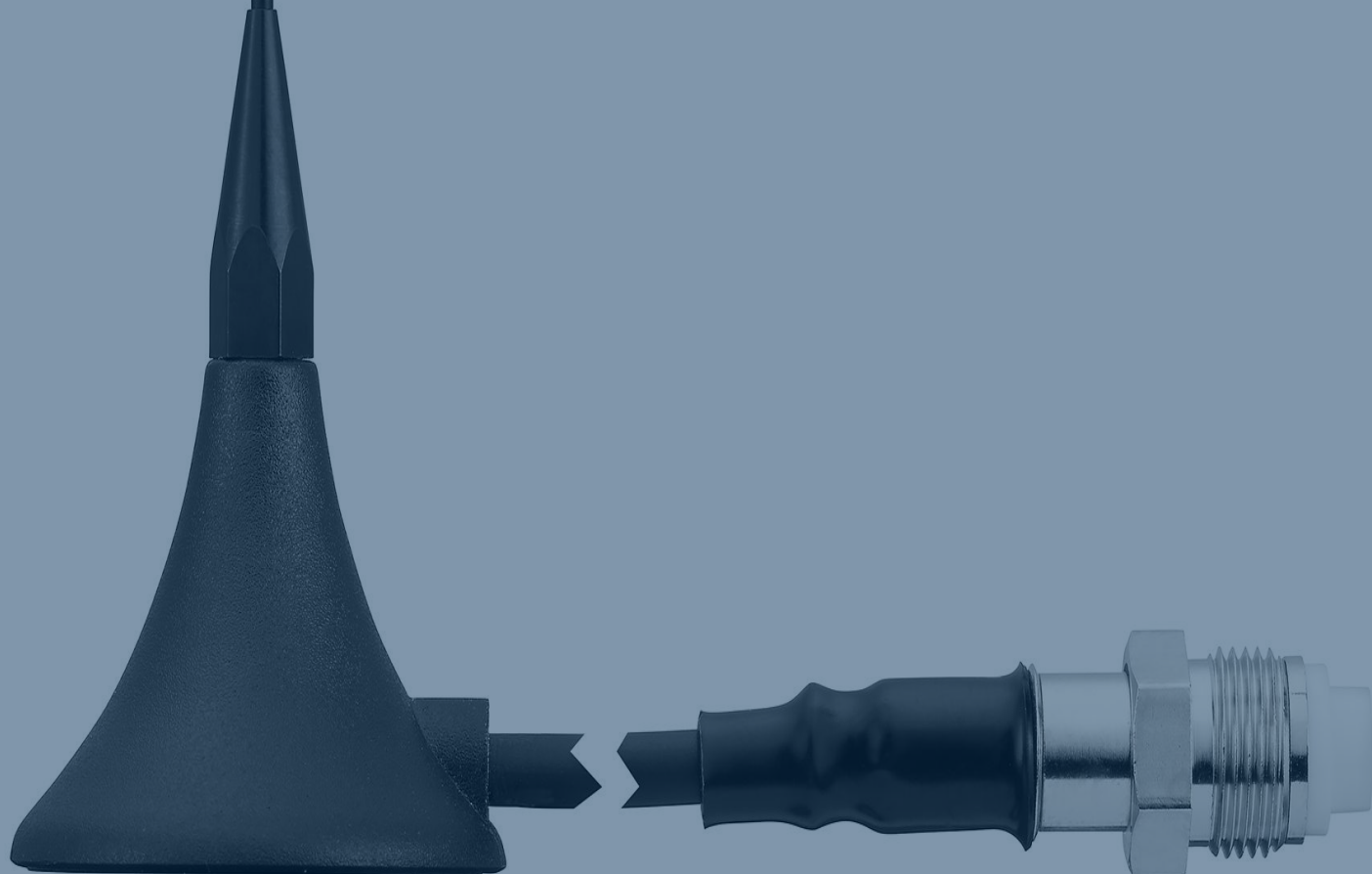




# MOBILE ANTENNAS

PROCOM A/S



Home	1
ZG-Mount	6
Z-Mount	9
XG-Combi Mount	12
X-Mount	16
TFA 4/2/TETRA-FM-S-CXP0.26-BBMU	20
SF 902/h	23
SF 900/1800	26
SF 401/...	29
SF 2402/...	32
SF 23-2	35
SF 1802	37
SF 160/...	39
NM-Mount - NanoMag	42
MZG-Mount	44
MU 911-ZG/...	47
MU 911-X/...	50
MU 911-LX/...	53
MU 909-XP4/...	56
MU 908-X/...	59
MU 907-ZG/...	62
MU 907-X/...	64
MU 906-X/...	67
MU 904-ZG/...	70
MU 904-X/...	73
MU 904-LX/...	76
MU 901-X/...	79
MH 4-Z	82
MU 901/1801/UMTS-MMS	85
MU 901/1801/UMTS-LX	88
MH 3-Z	91
MU 901/1801-LX-SP	94
MU 901/1801-LX	97
GPS-C R/FM	100
MH 2-ZG	104
MH 2-Z	107
MU 9-XP4R/...	111
GPS-C R/DAB/FM	115
MH 1-Z	119
MU 9-XP4/..., MU 9-CXP4/..., MU 9-XGP4/...	123
GPS-C MU 4/FM/...	128
MU 807-XG/...	132
GPS-C MU 3/TETRA/I	135
MU 800/900/1800/2100/2600-LX	139
MU 800/2600-LX	142
MU 7-X/...	145
MH 1-XR, MH 1-XGR, MH 1-CXR, MH 1-MMR	148

