



**Built-ups**

**933-2849 HO 90'**  
**933-2616 N 130'**

## **MODERN TURNTABLE WITH DCC INSTALLATION INSTRUCTIONS**

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Thank you for purchasing this Cornerstone Series® Built-up.

### **HISTORY OF THE TURNTABLE**

Although we associate turntables with steam locos, they're still used in some engine terminals. Requiring less space than a wye or loop, they're an economical way to reverse locos or cars. A turntable is basically a large bridge equipped with rails that can revolve in a full circle. Around the turntable, a series of radial tracks (other nicknames were also used) run into roundhouse stalls, open-air storage or service tracks. So that all rails were at the same height, the turntable was constructed in a large circular opening, called a pit. Early pits were made of earth or stone, while modern designs used concrete.

The basic concept of the turntable evolved before the railroad, when crude examples were used to reverse coal carts in mines. From the earliest days, steam locos (as well as specialized equipment like snowplows and observation cars) were built to operate in one direction, and had to be turned around for their return trip. By 1842, a device we would recognize as a railroad turntable was in regular use in England. Over the next century, the turntable became a fixture of railroading around the world.

In America, three basic types developed. The first was the center-balance, with a central pivot point and wheels under each end of the bridge to support the weight, but bigger and heavier locos put too

much strain on these early turntables. The next was the Articulated Design, with a central vertical hinge, which allowed the table to tip in the direction of the greatest weight. The final type (still seen today and the prototype for this model) was the Continuous Girder, which supports the weight on a center pivot and on load-bearing wheels under each end.

Two styles of turntable bridges became common. These included the Deck Style, with most of the bridge below ground level (requiring a deep pit) and the Through Type, where a portion of the bridge was above ground.

In order to swing the table end for end a source of power was needed. In the early days, men pushed the tables, and they came to be called "armstrongs," as it took strong arms to do the job! In later years steam and gasoline engines were used to drive one set of the load-bearing wheels, but electric motors were found to be the best choice for most applications. Electricity was supplied to most tables by an arch over the center, connected to overhead power lines.

In most terminals, the turntable and roundhouse were in constant use. For easier and safer operation, turntables had a small operator's cabin at one end of the bridge. This housed controls and placed the operator in the best position to align the rails.

Many also sported an old engine bell, which was rung to warn that the table was being turned.

As was the case with most engine service facilities, new turntables were built to accommodate the longest engines in service on a division. For this reason, some large engines were restricted to one or two divisions where turntables and facilities were big enough for them. Railroads also went to extremes to utilize existing turntables. Some ordered new steam locos with short wheelbases so they would fit, others extended turntable rails, and some resorted to jacking up the end of the tender!

With the coming of diesels, the need for turntables began to decline. Although F units still had to be turned, the new roadswitchers and Geeps could be run in either direction. Today, the number of turntables on active duty is declining, but those in use can be found at major shops and engine terminals. A few are also in use at railroad museums.

For more ideas to detail your scene, ask your dealer, visit [walthers.com](http://walthers.com) on-line or see the latest Walther's HO and N&Z Scale Model Railroad Reference Book.

## INSTALLATION ON YOUR LAYOUT

Your new turntable has been carefully assembled and tested to provide years of enjoyable operation. Take a few minutes to look over the parts, read the instructions and study the drawings before starting.

Your new turntable drive should be powered from its own power pack or the booster unit of your digital controls, sold separately. Check the output of the transformer with an AC voltmeter before making any electrical connections. The drive operates best at 16 Volts AC, 500mA; a minimum of 12 Volts is required,

but total output **must not exceed 18 Volts AC (RMS) or DC.**

Programming of your turntable will be covered in the later section titled "Control Box Manual".

## PLANNING YOUR TURNTABLE INSTALLATION

DCC control requires a greater structure in assigning the stops for each of the turntable service tracks. With DCC control; each end of the turntable bridge has an address for each of the service tracks, each of which needs to be programmed for each lead track. Hence, stop #1 (which is pre-programmed-note it's position on the mounting template) is for the operator's cabin end of the bridge and stop #2 is the open end (also preprogrammed) of the bridge for the first track. Note that stops #1 & 2 can't be moved so you want to do a calibrate (see the final assembly section in this instruction) before you fasten down the pit and the first track (unless you don't want to utilize stops #1 & 2).

