



STANDARD MICROWAVE
COMBINER MODEL
SMC-XX-X-HP-X
Installation Manual



Please read the manual completely and carefully before installation.
Instructions are intended for qualified and experienced personnel.

June 2011

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Information

Regulatory Information

This product, when installed properly with an approved Outdoor Unit (ODU) is designed to meet the following standards.

- EN60950-1
- EN60950-22
- FCC Part 101
- EN 302 217-x

Warranty Information

This product is warranted for two years from date of purchase. Visit the Trango Systems Web site for a complete description of warranty coverage and limitations.

Contact Information

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1.0 Overview

Thank you for purchasing this standard combiner for your microwave transmission link installation. This product has been designed and manufactured to the highest standards and will provide years of trouble free service if installed correctly.

The combiner is designed for mounting two Outdoor Units (ODUs) directly to a parabolic dish antenna. Both ODUs mounted on the combiner will use the same polarization, which may be configured to be either horizontal OR vertical. This type of combiner is typically used for 1+1, 2+0, and 4+0 applications (two required). ODUs are latched onto the combiner and the combiner is then latched and bolted onto the antenna.

There are two types of this combiner, one that has an equal power split between the two ODUs, and one that has an unequal split between the ODUs. Further, the both types of combiners are available in direct mount or remote mount. The unequal split version is recommended for 1+1 applications only where more system gain is desired on the main path and a less system gain can be tolerated on the standby path. See the chart below for details on combiner insertion loss from the ODU to the antenna. This loss must be considered when conducting a path loss analysis.

Model	LOSS (dB) ODU1	LOSS (dB) ODU 2
SMC-06-xx	1.9	6.5
SMC-03-xx (6-23 GHz)	3.3	3.3
SMC-03-xx (26-38 GHz)	4.1	4.1

This mount has been designed and manufactured to the highest standards and will provide years of trouble free service if installed correctly. Please review and follow this installation manual.

For Remote mount combiners, the connection to the antenna is made with flex waveguide (not included) attached to the waveguide port.

This Manual covers the following models:

ANTENNA MOUNT COMBINERS

Model	Description	GHz	Antenna WG Diam.	ODU WG Diam.	FREQ. Range (GHz)
SMC-06-3-HP	STD 3 dB Combiner Antenna mnt, 6 GHz	6	RIDGE	N/A	5.9 to 7.1
SMC-06-6-HP	STD 6 dB Coupler Antenna mnt, 6 GHz	6	RIDGE	N/A	5.9 to 7.1
SMC-78-3-HP	STD 3 dB Combiner Antenna mnt, 7/8 GHz	7&8	1.025	1.025	7.1 to 8.5
SMC-78-6-HP	STD 6 dB Coupler Antenna mnt, 7/8 GHz	7&8	1.025	1.025	7.1 to 8.5
SMC-11-3-HP	STD 3 dB Combiner Antenna mnt, 11 GHz	11	0.740	0.740	10.7 to 11.7
SMC-11-6-HP	STD 6 dB Coupler Antenna mnt, 11 GHz	11	0.740	0.740	10.7 to 11.7
SMC-13-3-HP	STD 3 dB Combiner Antenna mnt, 13 GHz	13	0.620	0.620	12.7 to 13.3
SMC-13-6-HP	STD 6 dB Coupler Antenna mnt, 13 GHz	13	0.620	0.620	12.7 to 13.3
SMC-15-3-HP	STD 3 dB Combiner Antenna mnt, 15 GHz	15	0.560	0.560	14.4 to 15.4
SMC-15-6-HP	STD 6 dB Coupler Antenna mnt, 15 GHz	15	0.560	0.560	14.4 to 15.4
SMC-18-3-HP	STD 3 dB Combiner Antenna mnt, 18 GHz	18	0.455	0.455	17.7 to 19.7
SMC-18-6-HP	STD 6 dB Coupler Antenna mnt, 18 GHz	18	0.455	0.455	17.7 to 19.7
SMC-23-3-HP	STD 3 dB Combiner Antenna mnt, 23 GHz	23	0.375	0.375	21.2 to 23.6
SMC-23-6-HP	STD 6 dB Coupler Antenna mnt, 23 GHz	23	0.375	0.375	21.2 to 23.6
SMC-26-3-HP	STD 3 dB Combiner Antenna mnt, 26 GHz	26	0.370	0.370	24.2 to 26.5
SMC-26-6-HP	STD 6 dB Coupler Antenna mnt, 26 GHz	26	0.370	0.370	24.2 to 26.5
SMC-28-3-HP	STD 3 dB Combiner Antenna mnt, 28 GHz	28	0.290	0.290	27.5 to 29.5
SMC-28-6-HP	STD 6 dB Coupler Antenna mnt, 28 GHz	28	0.290	0.290	27.5 to 29.5
SMC-32-3-HP	STD 3 dB Combiner Antenna mnt, 32 GHz	32	0.250	0.250	31.8 to 33.4
SMC-32-6-HP	STD 6 dB Coupler Antenna mnt, 32 GHz	32	0.250	0.250	31.8 to 33.4
SMC-38-3-HP	STD 3 dB Combiner Antenna mnt, 38 GHz	38	0.219	0.219	37.0 to 40.0
SMC-38-6-HP	STD 6 dB Coupler Antenna mnt, 38 GHz	38	0.219	0.219	37.0 to 40.0

