

Balustrade System Installation - Cambridge & Huntington

Marble & Resin Composite Product Manufactured By Pacific Columns.

A. PARTS AND SUPPLIES NEEDED FOR INSTALLATION

Hardware included for each 10' section of rail:

- 2 3"x 1-1/2" L-brackets
- 4 1-3/4" x 3/16" Blue hex-head screws for anchoring the L-brackets to the newel cap, column or wall
- 4 3/8" threaded rods – cut off excess
- 4 3/8" Concrete anchors, washers and hex nuts
[4 -3/8" zinc-coated threaded inserts will be provided for **wood installations** in place of the concrete anchors]
Synboard® fillet for code spacing - spacing other than code may require the purchase of additional Synboard®

Hardware included for each Newel Post:

- 1 1-1/2" Channel iron
- 1 3/8" Threaded rod
- 1 3/8" concrete anchor and hex nut
[A 3/8" zinc-coated threaded insert will be provided for **wood installations** in place of the concrete anchor]

Hardware not included:

The following will need to be purchased before beginning installation.

- Sub-Rail** Pressure treated boards cut the length of each top rail section. Use a 2x4 for the 5-1/2" Balustrade System and a 2x6 for the 7-3/4" Balustrade System. Use pressure treated 3/4" plywood as the sub-rail for curved (radius) rail and low profile top (7-1/4" x 3-1/4").
- Screws** 1" Coarse threaded screws for anchoring the L-bracket to the sub-rail. You will need 2 coarse screws for each L-bracket.
- Adhesive** Premium grade, heavy-duty, sub-floor adhesive.
- Sealant/Caulk** Premium grade Elastomeric Latex Sealant such as DAP Dynaflex 230®.
- Silicone** (Optional) Use a premium grade of silicone on upper level installations where you want to prevent moisture seepage below.
- Bondo®** (Optional) Used to fill in rail seams if necessary or for any repairs.
- Shims** (Optional) **Can be purchased separately with your order.**
Shim size is 4" (W) x 1/2" (H) and is used primarily for **roof top installations**. Space shims 18" on center with a shim 1" from both ends of each bottom rail section. When drilling the hole in the bottom rail for the threaded rods (see C-8) also drill the hole through the shim. For installations that need to be watertight please see instructions on page 2 "For upper level installations", also apply a generous amount of silicone to the bottom of the shim.

B. PREPARATION

- Storage** **Rails should be stored on a flat surface, topside up, prior to being installed.** Rails are designed to butt into the sides of newel posts, columns or walls and not into each other. The structural integrity of this balustrade assembly is based on adherence to the following installation instructions.
- General** **Specify whether installation is on a concrete or wood surface and if there are any stair or roof top installations when ordering. This will insure that the correct installation hardware is provided with your order.** Each installation will vary slightly. Read the Installation Instructions completely. Consult your representative if you have any questions **before** starting your installation.
- Cutting** Use a masonry blade where cuts are required on the top and bottom rail. Use a grinder with metal grinding wheel for a flush finish.
- Drain Holes** Use 1-3/4" steel door hole saw [Dewalt® brand recommended]. Drainage holes are generally not needed for wood installations.
- Seams** The rails come in varied lengths cut to order to avoid seams, however if your installation necessitates a seam in the rail you can use car Bondo to fill in the seam. Follow manufacturer's instructions then sand smooth. Use the DAP Dynaflex 230® sealant/caulk to fill in any gaps.
- Adhesive** For all attachments it is recommended that a premium grade sub-floor adhesive be used. Follow the manufacturer's instructions for the adhesive used, as not all products have the same drying times. Remember to not skimp on the adhesive. **Apply adhesive generously.**
- Sub-Rail** Use pressure treated boards cut the length of the top rail for each section. Use a 2x4 for the 5-1/2" Balustrade System and a 2x6 for the 7-3/4" Balustrade System. Synboard (see C15 for installation) should be installed, as fillet after the balustrade installation is complete. Cut pressure treated 3/4" plywood as the sub-rail for curved (radius) rail and low profile top (7-1/4" x 3-1/4") to 1/4" less than the inside rail width to allow for expansion.

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- Painting** Application of a high quality exterior primer such as Kilz® or Zinsser 123® is recommended followed by a premium grade of exterior topcoat paint. Follow the paint manufacturers' instructions concerning use within temperature ranges for best results.
- Custom** Stair and Radius Rail sections are priced separately. For stair installations the newel post base as well as the top and bottom of the baluster is extended to allow for angle cuts. A template, provided by the customer, is required for radius rail sections.

C. INSTALLATION OF STRAIGHT RAIL AND NEWEL POSTS

[See following installation instructions for Half-Newel Posts - Stair Rail and Stair Newel Posts]

NOTE: Floor sub-surface must be finished before beginning installation.

NOTE: When installing system on less than 3/4" decking [plywood, OSB, other] and threaded insert DOES NOT HOLD, over drill hole to a 1" size and use a 3/8" butterfly toggle bolt to secure. Proceed with install as below.

