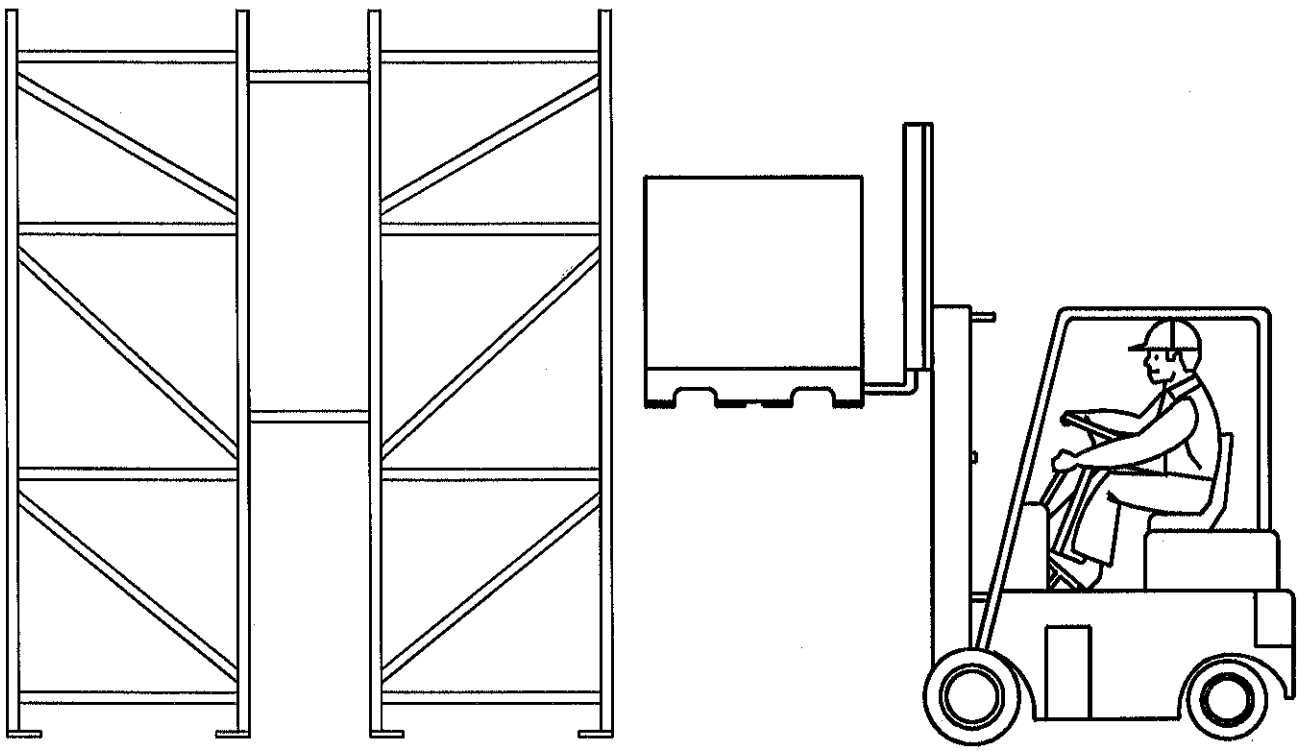
IMPORTANT: CUSTOMER & INSTALLER TO READ THIS MANUAL PRIOR TO INSTALLATION & USE !

RIDG-U-RAK

INSTALLATION GUIDE
FOR

SELECTIVE RACK

STORAGE SYSTEMS



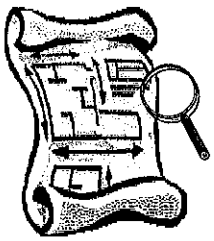
MAPICS NO. 510805

REVISED 3/1/00

SELECTIVE RACK INSTALLATION GUIDE

CONTENTS

I. INTRODUCTION

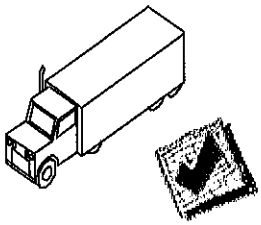


All instructions, including building construction drawings, Ridg-U-Rak drawings and this installation guide should be reviewed thoroughly by the customer and the installer before installation begins. By doing so you will provide yourself with a basic guide for erecting a SELECTIVE rack system. Many factors, 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 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. All beams must be locked in place with beam locks or automatic locks.
6. Decking material must be securely anchored and supported to insure that it cannot accidentally shift during loading and unloading the rack.
7. 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.
8. Installation should be performed under the guidance and supervision of a person that is a qualified and experienced rack installer.
9. It is important that all personnel wear hard hats while installing bolted connections.
10. Proper floor design to accept the loading conditions imposed upon it by the rack structure shall not be the responsibility of Ridg-U-Rak.
11. 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.
12. 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.
13. 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.
14. The use of proper tools for rack assembly is mandatory.
15. 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.
16. 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

Selective rack systems are used to store goods between aisles. This most common rack storage method permits immediate accessibility to every pallet load in the system. This type of system may be 2 or more levels high and virtually any length. There are many available optional components for this system such as column guards which 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 Selective rack 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, beams, etc. for the system. They will also indicate, 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.

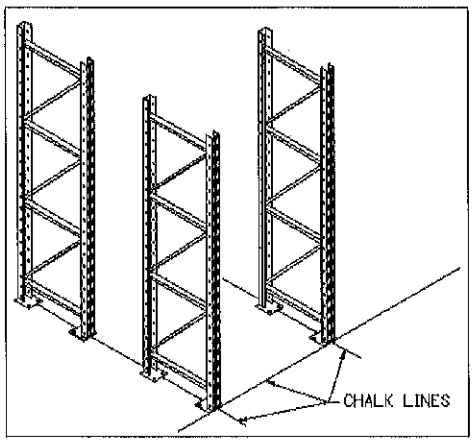
VI. INSTALLATION PROCEDURE

Step 1. CLEAR AREA

Installation area must be free and clear.

