

IMPORTANT: CUSTOMER & INSTALLER TO READ THIS MANUAL PRIOR TO INSTALLATION & USE!

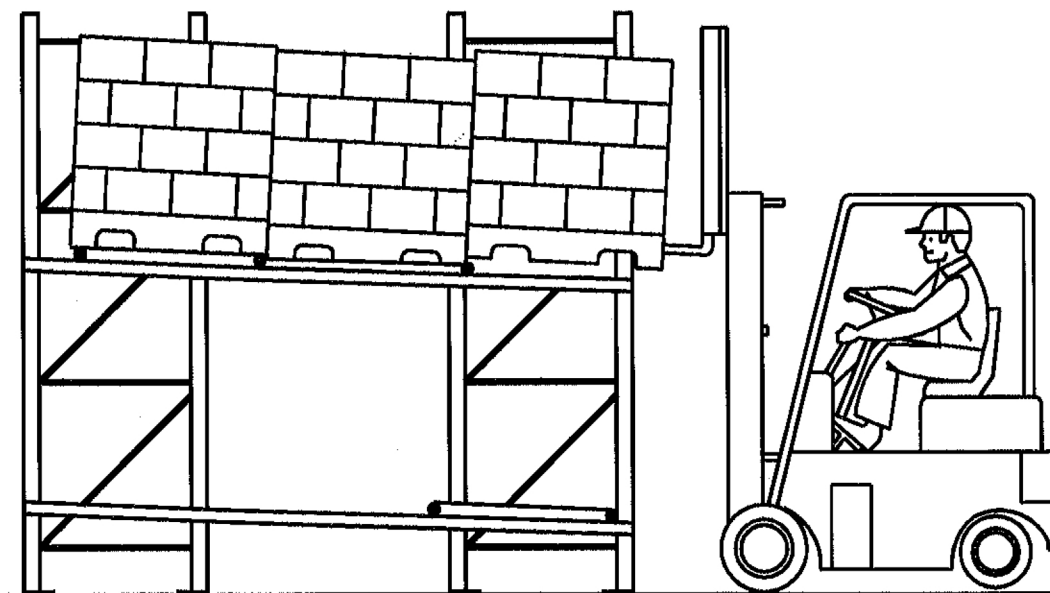
RIDG-U-RAK

INSTALLATION GUIDE
FOR

2 THROUGH 5 DEEP

PUSH-BAK[®]

STORAGE SYSTEMS

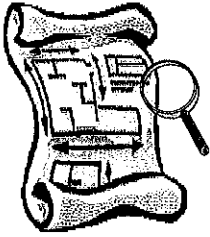


PUSH-BAK INSTALLATION GUIDE

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I. INTRODUCTION

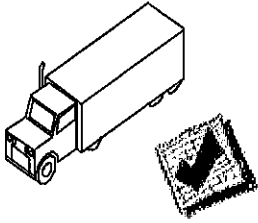


All instructions, including building construction drawings, Ridg-U-Rak drawings and this installation guide should be reviewed thoroughly by the customer and the installer before installation begins. By doing so you will provide yourself with a basic guide for erecting a PUSH-BAK rack system. Many factors, which vary from each installation, can determine the best procedure for erecting the system. Therefore your crew may require alternate methods and steps. The success of the installation will ultimately depend on the experience and skill of the installation crew.

II. IMPORTANT GUIDELINES FOR INSTALLATION

1. Damaged racks must be addressed by the customer immediately. Failure to do so could result in rack component failures.
2. Do not store rack material outdoors. Extensive damage may occur. The Push-Bak wheel bearings may seize if they are exposed to dampness or rain and the standard painted finish is not intended for outdoor storage.
3. Compatibility and correctness of materials supplied by other manufacturers for use with the rack system is not the responsibility of Ridg-U-Rak.
4. The rack must be installed using all components and hardware specified. Elimination of components or hardware should never be attempted.
5. Use of the rack for supporting loads beyond that for which it is specifically designed for, i.e. (sprinkler pipes, refrigeration equipment, etc.) should not be attempted.
6. Installation should be performed under the guidance and supervision of a person that is a qualified and experienced rack installer.
7. It is important that all personnel wear hard hats while installing bolted connections.
8. Proper floor design to accept the loading conditions imposed upon it by the rack structure shall not be the responsibility of Ridg-U-Rak.
9. Use of the rack as scaffolding, or climbing on the rack, is not recommended. Persons using the rack for these purposes shall do so at their own risk.
10. Never install beams from both ends of the row at same time. Always start at one end only, or from the center of a row and work both ways.
11. Always engage both ends of the beam at the same time, and be sure it has fully engaged the column before seating beams to install locking devices.
12. Do not hammer on ends of beams to install and seat! If seating is difficult, get a piece of 1" x 1" x 1/8" angle x 6" long. Stand it up on top of the hook and hit downward, seating the hook.
13. Normally a rawhide faced hammer or urethane hammer may be used for installing beams.

III. SHIPMENT CHECK AND UNLOADING INSTRUCTIONS



It is important that you thoroughly check the shipment against the bill-of-lading supplied with each truckload as soon as it arrives. Separate the shipment into groups of identical items. Check each item to assure that the physical quantities received agree with the bill-of-lading. While doing this you should familiarize yourself with the components and their nomenclature which will be used throughout this guide. Our responsibility for this shipment will cease when you sign for it after it arrives at your facility! If any goods called for on the bill-of-lading are short or damaged, do not accept this shipment until the freight agent makes a damaged notation on your freight bill. If any concealed loss or damage is discovered, notify your freight agent at once and ask him to make an inspection. This is absolutely necessary. Unless you do this, the transportation companies will not entertain any claim for loss or damage. If the agent will not make an inspection, then you should make an affidavit that you notified him (on a certain date) and he failed to do so. This, with other papers, will support your claim.

IV. GENERAL DESCRIPTION OF SYSTEM

Push-Bak systems are used to store pallets of goods two or more deep between aisles. Pallets are loaded onto a cart. The carts are nested to provide a low profile and are linked when extended. There may be as little as 1 cart or as many as 8 carts, depending on the application. The carts have steel flanged wheels that roll on rails that run from the aisle to the rear of the system. After the first cart is loaded with a pallet the fork truck can simply push the first pallet back to expose the second cart for pallet storage, then push the second pallet back to expose the third cart and so on. When the last pallet is in position the target plate (in front when lane is not full) will not be visible. The last pallet is loaded directly onto the rails, therefore a 3 cart Push-Bak system will allow for 4 pallet storage positions. Please note that although this guide shows 2-5 deep systems only there are systems provided by Ridg-U-Rak for 6-9 deep under a separate Push-bak Installation guide. Optional guards are available and may be desired to provide protection from lift truck damage. Use of pallet size other than that which the rack is designed for should not be attempted. Pallets should be of good condition with no loose or broken boards and also of sufficient strength to carry the intended loads.

V. FAMILIARIZE YOURSELF WITH THE RACK SYSTEM



Due to the numerous types of Push-bak systems, supplemental drawing(s) and a bill of material are generally required. They will show the rack front and side profile along with the locations and dimensions of frames, spacers, etc. for the system. They will also indicate the proper beam weld downs, beam locations, special features and optional components. Reading this guide and studying the drawing(s) and documents associated with this installation package is an important starting point in your installation. Any question regarding the layout, installation procedure, components, or documents after thoroughly reading this installation guide and supplemental drawing package should be brought to the attention of Ridg-U-Rak, Inc.

