

Glide Switches 800 Series

These instructions are for our 800 Series Glide Switches product line, as used with TC/American Crane 325 Series Patented Track rail. See the Index to locate the appropriate pages for the model of switch being used.

DANGER

Lifting Operations

Installation of equipment such as TC/American Crane's Switches requires performance of overhead lifting operations. Proper lifting procedures involve training, skills and experience beyond the scope of this document. Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following safety practices appropriate for the lifting operation being employed.

DANGER

Overhead Mechanical Assembly

Persons performing installation and assembly of overhead equipment must use caution while lifting, assembling and adjusting components. These operations are frequently conducted from manlifts or platforms that require specific knowledge, training and operation skills beyond the scope of this document.

Access to the floor below the work area must be restricted to reduce the potential of personnel injury due to falling objects.

Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following appropriate safety practices.

DANGER

Electrical Equipment Installation, Service and Maintenance

Persons performing installation, service or maintenance activities on, near, or with equipment that is electrically powered are exposed to electrical hazards that could result in serious injury or death if proper precautions are not followed. Before performing such work, disconnect the electrical power source for the system at the disconnect device and lock it out, following appropriate Lockout/Tagout (LOTO) procedures, to prevent electric power from being applied while work is being performed.

All persons must use safe work practices appropriate to the electrical system, and follow all workplace procedures and policies. This requires specific knowledge, equipment and training beyond the scope of this document. Workplace supervisors are responsible to assure that all persons under their supervision are properly trained, properly equipped, and are following appropriate safety practices.

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Switches

TC/American Crane offers several models of switches, for all models and sizes of our rail. Selection of the appropriate model depends upon the layout of the monorail, the load to be carried, powered travel or hand pushed, service duty class, and other factors.

Switch Model Numbers:

(general information for all switches)

- The first character(s) of the Model Number identifies the rail size used with this switch:
 - 2 = 200 Series Rail
 - 3 = 325 Series Rail
 - 4 = 400 Series Rail
 - 45 = 450 Series Rail
- The second character(s):
 - S = Switch, non-electrified (without conductor bars)
 - ES = Switch, electrified (with conductor bars)
- The intermediate numbers identify a model series, i.e.:
 - 260 = 200 Series, 2-way glide switch
 - 693 = 600 Series, 2-way glide switch
 - 833 = 800 Series, 3-way glide switch
 - 2710 = 2000 Series, Wye glide switch
 - Etc.
- The next number, or number and letters, may identify the switch as follows:
 - L = Left Hand configuration (or sometimes "LH")
 - R = Right Hand configuration (or sometimes "RH")
 - Y = Wye configuration
 - H = "H" Series rail (in 800 and 2000 Series Switches, 3-way and wye configurations)
 - LH = "H" Series rail (in 800 and 2000 Series Switches, 2-way configurations, left hand)
 - RH = "H" Series rail (in 800 and 2000 Series Switches, 2-way configurations, right hand)
 - 12 = 12" (for 2000 Series only)
 - 12H = 12" deep, "H" Series rail (for 2000 Series only)
 - 14H = 14" deep, "H" Series rail (for 2000 Series only)
 - Etc.

NOTE: See the appropriate section(s) of these instructions for assembly, installation and maintenance details specific to your Switch model.

NOTE: For a specific parts breakdown of the Switch provided with an order, see the drawings provided with that shipment and the Switch Section of TC/American Crane Systems Catalog.

General Installation Instructions

Before beginning the installation:

- When shipment is received, remove all shipping materials and visually inspect all parts for damage. Repair and/or replace if necessary.
- Check packing lists against materials received and identify all parts.
- Gather all TC/American Crane drawings, plus any vendor equipment drawings, and keep in a secure location for reference during installation and start-up, and to give to end user for future reference.
- Store all equipment in a clean, secure area prior to final assembly.

Installing Switches in a Monorail System:

- Check layout drawings for any notes.
- TC/American Crane Glide Switches are shipped fully assembled and ready to install.
- Begin a monorail installation at one switch location (determine if a particular switch is at a critical location) and work out from there, adding straight rails and curves sequentially.
- Refer to *Suspension* section of this document for notes about primary and auxiliary suspension methods. Use care when installing and leveling switches so that switches are uniformly and equally suspended, with no twisting of the switch frame.
- Switches must be installed in alignment with the planned monorail layout. Establish a reference line for the system and take dimensions from there, rather than the building (building may not be accurate and square). Adjust switch suspension so the straight rail of the inner frame (or the centerline of a Wye switch) is aligned with the centerline of the incoming and/or outgoing straight rails.
- If there is more than one switch in a system, add the second and additional switches as the installation progresses. Do not install all switches and then try to force rails into place between them.
- Install all switches, curves and rails snug until all is in place. Then shift and adjust as necessary to assure that straight rails enter and exit the switch straight, and that curves are properly formed and flow smoothly from the switch. See *Treadline and Rail Alignment Adjustment Notes* section of this document.
- Make any adjustments for switch rail height, switch throw and tread alignment. See *Switch Adjustments* section of this document. Adjustments and shimming are a necessary part of normal installations.
- For switches with electric or air operating mechanisms, see the separate *Air Operated Switch Installation Instructions* or *Electric Operated Switch Installation Instructions*.
- Make any final switch leveling adjustments (adjust nuts on threaded rods, or use shims at bolted connections). Use care when installing and leveling switches so that switches are uniformly and equally suspended, with no twisting of the top plate or slide channels of the switch.
- Tighten all suspension components.
- Rod suspended switches must be rigidly sway braced for stability. Sway brace materials are by others.

Initial Start-Up:

- After lubrication, operate all switches several times through full switch throw in all directions.
- Verify proper latching at each outgoing rail or curve location.
- Run trolleys through the switches to check clearances and smooth transition.
- Verify that safety stops on the switch properly contact the trolley to prevent it from falling off when the switch rail is not aligned to an outgoing rail.
- NOTE: These switches are not designed to be thrown (moving portion of the switch repositioned) with a load on the rail of the inner frame.

Terminology Notes

The following instructions use these unique terms:

- “Outer Frame” - describes the portion of the switch that is suspended from the building, and is the “fixed” or “non-moving” portion of the switch.
- “Inner Frame” - describes the portion of the switch with straight and curved rail segments that slide from side to side.
- “Right Hand” or “Left Hand” references are based upon looking at the switch from the incoming rail side (single rail leading to the switch).

800 Series Glide Switches

Non-Electrified

(with 3RL13-22 rail on the inner frame)

3S-830-R	2-way, RH	Figure 1
3S-831-L	2-way, LH	Not Shown
3S-833	3-way	Not Shown
3S-832	Wye	Not Shown

Non-Electrified

(with 3RH13-30 rail on the inner frame)

3S-830-RH	2-way, RH	Not Shown
3S-831-LH	2-way, LH	Not Shown
3S-833-H	3-way	Figure 2
3S-832-H	Wye	Not Shown

Electrified

(with 3RL13-22 rail on the inner frame)

3ES-830-R	2-way, RH	Not Shown
3ES-831-L	2-way, LH	Not Shown
3ES-833	3-way	Not Shown
3ES-832	Wye	Not Shown

Electrified

(with 3RH13-30 rail on the inner frame)

