

# 4.6 Meter Trifold ESA

The Kratos 4.6 Meter Trifold™ is a transportable satellite antenna system, designed for use worldwide in various applications serving data, voice and communications networks.

A broad range of adjustments provides non-critical Positioner/Trailer orientation and the ability to view geostationary satellites, horizon-to-horizon, from any location worldwide. The system provides a high quality and dependable antenna platform, supported by the worldwide Kratos service and support network.

The electrical performance and versatility allows the ability to configure the antenna with a variety of transmit and receive feed assemblies. This versatility provides the ability to configure the antenna with multiple linearly or circularly polarized C-band, X-band, X-band Low Passive Intermodulation (PIM), Ku-band, K-band, and Ka-band feed systems. Each feed system has been designed to be easily removable for transport.

The antenna system design consists of a spun aluminum reflector, a removable subreflector, heavy duty elevation over azimuth Positioner, and an optional heavy duty Trailer for transport.

The 4.6m Trifold™ system provides a complete solution for mobile communications. Its versatility allows the system to be configured to meet various customer applications, including commercial and military.

Trifold™ antennas can have non standard custom designed configuration such as:

- Military trailers; 2 and 3 axles
- Equipment enclosures
- Environmental control
- Generators
- RF equipment integration



## Features

- Tracking and Auto Acquisition
- UHF to Ka-Band Capabilities
- Various Configuration and Integration Options Available per Customer Request
- Three Axis Motorization
- MTBF: >15,000 Hhours
- MTTR: <30 Minutes
- Air Transport: C-141, C-17, C-5, C-130
- U.S. FCC Regulation 25-209 for Mandatory Pattern Requirements for 2° Satellite Spacing Based on Off Satellite Measurements at Ku Band
- ITU-R S.580 and S.465 Recommendations for Pattern Performance for 2° Spacing
- Rugged Aluminum and Steel Construction Provides 125 mph (200 km/h) Wind Survival in the Stow Position and 30 mph (48 km/hr) Gusting to 45 mph (72 km/h) in any Position of Operation

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## Design Standards

Reflector	Aluminum painted with highly diffusive white paint
Ground Mount	Hot-dipped galvanized steel, per ASTM-A123 for structural steel.
Hardware	Sizes $\leq$ 3/8 in (9.5mm), stainless steel, passivated per MIL-F-14072-E300 Sizes $\geq$ 3/8 in (9.5mm), hot-dipped galvanized stainless steel, passivated per ASTM-A123

## Environmental Performances

Operational Wind Loading	30 mph (48 km/h) Gusting to 45 mph (72 km/h)
Operational Wind Loading for 3.9m Trifold™ on Low Profile Positioner	45 mph (72 km/h) with max degradation of 0.5 dB at C and X-Band operation
Wind Loading, Survival, with Trailer outriggers fully extended	Go to stow at 85 mph (137 km/h)
Wind Survival in any Position, with Trailer outriggers fully extended	65 mph (105 km/h) Gusting to 85 mph (137 km/h)
Wind Survival in "Stow" Position, with Trailer outriggers fully extended	125 mph (200 km/h)
Operating Temperature	-40° to 52°C (-40° to 125°F)
Rain	4 in (102 mm) per hour
Solar Radiation	360 BTU/hr/ft <sup>2</sup> (1135 Watts/m <sup>2</sup> )
Ice (survival)	1 in (2.5 cm) on all surfaces
Relative Humidity	100%
Shock and Vibration	As encountered by commercial Air, Rail and Truck shipment.
Atmospheric Conditions	As encountered by Moderately Corrosive Coastal and Industrial Areas.

## Mechanical Performances

The 4.6m Trifold™ Antenna mechanical general specifications and performances are listed in below table. Additional information, dimensions and layout may be provided by Kratos on a case-by-case basis.