1. If rails are to be connected to a wall, round column or your own posts which were not purchased as part of our balustrade system you will need to have these installed before beginning installation. Make sure the spacing of the balusters and height of the completed system adheres to your local building code requirements and use guidelines. Lay out the complete balustrade system allowing for the newel posts, balusters and rails. Using a pencil, outline the placement of the bottom rail and newel posts. Putting tape over the post pencil markings will protect the floor surface from any excess adhesive. Tip: After setting let the adhesive dry overnight. Remove overage with a sharp wood chisel.
2. Install the newel posts before installing the rails or balusters. The newel post consists of 3 pieces: the base, the center post and the cap, (see Figure A). The top of the base has an inside ledge while the bottom of the base is flat. It is very important that the **center shaft and base are level** before proceeding. If the slope on the sub-surface is 1/4" or less, use a wedge [shim] under the base for leveling. The wedge will be caulked in after installation. If the slope is greater than 1/4" it is recommended that you trim the bottom of the base to level.
3. Mark the placement for the center of each newel post on the sub-surface. Drill an 11/16" hole for the concrete anchor at the center of the placement. Tap the concrete anchor into the drilled hole. Wood installations will use a 3/8" zinc-coated threaded insert in place of the concrete anchor. Drill a 5/8" hole slightly deeper than the threaded insert and use a 7/16" Allen Wrench to screw the insert into the drilled hole. Clean area by brushing away any dust before applying adhesive.

NOTE: For upper level installations where you want to prevent moisture seepage below use a premium grade of silicone as described in the following instructions. Fill the drilled hole with silicone before inserting the concrete anchor or threaded insert and fill the anchor or insert with silicone as well. Insert the threaded rod. Prepare a 2" gasket to fit over the rod putting silicone on both the top and bottom of the gasket. Tighten the gasket by using a 3/8" x 2" washer and hex nut; do not over tighten. Mound additional silicone around the gasket, washer and nut and on the rod – generously spreading the silicone over the gasket area and rod to ensure good seal.

4. Apply a heavy bead of adhesive to the bottom of the base. Center the base over the anchor and adhere the base to the floor sub-surface. Run a bead of adhesive along the top inside ledge of the base. Set the center post into the base ledge making sure it is centered. Note: the cutouts on the center post should be facing up. Screw a 3/8" threaded rod into the concrete anchor, or 3/8" threaded insert for wood installations. Drill a 3/8" hole in the channel iron that will line up with the threaded rod. Slip the channel iron over the threaded rod through the drilled hole and into the cutouts in the center post. Secure the rod to the channel iron using a hex nut. Cut off any excess on the threaded rod if necessary.
5. Run a heavy bead of adhesive along the outer top edge of the center post as well as around the inside ledge of the cap. Place the newel cap on top of the center post and slide into place. Make sure the cap is square and even all around the center post. To keep the cap from shifting while installing the top rail you will need to cut 8 wood wedges. Using 2 wedges per side insert the wedges into the gap between the cap and the center post. You may also want to pilot drill and countersink a screw to hold the cap in place, however this is not necessary. See separate instructions for installing half-newel posts and stair newel posts.

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6. **IMPORTANT** – Drill the drainage holes before securing the bottom rail sections to the sub-surface. Note: drainage holes are generally not need for wood installations. Cut 7/8” to 1” half round holes at the base of each bottom rail section at the point where the bottom rail connects to the newel post, column or wall. **There should be a drainage hole on BOTH ENDS and on BOTH SIDES of the bottom rail.** You will also need to drill additional drainage holes on both sides of the rail at any other low areas or where deemed necessary. The preferred method for making the drainage holes is to use a Dewalt 1¾” steel door hole saw. For two bottom rails the same length, turn the two rails over on their sides and clamp together. Using the hole saw, drill a hole through the center of the clamped rails. This will give you a 7/8” half round hole on both rails. If the rails are different lengths you can still use the 1-3/4” hole saw by first marking the rails for the drain holes, clamping the rails together and drilling a hole at the markings. If another rail piece is not available clamp a piece of 2x4 to the bottom rail and drill the hole through the rail and the 2x4.
7. Temporarily place the bottom rail inside the pencil marks and slide into place next to the installed newel post. It is **VERY IMPORTANT to leave a 1/8” gap between the rail and the newel post, column or wall at both rail ends.** These expansion joints will be caulked later. Similar to any product subject to hot and cold weather conditions, you may experience contractions and expansions in the rail, which may require occasional, touch ups in the expansion joints. Determine the spacing to be used between each baluster and cut several wood blocks to that width. Be sure spacing adheres to the 4” sphere code if required. Temporarily place the balusters on the rail and using the wood blocks as a guide mark the baluster placements on the rail. Remove the balusters from the rail and using a carpenter’s square outline the sides of each baluster on the rail. Also, mark the baluster centers for placement of the threaded rods. Not all balusters will need a rod; however, **the first and last baluster for each rail section must have a threaded rod.** Space the remaining rods equally among the remaining balusters for each rail section.
8. Use a 1” spade drill-bit to drill a hole in the bottom rail where the threaded rods will be placed. Do not drill into the sub-surface, however, lightly nick the sub-surface to mark the placement of the concrete anchors or threaded inserts. Move the bottom rail and drill an 11/16” hole for the concrete anchor where the surface was nicked for the rods. Tap the concrete anchor into the drilled hole. Wood installations will use a 3/8” zinc-coated threaded insert in place of the concrete anchor. Drill a 5/8” hole slightly deeper than the insert and use a 7/16” Allen wrench to screw the insert into the hole. Clean area by brushing away any dust before applying adhesive in the next step. If using shims see instructions on page 1 under "Shims".

NOTE: For upper level installations where you want to prevent moisture seepage below use a premium grade of silicone to fill the 11/16” drilled hole in the sub-surface.