GPS-C MU 1/...	151
MU 7-LX/...	155
MU 5-ZG/...	158
MH 1-MG/GPS/160-174	161
MU 5-Z/...	164
MU 5-X/...	167
GPS-C MHU 3/FM	170
MH 1-LXR	175
MU 4-ZG/...	178
MG-Mount	182
GPS-C MC-TETRA/FM	186
MCA 70/TETRA	189
MCA 4-Z	191
MCA 1-Z/...	193
MU 4-Z/...	195
GPS-C HX 2/...	200
GPS-C FLEX/TETRA/GSM	204
MU 4-X/..., MU 4-CX/..., MU 4-XG/..., MU 4-MM/...	208
GPS-C FLEX/70/GSM/...	212
MU 3-BZ/TETRA/I	216
GPS-C 900/1800/UMTS/WIFI	219
MU 3-BZ	223
MU 2404/UMTS-MMS	226
GPS-C 900/1800/UMTS	228
MU 2404/UMTS-LX	232
GPS-C 900	235
MU 2404-MMSP2/...	239
MU 2404-MMS	241
GPS-C 4/TETRA-S BBMU/...	243
MU 2404-LX	247
GPS-C 4/70/FM	250
MU 2401/UMTS-MMS	254
GPS-C 4/2/TETRA-S BBMU/...	256
MU 2401/UMTS-LX	260
MU 2401-LX	262
GPS-C 4/2/TETRA-FM-S BBMU/PH/...	264
MU 23-3-ZG	268
LX-Mount	271
MU 23-3-X	274
GPS-C 4/2/TETRA-FM-S BBMU/...	278
MU 1804-LX	282
MU 1801-LX	285
GPS-C 2R/GSM/FM/...	288
MU 11-X/...	292
MU 1-ZG/...	296
MU 1-Z/...	299
MU 1-X/..., MU 1-CX/..., MU 1-XG/..., MU 1-MM/...	302
MU 1-NM/...	305
GPS-C 2R/FM/...	307
MU 1-LX/...	311

GPS-C 2R/70/FM	314
GPS-C 2/70/.../...	318
GPS-C 1800/UMTS	322
GPS-C 162-174/851-869 MHz	326
MLH 6/2-BZ	329
ML 3-ZP4	332
ML 3-XR	335
HX 30-KZ	338
ML 2-Z	341
HX 27-KZ	344
ML 2-XR	346
ML 1-ZR/160/BBMU/...	349
ML 1-ZG	352
ML 1-Z	355
MM-Mount - MiniMag	359
MHU 3-X, MHU 3-CX, MHU 3-XG	363
GPS-COMBI MOUNT 3.5-7.5 mm	367
MHU 3-SM	371
MHU 3-LX	375
MHU 3-BZ	379
GF-RK 900/1800	382
GF-RK 900	384
GF-RK	386
GF 911/...	388
GF 904/...	392
GF 901/...	396
GF 900/1800	400
GF 405/...	404
GF 404/...	408
GF 402/...	412
GF 401/...	416
GF 27	420
GF 230-DAB	424
GF 23-3	428
GF 2/70	432
GF 1804	436
GF 151	440
DHX 27 5/8-KFZ	444
DFSA 4/TETRA-BZ BBMU2	447
DFSA 4/TETRA-BZ BBMU1	450
DFA-FLX-X/410-430/890-960 MHz	453
CX-Mount	456
DFA 450/900-ZG/..	460
CT 30-ZP4	464
DFA 450/900-X/...	467
CT 27-ZP4	470
DFA 4/70-Z/...	473
CT 27 1/2-BZ-BBMU	476
DFA 4/2-Z/...	479
DFA 2/900-X/...	482



DFA 2/70-Z/...	485
DFA 2/70-X/...	488
GPS-COMBI MOUNT	491
GPS-C TETRA-I	495
GPS-C R/GSM/FM	499
MU 901-LX/...	503
FF 4/2/TETRA/FM/GPS-BBMU	506
PMA 5.5-TNC	508
PMA 2.4-TNC	510
GPS-C UMTS	512
MU 800/900/1800/2100/2600-MMS	516
MU 1-MG/GPS/...	518
ML 1-ZR/BOS1 BBMU	521
MU 150/450/.../...-MM	526
End	529

## ZG-Mount

### Low Profile Mobile Antenna Mount with Thread Stud



- Used together with all PROCOM ZG-type antenna whips.
- M8x1 thread whip-mounting system.
- For installation on horizontal surfaces (roof top or trunk lid) in a 21 mm dia. hole.
- Particularly well suited for rooftop-mounting because of very low internal protrusion and ability to be installed exclusively with access from the outside.
- Complete line of whips available for all communications bands up to 1300 MHz.

## DESCRIPTION

- Mounting body made of stainless steel!
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
ZG-Mount	130000377
ZGP4-Mount	130000388
ZGP5-Mount	130000389

## SPECIFICATIONS

MODEL	ZG-Mount
APPLICATION	Low-profile mount for mobile antennas
FREQUENCY	0-1300 MHz
CONNECTION TO WHIP	M8x1 thread stud
MATERIALS	Stainless steel Black chromed brass Environment-proof plastics
COLOUR	Black
HEIGHT	Approx. 28 mm
INSTALLATION DIAMETER	38 mm
BUILD-IN DEPTH	10.5 mm
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
WEIGHT	ZG-version: Approx. 70 g ZGP4-version: Approx. 210 g
MOUNTING	21 mm dia. hole

ROOF THICKNESS	Max. 2 mm
----------------	-----------

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME-TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## INSTALLATION

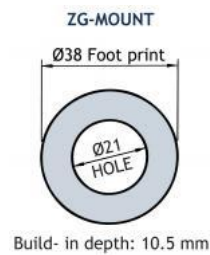
The ZG-mount is designed for mounting in a 21 mm dia. hole on horizontal surfaces as e.g. roof top or trunk lid, with access from the outside only.