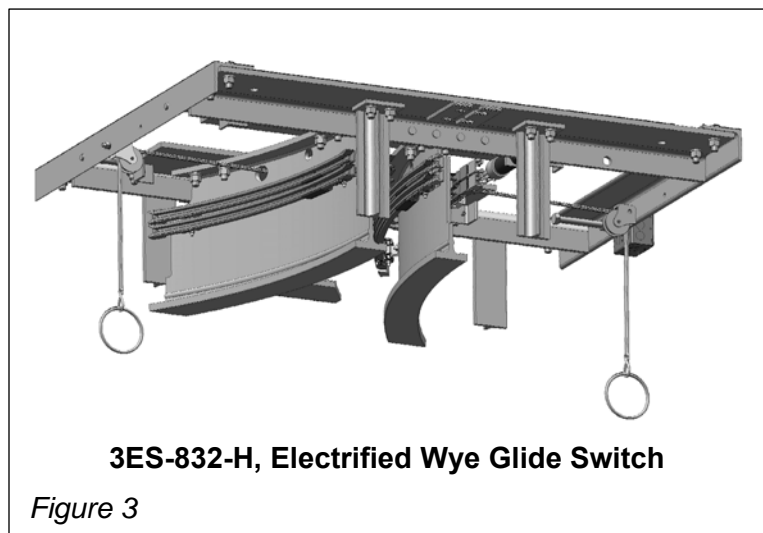
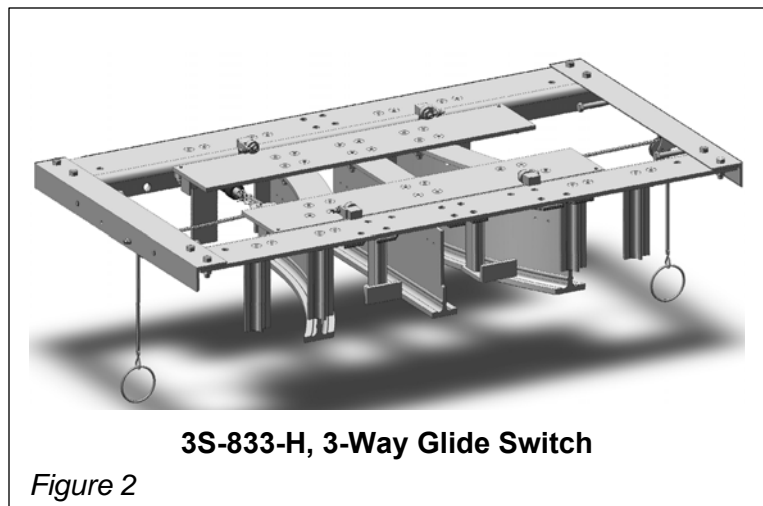
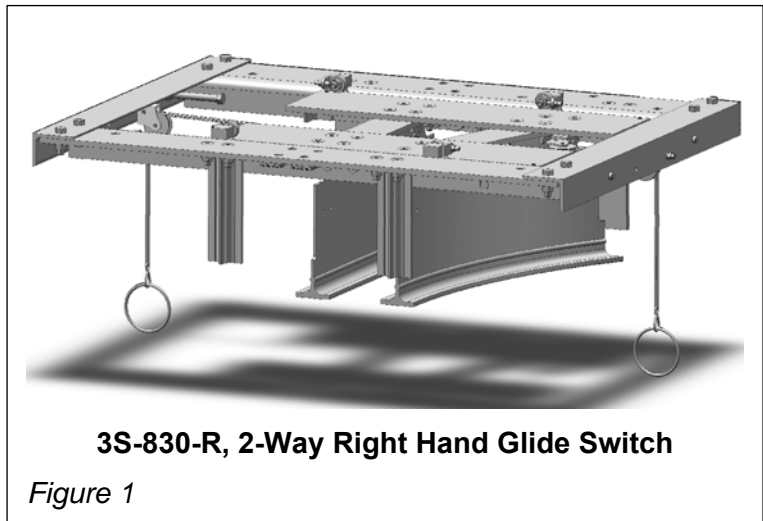
3ES-830-RH	2-way, RH	Not Shown
3ES-831-LH	2-way, LH	Not Shown
3ES-833-H	3-way	Not Shown
3ES-832-H	Wye	Figure 3

Figure 1: typical non-electrified 800 Series 2-Way Glide Switch.

Figure 2: non-electrified 800 Series 3-Way Glide Switch with Shielded Channel-Bar conductors factory mounted and wired.

Figure 3: electrified 800 Series Wye Glide Switch.

All switches may be provided with either Shielded Channel-Bar or Shielded Figure-8 Bar electrical conductors.



Non-Electrified vs. Electrified Switches:

General construction, installation, operation and adjustment are the same for both types of switches.

Non-electrified 800 Series Glide Switches are provided with conductor bar mounting holes in the web of the rail on the inner frame, but do not have any conductor bar or wiring harness provided. Electrified 800 Series Glide Switches are a non-electrified switch with the addition of electrical components.

For more detail, see the TC/American Crane Systems Catalog and drawings provided with the shipment.

Conductor bars: are factory wired to a junction box mounted on the frame of the switch. Building power must be provided to each switch and field connected at the junction box. Building power must be separately provided to incoming and outgoing runs of electrified straight and curved rails. See Figures 24 and 25.

For installation of electrical conductor bar systems, see the TC/American Crane *Shielded Channel-Bar Electrical Conductor Installation Instructions* or *Shielded Figure-8 Electrical Conductor Installation Instructions*.

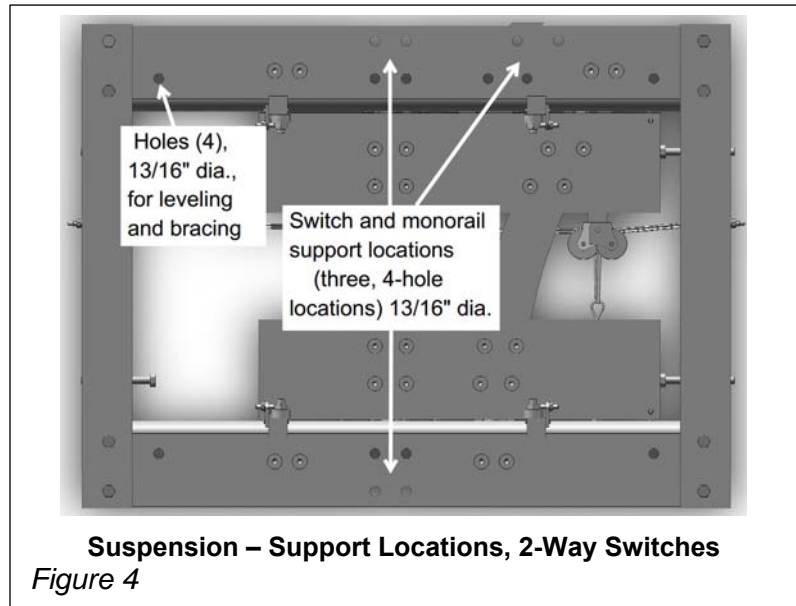
Switch Support / Suspension

Locations, see Figures 4, 5 and 6:

800 Series Glide Switches must be supported at each of the locations shown. Use 3/4" hanger rods, or bolts to support members, at each of the suspension points.

Use care so the switch frame is equally supported at each location and the frame is not twisted or bent.

Note: straight sections of rail and curves are attached to the outer frame angle of 800 Series switches, using the same holes as used for switch support. See Figures 7, 8, 11 and 12.



Leveling, All Switches: allow space above switch for leveling via threaded hanger rods, or by shims if bolted connection.

Use care when leveling so that the switch frame is not twisted or bent.

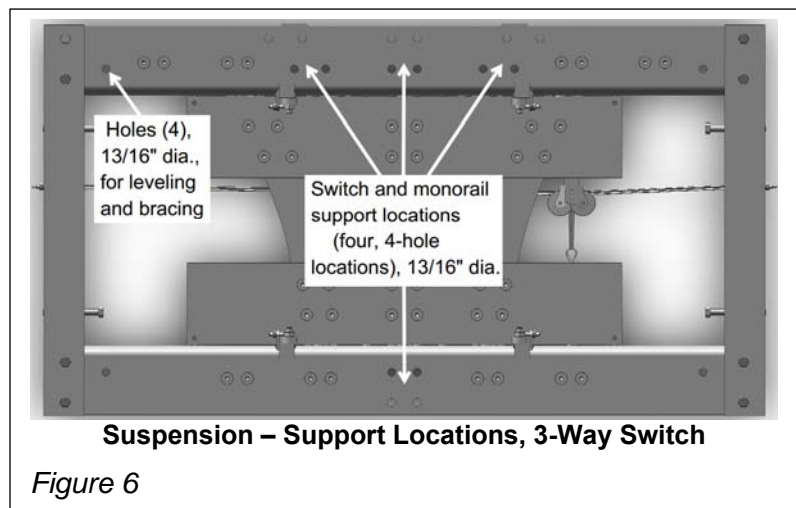
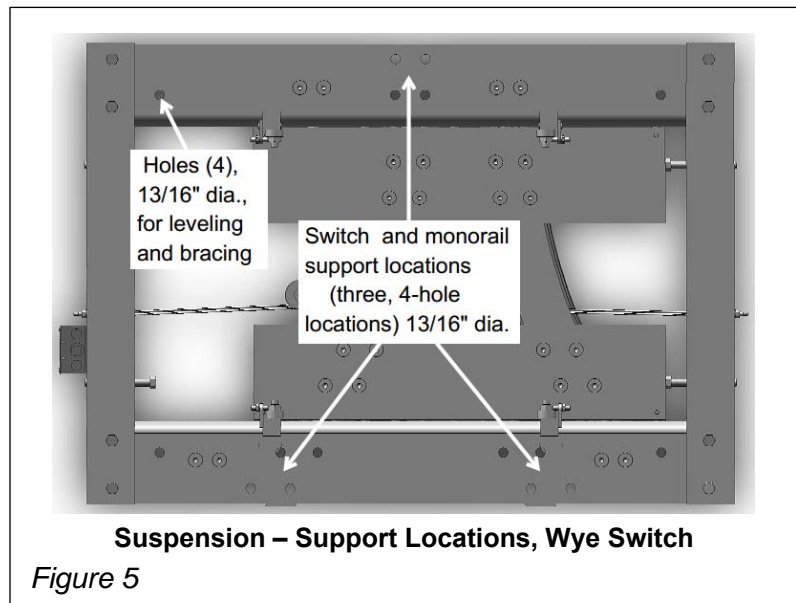
Switch Bracing: rod suspended switches must be sway braced, laterally and longitudinally. Sway brace materials are by others.