We also suggest that you use these first 2 pre-programmed stops as your inbound service track so you can use these first two numbers for your "first" track (you can position your first track elsewhere, however, then the stop numbering will start with #3). Then lay out the remaining service tracks you want avoiding the "dead track" area as marked on the underside of the pit molding (you may need to adjust your positioning of the pit molding clockwise or counterclockwise to best avoid the dead area and best utilize the available programmable tracks- 28 plus the first track- given your track arrangement and roundhouse position).

An easy method to continue the programming the stops for each service track is to continue on to the

second track (which would be stops 3 & 4) going clockwise from the first track (stops 1 & 2) and continue clockwise to each of the tracks. In this manner; the tracks from the operator's cabin end of the bridge will be odd numbers 1,3,5,7,9 etc and the same tracks from the open end of the bridge will then be even numbers 2,4,6,8,10 etc.

This method makes it an easy memory system to position your turntable to the correct service track as with the control box (as well as from your DCC controller); the stop number must be entered on the control box to position the bridge to the tracks.

## INSTALLING THE PIT

Your new turntable automatically reverses track polarity when turned. As a result, the unit has two electrically insulated areas where the track on the bridge is not powered. These are identified on the underside of the lip by the "NO TRACK" lettering (also shown on the mounting template). Working approach and fan tracks must be installed away from these areas – we suggest placing them at 90° to the approach tracks. You can, however, add an unpowered display track at these points if desired.

The opening in the wall of the pit houses the optical sensor used as the "zero point."

For the indexing to work properly, this area, along with the small gear teeth and ring rail molded in the bottom of the pit, must be clean and open at all

times. If you plan to paint or weather the pit further, mask off these areas before starting.

**Before installing the pit, cover the center pivot hole with tape to keep out dust and debris.**

For best results your new turntable must be installed on a flat, level surface. Determine the location for your pit; use the enclosed template to cut the mounting hole in your benchwork. Allow at least 2-1/4" (5.7cm) of clearance below the pit for HO Turntables, 2" (50mm) for N Scale Turntable. The zero reader is mounted directly below a mounting boss; be sure to provide clearance in your benchwork for the reader too.

Note the position of stop #1 on the installation template, we suggest that this becomes the inbound lead track of your installation.

If your pit will be mounted on a wooden surface, drill out the areas for the mounting bosses as shown on the template with a 5/16" (8mm) bit for HO Turntables, 7/32" (5.5mm) bit for N Scale Turntable. Secure the pit in place using the eight screws and washers — if the thickness of your wood surface is less than 1/2", use additional washers (not included) for correct spacing — do not over tighten as this could cause the pit to warp.

If you are using foam for the surface of your layout, open the areas for the mounting bosses slightly and push the pit into place.

Make sure the pit is level, secure and properly supported before proceeding.

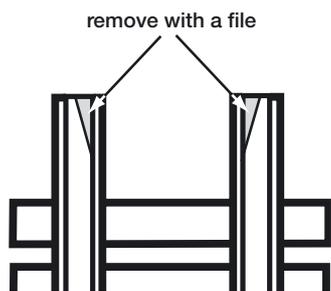
## INSTALLING SERVICE TRACKS

With the pit in place, you can install service tracks. The indexing can be programmed for up to 58 different stopping positions (29 tracks) so you can add tracks almost anywhere around the pit – but remember, don't install working tracks in the "NO TRACK" areas.

The HO bridges are equipped with Code 83 rail; if you are using another size for your service tracks, use Walthers Transition Tracks #948-897 for Code 100 or #948-898 for Code 70 (each sold separately).

**The N scale bridge is equipped with Code 80 rail.**

For a smooth transition between the bridge and service tracks, you'll need to modify your rails by



filing the inside ball of the rail at a slight angle for about 3/16" (4mm) (see illustration above).

