High Performance Utility Poles

Assembly & Installation Guide
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# Assembly & Installation Guide

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Disclaimer:
The following instructions are RS Technologies’ recommendations regarding the receiving, assembly and installation of RS modular composite utility poles and communication structures. These recommendations are intended to supplement standard utility pole setting work methods.

Recommended procedures do not cover all possible variations in equipment design or provide answers to all specific installation and operating questions which may occur. As such please contact your local RS representative should you have any questions about procedures that are not covered in this guide.

Standard Items Delivered With RS Poles:
1. Joint Hardware (two blind nuts, washers and bolts and four hole plugs per joint)
2. One Base Plate (per pole)
3. Four J-Bolts, Nuts and Washers (for base plate)
4. One Top Cap (per pole)
5. Four Self-Drilling Screws (for top cap)

Additional Accessories Available From RS Upon Request:
1. RS Jacking Lugs (four are required to assemble a pole and comprise one set)
2. Carbide Tipped Drill Bits or Hole Saws For Field Drilling
3. Pole Steps
## 1.0 Module Information

### Imperial Units

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2.0 Equipment and Safety

2.1 Installation Site Equipment Requirements For The RS Poles
1. One set of Jacking Lugs (there are four jacking lugs in a set)
2. 2 x 3 Ton Come-Along
3. 2 x 20 ft. [6.1 m] chain extension for come-alongs to reach jacking lugs
4. Dead Blow Rubber Mallet (for slip joints tension release during module assembly)
5. Crescent Wrench with range from 9/16” [14 mm] (for J-Bolts) to 1-1/8” [29 mm] (for blind nuts)
6. 5/16” [8 mm] Hex Head socket with drill attachment (to install top cap screws)
7. Drill (gas, hydraulic or battery operated)
8. 1-1/8” [29 mm] Carbide Tip Drill Bit or hole saw (other sizes as necessary if field drilling is required)
9. Chalk Line (for axial marking if field drilling is required)
10. Circular Saw with Diamond Blade (if modules will be field cut)
11. Permanent Marker (if field drilling or cutting)
12. Particle Mask and Safety Goggles (if field drilling or cutting)
13. Gloves
14. Ground Wire Clips and Self-Drilling Screws (if ground wire is run externally)
15. Fish Tape/Draw Wire/Draw Tape (if ground wire is run internally)
16. 100 ft. [30.5 m] Tape Measure
17. Cant Pole or Cant Hooks

2.2 Safety Notes

2.2.1
Refer to the MSDS and consult your safety coordinator for information on Personal Protective Equipment required for this task. Always follow manufacturer’s instructions when operating the drills and come-alongs.

2.2.2
Always wear gloves when handling the modules.

2.2.3
Always wear a particle mask when cutting or drilling fiberglass.

2.2.4
Always wear safety glasses with side shields when cutting or drilling fiberglass.

2.2.5
Always install safety strap or chain when using jacking lugs.
3.0 RS Pole & Module Code Legend

In order to identify RS poles and modules, RS part numbers are indicated in several locations:

Module ID: A paper module tag is taped inside base of each module and an embossed aluminium tag is affixed to the outside each module near the midpoint with two self tapping screws.

Pole ID: Every RS pole has a pole ID tag located a set distance from the pole base affixed to the base module with two self tapping screws.

The following pole data uses the RS pole codes. See Figure 1a/Figure 1b for an understanding of pole and module code components.

From Figure 1a the sample code denotes a 45 ft. [13.7 m] pole using modules 2, 3 and 4 with the top module cut to achieve the 45 ft. [13.7 m] length.
4.0 Receiving and Unloading

4.1 Receiving a trailer load of poles
RS poles are shipped in nested bundles. Depending on the size of the pole, these bundles will be approximately 19 ft. [5.8 m] or 37 ft. [11.3 m] in length (See Figure 2). Nested RS poles can be unloaded using a forklift or boom truck (See Figure 3a and 3b).