Attach bracing to switch at the 4 holes in the top plate of each switch, as shown in Figures 4, 5 and 6.

Use care so the switch frame is equally braced at each location and the frame is not twisted or bent.

Monorail and switches must be aligned and leveled before bracing is installed. Do use bracing to force the rail or switch into alignment. Bracing must not carry any of the vertical load at a suspension point.

See Suspension section of TC/American Crane systems catalog for pipe brace fittings and clamps, or fabricate components locally.



Monorail and Curve Suspension and Connection to Switches

Figure 7: typical connection of straight monorail and switch curve to outer frame of 800 Series glide switch (Right Hand, non-electrified shown), using the same holes as used for switch support.

Support hardware not shown.

Note: suspension hanger rods and hardware, or bolts for “direct bolt” suspension, are by others.

The straight and curved rail sections shown in Figure 7 are the same depth as the straight and curved rail sections within the switch (on the inner frame). If the incoming or outgoing rails are deeper than the inner frame rails (sometimes required to meet ECL), they must be “step cut” or “notched” as required (see Figure 9, typical).

Note: for Equivalent Center Load (ECL) and calculations, see the Rail Section and the Engineering Section of the TC/American Crane Systems Catalog.

Note: see Figure 17 for installation of shims to align rail treadlines.

Figure 8: typical straight rail “end prep” for incoming and outgoing straight rail sections on an 800 Series Switch.

Note: top flange is trimmed as shown to facilitate shim installation.

Figure 9: typical “step cut” or “notch” in end of rail. This reduces height of rail where it connects to the 800 Series Switch to same height as rail on the inner frame of the switch.

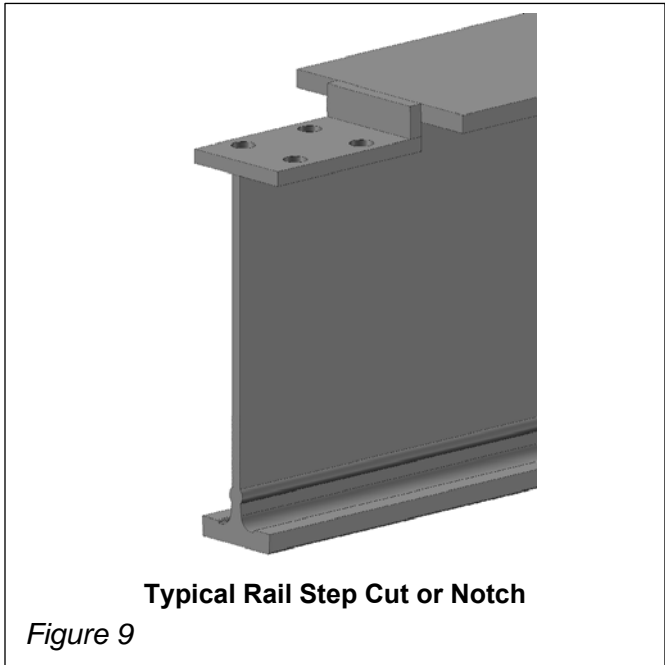
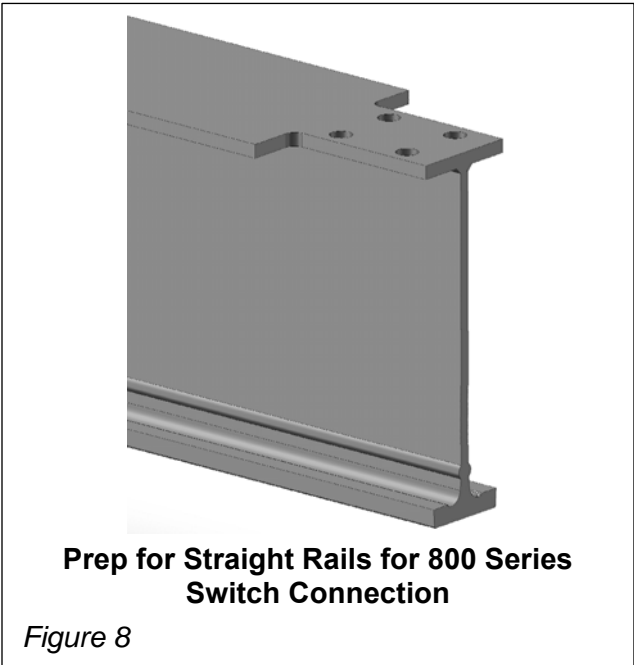
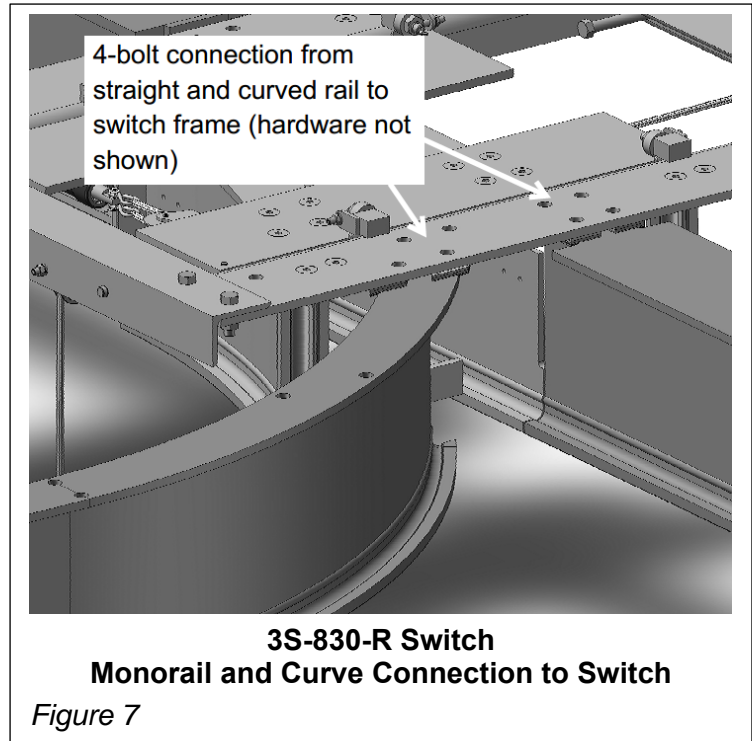


Figure 10: typical connection of switch curve to outer frame of 800 Series Glide Switch (Right Hand, non-electrified shown).

Figure 11: Typical end prep of curve at connection to switch. Curve is attached using the same holes as used for switch support.

Hardware to connect curved rail to switch, and for switch support, is not shown.

Note: suspension hanger rods and hardware, or bolts for “direct bolt” suspension, are by others.

