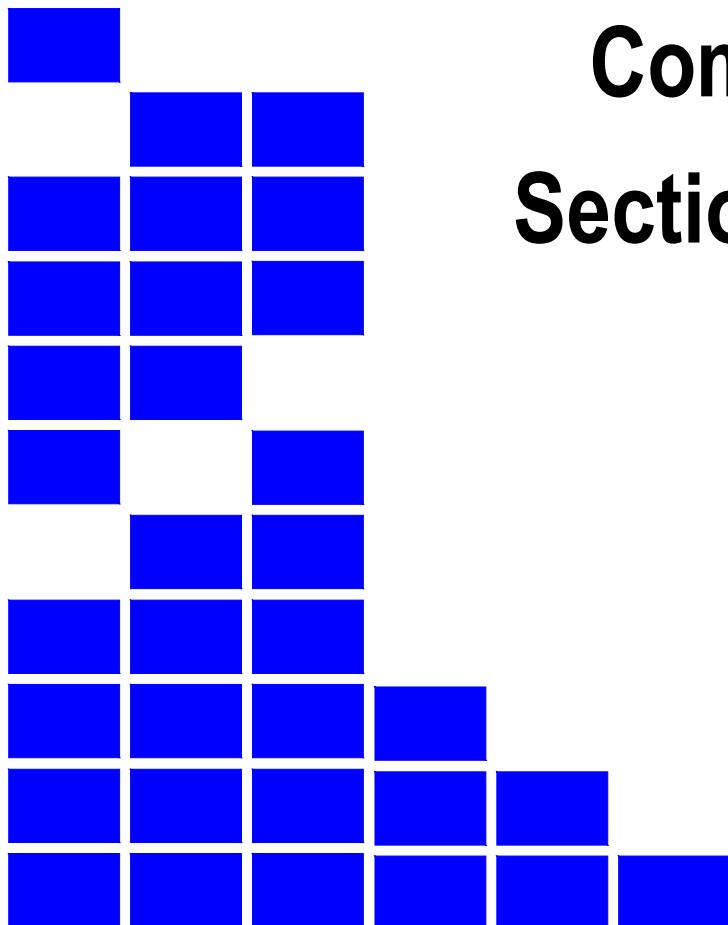




Installation Instructions



**Commercial
Sectional Doors**

C.H.I. COMMERCIAL OVERHEAD DOOR INSTALLATION INSTRUCTIONS

These instructions will show you how to install a C.H.I. Commercial door. They are for the mechanically experienced person who has proper tools to perform the job. They are not meant to infringe upon or supersede any State or County building codes or safety regulations.

Included in this booklet are instructions for installing Standard Lift, High Lift, Vertical Lift and Low Headroom doors mounted on Wood or Steel Jambs.

Table of Contents

| | | |
|--|-------|-----------|
| Before You Begin... | ----- | this page |
| Opening Preparation | ----- | page 3 |
| Installing Your New Door | | |
| Sections and Hardware | ----- | page 6 |
| Struts | ----- | page 8 |
| Track | ----- | page 11 |
| Springs | ----- | page 17 |
| Low Headroom Details | ----- | page 25 |
| Supplemental Instructions | | |
| Adjustable End Bearings | ----- | page 30 |
| Incline Track | ----- | page 31 |
| Spring Bumper | ----- | page 32 |
| Bottom Fixtures | ----- | page 33 |
| Heavy Reinforced Bottom Fixture | ----- | page 34 |
| Reinforcing End Hinge Shim Details | ----- | page 35 |
| Duplex Spring Retainer Bearing Installation | ----- | page 36 |
| Cee-Strut Installation | ----- | page 37 |
| Double Lock Bar | ----- | page 38 |
| Full View Section with Lock | ----- | page 40 |
| 1-1/2" Doors with 3" Track | ----- | page 41 |
| Reverse Angle Track Wood Attachment Detail | ----- | page 42 |

Before You Begin...

Read and be sure that you completely understand all of the steps and warnings as outlined prior to beginning installation!

Safety First. Safety warnings are clearly marked with a **Warning!** symbol. Observe all guidelines and warnings given in the instructions during installation and then review and post Maintenance and Warnings at back of booklet near the door for future reference.

If you plan to use an existing door opener, check it for current safety features. This is the time to update your operator to assure yourself of the safest door system possible.

Warning! **If you are removing an existing door, only an experienced person should release the spring tension. The spring is the most dangerous part of your door. It is charged with force at all times and this force must be properly and safely released before removing any part of your existing door. Serious injury or death may result if you attempt to loosen or remove any part of the spring system whether it is attached to the door or to the wall before releasing all of this spring force.**

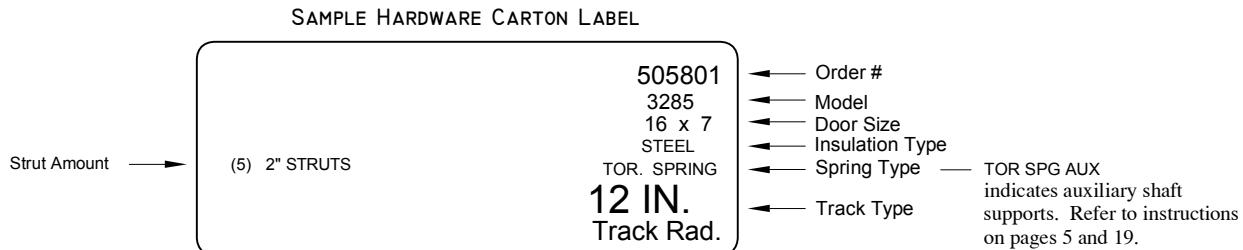
Warning! **Wear protective gloves and eye wear when working on your door.**

Warning! **Strong winds or gusts can cause a partially installed door to fall.**

Opening Preparation

Check opening size and door size.

Door size and type are marked on the hardware carton label and spring tag. Check this information and compare it with the actual opening size. Also check side room, headroom and back depth dimensions.

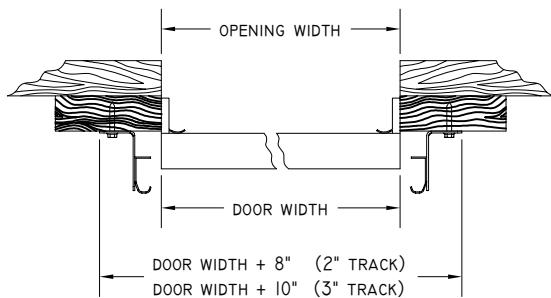


OPENING REQUIREMENTS

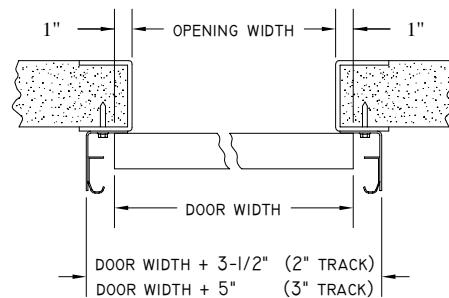
| TRACK MOUNTING | OPENING WIDTH | OPENING HEIGHT |
|----------------|---------------------|---------------------|
| BRACKET MOUNT | SAME AS DOOR WIDTH | SAME AS DOOR HEIGHT |
| ANGLE MOUNT | SAME AS DOOR WIDTH | SAME AS DOOR HEIGHT |
| REVERSE ANGLE | DOOR WIDTH MINUS 2" | SAME AS DOOR HEIGHT |

SIDE ROOM REQUIREMENTS

(FOR LOW HEADROOM SEE PAGE 25)



BRACKET MOUNTED TRACK
ANGLE MOUNTED TRACK: LEG OUT
(WOOD JAMBS SHOWN)



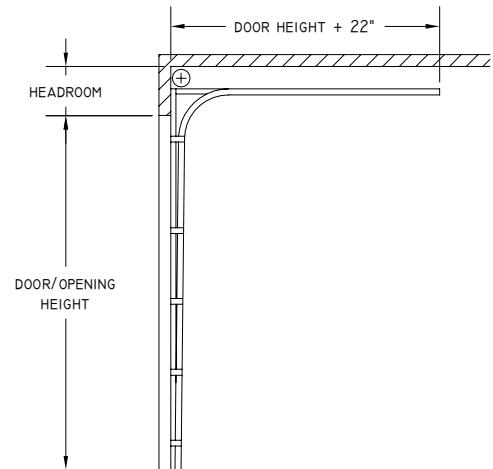
REVERSE ANGLE TRACK: LEG IN
(STEEL JAMBS SHOWN)

WHENEVER POSSIBLE ALLOW MORE SIDE ROOM FOR EASE OF INSTALLATION.

HEADROOM AND BACK DEPTH REQUIREMENTS FOR STANDARD LIFT DOORS

(for low headroom see page 25)

| drum | spring id | 12" radius | | 15" radius | |
|------|-----------|--------------|----------|--------------|----------|
| | | shaft center | headroom | shaft center | headroom |
| 4-8 | 1-3/4" | 9-1/2" | 12" | 12-1/2" | 15" |
| | 2-5/8" | 9-1/2" | 12" | 12-1/2" | 15" |
| | 3-3/4" | 11" | 14" | 12-1/2" | 15" |
| 4-12 | 1-3/4" | 9-1/2" | 12" | 12-1/2" | 15" |
| | 2-5/8" | 9-1/2" | 12" | 12-1/2" | 15" |
| | 3-3/4" | 11" | 14" | 12-1/2" | 15" |
| 5-18 | 1-3/4" | 11-1/2" | 15" | 12-1/2" | 16" |
| | 2-5/8" | 11-1/2" | 15" | 12-1/2" | 16" |
| | 3-3/4" | 11-1/2" | 15" | 12-1/2" | 16" |
| | 6" | 13-1/2" | 17" | 14-1/2" | 18" |
| 8-32 | all | n/a | n/a | 16-1/2" | 21" |

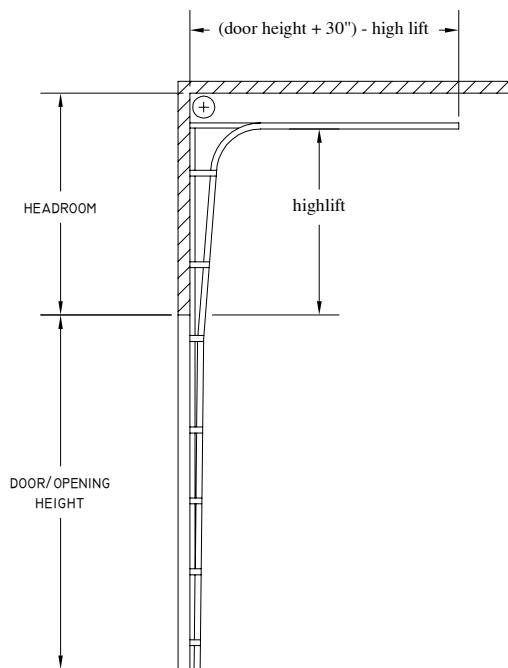


MINIMUM VALUES SHOWN. WHENEVER POSSIBLE ALLOW MORE HEADROOM FOR EASE OF INSTALLATION.
ADD 2-1/2" TO HEADROOM IF YOU ARE USING A DOOR OPENER.

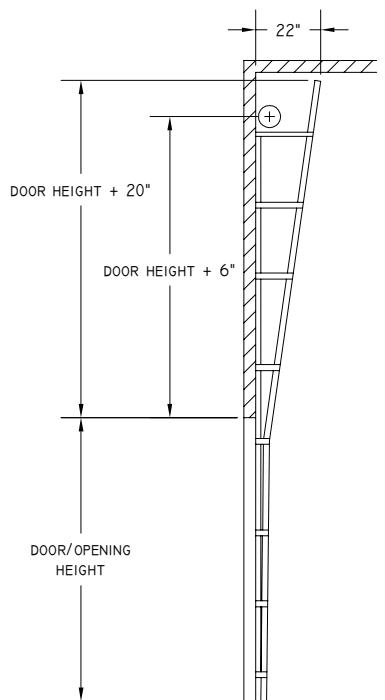
HEADROOM AND BACK DEPTH REQUIREMENTS FOR HIGH LIFT DOORS

| drum | shaft center | headroom |
|--------|--------------|----------|
| hl-54 | hl + 6" | hl + 10" |
| hl-120 | hl + 8" | hl + 13" |
| hl-164 | hl + 10" | hl + 16" |

add 1" to shaft center and headroom for 3" track.

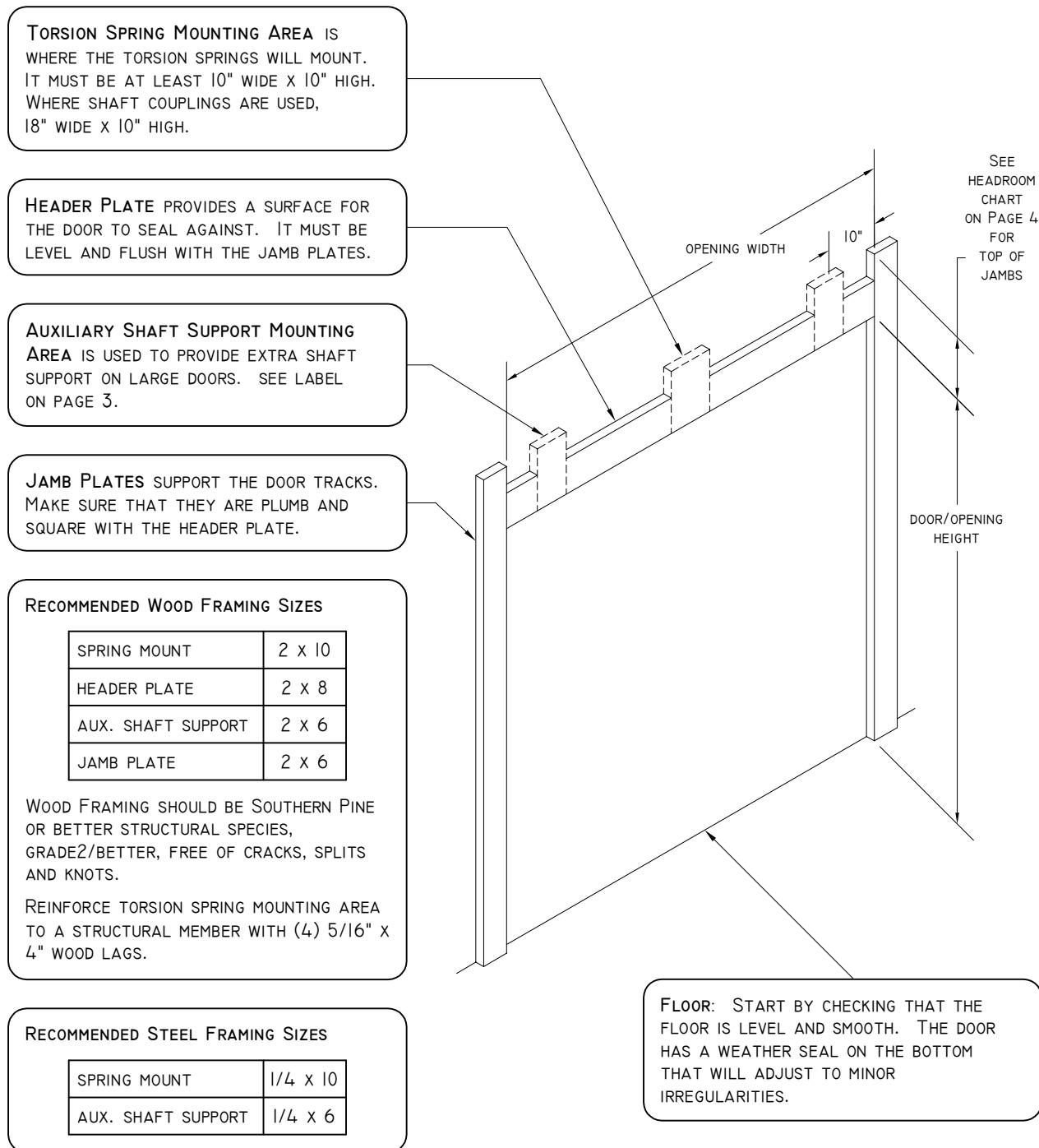


HEADROOM AND BACK DEPTH REQUIREMENTS FOR VERTICAL LIFT DOORS



After you have checked that the door will fit, prepare the opening.

It is very important that the opening is correctly prepared before installing tracks and springs. All mounting surfaces must be structural components and not covered with drywall, paneling or any other building material. The materials listed here are not supplied with the door.



✓ Warning! Attachment of the jamb plates, header plate and torsion spring mounting area to building framework must provide adequate support to sustain the weight of the door, track and spring assemblies as well as resistance to wind load forces and vibration caused by door operation.

Sections and Hardware

Attach hardware to bottom section.

The bottom section has weather seal attached to it. Set it on saw horses face down (the face is the outside of the door). Apply hardware as shown below. Refer to tag on the hardware carton to see if this door will have struts. If so, review pages 8 and 9.

STEP 1

SECTIONS ARE ATTACHED TO EACH OTHER WITH HINGES. FASTEN HINGES MARKED #1 TO TOP OF BOTTOM SECTION AT EACH STILE USING (2) 1/4" SHEET METAL SCREWS PER HINGE. MAKE SURE THAT THE TWO SLOTS ARE AT TOP OF HINGE. THIS ALLOWS FOR ADJUSTMENT WHEN STACKING SECTIONS. ATTACH EACH BOTTOM FIXTURE WITH (4) RED 1/4" SHEET METAL SCREWS.

STEP 2

INSTALL INSIDE STEP PLATE ON AN INTERMEDIATE STILE USING 1/4" SHEET METAL SCREWS.

STEP 3

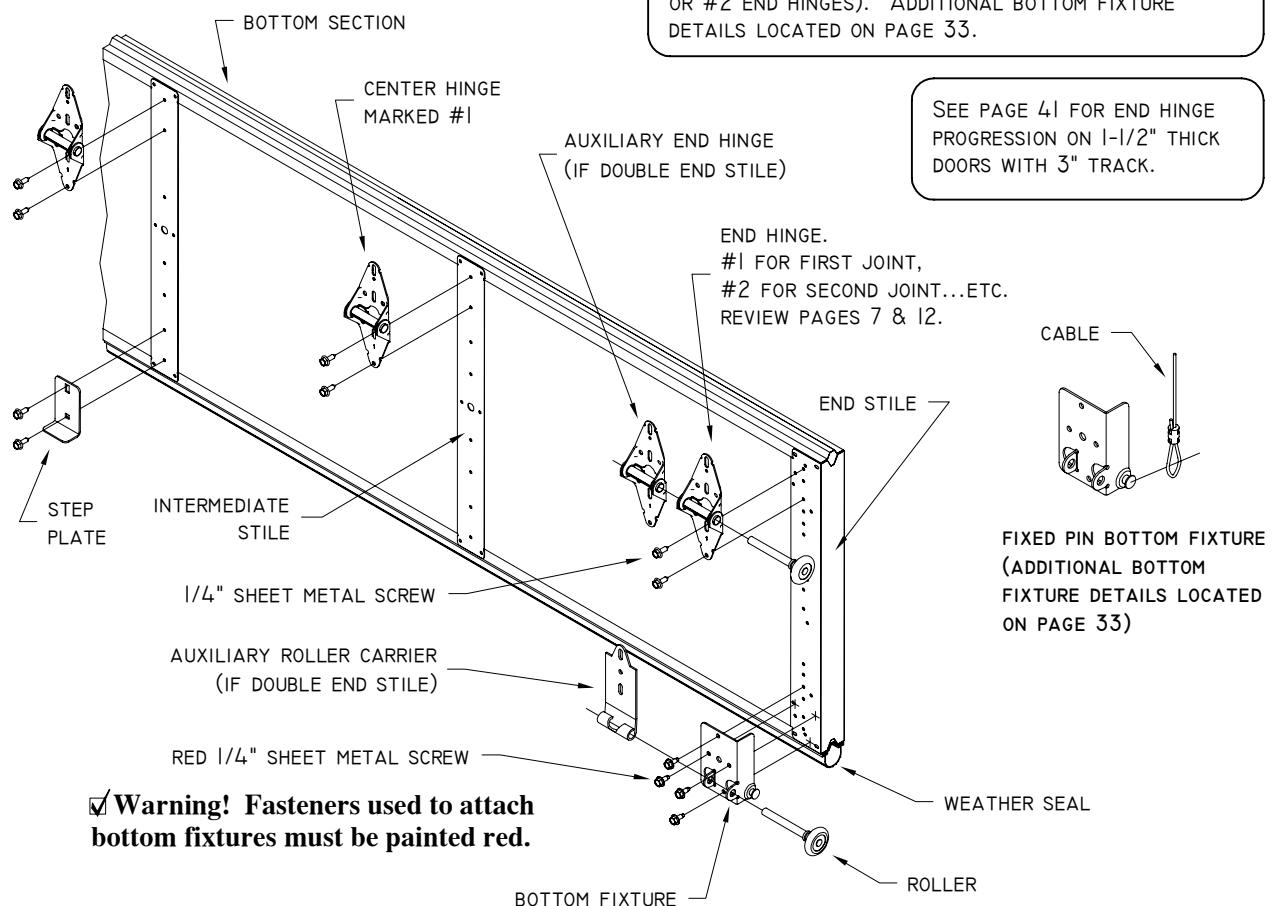
THE DOOR IS HELD IN THE TRACK WITH ROLLERS. INSERT ROLLERS INTO BOTTOM FIXTURES AND END HINGES.

