



Microwave Guide



For Tower Mounts

Sabre Industries™

Sabre has designed this catalog to address customer concerns on installation and overall system performance of microwave dishes. Through the years, we've found that many system performance issues for microwave deployment are due to the incorrect mount being used or improper installation. Our intent is to allow those responsible for planning a microwave deployment to properly specify a mount that meets TIA and manufacturer's loading requirements.

By utilizing this catalog, engineers and microwave planners will be able to specify the mount part numbers needed prior to contractors' bidding the projects. This should alleviate the need for the contractor to determine which mount to use and how it should be installed.

This catalog will also serve as a secondary reference manual. We've added important tools throughout the book to help planners, engineers, and installers better understand the requirements for a successful installation with minimal maintenance.



As experts in the field, contractors should be delivering the highest quality installs for site owners. They should plan properly to ensure installation is done with the structure, safety and system in mind, as well as take into account the long term maintenance of the site. If an issue with an install is noted in the planning phase, the contractor should communicate with the owner to minimize the long term costs and exposure.

ABOUT SABRE INDUSTRIES

Sabre Industries specializes in communication tower erection, multi-site maintenance, full-site construction, and horizontal directional drilling through our services group, MUTI-Sabre Industries Telecom Services. We also have extensive experience in all types of excavation, along with the installation of both mat and drilled shaft types of tower foundations; access roads and site clearing; and full grounding systems.

In addition to providing a variety of infrastructure services, Sabre Industries has an in-house professional staff that is continually doing research and development on new and improved products. Our engineered structures group has been in the tower industry for almost 40 years, and offers antenna and dish mounting systems for nearly all applications.

4 Leg Mounting Solutions

Universal Pipe Mount Kits, Microwave Dish Strut Support, Microwave Strut Support

12 Face Mounting Solutions

Tower Face Mounts, Tower Face Mount Strut Support Kits, Tower Face Mount Stand-Off Bracket, Microwave Dish Waveguide Shields

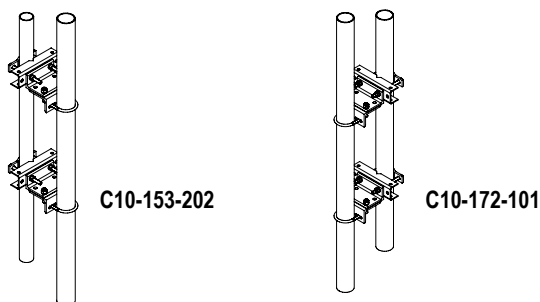
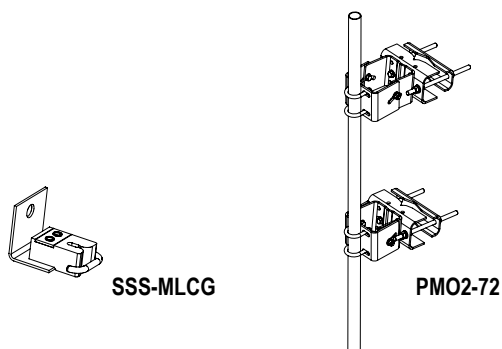
19 Accessories

Pipe, Hardware

UNIVERSAL PIPE MOUNT KITS

- Application:** Lattice Towers
- Size:** 2-3/8" (60.3 mm) OD or 4-1/2" (114.3 mm) OD
- Design:** Pipe with saddle mount and adjustable clamps
- Feature:** Open face; taper adjustment
- Mounts to:** Straight or tapered legs up to 16" (406.4 mm) OD, 16" (406.4 mm) angle 60°, or 12" (304.8 mm) angle 90°
- Material:** Hot-dip galvanized steel
- Includes:** Universal saddle mount, taper adjustment brackets, with or without pipe
- Order Separately:** Pipes for base kits
- Wind Rating*:** 120 mph (BWS) per ANSI/TIA-222-G at 150' (45.7 m) AGL

*Typical installation of one 6' microwave antenna with stiff arm



Universal Pipe Mount Kit with Open Face, taper adjustment, for round or 60° angle legs up to 8" (203.2 mm) or 6" (152.4 mm) 90° angle legs

ITEM #	DESCRIPTION
PMO2-72	2-3/8" x 72" (60.3 mm x 1.8 m) Antenna Mounting Pipe
PMO2-96	2-3/8" x 96" (60.3 mm x 2.4 m) Antenna Mounting Pipe
PMO2-NP	Pipe ordered separately
PMO4-63	4-1/2" x 63" (114.3 mm x 1.6 m) Antenna Mounting Pipe
PMO4-96	4-1/2" x 96" (114.3 mm x 2.4 m) Antenna Mounting Pipe
PMO4-NP	Pipe ordered separately

Universal Pipe Large Mount Kit with Open Face, taper adjustment, for round or 60° angle legs up to 16" (406.4 mm), or 12" (304.8 mm) 90° angle legs

ITEM #	DESCRIPTION
PMOX2-72	2-3/8" x 72" (60.3 mm x 1.8 m) Antenna Mounting Pipe
PMOX2-96	2-3/8" x 96" (60.3 mm x 2.4 m) Antenna Mounting Pipe
PMOX2-NP	Pipe ordered separately
PMOX4-63	4-1/2" x 63" (114.3 mm x 1.6 m) Antenna Mounting Pipe
PMOX4-96	4-1/2" x 96" (114.3 mm x 2.4 m) Antenna Mounting Pipe
PMOX4-NP	Pipe ordered separately

Universal Microwave Mounting Kit mounts microwave dishes to either round or angle legs. Kits also adapt to straight or tapered towers. Kits include 4-1/2" OD x 7' (114.3 mm OD x 2.1 m) pipe

ITEM #	DESCRIPTION
C10-153-202	Universal Mounting Kit (small) fits 1-1/2" to 5-9/16" OD (38.1 mm to 141.3 mm OD) legs and 2-1/2" x 2-1/2" (63.5 mm x 63.5 mm) up to 4" x 4" (101.6 mm x 101.6 mm) angle legs
C10-153-204	Universal Mounting Kit (large) fits 5-3/4" to 10-3/4" OD (146.1 mm to 273.1 mm OD) legs and 5" x 5" (127 mm x 127 mm) to 8" x 8" (203.2 mm x 203.2 mm) angle legs
C10-172-998	Universal Mounting Kit (small) fits 1-1/2" to 5-9/16" OD (38.1 mm to 141.3 mm OD) legs and 2-1/2" x 2-1/2" (63.5 mm x 63.5 mm) up to 4" x 4" (101.6 mm x 101.6 mm) angle legs. Double u-bolts for heavy duty pipe connection
C10-172-999	Universal Mounting Kit (large) fits 5-3/4" to 10-3/4" OD (146.1 mm to 273.1 mm) legs and 5" x 5" (127 mm x 127 mm) to 8" x 8" (203.2 mm x 203.2 mm) angle legs. Double u-bolts for heavy duty pipe connection

Universal Pipe Mounting Kit accommodates pipe sizes from 2-3/8" up to 4-1/2" OD (60.3 mm up to 114.3 mm). Mount can be used on both tapered and straight leg towers (Pipe purchased separately)

ITEM #	DESCRIPTION
C10-172-101	Universal Pipe Mounting Kit (small) fits 1-1/2" to 5-9/16" OD (38.1 mm to 141.3 mm OD) legs and 2-1/2" x 2-1/2" (63.5 mm x 63.5 mm) to 4" x 4" (101.6 mm x 101.6 mm) angle legs
C10-172-102	Universal Pipe Mounting Kit (large) fits 5-3/4" to 10-3/4" OD (146.1 mm to 273.1 mm OD) legs and 5" x 5" (127 mm x 127 mm) to 8" x 8" (203.2 mm x 203.2 mm) angle legs

Lockable Cable Guide

ITEM #	DESCRIPTION
SSS-MLCG	Lockable Cable Guide for Microwave Dish Mount

ANSI/TIA-222-G 12.3 OUTLINES ADDITIONAL REQUIREMENTS FOR STRUCTURES:

Unless otherwise required, antenna supporting structures exceeding 10' in height and antennas intended for climbing shall be equipped with a minimum of one climbing facility equipped with a safety climb device.