Step 2. CHALK LINES

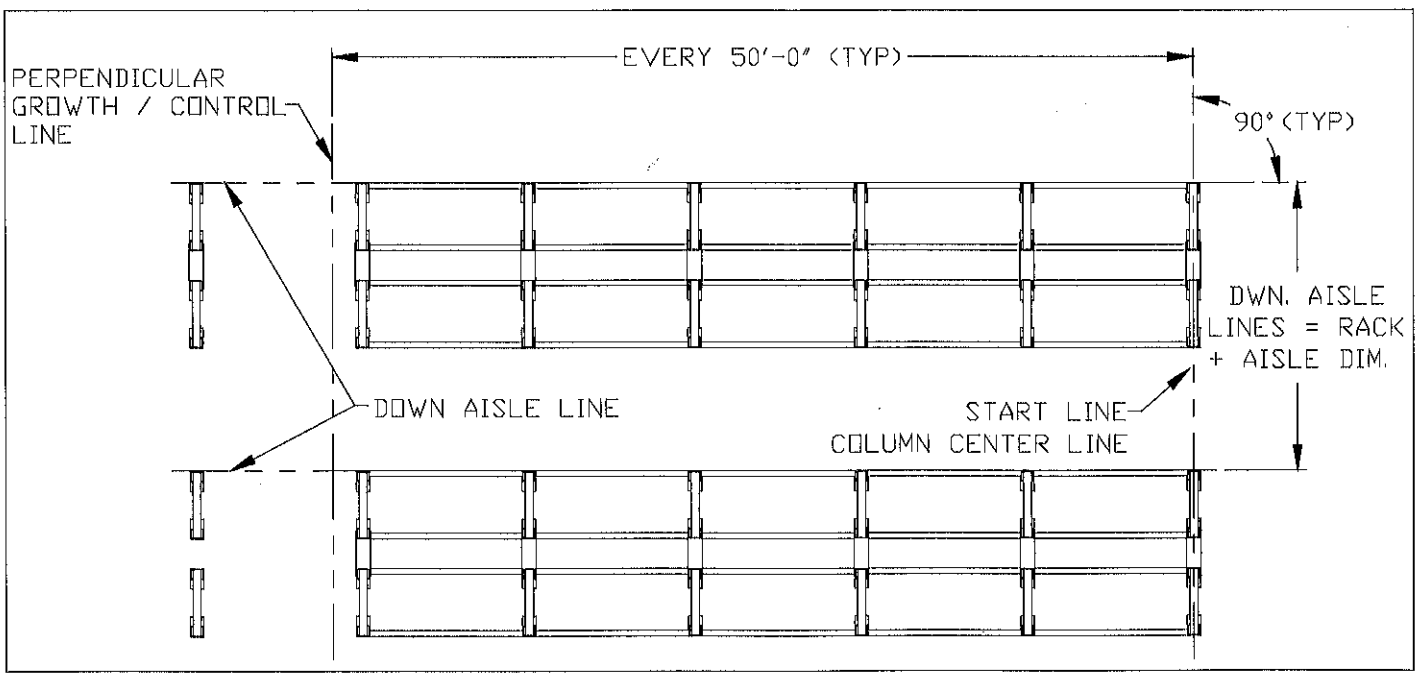
The key to a good installation begins with an accurate floor layout. Using a tape measure and a chalk line, establish a grid pattern (See Below). Placement of the rack will be established either by the customer or from drawings supplied by the customer or distributor.



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

Start at the beginning of a bank of rack and snap a "start line". The "start line" should be the center of the first column in the rack system and should run perpendicular to the aisle. Then every 50 ft. snap "growth / control line(s)" parallel to the "start line". Be sure that the "start line" and "growth / control line(s)" are perpendicular (90 degrees) to where you would like the aisle to be. Next snap a "down aisle line" at the front of the frames nearest the first aisle. For accuracy use the front of the frame's column. In order to snap the rest of the "down aisle lines" you will need to know the dimensions of a bank of rack and the aisle widths. The rack width may be obtained either by referencing the "Supplemental drawings" or adding the frame widths and the spacer length. After the rack width is known add the aisle width. The total of the rack width and the aisle width is the distance at which the rest of the "down aisle line(s)" are to be snapped from the first "down aisle line". Be sure they are perpendicular to the "start line" and parallel to the first "down aisle line".

Remember …Start right and you will finish right.



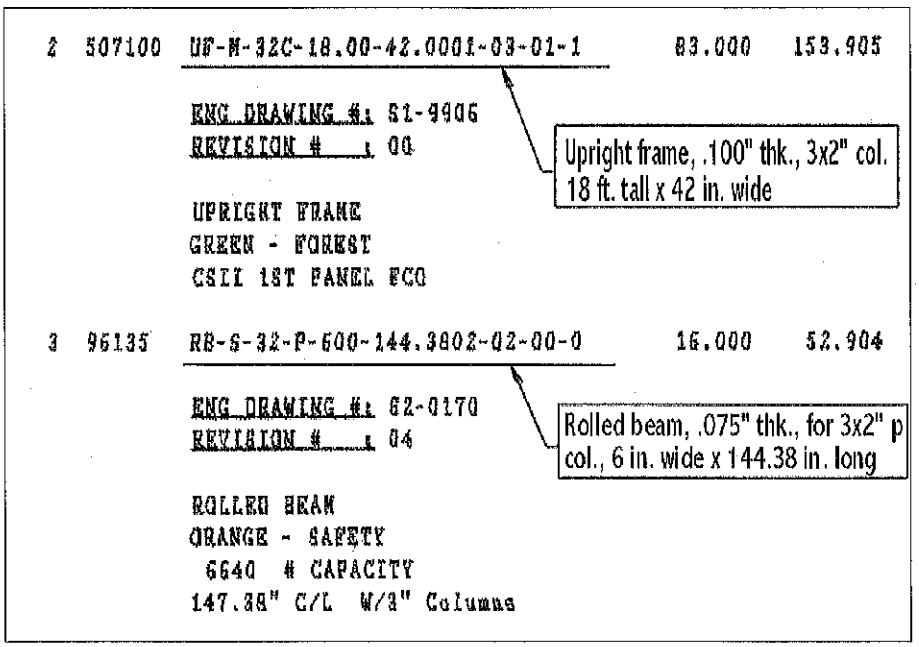
Step 3. CHARTING FLOOR DEVIATIONS

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 within 1/4" per 10' of height.

Step 4. BEAM and HARDWARE IDENTIFICATION

The rack component parameters 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 components and their respective locations within the rack system. 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 which 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: Bill of material (See the supplemental drawing package and / or bill of material for the information that is specific to your selective rack system).