STEP 4

THE DOOR IS RAISED AND LOWERED BY LIFT CABLES. ATTACH CABLES TO BOTTOM FIXTURES (ONE MOUNTED ON EACH SIDE OF THE BOTTOM SECTION). ADDITIONAL BOTTOM FIXTURE DETAILS LOCATED ON PAGE 33.

SPECIAL NOTE FOR 3" TRACK

THE END HINGES ON 3" TRACK START WITH THE #3 HINGES ON THE BOTTOM SECTION (THERE WILL NOT BE #1 OR #2 END HINGES). ADDITIONAL BOTTOM FIXTURE DETAILS LOCATED ON PAGE 33.



For low headroom doors see differences in bottom fixture design on page 26.

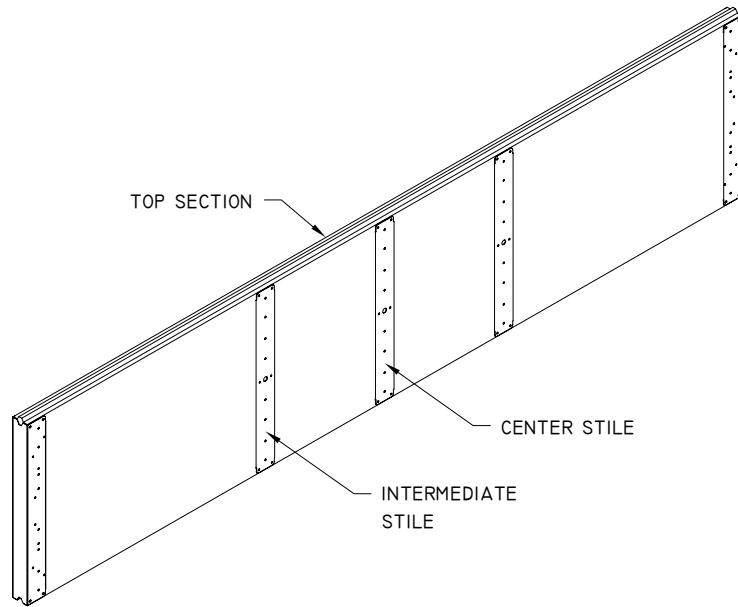
Selecting a top section.

Use a 24" high section when available.

If the door will be electrically operated, the operator must attach to a structural part of the section. Use the center stile for this purpose. When there is an odd number of panels a center stile is factory attached to the top section.

Sandwich type doors with an odd number of panels will not have a center stile; an operator mounting plate must be used. This mounting plate is not supplied with the door. Contact your C.H.I. door supplier.

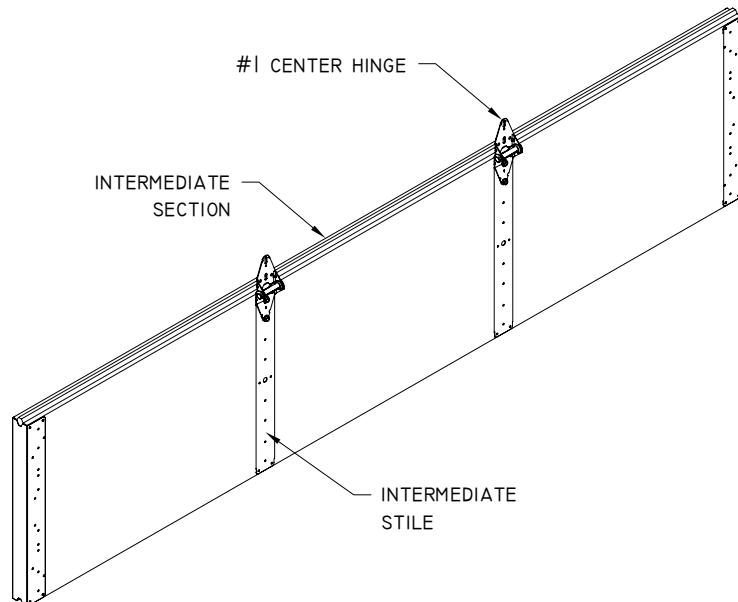
If a strut is required on this section, install it now (see pages 8 and 9).



Prepare remaining sections for stacking.

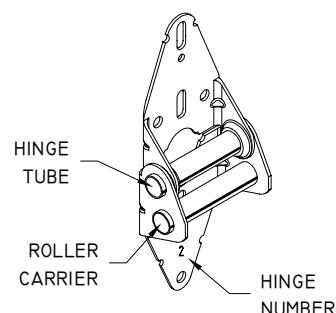
Apply #1 center hinges to intermediate stiles.

If a strut is required, install it now (see pages 8 and 9).



End Hinge progression.

To allow door to 'breakaway' from jambs, the vertical tracks are angled out from the wall. Review page 12 for end hinge placement. End hinges are designed to match the angle of the track. As hinge numbers increase so will the distance from hinge tube to roller carrier.



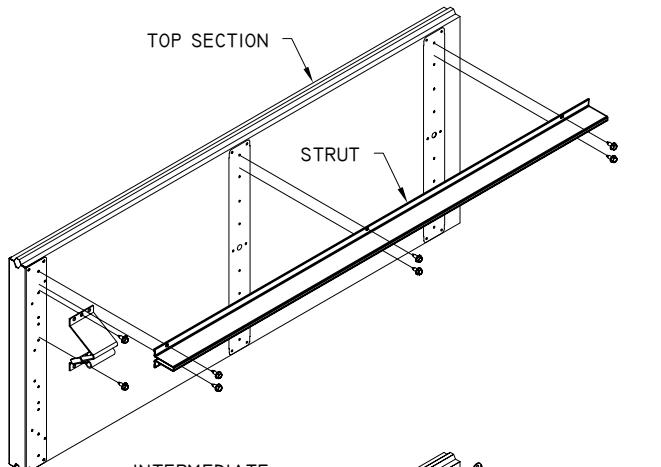
Struts. (refer to page 9 for model 329X)

Struts provide reinforcement of larger commercial doors. Not all doors will have struts. However, the top section of a trolley operated door must include one. Struts are fastened at the same time as hinges.

✓Warning! **Installing a trolley operator without a top section reinforcing strut will void warranty.**

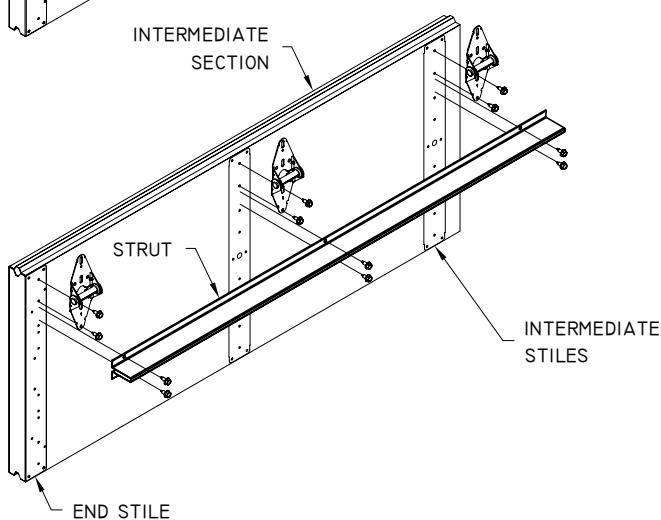
One strut per door: use on top section.

Locate edge of strut approximately 1" down from section shoulder. Use 1/4" self drilling screws to attach strut to stiles. Top fixtures will be attached after horizontal tracks are in place.



Two struts.

Install one strut on top section. Install the second strut on an intermediate section approximately half way up door.



Three struts.

Install one strut on top section. Install the second strut on an intermediate section approximately half way up door. Install third strut on hinge line at top of bottom section.

More than three struts.

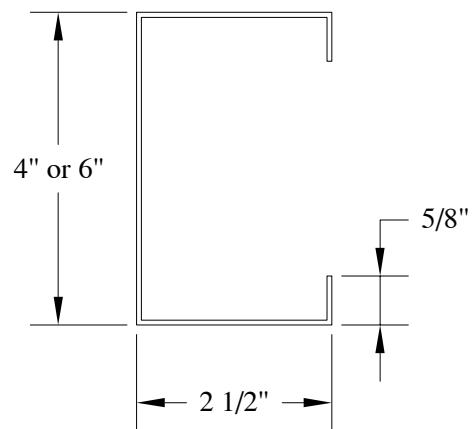
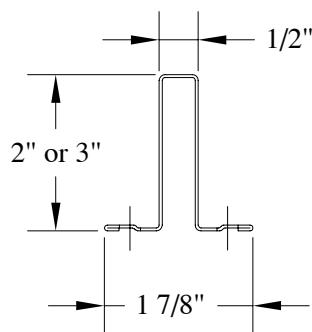
Install one strut on the top and bottom sections. Space remaining struts as evenly as possible.

* Stiles not visible on sandwich door sections.

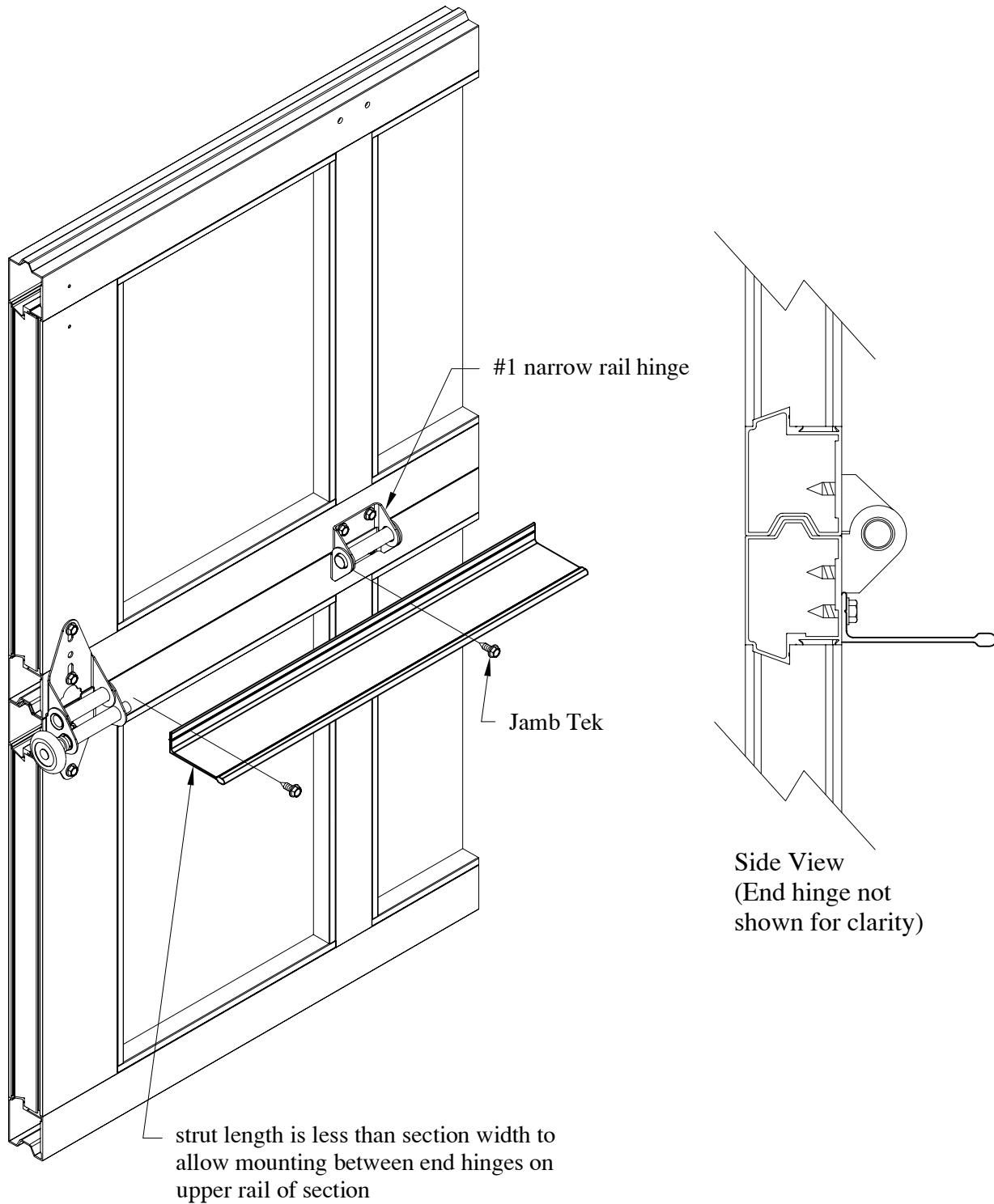
Stile location and strut attachment is the same as shown.

4" Cee-Strut

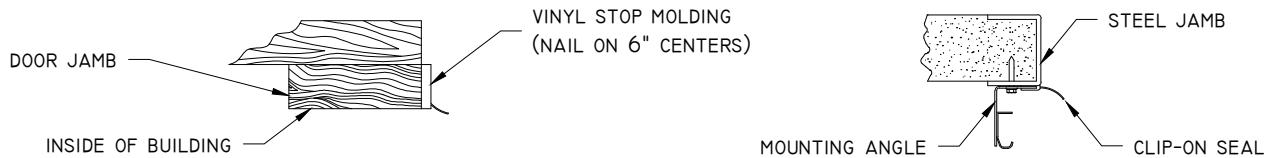
2" Narrow Strut



Model 329X Full View aluminum extruded strut



If you have stop molding or clip-on seal, attach it to the jambs or track as shown.



Place bottom section in the opening and mark reference lines for tracks.

STEP 5

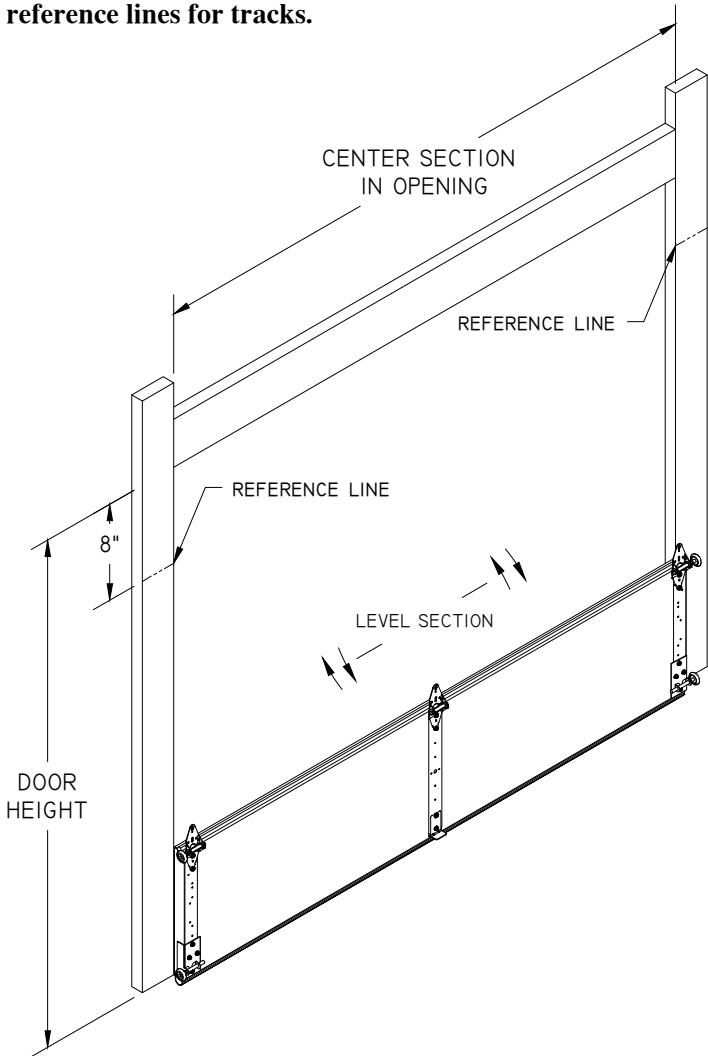
CENTER AND LEVEL BOTTOM SECTION IN OPENING. IF THERE IS A GAP ON ONE END AT THE FLOOR THEN THE TRACK WILL NOT REST ON THE FLOOR BY THE SAME AMOUNT. CHECK THIS WHEN VERTICAL TRACKS ARE IN PLACE.

STEP 6

AFTER SECTION IS LEVELED, MEASURE UP FROM BOTTOM RAIL (DO NOT MEASURE FROM THE VINYL WEATHER SEAL) SAME DISTANCE AS DOOR HEIGHT AND MARK A LINE ON THE JAMB.

STEP 7

MEASURE DOWN FROM THE REFERENCE LINE 8" (14" FOR LOW HEAD ROOM) AND MARK A LEVEL REFERENCE LINE ACROSS BOTH JAMBS. THIS IS WHERE THE LOWER VERTICAL AND UPPER HORIZONTAL TRACKS WILL MEET.



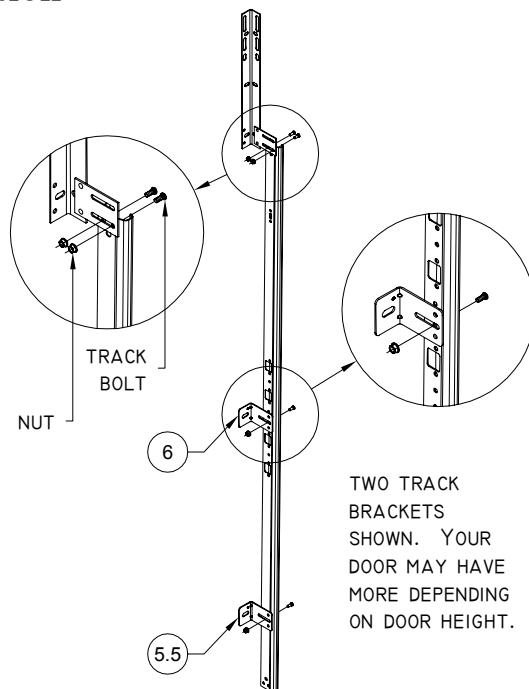
Track Installation

Prepare the field bolted vertical tracks.

STEP 1

THE TOP OF THE VERTICAL TRACK MUST PITCH BACK FROM THE JAMB FOR THE DOOR TO SEAL PROPERLY. THIS SPACING IS SET BY USE OF GRADUATED TRACK BRACKETS. ATTACH BUT DO NOT FULLY TIGHTEN BRACKETS TO TRACK WITH 1/4" X 5/8" TRACK BOLTS AND NUTS.

Always place heads of bolts to inside of the track. This will prevent rollers from striking bolts.



STEP 2

THE FLAG ANGLE MOUNTS TO THE TOP OF THE TRACK WITH (2) 1/4" X 5/8" TRACK BOLTS AND NUTS. THIS BRACKET JOINS THE VERTICAL AND HORIZONTAL TRACKS AS WELL AS THE ANGLE ATTACHED TO THE HORIZONTAL TRACK. LEAVE BOLTS LOOSE AT THIS TIME. YOU WILL ADJUST THE TRACK AFTER IT IS INSTALLED TO THE JAMBS.

Install vertical tracks.

Bring cables up behind roller shafts. This will save you from having to thread them after the track is installed. Wood jambs shown. Use 1/4" jamb teks for steel jambs.

STEP 1

SLIP LEFT HAND VERTICAL TRACK OVER ROLLERS WITH A TWISTING MOTION.

STEP 2

POSITION TOP OF VERTICAL TRACK EVEN WITH THE REFERENCE LINE THAT YOU MARKED ON THE JAMBS. TEMPORARILY FASTEN TRACK TO JAMB TO KEEP IT AT CORRECT HEIGHT. YOU WILL NEED TO BE ABLE TO PLUMB THE TRACK ONCE THE SPACING AT THE BOTTOM IS SET.

STEP 3

SPACE BOTTOM OF TRACK LEAVING 1/2" TO 3/4" OPENING BETWEEN TRACK AND BOTTOM SECTION. FASTEN BOTTOM TRACK BRACKET TO JAMB WITH 5/16" X 1-5/8" WOOD LAG (ALWAYS DRILL 3/16" PILOT HOLES FOR WOOD LAGS).