A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna.

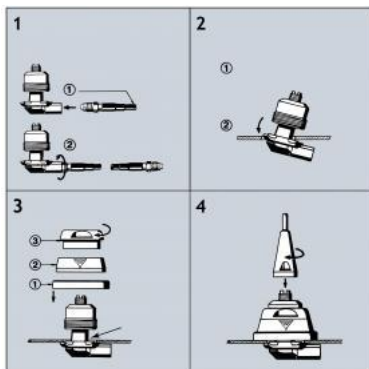
The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a fork spanner. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

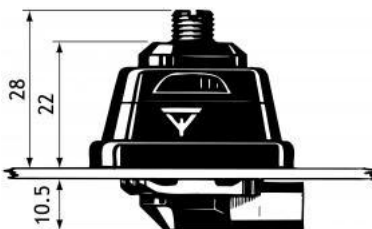
## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.





## Z-Mount

### Low Profile Mobile Antenna Mount with Toggle Joint

- Can be used together with all PROCOM mobile antenna whips provided with toggle joint.
- Installation possible everywhere on the car.
- Particularly well suited for rooftop-mounting because of very low internal protrusion and ability to be installed exclusively with access from the outside. Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.

## DESCRIPTION

- Hole diameter: 21 mm.
- Mounting body made of stainless steel !
- Wide variety of antenna whips available in the frequency range up to 470 MHz.
- Choice between two connection principles:
  - Z-mount : FME-connection (supplied without cable).
  - ZP4-mount : Permanently attached 4 m cable terminated with FME-connector.
- Available in bright or black (black plastic parts for both versions).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
Z-Mount	130000396
BZ-Mount	130000398
ZP4-Mount	130000388
BZP4-Mount	130000389
BZP5-Mount	130000408

## SPECIFICATIONS

MODEL	Z-Mount
APPLICATION	Low-profile mount for mobile antennas
FREQUENCY	0 - 470 MHz
CONNECTION TO WHIP	Toggle joint (for wing screw or hat screw with key)
MATERIALS	Stainless steel Bright or black chromed brass Environment-proof plastics
COLOUR	Black or bright and black
HEIGHT	Approx. 40 mm
INSTALLATION DIAMETER	38 mm
BUILD-IN DEPTH	10.5 mm
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm

WEIGHT	Z-version: Approx. 90 g ZP4-version: Approx. 230 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME.TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## INSTALLATION

The Z-mount is designed for mounting in a 21 mm dia. hole.

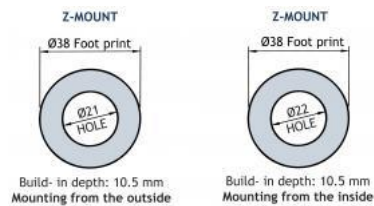
The whip is fastened to the mount by means of our standard ball joint and wing screw system. The adjustable ball joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. The Z-mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

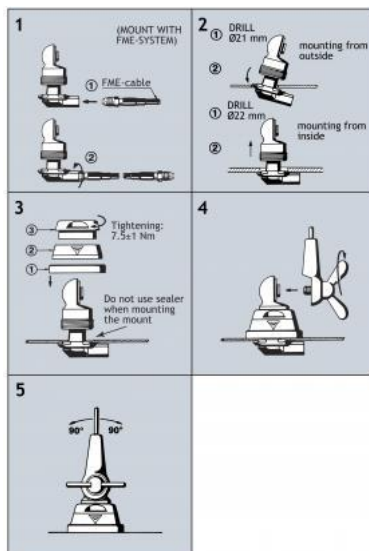
However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna.

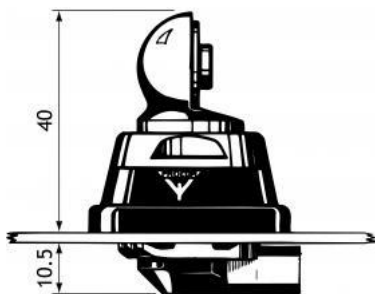
### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.



### PLEASE NOTE:

The whips are normally installed on the mount by means of the standard wing screw, but may also be installed using the optional hat screw with key (accessory item).

## XG-Combi Mount

### GPS mount for GPS Antennas and Other Frequencies



- Mobile mount with a nice, “streamline”-look, which can be installed everywhere on the car in an 19 mm dia. hole.
- Especially suited for mounting on the narrow strip on rear wing between trunk lid and car side.
- M6 thread whip-mounting system.

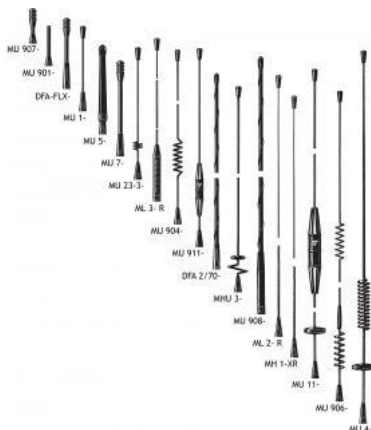
## DESCRIPTION

- Very low requirements to installation depth both under and after installation.
- Designed for installation with access from the outside only.
- Bendable section in mount makes whip tiltable 30° by hand.
- Complete line of whips available for all communications bands up to 1300 MHz.
- Mounting body made of stainless steel !
- Choice between two connection principles:
  - XG-Combi mount: FME-connection and GPS (supplied without cable).
  - XGP4-Combi mount: Permanently attached 4 m RG 58 cable terminated with FME-connector and GPS.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular Polarization (RHCP).
  - 2.85 V - 5 V supply voltage (typical 3 V).