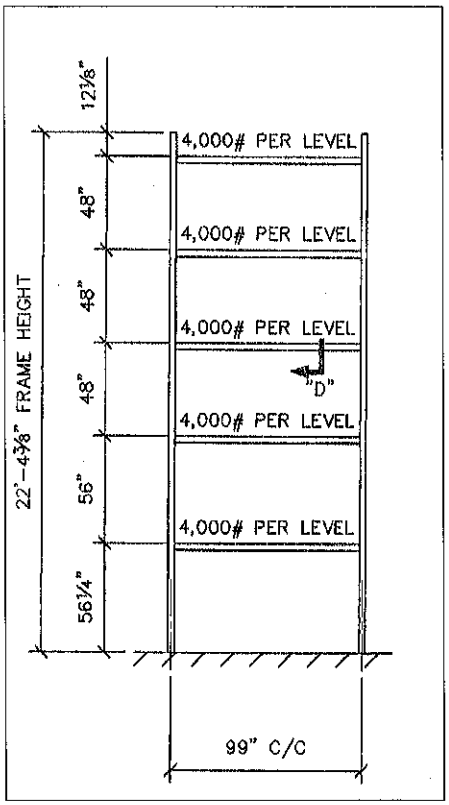


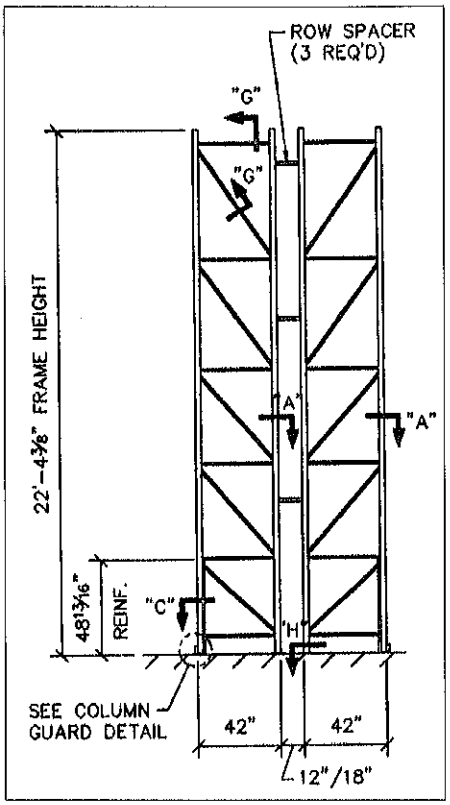
Step 5. RACK PROFILE

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 five (5) bays at this time (10 bays if your system is back to back).

(REMINDER: Be sure to check for Special Features and for optional components. See "Optional components" herein and the bill of material.

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



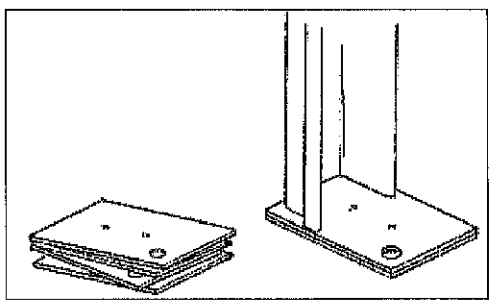


Step 6. RAISING THE "START LINE" FRAME

Begin at the "start line" where it intersects the "down aisle line". 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. Place the base of a frame on the "start line" with the front of the frame on the "down aisle line" and raise to a vertical position. Recheck to be sure that it's on the proper lines. 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.

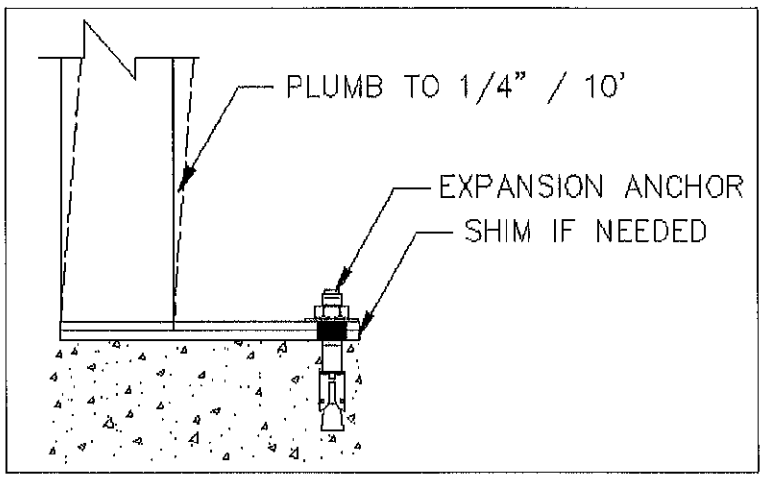
Step 7. SHIMMING THE "START LINE" FRAME

Shim the frame(s), if needed, with Ridg-U-Rak self positioning metal shims (or equivalent) at this time. The rack manufacturers institute (R.M.I.) requires that frames be plumb within 1" per 10' of height. Ridg-U-Rak recommends within 1/4" per 10' of height unless the lift truck manufacturer requires stricter tolerances. 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").



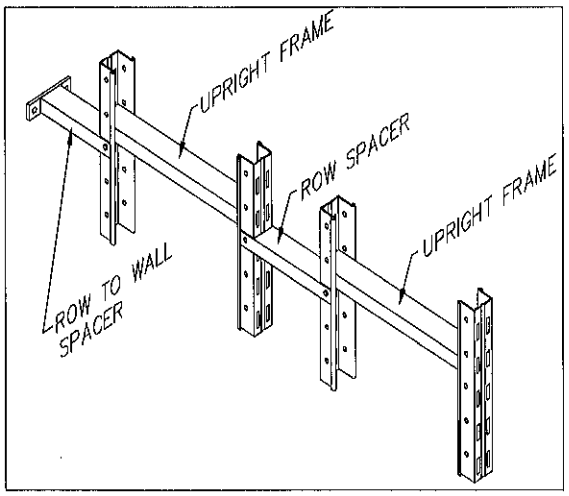
Step 8. LAGGING THE "START LINE" FRAME

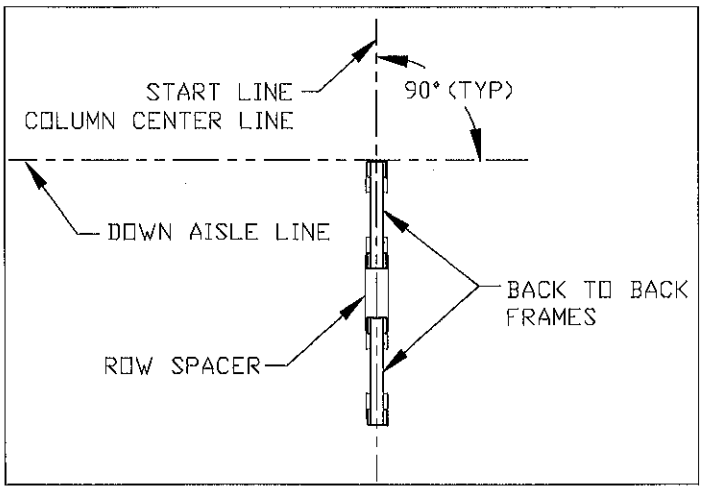
The frame should be plumb, 90 degrees to the "down aisle line" and correctly positioned with the center of the frame's upright on the "start line". It should be anchored now to ensure that it stays in position. Lag only the frame(s) on the "start line". (Ref. step # 2) The remainder of the lagging will 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.



Step 9. BACK TO BACK "START LINE" FRAMES

If your selective rack contains back to back frames it will be necessary to install a row spacer on the interior columns of the frames. This must be done before lagging the second frame of the back to back set. This will give the exact distance needed between the back to back frames. (See the "Bolting and locking device details" section for the correct spacer installation procedure).