9. Turn the bottom rail upside down and using the adhesive spot glue approximately every 18” on the bottom of both sides of the bottom rail. **DO NOT** run a continuous bead the length of the rail. You will also not want to caulk the bottom rail where it attaches to the floor, this will allow for drainage between the glue spots. Place the rail back into place inside the markings; remembering to leave the 1/8” expansion gaps at both rail ends. The holes in the rail should line up with the holes drilled into the floor sub-surface. Screw the 3/8” threaded rods through the bottom rail and into the concrete anchors, or 3/8” threaded inserts for wood installations.
10. Before installing the balusters measure the height of the balusters that will be used for that rail section. Due to shrinkage after casting, balusters may vary slightly in overall height. Measure all balusters and group by height so that similar height balusters will be used together in each section. Set the two tallest balusters for that rail section at each end. You may also trim the balusters to the same height if desired. Run a continuous bead of adhesive around the bottom of each baluster and set the balusters in place on the rail using the pencil markings for placement. **BE SURE TO LINE THE BALUSTERS UP WITH THE SEAMS POSITIONED ON THE SAME SIDE AND POINTING IN THE SAME DIRECTION.**
11. Prepare the sub-rail by marking and drilling 3/8” holes that will align with the threaded rods. The end of the sub-rail should fit flush against the newel post cap, column or wall (see Figure B). Run a bead of adhesive around the top of the balusters. Center the sub-rail over the balusters and attach the sub-rail to the balusters by snugly fastening the washers and hex nuts to the threaded rods. **CAUTION – DO NOT OVER TIGHTEN THE HEX NUTS.** Cut off any excess threaded rod if necessary.

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12. Before attaching the L-bracket to the sub-rail and newel cap, column or wall apply adhesive to the backside of the L-bracket. Attach the L-brackets to each end of the sub-rail using two 1" coarse screws (not included). Attach the L-bracket to the newel cap, column or wall by pilot drilling two holes using a 5/32" drill bit and two 1-3/4" blue screws (provided). Be sure to center the L-bracket on the cap, wall or column (see Figure C).
13. To install the top rail - run a bead of adhesive along the outside edge of the baluster tops as well as along the channel underneath the top rail. Slide the top rail into place over the sub-rail and the baluster tops. It is **VERY IMPORTANT** to leave a 1/8" gap at both ends of the rail between the top rail and the newel cap, column or wall. These expansion joints will be caulked in later.
14. To attach a rail that will go from a round column to a round column, you can cope the top and bottom rail with a grinder, belt sander and/or dremel tool, to fit over and around the column and base/plinth. You may also cut the column base in half, slide the rail to the column and cope both base halves to fit around the bottom rail. Using adhesive, glue the base/plinth back together and place back around the column.
15. To finish, lightly sand the rails and newel posts. **To install the Synboard® fillet under the top rail** cut the Synboard® to the width required to fit between the balusters. Use an air gun or adhesive to attach the Synboard® to the sub-rail. Caulk the seams, the 1/8" expansion joints and connecting points with the DAP Dynaflex 230®. Also caulk the gap between the newel post base and the newel post center. **FOR DRAINAGE DO NOT CAULK THE BOTTOM RAIL WHERE IT IS ADHERED TO THE FLOOR SUB-SURFACE.** It is recommended that a high quality exterior primer such as Kilz® or Zinsser 123® should be applied to the rails, newel posts and balusters followed by a premium grade of exterior topcoat. For best results follow the paint manufacturer's instructions. Do not use paint or solvents containing acetone.

D. HALF-NEWEL POST INSTALLATION INSTRUCTIONS

Hardware included for each Half-Newel Post:

You will **NOT NEED** a channel iron, threaded rod or the concrete anchor and hex nut for installation of the half-newel post.

Hardware not included:

The following will need to be purchased before beginning installation.

- 1 2" x 6" x 18" Pressure treated board to secure the center of the half-post to the wall.
 - 12 1/4"x 3" Blue Tapcon® [Phillips] head screws.
1. **Read steps C 2 – 5 before proceeding.** Installation of the half-newel post is similar to the full-newel post with the exception of the installation of the center post. **Be sure to level the half-base before beginning installation, see C 2.** Locate the position of the half-base against the wall. Apply a generous amount of adhesive around the bottom and cut side (wall side) of the post base and adhere the base to the floor surface and wall.
 2. Temporarily locate and mark the position of the half-center post on the wall. Place the 2" x 6" x 18" pressure treated board on the wall so that it will be centered in the cavity of the half-center post. Apply a generous amount of adhesive to the back of the board. Countersink and pilot drill 4 holes using a 3/16" drill bit through the 2" x 6" x 18" board and into the wall. Secure the board to the wall using 4 - 1/4"x 3" blue Tapcon screws. Attach the half-center post to the board by first applying a generous amount of adhesive to the cut side (wall side) and bottom of the center post. Also apply adhesive to the inside ledge of the base, center the half-post in the half-base. Countersink and pilot drill 2 - 3/16" holes on each side of the post through the side of the board. You will be drilling a total of 4 holes, 2 on each side, not in the front. Secure the center post to the board using 4 - 1/4" x 3" blue Tapcon screws.
 3. Attach the half-newel cap to the half-center post by applying a generous amount of adhesive all around the outer edges of the half-cap and the top of the half-center post. Center the half-cap over the half-center post. Countersink and pilot drill 2 - 3/16" holes on each side at the bottom of the cap. You will be drilling a total of 4 holes, 2 on each side, not in the front. Secure the center post to the board using 4 - 1/4" x 3" blue Tapcon screws. Finish off countersunk holes with Bondo.