## ORDERING DESIGNATIONS

TYPE NO.	VERSION	PRODUCT NO.
XG-COMBI MOUNT	XG-Combi mount with FME-system	130002032
XGP4-COMBI MOUNT	XGP4-Combi mount with 4 m RG 58 cable and FME-connector	130002043

## A SELECTION OF THE VARIOUS WHIPS WHICH CAN BE CONNECTED TO THE XG-COMBI MOUNT



## SPECIFICATIONS

### ELECTRICAL



MODEL	XG-COMBI MOUNT
APPLICATION	Mount for mobile antennas
CONNECTION TO WHIP	M6 thread stud
BUILD-IN DEPTH	Active : 30 mm Passive : 11 mm
<b>MECHANICAL</b>	
MATERIALS	Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
COLOUR	Black
LENGTH/WIDTH	48 mm/28 mm
WEIGHT	XG-version: Approx. 60 g XGP4-version: Approx. 200 g
MOUNTING	19 mm dia. hole
ROOF THICKNESS	Max. 2 mm
<b>ELECTRICAL for GPS-part</b>	
OPERATING FREQUENCY	1575.42 ±1.023 MHz
LNA GAIN	22 dB ±2 dB
NOISE FIGURE	Max. 1.5 dB (typical 1.1 dB)
VOLTAGE	DC 2.85 V ~ 5 V (typical 3 V)
CURRENT	≤ 20 mA
IMPEDANCE	Nom. 50 Ω
<b>MECHANICAL</b>	
CONNECTOR	Cable: RG 178, length 150 mm Connector: FME-male

#### FME-SYSTEM ACCESSORIES

<b>FME-CABLES</b>	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066

12 m FME-white	110000068
18 m FME-white	110000069
<b>FME-CONNECTORS</b>	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## INSTALLATION

XG-Combi mount antenna types can be mounted anywhere on the car, however, roof top mounting is always recommended.

The oblong XG-Combi mount is able to be mounted on the often very narrow strip on the rear wing between the trunk lid and the side of the car.

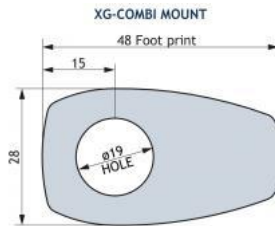
Mounting can take place with access from the outside or inside when drilling an 19 mm dia. hole.

A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna.

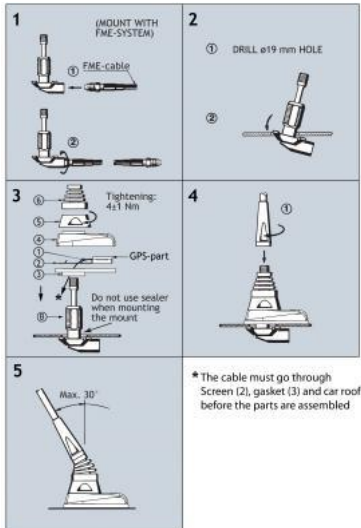
When cleaning the car in car-washing machines, the whip is easily removed using a fork spanner, size 9 mm. The whip is refitted again by screwing it onto the thread stud and tightening it lightly with the spanner.

As the XG-Combi mount is internally equipped with a bendable section, the antennas can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

## 1. INSTALLATION DIMENSIONS



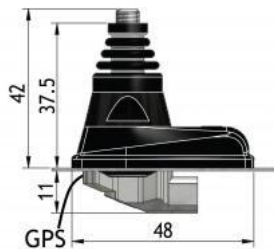
## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## ASSEMBLY INSTRUCTIONS

- Put GPS-FME-connector-cable through the gasket (2).
- Put the gasket (2) + GPS-part (1) over the body (B).
- Put the body (B) + gasket (3) + GPS-part (1) through the ø19 mm hole.
- Put the housing (4) over the body (B) and be sure that the GPS-part (1) fits into the square hole in the body (B).
- Put the threaded part over the body (B) and tighten max. 4 ±1 Nm!
- Put the corrugated plastic unit (6) over the body (B).
- Mount the antenna whip se figure 4.





## X-Mount

### Stream-lined Mobile Mount

- Mobile mount with a nice, “streamline”-look, which can be installed everywhere on the car in an 18 mm dia. hole.
- Especially suited for mounting on the narrow strip on rear wing between trunk lid and car side.
- M6 thread whip-mounting system.