STEP 4

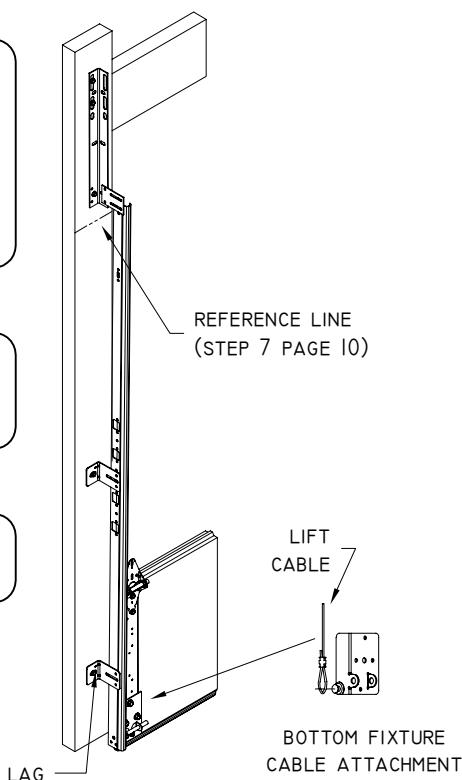
NOW LOOSEN TOP OF TRACK AND PLUMB IT WITH THE BOTTOM. CHECK TO MAKE SURE THAT THE SPACING AT THE BOTTOM DID NOT CHANGE. ATTACH FLAG ANGLE TO THE JAMB WITH (3) 5/16" X 1-5/8" WOOD LAGS.

STEP 5

CONTINUE TO FASTEN TRACK ASSEMBLY TO JAMB WITH WOOD LAGS.

STEP 6

INSTALL RIGHT HAND TRACK SAME WAY AS LEFT HAND TRACK.



Stack the sections in the opening.

STEP 1

STACK AN INTERMEDIATE SECTION ON TOP OF THE BOTTOM (#1) SECTION. THIS IS SHOWN AS THE #2 SECTION.

STEP 2

BRING UP LIFT CABLES SO THEY ARE BETWEEN
EDGE OF DOOR AND TRACK.

STEP 3

SLIP ROLLER STEM INTO #2 END HINGE USING HINGE TUBE THAT WILL BE FARTHEST FROM DOOR (SEE DETAIL BELOW). INSERT ROLLER INTO TRACK. ATTACH END HINGE (MAKE SURE THE TWO SLOTS ARE AT THE TOP OF THE HINGE) TO TOP OF #2 SECTION WITH 1/4" SHEET METAL SCREWS. REPEAT AT OTHER END OF SECTION.

STEP 4

WITH #2 SECTION HELD IN PLACE BY ROLLERS AND END HINGES, FLIP UP HINGES FROM BOTTOM SECTION AND ATTACH THEM TO THE #2 SECTION WITH 1/4" SHEET METAL SCREWS.

STEP 5

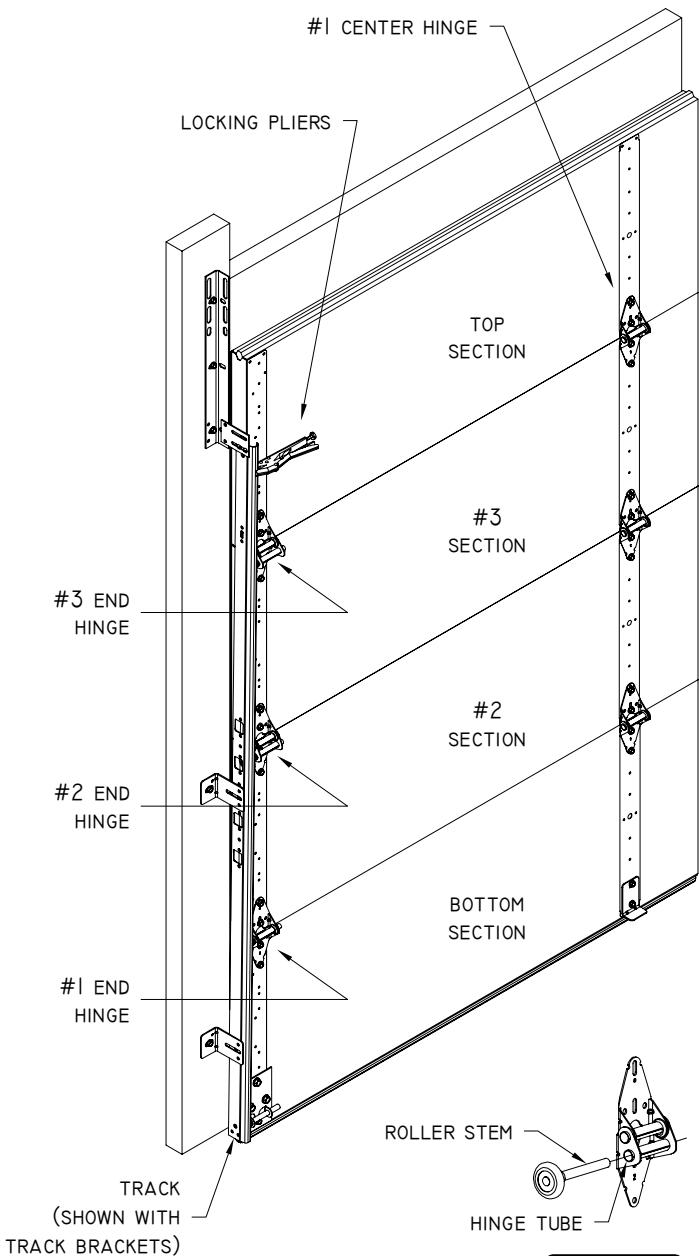
FOR EACH SECTION ADDED YOU WILL USE DIFFERENT END HINGES. THE #3 SECTION WILL USE #3 END HINGES, THE #4 SECTION WILL USE #4 HINGES AND SO ON.

*SPECIAL NOTE FOR 3" TRACK
THE END HINGES ON 3" TRACK START WITH #3
END HINGES ON THE BOTTOM SECTION (THERE
WILL NOT BE #1 OR #2 END HINGES). THE #2
SECTION WILL HAVE #4 END HINGES, THE #3
SECTION WILL HAVE #5 END HINGES AND SO ON.

SEE PAGE 41 FOR END HINGE
PROGRESSION ON 1-1/2" THICK
DOORS WITH 3" TRACK.

STEP 6

CONTINUE TO STACK SECTIONS IN OPENING
UNTIL YOU COME TO THE TOP SECTION.
SECURE TOP SECTION IN OPENING WITH LOCKING
PLIERS CLAMPED TO THE TRACK. FLIP UP
HINGES FROM SECTION BELOW AND ATTACH
THEM TO THE TOP SECTION.



STEP 3

Identify the type of upper track to be used.

The first step is to look at what type of upper track attaches to your vertical tracks. Review the illustrations on page 4 to see what installation instructions you need to follow.

Standard Lift: shown below

High Lift: page 14

Vertical Lift: page 15

Low Headroom: page 26

Standard lift track installation.

Standard lift doors will have a pair of horizontal curve tracks that will mount to the vertical track assembly.

STEP 1

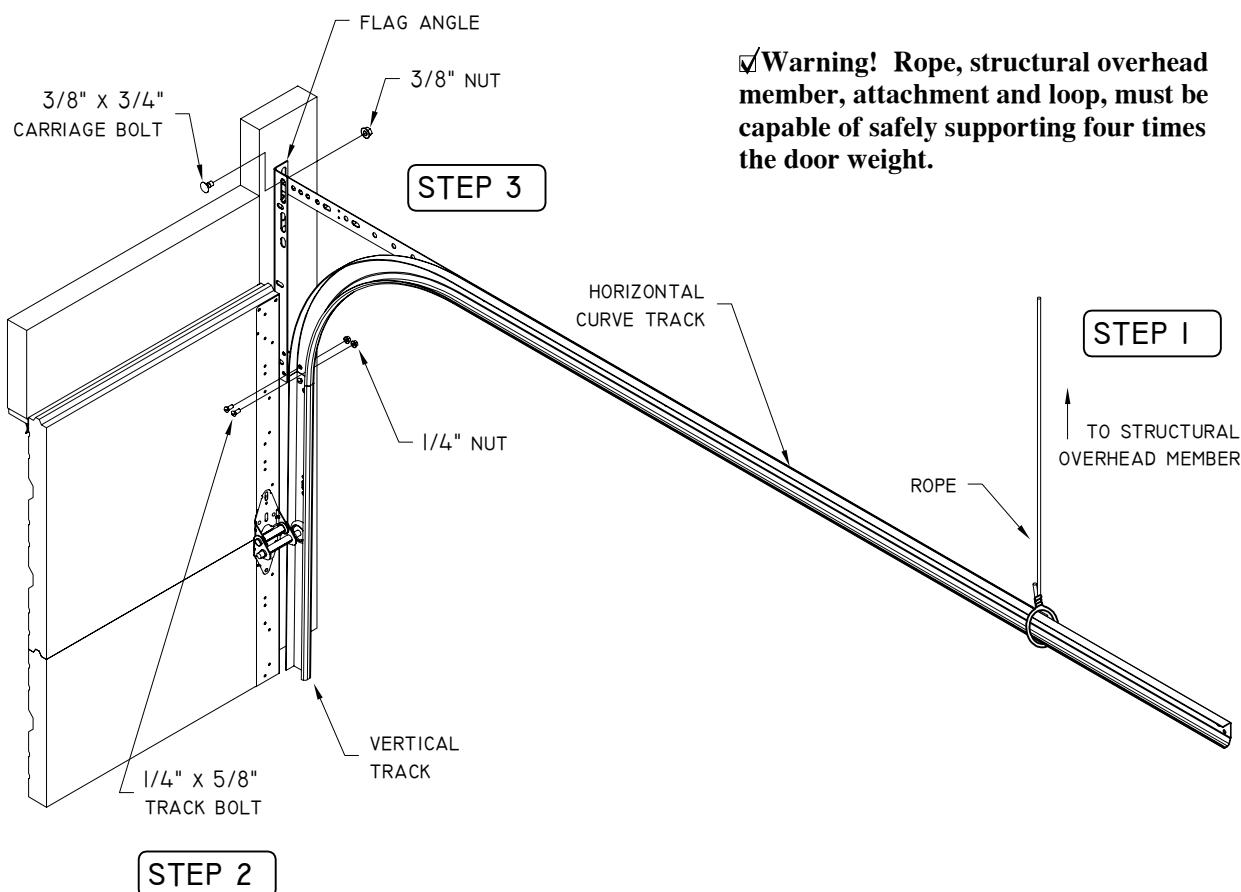
USE ROPE AS A TEMPORARY SUPPORT FOR THE BACK OF THE HORIZONTAL CURVE TRACK. ALIGN ROPE WITH VERTICAL TRACK. ATTACH IT TO A STRUCTURAL OVERHEAD MEMBER.

STEP 2

FASTEN HORIZONTAL CURVE TRACK TO FLAG ANGLE WITH (2) $1/4" \times 5/8"$ TRACK BOLTS AND NUTS. ALWAYS PLACE HEADS OF BOLTS TO INSIDE OF THE TRACK. THIS WILL PREVENT ROLLERS FROM STRIKING BOLTS.

STEP 3

FASTEN ANGLE (ATTACHED TO HORIZONTAL CURVE TRACK) TO FLAG ANGLE WITH $3/8" \times 3/4"$ CARRIAGE BOLT AND NUT. ALWAYS PLACE HEADS OF BOLTS ON SAME SIDE AS THE DOOR SECTIONS. THIS WILL PREVENT DOOR FROM STRIKING BOLTS.



High lift track installation.

High lift doors with 24" or more of lift have an additional straight piece of track (see detail below). High lift doors with less than 24" of lift have an extended vertical track and will install the same as standard lift track. Review page 13.

STEP 1

FASTEN BOTTOM OF ADDER TO FLAG BRACKET OR MOUNTING ANGLE WITH (1) 1/4" x 5/8" TRACK BOLT AND NUT. PLACE BOLT HEAD ON SAME SIDE AS DOOR. THIS WILL PREVENT ROLLERS FROM STRIKING AGAINST THE BOLT. ATTACH ADDER TO WALL WITH 5/16" x 1-5/8" WOOD LAGS OR METAL SCREWS (ALWAYS DRILL 3/16" PILOT HOLES FOR WOOD LAGS).

STEP 2

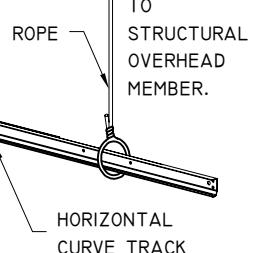
USE ROPE AS A TEMPORARY SUPPORT FOR BACK OF HORIZONTAL CURVE TRACK. ALIGN ROPE WITH VERTICAL TRACK. ATTACH IT TO A STRUCTURAL OVERHEAD MEMBER.

STEP 3

FASTEN HORIZONTAL CURVE TRACK WITH (2) 1/4" x 5/8" TRACK BOLTS AND NUTS. ALWAYS PLACE HEADS OF BOLTS TO INSIDE OF TRACK. THIS WILL PREVENT ROLLERS FROM STRIKING BOLTS.

Warning! Rope, structural overhead member, attachment and loop, must be capable of safely supporting four times the door weight.

STEP 2



STEP 3

STEP 1

VERTICAL TRACK
(SHOWN WITH MOUNTING ANGLE)

1/4" NUT

3/8" NUT

3/8" x 3/4"
CARRIAGE BOLT

STEP 4

STEP 4

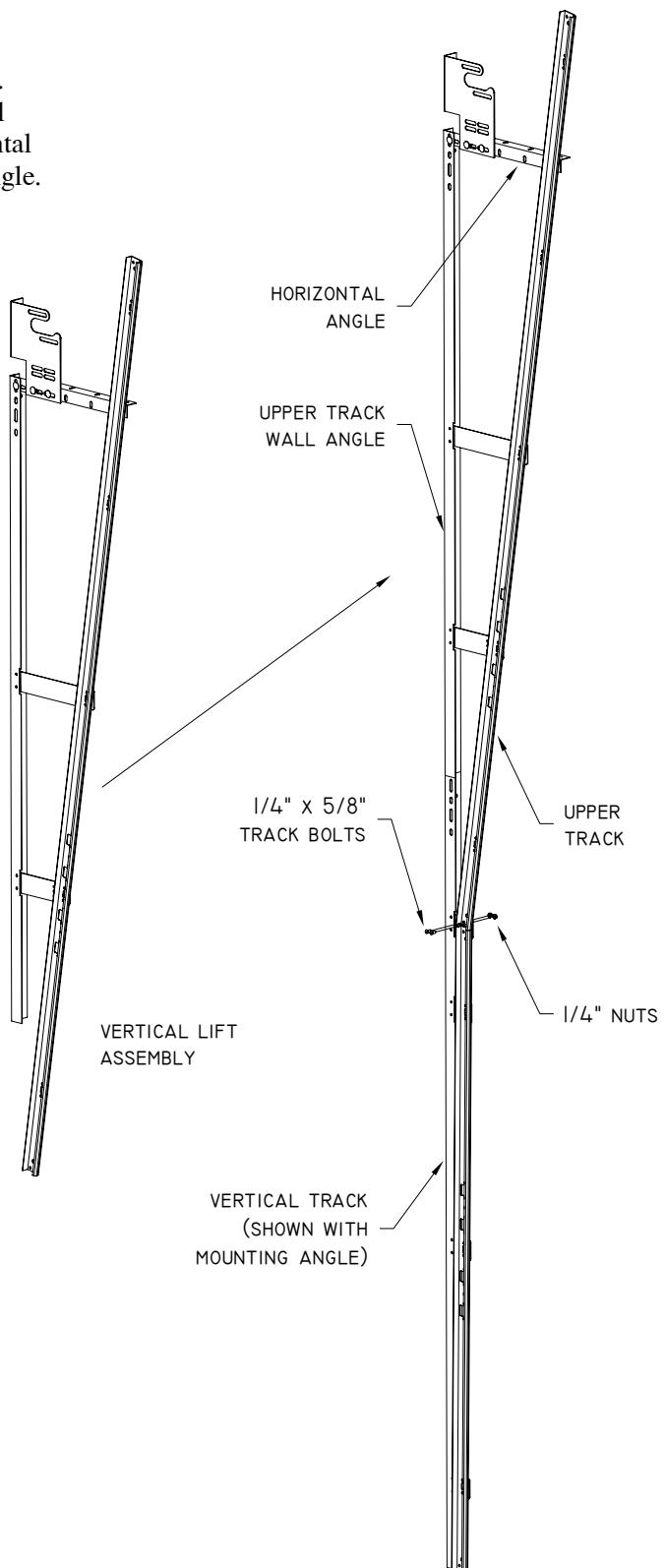
FASTEN ANGLE (ATTACHED TO HORIZONTAL CURVE TRACK) TO WALL ANGLE WITH 3/8" x 3/4" CARRIAGE BOLT AND NUT. ALWAYS PLACE HEADS OF BOLTS ON SAME SIDE AS DOOR SECTIONS. THIS WILL PREVENT DOOR FROM STRIKING BOLTS.

Vertical lift track installation.

Vertical lift doors do not have a horizontal track. The upper track is straight, similar to the vertical track, and is mounted to a wall angle. A horizontal angle connects the track to the top of the wall angle.

STEP 1

FASTEN UPPER TRACK TO FLAG BRACKET OR MOUNTING ANGLE WITH (2) $1/4" \times 5/8"$ TRACK BOLTS AND NUTS. ALWAYS PLACE HEADS OF BOLTS ON SAME SIDE AS DOOR. THIS WILL HELP PREVENT ROLLERS FROM STRIKING AGAINST THE BOLTS.



STEP 2

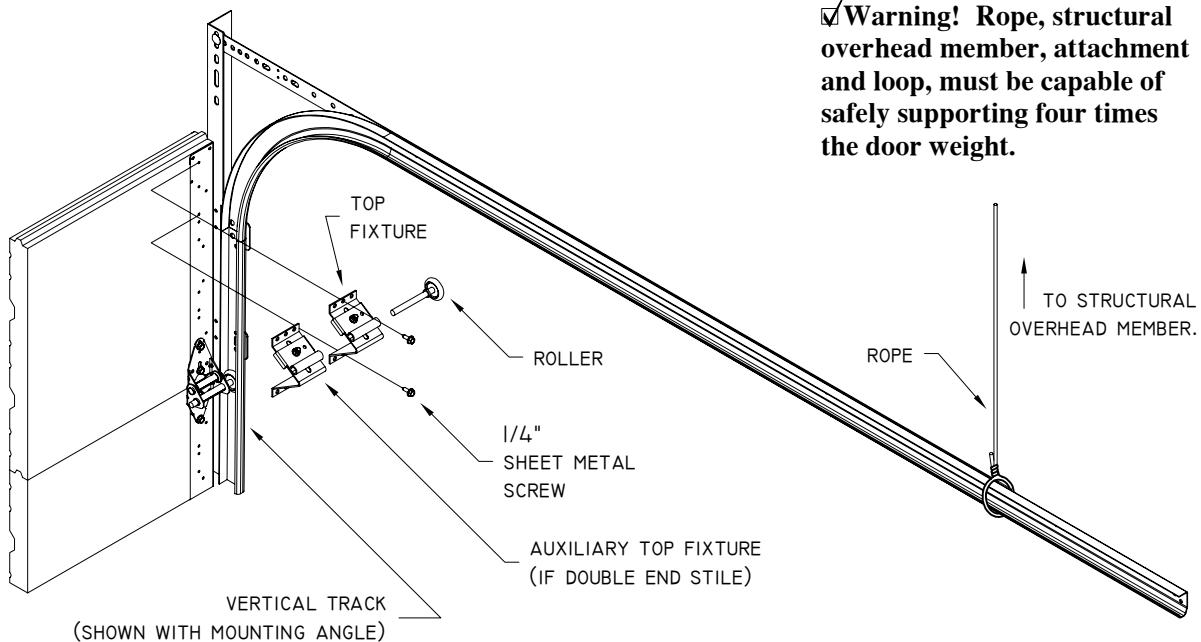
PLUMB UPPER TRACKS WITH VERTICAL TRACKS AND ATTACH TO WALL WITH $5/16" \times 1-5/8"$ WOOD LAGS OR METAL SCREWS (ALWAYS DRILL $3/16"$ PILOT HOLES FOR WOOD LAGS).

Attach top fixtures and rollers.

(for low headroom doors see page 27)

Finish applying door hardware by attaching top fixtures and rollers to the top section. Review pages 8 and 9 if your door includes a top strut.

LOOSEN ADJUSTMENT BOLT IN TOP FIXTURE. SLIP ROLLER STEM INTO ROLLER CARRIER. INSERT A ROLLER INTO THE TRACK. POSITION TOP FIXTURE ABOUT 1" FROM SECTION TOP. HOLES IN FIXTURE WILL LINE UP WITH HOLES IN END STILES. ATTACH TOP FIXTURE WITH 1/4" SHEET METAL SCREWS. ADJUST TOP FIXTURE ROLLER CARRIER SO DOOR SEALS FIRMLY AGAINST STOP MOLDING.



Attach the pull rope.

Warning! If this door is to be electrically operated, do not install the pull rope. The use of a pull rope on a non-manually operated door can cause serious injury.

For manually operated doors attach an eye screw to the jamb at about 50" from the floor. Tie one end of pull rope to roller stem on bottom fixture between the two tabs that hold the roller. Tie other end of the rope to eye screw.

Inspect the work which you have done for missing parts or loose fasteners.

Before moving on, check that all of the fasteners used in the track system are in place and tight. Also check that applied hardware is in place and securely fastened.

Torsion Spring Assembly Details

Spring systems will vary according to the door model, size and options. While you are assembling the spring line, take time to study the parts and identify them.