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E. STAIR INSTALLATION INSTRUCTIONS

Hardware included for each Extended Newel Post:

- 1 1½" Channel iron
- 1 3/8" Threaded rod
- 1 3/8" Concrete anchor and hex nut

[A 3/8" zinc-coated threaded insert will be provided for wood installations in place of the concrete anchor]

Hardware not included. The following will need to be purchased before beginning installation:

- Sand and concrete mix for the extended posts
- 4 1/4" x 4" Blue Tapcon Phillips head screws
- 3/16" x 2-3/4" Blue Tapcon Phillips head screws - 4 for each extended baluster

Threaded rods are not used for the balusters on stair installations.

1. **Read installation instructions in Section C before proceeding.** The rail will attach to a standard height newel post, column or wall at the top of the stairs and an extended post at the bottom of the stairs. Temporarily position the extended newel base at the bottom of stairs and the standard newel base at the top of the stairs. Place the bottom rail alongside the top and bottom posts and mark the vertical position on the rail to determine the angle cut. **Remember to leave the 1/8" gap for expansion on both ends of the rail.** To determine the height needed for the extended newel base, temporarily slide the bottom rail back into place and position it against the top and bottom bases. Mark the bottom base so that the height of the reveal is the same for both the top and bottom bases. Use a masonry blade for cutting the rail and base.
2. It is important that both bases are level; square and stable before installing, see step C 2. After cutting the bottom base to the correct height install the base and center post as described in steps C 2 - 4. **DO NOT install the cap at this point.** The bottom extended posts will require a strong and stable installation, as the grade of the stairs will force more weight onto these posts. For added strength and security pack the bottom extended posts with a mixture of **1/3 sand and 2/3 concrete mix that has been slightly moistened.** The concrete mixture should come to the top of the center post. Be sure to use a **moistened not wet** concrete mix to minimize leaching between the base and floor surface, which could result in staining the floor surface. Cut off any excess threaded rod if necessary and attach the newel cap as described in C 5.
3. Attach the bottom rail to the top and bottom posts by countersinking and pilot drilling a 3/16" hole on both sides and at both ends of the bottom rail. The hole needs to be angled to go through the side of the rail into the post base. Secure the rail with the 4 - 1/4" x 4" blue Tapcon screws.
4. Temporarily place the sub-rail against the top and bottom newel caps to mark the height for the top rail. You will want the same distance between the top and bottom rail as the rail on the straight runs. This will also determine the angle to cut the top and bottom reveals of the extended balusters. Make sure the balusters are in a level position vertically and that the seams are all pointing in the same direction before marking and cutting. The baluster should be cut equally at the top and bottom so that the reveal is the same.
5. Before attaching the balusters to the bottom rail mark the baluster positions on the rail so that they are spaced equally along the rail. Start by installing the top and bottom baluster to both the bottom rail and top sub-rail first [See Step C 6]. Before installing apply a heavy bead of adhesive to the baluster ends. To install the bottom baluster countersink and pilot drill two 5/32" holes on the side of each baluster. Angle the hole through the baluster and into the bottom rail. To install the top baluster and all balusters in between drill the holes on the bottom front side of each baluster i.e. the side facing the bottom newel post. Secure each baluster to the bottom rail by using 2 - 3/16" x 2-3/4" Tapcon screws.
6. Follow steps C 11 - 12 for installation of the sub-rail including the L-brackets but excluding the drilling for the threaded rods. Attach the balusters to the sub-rail by pilot drilling two 5/32" holes down and through the sub-rail and into the top of each baluster. Secure the baluster to the rail by using 2 - 3/16" x 2-3/4" Tapcon screws.
7. Place the bottom rail alongside the top and bottom posts and mark the vertical position on the rail to determine the angle cut. Follow the installation and finishing instructions in steps C 13 – 15.

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OTHER INFORMATION

It is always advisable to check your local building codes before starting construction. If you have any questions regarding these installation instructions, please contact us before starting installation.