Step 10. INSTALLING SPACERS

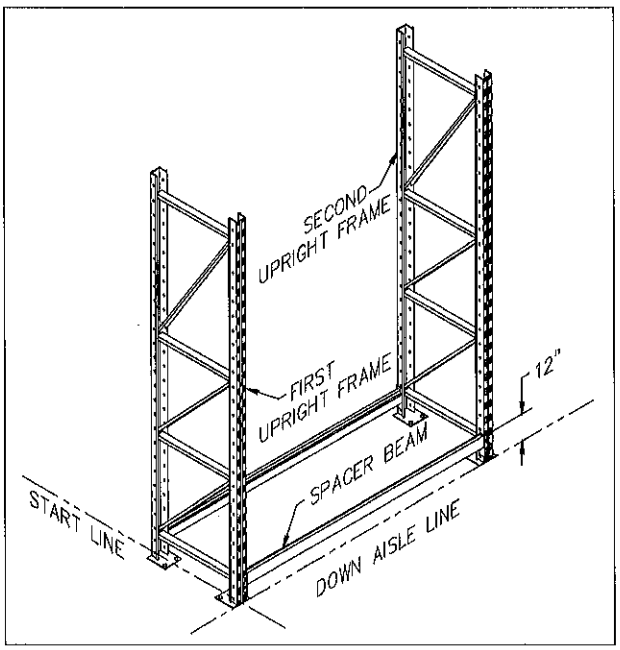
Generally spacers should be installed with the first one as close to the top as possible and additional spacers positioned down in 6-ft. increments. The number of spacers is determined by the frame height (see the supplemental drawings).

Step 10. COMPLETING ALL "START LINE" FRAMES

All the "start line" frames for one bank of rack should be raised, spacers installed (if necessary), shimmed (if necessary), 90 degrees to the "down aisle line" and lagged. (See steps 6 through 10).

Step 11. RAISING THE FIRST BAY

With one or two people, repeat the procedure as outlined in #6 above, raising the next upright frame to a vertical position approximately a beams length from the first frame. Place the frame with brace pattern identical to the first frame on the "down aisle line". With someone holding the frame in its' general location, place a lower beam in its' correct location on both sides of the frame (ref. "supplemental drawings"). If the lower beams in your system are 48 inches from the floor or more it will be necessary to use temporary beams at the 12 inch level on both sides of the frame. If your system utilizes a bolted connection, hand-tighten all bolts. If it utilizes standard hooks tip the hook back inserting the bottom edge of the hook plate into the return flange of the column, then roll the beam into place, inserting the hook lugs into the column slots. Ridg-U-Tier II beams have connector pins that are inserted into the tear-drop shaped holes in the column face. Be sure to engage both ends of the beam at the same time and fully engaged the columns. Seat the beam by tapping it into full engagement. Use a rawhide mallet if necessary. *Note: Position beams to assure a safe & steady starting structure.



Step 12. INSTALLING REMAINING BEAMS OF THE FIRST BAY

As stated in number V there are many rack profiles. This is primarily due to whether the system is a back to back system and the number of levels. In order to erect a 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 bay (or bays if back to back).

IMPORTANT: Hand tighten all bolted frame / structure connections at this time. Connections must have some play for adjustment. Do not torque until the selective racks are squared and ready to be lagged.

Step 13. SHIMMING THE FIRST BAY

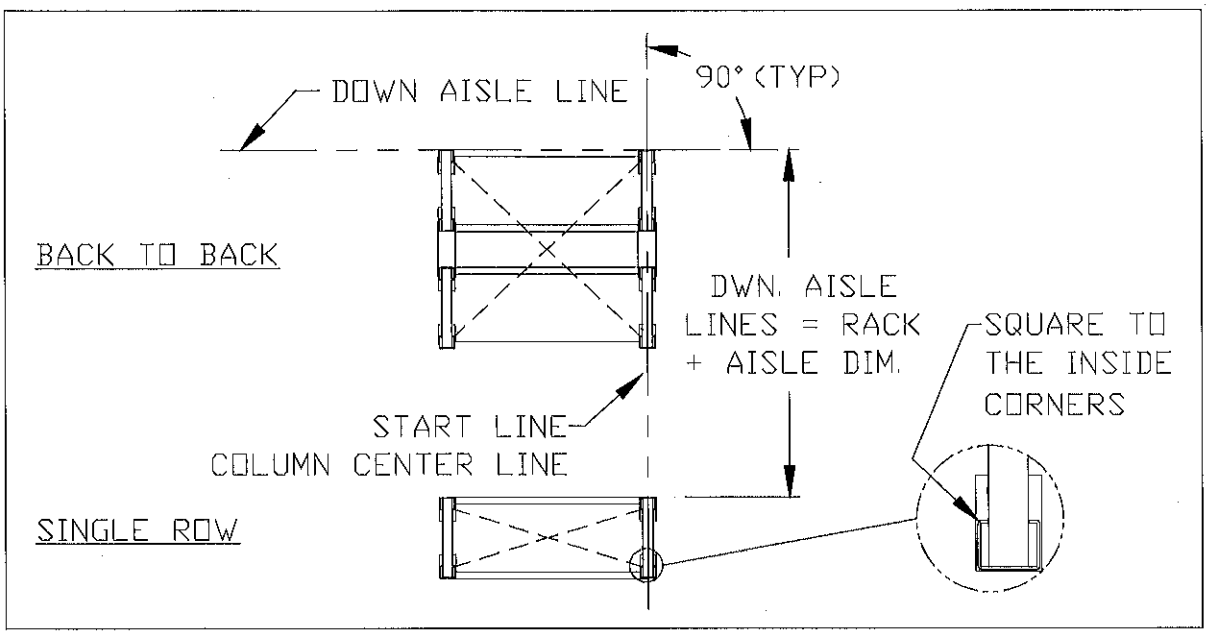
Shim the second frame of the first bay, if needed, with Ridg-U-Rak self positioning metal shims (or equivalent) as stated in step 7 above.

Step 14. PLACE PLUMB LINE

Be sure the first bay is plumb. The accuracy of the following bays will depend somewhat on the accuracy of the first bay.

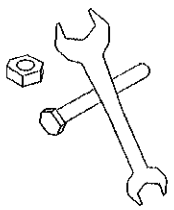
Step 15. SQUARING THE FIRST BAY

In order to assure that the bay is not out of square it must be squared before going on. If this is not done the entire bank may be out of square. Square the upright frames from inside corner radius to inside corner radius as shown in the drawing below. Use a laser measuring device or a tape rule.