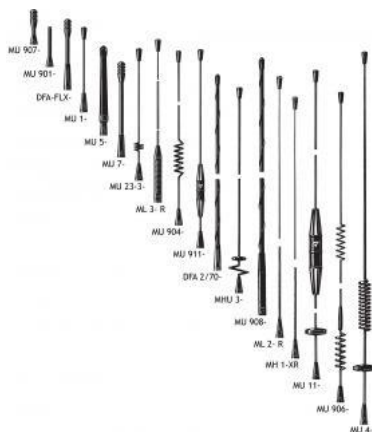
## DESCRIPTION

- Very low requirements to installation depth both under and after installation.
- Designed for installation with access from the outside only.
- With access available from the inside, installation is possible in a 14 mm dia. hole.
- Bendable section in mount makes whip tiltable 30° by hand.
- Complete line of whips available for all communications bands up to 1300 MHz.
- Mounting body made of stainless steel !
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE NO.	VERSION	PRODUCT NO.
X-Mount	X-mount with FME-system	130000373
XP4-Mount	XP4-mount with 4 m cable and FME-connector	130000374
XP5-Mount	XP5-mount with 5 m cable and FME-connector	130000375

## A SELECTION OF THE VARIOUS WHIPS WHICH CAN BE CONNECTED TO THE X-MOUNT



## SPECIFICATIONS

MODEL	X-Mount
APPLICATION	Mount for mobile antennas

FREQUENCY	0 - 1300 MHz
CONNECTION TO WHIP	M6 thread stud
MATERIALS	Stainless steel Black chromed brass Cu-nite brass Environment-proof plastics
COLOUR	Black
HEIGHT	Approx. 42 mm
LENGTH/WIDTH	41. 5 mm/27.5 mm
BUILD-IN DEPTH	Active : 30 mm Passive : 11 mm
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
WEIGHT	X-version : Approx. 45 g XP4-version : Approx. 180 g
MOUNTING	18 mm dia. hole
ROOF THICKNESS	Max. 2 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569

FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## INSTALLATION

X-mount antenna types can be mounted anywhere on the car, however, roof top mounting is always recommended.

The X-mount is able to be mounted on the often very narrow strip on the rear wing between the trunk lid and the side of the car.

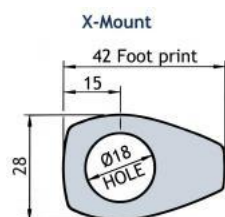
Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole, in which case the bottom plastic ring of the packing gasket should be removed with a sharp cutter.

A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna.

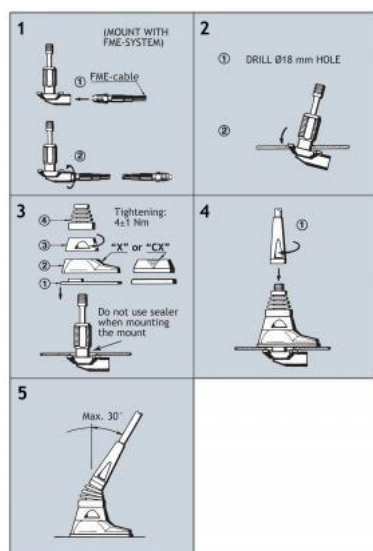
When cleaning the car in car-washing machines, the whip is easily removed using a fork spanner. The whip is refitted again by screwing it onto the thread stud and tightening it lightly with the spanner.

As the X-mount is internally equipped with a bendable section, the antennas can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

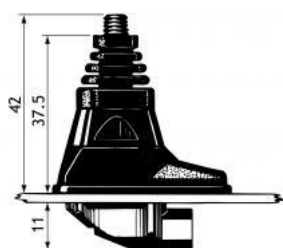
### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.





## TFA 4/2/TETRA-FM-S-CXP0.26-BBMU

### Collinear Mobile ANTenna for the 4m, 2m, TETRA and FM Bands

- 4-Band Mobile Antenna for the 4m, 2m, TETRA and FM Bands.
- Polyethylene-covered flexible whip.
- Black-chromed stainless steel antenna mount (CX-mount) with M6 thread whip-mounting system.

## DESCRIPTION

- Bendable section in mount makes whip tiltable 30° by hand.
- Easily removable whip (e.g. for wash tunnels).
- Matching unit (BBMU) included.

## ORDERING DESIGNATIONS

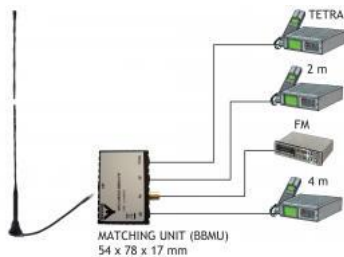
TYPE	PRODUCT NO.
TFA 4/2/TETRA-FM-S-CXP0.26-BBMU	130001731

## SPECIFICATIONS

ELECTRICAL	
MODEL	TFA 4/2/TETRA-FM-S-CXP0.26-BBMU
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 2 m: 167.5 - 174 MHz 70 cm: 380 - 410 MHz FM band: 93 - 108 MHz (Limited in 88 - 93 MHz)
SWR	74.2 - 77.7 and 84 - 87.5 MHz: ≤ 2.5 167.5 - 169.5 and 172 - 174 MHz: ≤ 2.0 380 - 410 MHz: ≤ 2.5
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 m: Approx. -3 dB 2 m: Approx. -4 dB 70 cm: Approx. 2 dB (acc. to EIA RS-329-1)
MAX. POWER	25 W
MECHANICAL	



MATERIALS	Whip: Glass fibre whip with copper wire winding, polyethylene-covered Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	670 mm
WEIGHT	60 g
MOUNTING	On the CXP0.26 mount



## INSTALLATION

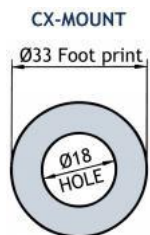
This antenna can be mounted anywhere on the vehicle.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the gasket with a sharp cutter.