REMOTE MOUNT COMBINERS

Model	Description	GHz	Antenna WG Diam.	ODU WG Diam.	FREQ. Range (GHz)
SMC-06-3-HP-R	STD 3 dB Combiner Remote mnt, 6 GHz	6	RIDGE	N/A	5.9 to 7.1
SMC-06-6-HP-R	STD 6 dB Coupler Remote mnt, 6 GHz	6	RIDGE	N/A	5.9 to 7.1
SMC-78-3-HP-R	STD 3 dB Combiner Remote mnt, 7/8 GHz	7&8	WR-112	1.025	7.1 to 8.5
SMC-78-6-HP-R	STD 6 dB Coupler Remote mnt, 7/8 GHz	7&8	WR-112	1.025	7.1 to 8.5
SMC-11-3-HP-R	STD 3 dB Combiner Remote mnt, 11 GHz	11	WR-75	0.740	10.7 to 11.7
SMC-11-6-HP-R	STD 6 dB Coupler Remote mnt, 11 GHz	11	WR-75	0.740	10.7 to 11.7
SMC-13-3-HP-R	STD 3 dB Combiner Remote mnt, 13 GHz	13	WR-75	0.620	12.7 to 13.3
SMC-13-6-HP-R	STD 6 dB Coupler Remote mnt, 13 GHz	13	WR-75	0.620	12.7 to 13.3
SMC-15-3-HP-R	STD 3 dB Combiner Remote mnt, 15 GHz	15	WR-62	0.560	14.4 to 15.4
SMC-15-6-HP-R	STD 6 dB Coupler Remote mnt, 15 GHz	15	WR-62	0.560	14.4 to 15.4
SMC-18-3-HP-R	STD 3 dB Combiner Remote mnt, 18 GHz	18	WR-42	0.455	17.7 to 19.7
SMC-18-6-HP-R	STD 6 dB Coupler Remote mnt, 18 GHz	18	WR-42	0.455	17.7 to 19.7
SMC-23-3-HP-R	STD 3 dB Combiner Remote mnt, 23 GHz	23	WR-42	0.375	21.2 to 23.6
SMC-23-6-HP-R	STD 6 dB Coupler Remote mnt, 23 GHz	23	WR-42	0.375	21.2 to 23.6
SMC-26-3-HP-R	STD 3 dB Combiner Remote mnt, 26 GHz	26	WR-42	0.370	24.2 to 26.5
SMC-26-6-HP-R	STD 6 dB Coupler Remote mnt, 26 GHz	26	WR-42	0.370	24.2 to 26.5
SMC-28-3-HP-R	STD 3 dB Combiner Remote mnt, 28 GHz	28	WR-28	0.290	27.5 to 29.5
SMC-28-6-HP-R	STD 6 dB Coupler Remote mnt, 28 GHz	28	WR-28	0.290	27.5 to 29.5
SMC-32-3-HP-R	STD 3 dB Combiner Remote mnt, 32 GHz	32	WR-28	0.250	31.8 to 33.4
SMC-32-6-HP-R	STD 6 dB Coupler Remote mnt, 32 GHz	32	WR-28	0.250	31.8 to 33.4
SMC-38-3-HP-R	STD 3 dB Combiner Remote mnt, 38 GHz	38	WR-28	0.219	37.0 to 40.0
SMC-38-6-HP-R	STD 6 dB Coupler Remote mnt, 38 GHz	38	WR-28	0.219	37.0 to 40.0

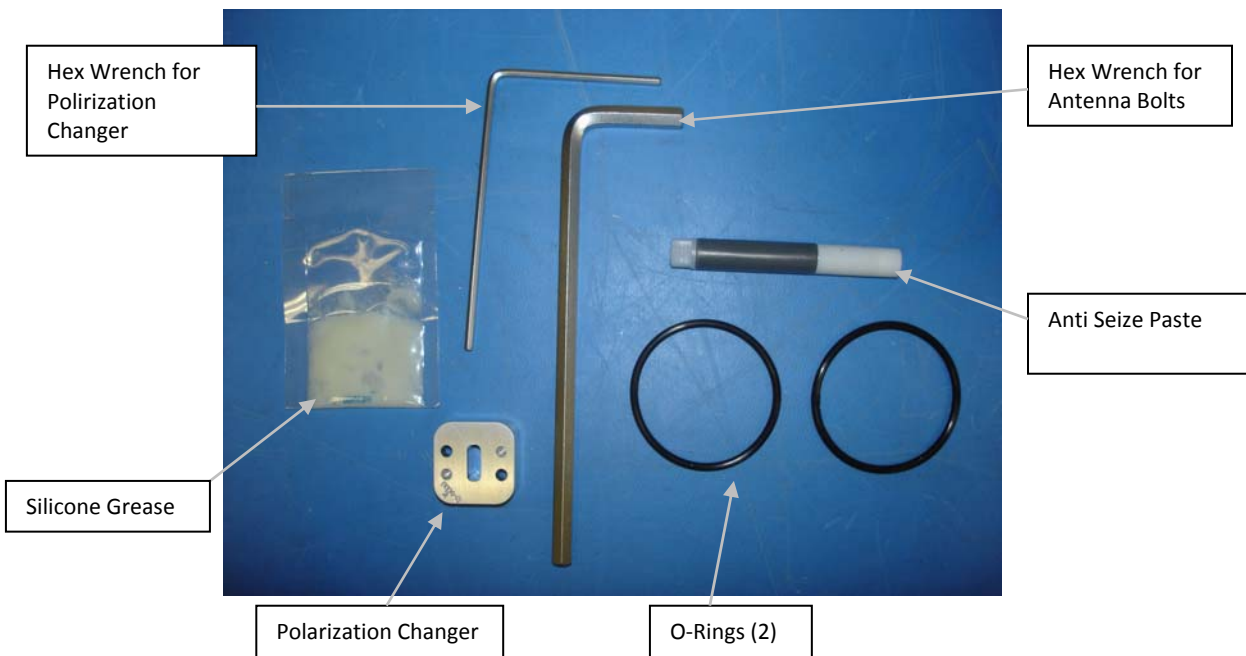
ODU Compatibility: All SMC combiners are compatible with all ODUs utilizing the HP style direct mount latch system with the exception of the SMC-06, which is only compatible with HP and AP1 ODUs. For 6 GHz HP2 and AP2 ODUs, consult your Trango Sales representative for more information

Below is a list of the parts that are included in the packing box. Please check to ensure that all the parts are present. If anything is missing please contact your Trango sales representative immediately.

