



Built-ups

HO Scale Structure Built-up 933-2840

90' 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

Sized to fit an average layout, this 90' unit is typical of turntables installed by many roads at division point terminals where smaller engines were changed and serviced. It will easily accommodate engines up to 12-3/8" (30.9cm) long, such as a 2-8-2 or 4-6-2 which was the big steam power on many lines, as well as most diesels.

Most turntables were built in conjunction with a Roundhouse such as #933-3041, which is sized for smaller motive power and holds engines up to 13" (32.5cm) long. This basic kit builds a three-stall structure, but its modular design makes it easy to enlarge, up to a full-circle, by combining kits. (NOTE: If you will be using your turntable with this building, for proper alignment, the front edge of the Roundhouse Baseplate (part #1) must be located 5-3/16" (131.7mm) from the edge of the Turntable Pit.)

Engines coming in from the road would also be inspected and serviced at the Wood Coaling Tower (#933-2922), or at a Concrete Tower such as #933-2903 or #933-3042, Sanding Tower (#933-3182), Steel Water Tank (#933-3043) or Wood Water tank (#933-3531) and Cinder Conveyor and Ash Pit (#933-3181).

For more ideas to detail your scene, ask your dealer, visit walthers.com on-line or see the latest Walthers HO Scale Model Railroad Reference Book.

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.

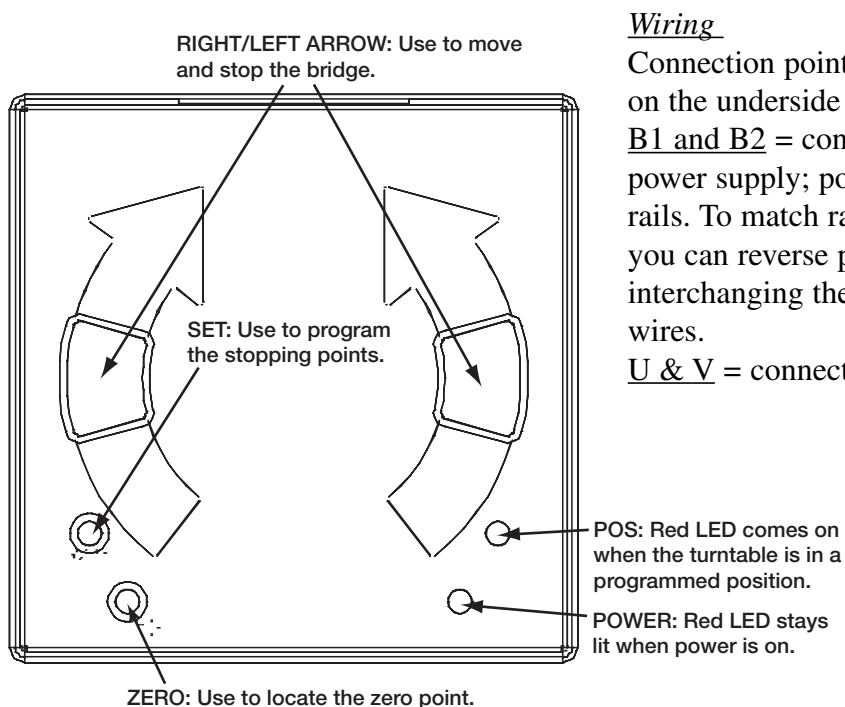
INSTALLING THE CONTROL BOX

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, place the front panel in the opening and reattach the back.



Wiring

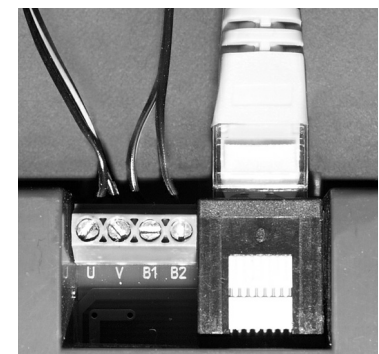
Connection points are marked on the underside as follows: **B1 and B2** = connect to rail power supply; powers bridge rails. To match radial tracks, you can reverse polarity by interchanging the B1 and B2 wires.