Switch Curves Matched to Switch Assembly

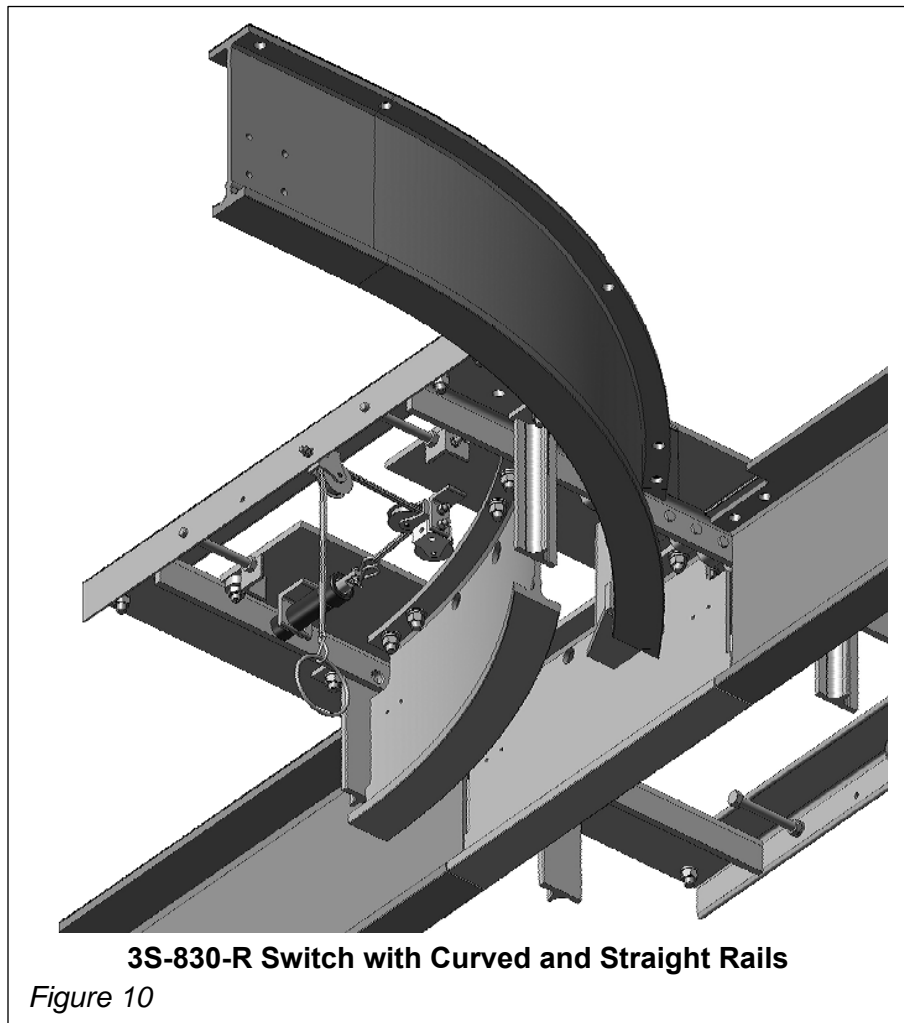
Curved rails for the switch inner frame and for the outgoing switch curve are formed in the shop as a single piece, then cut as required. Top flange of the switch curve is match drilled to switch frame, and must be installed as a complete pair in the field.

Systems with multiple switches and curves are provided with match marks on the bottom of the tee section of the curve and the curved section of the inner frame. Matched pairs of switches and curves must be installed together.

Field Replacement of Switch or Curve

If a switch curve is being field replaced independently of the switch, it will be provided less the top flange holes. Place switch curve into position, align the tee section, transfer punch the switch to the top flange of the curve, and then drill to fit.

If a switch is field replaced independently of the switch curve, it will be provided less the holes for mounting the curve to the switch. Place switch curve into position, align the tee section, transfer punch the existing curve top flange holes to the frame angle of the switch, and then drill to fit.



Switch Latching and Operating Mechanisms

All 800 Series Glide Switches are operated (unlatched, moved and re-latched) by pulling on one of the C-4 twist link chains and rings connected to the switch latch bolt assembly. Each chain is approximately 12' long and is routed from the latch through sheaves mounted on the inner and outer frames (see Figures 1, 2 and 3).

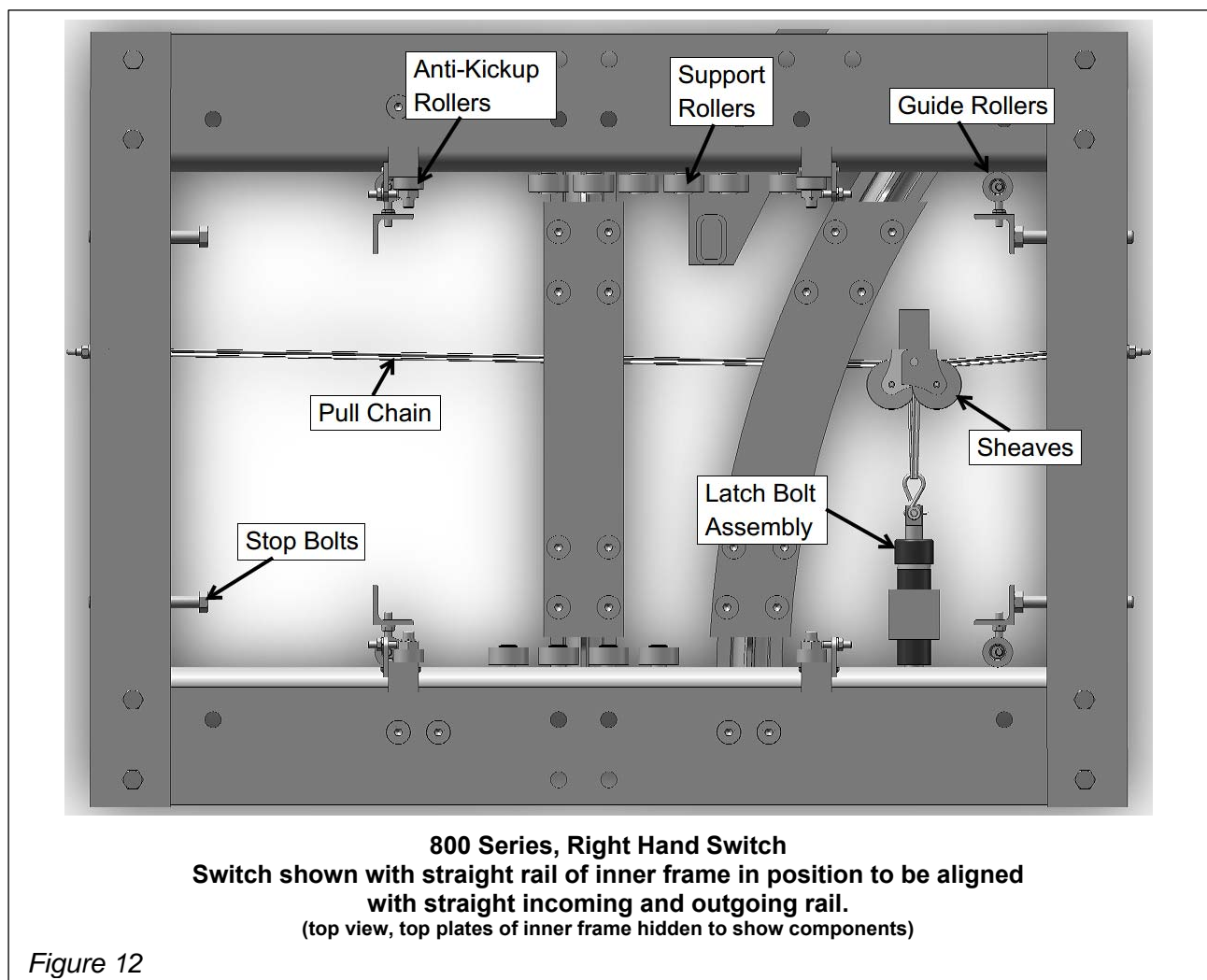
Chain length may be adjusted as needed to meet the height and layout of the monorail system (by others, unless special ordered). Additional sheaves may be furnished locally to route the chains as required.

2-Way and Wye Glide Switch Latch Operation

(ref: Figures 12 and 13)

Right Hand Glide Switch,

- A. Operation from Straight to Right Hand (RH) Curve: Pull the ring and chain on the left side of the switch (direction to which you want the inner frame to move so the curved rail will move into position with the incoming straight rail and outgoing switch curve). Pulling the chain retracts the latch bolt and disengages the nose of the latch bolt from an alignment and locking hole in the outer frame angle.



Continued pull on the rope moves the inner frame in the direction of pull until it contacts the stop bolts (see Figures 12 and 13). Releasing pressure on the chain allows the spring inside the latch bolt assembly (see Figures 14A and 14B) to push the nose of the latch bolt into an alignment hole. This locks the switch into position with the outgoing curved rail. Switch operation to the Right Hand Curve position is complete, and normal monorail use may proceed.

B. Operation from RH Curve to Straight:
opposite of "A" above.

Left Hand Glide Switch

Similar operation as Right Hand Glide Switch.

Wye Glide Switch

Similar operation as Right Hand and Left Hand Glide Switches.