Packing List:

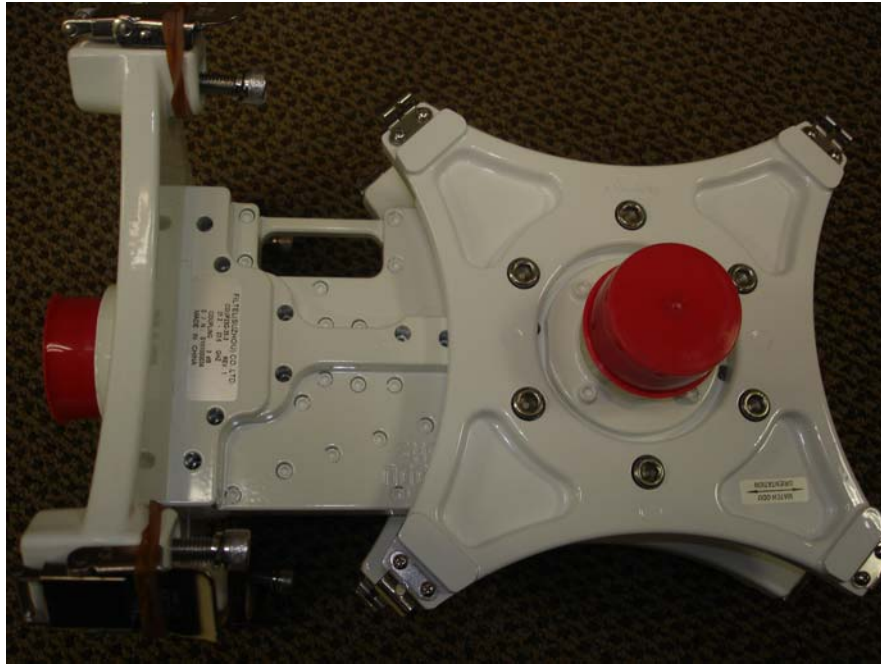
Item	Description	Quan
1	Combiner	1 pcs
2	O-ring	2 pcs
3	Silicone grease	1 packet
4	Anti-Seize	1 packet
5	Polarization Changer (Antenna mount version only)	1 pcs
6	Hex Wrench for Polarization Changer (Antenna mount version only)	1 pcs
7	Hex Wrench for Combiner to Antenna bolts (Antenna mount version only)	1 pcs
8	Pole Mount Brackets (-R Only)	1 set
9	Hex Bolt M10 x 150mm for Pole Mount brackets (-R Only)	4 pcs
10	Hex Nut M10 for Pole Mount brackets (-R Only)	4 pcs
11	Lock Washer M10 for Pole Mount brackets (-R Only)	4 pcs
12	Cap Screw M4 or M3 x 10mm (-06, -07, -11, -13, -15) for Waveguide (-R Only)	4 pcs*
13	Lock Washer M4 or M3 to match Cap Screw (-R Only)	4 pcs*
14	Flat Washer M4 or M3 to match Cap Screws (-R Only)	4 pcs*

* -06 models come with 8 pcs each



2.0 Mounting

Antenna Mount Combiner SMC-XX-X-HP



Step 1: Apply silicone grease to the antenna nose o-ring around the full perimeter of the antenna as shown.



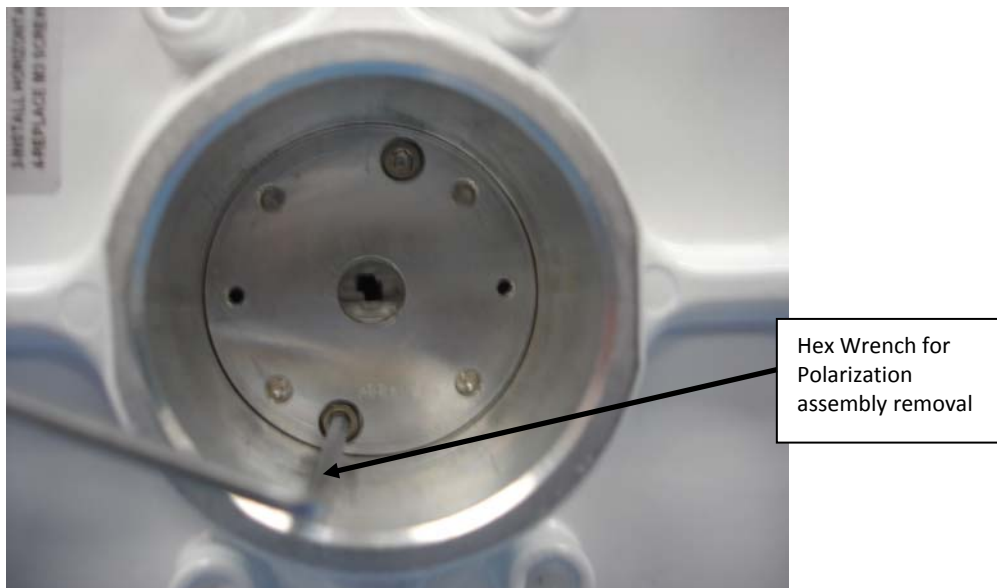
Step 2: Set the correct polarization for the combiner to use

FOR VERTICAL ANTENNA POLARIZATION:

The Combiner is setup for vertical polarization out of the box – nothing more needs to be done. Proceed to Step 3.