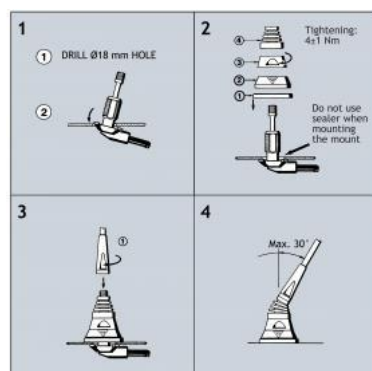
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

As the mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

### 1. INSTALLATION DIMENSIONS:



### 2. INSTALLATION STEPS:



Do not use sealer on rubber gasket or other places.





## SF 902/h

2 dB Mobile Sidefix® Antenna for the EGSM and NMT-900 Cellular Networks

- Elevated-feed skirt-dipole in a shroud of flexible and weather- and shockproof plastics.
- 2 dB gain compared to a standard  $\frac{1}{4} \lambda$  roof mount antenna.

## DESCRIPTION

- Groundplane independent due to half-wave design.
- For temporary antenna installations.
- Mounting on side-windows using a simple “clip-on” procedure.
- Provided with FME-connection (cable to be ordered separately).
- For the EGSM and NMT-900 Cellular Networks.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
SF 902/h	130001132

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 902/h
ANTENNA TYPE	Elevated-feed $\frac{1}{2} \lambda$ dipole
FREQUENCY	880 - 960 MHz (EGSM and NMT-900 Cellular Networks)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 40$ MHz @ SWR $\leq 1.5$ $\geq 75$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.1$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Brass, weather- and shockproof plastics
CABLE	FME-cable to be ordered separately

COLOUR	Black
HEIGHT	Approx. 21 cm
WEIGHT	Approx. 70 g
MOUNTING	"Clip-on" mounting on the side-window
SIDE WINDOW THICKNESS	Max. 4 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.





## SF 900/1800

Dual-frequency Mobile SideFix® Antenna for the 900 MHz and 1800 MHz Cellular Networks

- Dual-frequency antenna - two bands - one antenna!
- Covering both EGSM/NMT-900 and DCS 1800/PCN.

### DESCRIPTION

- Elevated-feed skirt-dipole in a shroud of flexible and environment-proof plastic.
- 0 dB gain compared to a standard  $1/4 \lambda$  roof mount antenna.
- Groundplane independent due to half-wave design.
- 'For temporary antenna installations.
- Mounting on side-windows using a simple "clip-on" procedure.
- Provided with FME-connection (cable to be ordered separately).

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
SF 900/1800	130001133

### SPECIFICATIONS

ELECTRICAL	
MODEL	SF 900/1800
ANTENNA TYPE	Elevated-feed $1/2 \lambda$ dipole
FREQUENCY	880-960 MHz (EGSM/NMT-900 Cellular Networks) 1710-1880 MHz (DCS-1800/PCN)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB on both bands (acc. to EIA RS-329-1)
BAND WIDTH	900 MHz: 65 MHz @ SWR $\leq$ 2.0 1800 MHz: 115 MHz @ SWR $\leq$ 2.0
SWR	$\leq$ 1.5 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Brass, environment-proof plastics

CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 21 cm
WEIGHT	Approx. 70 g
MOUNTING	"Clip-on" mounting on the side-window

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FME-P
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME-TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.







## SF 401/...

### 2 dB Mobile Sidefix® Antenna for the 450MHz Band

- End-fed half-wave dipole in highly flexible polyethylene covered StraightFlex.
- 2 dB gain compared to a standard  $1/4 \lambda$  roof mount antenna.

## DESCRIPTION

- Groundplane independent due to half-wave design.
- For temporary antenna installations.
- Mounting on side-windows using a simple "clip-on" procedure.
- Provided with FME-connection (cable to be ordered separately).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.	FREQUENCY RANGE
SF 401/CEL5	130000794	380 - 410 MHz
SF 401/CEL4	130000792	406 - 430 MHz
SF 401/CEL3	130000793	425 - 440 MHz
SF 401/CEL2	130000791	440 - 455 MHz
SF 401/CEL1	130000782	450 - 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 401/...
ANTENNA TYPE	End-fed $1/2 \lambda$ dipole mobile antenna
FREQUENCY	380-470 MHz covered by five models
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 25$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.3$ @ f.res.

MAX. POWER	25 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Polyethylene-covered StraightFlex steel wire Black-chromed brass Mount: Environment-proof plastics Brass
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 360 mm
WEIGHT	Approx. 86 g
MOUNTING	"Clip-on" mounting on the side-window

## FME-SYSTEM ACCESSORIES

<b>FME-CABLES</b>	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
<b>FME-CONNECTORS</b>	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME-TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF

Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.



## SF 2402/...

### 2 dB Mobile Sidefix® Antenna for the 2500 MHz Band

- Elevated-feed skirt-dipole in a shroud of flexible and environment-proof plastics.
- 2 dB gain compared to a standard  $1/4 \lambda$  roof mount antenna.
- Groundplane independent due to half-wave design.

## DESCRIPTION

- For temporary antenna installations.
- Mounting on side-windows using a simple "clip-on" procedure.
- Provided with FME-connection (cable to be ordered separately).
- Delivered factory tuned to customer's specified frequency.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY
SF 2402/2350 MHz	130001272	2350 MHz
SF 2402/2400 MHz	130001272	2400 MHz
SF 2402/2450 MHz	130001272	2450 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 2402/...
ANTENNA TYPE	Elevated-feed $1/2 \lambda$ dipole
FREQUENCY	To be specified within 2300 - 2500 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 160$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Brass, environment-proof plastics

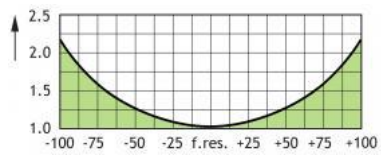
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 19 cm
WEIGHT	Approx. 60 g
MOUNTING	"Clip-on" mounting on the side-window

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME-TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## TYPICAL GAIN AND SWR CURVE





## SF 23-2

2 dB Mobile Sidefix® Antenna for the 23 cm Amateur Band: 1240, 1300 MHz

- Elevated-feed skirt-dipole in a shroud of flexible and weather- and shockproof plastics.
- 2 dB gain compared to a standard  $\frac{1}{4} \lambda$  roof mount antenna.