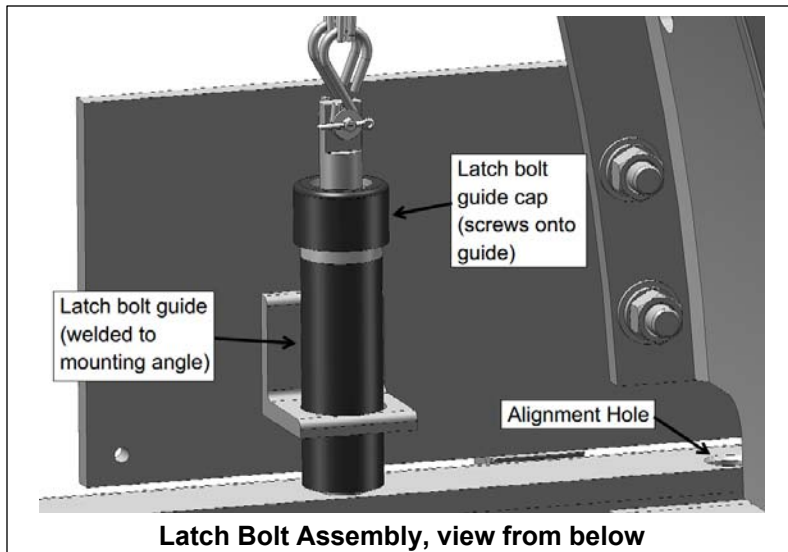
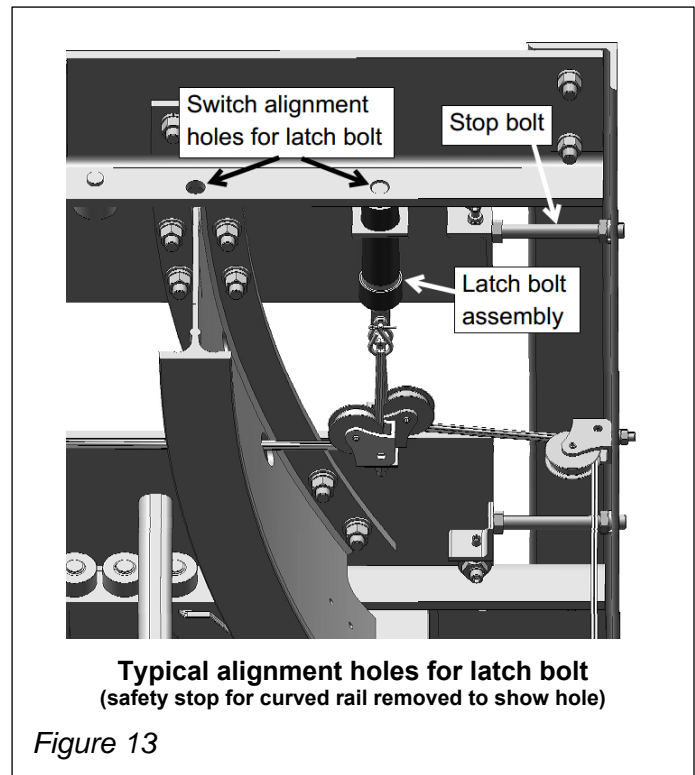


Fig. 14A

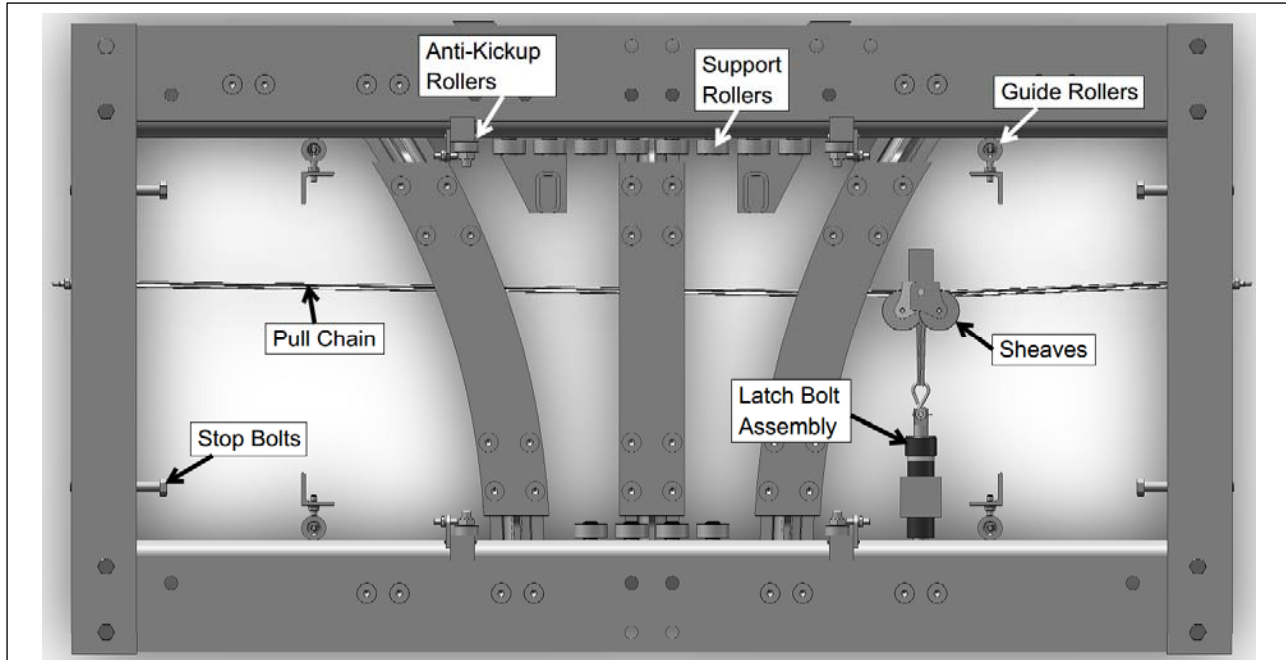


Fig. 14B

3-Way Glide Switch Latch Operation

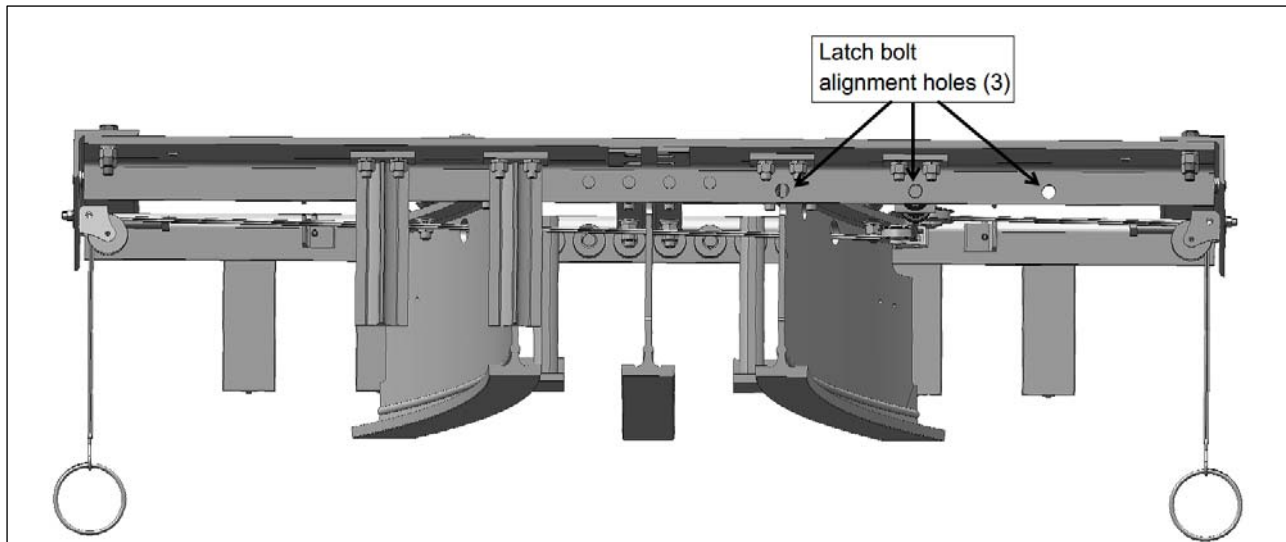
(ref: Figures 15 and 16)

Repositioning the inner frame of a 3-Way switch from center rail alignment (as shown in Figure 15) to alignment with either the RH or LH out-going curve is similar to the operation described for the 2-Way and Wye Glide Switches. The difference for a 3-Way switch is that there is no hard stop to align the rail at the center (straight through) position. Operators of the switch will need to learn to “feel” the latch bolt slide along the inner face of the frame angle until it aligns with the hole for the center position (see Figure 16).