FOR HORIZONTAL ANTENNA POLARIZATION:

Step 2a: Remove the polarization plate assembly inside the antenna port of the combiner using the small hex wrench 2 places. The combiner is set for VERTICAL polarization from the factory as shown in the diagram



Step 2a Antenna Port VERTICAL polarization

Step 2b: Remove the waveguide twist block on the back of the plate that was just removed using the same wrench as in step 2a.



Step 2b twist block still attached



Step 2b with twist block removed

Step 2c: Replace the twist block with the straight through block supplied with the combiner using the same screws.



Step 2c Orientation of the straight-through block



Step 2c Straight-through block install

Step 2d: Replace the polarization plate assembly back into the antenna port of the combiner and tighten using the small hex wrench to approx 8 lb-in. The Antenna port is now configured to use the Horizontal polarization on the antenna.



Step 2d Completed HORIZONTAL Polarization Antenna Port

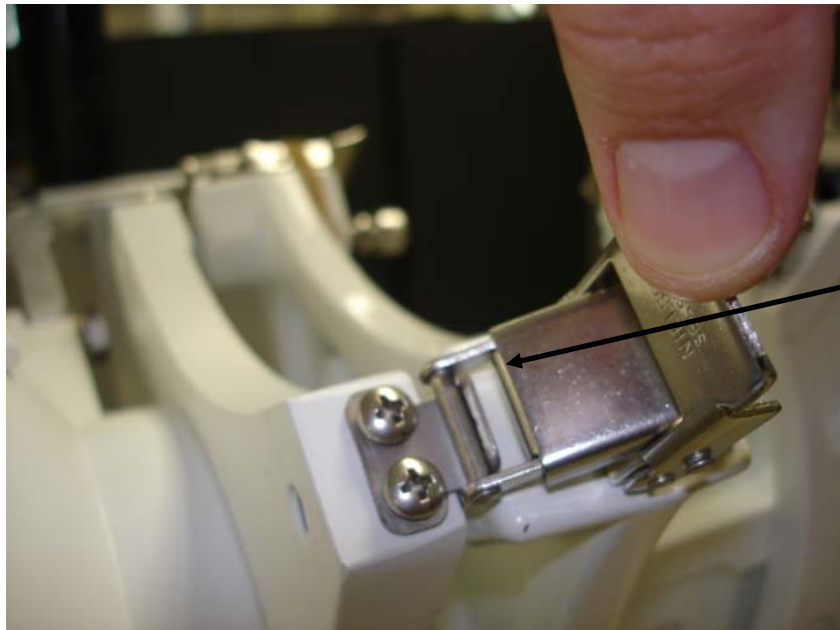
Step 3: Attach the Combiner to the antenna

Slide the combiner antenna port over the antenna nose and latch the combiner to the antenna in four places. It is best to latch two opposite corners at the same time to ensure even pressure and prevent binding. That the combiner is mounted with the correct side up as noted in the label.





Label on top of unit



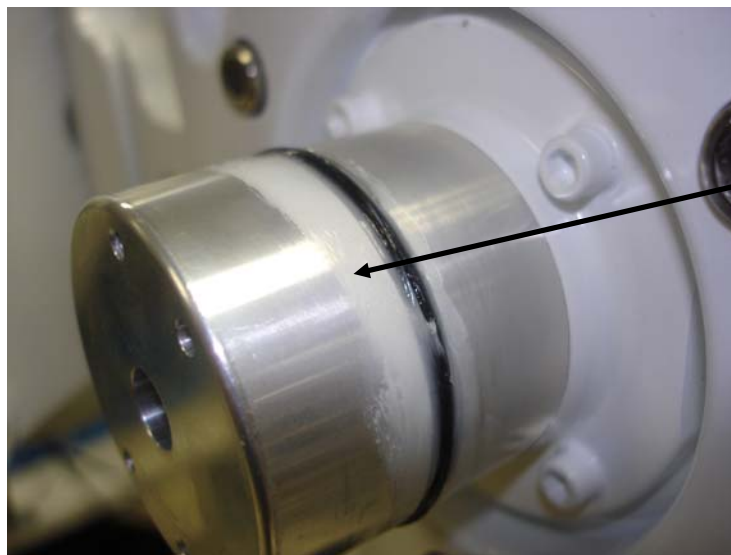
Latch (4)

Step 4: Tighten the Antenna bolts

Using the large hex wrench supplied, tighten the 4 M8 bolts next to the latches to the antenna. Tighten until snug.