Torsion Springs: Torsion springs supply the force to raise the weight of the door. Torsion springs are under tension and rotate about a shaft as they operate. Initial tension is loaded into springs using spring winding bars (not supplied). Torsion springs come in different coil diameters, wire sizes and lengths. Each torsion spring has a retainer and a winding plug mounted on the ends. The retainer holds one end of the spring stationary and is mounted to a spring bracket. The winding plug at the other end of the spring is fastened to the shaft with set screws and transfers spring force to the spring shaft. See illustration on page 19.

Spring Shaft: The spring shaft transfers force from the springs to the cable drums. The shaft may come in one or two pieces. The one piece will span the entire door width while the two piece will be coupled together at the center.

Cable Drums: Cable drums transfer spring force to the door by use of lift cables. Cable drums will differ in design according to the upper track system and door weight.

Spring Bracket: Holds spring system to wall.

End Bearing Plates: End bearing plates support the spring shaft and allow it to rotate freely while door is moving.

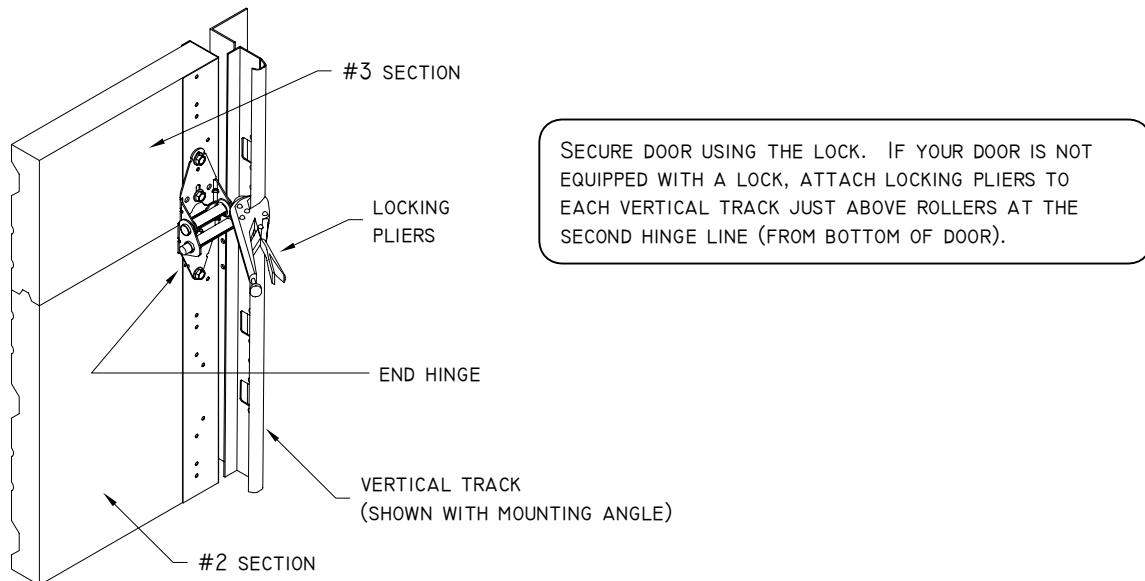
Check all spring assembly instructions and parts.

Warning! If there appears to be any parts missing stop here and contact your C.H.I. door supplier immediately. Do not substitute parts.

Warning! Do not remove any factory applied spring tag or warning label! If any tags or labels are missing or unreadable, contact your C.H.I. door supplier immediately.

Secure door in fully closed position.

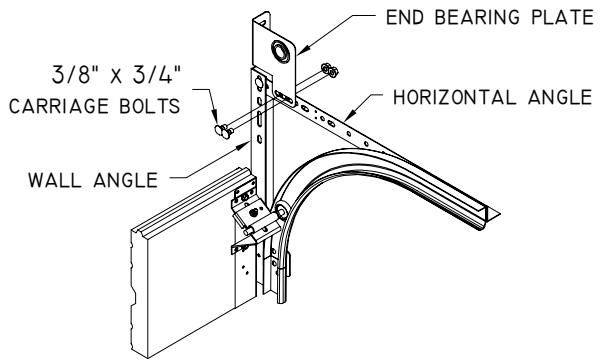
Warning! Securing door in the fully closed position will prevent any unexpected door movement while you are working on the spring system. Failure to do so could result in serious injury or death.



Install end bearing plates.

(for low headroom doors note different end bearing plates as shown on page 27)
(supplemental end bearing instructions are on page 30)

ATTACH END BEARING PLATES TO HORIZONTAL ANGLE USING (2) 3/8" x 3/4" CARRIAGE BOLTS AND NUTS. ALWAYS PLACE HEADS OF BOLTS ON SAME SIDE AS DOOR SECTIONS.



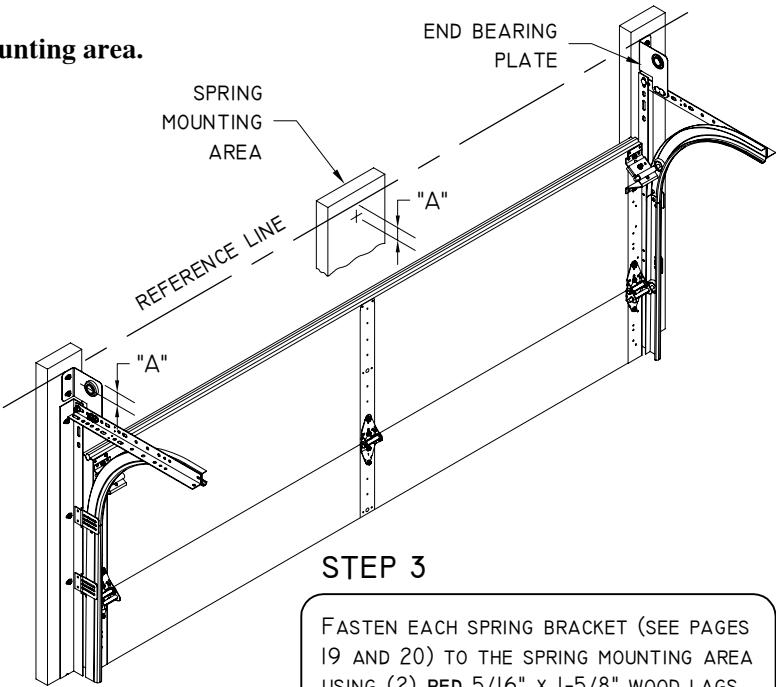
Attach spring supports to the spring mounting area.

STEP 1

SNAP A CHALK REFERENCE LINE ACROSS THE TOP OF THE END BEARING PLATES ONTO THE SPRING MOUNTING AREA.

STEP 2

USE THE ILLUSTRATIONS ON PAGES 5, 19 AND 20 TO HELP YOU DETERMINE WHERE THE SPRING BRACKETS WILL BE PLACED. MARK THESE LOCATIONS ON THE REFERENCE LINE (ALLOW 10" BETWEEN BRACKETS WHEN SHAFT COUPLINGS ARE USED). MEASURE FROM THE TOP OF ONE END BEARING PLATE TO THE CENTER OF THE BEARING ("A"). MARK THIS SAME DISTANCE "A" DOWN FROM THE REFERENCE LINE WHERE THE SPRING BRACKETS WILL BE LOCATED. THIS WILL INDICATE THE CENTER OF THE SPRING SHAFT.

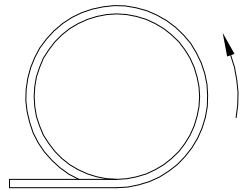


STEP 3

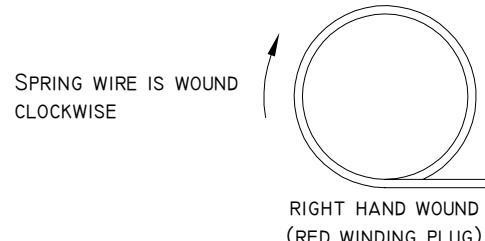
FASTEN EACH SPRING BRACKET (SEE PAGES 19 AND 20) TO THE SPRING MOUNTING AREA USING (2) RED 5/16" x 1-5/8" WOOD LAGS OR METAL SCREWS. IF AUXILIARY SHAFT SUPPORTS WERE PROVIDED, LOCATE THEM 10" IN FROM EACH JAMB. POSITION AND ATTACH IN THE SAME MANNER AS THE SPRING BRACKETS.

Identify torsion springs. (for low headroom doors note differences in spring placement as shown on page 28)

Springs are single or in pairs based on door design and track system. It is important to determine the 'wind' of a spring before installation. A 'right hand wound spring' will have a red winding plug. A 'left hand wound spring' will have a black winding plug. Cable drums are also color coded. The red drum will be on the left side of the spring assembly and the black drum on the right side. **Match color of winding plug on spring with drum.**



SPRING WIRE IS WOUND COUNTERCLOCKWISE



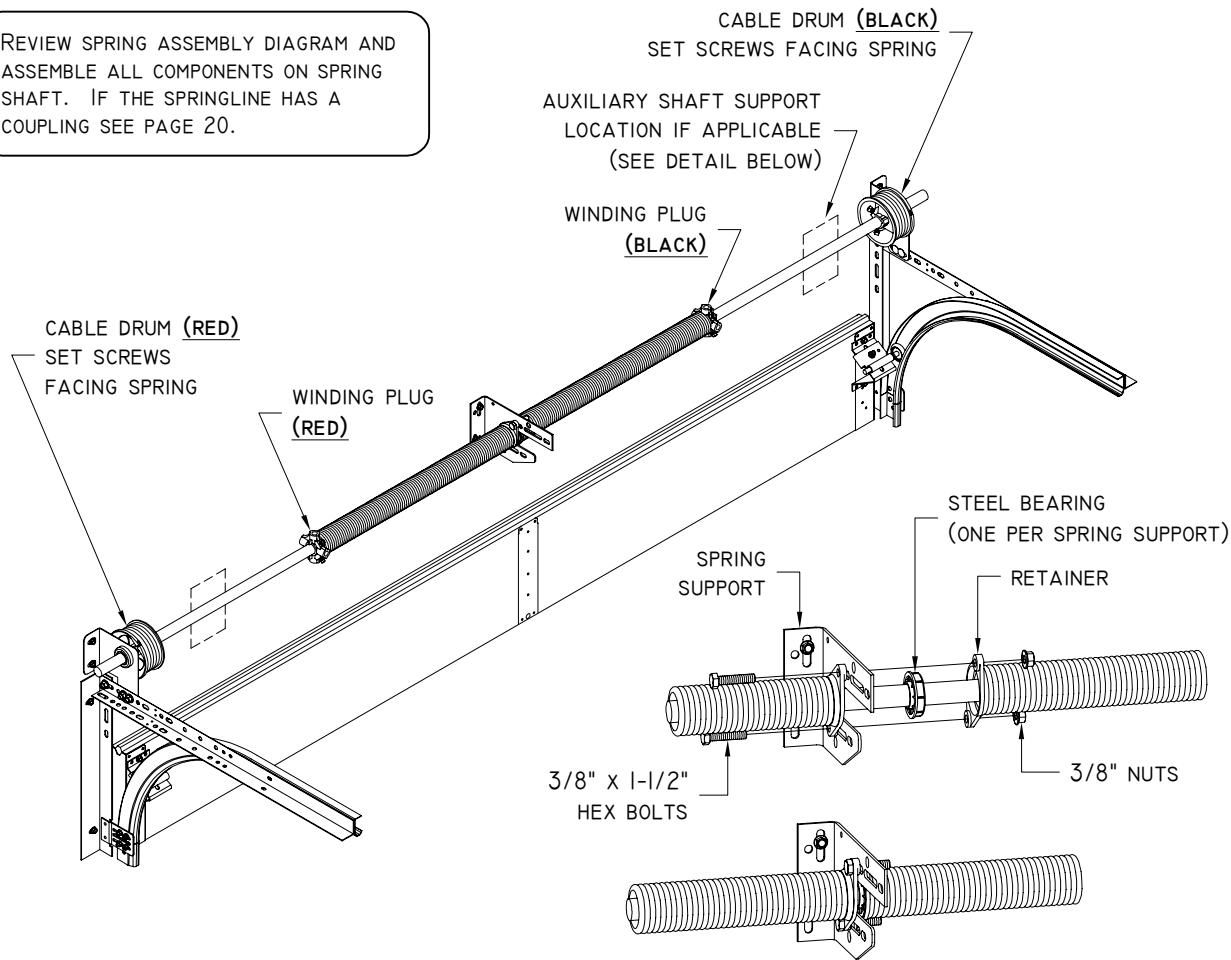
SPRING WIRE IS WOUND CLOCKWISE

Pre-assemble spring line and mount it to spring support.

(for low headroom doors note differences in spring system layout as shown on pages 28 and 29)

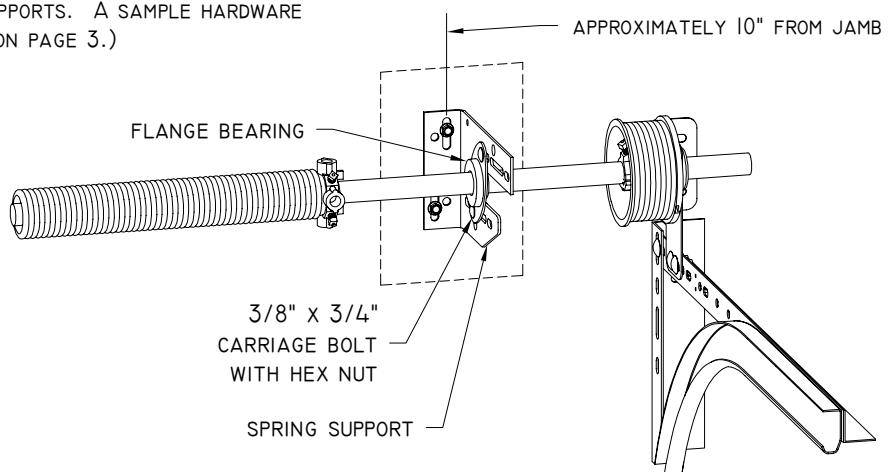
For illustrative purposes, two springs are shown. Your door may have a single spring. If so, follow the details for that color of spring.

REVIEW SPRING ASSEMBLY DIAGRAM AND ASSEMBLE ALL COMPONENTS ON SPRING SHAFT. IF THE SPRINGLINE HAS A COUPLING SEE PAGE 20.



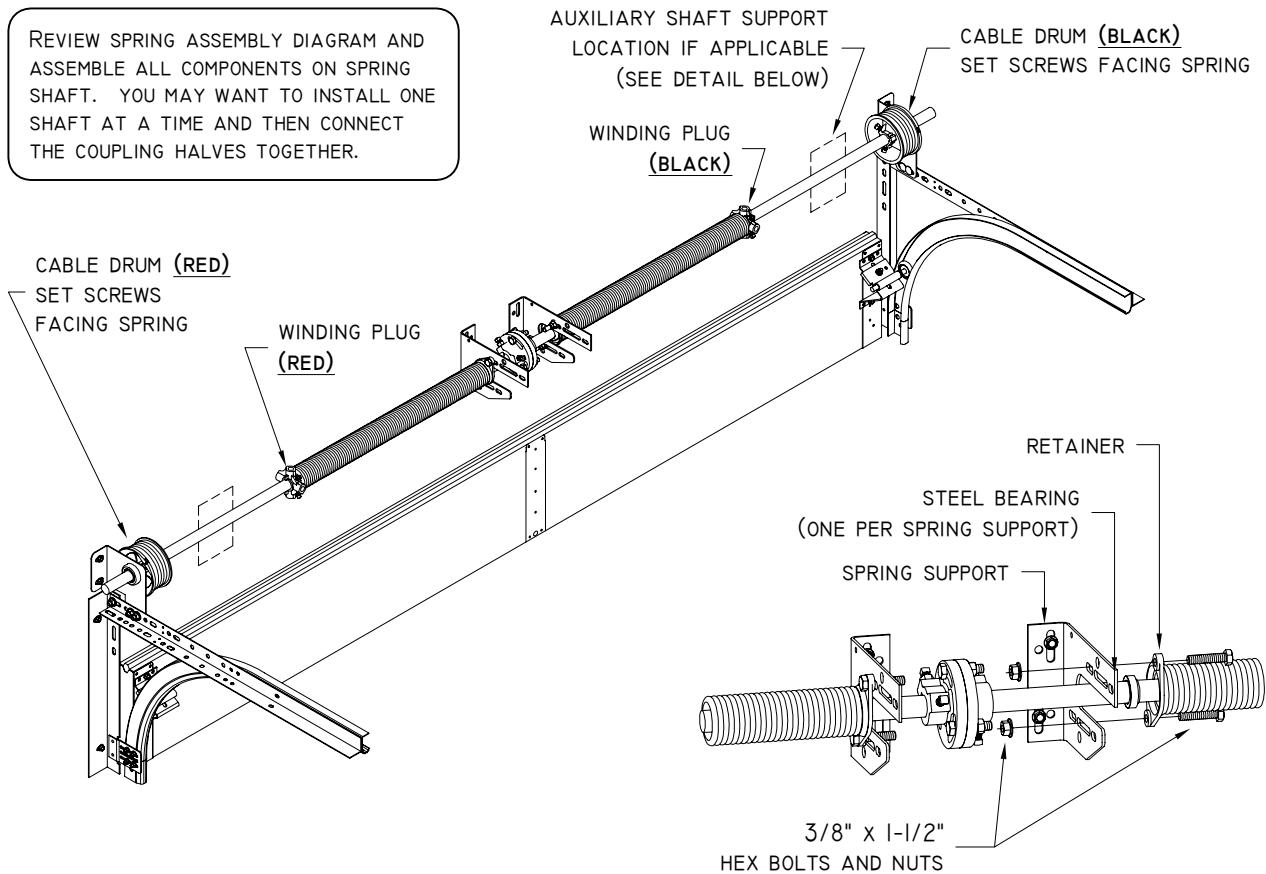
AUXILIARY SHAFT SUPPORT DETAIL.

(SEE HARDWARE CARTON TO DETERMINE IF YOUR DOOR HAS AUXILIARY SHAFT SUPPORTS. A SAMPLE HARDWARE CARTON TAG IS LOCATED ON PAGE 3.)



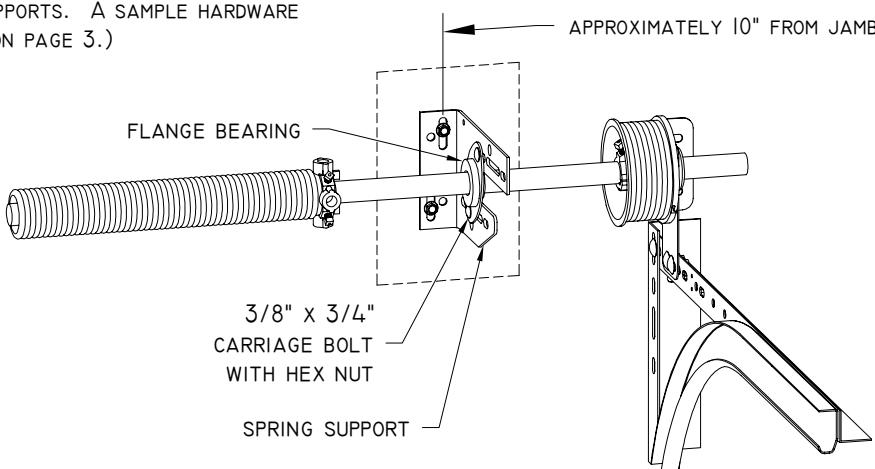
Pre-assemble spring line with shaft coupling.

(for low headroom doors note differences in spring system layout as shown on pages 28 and 29)



AUXILIARY SHAFT SUPPORT DETAIL.

(SEE HARDWARE CARTON TO DETERMINE IF YOUR DOOR HAS AUXILIARY SHAFT SUPPORTS. A SAMPLE HARDWARE CARTON TAG IS LOCATED ON PAGE 3.)



Secure spring shaft and fasten cables to drums.