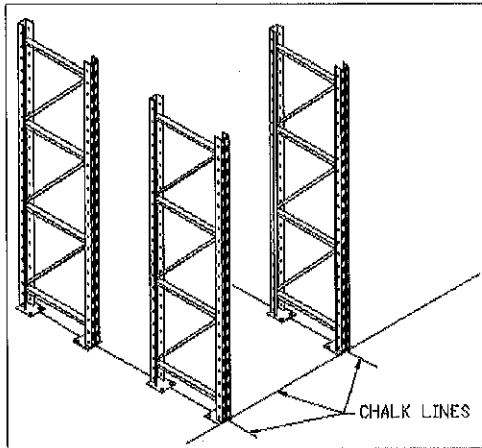
VI. INSTALLATION PROCEDURE

Step 1. CLEAR AREA

Installation area must be free and clear.

Step 2. CHALK LINES

The key to a good installation begins with an accurate floor layout. Using a tape measure and a chalk line, establish a grid pattern showing the front of each bank in the system and all frame centerlines. Placement of the rack will be established either by the customer or from drawings supplied by the customer or distributor.



(NOTE: It should be certain before using drawings that the customer has approved them for construction).

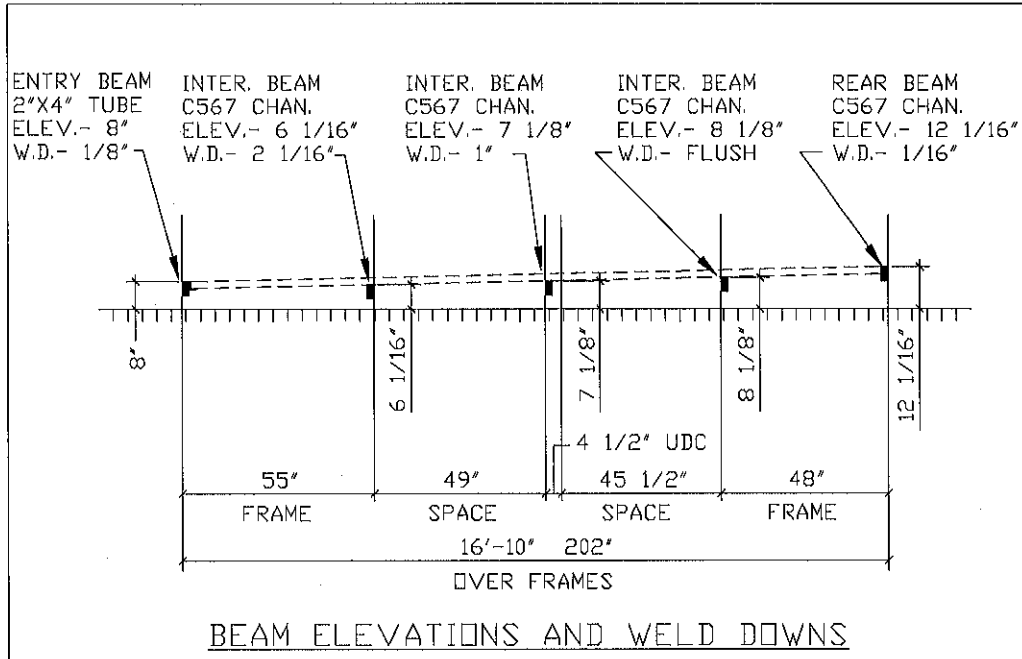
Step 3. SHIMMING

A laser or any surveying equipment may be used to establish any deviations in the floor. Find the high point of the floor in the area where the racking will be installed. Mark the floor or a chart with the information so each frame can be shimmed to establish a level system. The system must be plumb.

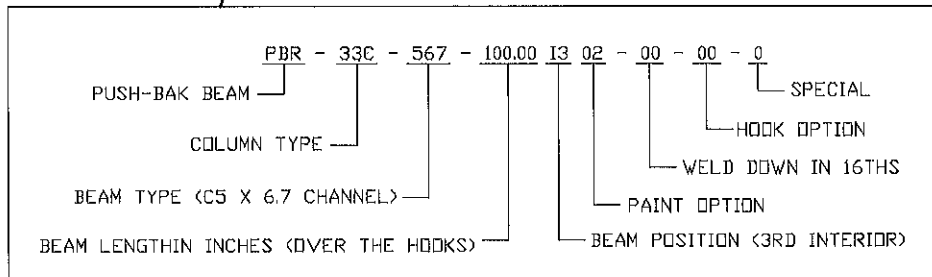
Step 4. BEAM and HARDWARE IDENTIFICATION

The beams for Push-bak systems have various weld downs (distance from top of connector to top of beam) to obtain the slope of the rails. The weld-downs, beam type and beam length are all parameters that may be found within the item description of the bill of material (see below). You may also reference the "Special Instructions", "Supplemental Drawing(s)" or contact Ridg-U-Rak to identify the beam weld-downs and their respective locations in the system. Each beam location will have a specific beam size and weld down that must be used. Generally, these are structural tubes or structural channel beams. Check before installing each beam that it is correct for that location. Beams should be installed at the indicated heights using the correct hardware specified in this manual. All hardware is A-325 high strength bolts and nuts. Do not, under any circumstances, use any hardware other than what is specified without approval from Ridg-U-Rak, Inc. Refer to the "Supplemental Drawings" and "Bolting & locking device details" of this guide to determine the correct hardware for all connections.

EXAMPLE: BEAM ELEVATION and WELD DOWN (See the supplemental drawing package and / or bill of material for the information that is specific to your push-bak system).



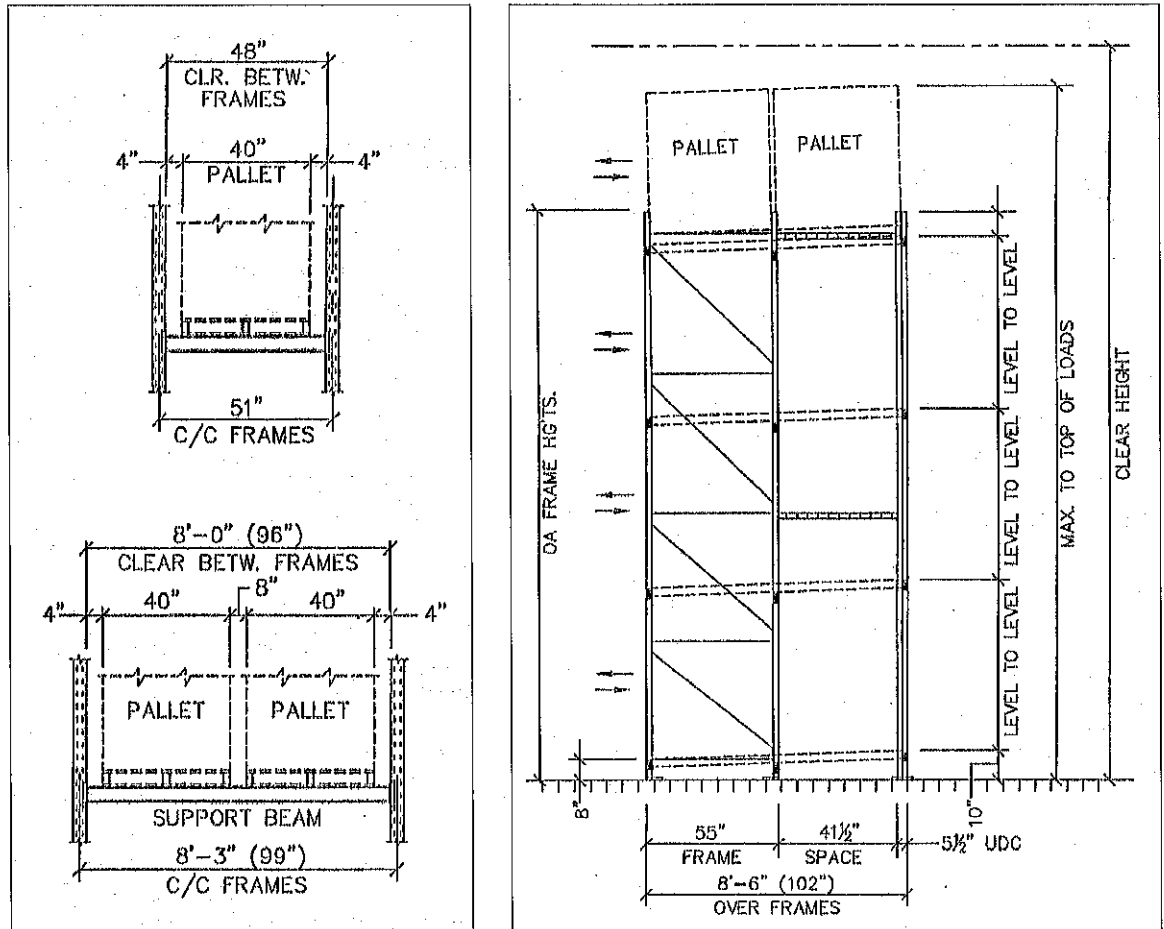
ITM #	MAPICS #	ITEM DESCRIPTION
10	513487	PBR-33C-567-100.00I302-00-00-0
		ENG DRAWING #:
		REVISION #:
		PUSHBAK BEAM (RIDG-U-RAK)
		ORANGE - SAFETY
		3RD INTERIOR BEAM WITH HOLES FOR RAILS



