B.
EFFECTS	Effects relay output. Pins left to right are C (common), NC (normally closed), NO (normally open) — wire to the contact you need.
APR2	Connection to the optional APR2 Automatic Power Router (roundhouse / stall-track power).
MOTOR	Motor connection (DB9) to the closed-loop stepper.
POWER 24V DC	24 V, 6 A power input (barrel jack).

C.1 ATR Wiring

Track (layout) power connects to terminals A and B, which are internally fused; bridge power comes from terminals C and D to the bridge rails. If you are using DCC, connect the DCC bus to A and B — C and D supply the bridge only. In the Track 1 home position, A connects to C and B to D; polarity reverses automatically as the bridge passes ±90° from Track 1. Always use adequately sized wire and follow your booster or power-pack manufacturer's instructions.

Appendix D — Firmware Change Log

Contact and Support

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PTC Model 5, Installation Instructions and User Manual, Rev 06/2026