(for low headroom doors note differences in spring system layout as shown on pages 28 and 29)

STEP 1

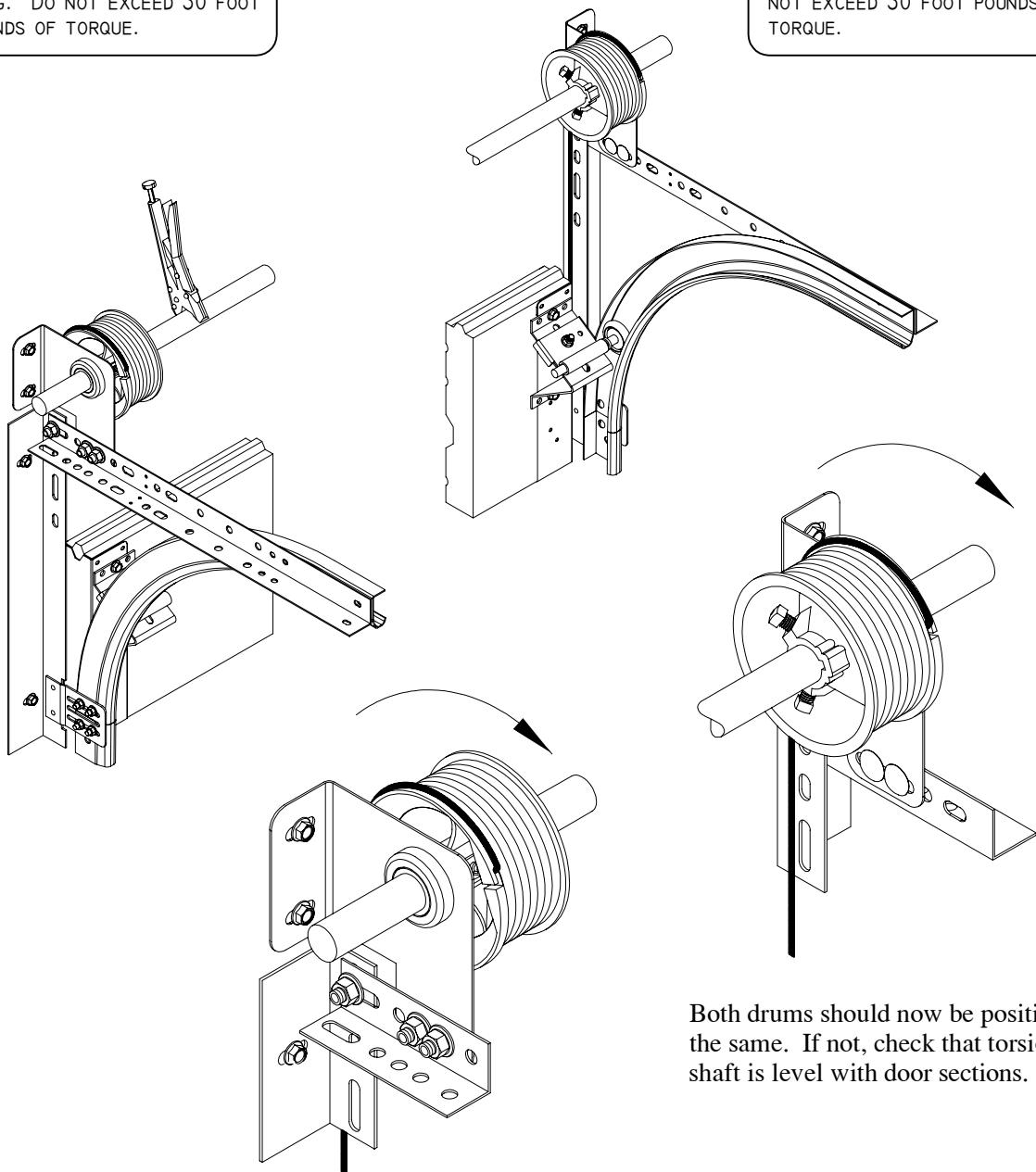
POSITION LEFT HAND CABLE DRUM (RED) AGAINST END BEARING PLATE. INSERT CABLE INTO SLOT ON DRUM EDGE. FIRMLY SEAT THE CABLE LUG IN THE DRUM. ROTATE DRUM TO WIND UP CABLE UNTIL IT IS TAUGHT. TIGHTEN SET SCREWS SNUG. DO NOT EXCEED 30 FOOT POUNDS OF TORQUE.

STEP 2

RESTRAIN SPRING SHAFT WITH LOCKING PLIERS TO KEEP SHAFT FROM TURNING. USE WALL TO HOLD LOCKING PLIERS IN PLACE. MOVEMENT OF SHAFT MAY CAUSE SLACK IN CABLE.

STEP 3

POSITION RIGHT HAND CABLE DRUM (BLACK) AGAINST END BEARING PLATE. INSERT CABLE INTO SLOT ON DRUM EDGE. FIRMLY SEAT CABLE LUG IN DRUM. ROTATE DRUM TO WIND UP CABLE UNTIL IT IS TAUGHT. TIGHTEN SET SCREWS SNUG. DO NOT EXCEED 30 FOOT POUNDS OF TORQUE.



Both drums should now be positioned the same. If not, check that torsion shaft is level with door sections.

Wind torsion springs.

(for low headroom doors see differences in spring winding as shown on pages 28 and 29)

STEP 1

MARK A CHALK LINE ALONG LENGTH OF SPRING TO COUNT NUMBER OF TURNS WHILE WINDING. THE APPROXIMATE NUMBER OF TURNS TO WIND EACH SPRING IS ON TAG ATTACHED TO SPRING ASSEMBLY. LEAVE TAG ATTACHED TO SPRING ASSEMBLY FOR FUTURE REFERENCE.

Warning! Never exceed number of turns shown on spring tag by more than one-half turn.

Warning! Use solid steel winding bars 1/2" in diameter and at least 18" long (not supplied). Be sure that the bar is inserted fully into the winding plug. Use of improper or undersized bars may result in component failure and cause serious personal injury or death. Never use screwdrivers or tubing.

Warning! Keep your head and body out of line with the winding bars. Always maintain a secure footing and balance. Firmly grasp the winding bars and be braced to resist strong forces whenever winding springs.

Warning! From this point onward, the spring is under tension and extremely dangerous.

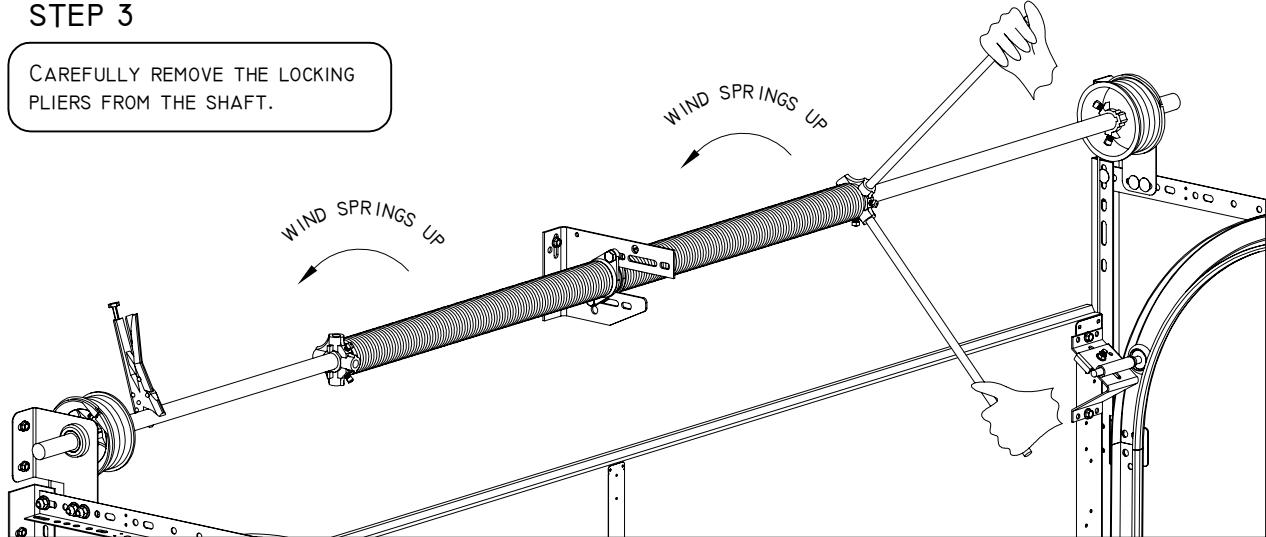
STEP 2

USING TWO WINDING BARS, INSERT ONE FULLY INTO WINDING PLUG AND WIND SPRING BY PUSHING IN AN UPWARD DIRECTION. WIND SPRING ONE QUARTER OF A TURN UNTIL SECOND WINDING BAR CAN BE PROPERLY INSERTED. NOW, INSERT SECOND WINDING BAR AND PUSH UP WHILE CAUTIOUSLY REMOVING FIRST WINDING BAR. REPEAT THIS PROCEDURE UNTIL THE CORRECT NUMBER OF TURNS HAVE BEEN WOUND INTO SPRING. STRETCH THE SPRING THE DISTANCE OF TWO WIRE COILS. TIGHTEN SET SCREWS SNUG. DO NOT EXCEED 30 FOOT POUNDS OF TORQUE. REMOVE WINDING BARS.

Warning! When winding torsion springs, spring diameter will decrease and spring length will increase. If this is not observed, stop immediately and check for proper spring placement.

STEP 3

CAREFULLY REMOVE THE LOCKING PLIERS FROM THE SHAFT.



- ✓ **Warning!** All spring component parts whether part of spring line, attached to door, or attached to wall are now under tension and are extremely dangerous.
- ✓ **Warning!** Spring adjustments from this point onward must be performed in accordance with all warnings and directions as previously stated.
- ✓ **Warning!** Never place your fingers in or near section joints while the door is moving.

Remove track restraints and test the balance of the door on the floor.

With door still secured, clamp an additional set of locking pliers to each track just below the rollers at the third hingeline (from the bottom of the door). This will allow for testing of the door counterbalance without permitting the door to travel freely. Carefully remove the first set of constraints and slowly raise the door.

If door does not lift off of the floor by itself, or does not roll back to the floor when not supported, it is properly counterbalanced.

If door lifts off of the floor by itself, the springs are too strong and less spring tension may be required (less turns on the spring).

If the door rolls back to the floor, the springs are too weak and more spring tension may be required (more turns on the spring).

After determining the door is adequately balanced to avoid unexpected movement, remove all restraints from the vertical tracks.

- ✓ **Warning!** Do not raise the door to the fully opened position. The track backhangs and swaybracing must first be set in place.

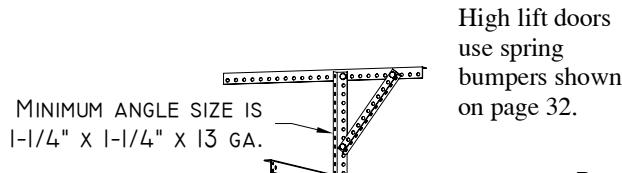
Install track hangs. Standard Lift and High Lift Doors.

Standard Lift and High Lift track hang assemblies are the same. The high lift door assembly is shown. Materials and fasteners for track hangs and swaybraces are not provided with the door.

DOORS OVER 12' HIGH WILL REQUIRE ADDITIONAL BACKHANGS AT CENTER OF HORIZONTAL TRACKS. HEAVY DOORS, REGARDLESS OF HEIGHT, MAY REQUIRE ADDITIONAL TRACK HANGS.

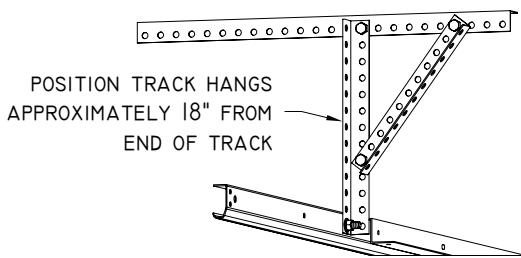
STEP 1

SLOWLY RAISE DOOR HALF-WAY AND CHECK THAT SPACING BETWEEN DOOR EDGES AND UPPER TRACKS IS APPROXIMATELY 1/2"-3/4" PER SIDE (AVOID CROWDING THE TRACK WITH TOO SMALL OF A SPACING). HORIZONTAL TRACKS SHOULD BE PITCHED SLIGHTLY UPWARD INTO BUILDING (ABOUT 1/8" OF RISE PER 12" OF RUN).

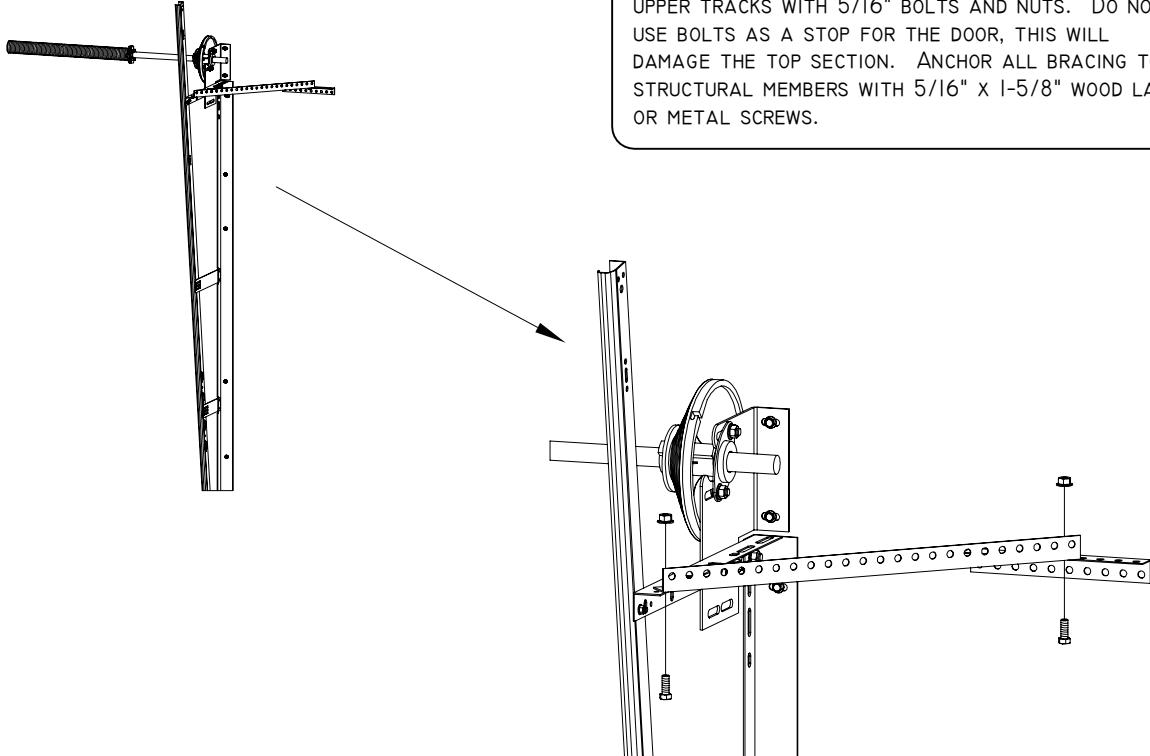


STEP 2

ATTACH REAR OF HORIZONTAL TRACKS TO BACKHANGS AND SWAYBRACES WITH 5/16" BOLTS AND NUTS. DO NOT USE BOLTS AS A STOP FOR THE DOOR, THIS WILL DAMAGE THE TOP SECTION. ANCHOR ALL BRACING TO STRUCTURAL CEILING MEMBERS USING 5/16" x 1-5/8" WOOD LAGS OR METAL SCREWS.



Install track hangs. Vertical Lift Doors



Finalize the track and spring adjustments.

Warning! Failure to securely support and brace the upper track assembly can cause the door to fall from the overhead position and result in serious personal injury or death.

Complete installation of stop molding on jambs and header where applicable.

Operate the door through one full cycle. Check door stops and top fixtures for proper seal.

If door is not functioning correctly check for binding against the jamb, header or tracks. If no obstructions are observed, attempt to correct the situation by adjusting the spring tension.

Warning! Never add more than one-half turn of tension to any spring.

More than one-half turn added or released from a spring may indicate that the installed door weight is different from the calculated spring weight. Check if all the options and hardware were installed. Consult your C.H.I. door supplier if door remains inoperable.

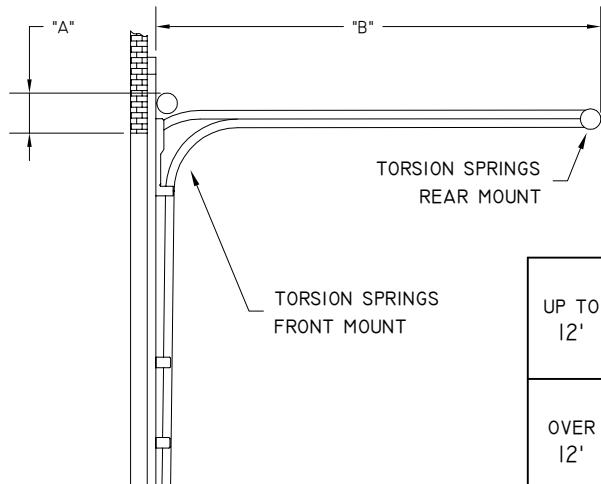
Low Headroom Details

Installation of low headroom doors is basically the same as standard lift doors. Certain differences do however require additional details. All low headroom doors will have a pair of double horizontal curve tracks (see detail below). The upper track is used for the low headroom-top fixture rollers. All other rollers travel in the lower track. This allows the top section to 'turn over' quickly and requires less headroom.

SIDEROOM REQUIREMENTS FOR LOW HEADROOM DOORS

| TRACK TYPE | AT BOTTOM OF DOOR | AT TORSION SHAFT |
|------------|---------------------|------------------|
| 2" TRACK | DOOR WIDTH + 6" | DOOR WIDTH + 12" |
| 3" TRACK | DOOR WIDTH + 9-1/2" | DOOR WIDTH + 14" |

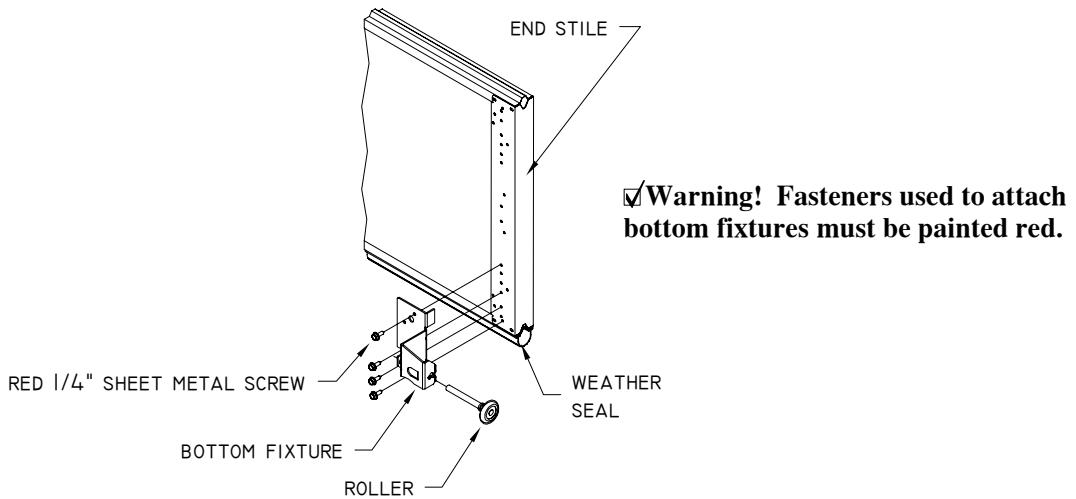
HEADROOM AND BACK DEPTH REQUIREMENTS FOR LOW HEADROOM DOORS



| | SPRING MOUNT | 2" TRACK | | 3" TRACK | |
|-----------|---------------|---------------|-------------------|---------------|-------------------|
| | | "A" DIMENSION | "B" DIMENSION | "A" DIMENSION | "B" DIMENSION |
| UP TO 12' | SPRINGS FRONT | 9" | DOOR HEIGHT + 22" | 11" | DOOR HEIGHT + 22" |
| | SPRINGS REAR | 6" | DOOR HEIGHT + 28" | 8" | DOOR HEIGHT + 28" |
| OVER 12' | SPRINGS FRONT | 11" | DOOR HEIGHT + 22" | 14" | DOOR HEIGHT + 22" |
| | SPRINGS REAR | 6" | DOOR HEIGHT + 28" | 8" | DOOR HEIGHT + 28" |

See page 29 for rear torsion spring mounting area.

Bottom fixture attachment for low headroom doors.



Low headroom horizontal curve track installation.

Low Headroom doors have double-horizontal tracks that mount to the vertical track assembly and flag bracket.

STEP 1

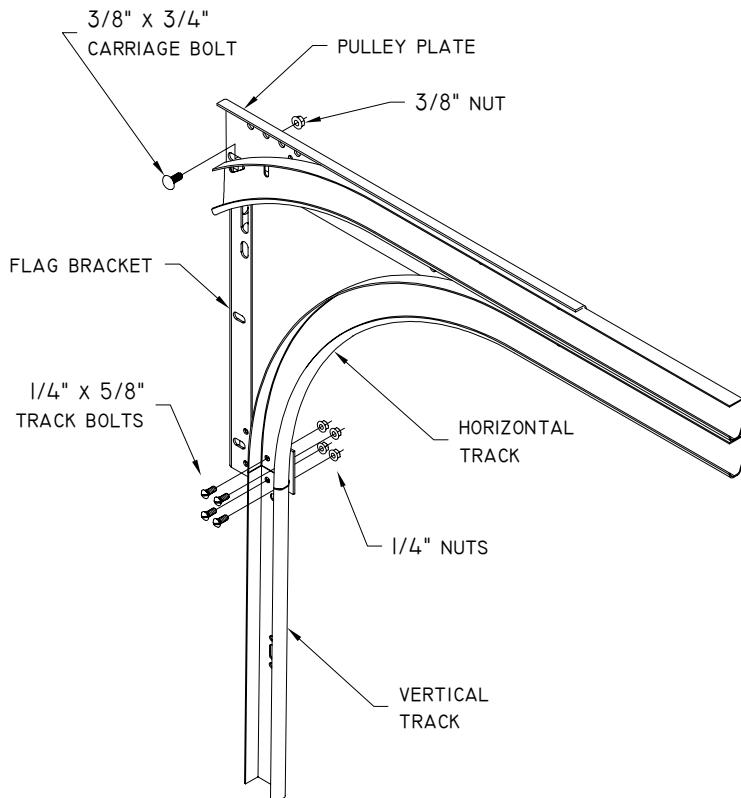
TEMPORARILY SECURE BACK OF HORIZONTAL CURVE TRACKS. SEE PAGE 13 FOR INSTRUCTIONS AND WARNINGS.