Step 5. RACK PROFILE

Push-bak racks should be started with the erection of a single bay. Refer to the proper rack profile from the "supplemental drawings" prepared for this particular system and/or "Special Instructions" herein. Identify and gather the correct components for a single bay at this time. Be sure to check for special features and optional components before initiating the installation process.

EXAMPLE: RACK PROFILE (See the supplemental drawing package for the rack profile that is specific to your Push-bak system).



Step 6. ERECTING A STARTER BAY (raising the first upright frame)

Start at the first frame location at the rear of the bay. Place the base of the frame on line and raise it to a vertical position. Recheck to be sure that it's on the proper line. Raising the upright is accomplished manually with relative ease by having one or two people place their feet on the base pads and two or three people raise the frame to a vertical position. This procedure will work with up to 23' or 24' upright frames. If the upright is too heavy, use a forklift truck to raise it. Be sure that the frame depth, height, style etc., and also the slope of the diagonal braces are correct. Frames are generally installed with the column at the high end of the diagonal brace as the front of the frame.

IMPORTANT: Hand tighten all bolted connections at this time. Do not torque until Push-bak systems are installed.

Step 7. RAISING THE SECOND UPRIGHT FRAME

With one or two people supporting the frame, repeat the procedure as outlined in #6 above, raising the next upright frame to a vertical position. Place the frames with brace patterns identical to each other. With someone holding the frames in their general locations, place a

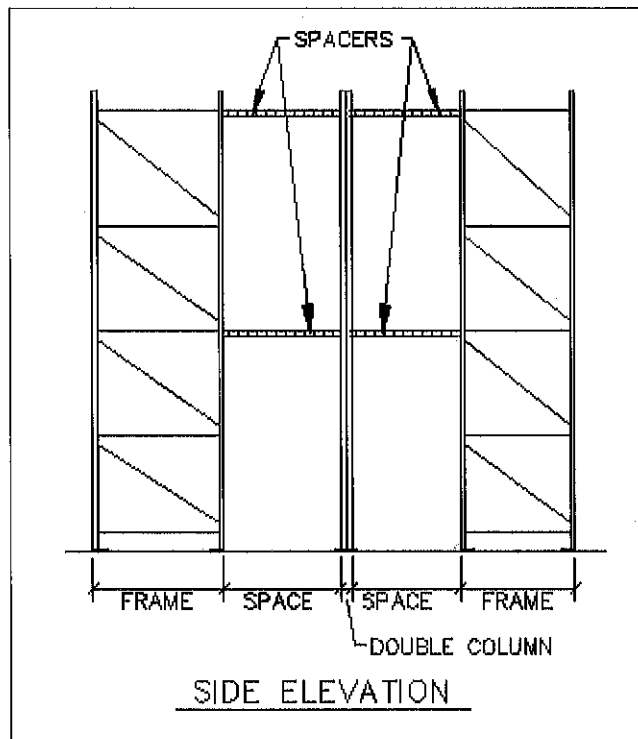
beam in its correct location by engaging both ends of the beam at the same time. Be sure the beam has fully engaged the columns. Seat the beam by tapping it into full engagement. Use a rawhide mallet. When the beam is fully seated, locks can be installed. If your system utilizes a bolted connection, hand-tighten all bolts. *Note: Position beams to assure a safe & steady starting structure. Install a second higher beam to steady the structure if necessary.

Step 8. INSTALLING REMAINING BEAMS AND FRAMES OF THE STARTER BAY

As previously stated there are many rack profiles. This is primarily due to the number of pallets deep and the number of levels in the Push-bak system. In order to erect a Starter Bay it is necessary to utilize the supplemental drawing(s) and bill of material for the correct profile and components. Install all frames and beams necessary to complete the starter bay.

Step 9. INSTALLING SPACERS

Spacers can be installed once you have frames standing with the correct beams in place. Generally spacers should be installed with the first one as close to the top as possible and additional spacers positioned down in 6-ft. increments. The number of spacers is determined by the frame height (see the supplemental drawings).



(REMINDER: Only hand tighten bolted connections at this time.) Be sure to check for Special Features and for optional components. See “Optional components” herein and the bill of material.