.1 When a safety climb device is not continuous over the entire height, climber attachment anchorages shall be available at a maximum spacing of 4' (1.2 m) over the height if not equipped with a safety climb device.

.4 Climbing and safety climb devices need not be installed over the entire height of a structure when their installation would adversely affect the performance of an antenna. In such case, the structure shall be equipped with a warning sign or climber attachment anchorages shall be provided in accordance with the requirements of Note 1.



NOTE:

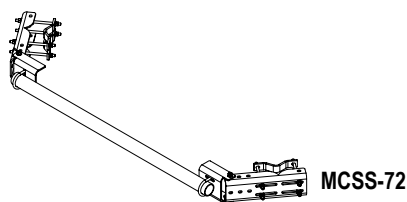
While the TIA-222 standard does allow for a climbing path to be obstructed, a contractor should never do so without first informing the owner and ensuring that there is a means for competent climbers to bypass the obstruction. Signage, in this event, is required.



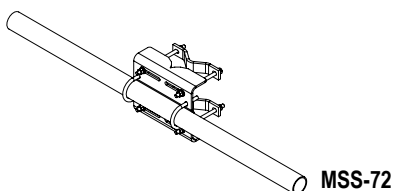
Please contact cataloginfo@sabreindustries.com if you have questions about the usage of these signs.

MICROWAVE DISH STRUT SUPPORT

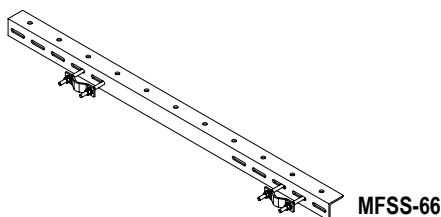
- Application:** Lattice Towers
- Size:** 4', 6', 8', or 10' (1.2 m, 1.8 m, 2.4 m, or 3.0 m) tower faces
- Design:** Round or angle strut support kits
- Feature:** Tower face strut support kits
- Mounts to:** Straight or tapered legs up to 16" (406.4 mm) OD, 16" (406.4 mm) angle 60°, or 12" (304.8 mm) angle 90°
- Material:** Hot-dip galvanized steel



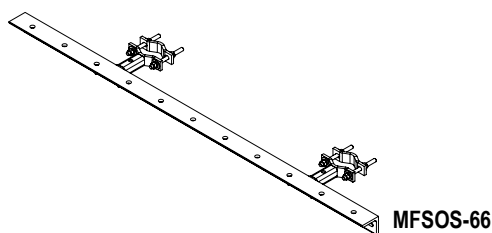
MCSS-72



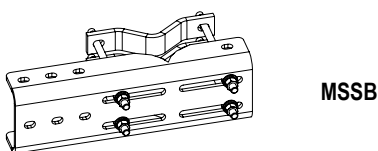
MSS-72



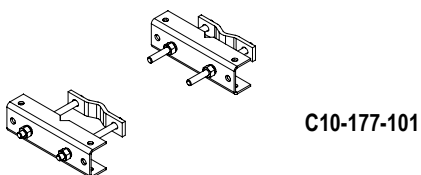
MFSS-66



MFSOS-66



MSSB



C10-177-101

Tower Face Mounted Microwave Dish Strut Support Kit for round or 60° angle legs up to 8" (203.2 mm), or 6" (152.4 mm) 90° angle legs

ITEM #	DESCRIPTION
MCSS-72	6' (1.8 m) pipe
MCSS-96	8' (2.4 m) pipe
MCSS-120	10' (3.0 m) pipe

Tower Face Mounted Microwave Dish Strut Support Kit for 8" (203.2 mm) to 16" (406.4 mm) round or 60° angle legs, or 6" (152.4 mm) to 12" (304.8 mm) 90° angle legs

ITEM #	DESCRIPTION
MCSSX-72	6' (1.8 m) pipe
MCSSX-96	8' (2.4 m) pipe
MCSSX-120	10' (3.0 m) pipe

Tower Leg Mounted Microwave Dish Strut Support Kit for round or 90° angle legs up to 8" (203.2 mm), or 6" (152.4 mm) 60° angle legs

ITEM #	DESCRIPTION
MSS-72	6' (1.8 m) pipe
MSS-96	8' (2.4 m) pipe

Tower Leg Mounted Microwave Dish Strut Support Kit for 8" (203.2 mm) to 16" (406.4 mm) round or 60° angle legs, or 6" (152.4 mm) to 12" (304.8 mm) 90° angle legs

ITEM #	DESCRIPTION
MSSX-72	6' (1.8 m) pipe
MSSX-96	8' (2.4 m) pipe

Microwave Dish Face Strut Support Kit – Guyed Towers

ITEM #	DESCRIPTION
MFSS-66	3/8" x 3" x 3" x 5'-6" (9.5 mm x 76.2 mm x 76.2 mm x 1.7 m)

Microwave Dish Face Stand-off Strut Support Kit 6" (152.4 mm) – Guyed Towers

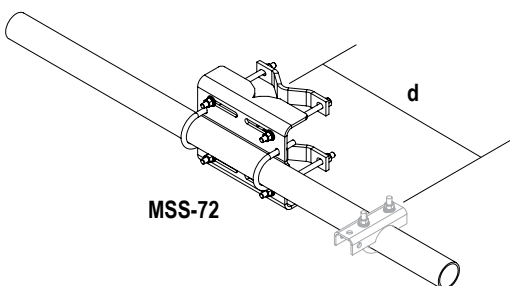
ITEM #	DESCRIPTION
MFSOS-66	Mounts to round legs 1-1/2" (38.1 mm) to 3-1/2" (88.9 mm) in diameter. Support is 66" (1.7 m) long

Microwave Dish Strut Support Bracket for 8" (203.2 mm) to 16" (406.4 mm) round or 60° angle legs, or 6" (152.4 mm) to 12" (304.8 mm) 90° angle legs

ITEM #	DESCRIPTION
MSSB	Leg mounted (kit of 1) up to 8" (203.2 mm) leg
MSSBX	Leg mounted (kit of 1) Large Leg Kit up to 16" (406.4 mm)

Tieback Clip Kit used in conjunction with Tieback Kits. Hardware for attachment to tower leg is included

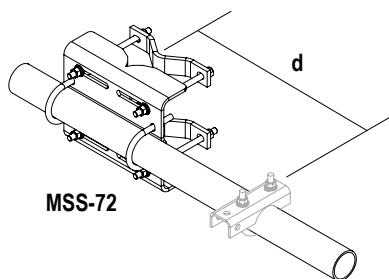
ITEM #	DESCRIPTION
C10-177-101	Tieback Clip Kit fits 1-1/2" to 5-9/16" OD (38.1 mm to 141.3 mm OD) legs and 2-1/2" x 2-1/2" (63.5 mm x 63.5 mm) to 4" x 4" (101.6 mm x 101.6 mm) angle legs
C10-177-102	Tieback Clip Kit fits 5-3/4" to 10-3/4" OD (146.1 mm to 273.1 mm OD) legs and 5" x 5" (127 mm x 127 mm) to 8" x 8" (203.2 mm x 203.2 mm) angle legs