STEP 2

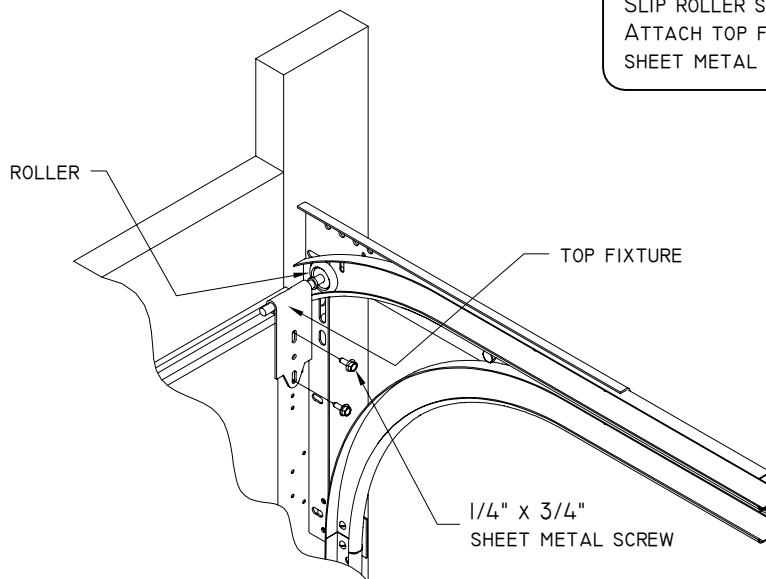
FASTEN HORIZONTAL CURVE TRACK TO FLAG BRACKET WITH (2) 1/4" X 5/8" TRACK BOLTS AND NUTS. ALWAYS PLACE HEADS OF BOLTS TO INSIDE OF TRACK. THIS WILL PREVENT ROLLERS FROM STRIKING BOLTS.

STEP 3

FASTEN PULLEY PLATE TO FLAG BRACKET WITH A 3/8" X 3/4" CARRIAGE BOLT AND NUT.



Top fixture attachment for low headroom doors.

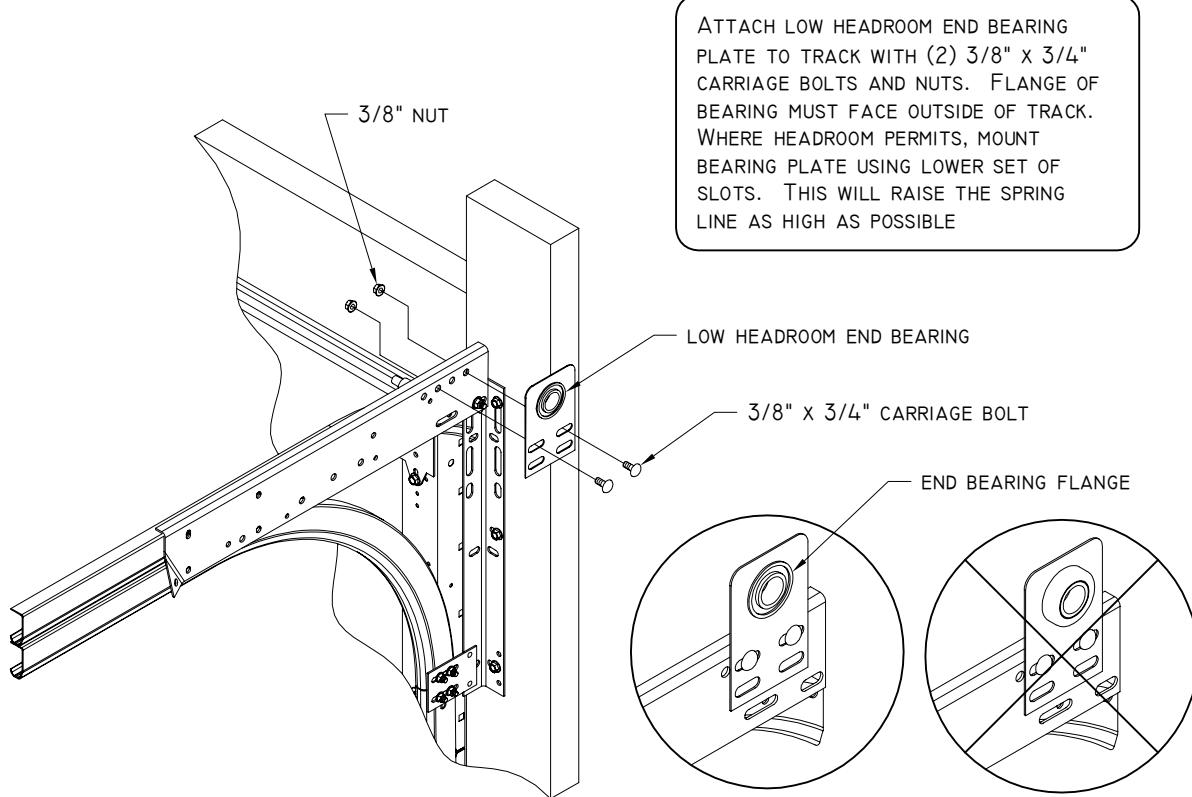


INSERT A ROLLER INTO THE TRACK.
SLIP ROLLER STEM INTO TOP FIXTURE.
ATTACH TOP FIXTURE WITH 1/4" X 3/4"
SHEET METAL SCREWS.

Low Headroom Torsion Spring Assembly Details

End bearing plates for rear mounted springs are factory attached to end of curve track.

End bearing plates for front mounted springs.



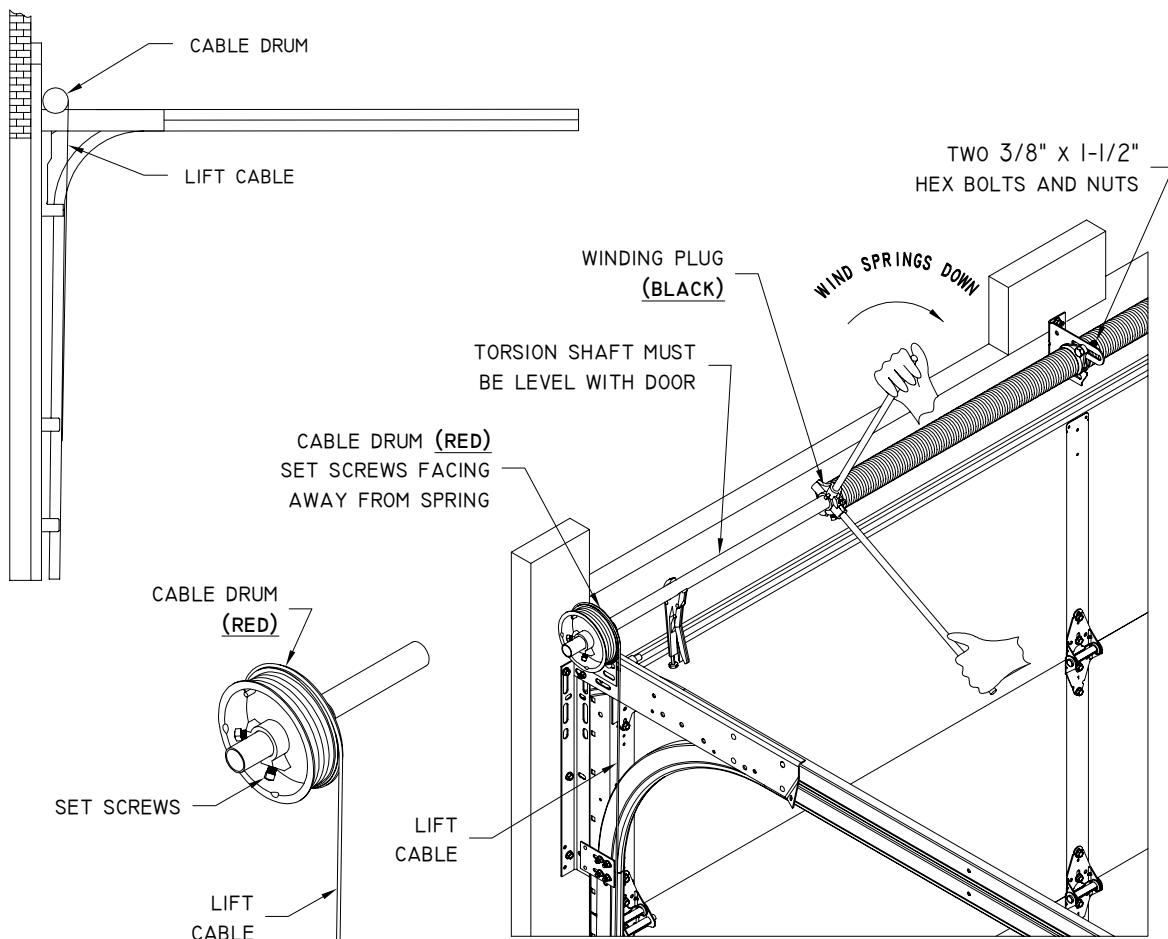
ATTACH LOW HEADROOM END BEARING PLATE TO TRACK WITH (2) 3/8" X 3/4" CARRIAGE BOLTS AND NUTS. FLANGE OF BEARING MUST FACE OUTSIDE OF TRACK. WHERE HEADROOM PERMITS, MOUNT BEARING PLATE USING LOWER SET OF SLOTS. THIS WILL RAISE THE SPRING LINE AS HIGH AS POSSIBLE

Low headroom torsion springs assemblies.

Low headroom spring installations do not follow the standard rules for spring placement and winding. The main differences are:

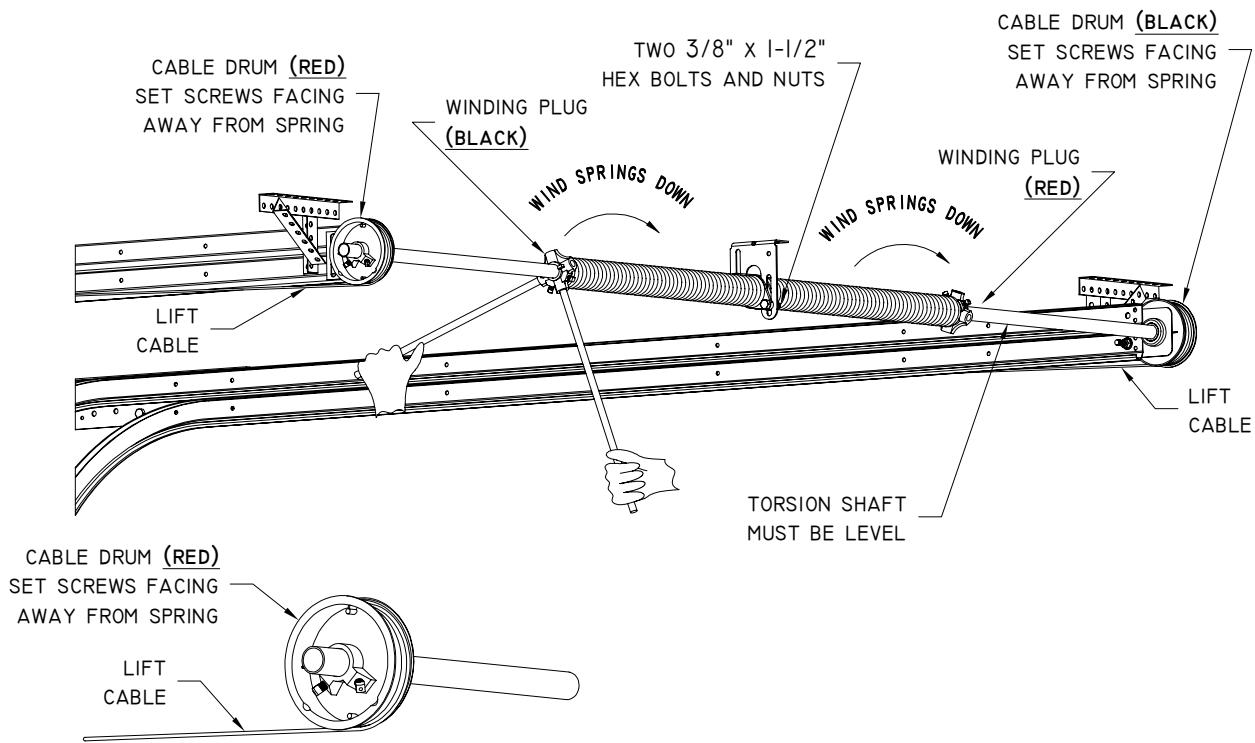
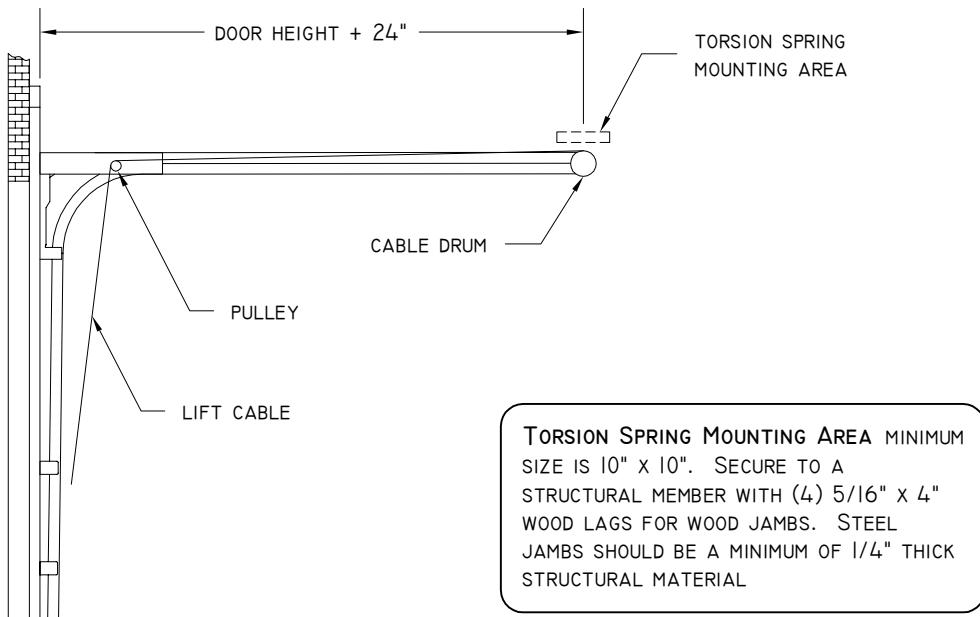
- 1) Cable drums are on the outside of the track.
- 2) The right hand wound spring (painted red) will face the right hand drum (painted black) and the left hand wound spring (painted black) will face the left hand drum (painted red).
- 3) Springs are wound down instead of up.
- 4) Lift cables spool off the back of cable drums.

Front mounted low headroom torsion springs.



Warning! Attachment of the torsion spring mounting area to building framework must provide adequate support to sustain the weight of the spring assembly as well as resistance to vibration caused by door operation.

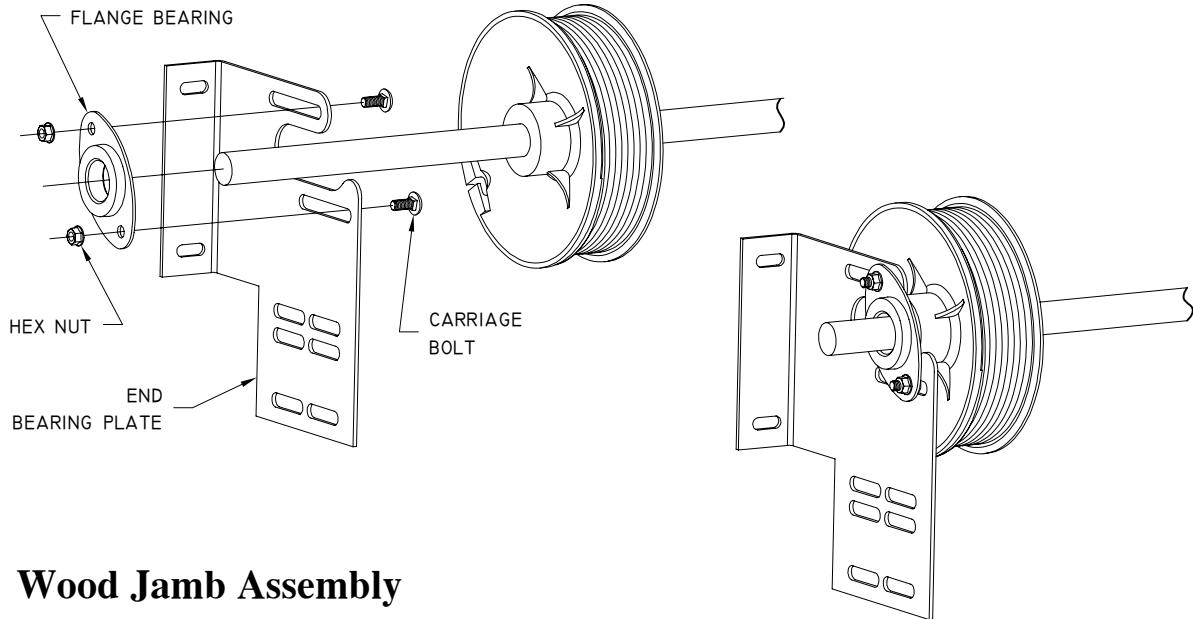
Rear mounted low headroom torsion springs.



Warning! Attachment of the torsion spring mounting area to building framework must provide adequate support to sustain the weight of the spring assembly as well as resistance to vibration caused by door operation.

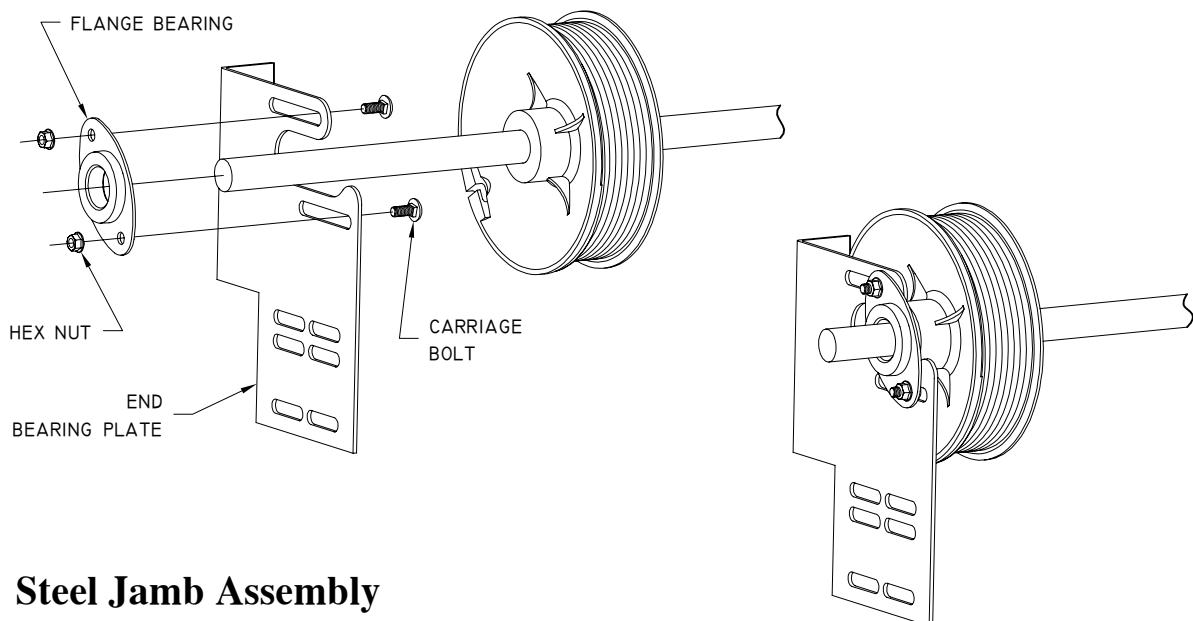
Supplemental Instructions

Adjustable End Bearing Assembly



Wood Jamb Assembly

(LEFT SIDE SHOWN RIGHT SIDE OPPOSITE)



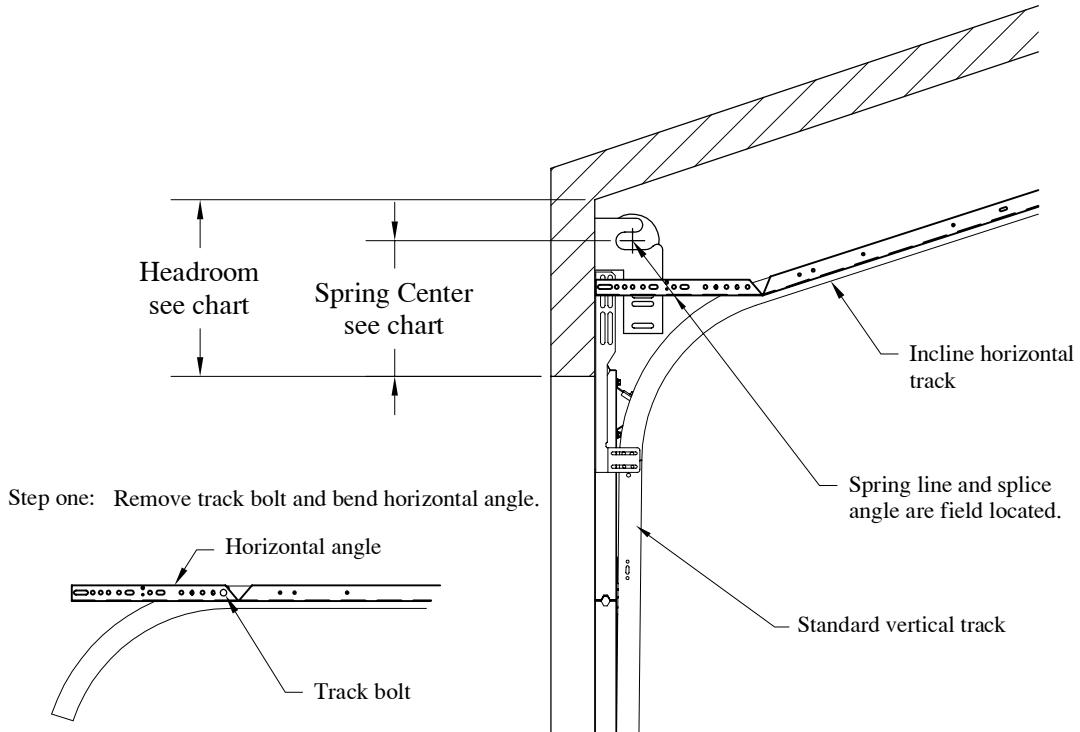
Steel Jamb Assembly

(LEFT SIDE SHOWN RIGHT SIDE OPPOSITE)

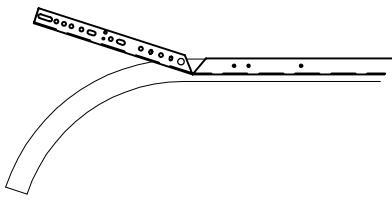
Supplemental Instructions

Incline Track Installation Details

Shown below is a typical standard-lift incline-track layout. A field-located horizontal angle connects the horizontal track to the wall angle / flag angle. Incline track installations will require additional time and material.