Optics Type	Dual Reflector Gregorian
Reflector Construction	Dual Piece Aluminum Spinning
Reflector Segments	3
Mount Configuration	Elevation over Azimuth Heavy Duty Positioner

### Antenna Pointing Range, Coarse/(Continuous)

Elevation:	5-90°
Azimuth:	$\pm$ 146° from Center
Polarization	$\pm$ 90°

## Shipping Information

### Packing Options

Standard Commercial Domestic Pack (without trailer)	Included
Export Pack for OCEAN Transport for all Trifold™ Antennas (without trailer)	OCEANSHIP-T
Export Pack for Air Transport for all Trifold™ antennas (without trailer)	AIR-EXPORT-PACK-T

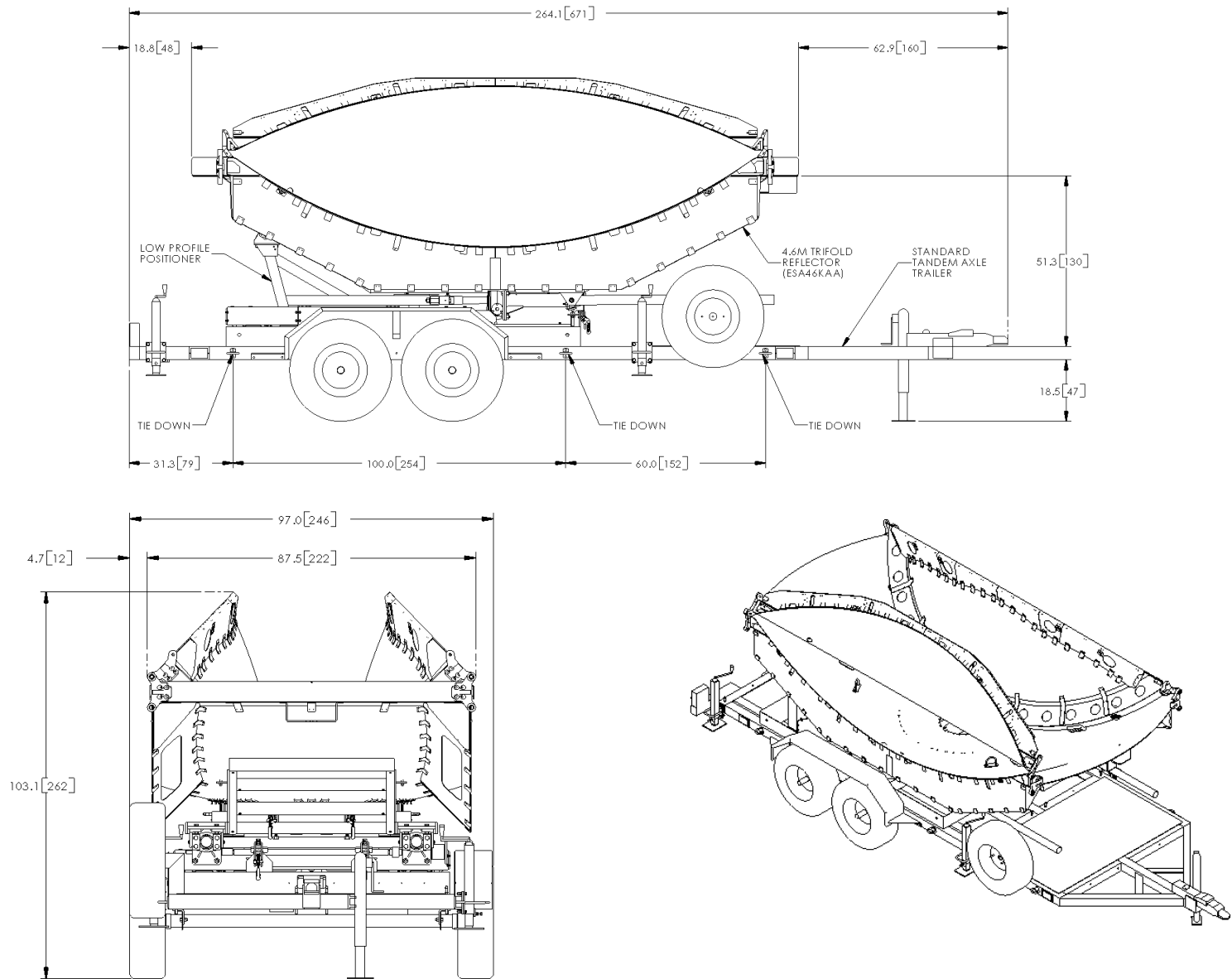
### Required Shipping Container

40 foot flat rack	Quantity 1
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Shipping container information is given for basic configuration and may vary depending on the selected options, please contact Kratos for specific container loading plan.