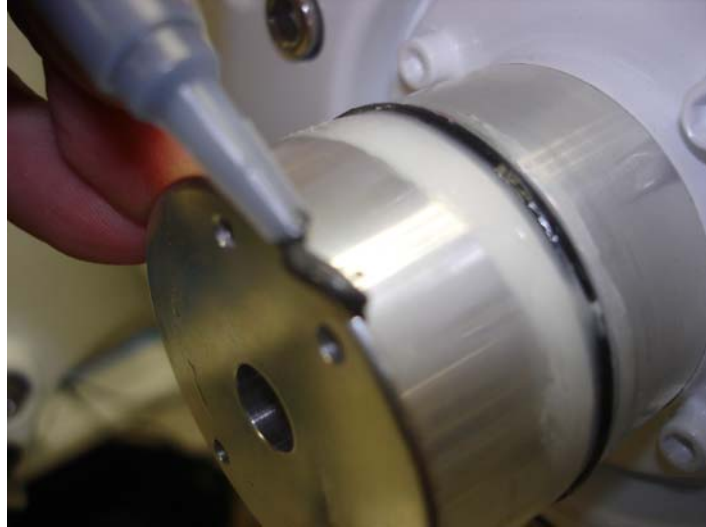


Step 5: Install the O-Rings (if not already installed) and apply the silicone grease around the ODU port o-rings. Ensure the silicone is consistent all the way around.

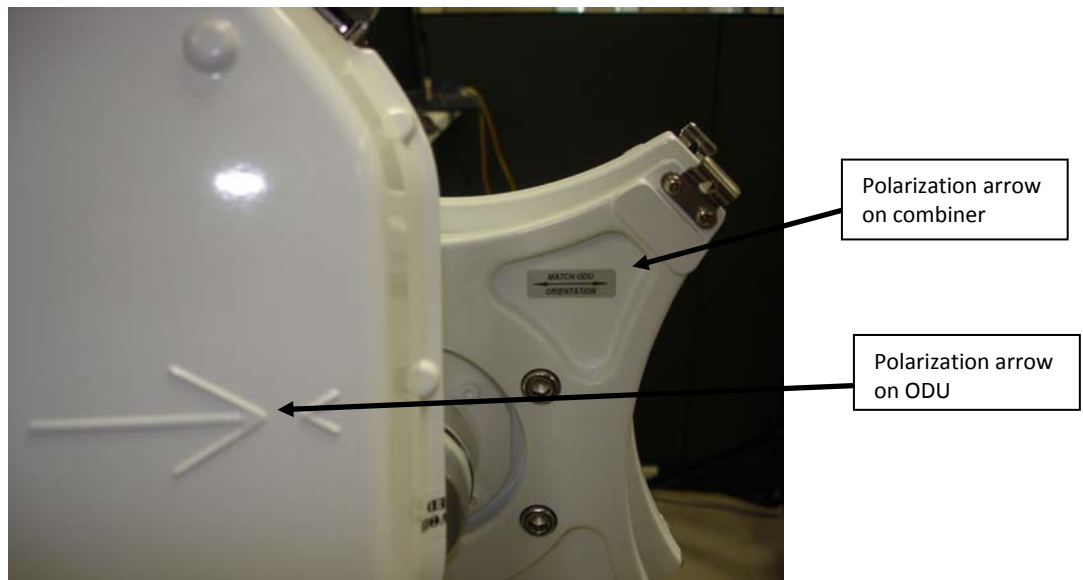


Silicone grease

Step 6: Apply the anti-seize paste around the ODU port nose as shown below to make the ODU slide onto the nose without binding. Avoid getting any material in the waveguide hole.



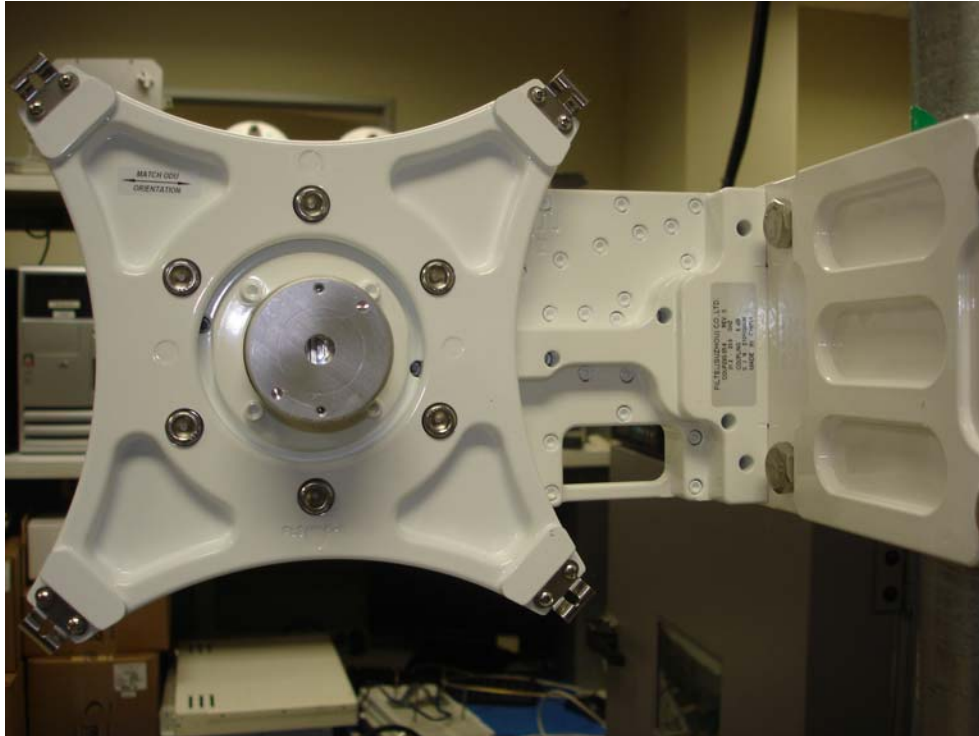
Step 7: Install and latch the ODUs into place as shown below. Ensure that the Arrow on the ODU is aligned with the arrow on the combiner as shown, or the ODU will not function correctly. For SMC-XX-6-HP Combiners, ensure that the main ODU is the connected to the side of the combiner that has the “MAIN” label designation – this is the lower loss side. The standby ODU should be connected to the “STANDBY” Side.