The centre of gravity (CoG) marking is a dashed line around each module - do not refer to this line on the outermost module to lift a nested pole set as it refers to the module only. If a nested pole set contains longer outside modules (i.e. a 5/6, 6/7, 8/9 or 10/11), and shorter inside modules (i.e. a 1, 2, 3, 4 or 5), use caution as the center of gravity for the nested set will be closer to the base. Refer to the RS pole drawing to confirm the center of gravity for nested and assembled poles. Contact RS for any applicable drawings.

Prior to unloading poles, ensure that all poles are blocked and that lower rows of poles remain securely strapped. Do not release or cut any straps or banding, respectively, until all poles are properly secured.

5.0 Un-Nest Pole Modules

5.1 Remove shipping bolt
RS nested bundles are secured with a shipping bolt. To un-nest the modules, remove the shipping bolt located at the large end of the nested module set (see Figure 4). This bolt holds all the modules together from a single point. Ensure that the nested module set is elevated (wood dunnage is recommended for this purpose) to allow for removal of the bolt. Ensure that the shipping bolt is on the bottom of the nested modules to reduce module movement after the shipping bolt is removed and to avoid possible injury.

Note: Other blind nut/bolt assemblies may be installed along the length of the module(s) or bundle; these bolts are used to secure double modules used in reinforced poles and SHALL NOT be removed.
5.2 Un-nest modules and lay out for assembly

After the shipping bolt is removed, un-nest the modules starting with the innermost (smallest) module first and layout for assembly (See Figure 5). For smaller modules, this can usually be accomplished by-hand with two to four crew members. For larger modules, handling with a boom truck is recommended to move modules faster and safer. When un-nesting a module, it is important that the base of the module needs to be lifted up during its removal from the nested set to minimize scratching along the length of the module.

6.0 Line-Up Modules For Assembly

6.1 Line-up modules on blocks

Once the modules are un-nested and laid out in sequence for assembly, it is recommended that the modules be set on "blocking" to keep the modules off the ground and debris out of the slip joints. Two blocks per module is recommended. Pipe stands and assembly racks can also be used instead of wood blocks to elevate the modules to a comfortable working level (See section 6.3). Wipe clean any debris from the slip joint region, especially inside the butt end of the smaller (upper) module to be assembled where the tip of the larger (lower) module will be inserted. (See Figure 6).

6.2 Fit modules together

Once the modules are up on blocks, starting with the largest modules to be assembled (be sure to position the butt of the base module where desired), slide the base of the smaller module over the tip of the larger module by hand using the alignment marks as a guide. There are four quadrant axes on RS modules with the elongated tip and base alignment marks only on one axis. Using the alignment marks ensures that the jacking lug holes and any pre-drilled holes are kept in alignment (See Figure 7 for pole marking details and Figure 8 for an example of modules being fitted together).

Note: Alignment marks will typically appear as text with data including module weight and serial number. In cases where the original alignment line printing has faded, the alignment marks appear as a single solid line.

Note: RS poles can also be assembled vertically. For this type of assembly, the base module should be set and plumbed first. The subsequent modules can then be lifted into place as a pre-framed single unit or assembled module-by-module, depending on preference and site conditions. If the pole is assembled vertically, the modules are still required to be “jacked together” using two 3 ton come-alongs, safety straps or chains and RS jacking lugs. See sections 7.0 and 8.0 for slip joint assembly instructions.
6.3 Assembly racks

Different assembly rack options are available for RS poles.

Pipe stands are an inexpensive method to raise the pole to a comfortable working height during the assembly process and the concave stand tops hold the pole into position (See Figures 9 and 10).

Assembly racks are the most efficient method to assemble RS poles and enable complete pole assembly in as little as 10-15 minutes. These racks elevate the pole to a comfortable working height and using rollers facilitate quick un-nesting of the modules and easy assembly of the complete pole (See Figures 11, 12, 13 and 14). For effective use, the assembly racks require a minimum pole quantity and a flat central staging area. Please contact RS for further information on the use of the assembly racks.