MSS-72

Saddle mount attached in center of pipe

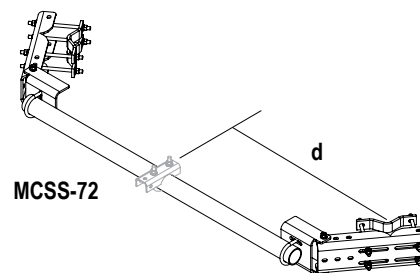
ITEM #	DESCRIPTION
MSS-72	Max distance from leg (d): 36" Max load: 2900 lb
MSS-96	Max distance from leg (d): 48" Max load: 2150 lb



MSS-72

Saddle mount attached at one end of pipe

ITEM #	DESCRIPTION
MSS-72	Max distance from leg (d): 60" Max load: 1750 lb
MSS-96	Max distance from leg (d): 84" Max load: 1250 lb



MCSS-72

Pipe attached at each end to tower leg mount

ITEM #	DESCRIPTION
MCSS-72	Max distance from leg (d): 36" Max load: 5800 lb
MCSS-96	Max distance from leg (d): 48" Max load: 4300 lb
MCSS-120	Max distance from leg (d): 60" Max load: 3500 lb

NOTES:

Maximum load is the maximum calculated factored load in accordance with ANSI/TIA-222-G. Cantilever cases assume no rotation at the leg connection point.

Suitability of mount, including serviceability requirements and local effects on supporting tower members, needs to be determined by a qualified structural engineer.

It is assumed that a qualified structural engineer has reviewed the tower structure for the loads created by the microwave antennas and strut supports.

All pipe for above mounts are 3" Schedule 40 (3-1/2" OD) 50 ksi.

MSS-72



MCSS-72



Once the final path has been established, tie back mounts and arms are normally cut 12" past the required attachment point, reducing the likelihood of damage from ice, debris, and interference with future rigging or installs. The cut end is then treated per owner requirements.

MICROWAVE STRUT SUPPORT

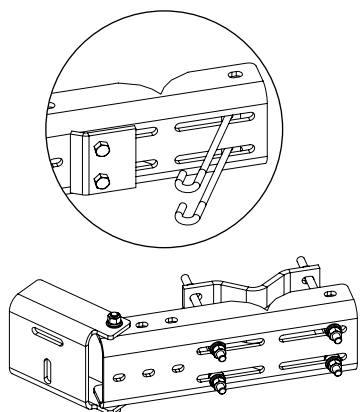
- Application:** Lattice Towers
- Size:** 21" (533.4 mm) channel
- Design:** Universal support bracket
- Feature:** Universal strut attachment
- Mounts to:** Straight or tapered legs up to 16" (406.4 mm) OD, 16" (406.4 mm) angle 60°, or 12" (304.8 mm) angle 90°
- Material:** Hot-dip galvanized steel
- Includes:** Support bracket, attachment hardware
- Order Separately:** Microwave pipe or angle, u-bolt

Microwave Strut Support Bracket for round or 60° angle legs up to 8" (203.2 mm), or 6" (152.4 mm) 90° angle legs

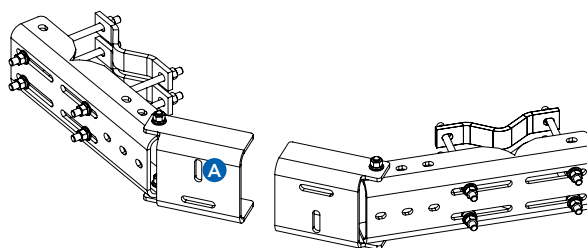
ITEM #	DESCRIPTION
MSSBF-3	Universal for mounting up to 3-1/2" (88.9 mm) face pipes on round or angle legs (kit of 1)
MSSBF-4	Universal for mounting up to 4-1/2" (114.3 mm) face pipes on round or angle legs (kit of 1)
2MSSBF3	Face mounted for mounting up to 3-1/2" (88.9 mm) face pipes on round or angle legs (kit of 2)

Microwave Strut Support Bracket for 8" (203.2 mm) to 16" (406.4 mm) round, or 8" (203.2 mm) to 16" (406.4 mm) 60° angle legs, or 6" (152.4 mm) to 12" (304.8 mm) 90° angle legs

ITEM #	DESCRIPTION
MSSBFX-3	Universal for mounting up to 3-1/2" (88.9 mm) face pipes on round or angle legs (kit of 1)
MSSBFX-4	Universal for mounting up to 4-1/2" (114.3 mm) face pipes on round or angle legs (kit of 1)
2MSSBFX3	Face mounted for mounting up to 3-1/2" (88.9 mm) face pipes on round or angle legs (kit of 2)



MSSBF-3 / MSSBF-4



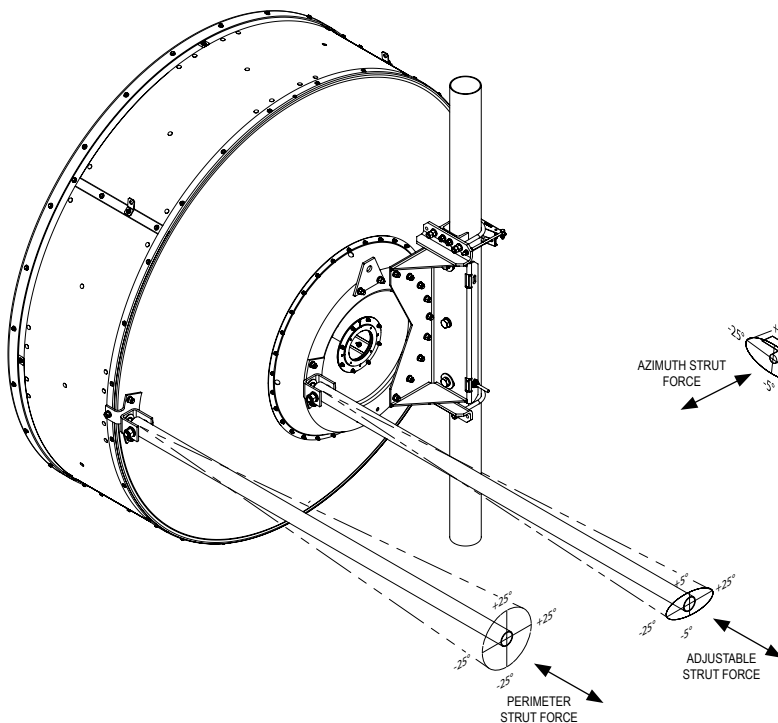
2MSSBF3

A Order bolts or u-bolts for face separately

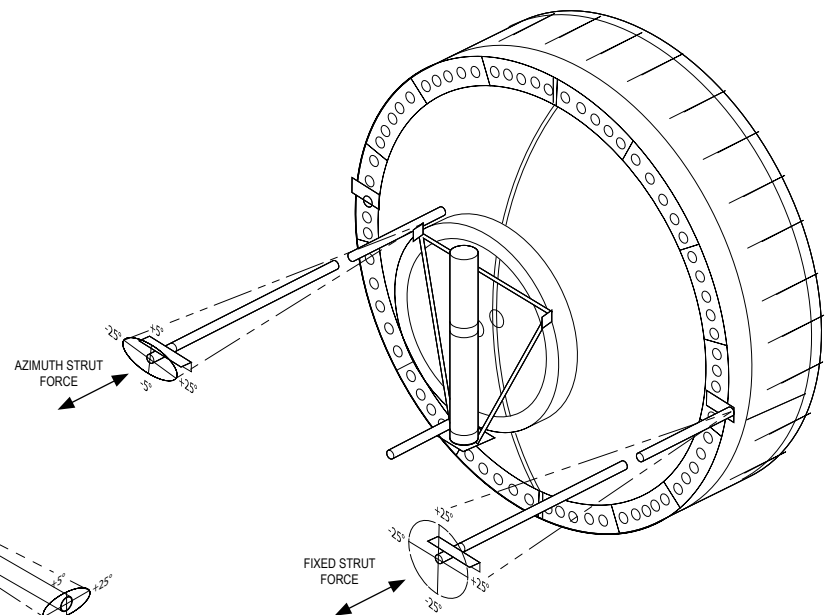


Adjustable strut arms must have a vertical angle of less than 5 degrees and a horizontal angle of less than 25 degrees. Perimeter strut arms must have vertical and horizontal angles of less than 25 degrees. Follow microwave antenna manufacturer instructions on strut arm placement locations and contact them for maximum strut loads.