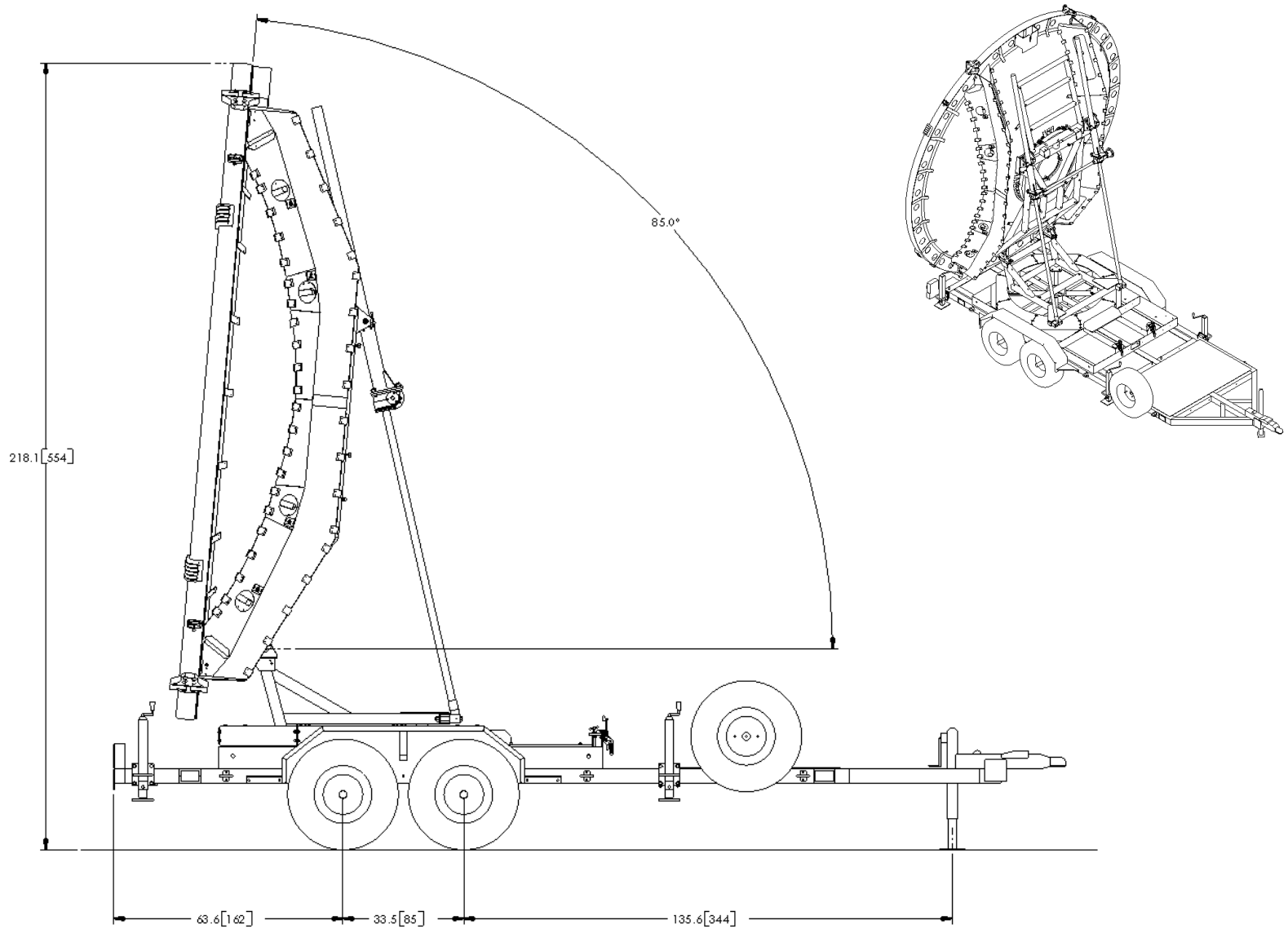
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## 4.6M with Low Profile Positioner Dimensional Drawings with ESA46AA-3 reflector



# 4.6 Meter Trifold ESA

4.6M with Low Profile Positioner Dimensional Drawings with ESA46AA-3 reflector



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## Antenna Configurations

Transportable Earth Station Antennas	
4.6 M Trifold™ Transportable Satellite Antenna	ESA46AA-3
4.6 M Trifold™ Transportable Satellite Antenna Low PIM	ESA46AA-LP-3

## Positioner Configurations

The RPP low profile positioner uses an anti-backlash dual azimuth drive coupled to a chain driven wheel as well as a dual jack for the elevation. This positioner provides an accurate azimuth and elevation pointing for positioning, tracking and auto acquisition.. This positioner includes a sealed bearing precision azimuth system to improve positioning and tracking accuracy for applications up to Ka band.