Step 16. TIGHTEN AND TORQUE ALL BOLTED CONNECTIONS

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



Step 17. LAGGING THE FIRST BAY

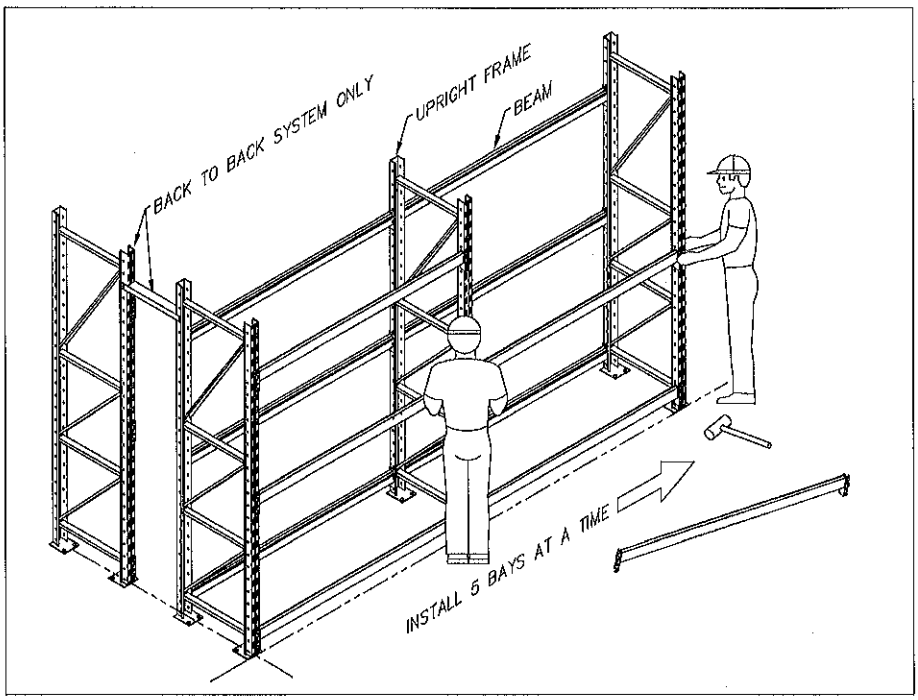
The first bay should be complete, plumb, square, correctly positioned on the chalk lines, and connections tightened. It should be anchored now to ensure that the rack system stays in position.

Step 18. COMPLETING FIVE BAYS AND CHECKING GROWTH

Continue installing bays until there are five complete bays (Ten bays if your system is back to back). Make sure you use a beam at 48" or less from the floor as a means of correctly spacing the frames. Once you have the bays complete check for growth. Growth may accumulate from the tolerances of each bay as they are assembled. The last frame of the five bays may be closer or further from the "growth / control line" than it should be. In order to find the correct distance from the "growth / control line" you may reference the "supplemental drawings" or figure the distance mathematically. The distance may be found by multiplying the center to center distance of the frames columns X the no. of bays installed. The distance from your "start line" to the "growth / control line is also used. Subtract the smaller number from the larger number and this is the correct distance the center of the frame should be from the "growth / control line".

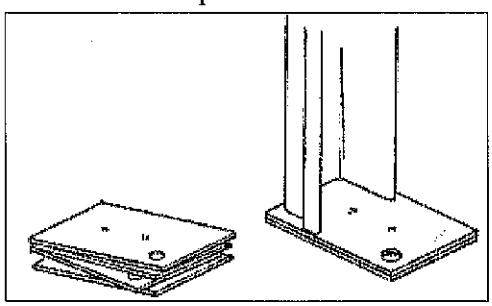
EXAMPLE: Dist. To "growth / control line" (50 ft.) – bank length 8 ft X 5 (40 ft.) = 50 ft. – 40 ft. = 10 ft. from center of column to "growth / control line".

Once the correct distance is found this must be compared to the actual distance. If adjustments are needed adjust each column as necessary to bring the rack to the correct distance from the "growth / control line". (see drawing on page 10)



Step 19. SHIMMING FIVE BAYS (Ten if back to back)

Shim the frames, if needed, with Ridg-U-Rak self positioning metal shims (or equivalent) at this time. The rack manufacturers institute (R.M.I.) requires that frames be plumb within 1" per 10' of height. Ridg-U-Rak recommends within 1/4" per 10' of height unless the lift truck manufacturer requires stricter tolerances. 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").

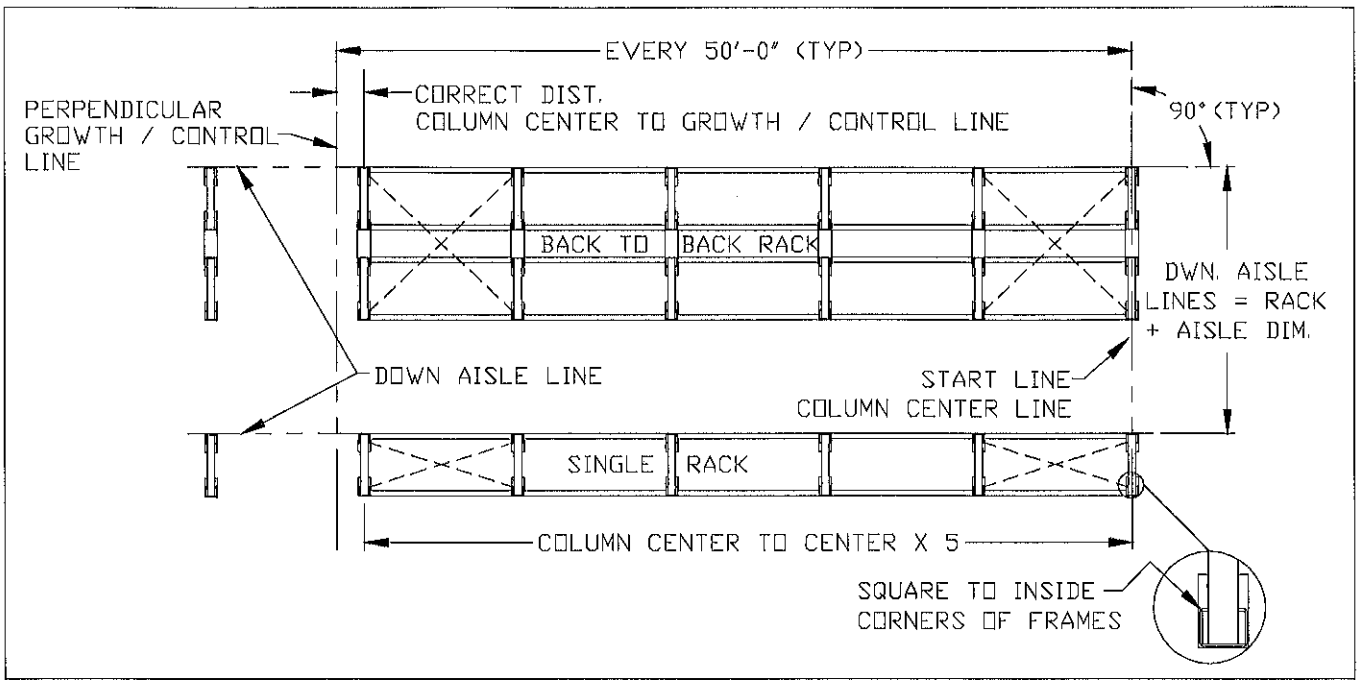


Step 20. PLUMB FIVE BAYS

Be sure the bays are plumb. Place the plumb line at the start, Travel malls (If included in your selective rack system), and the end of each set of 5 bays (Ten If back to back).

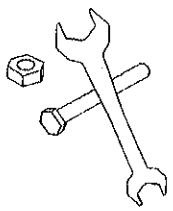
Step 21. SQUARING THE LAST BAY OF A SET OF FIVE

In order to assure that the bays remain square, the last bay of the set of 5 bays must be squared before going on to the next set. If this is not done the entire bank may be out of square. At the last bay square the upright frames from inside corner radius to inside corner radius as shown in the drawing at the top of page no. 10. Use a laser measuring device or a tape rule.