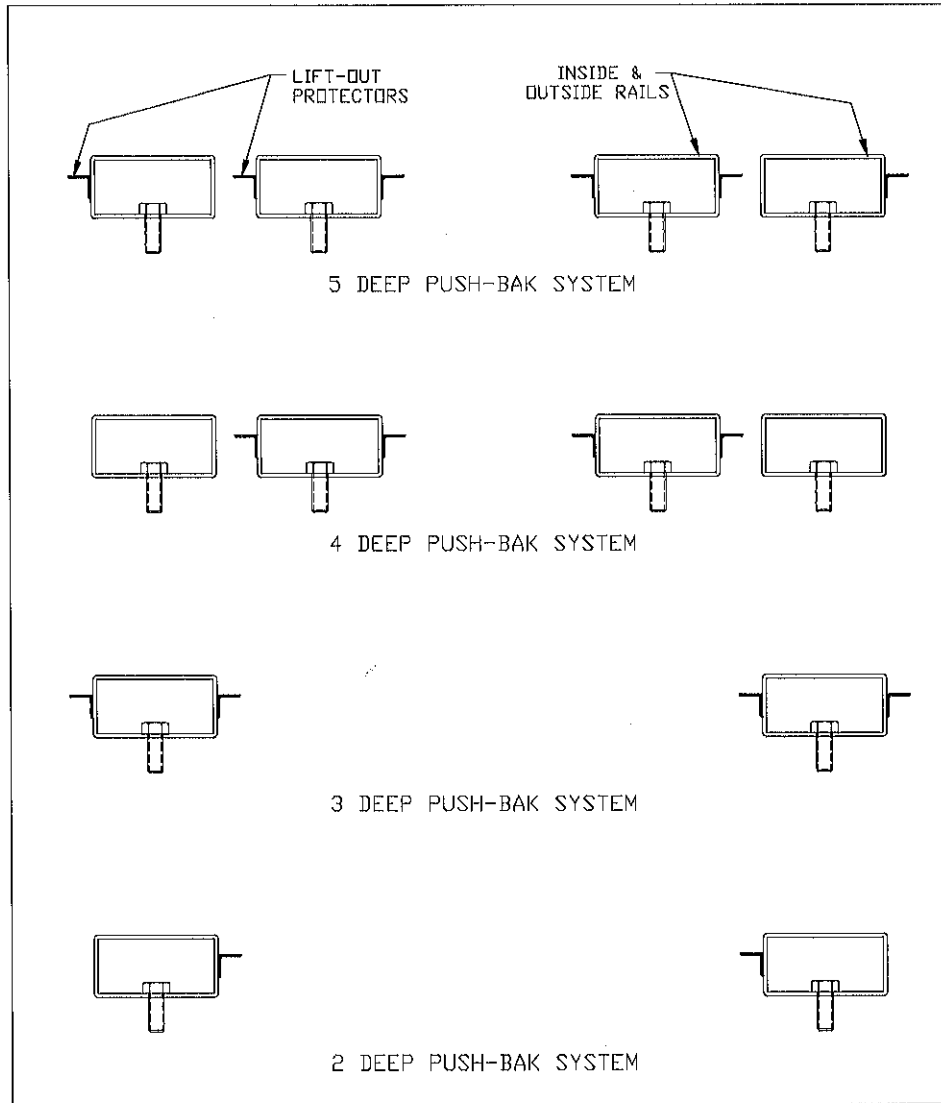
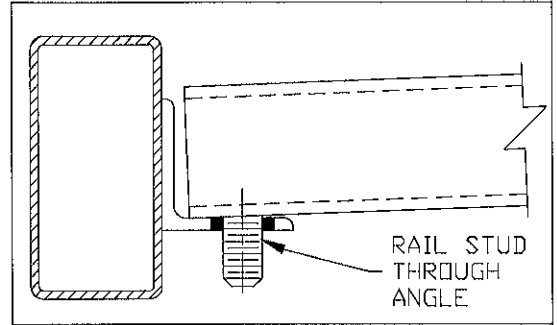
Step 10. INSTALLING TIE RODS



Please note that when installing a “5 deep double pallet width” system there are additional components that must be installed. In each double lane 2 “tie rods” must be installed with their hooks in the angled slots located at the center of the load / unload beams. The other ends of the tie rods are to be passed through the slots in the first interior beam and secured with the nuts supplied. See the “Bolting and locking device details” herein.

Step 11. INSTALLING THE PUSH-BAK SYSTEM RAILS

Installation of the Push-bak System can now begin. Standard rails all have threaded studs welded at the bottom of the rail tube at each end (as shown below). Front and rear beams include heavy angles with slots punched to ensure that rails are approximately spaced and parallel. Designers at Ridg-U-Rak determine the weld down on beams to achieve the appropriate slope, which is generally 1/4" per foot. Each lane consists of 2 or 4 rails. The rails are to be installed as shown below. The number of rails and lift out protectors depends on the depth of the system. Lift-out protectors are 3/4" x 3/4" x approximately 54" long and are at one end of the rails only. Rails should be installed so that the end with the angle is at the load / unload end. Nuts are provided to fasten the rails to the beams. When carts are installed, the lift-out angle brackets on the carts will fit under the angles on the rails.



Step 12. USING THE RAIL INSTALLATION GAUGE

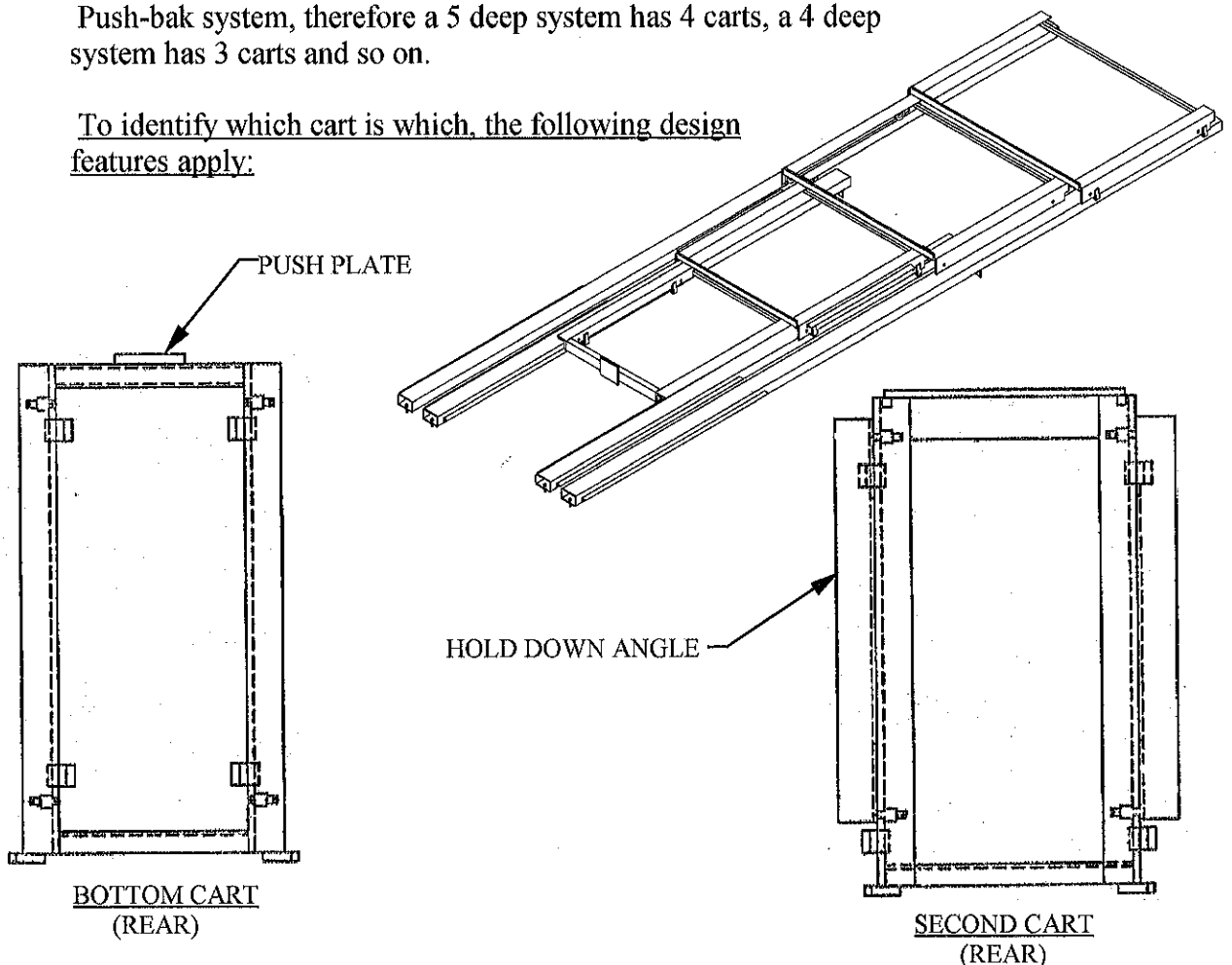
Ridg-U-Rak has included "rail installation gauge(s)" with the rail shipment. This tool must be used to set the distance between the rails before tightening them. This step is necessary in order to maintain a side shift allowance of 1/8" to 1/4" between the cart wheels and the rail. The procedure for gauging and tightening the Push-Bak rails is as follows:

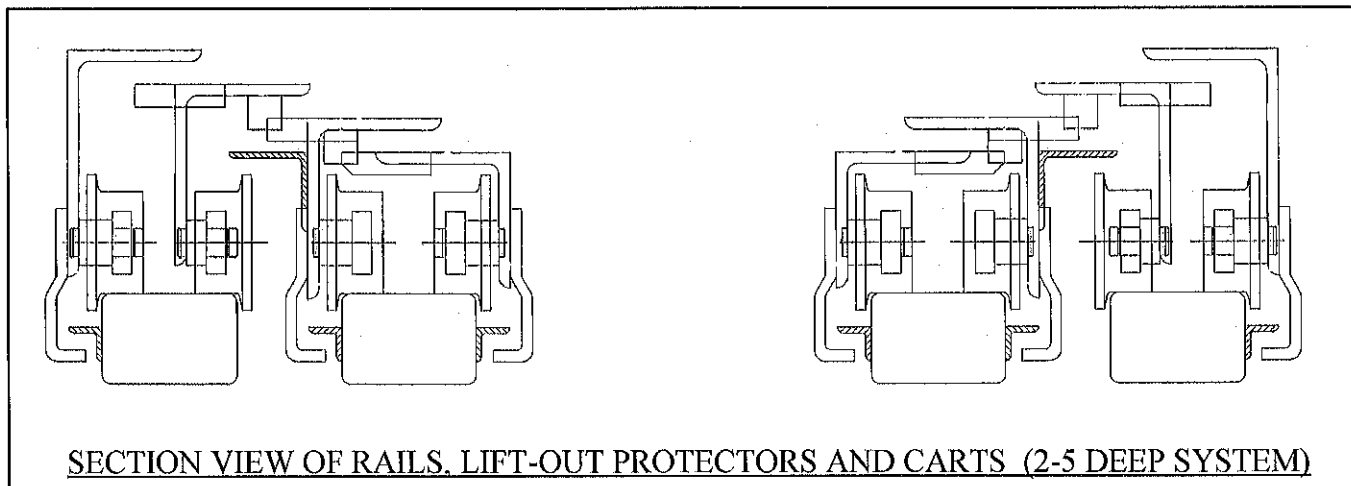
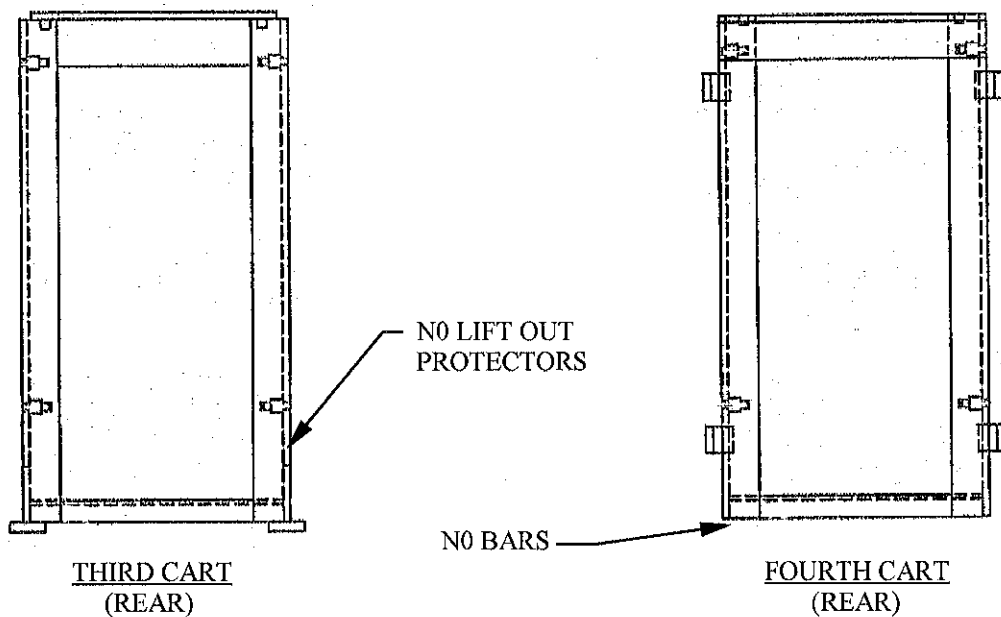
1. Start at either end of the rails and gauge the rails as close to the rail studs as possible.
2. Tighten the rails to the angle clips with the studs and nuts provided while the gauge is in place.
3. Move to the next point of connection to the beam, gauge the distance between the rails, and tighten the nuts while the gauge is in place.
4. Continue this procedure until you reach the opposite end of the system.
5. Double check the spacing between the rails back to the point you started at adjusting if necessary as you go.
6. If the system is 4 -5 deep, there will be two sets of rails and two separate gauges.

Step 13. INSTALLING PUSH-BAK CARTS

The cart with the pushplate on the center of the front cross member is installed first (if this is a 2 deep system there will be only one cart per lane) with the pushplate closest to the load / unload end. After the lowest cart (the one with the pushplate) is installed, subsequent carts are installed by placing them on the rails while overlapping the carts slightly forward of the rear of the previous cart. Use the rails as the last pallet position in the Push-bak system, therefore a 5 deep system has 4 carts, a 4 deep system has 3 carts and so on.

To identify which cart is which, the following design features apply:





Step 14. PUSH-BAK SYSTEM CHECK

When all carts are installed, they should be checked to ensure that they all roll freely up and down the lane. When pushed up a lane, carts should return to the load/unload end when released. If not, check to ensure that the small anti lift-out brackets on the carts are running freely below the 3/4" x 3/4" angles on the inside of the rails. Also check to ensure that the flange portion of the wheels on the carts are positioned as shown in step 13 graphics above.

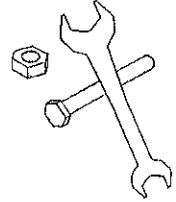
DANGER! DO NOT STAND OR PUT HANDS, ARMS, LEGS, ETC. IN THE INTERIOR OF THE BAY DURING TESTING.

Carts should have a small amount of side shift allowance to prevent binding of the wheels against the rail. This side shift allowance should be 1/8" to 1/4". If side shift is significantly different from this dimension, then it is advisable that the installer use the rail installation gauge to check the distance between the rails and make corrections if necessary. If no

corrections are necessary measure the exact distance between the rails, and then contact Ridg-U-Rak to isolate the cause. After installation, carts should be nested above each other at the load / unload position when empty. To check that the carts are inserted properly, pull the empty top cart towards the back of the lane. Each cart should travel approximately one pallet depth before engaging the next cart and then pulling it up the lane behind the previous cart (as shown in step 13 graphics above).

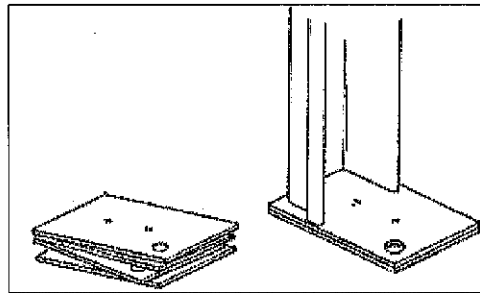
Step 15. TIGHTEN AND TORQUE ALL BOLTED CONNECTIONS

Bolted connections in the rack system should now be tightened and torqued to the proper specifications. (Refer to the “Bolting & locking device details section herein).



