



Dual Band Duplexed Antenna Kit 108-174 380-870 MHz NMO Mount/N Type Connectors

Antennas Technical Data Sheet

PE51AK1000

Features

- Duplexer (VHF/UHF 108-174 MHz/380-870 MHz), with integral N-type (m) Connectors (3 ea.)
- Low Loss 195 NMO mount with cable (1 ea.)
- RG-58/U NMO mount with cable (1 ea.)
- Field Tunable Antennas (2 ea.)
- RG-58/U Feed Cable (1 ea.)

Applications

- Service Vehicles
- Public Safety
- Public Transportation
- Mining & Construction

Description

This VHF/UHF mobile duplexed antenna kit is ideally suited for multipoint mobile applications including service vehicles, public transportation, public safety, mining and construction vehicles, as well numerous other commercial and industrial applications where mobility and wide coverage is desired. The antenna kit features a VHF/UHF duplexer and a pair of field tunable antennas. This gives users the flexibility to operate radio transceivers in any VHF and UHF band with optimum performance. The kit allows the user to upgrade/switch to any NMO-type antenna.

Configuration

Design	Duplexer
Application Band	VHF/UHF
Band Type	Dual
Cable Length	204 in [518.16 cm]
Connector Type	NMO Mount
Interface 2	N

Duplexer Electrical Specifications

Description	Minimum	Typical	Maximum	Units
Frequency Range (VHF)	100		180	MHz
Frequency Range (UHF)	380		870	MHz
Input VSWR (All Ports)			1.6:1	
Impedance		50		Ohms
Isolation (VHF↔UHF-870)	50			dB

Electrical Specification Notes:
Electrical specifications data applies to Duplexer

Duplexer Specifications by Band

Description	Band 1	Band 2	Band 3	Band 4	Band 5	Units
Range	100-180	380-520	746-870			MHz
Insertion Loss	0.2	0.3	0.5			dB
Maximum Input Power	150	100	75			Watts

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Field Tunable Antenna Electrical Specifications

Description	Min	Typ	Max	Max
Frequency Range	108		870	MHz
VSWR (Field Tunable)			1.6:1	
Impedance		50		Ω
Gain		2		dBi
Power Rating		100		W
Polarization		Linear, Vertical		
E-Plane		50		Degrees
H-Plane		Omnidirectional		
Groundplane		Required		

Field Tunable Antenna Mechanical Specifications

Height	31.75 in [806 mm]
Radiator Material	300 Series SS
Radiator Plating	Black Chrome
Base Material	Xenoy™ w/TPV Skirt
Mounting Application	¼" thru-hole NMO mount
Operating Temperature	-40°C to 85°C
Corrosion	Salt and UV Resistant

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Duplexer Mechanical Specifications

Size

Overall Length
Width
Height

3.27 in [83.06 mm]
2.1 in [53.34 mm]
1.1 in [27.94 mm]

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Installation Instructions

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DUAL BAND DUPLEXED ANTENNA SYSTEM 108-174 MHz / 380-870 MHz

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Parts (Figure 1): Verify all parts are included. Reference items in Figure 1:

1. (1 ea.) Multi-Band Duplexer
2. (2 ea.) Z-Nut™ Field Tunable ¼ Wave Antenna
3. (3 ea.) Type N Connectors, RG-58/U & 1956 Type
4. (1 ea.) RG-58/U NMO Cable Mount
5. (1 ea.) 195 Low Loss NMO Cable Mount
6. (1 ea.) RG-58/U Feed Cable, 17 ft. (5.1m) length

Tools/Materials Required:

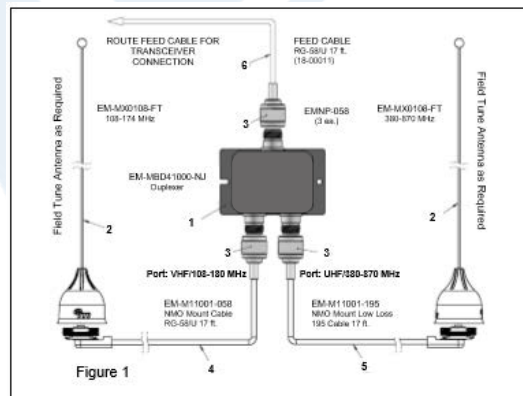
- Drill and Hole Punch, 3/8" (19.05mm) Diameter – NMO Cable Mount Installation
- #8 Self Tapping or Machine Screws (2 ea.) – Duplexer Installation
- Cable Stripping Tools for RG-58/U & 195 type cable – Connector Installations
- Coaxial Connector (sold separately) for attaching Feed Cable (RG-55/U) to radio transceiver

Pre-Installation Checklist and Tips:

- ✓ Locate a suitable mounting location for the Duplexer providing the shortest cable lengths for installing both antennas.
- ✓ **Important: Duplexer intended for interior or environmentally protected installation only. Do not install with direct exposure to outdoor environment.**
- ✓ Follow all instructions provided with each NMO Cable Mount and Field Tunable Antenna to be installed.
- ✓ **Best Performance Recommendations:**
 - Minimize all cable lengths during installation to reduce unnecessary cable insertion loss.
 - Feed the UHF of 700/800 MHz Antenna using the 195 Low Loss NMO Cable Mount.
 - Separate antennas by largest distance possible to prevent VSWR mismatch or radiated obstruction. (**Note:** Duplexer provides >50 dB isolation between VHF and UHF/700-800 MHz antenna ports, maximizing cross-talk rejection.)

Installation:

1. Refer to figure 1 for antenna/duplexer system configuration.
2. Install Duplexer to a suitable mounting surface using #8 screws. Mounting Hole spacing: 2-15/16" (74.6mm).
3. Install NMO Cable mounts for each antenna according to the individual instructions.
4. Verify antenna cable routing. Cut excess cable. Strip ends of the NMO cable mounts according to the N Type Connector instructions provided with the connectors. Attach N Type connectors to the cables. Crimp and verify operation.
5. Repeat Step 4 for one end only of RG-58/U Feed Cable. Attach radio transceiver connector (sold separately) to the opposite end of the RG-58/U Feed Cable.
6. Install all remaining connections according to the system diagram in Figure 1.
7. Verify radio transceiver performance for all required operating bands or channels.



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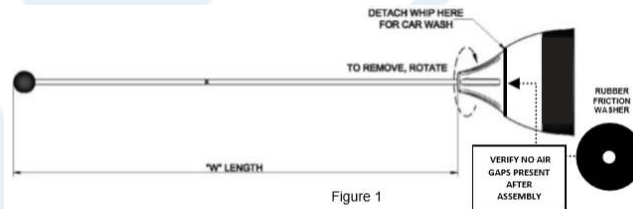
Installation Instructions FIELD TUNABLE "X"-NUT™ ANTENNA & REPLACEMENT WHIP 108-960 MHz

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PLEASE READ INSTRUCTIONS CAREFULLY BEFORE INSTALLING AND TUNING ANTENNA

- IMPORTANT:** When Installing Replacement Whips, press Rubber Friction Washer is secure and pressed completely flat around the base of the threaded stud. Attach Replacement Whip to the NMO Antenna Base by threading with firm hand torque until completely seated against Rubber Friction Washer.
- Attach antenna to NMO mount (sold separately) with firm hand torque.
- Refer to Table 1 to determine desired frequency and cut length.
- Note:** Vehicle ground-plane variations will affect final tuned length and VSWR match. Always make first cut longer than referenced in Table 1. The tuned length always includes the ball tip attached.
- Loosen the ball tip from the whip using a 1/16" hex wrench.
- Measure the cut length "W" as shown in figure 1. The length includes ball tip.
- Cut the whip longer than desired length using heavy-duty wire cutters.
- During the tuning process, attach the ball tip to the top of the cut whip using hex wrench.
- Verify that reflected power is minimized for best performance at desired frequency using VSWR meter or similar device. If necessary, frequency tuning is achieved by cutting the whip in small incremental cuts until desired frequency match is verified.
- Secured ball tip with hex wrench using firm hand torque.

