



# Built-ups

## HO Scale Structure Built-up 933-2829

### MODERN 130' TURNTABLE

Thanks 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 railroad-ing 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.

#### ON YOUR LAYOUT

This 130' table is typical of units installed by most roads from the 1920s on at division point terminals, where engines were changed and serviced. It will easily accommodate large articulated steam locos and most diesels up to 18" (45cm) long.

As bigger power came into service, bigger roundhouses were also required. This can easily be modeled with the Modern Roundhouse (933-2900) which includes parts for three complete stalls. It can be expanded up to a full circle with the Modern Roundhouse Add-On Stalls (933-2901) which includes matching roof panels, doors and interior truss work. Your new model will be right at home alongside the Machine Shop (933-2902), Modern Coaling Tower (933-2903), Sanding Tower (933-3182), Steel Water Tank (933-3043), and Cinder Conveyor and Ash Pit (933-3181) as well.

In many bigger cities, the terminal was part of the railroad's shop complex, which can be modeled with the Backshop (933-3039) and Car Shop (933-3040).

For more ideas to detail your scene, ask your dealer, visit [walthers.com](http://walthers.com) or see the latest Walthers HO Scale Model Railroad Reference Book.

For additional prototype history and information on turntables, see "The Locomotive Merry-Go-Round" by James Alexander Jr. in the July 1995 issue of *Trains* magazine. Your local library may also have copies of older Railroad Maintenance Cyclopedias, which provided basic information on turntables and other facilities.

## INSTALLATION ON YOUR LAYOUT

Your new turntable has been carefully assembled and tested to provide years of enjoyable operation. Please take a few minutes to look over the parts, read these instructions

and study the drawings before starting.

Your new turntable drive should be powered from its own power pack, sold separately. Check the output of the transformer with a voltmeter before making any electrical con-

nections. The drive operates best at 15 Volts AC or DC, 500mA; a minimum of 12 Volts is required, but total output must not exceed 19 Volts AC (RMS) or DC.

## 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. The zero reader is mounted directly below a mounting boss; be sure to provide clearance in your bench-

work for the reader too.

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. 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.

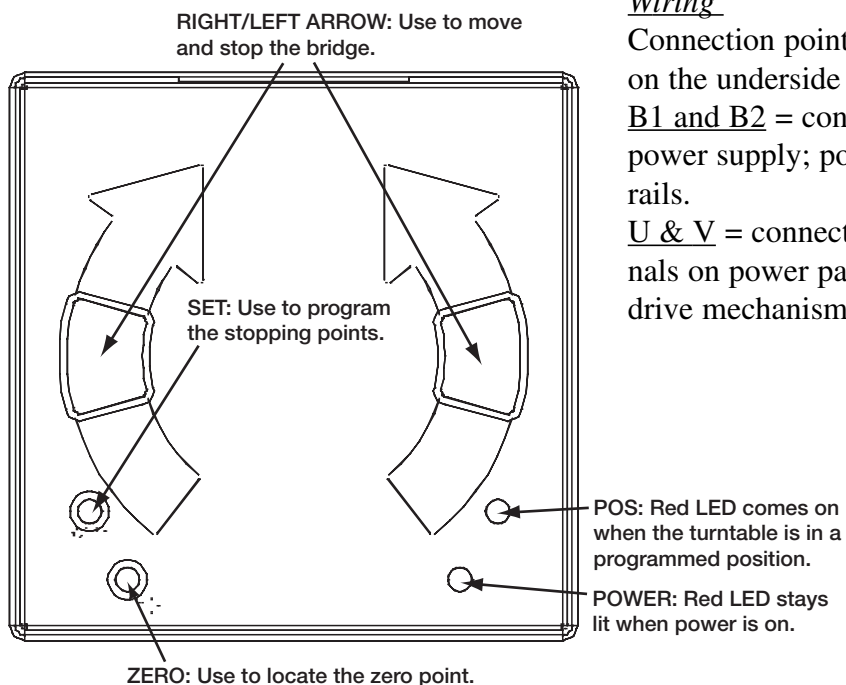
## INSTALLING THE CONTROL BOX

This unit is used to program and operate your turntable. As noted above, we suggest a dedicated power pack be used as a power

supply. Do not attempt to run the turntable at this time.

The control box can be used as-is, or flush-mounted on the surface or side of your layout. Simply remove the four screws from the back to

remove the front panel. Cut a mounting hole with the template, place the front panel in the opening and reattach the back.

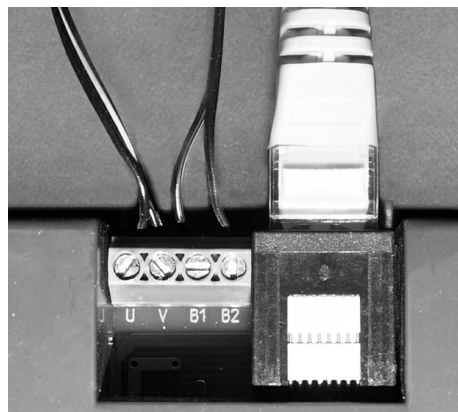


### Wiring

Connection points are marked on the underside as follows: **B1 and B2** = connect to rail power supply; powers bridge rails.

**U & V** = connect to AC terminals on power pack; powers drive mechanism.

All wires are secured using the small screw terminals. Plug in the large gray cable from the indexing unit (located beneath the pit) into the port on the side of the control box.