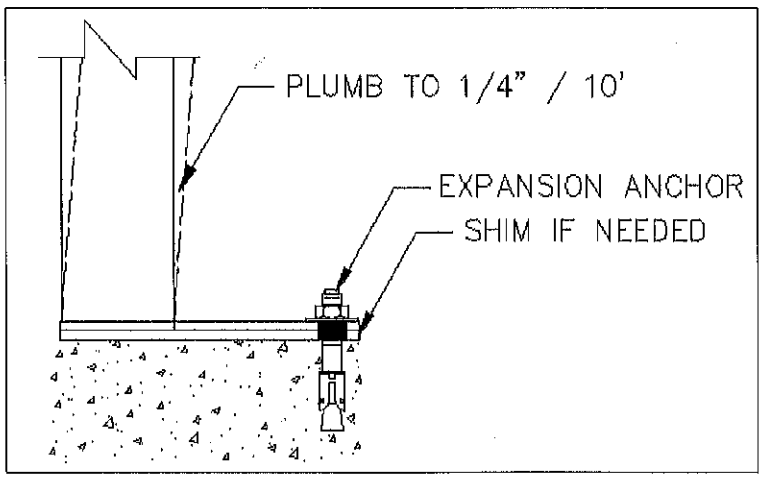
Step 22. TIGHTEN AND TORQUE ALL BOLTED CONNECTIONS

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



Step 23. LAGGING THE SET OF FIVE BAYS (Ten if back to back)

The bays should be near complete, correctly positioned on the chalk lines, shimmed, plumb, square, locking devices installed and connections tightened. They should be anchored now to ensure that the rack system stays in position. Lag bolts must be of the type specified in the bill of material, "Supplemental drawings" or in the "Special Instructions" herein.



Step 24. INSTALLING CROSSBARS AND DECKING

Some selective rack systems utilize crossbars or crossbars and decking. If your rack system includes crossbars / decking install them now. (reference the "optional components", supplemental drawing(s) and the bill of material).

Step 25. COMPLETING A BANK OF SELECTIVE RACK

The remainder of the selective rack bank can now be completed by repeating Steps 6–24.

Step 26. COMPLETING THE ENTIRE SELECTIVE RACK SYSTEM

Repeat Steps 6-25 for each bank of selective rack, always using a complete, correctly positioned, shimmed, plumb and square starter bay, until the entire system is complete.

Step 27. 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 selective rack 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 ?

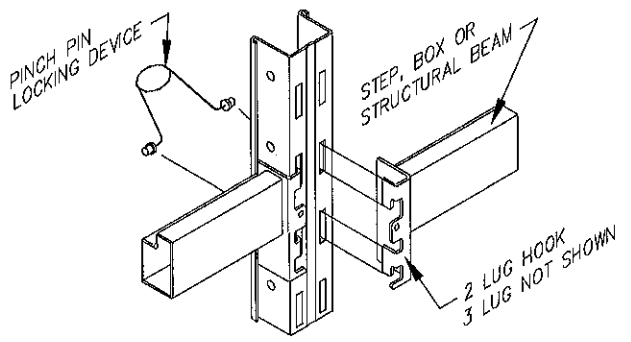
---------- Anchored all frames and posts with the correct anchors ?

---------- Cleaned up the work site to provide a safe working environment ?

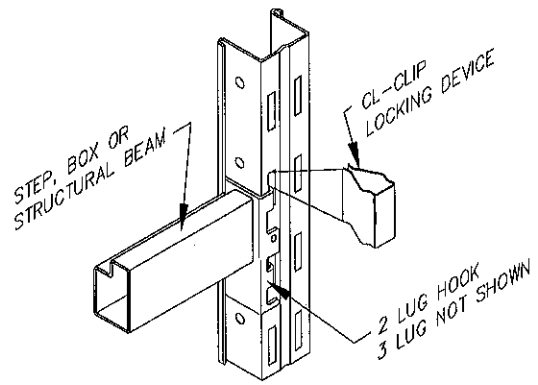
VIII. BOLTING & LOCKING DEVICE DETAILS

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

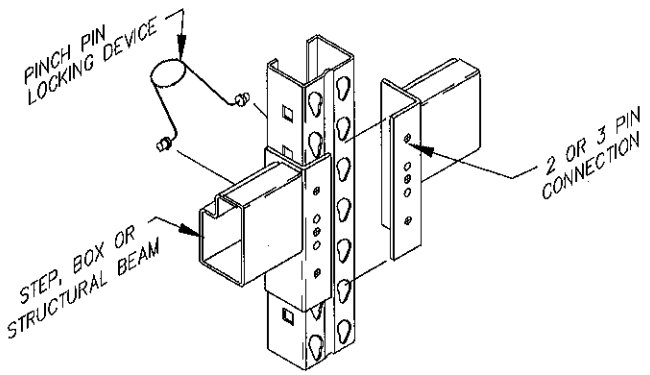
CONNECTION DESCRIPTION & TORQUE REQUIREMENTS



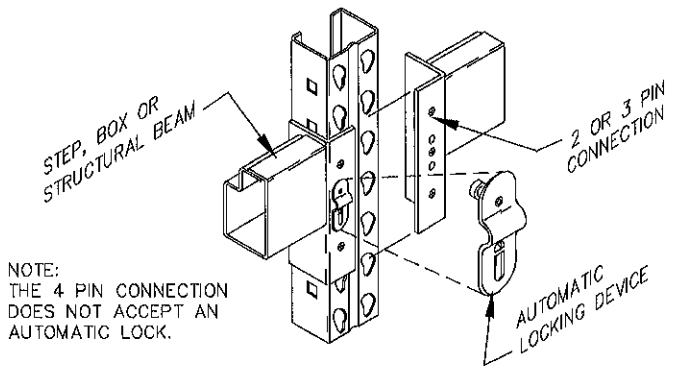
STANDARD 2 OR 3 LUG HOOK WITH PINCH PIN



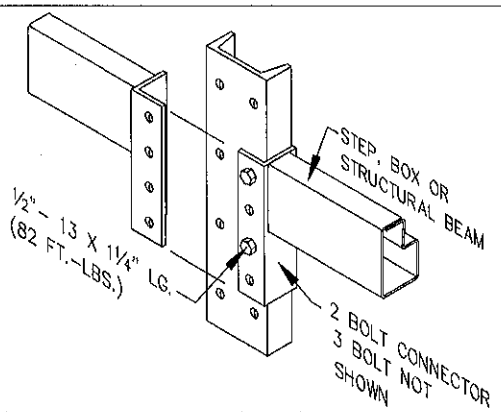
STANDARD 2 OR 3 LUG HOOK WITH CL-CLIP



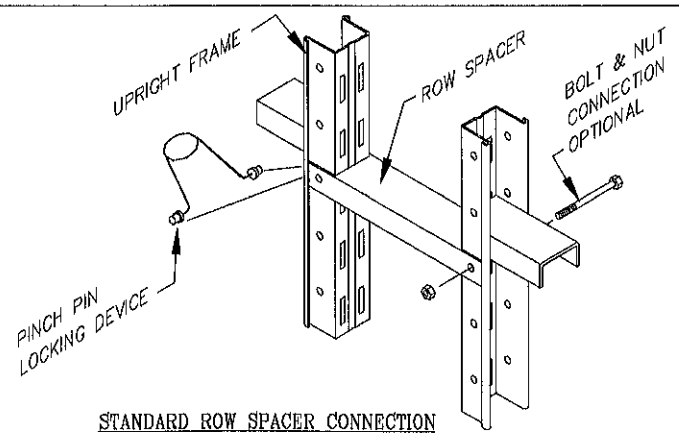
STANDARD 2 OR 3 PIN CONNECTION WITH PINCH PIN