Step two: Insert track bolt in predrilled horizontal track.

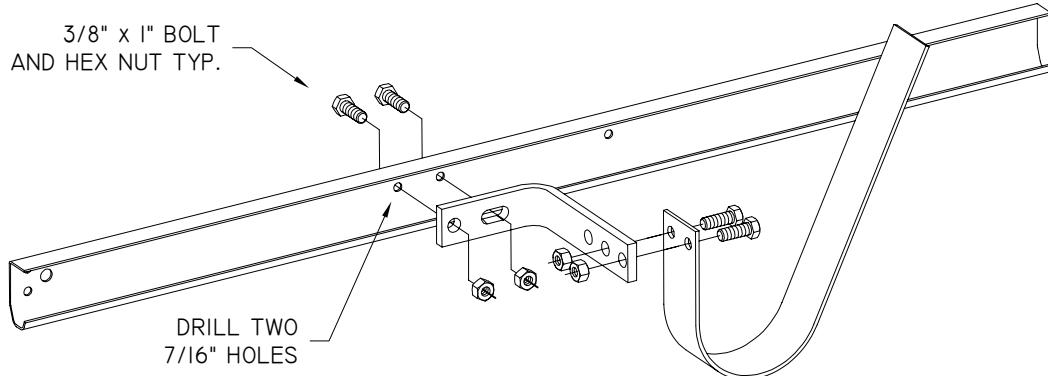


Headroom Chart

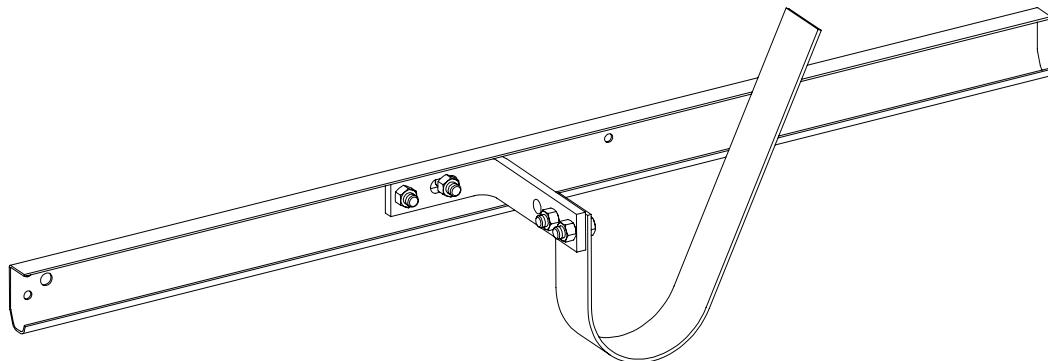
| Drum Type | 2" Track | | 3" Track | |
|--------------------|---------------|----------|---------------|----------|
| | Spring Center | Headroom | Spring Center | Headroom |
| 4-8 / 4-12 | 12" | 14-1/2" | 13" | 15-1/2" |
| 5-18 | 13" | 16" | 14" | 17" |
| 5-18 w/ 6" springs | 15" | 18-1/2" | 16" | 19-1/2" |
| 8-32 | N/A | N/A | 17-1/2" | 22" |

Supplemental Instructions

Spring Bumper Assembly



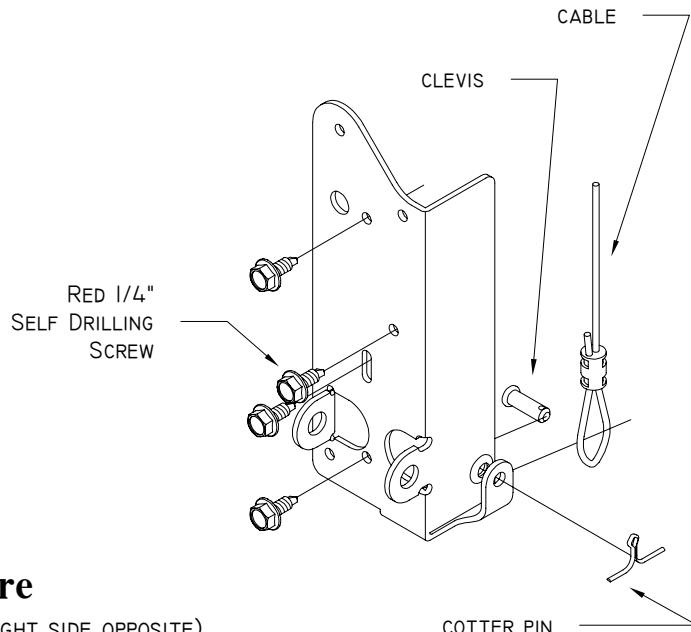
REAR OF HORIZONTAL CURVE TRACK



(LEFT SIDE SHOWN RIGHT SIDE OPPOSITE)

Supplemental Instructions

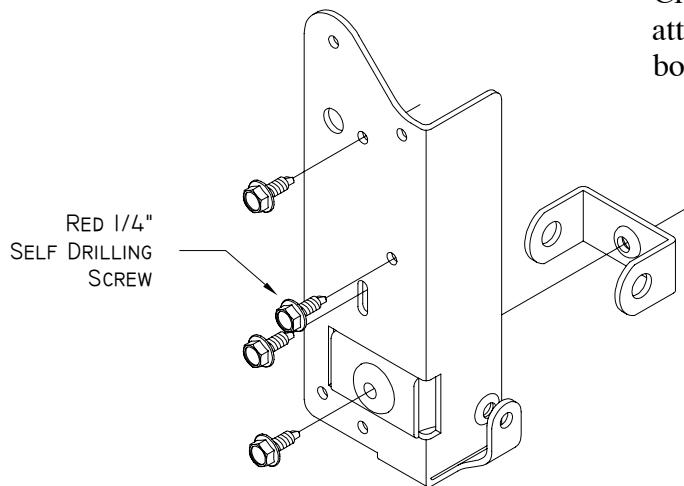
Additional Bottom Fixture Details



Loose Pin Bottom Fixture

(RIGHT SIDE SHOWN RIGHT SIDE OPPOSITE)

Clevis, Cotter Pin and Cable attach same as the Loose pin bottom fixture shown above.

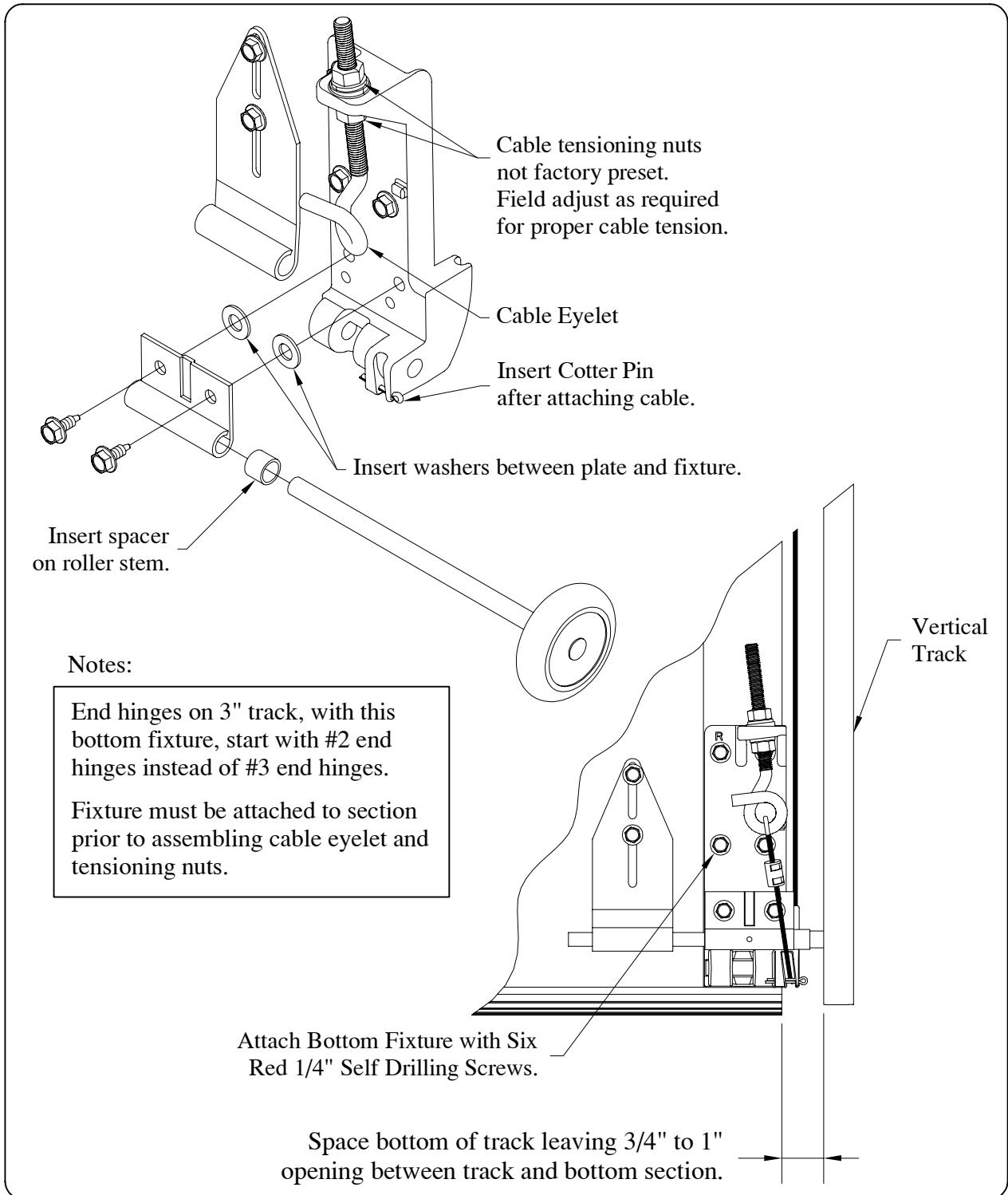


3" Track Bottom Fixture

(RIGHT SIDE SHOWN LEFT SIDE OPPOSITE)

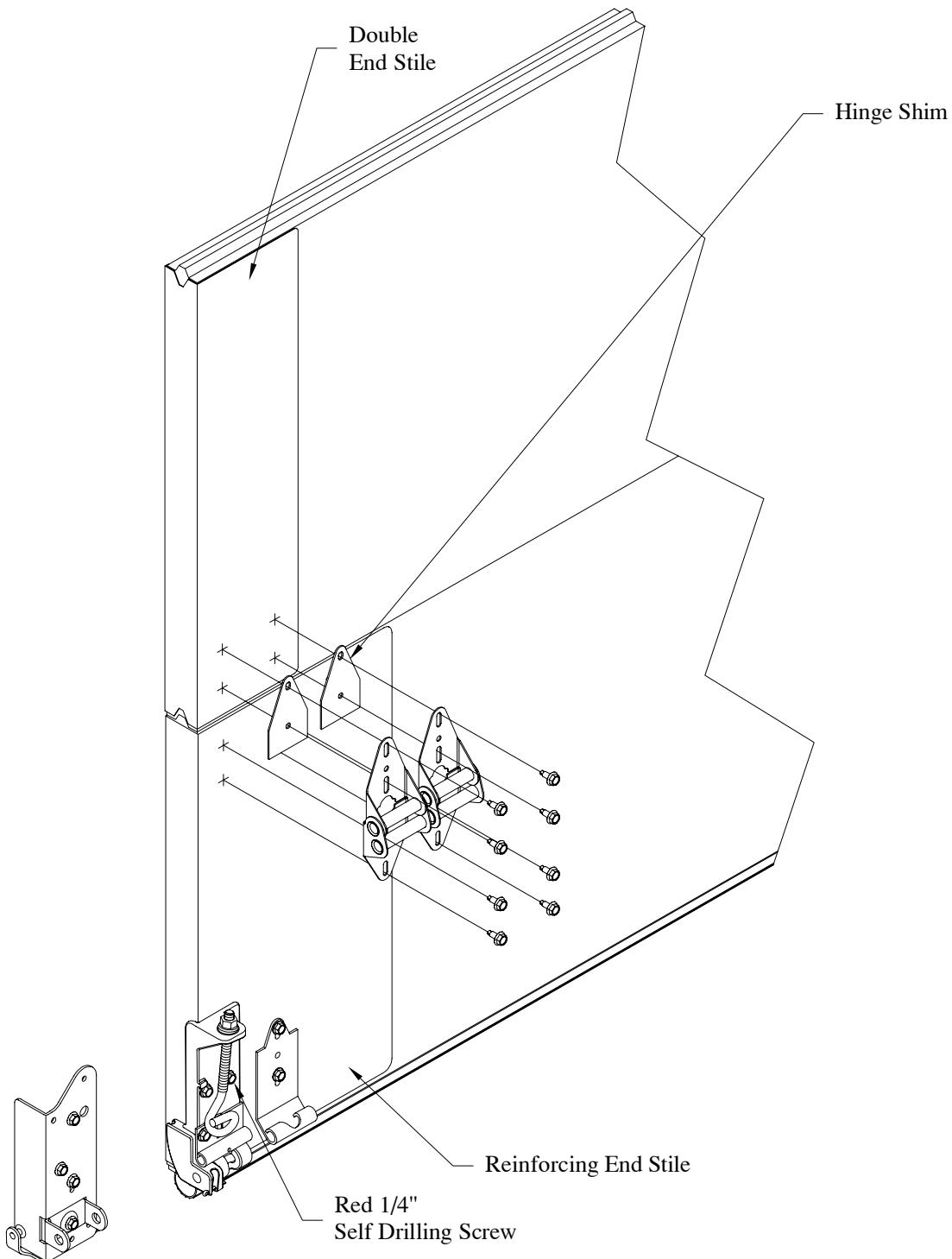
Supplemental Instructions

Heavy Reinforced Bottom Fixture



Supplemental Instructions

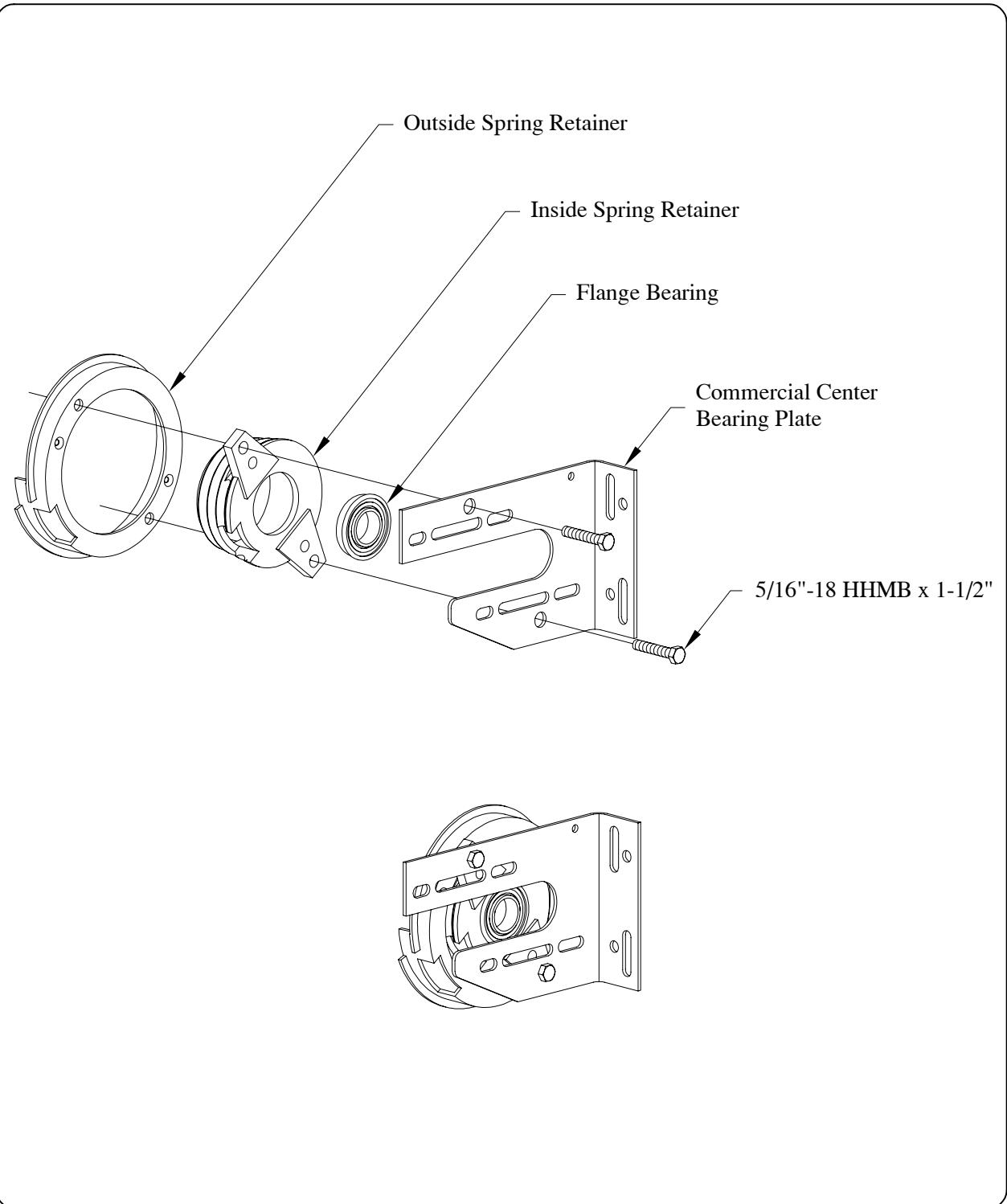
Reinforcing End Stile Hinge Shim Details on models 3212/3216/3285