Automatic Car Wash Features: - For optimal protection and extended reliability of the antenna and the NMO vehicle mount, remove the whip only from the antenna base (as shown in Figure 1) before entering automatic car wash. Before re-installation, wipe the stud and base dry with a clean cloth. Attach whip to the antenna adapter with firm finger tight grip.



Freq. (Bandwidth) MHz	"W" Length inch (mm)	Freq. (Bandwidth) MHz	"W" Length inch (mm)
108	27-1/8 (689)	146 (±4)	17-5/8 (447)
120	23-1/8 (587)	157 (±5)	16-1/4 (412)
122	22 (559)	168 (±6)	15-3/16 (385)
124	21-5/8 (548)	222 (±14)	11-1/4 (285)
126	21-3/8 (542)	245 (±15)	9-7/8 (252)
128	20-5/8 (523)	418 (±30)	5-1/4 (133)
130	20-7/16 (518)	450 (±35)	4-13/16 (122)
132	20 (508)	480 (±35)	4-1/2 (114)
136	19-1/4 (488)	520 (±40)	4 (102)
138	18-7/8 (479)	746-894	2-1/8 (53)
140	18-1/2 (471)	890-960	1-5/8 (41)
142	18-1/8 (459)		

Table 1.

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Environmental Specifications

Temperature

Operating Range

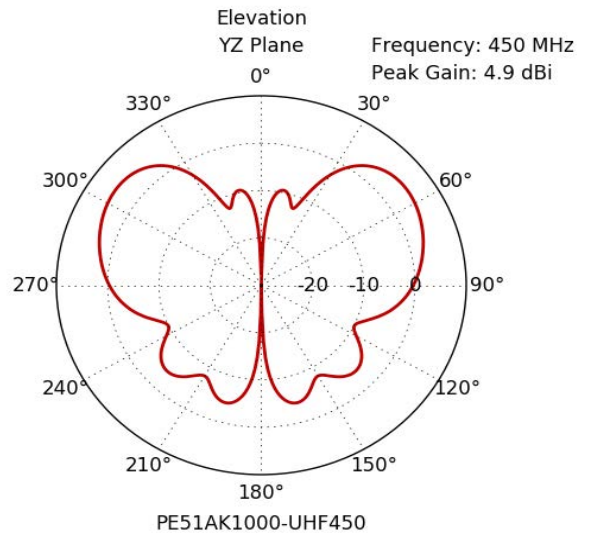
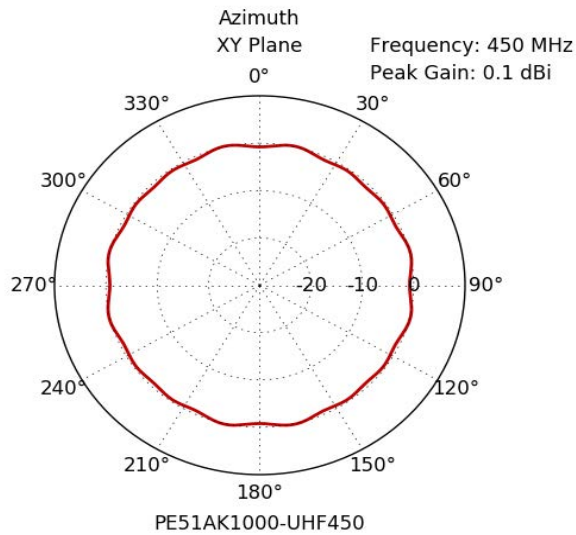
-40 to +85 deg C

Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

Notes:

Typical Radiation Pattern



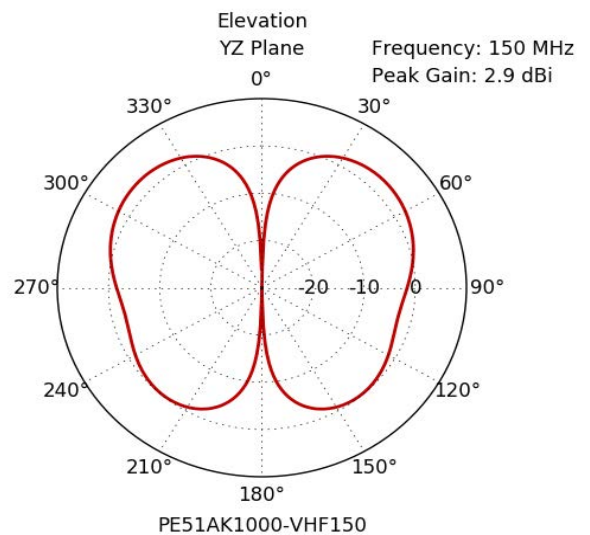
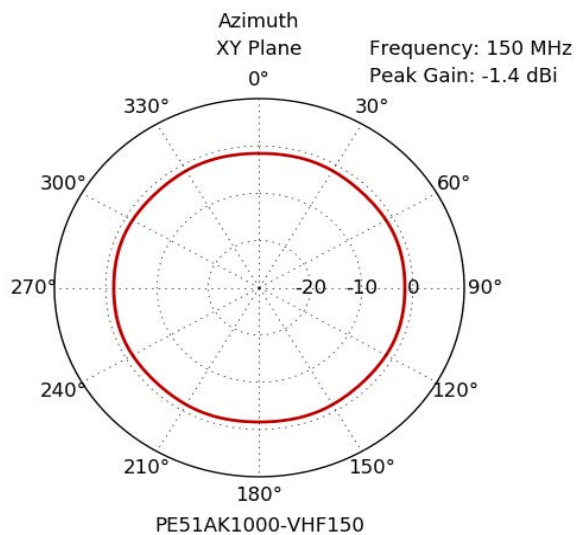
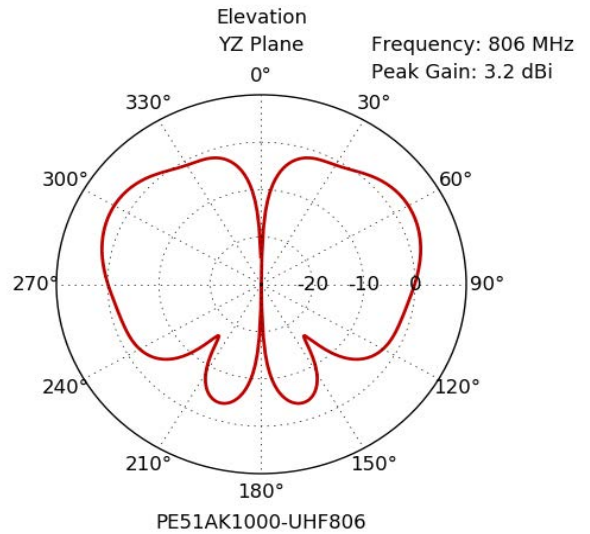
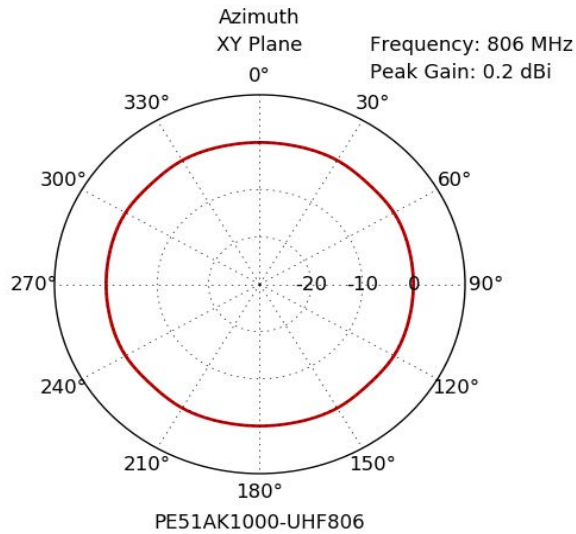
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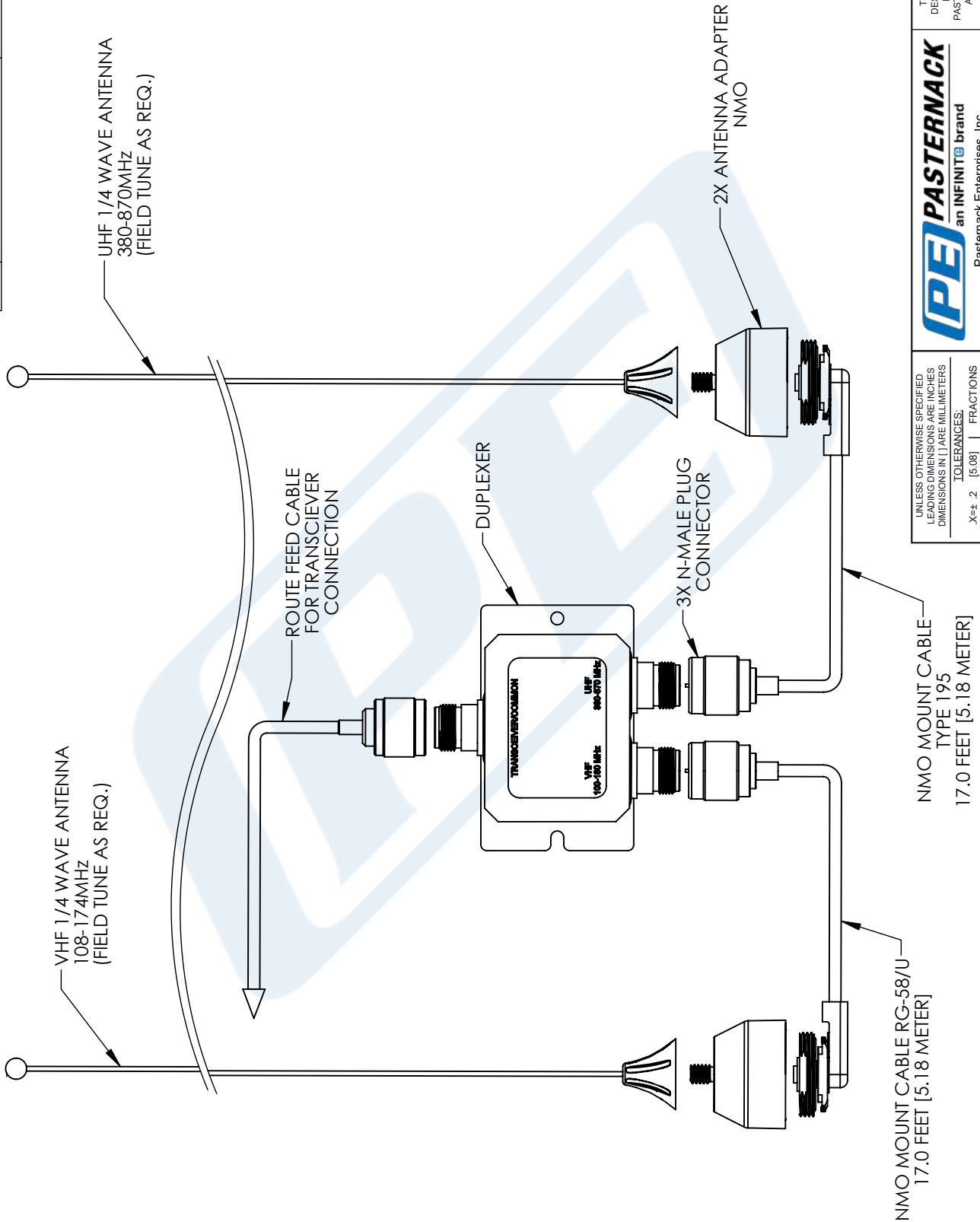
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PE51AK1000 CAD Drawing

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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	08/08/2019	MMILLER



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