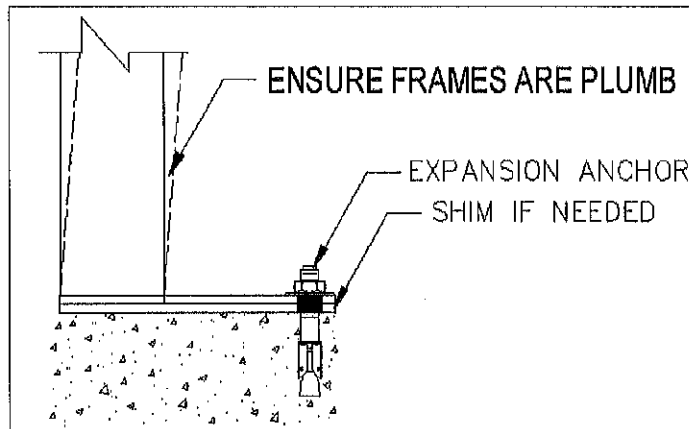
Step 16. SHIMMING THE STARTER BAY

Shim the frames, if needed, with Ridg-U-Rak metal shims (or equivalent) at this time to ensure the frames are plumb.



Step 17. LAGGING THE STARTER BAY

The starter bay should be near complete, plumb and correctly positioned on the chalk lines. It should be anchored now to ensure that the rack system stays in position. Lag only the frames at the end of the row. The remainder of the lagging will be done as the final step. Lag bolts must be of the type specified in the bill of material, “Supplemental drawings” or in the “Special Instructions” herein. Refer to the floor chart or markings on the floor that were made in Step 3 for shimming. Add Ridg-U-Rak metal shims (or equivalent) as required by your chart or markings. (Ridg-U-Rak shim thicknesses available: 1/16”, 1/8”, 3/16”, 5/64” and 7/64”).



Step 18. COMPLETING A BANK OF PUSH-BAK RACK

The remainder of the Push-bak rack bank can now be completed by repeating Steps 6 –15.

Step 19. FINAL SHIMMING

Refer to the floor chart or markings on the floor that were made in Step 3 for the shimming of the remainder of the Push-bak system bank. Add Ridg-U-Rak metal shims (or equivalent) as required by your chart or markings.

Step 20. FINAL LAGGING

With the rack and Push-bak components correctly erected and the entire bank level and on line, lag each frame or frame post with (2) lag bolts. Lag bolts must be of the type and dimensions specified in the bill of material, “Supplemental drawings” or “Special instructions” herein.

Step 21. COMPLETING THE ENTIRE PUSH-BAK RACK SYSTEM

Repeat Steps 6-20 for each bank of Push-bak rack, always using a level on line and lagged starter bay, until the entire system is complete.

Step 22. TECHNICAL ASSISTANCE

If after reading all documents, guides and drawings you are experiencing difficulty during the identification, installation, or any other aspect of the installation of the Push-Bak system, please call Ridg-U-Rak at (814)-725-8751. If we receive a call from an installer on site with a cellular phone, we can sort out questions or difficulties, usually without delay.

VII. COMPLETION CHECK

Check the following items before releasing the rack system for customer use!

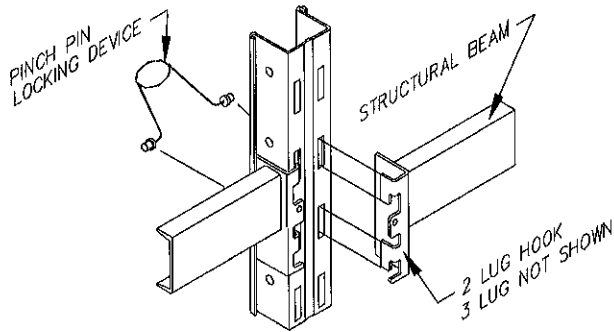
HAVE YOU:

- Installed all required component parts including optional components ?
- Installed, tightened and torqued all bolts or connections to the required specifications as shown in the “Bolting & locking device details” herein ?
- Plumbed and leveled all frames and posts within the applicable tolerances ?
- Anchored all frames and posts with the correct anchors ?
- Checked the carts in each lane to ensure they roll freely and extend in a linked fashion as indicated in step 13 ?
- Cleaned up the work site to provide a safe working environment ?

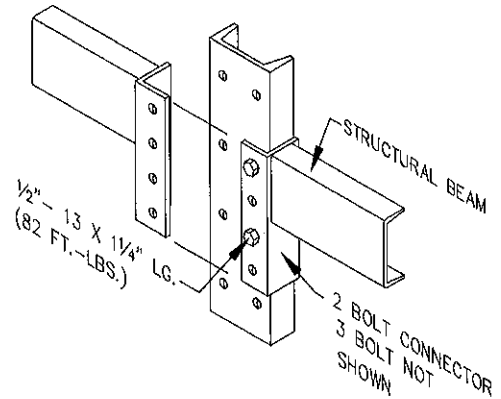
VIII. BOLTING & LOCKING DEVICE DETAILS

NOTE: All bolts and nuts are "A325" grade and plated unless specified otherwise.

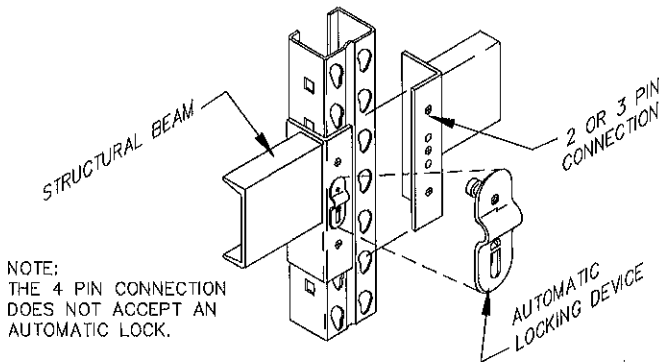
CONNECTION DESCRIPTION & TORQUE REQUIREMENTS