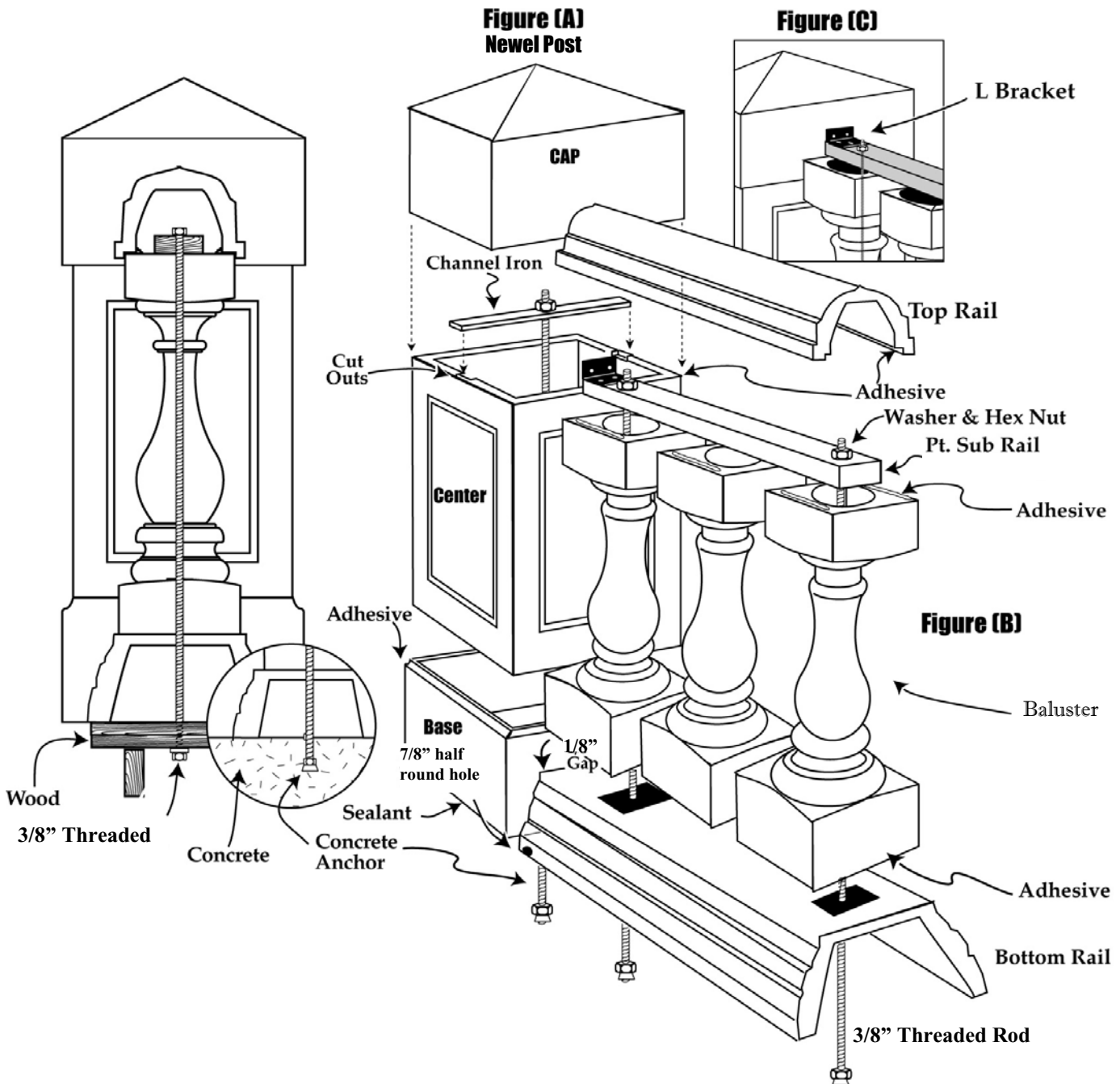
It is recommended that safety gloves, hats and goggles, as well as other specified safety equipment be used during installation and construction.

Manufacturer shall not be responsible if any failure to comply with these instructions results in the product failing to perform the purpose intended. Failure to comply with the above instructions shall result in voiding the terms and conditions as stated in the warranty.

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Installation Diagram



Balustrade System Installation - Charleston, Lexington, & Savannah

Marble & Resin Composite Product Manufactured By Pacific Columns.

A. PARTS AND SUPPLIES NEEDED FOR INSTALLATION WITH 6" NEWEL POST

Hardware included for each 10' section of rail:

- 2 2"x 1-1/2" L-brackets
 - 4 1-3/16" x 3/16" Blue hex-head screws for anchoring the L-brackets to the newel post, column or wall
 - 4 1/2" Pan head screws for anchoring L-brackets to the sub-rail
 - 4 1/4" x 3-1/4" Blue Phillips head screws for anchoring bottom rail to sub-surface
- Synboard® fillet for code spacing - spacing other than code may require the purchase of additional Synboard®

Hardware included for each Newel Post:

- 1 1-1/2" x 5-1/4" Channel iron
 - 1 3/8" Threaded rod
 - 1 3/8" Concrete anchor and hex nut
- [A 3/8" zinc-coated threaded insert will be provided for **wood installations** in place of the concrete anchor.]

Hardware not included:

The following will need to be purchased before beginning installation.

Sub-Rail Pressure treated 1/2" plywood ripped down to 3" wide cut the length of each top rail section.

Screws 1" Coarse threaded screws for anchoring the spindles to the sub-rail.

Adhesive Premium grade heavy-duty sub-floor adhesive.

Sealant/Caulk Premium grade Elastomeric Latex Sealant such as DAP Dynaflex 230®.

Silicone (Optional) Use a premium grade of silicone on upper level installations where you want to prevent moisture seepage below.

Bondo® (Optional) Used to fill in rail seams if necessary or for any repairs.

Shims (Optional) **Can be purchased separately with your order.**

Shim size is 4"(W) x 1/2" (H) x 5" (D) and is used primarily for **roof top installations**. 1/4" x 3-3/4" Blue Phillips head screws will be sent in place of 1/4" x 3-1/4" when using shims. Space shims 18" on center with a shim 1" from both ends of each bottom rail section. When drilling the hole in the bottom rail (see C-8) also drill the hole through the shim. For installations that need to be watertight please see instructions on page 2 "For upper level installations", also apply a generous amount of silicone to the bottom of the shim.

B. PREPARATION

Storage **Rails should be stored on a flat surface, topside up, prior to being installed.** Rails are designed to butt into the sides of newel posts, columns or walls and not into each other. The structural integrity of this spindle system assembly is based on adherence to the following installation instructions. For **Coastal Installations** aluminum and stainless steel parts can be purchased.