U & V = connect to AC termi-

nals 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.



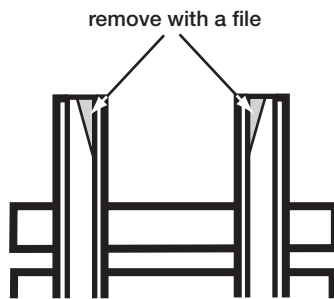
INSTALLING SERVICE TRACKS

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. Next, thoroughly vacuum the entire pit

to remove all debris from the center pivot point, the ring rail and gear track. Remove the protective blue tape from the contact and the zero reader. 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.

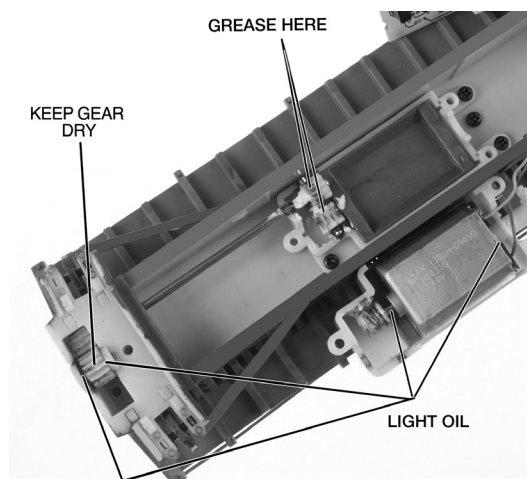
Use contact cleaner to clean the wipers and slip rings on the bottom of the bridge, should they get dirty.

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 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.



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 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.

IF THE BRIDGE STOPS AND WON'T MOVE; The contact wipers need to be cleaned. Remove the bridge and clean them with a good contact cleaner such as CRC 2-26.

IF THE BRIDGE WON'T STOP ON THE ZERO POINT; The small Zero Point Reader openings on the end of the bridge and side of pit may be blocked. Remove any dirt or other debris from the opening.

IF THE BRIDGE STOPS BETWEEN PROGRAMMED POSITIONS; proper contact is not being made between the Wipers and the Bridge Center Post. Check the Control Box. If the power is turned on and the POWER light is on but the POS light is off, or both lamps are off and there is power to the control box, the contacts on the Bridge Center Post and Wipers in the Pit need cleaning or adjusting:

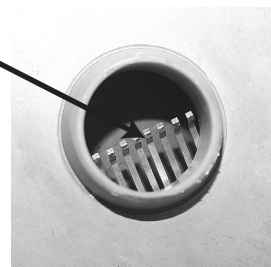
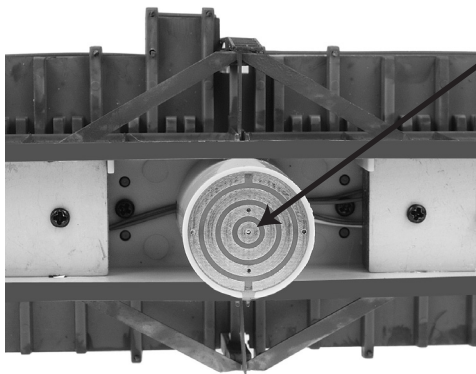
To Clean: Remove the Bridge from the Pit. Gently clean the contacts on the Bridge Center Post and wipers inside the Pit as shown. Use a soft cotton swab and a good contact cleaner such as CRC 2-26 then wipe dry. Reinstall the Bridge in the Pit.

Reset the Bridge: Press ZERO 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.

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.

Gently clean the contacts on the Bridge Center Post and the wipers inside the Pit.



TO REPAIR OR REPLACE BRIDGE HANDRAILS

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 pulling apart the bottom about 1/8" — the bottom of the arch is press fit over four pins.
- 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 find the zero point before resuming operation. On your control box, simply press the ZERO button until the POWER light flashes, then release. The bridge will turn clockwise until it locates the zero point; you won't need to reprogram the stopping points, as they're stored in the memory. NOTE: Turn off any other infra-red sources in the room when searching for the zero point.