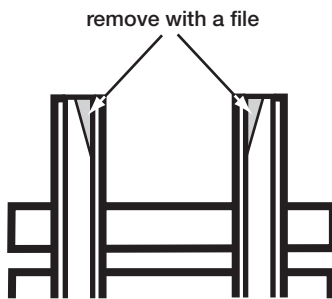
## INSTALLING SERVICE TRACKS

With the pit in place, you can install service tracks. The indexing can be programmed for up to 60 different stopping positions so you can add tracks almost anywhere around the pit – but remember, don't install working tracks in the "NO TRACK" areas.

The bridge is 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).

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 below).



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. Before installing the bridge, thor-

oughly 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 as shown at the middle of the bridge — don't glue it down, leave it removable for track cleaning and maintenance.

## PROGRAMMING YOUR TURNTABLE

### Initializing the Turntable

Begin by plugging in the power pack. With the power pack turned off, press the SET and ZERO buttons down at the same time. Now, turn on the power and hold both buttons for four to five seconds. When the POWER light stays on, the unit is ready to use. Press the ZERO button until the POWER light flashes, then release. The turntable will move to the zero point.

### Programming New Stopping Positions

1) Move the bridge from the zero point to the first track you'd like to program by pressing and releasing either ARROW button.

Two stop positions are programmed into the unit for testing at the factory. *Don't remove these*

*until you have programmed two or three of your own tracks!* You can also use these to test the operation of your unit at this time – simply press and release either the LEFT or RIGHT ARROW keys. The bridge will move in the direction selected until it locates a factory setting. The table will over-run the stop position slightly when turning counterclockwise — this is normal — then back slowly into position.

2) Move the bridge to your first desired position and stop the table about 1/8" (3mm) from the right hand rail. (If you go too far, press and release the LEFT ARROW button; touch and release either ARROW button to stop, then move the bridge counterclockwise with the RIGHT ARROW button.)

3) Hold the SET button and gradually inch the bridge rails into a 90° alignment by pushing and releasing the RIGHT ARROW key as

needed to move the bridge counterclockwise — use the outside edges of the rails as a guide to check that all rails are perfectly aligned.

(If the POS light comes on before the track is aligned correctly, clear the setting by pressing and holding the SET key until the POS light goes off.)

4) When the tracks and bridge are aligned to your satisfaction, press and hold the SET button until the POS light comes on to show the stop position is programmed into the memory.

Repeat steps one through five for each stopping position.

**Important Note:** Although tracks may be directly across from each other, you **must** program a separate stopping position on each end of the bridge.

## 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 find the zero point before resuming operation. Just press the ZERO button until the POWER light flashes, then release.

## NORMAL OPERATION

Turn on the power pack; the unit is ready to use when the red POWER light stays on. Use either ARROW button to turn the bridge: press and hold the button to pass stopping

positions. As the bridge approaches the desired service track, release the ARROW key. The bridge will overrun the stop position slightly, then align itself. When the unit stops, the POS indi-

cator will light; move your loco using your standard throttle. From time to time, "zero" the turntable to maintain your programmed positions.

## 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.

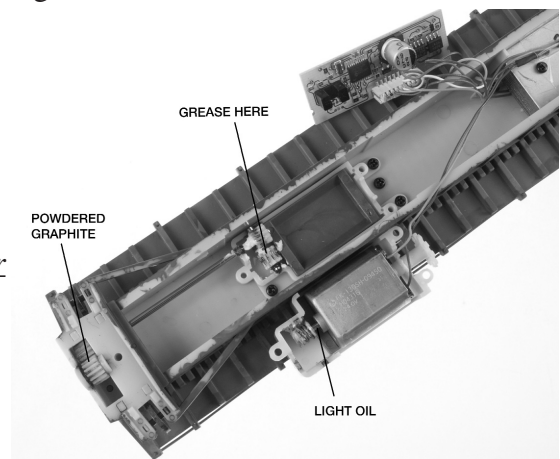
Use contact cleaner to clean the wipers and slip rings on the bottom of the bridge, should they get dirty.

**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 cog-wheel. **Important Note:** Any time the bridge is removed from the pit,

you must find the zero point before resuming operation. Just press the ZERO button until the POWER light flashes, then release. The bridge will turn clockwise until it locates the zero point and stop. You're now ready to resume operation using the ARROW buttons to move the bridge.

**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 for electric motors to the bearing. Apply light gear lubricant to the gear train. Apply powdered graphite to the final drive. Reverse these steps to reassemble — make sure the motor leads are positioned as shown.



## TROUBLESHOOTING

**POS LIGHT ON CONTROL BOX FLASHES RAPIDLY;** You may be trying to program a new position too close to an existing one; it will also flash if you attempt to program more than 60 positions.

**TO FIND THE ZERO POINT;** Press the ZERO button until the POWER light flashes – then release. The bridge will turn clockwise until it locates the zero point. **NOTE:** turn off any other

infra-red sources in the room when searching for the zero point.

**TO REMOVE SETTINGS;** Move the bridge to the desired position and stop — the POS indicator will come on. Press and hold the SET button for a few seconds until the POS light goes out. (*After you have programmed two or three new positions, clear the factory test settings the same way.*) To clear all programmed settings and reset the factory test positions; turn the power pack off. Hold

down the SET and ZERO and turn the power pack back on.

**IF BRIDGE IS SLIGHTLY OUT OF ALIGNMENT WITH TRACKS** (usually all in one direction); Re-zero the turntable by holding down the ZERO button until the POWER light flashes; the turntable will then re-zero itself and restore your programmed stopping positions.