General **Specify whether installation is on a concrete or wood surface and if there are any stair or roof top installations when ordering. This will insure that the correct installation hardware is provided with your order.** Each installation will vary slightly. Read the Installation Instructions completely. Consult your representative if you have any questions **before** starting your installation.

Cutting Use a masonry blade where cuts are required on the top and bottom rail. Use a grinder with metal grinding wheel for a flush finish.

Drain Holes Use 1-3/4" steel door hole saw [Dewalt® brand recommended]. Drainage holes are not generally needed for wood installations.

Seams The rails come in varied lengths cut to order to avoid seams, however if your installation necessitates a seam in the rail you can use car Bondo® or similar product to fill in the seam. Follow the instructions on the can and sand smooth. Use the DAP Dynaflex 230® to fill in any gaps.

Adhesive For all attachments it is recommended that a premium grade sub-floor adhesive be used. Follow the directions for the adhesive used as not all products have the same drying times. Remember to not skimp on the adhesive. **Apply adhesive generously.**

Sub-Rail Use pressure treated 1/2" plywood ripped down to 3" wide cut the length of each top rail section. Synboard® (see C 15 for installation) will be installed, as fillet after the spindle installation is complete.

Painting Application of a high quality exterior primer such as Kilz® or Zinsser 123® is recommended followed by a premium grade of exterior topcoat. Follow the paint manufacturers' instructions concerning use within temperature ranges for best results.

Balustrade System Installation - Charleston, Lexington, & Savannah

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Custom Stair and Radius Rail sections are priced separately. For stair installations the newel post reveal as well as the top and bottom of the spindle is extended to allow for angle cuts. A template, provided by the customer, is required for radius rail sections.

C. INSTALLATION OF STRAIGHT RAIL AND NEWEL POSTS –

See following installation instructions for Half-Newel Posts - Stair Rail and Stair Newel Posts.

NOTE: Floor sub-surface must be finished before beginning installation.

NOTE: When installing system on less than 3/4" decking [plywood, OSB, other] and threaded insert DOES NOT HOLD, over drill hole to a 1" size and use a 3/8" butterfly toggle bolt to secure. Proceed with install as below.

1. If rails are to be connected to a wall, round column or your own posts which were not purchased as part of our spindle system you will need to have these installed before beginning installation. Make sure the spacing of the spindles and height of the completed system adheres to your local code requirements and use guidelines. Lay out the complete spindle system allowing for the newel posts, spindles and rails. Using a pencil, outline the placement of the bottom rail and newel posts. Putting tape over the post pencil markings will protect the floor surface from any excess adhesive. Tip: After setting let the adhesive dry overnight. Remove overage with a sharp wood chisel.
2. Install the newel posts before installing the rails or spindles. The newel post consists of 2 pieces: the post and the cap. It is very **important that the post is level** before going any further. If the slope of the sub-surface is 1/4" or less, use a wedge under the post for leveling. The wedge will be caulked in after installation. If the slope is greater than 1/4" it is recommended that you trim the bottom of the post to level.
3. Mark the placement for the center of each newel post on the sub-surface. Drill an 11/16" hole for the concrete anchor at the center of the placement. Tap the concrete anchor into the drilled hole. Wood installations will use a 3/8" zinc coated threaded insert in place of the concrete anchor. Drill a 5/8" hole slightly deeper than the threaded insert and use a 7/16" Allen Wrench to screw the insert into the drilled hole. Clean area by brushing away any dust before applying adhesive in the next step.

NOTE: For upper level installations where you want to prevent moisture seepage below use a premium grade of silicone as described in the following instructions. Fill the drilled hole with silicone before inserting the concrete anchor or threaded insert and fill the anchor or insert with silicone as well. Insert the threaded rod. Prepare a 2" gasket to fit over the rod putting silicone on both the top and bottom of the gasket. Tighten the gasket by using a 3/8"x 2" washer and hex-nut; do not over tighten. Mound additional silicone around the gasket, washer, and nut and on 1" of the rod.

4. Apply a heavy bead of adhesive to the bottom of the post. Center the post over the anchor and adhere it to the floor sub-surface. Note: the cutouts on the newel post should be facing up. Screw a 3/8" threaded rod into the concrete anchor, or 3/8" threaded insert for wood installations. Drill a 3/8" hole in the channel iron that will line up with the threaded rod. Slip the channel iron over the threaded rod through the drilled hole and into the cutouts in the post. Secure the rod to the channel iron using a hex nut. Cut off any excess on the threaded rod if necessary.
5. Run a heavy bead of adhesive along the outer top edge of the post as well as around the inside ledge of the cap. Place the newel cap on top of the post and slide into place. Make sure the cap is square and even all around the center post. See separate instructions for installing half newel posts and stair newel posts.
6. **IMPORTANT** – Drill the drainage holes before securing the bottom rail sections to the sub-surface. Note: drainage holes are generally not needed for wood installations. Cut 7/8" to 1" half round holes at the base of each bottom rail section at the point where the bottom rail connects to the newel post, column or wall. **There should be a drainage hole on BOTH ENDS and on BOTH SIDES of the bottom rail.** You will also need to drill additional drainage holes on both sides of the rail at any other low areas or where deemed necessary. The preferred method for making the drainage holes is to use a Dewalt 1-3/4" steel door hole saw. For two bottom rails the same length, turn the two rails over on their sides and clamp together. Using the hole saw drill a hole through the center of the clamped rails. This will give you a 7/8" half round hole on both rails. If the rails are different lengths you can still use the 1-3/4" hole saw by first marking the rails for the drain

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holes, clamping the rails together and drilling a hole at the markings. If another rail piece is not available clamp a piece of 2x4' to the bottom rail and drill the hole through the rail and the 2x4.