800 Series, 3-Way Switch
Switch shown with straight rail of inner frame in position to be aligned
with straight incoming and outgoing rail.
 (top view, top plates of inner frame hidden to show components)

Figure 15



3-Way Switch, Alignment Holes for Latch Bolt
 (safety stops removed for clarity)

Figure 16

Motorized or Air Powered Operating Mechanisms

All switches shown in this installation instruction sheet are shown with manual (pull chain) operating mechanisms to shift the inner frame of the switch.

Electric motor operated or air powered mechanisms are available. See the separate *Air Operated Switch Installation Instructions* or *Electric Operated Switch Installation Instructions*.

Glide Switch Adjustments

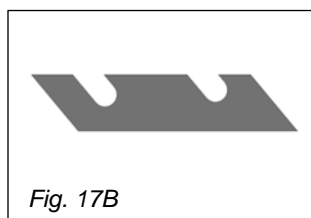
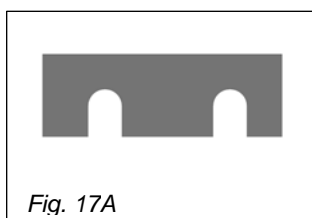
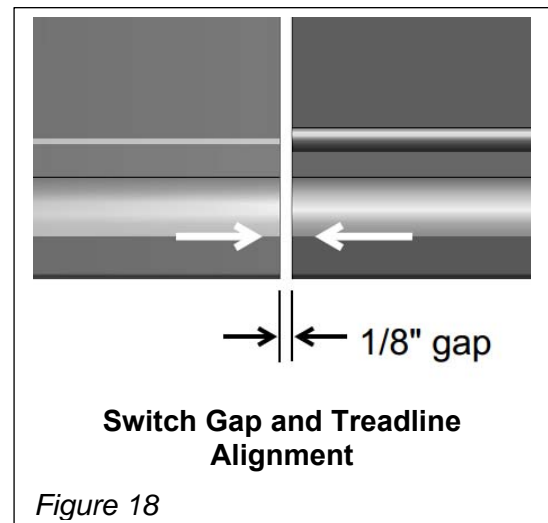
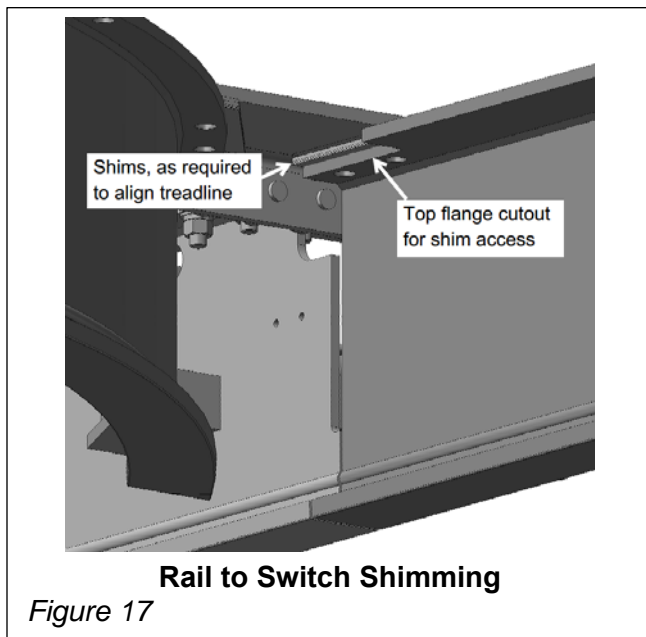
A. Incoming and Outgoing Straight and Curved Rail – Treadline Alignment and Switch Gap

Treadline alignment: adjust by shimming as required between the switch outer frame angle and top flange of rail (design allowance for $\frac{1}{4}$ " of shimming). See Figure 17, typical for straight and curved rail. Support hardware not shown.

The riding tread (treadline) of the switch rail and the monorail or curve must be at the same elevation (see Figure 18). Monorail beams can vary slightly in overall height, and the tee section thickness and width may also vary within tolerances. After shimming to best alignment, it is allowable to grind and feather very slightly at the adjoining rails to assure a smooth transition.

Note: 10, 16 and 20 gauge finger shims (see Figures 17A, straight shim, and 17B, curve shim) are provided with each switch for each hanger point. Note that it may be necessary to install more shims to one side of the web than the other to compensate for any "crowning" or "unlevel top flange" of the rail. A properly shimmed rail results in the tee section aligned and level to the adjoining tee of the switch.

Switch gap: see Figure 18. Maximum gap $\frac{1}{8}$ " at incoming and outgoing side of switch. Adjust via $\frac{13}{16}$ " holes in the switch frame angle vs. $\frac{3}{4}$ " diameter hanger rods or bolts. Also, check for proper adjustment of inner frame guide rollers.



B. Glide Switch Throw

2-Way and Wye Switches:

Figures 12, 13 and 19. Full throw to left and right is adjusted via stop bolts on the side angles. The stop bolts contact stop brackets on the switch inner frame. When the switch is fully thrown, rail on the inner frame must be in line with the corresponding outgoing straight or curved rail, and nose of the latch bolt must be aligned with a hole in the outer frame angle.

To adjust throw, loosen nut on stop bolt (see Figure 19) and position the inner frame fully left or right to align the nose of the latch bolt with a corresponding alignment hole in the frame angle (see Figure 13, typical). With the nose of the latch bolt fully engaged into a corresponding alignment hole, adjust stop bolt to contact the stop bracket on the inner frame. Tighten locking nut. Repeat process for other side.

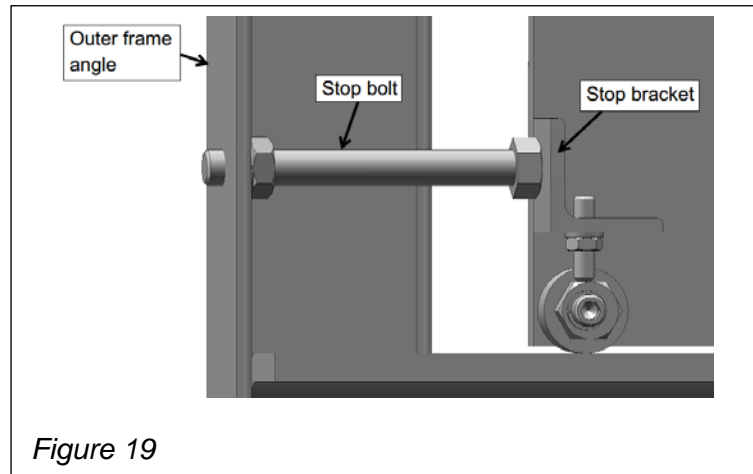


Figure 19

3-Way Switches:

Figures 15 and 19: Same process for full left and right as described for 2-Way and Wye Switches. The center alignment is factory set by the alignment of the latch bolt alignment hole in the outer frame angle and the support holes for the center rails.

Some alignment adjustment may be possible in the position of the outgoing rail via the $\frac{3}{4}$ " support hardware in $\frac{13}{16}$ " holes (see Figures 4, 5 and 6).

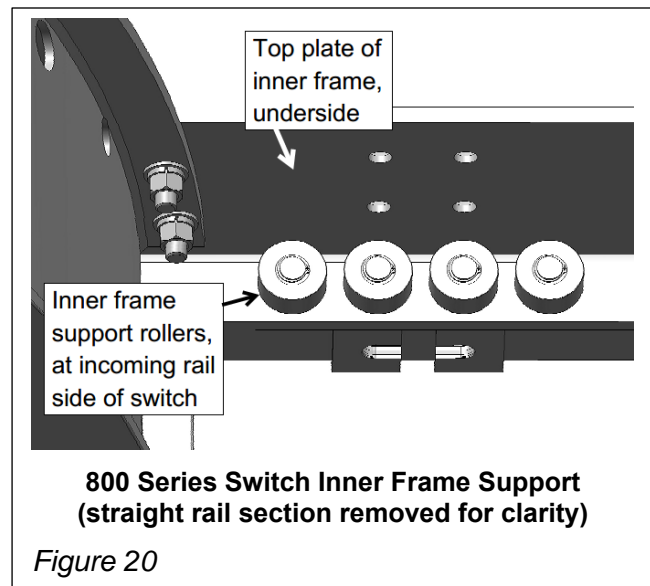


Figure 20

All Switches: Operate switch through several cycles of movement to be sure the throw is properly adjusted. The nose of the latch bolt should easily and positively engage the hole in the slide angle.