Step 8: Repeat for the other ODU. For SMC-XX-6-HP Combiners with a 1+1 HSB configuration, ensure that the main ODU is the connected to the side of the combiner that has the “MAIN” label designation – this is the lower loss side. The standby ODU should be connected to the other side. Also make sure that the label is at the top of the combiner.



Remote Mount Combiner SMC-XX-X-HP-R



Step 1: Attach the combiner to the pole

The Remote mount combiners come with 2 brackets and the necessary bolts and lock washers to attach the combiner to a 2.3 to 4.5 inch (58 to 115 mm) diameter pole. Preferably this will be done in close proximity to the antenna to avoid a long waveguide run. Long waveguide runs will require dehydration and pressurization which is not covered in this manual.

Ensure that the nuts are tightened but not over torqued. The Anti-seize may be used with the bolts to ease this installation.

Step 2: Attach the flex waveguide to the combiner waveguide.

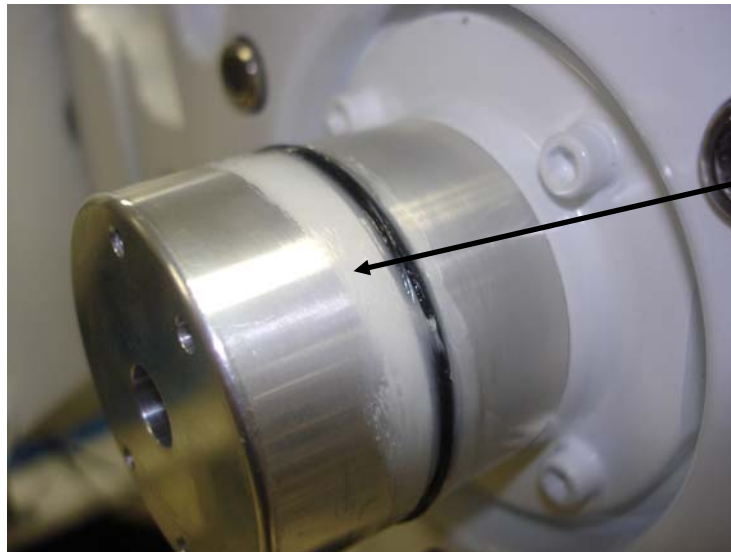
Install the waveguide flange onto the combiner using the supplied M4 or M3 cap screws and flat/lock washers as shown below. Ensure that the flange interface has an appropriate gasket or O-ring (not supplied) to prevent water intrusion. Tighten the cap screws into place. Appendix 1 show the bolt patterns for all waveguide port openings.

NOTE: Connect the other end to the antenna waveguide port per the Antenna manufacturer instructions.

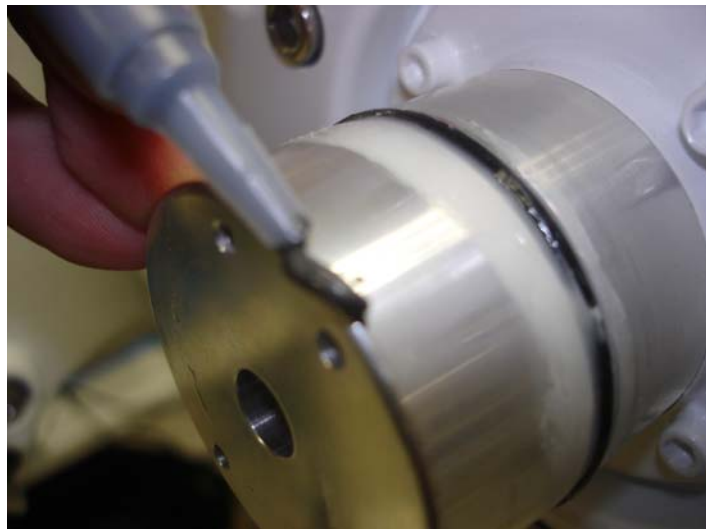
NOTE: Use waveguide hangar to ensure the waveguide does not move due to wind or weather.



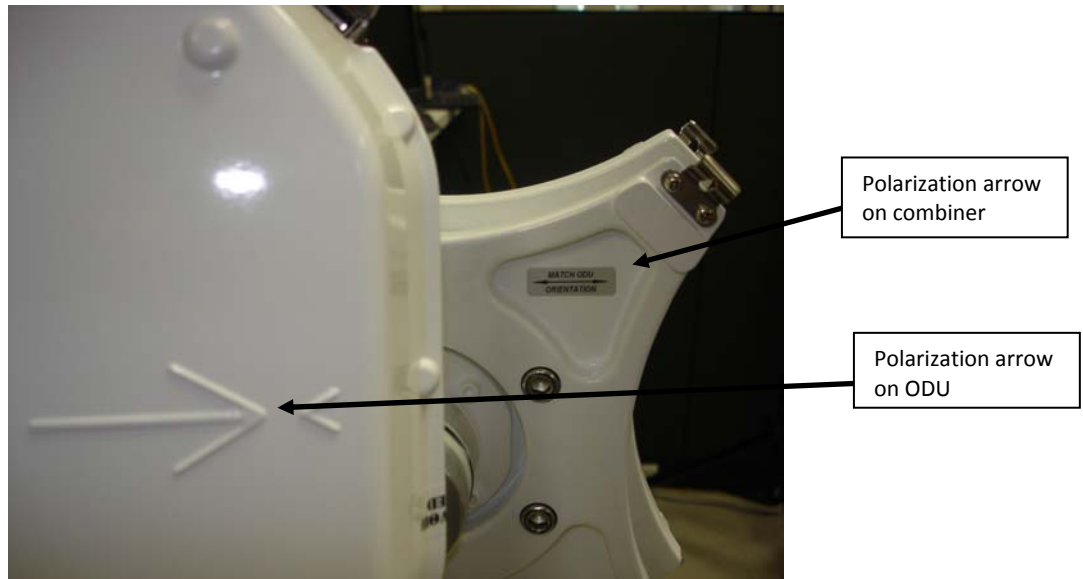
Step 3: Install the O-Rings (if not already installed) and apply the silicone grease around the ODU port o-rings. Ensure the silicone is consistent all the way around.