7. Temporarily place the bottom rail inside the pencil marks and slide into place next to the installed newel post. It is **VERY IMPORTANT to leave a 1/8" gap between the rail and the newel post, column or wall at both rail ends.** These expansion joints will be caulked in later. Similar to any product subject to hot and cold weather conditions you may experience contractions and expansions in the rail, which may require occasional, touch ups in the expansion joints. Determine the spacing to be used between each spindle and cut several wood blocks to that width. Be sure spacing adheres to the 4" sphere code if required. Temporarily lay the spindles along side the rail and using the wood spacer blocks as a guide mark the spindle placements on the rail. Using a carpenter's square outline the sides of each spindle on the rail. Also, mark the spindle centers for placement of the spindle rods.
8. Use a 1" drill bit to drill a hole through the bottom rail into the markings for each spindle center. The bottom rail is attached to the sub-surface using the 1/4" x 3-1/4" blue Phillips head screws. You will use 4 per 10' rail section (2 per 5' section and 3 per 7' section) spaced equally. These screws will be placed right next to a 1" drilled hole inside the spindle outline so that the spindle will be placed over the screw. Countersink and pilot drill a 3/16" hole for each screw. Move the bottom rail and drill a 3/16" hole into the sub-surface that will align with the 3/16" screw drillings in the bottom rail. Clean area by brushing away any dust before applying adhesive in the next step. If using shims please see instructions on page 1 under Shims.

NOTE: For upper level installations where you want to prevent moisture seepage below use a premium grade of silicone to fill the 3/16" drilled hole in the sub-surface.

9. Turn the bottom rail upside down and using the adhesive spot glue approximately every 18" on the bottom of both sides of the bottom rail. **DO NOT run a continuous bead of adhesive the length of the rail and DO NOT caulk the bottom rail where it attaches to the floor,** this will allow for drainage between the glue spots. Place the rail back into place inside the markings; remembering to leave the 1/8" expansion gaps at both rail ends. Screw in the 1/4" x 3-1/4" screws. **CAUTION – do not over tighten the screws.**
10. Before installing the spindles measure the height of the spindles that will be used for that rail section. Due to shrinkage after casting, spindles may vary slightly in overall height. Measure all spindles and group by height so that similar height spindles will be used together in each section. Set the two tallest spindles for that rail section at each end. You may also trim the spindle tops to the same height if desired. Run a continuous bead of adhesive around the bottom of each spindle and set the spindles in place on the rail using the pencil markings for placement. **Be sure to line the spindles up with the seams positioned on the same side and pointing in the same direction.**
11. For sub-rail take the 1/2" pressure treated plywood ripped to 3" wide and cut to the length required to fit flush (no gaps) between the newel post, column or wall. Run a bead of adhesive around the top of the spindles. Center the sub-rail over the top of the spindles making sure each spindle is level and square. Use the wood spacer blocks to level spindles. Tack the sub-rail to the spindles using an air gun and shoot 2 - 1" nails close to each spindle center. Secure the spindle by countersinking and pilot drilling 2 [two] 7/64" holes close to the spindle center and screw in 2 - 1" coarse screws.
12. Before attaching the L-bracket to the sub-rail and newel post, column or wall apply adhesive to the backside of the L-bracket. Attach the 2" side of the L-bracket to each end of the sub-rail using two 1/2" pan head screws. Center the L-bracket on the newel post, column or wall and attach the 1-1/2" side of the L-bracket by pilot drilling two holes with a 5/32" drill bit. Screw in two 1-3/4"x 3/16" blue hex head screws per L-bracket.
13. To install the top rail - run a bead of adhesive along the top of the sub-rail as well as along the channel underneath the top rail. Slide the top rail into place over the sub-rail. It is **VERY IMPORTANT to leave a 1/8" gap at both ends of the rail between the top rail and the newel post, column or wall.** These expansion joints will be caulked in later. Between every fifth spindle opening countersink and pilot drill a 7/64" hole on the underside of the sub-rail into the underside of the top rail. Screw in a 1" coarse threaded screw. This will tighten the sub-rail to the top rail.

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14. To attach a rail that will go from a round column to a round column, you can cope the top and bottom rail with a grinder, belt sander and/or dremel tool, to fit around the column and base/plinth. You may also cut the column base in half, slide the rail to the column and cope both base halves to fit around the bottom rail. Using adhesive glue the base/plinth on to the sub-surface around the column.
15. To finish, lightly sand the rails and newel posts. **To install the Synboard® fillet under the top rail** cut the Synboard® to the width required to fit between the spindles. Use an air gun or adhesive to attach the Synboard® to the sub-rail. Caulk the seams, the 1/8" expansion joints and connecting points with the DAP Dynaflex 230®. **For drainage do not caulk the bottom of the rail where it is adhered to the floor sub-surface.** It is recommended that a high quality exterior primer such as Kilz® or Zinsser 123® should be applied to the rails, newel posts and spindles followed by a premium grade of exterior topcoat. For best results follow the paint manufacturer's instructions. Do not use paint or solvents containing acetone.

D. HALF-NEWEL POST INSTALLATION INSTRUCTIONS

Hardware included for each Half-Newel Post:

You will **NOT NEED** a channel iron, threaded rod or the concrete anchor and hex nut for installation of the half -newel post.