Figure 9: Stacked set of pipe stands.

Figure 10: Pipe stands used to assemble a 36 m [118 ft.] RS pole.

Figure 11: Three module RS pole on the assembly racks with all modules un-nested and rolling the second module into position.

Figure 12: Completed pole being lifted off the assembly racks on the right and new nested set ready to be assembled on left.

Figure 13: Slip joint assembly using a mallet.

Figure 14: Drilling framing holes on site. Pre-drilled holes are available from RS on request.
7.0 Install Jacking Lugs

7.1 Module standard drilling
Every RS module is manufactured with pre-drilled locations. There are two (2) slots and two (2) holes at the base of every module. The two (2) slots are used for blind nut connections when the module is the smaller (upper) module in a slip joint and is not the base module in a pole. Both the two (2) slots and two holes (2) in the module base are used for four (4) J-bolts to secure the base plate if the module is the bottom module in a pole combination. Most modules are also equipped with four (4) jacking lug hole locations with two (2) jacking lug holes located near the module tip and two (2) jacking lug holes located near the module base. These holes are utilized during the pole assembly process. The exceptions to this are modules 1 and 1 Long that only have two (2) jacking lug holes located near the base of the module, because these modules will only ever be at the top of combination, and modules 5/6 and 10/11 that only have two (2) jacking lug holes located near the tip of the module, because these modules will only ever be at the bottom of a combination.

7.2 Insert jacking lugs into pre-drilled holes
Insert four jacking lugs, two jacking lugs per module, into the pre-drilled jacking lug holes on the modules. Pre-drilled jacking lug holes are located at 180 degrees to each other module (See Figure 15). Ensure that the lugs are fully inserted and flush with the pole wall and oriented in the direction of the come along to prevent damage to the pole wall or jacking lug.

![Figure 15: Jacking lug being inserted into pre-drilled jacking lug hole.](image)

7.3 Double wall vs Single wall jacking lugs
When assembling two standard single wall (SW) modules, four single wall jacking lugs are required. This is the most common RS pole assembly.

RS modules are also available in a double wall (DW) configuration where two of the same module have been assembled at the factory and secured with blind nut/bolt assemblies. It is important not to remove these bolt assemblies in the field. Additionally, these DW modules will require additional blind nut/bolt assemblies installed in pre-drilled locations along their length in the field after the entire pole has been assembled. Double wall modules may have a short section of the inner module protruding from the outer module at the base or be trimmed flush with the base of the outer module. Care should be taken in identifying these modules prior to pole assembly.

For assembling two DW modules, four DW jacking lugs are required.

For assembling one SW and one DW module, two SW and two DW jacking lugs are required.

**Note:** The SW and DW jacking lugs should be used only in their respective modules. It is critical to use the correct type of jacking lugs for SW and DW modules as improper use could result in damage to the module(s).
SW jacking lugs are stamped with the following:
H-JL-S
DD/MM/YYYY
MADE IN CANADA

DW jacking lugs are stamped with the following:
H-JL-D
DD/MM/YYYY
MADE IN CANADA
MAX LOAD: 3T
DOUBLE WALL ONLY

Note: The H-JL-S and the H-JL-D were formerly stamped RSX-1 and RSX-1DW respectively and are all compatible with RS modules.

7.4 Install jacking lug safety device
Wrap the jacking lug safety strap or chain around the module at each jacking lug location. Ensure that the strap or chain passes through the large hole in the jacking lug. Fasten the strap with the ratcheting device (or use the quick-link on the chain), the strap or chain should be as snug as possible but not tight (some minor slack is expected in the chain, See Figure 16 and 17).

Note: The use of safety straps or chains is mandatory when assembling RS modules. Failure to use a safety chain or strap could result in serious injury.