## DESCRIPTION

- Groundplane independent due to half-wave design.
- For temporary antenna installations.
- Mounting on side-windows using a simple “clip-on” procedure.
- Provided with FME-connection (cable to be ordered separately).
- For the 23 cm amateur band.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
SF 23-2	130001257

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 23-2
ANTENNA TYPE	Elevated-feed $\frac{1}{2} \lambda$ dipole
FREQUENCY	23 cm amateur band: 1240 – 1300 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 60$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Brass, weather- and shockproof plastics
CABLE	FME-cable to be ordered separately
COLOUR	Black

HEIGHT	Approx. 21 cm
WEIGHT	Approx. 70 g
MOUNTING	"Clip-on" mounting on the side-window
SIDE WINDOW THICKNESS	Max. 4 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.





## SF 1802

### 2 dB Mobile Sidefix® Antenna for the 1800 MHz Band

- Elevated-feed skirt-dipole in a shroud of flexible and environment-proof plastics.
- 2 dB gain compared to a standard  $1/4 \lambda$  roof mount antenna.

## DESCRIPTION

- Groundplane independent due to half-wave design.
- For temporary antenna installations.
- Mounting on side-windows using a simple “clip-on” procedure.
- Provided with FME-connection (cable to be ordered separately).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
SF 1802	

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 1802
ANTENNA TYPE	Elevated-feed $1/2 \lambda$ dipole
FREQUENCY	1800 MHz-band (1700 - 2000 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 120 \text{ MHz @ SWR} \leq 1.5$ $\geq 300 \text{ MHz @ SWR} \leq 2.0$
SWR	$\leq 1.1 \text{ @ f.res.}$
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Brass, environment-proof plastics
CABLE	FME-cable to be ordered separately
COLOUR	Black

HEIGHT	Approx. 19 cm
WEIGHT	Approx. 60 g
MOUNTING	"Clip-on" mounting on the side-window

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME.TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.



## SF 160/...

### 2 dB Mobile Sidefix® Antenna for the 1800 MHz Band

- End-fed half-wave dipole with a black-chromed, conical stainless steel whip.
- 2 dB gain compared to a standard  $\frac{1}{4} \lambda$  roof mount antenna.

## DESCRIPTION

- Groundplane independent due to half-wave design.
- For temporary antenna installations.
- Mounting on side-windows using a simple “clip-on” procedure.
- Provided with FME-connector (male).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY
SF 160/l	130000700	144 - 160 MHz
SF 160/m	130000702	155 - 170 MHz
SF 160/h	130000701	160 - 175 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	SF 160/...
ANTENNA TYPE	End-fed $\frac{1}{2} \lambda$ dipole mobile antenna
FREQUENCY	144 - 175 MHz covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel

	Black-chromed brass Mount: Weather- and shockproof plastics Black-chromed brass
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 960 mm
WEIGHT	Approx. 140 g
MOUNTING	"Clip-on" mounting on the side-window
SIDE WINDOW THICKNESS	Max. 4 mm

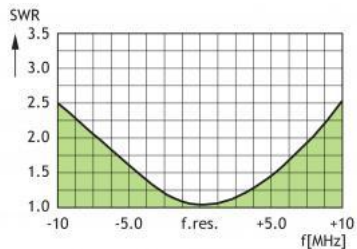
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC

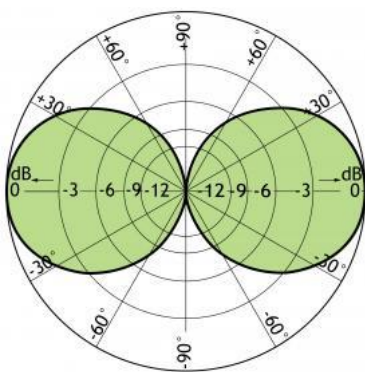
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## TYPICAL SWR CURVES



## TYPICAL RADIATION PATTERN (E-PLANE)





## NM-Mount - NanoMag

### Ultra-Small Magnetic Mount for Mobile Antenna Whips

- Ultra-small magnetic mount for specially designed low-weight antenna whips.
- Very high magnet power compared to size of mount.

- M3-thread whip-fastening system.
- Permanently attached 3 m RG 174 cable terminated with FME-connector.
- Whips available for the 450 MHz, 900 MHz and 1800 MHz bands.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
NM-Mount - NanoMag	130000343

## ORDERING

Generally	Order this magnetic base by simply asking for NM-Mount.
For complete antennas	Please see "MU 1-NM/...", "900 MHz NM-Series", and "MU 1804-NM".

## SPECIFICATIONS

MODEL	NM-Mount - NanoMag
APPLICATION	Magnetic mount for specially designed mobile antennas
FREQUENCY	450 MHz, 900 MHz and 1800 MHz bands
MATERIALS	Cu-nite brass Environment-proof plastics
CONNECTION TO WHIP	M3 thread stud
CABLE	3 m RG 174 (permanently attached)
CONNECTOR	FME-system
COLOUR	Black
WEIGHT	Approx. 56 G
DIMENSIONS	Total height: Approx. 24 mm Diameter: 27 mm
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	MU 1-NM, MU 901-NM: 120 km/h MU 904-NM, MU 1804-NM: 100 km/h

Procom A/S reserve the right to amend specifications without prior notice.