Hardware not included:

The following will need to be purchased before beginning installation.

- 1 2" x 4" x 24" Pressure treated board to secure the half-post to the wall
- 8 1/4"x 3" Blue Tapcon® Phillips head screws

1. **Read steps C 2 – 5 before proceeding.** Installation of the half-newel post is similar to the full-newel post. **Check that the post is level before beginning installation.**
2. Temporarily locate and mark the position of the half-post on the wall. Place the 2" x 4" x 24" pressure treated board on the wall so that it will be centered in the cavity of the half-post. Apply a generous amount of adhesive to the back of the board. Countersink and pilot drill 4 holes using a 3/16" drill bit through the 2" x 4" x 24" board and into the wall. Secure the board to the wall using 4 - 1/4"x 3" blue Tapcon screws. Attach the half-post to the board by first applying a generous amount of adhesive to the cut side (wall side) and bottom of the post. Countersink and pilot drill 2 - 3/16" holes on each side of the post in to the side of the board. You will be drilling a total of 4 holes, 2 on each side, none in front. Secure the post to the board using 4 - 1/4"x 3" blue Tapcon screws.
3. Secure the half-cap to the post by applying a generous amount of adhesive all around the edges of the half-cap and half-post. Center cap and attach.

E. STAIR INSTALLATION INSTRUCTIONS

Hardware included for each Extended Newel Post:

- 1 1-1/2" x 5-1/4" Channel iron
- 1 3/8" Threaded rod
- 1 3/8" Concrete anchor and hex nut
[A 3/8" zinc-coated threaded insert will be provided for **wood installations** in place of the concrete anchor]

Hardware not included:

The following will need to be purchased before beginning installation.

Sand and concrete mix for the extended posts

- 4 1/4"x 4" Blue Tapcon Phillips Head Screws
- 3/16"x 2-3/4" Tapcon Phillips Head Screws - 2 for each extended spindle
- 1" Coarse Thread Screws

1. **Read installation instructions in Section C above before proceeding.** The rails will attach to a standard height newel post, column or wall at the top of the stairs and an extended post at the bottom of the stairs. Temporarily position the extended post at the bottom of stairs and the standard newel post at the top of the stairs. Place the bottom rail alongside the top and bottom posts and mark the vertical position on the rail to determine the angle cut. **Remember to leave the 1/8" gap for expansion on both ends of the rail.**
2. To determine the height needed for the extended post, temporarily slide the bottom rail back into place and position it against the top and bottom posts. Mark the bottom post so that the height of the reveal is the same for both the top and bottom posts. Use a masonry blade for cutting the rail and bottom of the post.

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3. It is important that both posts are level and square before installing. After cutting the bottom post to the correct height install the post as described in steps C 2 - 4. **DO NOT install the cap at this point. Be sure post and threaded rod is secure and stable on the sub-surface before continuing.** The bottom extended posts will require a strong and stable installation, as the grade of the stairs will force more weight onto these posts. For added strength pack the bottom extended posts with a mixture of **1/3 sand and 2/3 concrete mix that has been slightly moistened.** The concrete mixture should come to the top of the newel post. Be sure to use a **moistened not wet** concrete mix to minimize leaching between the base and floor surface, which could result in staining the floor surface. Cut off any excess threaded rod if necessary and attach the newel cap as described in C 5.
4. Attach the bottom rail to the top and bottom posts by countersinking and pilot drilling a 3/16" hole on both sides and at both ends of the bottom rail. The hole needs to be angled to go through the side of the rail into the bottom of the post. Secure the rail with the 4 - 1/4" x 4" blue Tapcon screws.
5. Temporarily place the pressure treated sub-rail against the top and bottom newel posts to mark the height for the top rail. You will want the same distance between the top and bottom rail as the rail on the straight runs. This will also determine the angle to cut the top and bottom reveals of the extended spindles. Make sure the spindles are in a level position vertically and that the seams are all pointing in the same direction before marking and cutting using the wood spacer blocks as a guide. The spindle should be cut equally at the top and bottom so that the reveal is the same.
6. Before attaching the spindles to the bottom rail mark the spindle positions on the rail so that they are spaced equally along the rail. Start by installing the top and bottom spindle to both the bottom rail and top sub-rail first. Before installing apply a heavy bead of adhesive to the bottom spindle ends. To install the bottom spindle countersink and pilot drill two 5/32" holes on the side of each spindle. Angle the hole through the spindle and into the bottom rail. To install the top spindle and middle spindles, drill the holes at the bottom on the front side of each spindle i.e. the side facing the bottom newel post. Secure each spindle to the bottom rail by using 2 - 3/16"x 2-3/4" Tapcon screws.
7. Follow steps C 11 - 12 for installation of the sub-rail including the L-brackets.
8. To install the top rail place the top rail alongside the top and bottom posts and mark the vertical position on the rail to determine the angle cut. Follow the installation and finishing instructions in steps C 13 – 15.

OTHER INFORMATION

It is always advisable to check your local building codes before starting construction. If you have any questions regarding these installation instructions and your local building code requirements, please contact us before starting installation.

It is recommended that safety gloves, hats and goggles, as well as other specified safety equipment be used during installation and construction.

Manufacturer shall not be responsible if any failure to comply with these instructions results in the product failing to perform the purpose intended. Failure to comply with the above instructions shall result in voiding the terms and conditions as stated in the warranty.