Shown with typical 6' RFS dish



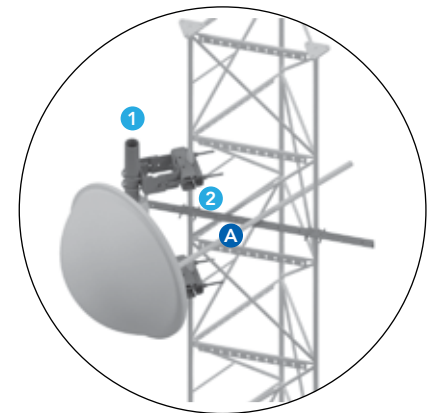
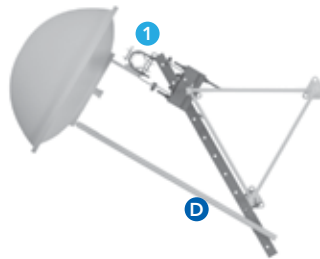
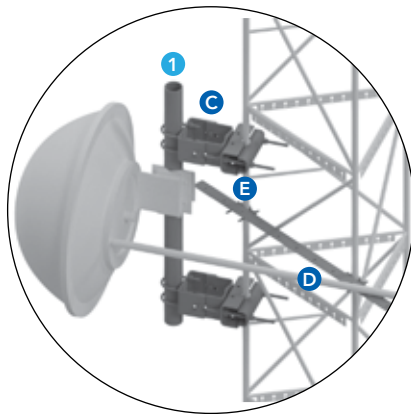
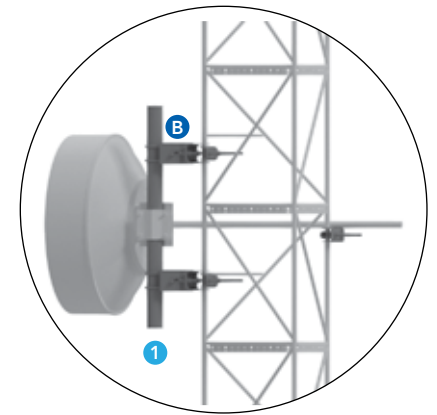
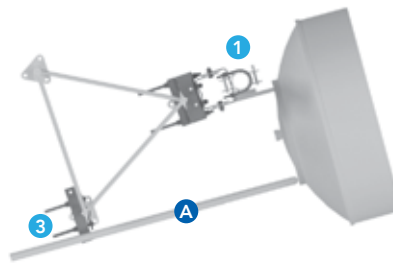
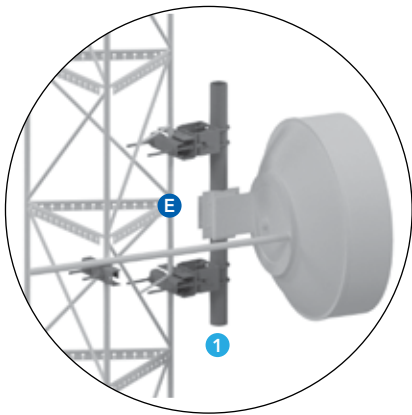
Shown with typical 8' Andrew dish



ANTENNA	ADJUSTABLE STRUT FORCE	PERIMETER STRUT FORCE
6' (1.8 m)	556 lb (2445 N)	279 lb (1228 N)
8' (2.4 m)	1291 lb (5682 N)	699 lb (3076 N)
10' (3.0 m)	2551 lb (11223 N)	1375 lb (6048 N)
12' (3.7 m)	3724 lb (16384 N)	1871 lb (8231 N)

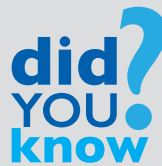
NOTE:

Loads are based on 125 mph (200 km/h) wind speed and were provided by Radio Frequency Systems.

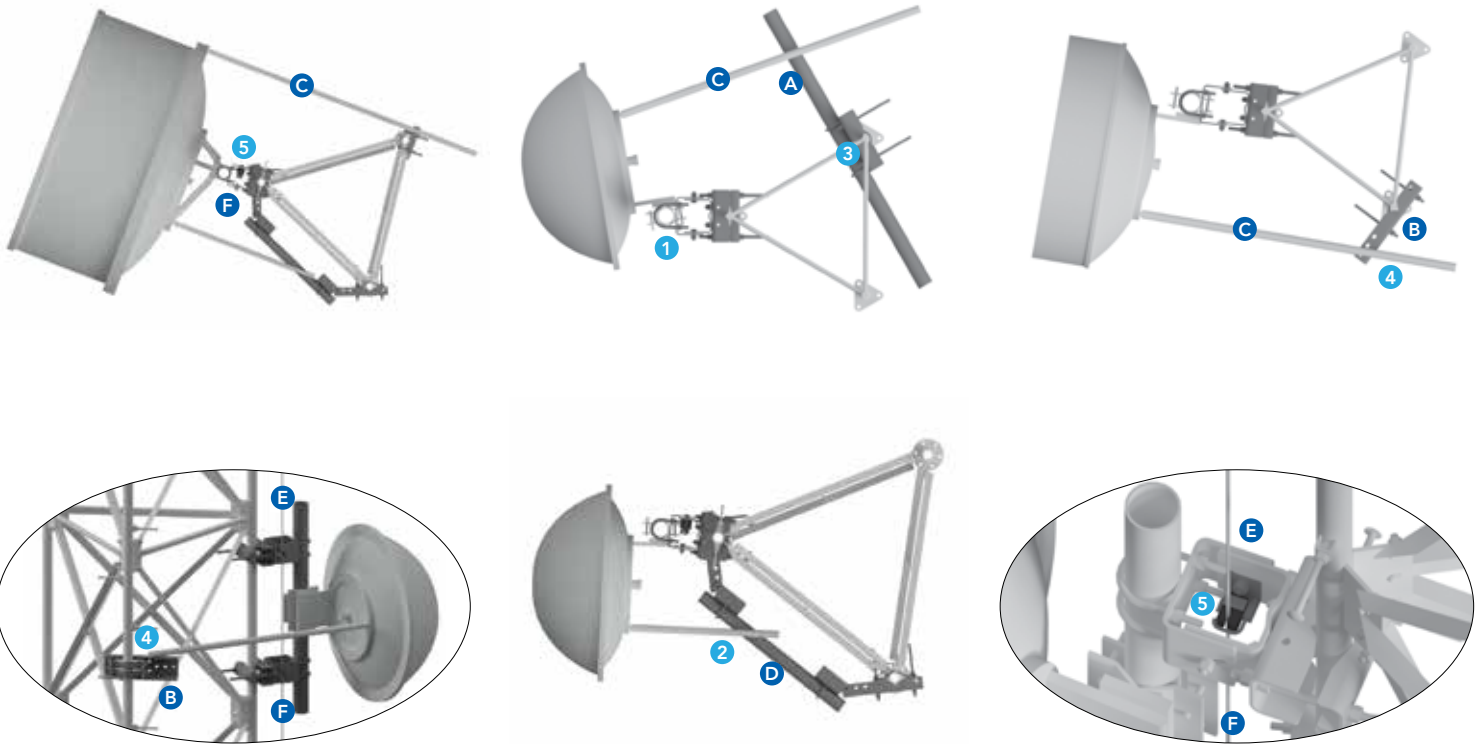


- 1 **PMO4-63** Universal Pipe Mount Kit with Open Face (page 4)
- 2 **MFSS-66** Microwave Dish Face Strut Support Kit (page 6)
- 3 **C10-177-101** Tieback Clip Kit (page 6)