Step 4: Apply the anti-seize paste around the ODU port nose as shown below to make the ODU slide onto the nose without binding. Avoid getting any material in the waveguide hole.



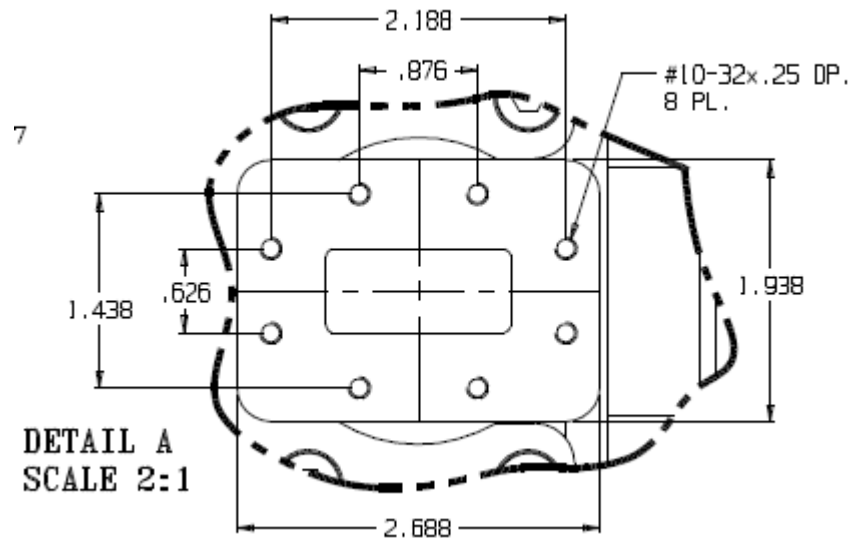
Step 5: Install and latch the ODUs into place as shown below. Ensure that the Arrow on the ODU is aligned with the arrow on the combiner as shown, or the ODU will not function correctly. For SMC-XX-6-HP Combiners, ensure that the main ODU is the connected to the side of the combiner that has the “MAIN” label designation – this is the lower loss side. The standby ODU should be connected to the “STANDBY” Side.



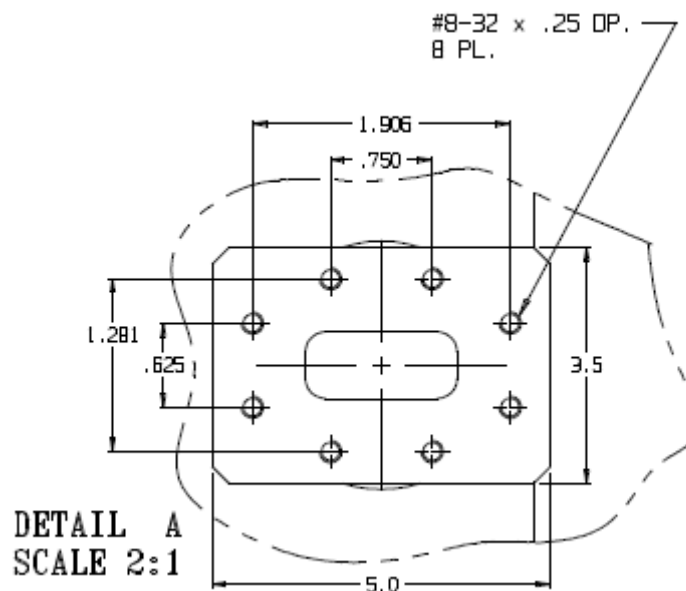
Step 6: Repeat for the other ODU. For SMC-XX-6-HP Combiners with a 1+1 HSB configuration, ensure that the main ODU is the connected to the side of the combiner that has the “MAIN” label designation – this is the lower loss side. The standby ODU should be connected to the other side. Also make sure that the label is at the top of the combiner.

Appendix A- Waveguide Detail

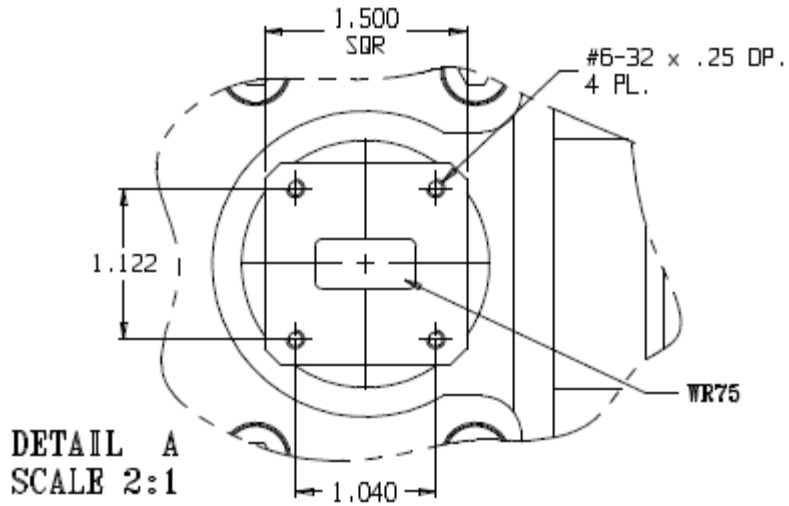
The diagrams below show the mounting pattern detail for all the waveguide flanges used on the remote mount models. Ensure that mating waveguide flanges have a gasket or O-ring installed to prevent moisture from entering the waveguide.