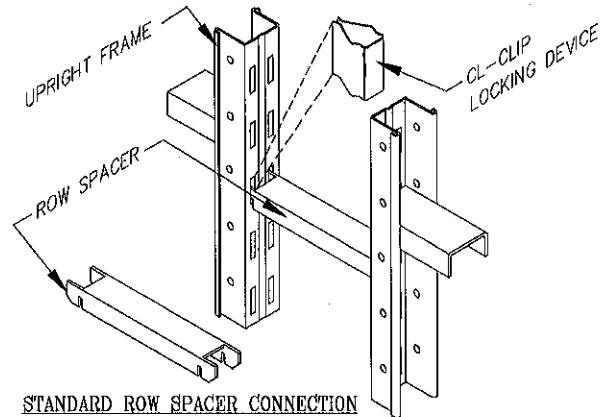
STANDARD 2 OR 3 LUG HOOK WITH PINCH PIN



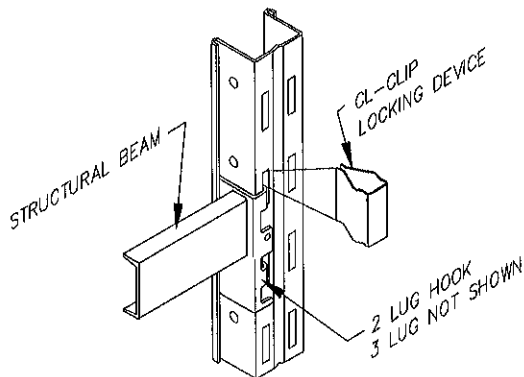
STANDARD 2 OR 3 BOLT CONNECTION



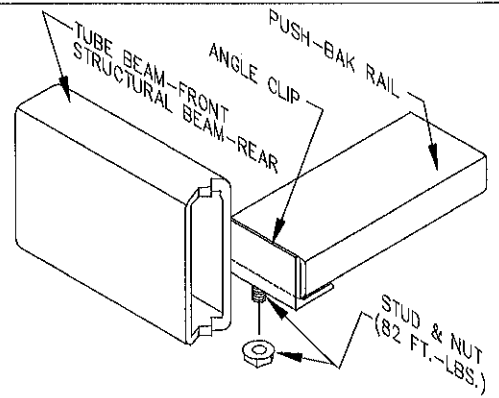
STANDARD 2 OR 3 PIN CONNECTION WITH AUTOMATIC LOCK



STANDARD ROW SPACER CONNECTION



STANDARD 2 OR 3 LUG HOOK WITH CL-CLIP

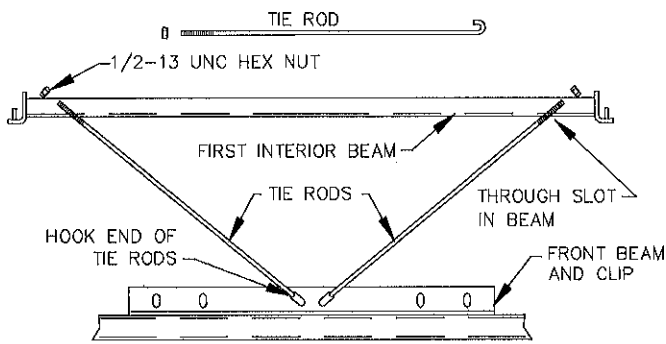


STANDARD FRONT & REAR PUSH-BAK RAIL CONNECTION

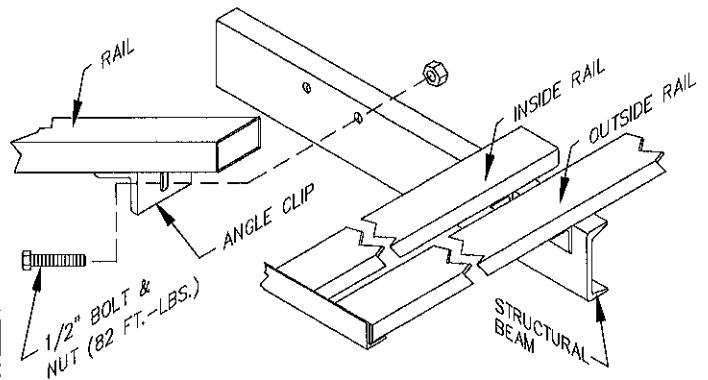
IX. BOLTING & LOCKING DEVICE DETAILS

NOTE: All bolts and nuts are "A325" grade and plated unless specified otherwise.

CONNECTION DESCRIPTION & TORQUE REQUIREMENTS



STANDARD TIE ROD CONNECTION FOR 5 DEEP DOUBLE LANE SYSTEM



STANDARD RAIL CONNECTION AT INTERIOR BEAMS

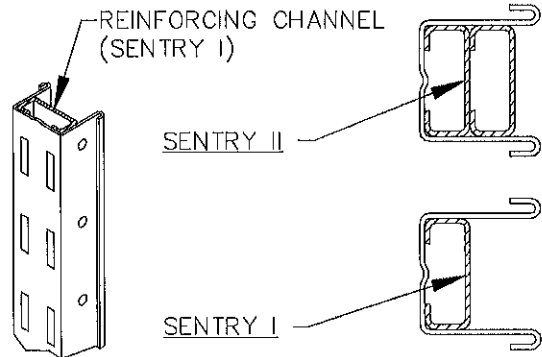
IX. OPTIONAL COMPONENTS

Most optional components are not covered under the standard installation procedure. The following options may be included in your system. Options should be identified within the "Supplemental drawings", (as stated in step 5), early in the installation process to avoid unnecessary delays and having to rework the system. The bill of material and "Special instructions" should also be reviewed for any information regarding optional components.

A. REINFORCED UPRIGHT FRAMES

UPRIGHT FRAMES LOCATED AT THE AISLES OR THE ENDS OF THE ROWS MAY CONTAIN ADDITIONAL PROTECTION. THIS IS USUALLY IN THE FORM OF A SINGLE CHANNEL REINFORCEMENT (SENTRY I) OR TWO CHANNELS (SENTRY II) EXTENDING UP TO THE FRAMES HORIZONTAL CROSS PIECE.

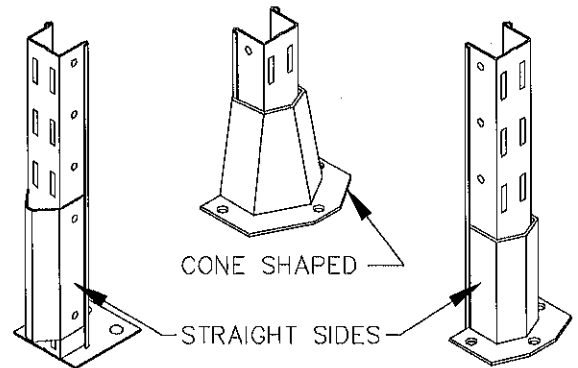
(NOTE: FIELD DRILLING THROUGH THE REINFORCEMENT MAY BE REQUIRED IN SOME SENTRY II CONDITIONS.)



B. COLUMN GUARDS

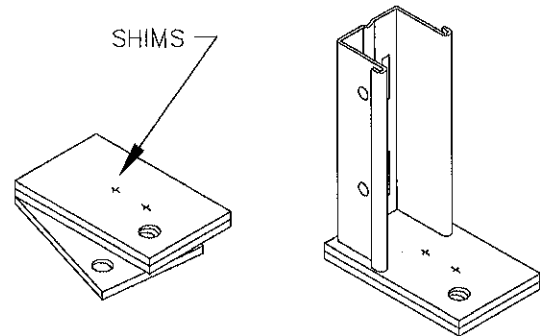
UPRIGHT FRAMES LOCATED AT THE AISLES MAY UTILIZE THE ADDITIONAL PROTECTION OF COLUMN GUARDS. COLUMN GUARDS COME IN VARIOUS STYLES WHICH ARE USUALLY BOLTED TO THE FRAME OR LAGGED TO THE FLOOR.

COLUMN GUARDS MAY ONLY BE USED WITH A PUSH-BAK SYSTEM WHEN THE LOCATION OF THE FRONT BEAM IS HIGH ENOUGH OR THE GUARD IS MODIFIED TO EXCEPT THE BEAMS.



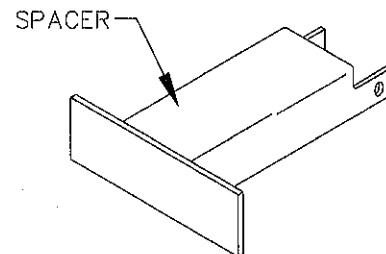
C. SELF POSITIONING SHIMS

SHIMS MAY BE REQUIRED FOR THE PLUMBING AND LEVELING OF FRAMES IN INSTALLATIONS WHERE THE FLOOR SURFACE IS NOT LEVEL. RIDG-U-RAK METAL SHIMS ARE INSTALLED ALIGNING THE LAG HOLES AND DIMPLES WITH THE EXISTING FLOOR PADS. A COMBINATION OF SEVERAL THICKNESSES MAY BE INSTALLED IF NECESSARY.