- A Strut returns back to tower at recommended angle
- B Taper adjustment allows for vertical mounting solution
- C Sliding taper brackets allow for 7° of non-incremental adjustment
- D Strut returns straight back to tower
- E Universal saddle mounts up to 8" (203.2 mm) dia. straight or taper legs



All mounts, ice shields, and other appurtenances shall be compliant with the requirements of TIA-222 and addendums. The mount, ice shield or other appurtenance shall have sufficient stiffness to resist wind induced vibration.



- 1 **PMO4-63** Universal Pipe Mount Kit with Open Face (page 4)
 - 2 **MCSS-72** Tower Face Mounted Microwave Dish Strut Support Kit (page 6)
 - 3 **MSS-72** Tower Leg Mounted Microwave Dish Strut Support Kit (page 6)
 - 4 **MSSB** Microwave Dish Strut Support Bracket (page 6)
 - 5 **SSS-MLCG** Lockable Cable Guide for Microwave Dish Mount (page 4)
- A **MSS-72** Provides strut support for offset single leg attachments
 - B **MSSB** Universal strut support for round or angle legs
 - C Strut returns straight back to tower at recommended angle
 - D **MCSS-72** Provides strut support for the tower face with universal leg attachment brackets
 - E Open face allows safety climb to pass through

F NOTE:
 If safety guide passes through mount, it is recommended to add a cable guide. The competent person should determine the placement of the cable guide to ensure the cable does not rub.



Sabre offers a Lockable Cable Guide (page 4) that attaches to our Pipe Mount. The competent person should determine appropriate placement to ensure the safety climb cable isn't damaged.

TOWER FACE MOUNTS

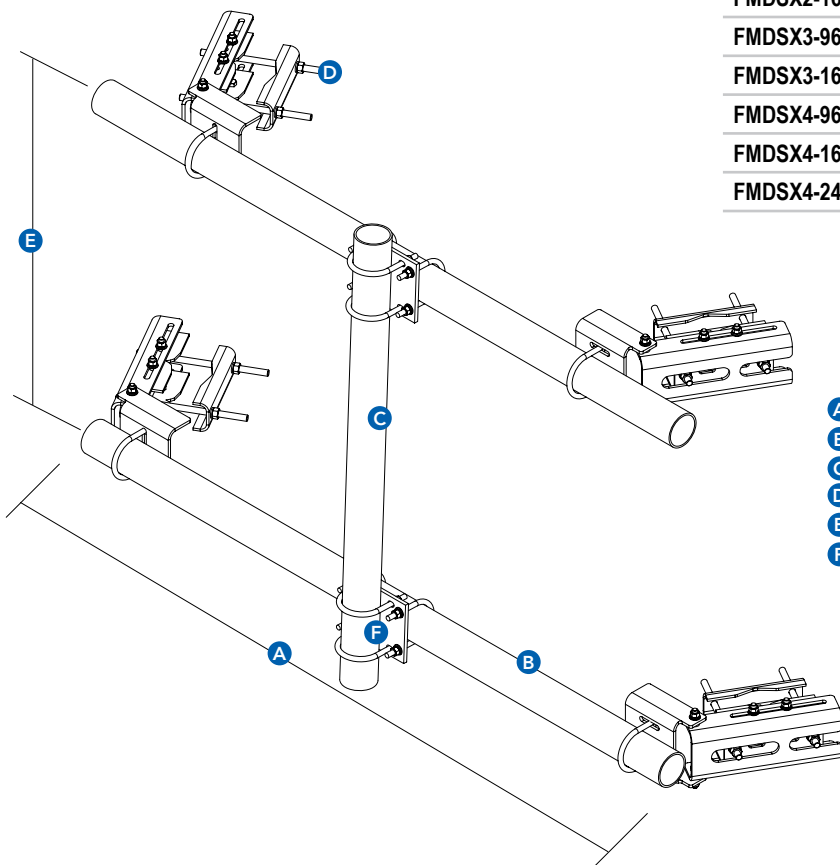
- Application:** Lattice Towers
- Size:** 8' (2.4 m), 14' (4.3 m), or 20' (6.1 m) face widths
- Design:** Pipe with saddle mounts and adjustable clamps
- Feature:** Universal taper adjustment for up to 9° of taper with 48" (1.2 m) of separation
- Mounts to:** Straight or tapered legs up to 16" (406.4 mm) OD, 16" (406.4 mm) angle 60°, or 12" (304.8 mm) angle 90°
- Material:** Hot-dip galvanized steel
- Includes:** Universal saddle mounts, slider brackets, pipe, plates, crossover hardware
- Order Separately:** Strut support kits, stand-off brackets

Tower Face Mount with Dual Face Supports includes 4-1/2" OD x 63" (114.3 mm OD x 1.6 m) Antenna Pipe for up to 8" (203.2 mm) legs

ITEM #	DESCRIPTION
FMDS2-96	8' x 2-3/8" OD (2.4 m x 60.3 mm OD)
FMDS2-168	14' x 2-3/8" OD (4.3 m x 60.3 mm OD)
FMDS3-96	8' x 3-1/2" OD (2.4 m x 88.9 mm OD)
FMDS3-168	14' x 3-1/2" OD (4.3 m x 88.9 mm OD)
FMDS4-96	8' x 4-1/2" OD (2.4 m x 114.3 mm OD)
FMDS4-168	14' x 4-1/2" OD (4.3 m x 114.3 mm OD)
FMDS4-240	20' x 4-1/2" OD (6.1 m x 114.3 mm OD)

Tower Face Mount with Dual Face Supports includes 4-1/2" OD x 63" (114.3 mm OD x 1.6 m) Antenna Pipe for up to 16" (406.4 mm) legs

ITEM #	DESCRIPTION
FMDSX2-96	8' x 2-3/8" OD (2.4 m x 60.3 mm OD)
FMDSX2-168	14' x 2-3/8" OD (4.3 m x 60.3 mm OD)
FMDSX3-96	8' x 3-1/2" OD (2.4 m x 88.9 mm OD)
FMDSX3-168	14' x 3-1/2" OD (4.3 m x 88.9 mm OD)
FMDSX4-96	8' x 4-1/2" OD (2.4 m x 114.3 mm OD)
FMDSX4-168	14' x 4-1/2" OD (4.3 m x 114.3 mm OD)
FMDSX4-240	20' x 4-1/2" OD (6.1 m x 114.3 mm OD)



FMDS3-96

- A** 8' x 14', or 20' Face Pipe (2.4 m x 4.3 m, or 6.1 m)
- B** 2-3/8", 3-1/2", or 4-1/2" OD pipe (60.3 mm, 88.9 mm, or 114.3 mm OD)
- C** 4-1/2" x 63" Antenna Mounting Pipe included (114.3 mm x 1.6 m)
- D** 16" all thread (406.4 mm)
- E** 4' (1.2 m)
- F** 4-1/2" OD (114.3 mm OD) pipe and crossover plates (as needed)



The FMDS series (shown above) are capable of being broken down into multiple base parts and used individually to solve many field issues.