The RPP positioner with the low profile design provides the capability to the Trifold™ antenna system to be air transportable in C-141, C-17, C-5, C-130 when using Kratos trailers.

Positioner for Transportable Earth Station Antennas	
Low Profile Trifold™ Positioner (RPP)	7587400



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## Trailer Configurations

The Kratos Trifold™ trailers are available in three versions characterized by the hitch interface.

The three options are shown below:



2-5/16" Std Ball Hitch used with trailer 7572758-1



Adjustable Eye Hitch used with trailer 7572758-2



Adjustable Clevis Hitch used with trailer 7572758-3

Trailer for Transportable Earth Station Antennas	
Tandem Axle Trailer with 2-5/16" Std Ball Hitch NHTSA Certified	7572758-1
Tandem Axle Trailer with Adj Eye Hitch NHTSA Certified	7572758-2
Tandem Axle Trailer with Adj Clevis Hitch NHTSA Certified	7572758-3



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## Motorization

One motorization system is available for this antenna: the NGC tracking system that can support Steptrack, Smartrack and Ephemeris orbital tracking.

The NGC-IDU controller can also operate the Sub-Reflector tracking system SRT-3-TRI, 3 axis Control Sub-Reflector Carriage, required for Ka application.

### Motor Kit

Azimuth/Elevation Motor Kit, RPP Positioner	NGC-MKRPP
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### SRT Kit

3 axis Control Sub-Reflector Carriage	SRT-3-TRI
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### Polarization Drive Kit

Part of the Feed System	
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### Outdoor Unit Controller

Power 200 - 230 VAC, 3 Phase 50/60 Hz for RPP Positioner	NGC-ODU-208-LPP
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Power 380 - 460 VAC, 3 Phase 50/60 Hz for RPP Positioner	NGC-ODU-380-LPP
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Antenna controller, motorization and options are detailed in specific bulletins, please contact Kratos.

## Motorization and NGC Options

Indoor	
NGC-IDU	NGC Rack Mounted Antenna Controller W/LCD Touch Panel
NGC-001	NGC-IDU Analog Telephone Modem
NGC-002	NGC-IDU Spectrum Analyzer Card, Analog
NGC-003	NGC-IDU DVB Receiver Card
NGC-004-02	NGC IDU, L-Band Internal Beacon Receiver
NGC-006	NGC-IDU Emergency Stop Button
NGC-007	NGC-IDU 10 Mhz Reference Source
NGC-008	NGC-IDU Redundant Power Supply
NGC-009	NGC-IDU Rack Slides
NGC-101	NGC-IDU Step Tracking Software
NGC-102	NGC-IDU Smartrack Software
NGC-103	NGC-IDU Predictive Track Software
NGC-104	NGC-IDU Full Tracking Capability Software
NGC-105	NGC-IDU Acquisition Assist
NGC-106	NGC-IDU Remote Access Software Package
NGC-107	NGC-IDU Spectrum Analyzer Enhanced User Interface
NGC-108	Receive Pattern Test Tool
NGC-109	Redundancy Control Software
NGC-111	Sand/Dust Deviator Feature
NGC-119	NGC High Availability System Redundancy Software
Outdoor	
7586787	NGC Handheld Terminal with Mil Spec Connector
NGC-202LPP	NGC ODU High Temperature Kit (+60 C)
NGC-205LPP	NGC ODU AC Polarization Drive Interface
NGC-250	NGC ODU Power Distribution System for Trifold™
NGC-251	NGC ODU Power Distribution System for Trifold™ 40m
NGC-252	GFCI and Precipitation Deviator Electrical Kit for Trifold™ Power Distribution
NGC-SEN-TRI-HA	NGC Acquisition Assist Sensor Package for Trifold™