Figure 16: Jacking lugs with safety strap installed correctly.
Figure 17: Jacking lugs with safety chain installed correctly.
8.0 Assemble Modules

8.1 Attach come-alongs to jacking lugs

Ensure that the modules being assembled are “lined-up” using the longitudinal module tip and base alignment marks, then attach come-alongs to the jacking lugs on both sides of the pole (See Figure 13). It is recommended that 3 ton come-alongs are used to ensure that slip-joints are brought together properly. Strap or chain extensions for the come-alongs will be required to assemble the modules.

Note: Unlike steel poles, lubricants (i.e. grease, WD-40 or soap) are not required.

8.2 Winch modules together

After come-alongs are securely attached to the jacking lugs and the safety straps or chains are in place, winch modules together using equal force on both sides. During this process ensure that the longitudinal alignment between the modules is maintained (See Figure 18). During the assembly process use a rubber mallet on the butt of the smaller (upper) module to relieve any built up stress in the slip joint resulting from uneven jacking pressure or module surface irregularities (See Figure 20). Continue winching PAST the dotted minimum overlap line until the joint is snug and there are no gaps around the base ring of the smaller (upper) module. Due to slip joint tolerance, the base of the top module may or may not pass the solid QC gauge line during pole assembly.

Note: The hand-drawn solid black marker horizontal QC gauge line is used for manufacturing process quality assurance purposes and is not the maximum slip joint overlap (See Figure 18 and 19).

It is important that each slip joint is assembled securely. Continue winching PAST the dotted minimum overlap line until the joint is snug. Due to slip joint tolerance, the base of the top module may or may not pass the solid hand-drawn QC gauge line during pole assembly. Winching should continue until the slip joint is tight, staying alert to any potential jacking lug hole damage on the module as a result of excessive force. If damage occurs to the jacking lug hole(s) during assembly, contact your local RS representative.

Once the jacking lugs and come-alongs are removed, insert the hole plugs into the four jacking lug holes. Hole plugs are supplied with the slip joint kit.
9.0 Secure Joint

9.1 Drill holes for the blind nut
Once the module slip joint is tight and fully seated, drill through the inner modules at the base end of the slot in the outer (upper) module with a 1-1/8” [29 mm] drill bit using the pre-cut slots as a guide (See Figure 21). The drilled hole should be located as close to the base-end of the slot as possible (See Figure 22).

**Note:** The slot is 7/8” [22 mm] wide to accommodate the 3/4” [19 mm] bolt used in the blind nut. The hole is drilled oversized to allow the insertion of the blind nut.

9.2 Install blind nuts
Insert blind nut into drilled hole and pull back on the cable to center the nut in the drilled hole. Next, thread the bolt by hand, ensuring that the blind nut is kept in line vertically (parallel) with the pole center line (See Figure 23). If the blind nut is horizontal, it may damage the pole wall. To assist in positioning the blind nut along the pole axis, pull the retention cable over to one side of the pole or the other, as shown in Figure 23. Once the bolt is threaded, tighten it with a socket or a crescent wrench. Repeat on the opposite side of the pole.

For any remaining modules that need to be assembled, repeat the procedures for assembling the modules, inserting the jacking lugs, jacking the modules together and securing the joint.

**Note:** After completing the blind nut installation at the slip joints, trim the blind nut cable (See Figure 24 above).
10.0 Install Base Plate

10.1 Insert J-Bolts into pre-drilled base plate holes

Insert four J-Bolts from the inside of the module into pre-drilled base plate holes located at the bottom of the base module (See Figure 25).

**Note:** Reverse this procedure to install J-Bolts on the inside of the pole, if desired. If the ‘N-1’ base plate is ordered, J-Bolts must be installed on the inside of the pole.

![Figure 25: J-bolts being inserted in pre-drilled base plate holes/slots at the bottom module.](image)

10.2 Attach base plate using J-Bolts, washers and nuts

Place the appropriately sized base plate on the base of the pole and align the base plate with the J-Bolts installed. Thread J-Bolts through the slots on the base plate and then attach the washers and nuts by hand (See Figure 26). After all four J-Bolts are secured and the base plate is centered; tighten each nut with a socket or crescent wrench.