TOWER FACE MOUNT STRUT SUPPORT KITS

- Application:** Lattice Towers
- Size:** Three versions (see table)
- Design:** Pipe with crossover plates
- Feature:** Can be adjusted to mount anywhere on tower face mount
- Mounts to:** Tower face mount kits
- Material:** Hot-dip galvanized steel
- Includes:** Plates, strut support, hardware, pipe
- Order Separately:** Tower face mount kit

Tower Face Mount Strut Support Kits 2-3/8" OD x 63" pipe (60.3 mm OD x 1.6 m)

ITEM #	DESCRIPTION
FMSS-2	2-3/8" OD x 2-3/8" OD (60.3 mm OD x 60.3 mm OD)
FMSS-3	2-3/8" OD x 3-1/2" OD (60.3 mm OD x 88.9 mm OD)
FMSS-4	2-3/8" OD x 4-1/2" OD (60.3 mm OD x 114.3 mm OD)

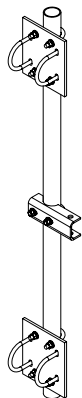
Tower Face Mount Vertical Supports

ITEM #	DESCRIPTION
FMVS-2	2-3/8" OD x 2-3/8" OD (60.3 mm OD x 60.3 mm OD)
FMVS-3	2-3/8" OD x 3-1/2" OD (60.3 mm OD x 88.9 mm OD)
FMVS-4	2-3/8" OD x 4-1/2" OD (60.3 mm OD x 114.3 mm OD)

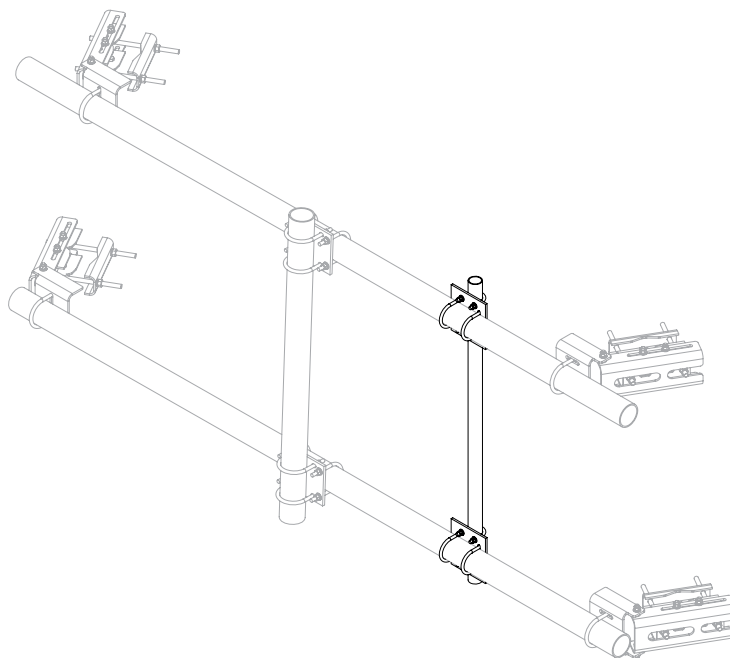
Strut Connection Clamp

ITEM #	DESCRIPTION
SSB-2	For 2-3/8" OD (60.3 mm OD) pipe
SSB-3	For 3-1/2" OD (88.9 mm OD) pipe
SSB-4	For 4-1/2" OD (114.3 mm OD) pipe

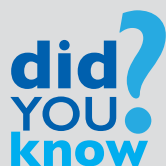
FMSS-2
2-3/8" OD x 63" pipe (60.3 mm OD x 1.6 m)



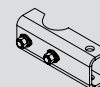
FMVS-2
2-3/8" OD x 63" pipe (60.3 mm OD x 1.6 m)



SSB-2
For 2-3/8" OD (60.3 mm OD) pipe

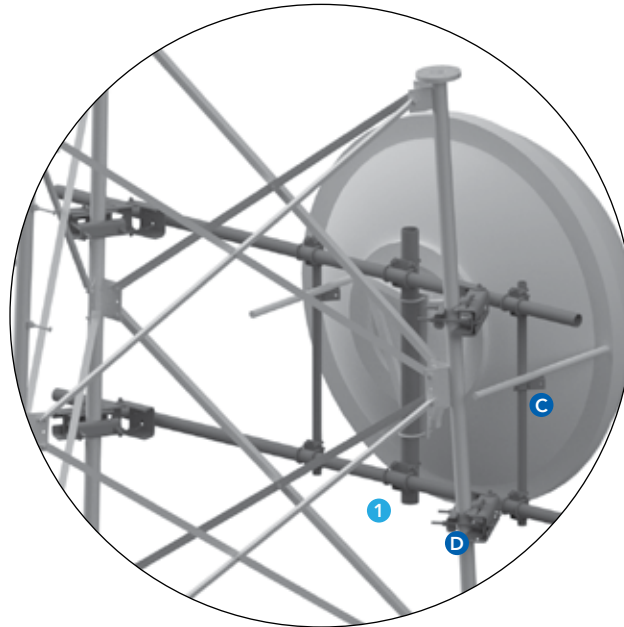


The strut support bracket (SSB series) can be used with MCSS series and MSS series displayed on page 7.



- 1 **FMSX3-168** Tower Face Mount with Dual Face Supports with 14' (4.3 m) Face Pipes 3-1/2" OD (88.9 mm) (page 12). Kit includes two FMSS-3's (page 13)
- 2 **MSSB** Microwave Dish Strut Support Bracket (page 6)

- A Strut returns back to tower at recommended angle
- B Optional strut attachment back to tower leg at recommended angle
- C Strut connection clamp attachment allows for vertical adjustment
- D Universal saddle mounts up to 16" (406.4 mm) OD straight or tapered legs
- E Mount can be positioned along horizontal support for azimuth adjustment



All towers and mounts require rigorous structural analysis whenever there's a change in the loading. Such analysis should always be done by a professional structural engineer. When a rigorous analysis is required, the requirements can be found in TIA-222-G.

TOWER FACE MOUNTS

Microwave Antenna Diameter	FMDS2-96	FMDS2-168	FMDS3-96	FMDS3-168	FMDS4-96	FMDS4-168	FMDS4-240
2' (0.6 m)	X	X	X	X	X	X	X
4' (1.2 m)	X	X	X	X	X	X	X
6' (1.8 m)	X	-	X	X	X	X	X
8' (2.4 m)	-	-	X	X	X	X	X
10' (3.0 m)	-	-	X	-	X	X	X
12' (3.7 m)	-	-	X	-	X	X	-

Notes:

Suitability of mount, including serviceability requirements and local effects on supporting tower members, needs to be determined by a qualified structural engineer. The chart above is for strength design only and considers Structure Class II, Exposure Category C, Topographic Category 1, basic wind speed of 90 mph, microwave antenna with cylindrical shroud at 200' above ground level, and load centered vertically and horizontally so that it is equally distributed to the two levels of face mounts.