All service tracks must align with the bridge rails in a straight line. The bridge can be used as a guide, but **VACUUM THE PIT AND THE SURROUNDING**

**AREA BEFORE PUTTING THE BRIDGE IN THE CENTER PIVOT!** Follow the instructions below for installing the bridge.

For the rails to sit correctly on the lip of the pit, you must remove a few ties from the end of the track.

**Important Note:** Rails **must** end at the edge of the pit — leave a gap of about 1/16" (1.5mm) between the end of each service track and the bridge.

Temporarily tape or pin the service tracks in place so you can make any adjustments **after** programming your stopping positions.

Wire the service tracks (parts not included) for power as desired.

## BRIDGE INSTALLATION

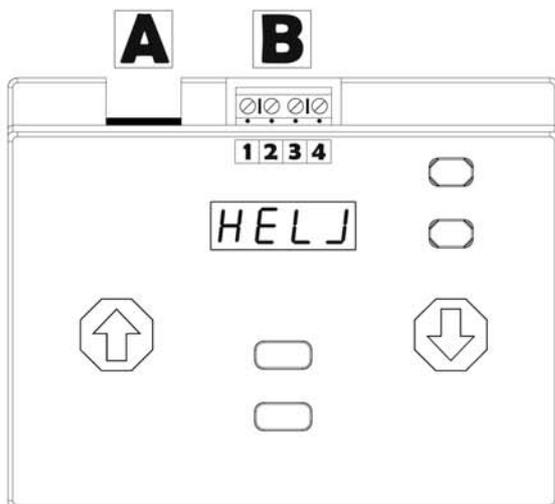
**Important Note:** Before starting, make sure the bridge rails are equally spaced about 1/16" (1.5mm) beyond each end. Remove the protective blue tape from the contact and the zero reader. Gently clean the contacts on the Bridge Center Post and wipers inside the Pit as shown in the maintenance and troubleshooting section.

Use a soft cotton swab and a good contact cleaner such as CRC 2-26 then wipe dry. Note: Be gentle when cleaning the wipers and avoid pushing them down. They should always be slightly raised in a flat row. If adjustment is needed, gently lift the wiper/s upward until it aligns with the others. Before installing the bridge, thoroughly vacuum the entire pit to remove all debris from the center pivot point, the ring rail and gear track. Remove the tape you placed on the center pivot hole. Insert the center

pivot on the bridge into this opening. The arch snaps in place at the middle of the bridge — don't glue it down, leave it removable for track cleaning and maintenance.

**NOTE! The circular contact ring and wipers must be ultra-clean with digital operation. Clean both parts any time the bridge is removed or installed.**

## CONNECTING POWER SUPPLY AND TURNTABLE



- A Turntable  
 B Power supply:  
 1: Bridge rail away from CAB  
 2: Bridge rail closer to CAB  
 3+4: Control box

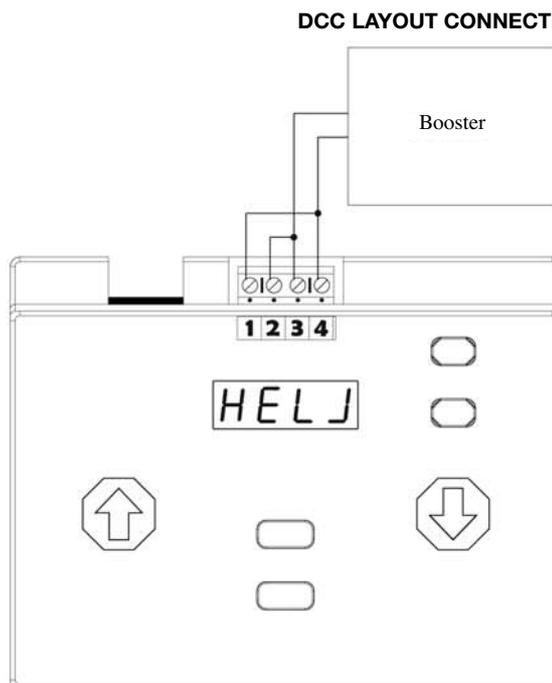
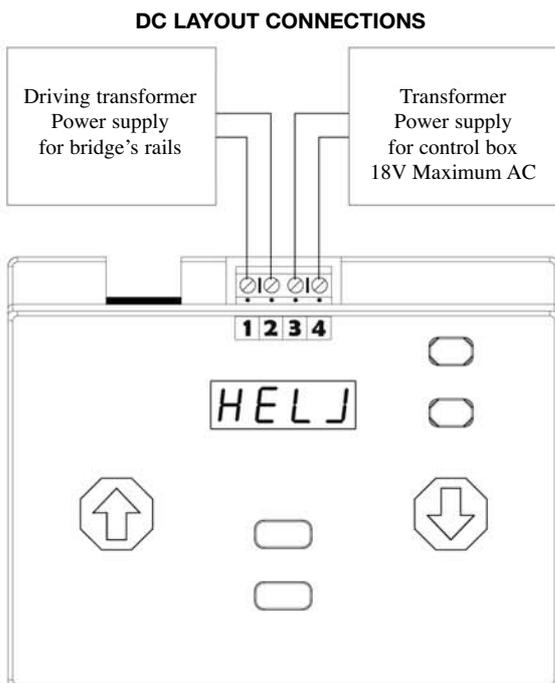
Hint: You can change the direction of the button arrows by removing the cover and the 6 screws holding the PCB in place inside the control box and reposition these 2 buttons as desired. Then reassemble.