STANDARD 2 OR 3 PIN CONNECTION WITH AUTOMATIC LOCK



STANDARD 2 OR 3 BOLT CONNECTION

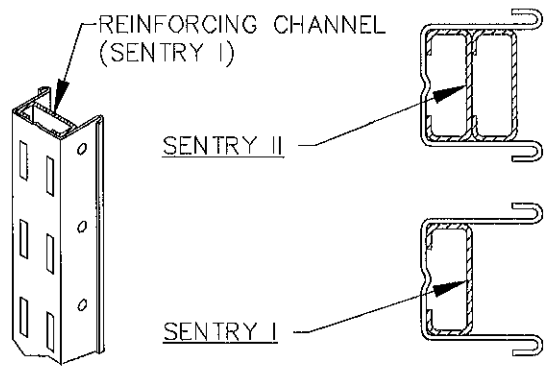


STANDARD ROW SPACER CONNECTION

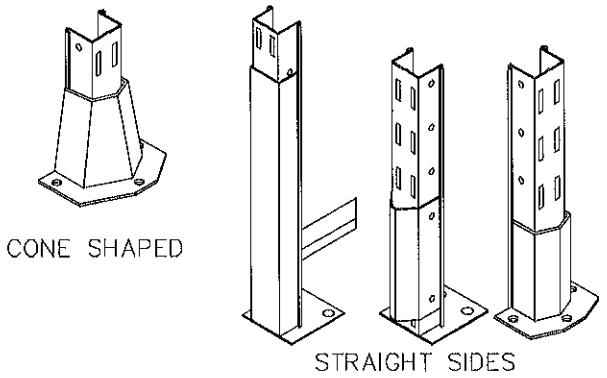
IX. OPTIONAL COMPONENTS

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.

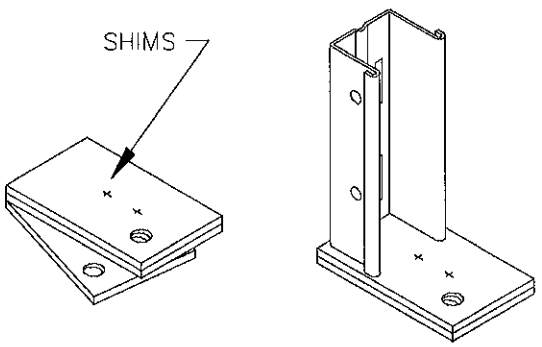
A. REINFORCED UPRIGHT FRAMES



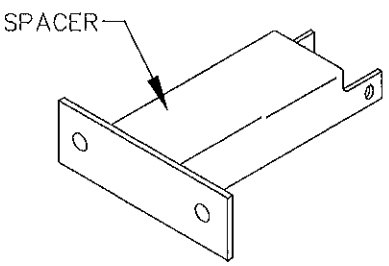
B. COLUMN GUARDS



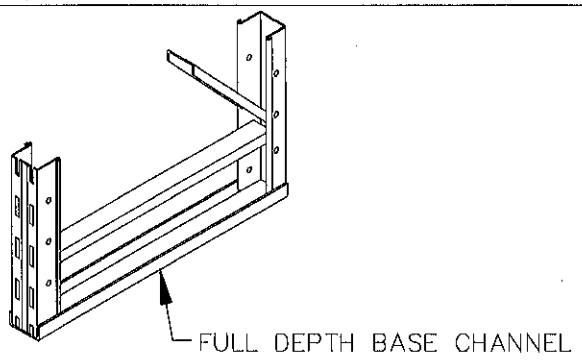
C. SELF POSITIONING SHIMS



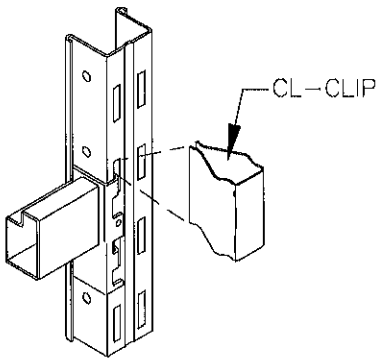
D. ROW SPACERS (RACK TO WALL)