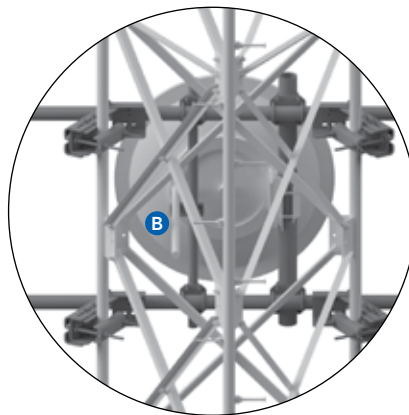
All pipe for above mounts are 2" (2-3/8" OD), 3" (3-1/2" OD), or 4" (4-1/2" OD) Schedule 40, 50 ksi.

Custom sizes and lengths available upon request.

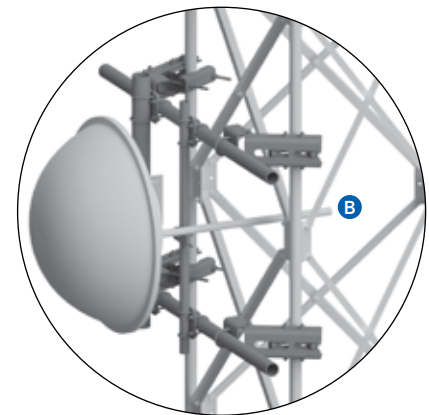
6' dish shown on 9' face tower using FMDS3-168 series mount



4' dish shown on 5' face tower using FMDS2-96 series mount



4' dish shown on 5' face tower using FMDS2-96 series mount



NOTES:

- A** Waveguide ladder and cables will fit behind the mount up to two deep
- B** Once path is set, cut the excess stiff arm 12" past the mount point to prevent falling ice from hitting the strut and affecting the path. Treat cut edge per owner requirements



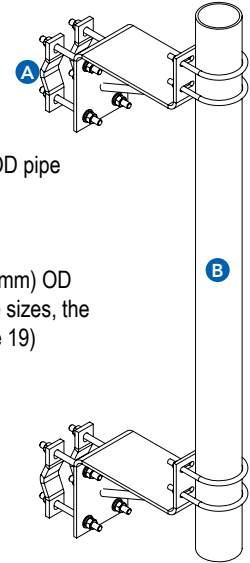
The Face Dish Mount can be adjusted to allow for waveguide ladders, along with coax and fiber up to two deep, to fit behind the mount.

TOWER FACE MOUNT STAND-OFF BRACKET

- Application:** Lattice Towers
- Size:** 4-1/2" (114.3 mm) OD
- Design:** 4-1/2" (114.3 mm) OD pipe mount stand-off
- Feature:** 14" (355.6 mm) stand-off
- Mounts to:** Tower face mount kits
- Material:** Hot-dip galvanized steel
- Includes:** Stand-off, attachment hardware
- Order Separately:** Tower face mount kit

Tower Face Mount Stand-off Bracket

ITEM #	DESCRIPTION
FMSOB-14	14" (355.6 mm) Stand-off



FMSOB-14

- A** Fits 2-3/8" (60.3 mm) to 4-1/2" (114.3 mm) OD pipe
- B** Pipe ordered separately

Note:

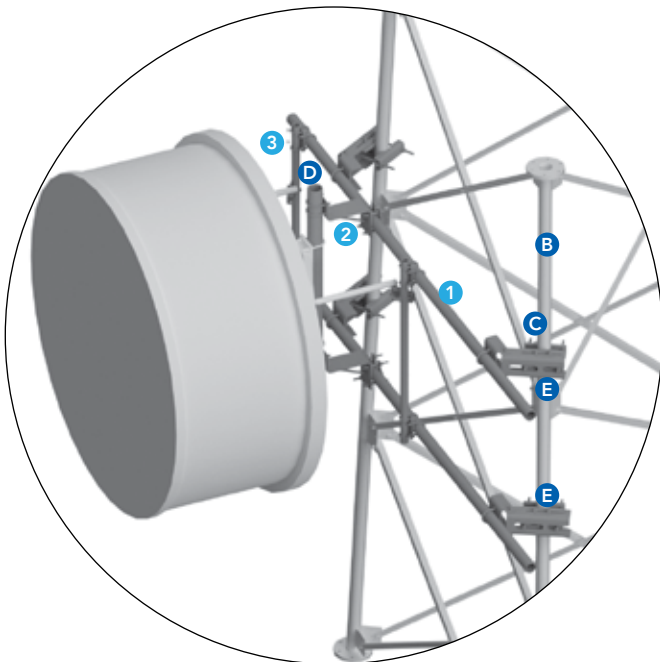
This kit comes with u-bolts for 4-1/2" (114.3 mm) OD pipe included. If using this kit with other pipe sizes, the u-bolts can be ordered separately (see page 19)



If the FMSOB-14 is used for a building wall mount application, different backing plate hardware is required.

- 1 FMS4-168** Tower Face Mount with Dual Face Supports with 14' (4.3 m) Face Pipes 4-1/2" OD (114.3 mm) (page 12)
- 2 FMSOB-14** Tower Face Mount Stand-off Bracket (above)
- 3 FMSS-4** Tower Face Mount Strut Support Kit 2-3/8" OD x 4-1/2" OD (60.3 mm x 114.3 mm) (page 13)

- A** Strut returns back to tower at recommended angle
- B** Tapered leg
- C** Channel supports adjust for inclination of tower leg taper
- D** True vertical antenna support
- E** Dual face support allows four point connection to structure
- F** Optional FMSOB-14 allows greater work space and elliptical path

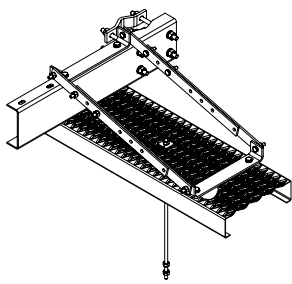


MICROWAVE DISH WAVEGUIDE SHIELDS

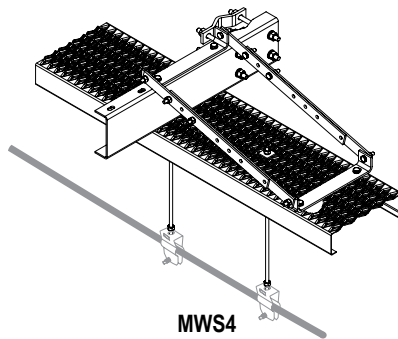
- Application:** Lattice Towers
- Size:** Three versions (see table)
- Design:** Support and protection for waveguide
- Feature:** Protects waveguide from falling debris
- Mounts to:** 4-1/2" (114.3 mm) OD pipe
- Material:** Hot-dip galvanized steel
- Includes:** Ice shield and all attachment hardware
- Order Separately:** Pipe mount

Microwave Dish Waveguide Shields

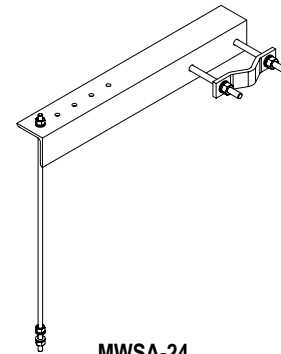
ITEM #	DESCRIPTION	WEIGHT
MWS2	Microwave Dish Waveguide Shield, 12" x 24" (304.8 mm x 609.6 mm) shield	42 lbs (19.1 kg)
MWS4	Microwave Dish Waveguide Shield, 12" x 48" (304.8 mm x 1.2 m) shield	61 lbs (27.7 kg)
MWSA-24	Microwave Dish Waveguide Shield, 24" (609.6 mm) angle	12 lbs (5.4 kg)