The inner frame of all 800 Series Glide Switches rides on a series of support rollers, as shown in Figure 20, at both the incoming and outgoing side of the switch (see Figures 12 and 15). The position of these rollers is not adjustable.

C. Anti Kick-up Rollers

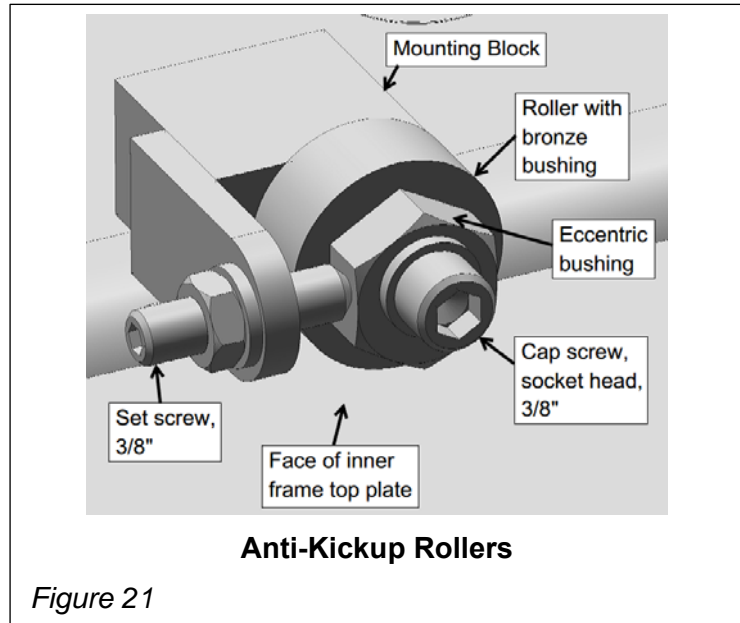
Figures 7, 12, 15 and 21: On all 800 Series Glide Switches, a set of four Anti-Kickup Rollers ride across the top surface of the inner frame plates. These prevent the inner frame from tipping (kicking up) when a loaded trolley enters or exits the switch.

Anti-kickup rollers are factory set. Rollers should just clear the top of the inner frame plates and not exert any down pressure when the switch is not loaded. Maximum clearance between roller and inner frame plate is 1/16"

For field adjustments (see Figure 21):

- Loosen and back off set screw
- Loosen cap screw
- Rotate eccentric bushing to adjust clearance of roller to inner frame plate
- Tighten cap screw
- Reset set screw against a flat face of the eccentric bushing, and tighten
- Operate switch through complete throw to verify clearances. Readjust if required.

Verify that roller paths are clean and clear.



D. Inner Frame Guide Rollers

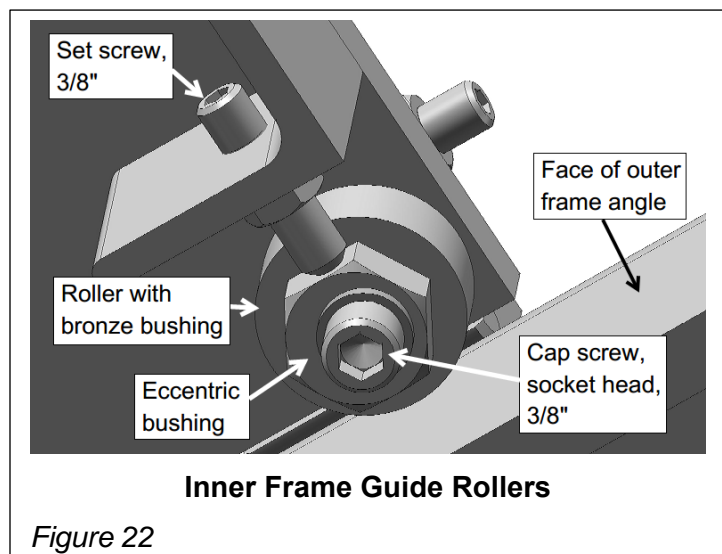
Figures 12, 15 and 22: On all 800 Series Glide Switches, a set of four Inner Frame Guide Rollers are used to guide the inner frame between the angles of the outer frame. Rollers should just brush against face of inner frame angle during throw of switch. If set too tight, the rollers may bind against the switch frame angle. If set too loose, the inner frame will not hold gap clearances and may "cock" in the outer frame, making operation difficult.

Guide rollers are used to:

- prevent the inner frame from "cocking" when the chains are pulled to move the inner frame
- adjust the switch gap
- hold the inner frame in position when a trolley with a load passes through
- may slightly adjust alignment of inner frame rails to incoming and outgoing rails (see Notes for Treadline and Rail Alignment Adjustment).

Field adjustment (see Figure 22):

- Loosen and back off set screw
- Loosen cap screw
- Rotate eccentric bushing to adjust clearance of roller to frame angle
- Tighten cap screw
- Reset set screw against a flat face of the eccentric bushing, and tighten
- Operate switch through complete throw to verify clearances. Readjust if required.



Verify that roller paths are clean and clear.

E. Removing Inner Frame from Switch Assembly

If necessary, the inner frame of Glide Switches can be removed from the outer frame by removing an outer frame angle from one side of the switch and disengaging the latch mechanism.

On electrified switches, also disconnect electrical wiring.

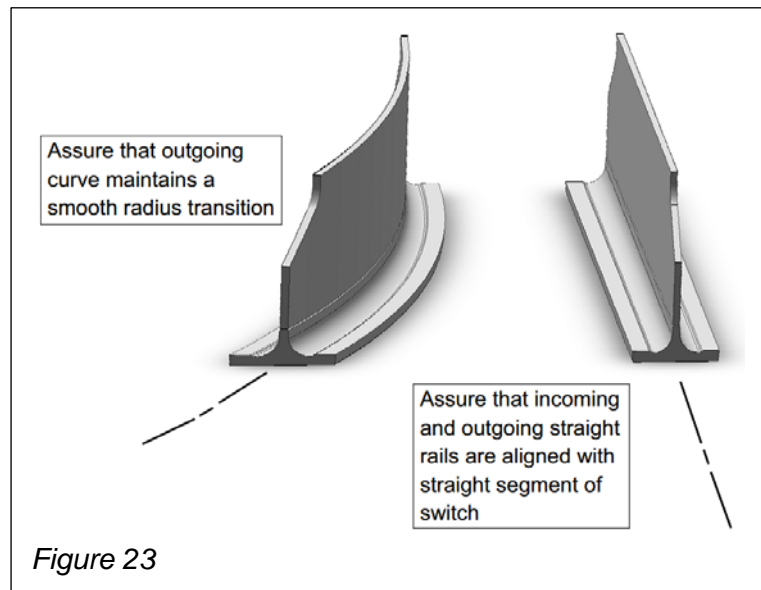
F. Notes for Treadline and Rail Alignment Adjustment

Minor misalignment of the treadline and edges of the switch inner frame rail to the treadline and edges of the outgoing rail or curves may be caused by various manufacturing tolerances in fabrication of the rail or assembly of the switch, various switch adjustments, and proper alignment of the incoming and outgoing rails relative to the switch and general monorail layout. See Figure 23.

Satisfactory final adjustments and alignment must be considered to be the result of the fine art of installation.

For alignment, check the following:

- straight rail of the monorail system must leave the switch in a straight line along the monorail path. If switch is not suspended in line with the planned monorail path, or if the straight rail of the monorail enters or leaves the switch at an angle, the edges of the straight rail will not be aligned with the edges of the switch rail and may cause an excessive gap between rail ends.
- relocate or adjust suspension of the outgoing straight rail to hold it in proper alignment.
- verify that curved rails make a smooth transition from the switch to the monorail path. Relocate or adjust suspension of the outgoing curved rail to hold it in proper alignment.
- inner frame guide rollers may need to be adjusted to center the inner frame within the outer frame. Verify that inner frame rolls parallel to the outer frame throughout the full throw distance. See Figures 12, 15 and 22.
- verify that the switch is supported securely, rigidly, aligned and level, whether by hanger rods, bolts or other support structure. Rod suspended systems (switches, curves and rail) must be braced to prevent movement. The monorail system must be fully aligned and leveled before installing bracing. The frame of the switch must not be twisted by unequal tightening of hanger rods, unequal shimming or a support structure that can flex. The switch must not be forced into position or alignment.



Satisfactory final alignment of the straight and curved monorail sections to the switch will likely be the result of a combination, and perhaps a best compromise, of all of the installation and switch adjustment procedures.