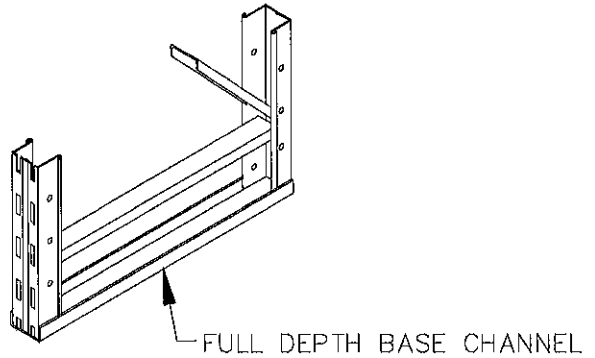
D. ROW SPACERS (RACK TO WALL)

UPRIGHT FRAMES LOCATED NEAR A WALL SOMETIMES UTILIZE A SPACER BETWEEN THE WALL AND RACK.



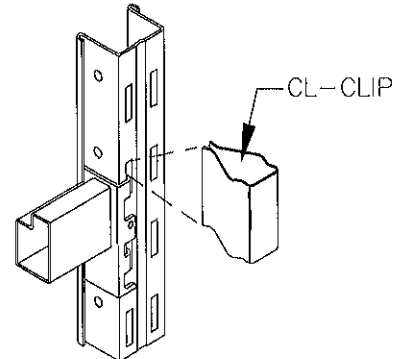
E. FULL DEPTH BASE CHANNEL

THE FULL DEPTH BASE CHANNEL IS USED WHEN THERE IS A DEMAND FOR INCREASED STABILITY OR A GREATER AREA OF WEIGHT BEARING SURFACE. IT MAY ALSO BE USED WHEN THERE ARE SEISMIC CONCERNS.



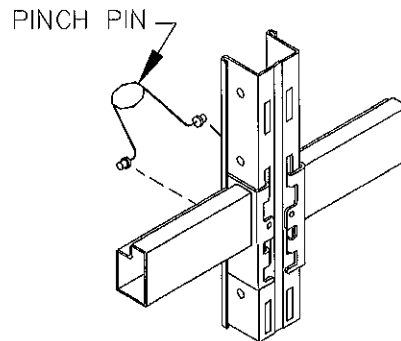
F. CL-CLIP

CL-CLIPS ARE USED WHEN THERE IS A POSSIBILITY OF INADVERTENTLY DISLODGING THE BEAM FROM ITS' SEATED POSITION WITHIN THE FRAMES. IT IS PLACED IN THE UNUSED PORTION OF THE SLOT IN THE FRAME OR POST JUST ABOVE THE HOOK OF A BEAM. IT IS INSERTED BY PUSHING IT INTO PLACE BY HAND AT BOTH ENDS OF THE BEAM AFTER IT IS SEATED.



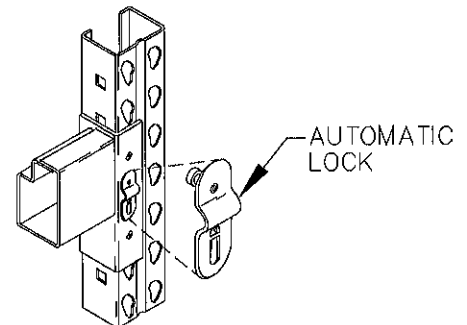
G. PINCH PIN LOCK

PINCH PINS ARE USED EITHER AS A MEANS OF CONNECTION OF COMPONENTS OR AS A LOCKING DEVICE. THEY ARE MADE OF (2) PINS & A SPRING-LIKE COIL. PINCH PINS ARE INSERTED BY PINCHING OR SQUEEZING & THEN RELEASING THE PINS INTO APPOSING HOLES THAT ARE PUNCHED INTO THE SIDES OF A POST OR FRAME (SHOWN AT RIGHT). THEY CAN BE USED TO LOCK BEAMS IN PLACE OR CONNECT FRAME SPACERS AMONG OTHER USES.



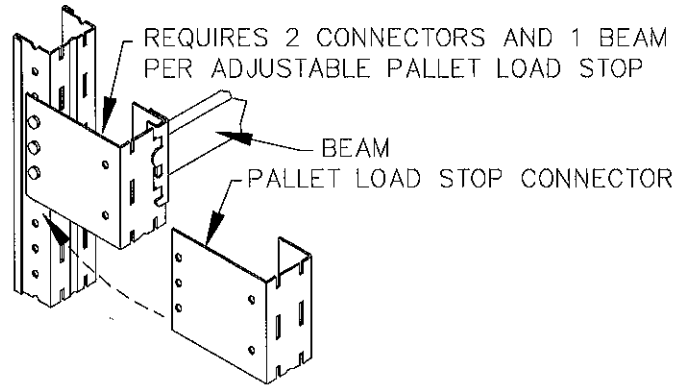
H. AUTOMATIC LOCK

AUTOMATIC LOCKS ARE USED WHEN THERE IS A POSSIBILITY OF INADVERTENTLY DISLODGING THE BEAM FROM ITS' SEATED POSITION WITHIN THE FRAMES. IT IS USED WITH "TEAR DROP" STYLE UPRIGHT FRAMES. THIS TYPE OF LOCK IS INSTALLED AT THE MIDDLE OF THE BEAM CONNECTOR PRIOR TO SEATING THE BEAM. INSTALL AUTOMATIC LOCKS AT BOTH ENDS OF THE BEAM IN THE HOLES PROVIDED, WITH THE PIN ORIENTED AT THE TOP (AS SHOWN). WHEN THE BEAM IS FULLY SEATED THE AUTOMATIC LOCK PINS WILL SPRING INTO PLACE LOCKING THE BEAM.



I. ADJUSTABLE PALLET LOAD STOPS

ADJUSTABLE PALLET LOAD STOPS ARE USED WHEN STOPPING A LOAD FROM PROTRUDING BEYOND A CERTAIN POINT IS NECESSARY. THEY CONSIST OF OFFSETS CALLED "PALLET LOAD STOP CONNECTORS" AND A BEAM. THE CONNECTORS ARE BOLTED ON THE FRAME UPRIGHTS AT APPROXIMATELY LOAD CENTER THEN THE BEAM IS SEATED TO COMPLETE THE ADJUSTABLE PALLET LOAD STOP.



XI. SUPPLEMENTAL DRAWINGS

Within this installation guide package there are supplemental drawings and documents to support the installation crew. These drawings/documents are specifically produced for this installation and will provide pertinent information. They will show rack profiles, locations & dimensions along with the proper beam weld downs, locations & sizes. Reading this guide and studying the drawing(s) and document(s) associated with this installation package is an important starting point in your installation. All instructions, including building construction drawings, Ridg-U-Rak drawings, the bill of material and this installation guide should be reviewed thoroughly by the customer and the installer before installation and use. By doing so you will provide yourself with the information needed to use as a basic guide when erecting a PUSH-BAK rack system. Any question regarding the layout, installation procedure, components, or documents after reading this installation guide and supplemental drawing package should be brought to the attention of Ridg-U-Rak, Inc.

(NOTE: It should be certain before using these drawings/documents that the customer has approved them for construction).

The number of drawings / documents attached to this installation guide is: _____

Please be sure all information is accounted for.