### A Turntable

Connect the turntable to the control box via the included cable.

### B Power supply

Connect the control box either to the booster of your digital layout or to the AC power supply of your analog layout (not exceeding 18 VAC). Pay attention not to mix up the connections!



Proceed to the Control Box Manual portion of the instructions to learn more about initial calibration, assigning stop points, and more.

### FINAL ASSEMBLY

Once you're satisfied with the operation of the bridge and how it aligns with each track, fasten each rail securely so its base rests directly on the outside lip of the turntable pit. You may wish to glue each rail to the pit surface, or spike the track in place at the first tie on the benchwork.

**Important Note:** Before doing any scenery work, such as painting or adding ballast and ground

*cover, remove the bridge from the pit and tape over the center pivot. Before putting the bridge back in the center pivot, carefully and completely vacuum the pit and the surrounding area.* After reinstalling the bridge, you must calibrate the zero point before resuming operation.

- Scroll to the menu point CAL.
- Press the function key "GO/SET". CAL in the display starts to flash. In case you want to cancel,

press "ESCAPE".

- Press the function key "GO/SET" again. CAL in the display flashes half as quick as before. The bridge will run until it reaches "0"-position (optical sensor –see mounting template).
- Now, after having passed the "0"-position, the bridge will automatically stop at position no. 1 (not programmable).

## MAINTENANCE

As operation can be affected by dust, you may wish to cover your model with a plastic sheet between operating sessions.

**Zero Point:** Make sure this area and the pit edge is always clean and free of dust.

Use contact cleaner to clean the wipers and slip rings on the bottom of the bridge, should they get dirty.

**Counting Wheel:** If your table begins stopping out of alignment, the counting wheel may have become plugged with dust. Simply remove the bridge from the pit and blow any dust clear of the cogwheel.

**Important Note:** Any time the bridge is removed from the pit, you must find the zero position before resuming operation.

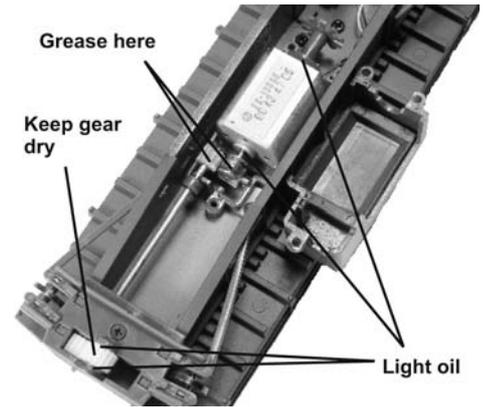
- Scroll to the menu point CAL on the control box.
- Press the function key “GO/SET”. CAL in the display starts to flash. In case you want to cancel, press “ESCAPE”.