SMC-06-X-HP-R

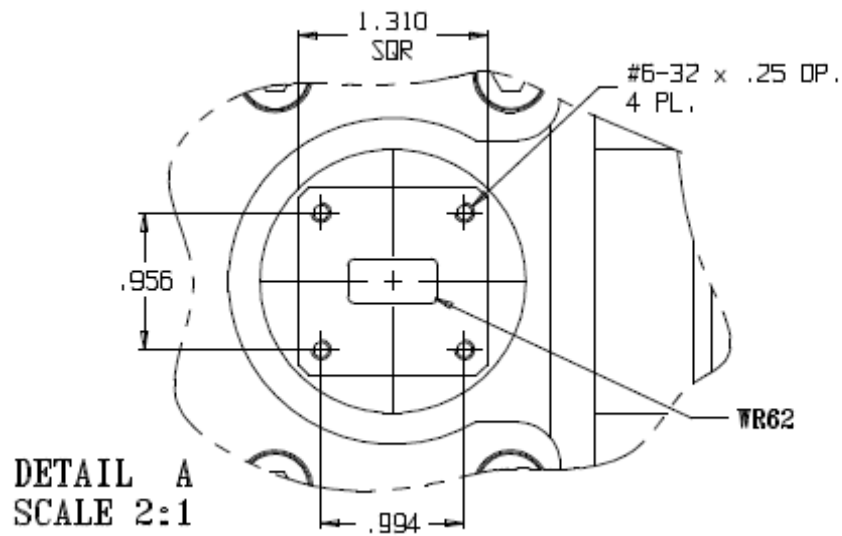


SMC-78-X-HP-R

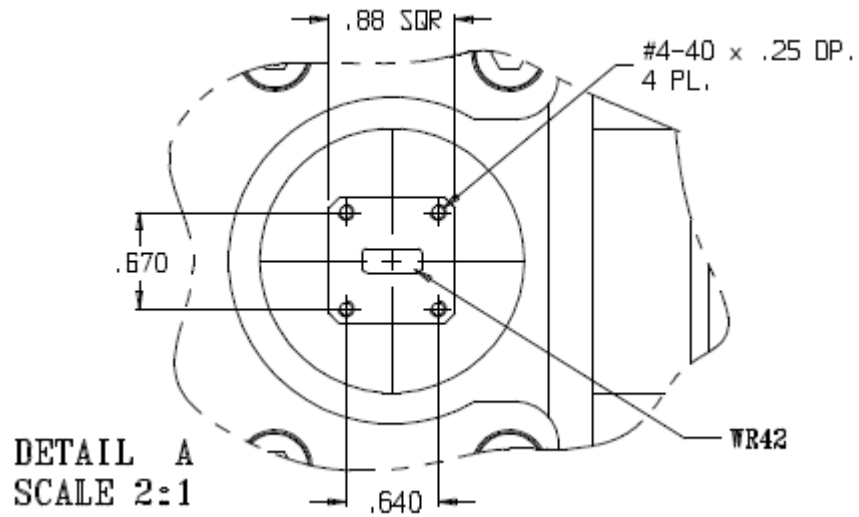


SMC-11-X-HP-R

SMC-13-X-HP-R



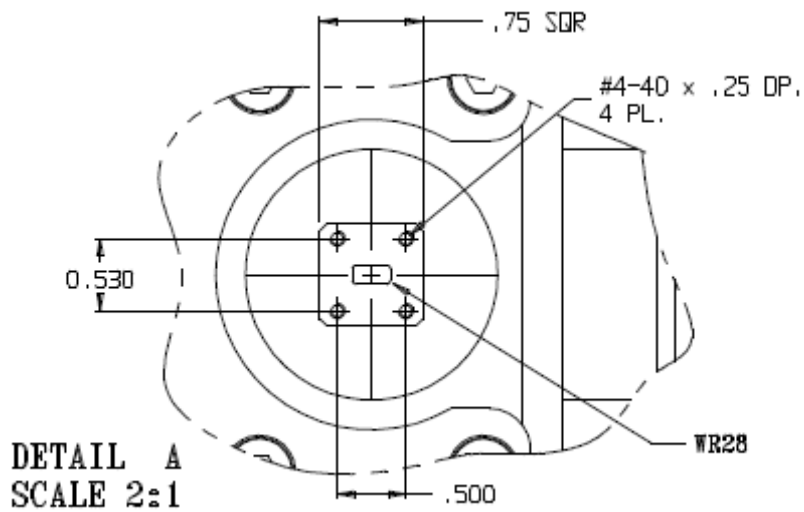
SMC-15-X-HP-R



SMC-18-X-HP-R

SMC-23-X-HP-R

SMC-26-X-HP-R



SMC-28-X-HP-R

SMC-32-X-HP-R

SMC-38-X-HP-R