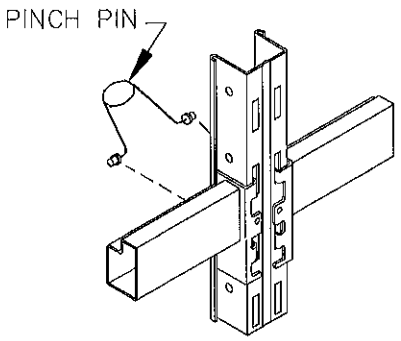
E. FULL DEPTH BASE CHANNEL



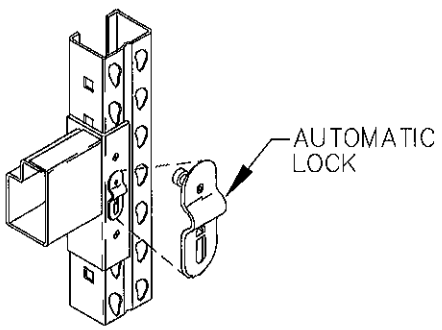
F. CL–CLIP



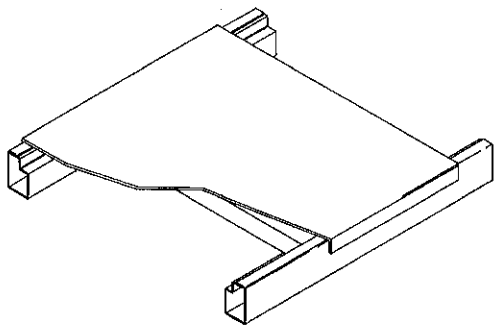
G. PINCH PIN LOCK



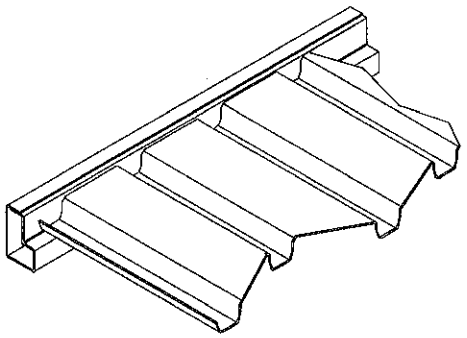
H. AUTOMATIC LOCK



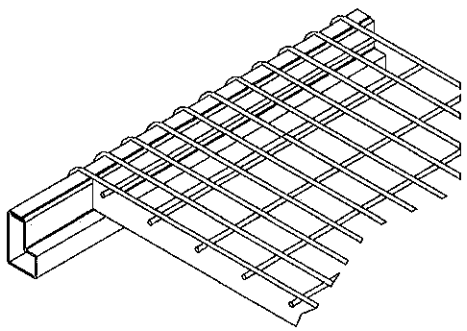
I. FLANGED STEEL DECKING



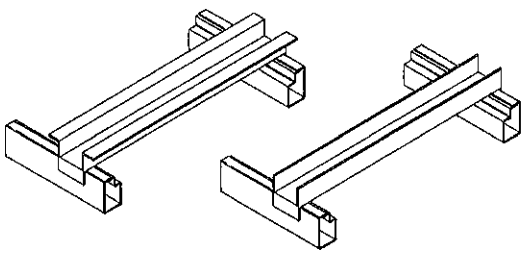
J. CORRUGATED DECKING



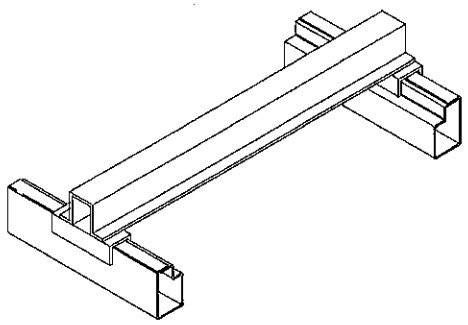
K. WIRE MESH DECKING



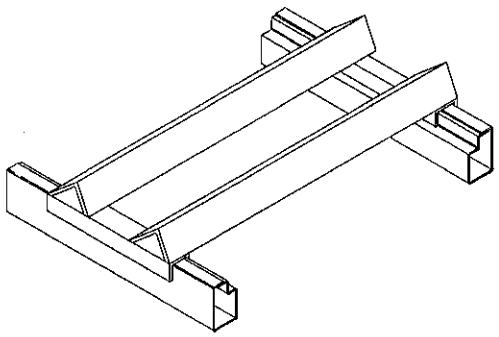
L. SKID RAILS – HEAVY AND STANDARD DUTY



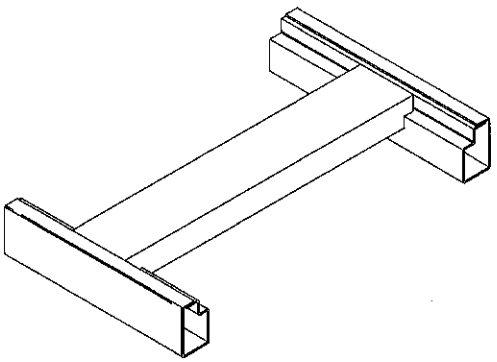
M. FORK ENTRY BARS



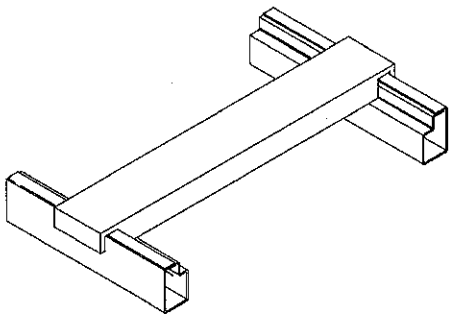
N. DRUM CRADLES



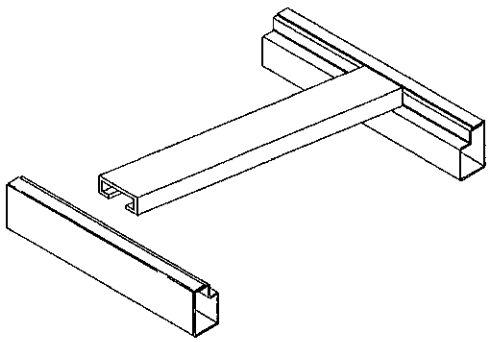
O. NOTCHED CROSS BARS



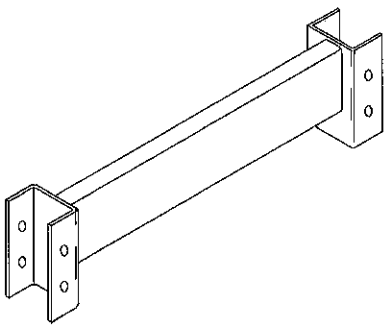
P. FLANGED CROSS BARS



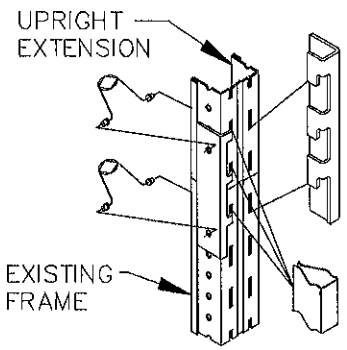
Q. CROSS BARS



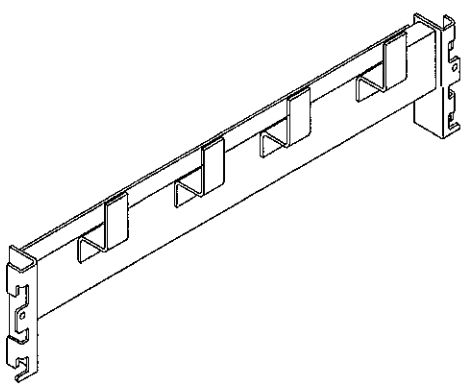
R. AISLE BRIDGE



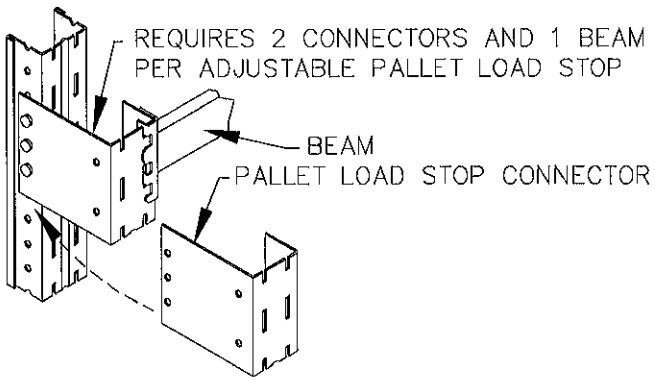
S. COLUMN CONNECTORS



T. PALLET STOPS – FACTORY WELDED



U. ADJUSTABLE PALLET LOAD STOPS



IX. SPECIAL INSTRUCTIONS

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 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 SELECTIVE 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.