• Press the function key “GO/SET” again. CAL in the display flashes half as quick as before. The bridge will start to turn until it reaches “0” position.

• After having passed the “0”-position (optical sensor), the bridge will automatically go to stop no. 1 (non-programmable).

**Lubrication:** In normal use, the drive mechanism should only require servicing about once a year. Use plastic compatible lubricants made especially for hobby products — *NEVER use household oils or lubricants!* Remove the arch. Loosen the circuit board, which is held in place with double-sided tape. Remove the three screws from the cover.

Apply a drop of light oil to both motor bearings and the drive gear bearing. Apply light gear lubricant to the gear train. Reverse these steps to reassemble — make sure the motor leads are positioned as shown.



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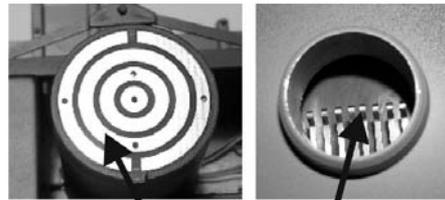
## TROUBLESHOOTING

If the bridge doesn't stop at programmed position and won't move again:

Proper contact is not being made between the wipers and the bridge center post.

The contact wipers need to be cleaned. Remove the bridge from the pit. Gently clean the contacts on the bridge center post and wipers inside the pit as shown.

Use a soft cotton swab and a good contact cleaner. Reinstall the bridge in the pit.



**Gently clean the contacts**

**Important note:** Be gentle when cleaning the wipers and avoid pushing them down. They should always be slightly raised in a flat row. If adjustment is needed, gently lift the wiper/s upward until it aligns with the others.

### If the control box reads Err1

The electrical contact between the control box and the bridge is lost. Please clean the 8 contacts in the pit and the center contact plate on the bottom of the bridge with a soft cloth with rubbing alcohol or a product such as CRC 2-26. Also check that the plug to the control box is firmly seated.

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## TO REPAIR OR REPLACE BRIDGE HANDRAILS (only for HO Turntables)

To speed repairs, a complete set of handrails is provided. Replacement is not difficult and requires only basic tools.

### Removing Existing Handrails

**NOTE:** Railings are press-fit, but because of manufacturing tolerances, some may be glued in place. Handle the bridge carefully to prevent damage.

- 1) Carefully remove the bridge from the pit; remove the arch from the bridge by gently spreading the columns away from the deck.
- 2) To remove press-fit railings, grasp each stanchion between your thumb and forefinger and gently pull upward.
- 3) If the stanchion won't come out easily — STOP PULLING — it's glued in. Cut the stanchion just above the square base; we suggest using a sprue cutter.

4) Gently slide the flush side of the sprue cutter under the square base, align the blades on the joint between the base and the bridge support, and squeeze gently without cutting. This should loosen the glue joint — gently pry the piece out of the bridge support.

If the piece still won't come out:

- 1) Cut off the square base just above the bridge deck.
- 2) Use a #61 drill bit to reopen the mounting hole.

### Final Assembly

The set includes two 7-Stanchion Long Railings and one 6-Stanchion Long Railing. Install these parts so the small pipe ends (which extend just past the end stanchion) face the arch.

Next to the Operator's Cabin is a 5-Stanchion Railing and two 90°-angle handrails. The smaller handrail fits alongside the cab and has one stanchion. The larger handrail has two stanchions and small pipe ends (extending just past the end stanchion); these should face the arch.

1) Press fit the new railing/s in place. Because of manufacturing tolerances, some may fit loosely. These can be secured with a tiny drop of plastic glue or CA.

2) Reinstall the Arch.

3) Make sure the pit is clean then reinstall the bridge. Remember, you must calibrate the zero point before resuming operation.

- Scroll to the menu point CAL.
- Press the function key “GO/SET”. CAL in the display starts to flash. In case you want to cancel, press “ESCAPE”.
- Press the function key “GO/SET” again. CAL in the display flashes half as quick as before. The bridge will run until it reaches “0”-position.
- After having reached the “0”-position, the bridge will automatically go to stop no. 1 (not programmable).

**NOTE:** Turn off any other infra-red sources in the room when searching for the zero point.