Bottom fixture may change
depending on door weight

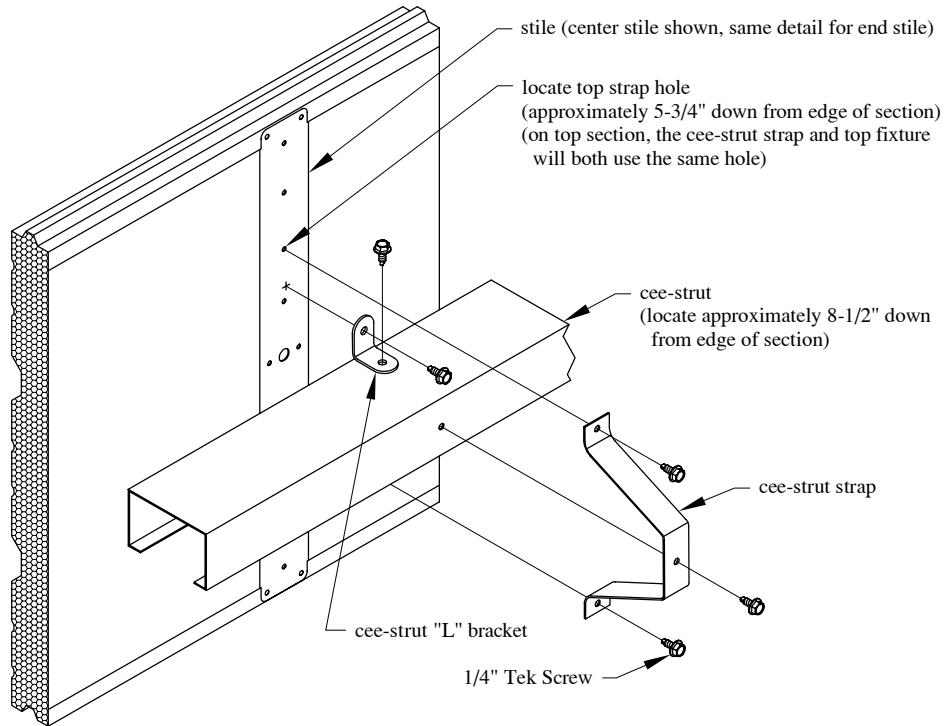
Supplemental Instructions

Duplex Spring Retainer Bearing Installation Instructions

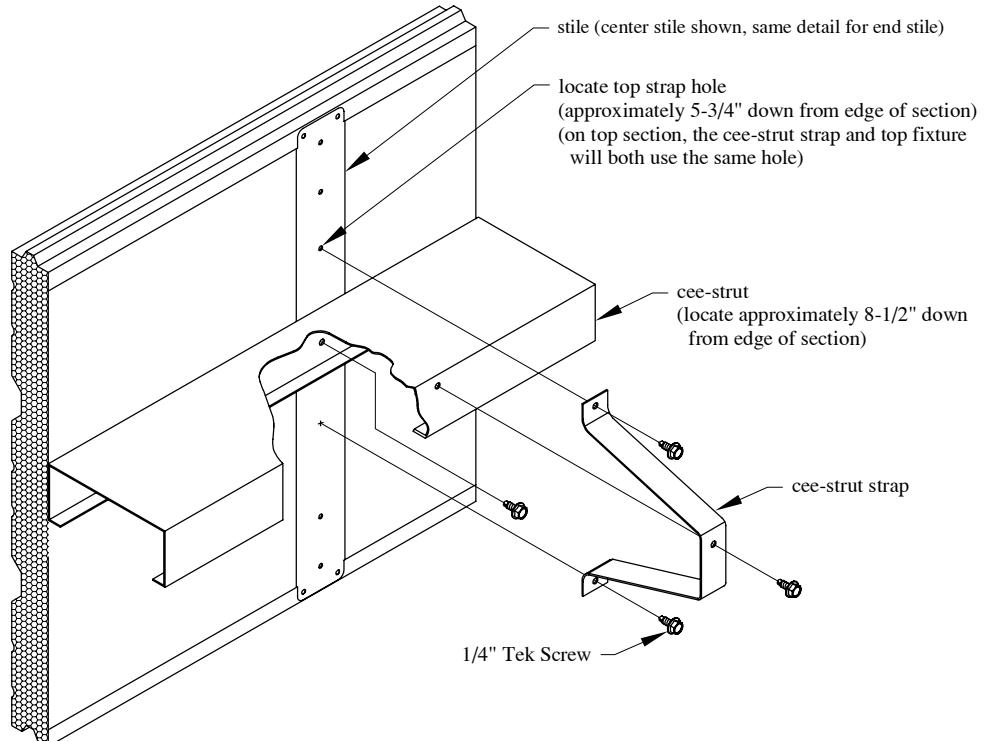


Supplemental Instructions

4" Cee-Strut with "L" Bracket Installation Instructions



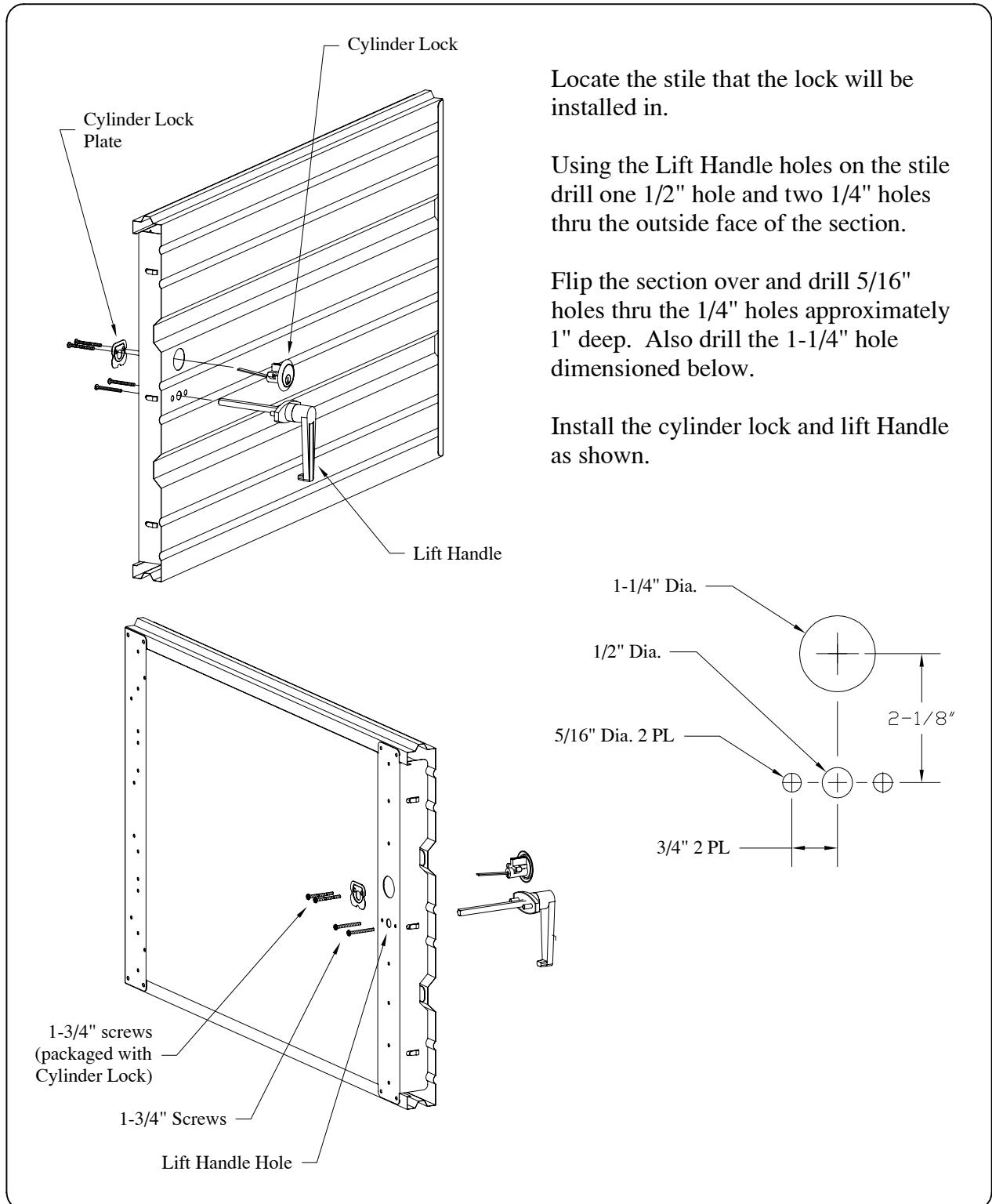
6" Cee-Strut without "L" Bracket Installation Instructions



Supplemental Instructions

Double Lock Bar Assembly

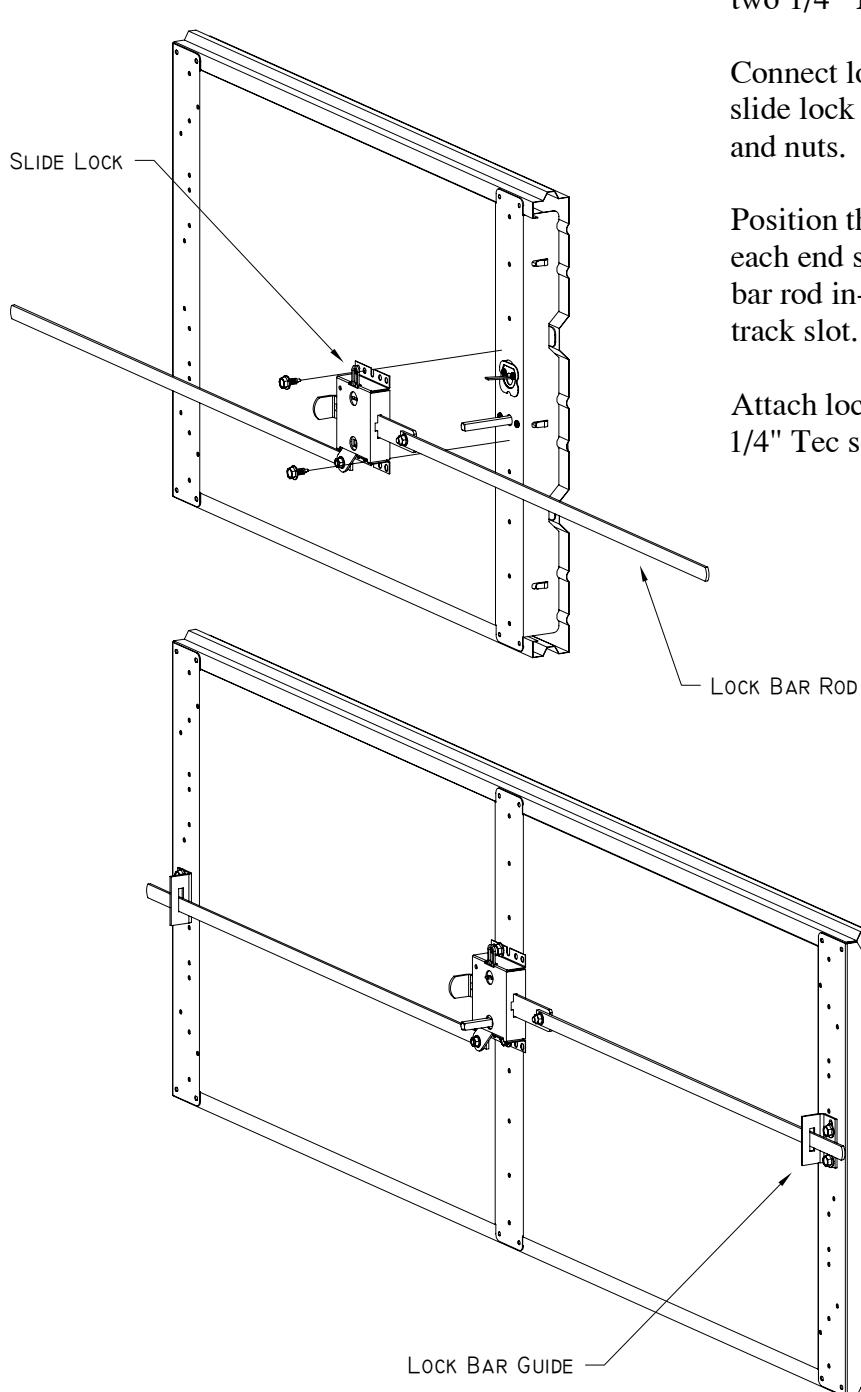
page 1 of 2



Supplemental Instructions

Double Lock Bar Assembly

page 2 of 2



Attach slide lock to stile using two 1/4" Tec screws.

Connect lock bar rods to the slide lock with supplied bolts and nuts.

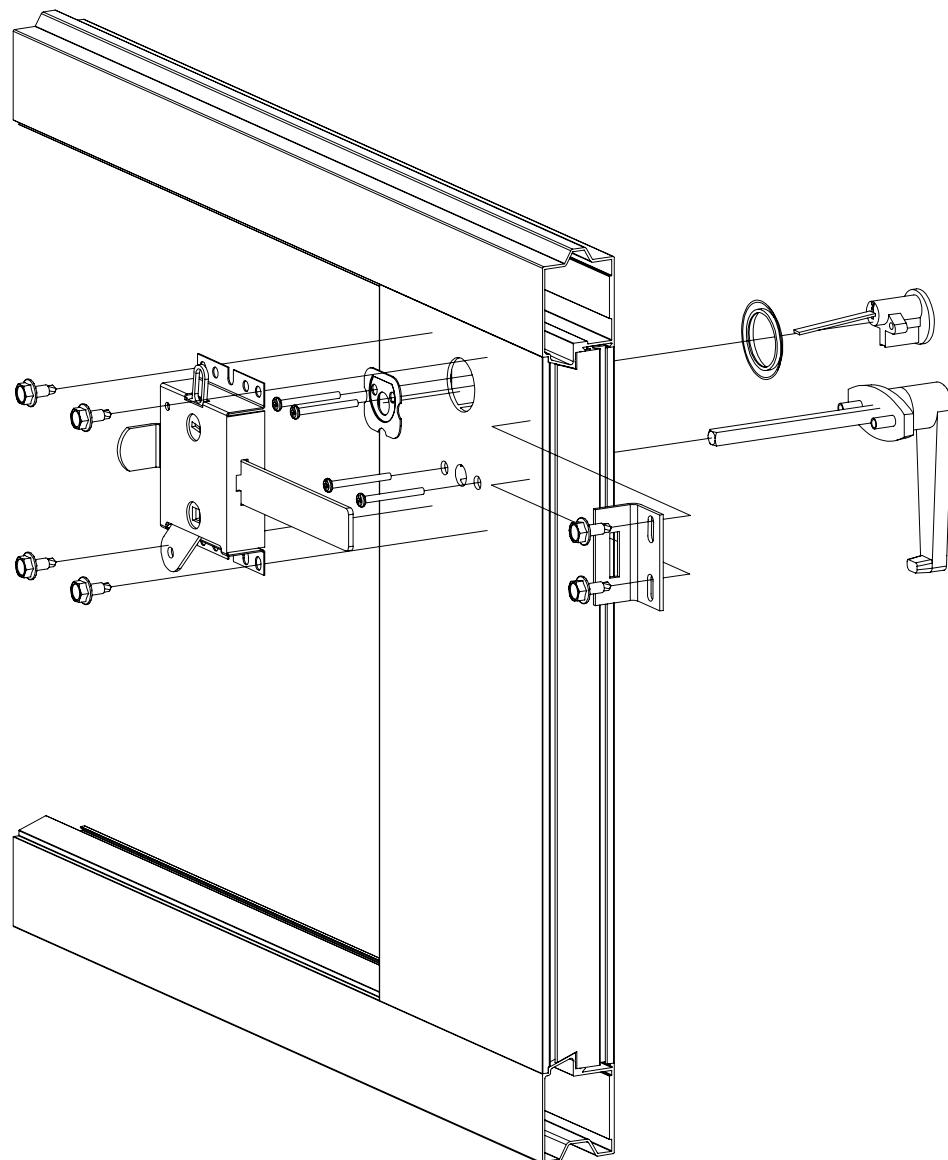
Position the lock bar guide on each end stile to place the lock bar rod in-line with the vertical track slot.

Attach lock bar guides with two 1/4" Tec screws.

Supplemental Instructions

Full View section with lock

Install the Cylinder Lock and Lift Handle as shown

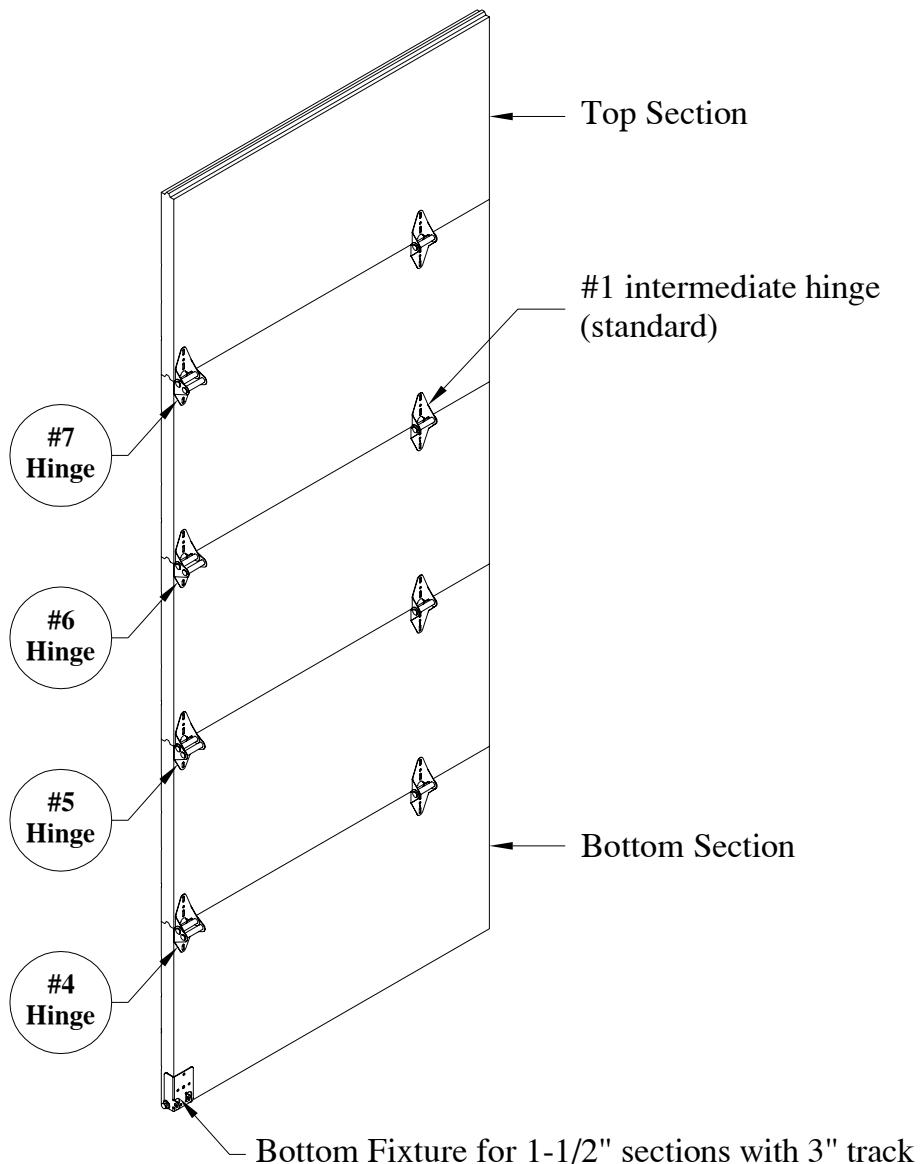


Supplemental Instructions

1-1/2" Doors with 3" Track

1-1/2" thick sections require a track system located closer to the jamb than 2" thick sections. This requires a different end hinge progression when using 3" track, as shown below. Note that the first set of end hinges start with a #4 hinge rather than a #3 hinge, which is common for 2" sections with 3" track.

The intermediate hinges do not change.

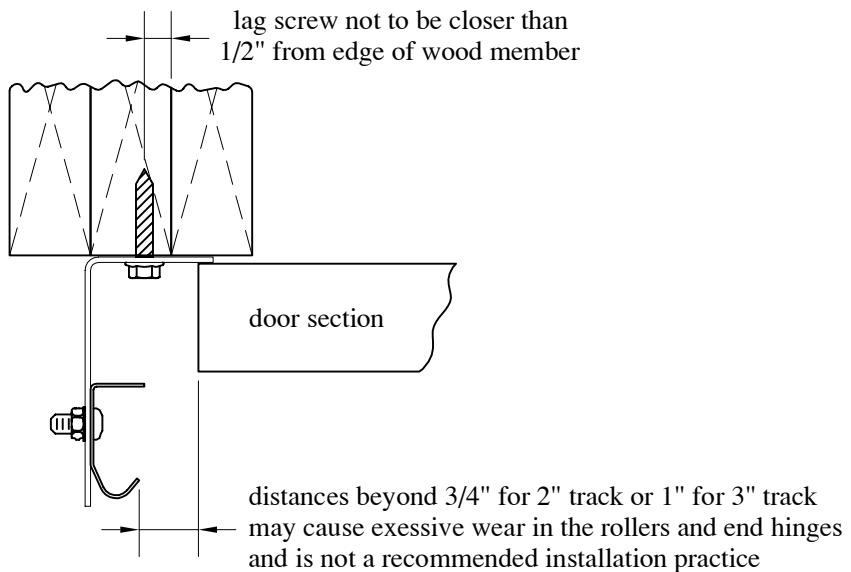


Supplemental Instructions

Reverse Angle Track Wood Attachment Detail

Recommended framing: Southern Pine or Spruce Pine Fir
Pre-drill 1/4" diameter pilot holes for lag screw insertion.
Lag screw: 5/16" diameter x 1-5/8" minimum long.
1-1/2" minimum lag screw embedment into structural wood.
Lag screws must be seated in full height frame members.
Suitability and design of the structural building components
must be verified by the engineer of record for the building.

wood framing
parallel
to opening



wood framing
perpendicular
to opening