MWS2



MWS4



MWSA-24

MWS2



MWS4

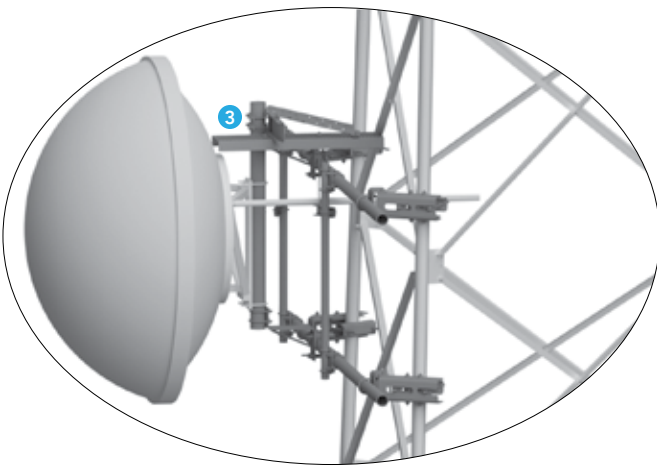
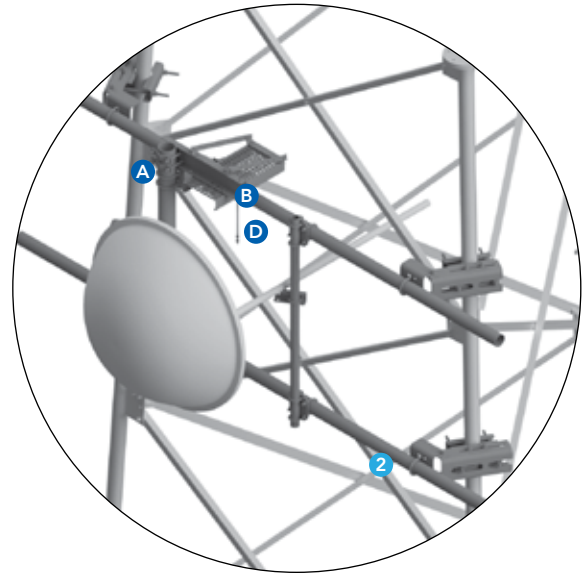


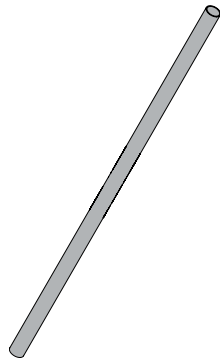
- 1 **MWS2** Microwave Dish Waveguide Shield (page 17)
- 2 **FMDS2-96** Tower Face Mount with 8' (2.4 m) Face Pipes 2-3/8" OD (60.3 mm) (page 12). Kit includes one FMSS-2 (page 13)
- 3 **MWS4** Microwave Dish Waveguide Shield (page 17)

- A Mounts to existing 4-1/2" OD (114.3 mm) vertical pipe mount
- B Offers multiple attachment points on grating
- C Grating can be mounted at any azimuth to protect and follow elliptical waveguide
- D Threaded support rod for elliptical waveguide

NOTE:

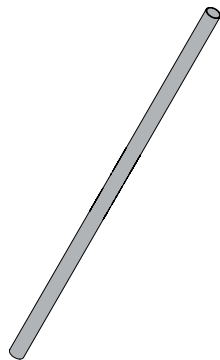
- E Once path is set, cut the excess stiff arm 12" past the mount point to prevent falling ice from hitting the strut and affecting the path. Treat cut edge per owner requirements.





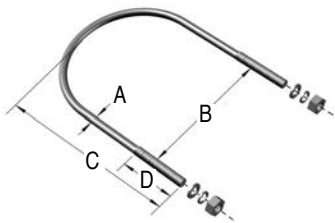
Schedule 40, 50 ksi pipe

ITEM #	DESCRIPTION
CS03266	2-3/8" OD x 8' pipe (60.3 mm OD x 2.4 m)
CS03267	2-3/8" OD x 14' pipe (60.3 mm OD x 4.3 m)
CS03268	3-1/2" OD x 6' pipe (88.9 mm OD x 1.8 m)
CS03269	3-1/2" OD x 8' pipe (88.9 mm OD x 2.4 m)
CS03270	3-1/2" OD x 10' pipe (88.9 mm OD x 3.0 m)
CS03271	3-1/2" OD x 14' pipe (88.9 mm OD x 4.3 m)
CS03272	4-1/2" OD x 8' pipe (114.3 mm OD x 2.4 m)
CS03273	4-1/2" OD x 14' pipe (114.3 mm OD x 4.3 m)
CS03274	4-1/2" OD x 20' pipe (114.3 mm OD x 6.1 m)



Standard Pipe

ITEM #	DESCRIPTION
C10-981-205	2-3/8" x 63" pipe (60.3 mm x 1.6 m)
C10-981-206	2-3/8" x 72" pipe (60.3 mm x 1.8 m)
C10-981-222	2-3/8" x 96" pipe (60.3 mm x 2.4 m)
C10-901-305	2-7/8" x 63" pipe (73.0 mm x 1.6 m)
C10-981-508	3-1/2" X 63" pipe (88.9 mm x 1.6 m)
C10-981-512	3-1/2" x 96" pipe (88.9 mm x 2.4 m)
C10-981-405	4-1/2" x 63" pipe (114.3 mm x 1.6 m)
C10-981-408	4-1/2" x 102" pipe (114.3 mm x 2.6 m)



A = Diameter
 B = Inside Width
 C = Inside Length
 D = Thread Length

U-Bolts

ITEM #	DESCRIPTION
C40-034-014	1/2" diameter x 2-7/16" wide x 5-3/8" long (12.7 mm x 61.9 mm x 136.5 mm), 3" (76.2 mm) thread length (fits 2-3/8" pipe (60.3 mm))
C40-034-015	1/2" diameter x 2-15/16" wide x 5-3/4" long (12.7 mm x 74.6 mm x 146.1 mm), 3" (76.2 mm) thread length (fits 2-7/8" pipe 73.0 mm)
C40-034-016	1/2" diameter x 3-9/16" wide x 6-1/2" long (12.7 mm x 90.5 mm x 165.1 mm), 3" (76.2 mm) thread length (fits 3-1/2" pipe (88.9 mm))
C40-034-018	1/2" diameter x 4-9/16" wide x 7-1/2" long (12.7 mm x 115.9 mm x 190.5 mm), 3" (76.2 mm) thread length (fits 4-1/2" pipe (114.3 mm))
C40-034-023	5/8" diameter x 2-7/16" wide x 5-3/8" long (15.9 mm x 61.9 mm x 136.5 mm), 3" (76.2 mm) thread length (fits 2-3/8" pipe (60.3 mm))
C40-034-025	5/8" diameter x 2-15/16" wide x 5-7/8" long (15.9 mm x 74.6 mm x 149.2 mm), 3" (76.2 mm) thread length (fits 2-7/8" pipe 73.0 mm)
C40-034-028	5/8" diameter x 3-9/16" wide x 6-1/2" long (15.9 mm x 90.5 mm x 165.1 mm), 3" (76.2 mm) thread length (fits 3-1/2" pipe (88.9 mm))
C40-034-032	5/8" diameter x 4-9/16" wide x 7-1/2" long (15.9 mm x 115.9 mm x 190.5 mm), 3" (76.2 mm) thread length (fits 4-1/2" pipe (114.3 mm))

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