All of the above are a part of normal installation. Installers must take care to properly suspend, align, shim and adjust all points within the switch and monorail components, recognizing that they have the final responsibility and ability to provide the customer with a properly operating system.

Typical Wiring Harness Diagrams

TC/American Crane 600 Series Electrified Switches are factory wired from a power supply junction box to the conductor bars mounted on the straight and curved rail sections on the switch inner frame. See Figures 24 and 25 below. Refer to drawings provided with the switch for more details.

Building power must be brought to the junction box at each switch location, plus separately to the conductor bars mounted on the monorail sections. The number and spacing of power feeds will depend upon overall monorail length, total amperage load on the system, and voltage drop. For more information, see the Engineering Section of the TC/American Crane Systems Catalog. Consult a qualified electrician for layout of the power distribution system.

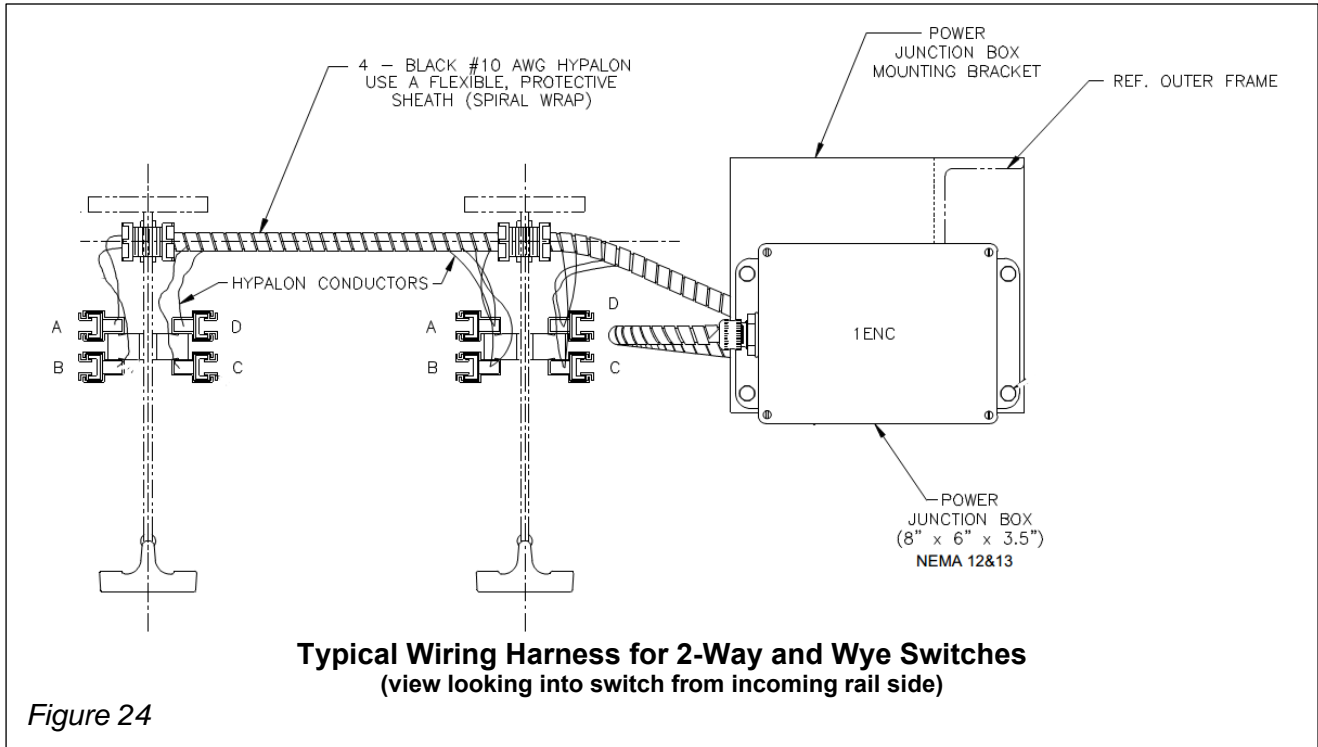


Figure 24

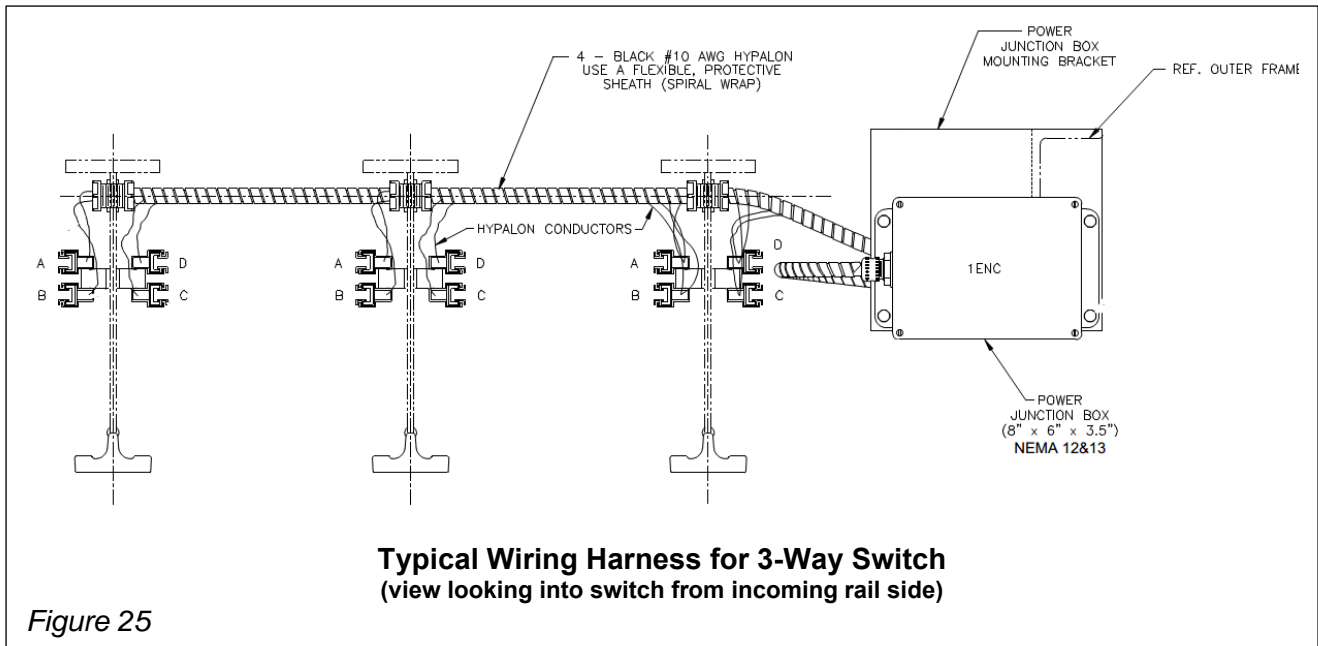


Figure 25

Lubrication

General Lubrication Information

1. Latch Bolt Assembly

Lubricate the latch bolt assembly upon installation. Work a small amount of grease into body of the latch guide where the latch bolt slides within it; also where the tail of the latch bolt goes through the guide cap.

2. Guide Rollers

All guide rollers have oil impregnated bronze bushings and should not require lubrication. However, if rollers do not turn freely, check for foreign material on the eccentric bushing for the anti-kickup rollers and inner frame guide rollers, or on the pins of the inner frame support rollers. Clean as required and/or apply light oil.

Lubrication Frequency

Recommended approximately each 6 months for normal operation, more frequently for heavy useage. Each application must be evaluated on its own merits, including: service duty, number of operations per shift, and operating environment.

Maintenance personnel should develop and maintain a record of all monthly inspections. Frequency of lubrication may be adjusted to match operational demands, based upon inspection reports.

Recommended Switch Lubricants

(for standard industrial operating environments)

Latch Mechanism
Rollers

Good grade multi-purpose lithium grease
Good grade light machine oil.

Note: TC/American Crane does not normally make a "brand name" recommendation for lubricants. Each customer may have a preference based upon many legitimate reasons. TC/A recommends to use a "good quality" lubricant and, when one is chosen, to not mix them.

Adjust lubrication type and frequency based upon the operating environment and customer requirements.

NOTE: before lubricating equipment that will be taken onto a customer's site, check with the customer for any preferences on brands or types (to maintain customer stock uniformity of products used and records maintenance).

NOTE: have Material Safety Data Sheet (MSDS) info available for any lubricants brought onto a work site.

NOTE: verify with customer that lubricants being used will not have an effect upon any production processes.