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## Feed Matrix

UHF- BAND FEED SYSTEMS	PORT	CP Left Hand	CP Right Hand	225 - 400 MHz Rx and Tx
1LHCPUHF-46T	1	X		X
1RHCPUHF-46T	1		X	X

C- BAND FEED SYSTEMS	PORT	CP	LP	RX 3.625 - 4.2 GHz	RX 3.4 - 4.2 GHz	RX 4.5 - 4.8 GHz	TX 5.850 - 6.425 GHz	TX 5.725 - 6.650 GHz	TX 5.725 - 6.725 GHz	TX 6.725 - 7.025 GHz
2CPC-46T	2	X		X			X			
2CPWCR-46T	2	X			X					
2LPC-46T	2		X	X			X			
2LPCPWCR-46T	2	X	X			X				
2LPWCR-46T	2		X			X				
4CPWC-46T-206	4	X				X			X	
4CPWWC-46T-2	4	X				X			X	
4LPNC-46T	4		X	X			X			
4LPWC-46T	4		X		X				X	

X- BAND FEED SYSTEMS	PORT	Low PIM	CP	RX 7.25 - 7.75 GHz	TX 7.9 - 8.4 GHz
2CPX-46T	2		X	X	X
2CPMX-46	2	X	X	X	X

Ku- BAND FEED SYSTEMS	PORT	LP	RX 10.7 - 11.70 GHz	RX 10.7 - 12.50 GHz	RX 10.7 - 12.75 GHz	RX 10.7 - 13.25 GHz	TX 12.75- 13.25 GHz	TX 12.75- 14.5 GHz	TX 13.75- 14.5 GHz	TX 13.75- 14.8 GHz
2LPKU-46T	2	X				X				X
4LPKU-46T	4	X			X					X
4LPKU-46T-1	4	X			X					X
4LPKU-46T-6	4	X		X				X		
4LPWKU-46T-212	4	X	X				X			X



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## Feed Matrix (cont)

K- BAND FEED SYSTEMS	PORT	LP	CP	RX 10.7 - 12.75 GHz	TX 17.3 - 18.4 GHz
2LPK-46T	2	X		X	X
4LPK-46T	4	X		X	X

KA- BAND FEED SYSTEMS	PORT	LP	CP	RX 17.7 - 21.2 GHz	RX 18.3 - 20.2 GHz	RX 20.2 - 21.2 GHz	TX 27.0 - 30.05 GHz	TX 27.50 - 31.00 GHz	TX 30.0 - 31.0 GHz
2LPCKAR-46T	2	X	X	X					
4CPKA-46T	4		X			X			X
4CPMKA-46-206	4		X			X			X
4CPWWKA-46T-206	4		X	X				X	
4LPKA-39T	4	X			X		X		
4LPWWKA-46-206	4	X		X				X	
4LPWWKA-46T	4	X		X				X	

Ku/K- BAND FEED SYSTEMS	PORT	LP	RX 10.7 - 12.75 GHz	TX 13.75- 14.5 GHz	TX 17.3- 18.4 GHz
6LPKUK-46T	6	X	X	X	X

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## Antenna Options and Spares

Heating Options	
GSS-46T-1	4.6M Trifold™ Passive Snowshield Cover
SSH6K-46T-1	4.6M Trifold™ 12000 Watt Electric Heater
WSS-IC-100	Interface Cable, 100 Feet
WSS-RMDP7	Rack Mounted Remote Monitor Control Panel
Safety Options	
LRK-TRI	Lightning Rod Kit for Trifold™ Systems
Other Options	
220190	Trifold™ Positioner to Trailer Mounting Hardware Kit
7578084	Transit Case, Trifold™ C-Band Feed System, Gray
7583831	Transit Case, Trifold™ Ku-Band Feed System, Gray
7579354	Trifold™ Trailer Feed Storage Cabinet up to 3 Trifold™ Feed Systems
FTST	Feed System Testing
Environment Systems Options	
7564531	Precipitation Deviator Ka-band, 208/380 VAC, 3 Phase
Spare	
7501282	Spare Ku-Band Feed Window Kit

Optional heavy duty custom transit cases are available for storage of all feed assemblies during transport of the Trifold™ satellite antenna system. Part numbers are available in the Antenna Options and Spares table on this page.





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