![Figure 26: Align base plate slots with J-Bolts and install washers and nut on each J-bolt to hold base plate in place. Standard base plate on the left, ‘N-1’ base plate on the right.](image)

**Note:** RS poles are shipped with the standard base plate. For installations where a smaller diameter base plate is required, the ‘N-1’ base plate option can be utilized and ordered accordingly. See page 3 of the Assembly and Installation Guide for base plate options and dimensional information.

![Figure 27: Standard base plate.](image)

![Figure 28: ‘N-1’ base plate.](image)

Commonly, to avoid base plate damage while lifting the pole, base plates are attached once the pole has been lifted vertically off the ground, just prior to installation.
### 11.0 Install Top Cap

Place the correctly sized top cap on the top module of an assembled pole and secure with four self tapping 5/16” [8 mm] hex head screws to pole using the pilot holes in the top cap (See Figure 29).

![Figure 29: Top cap being installed.](image)

### 12.0 Set the Pole

It is required that nylon slings be used when setting RS poles and that a through bolt, threaded rod or other piece of hardware be placed above the sling location pick point to prevent sling slippage during hoisting. Commonly, the pre-drilled jacking lug hole locations can be used for the through bolt (See Figure 30). Note, should the hardware used to prevent the nylon strap from slipping during erection not be permanent, hole plugs shall be used to plug the holes once the hardware is removed.

![Figure 30: Single eye bolt preventing sling slippage during installation.](image)

RS poles are light, tapered structures, so the balance point for the pole is easy to find. It is typically located close to the center of the pole and marked on the drawing(s) (See Figure 31). However, the exact center of gravity location will vary based on the amount of hardware attached to the pole when installing. Once the proper fulcrum point for hoisting is found, industry standard practices can be followed for setting the pole.

![Figure 31: Setting the pole using nylon slings.](image)
13.0 RS Hole Spacing Requirements

**RULES FOR HOLE SPACING/SIZE/LOCATION**

1. **Minimum Center to Center Distance Between Holes** = 6x Diameter of (Largest) Hole.
2. **Minimum Distance from Hole Center to Top Module Tip Edge** = 5x Diameter of Hole.
3. **Hole Diameter Not to Exceed** 1 1/4" (32mm).
4. **Holes Shall Not Be Drilled Within** 96" (2400mm) From Ground Line Without RS Approval.

**ASSEMBLED MODULE “NO DRILL” ZONE**

- **5” [127mm]** below base of upper module (see note 5).
- **3” [78mm]** above base of upper module (see note 5).
- **15” [380mm]** typical edge of upper module (see note 3).

**UNASSEMBLED MODULE “NO DRILL” ZONE**

- **6” [152mm]** no drilling zone below the QC gauge line.
- **QC Gauge Line, Represented as a Solid Hand Drawn Line** (location is module dependent).
- **6D (center to center)**
- **6D (center to edge)**

**NOTES:**

1. Unless otherwise approved by RS Engineering and the customer, drilling must comply with all relevant RS work instructions.
2. Additional fasteners are not recommended in split joints, unless approved by RS Engineering. Refer to hardware guidelines for pole wall beam attachment.
3. Additional field drilling of holes in the split joint area may be required when the tip of the lower module block holes that were pre-drilled in the base of the upper module once the split joint has been assembled.
4. Drilling holes in the module tip is acceptable (subject to the 5D rule). When a module is not used, it must be removed from the joint.
5. Any drilled holes or hardware attachments must allow a minimum of distance between the hardware and the base of the upper module. Hardware must not encroach this 5D spacing.
6. Contact RS to resolve hole violation issues.

**DRAWN BY**

**APPROVED BY**

**DRAWN:**

**APPROVED:**

**DESIGNATION:**

**DESCRIPTION:**

**REV NO:**

**RS MODULE HOLE SPACING REQUIREMENTS**

**DIM NO:** 10018-003

**RS PART NO:**

**REV E:**