## MZG-Mount

### Magnetic Base for Mobile Antennas



- Heavy-duty magnetic mount with thread stud for "ZG"-type antenna whips.
- Provided with FME connecting system (FME-cable must be ordered separately).

- Can be used at: 27 – 400 MHz using standard whips and at: 400 – 470 MHz using specially accommodated whips.
- Extraordinarily high attaching power: takes up to 1.6 m long whips.
- Silicone layer on contact surface protects the car roof and ensures maximum friction.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MZG-Mount	130000358
ORDERING	
Generally:	Order this magnetic base by simply asking for MZG-Mount. (FME-cable and FME-connector are ordered separately).
Complete antennas within 27-400 MHz	The whip and the MZG-Mount are ordered separately. All whips available in normal ZG-mount version also fit the MZG-Mount. Whips are tuned with an SWR-meter using the ZG-version cutting diagrams as a guide.
Complete antennas within 400-470 MHz	The whip and the MZG-Mount are ordered together by coding MZG-Mount into the antenna designation as e.g. MU 4-MZG/h. Please consult the ZG-mount leaflet for the particular whip type in question to check if the whip is available with MZG-Mount.

### FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069



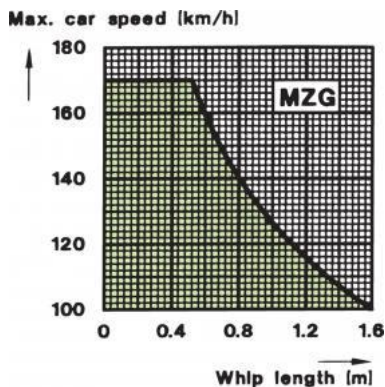
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P Prolongation	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

Or further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## SPECIFICATIONS

MODEL	MZG-Mount
APPLICATION	Magnetic mount for "ZG"-typemobile antenna whips
FREQUENCY	27 - 400 MHz using standard whips 400 - 470 MHz using special "MZG"-whips
MATERIALS	Stainless steel Bright or black chromed brass Environment-proof plastics
CONNECTION TO WHIP	M8 x 1 thread stud
CONNECTOR	FME-system
COLOUR	Black
WEIGHT	Approx. 0.9 kg
DIMENSIONS	Total height: Approx. 48 mm Diameter: 130 mm
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	Depending on whip height. See curve below

## CURVE



## USING THE MZG-Mount

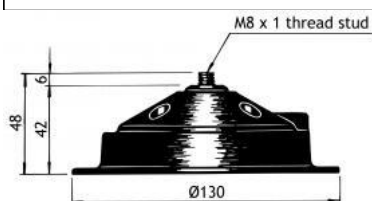
This magnetic mount is used to make an occasional antenna installation where it is not desirable to drill holes in the mobile unit. A magnetic mount antenna can advantageously serve several mobile units by shifting it from one unit to another. The MZG-Mount is provided with a large-diameter, thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect. The further extension of the supporting surface beyond the magnet area makes this mount stand for astounding values of bending moment and mechanical shock. The low profile of the MZG-Mount ensures low wind load. A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction. The MZG-Mount is provided with a M8 x 1 thread mount fitting the Procom "ZG"-type antenna whips.

## INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to produce best omnidirectional coverage.

### TUNING

Below 400 MHz	Use the cutting diagram for the corresponding ZG-mount model using the same type of whip as a guideline using an SWR-meter to tune the whip.
Above 400 MHz	Whips tuned by cutting: Use an SWR-meter. Whips tuned with disc: Adjustment diagram accompanies the antenna.





## MU 911-ZG/...

### Collinear 4 dB Mobile Antenna for the 900 MHz Band

- Encapsulated phasing coil.
- Black-chromed stainless steel whip.
- 3 models, type "l", "m" and "h" cover band segments suiting the most common 900 MHz CELLULAR networks such as EAMPS, ETACS, NMT-900 and EGSM.

- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 911-ZG/l	130001248	824 - 894 MHz (EAMPS)	ZG-mount with FME
MU 911-ZG/m	130001250	872 - 950 MHz (ETACS)	
MU 911-ZG/h	130001246	880 - 960 MHz (EGSM&NMT-900)	
MU 911-ZGP4/l	130001249	824 - 894 MHz (EAMPS)	ZGP4-mount with 4 m cable and FME-connector
MU 911-ZGP4/m	130001251	872 - 950 MHz (ETACS)	
MU 911-ZGP4/h	130001247	880 - 960 MHz (EGSM&NMT-900)	

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 911-ZG/...
ANTENNA TYPE	Colinear mobile antenna
FREQUENCY	900 MHz-band covered by three models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)

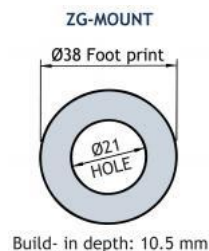
BANDWIDTH	$\geq 50 \text{ MHz @ SWR} \leq 1.5$ $\geq 90 \text{ MHz @ SWR} \leq 2.0$
SWR	$\leq 1.3 \text{ @ f. res.}$
MAX. POWER	60 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Stainless steel and brass, black-chromed Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1 \text{ Nm}$
COLOUR	Black
HEIGHT	Approx. 35 cm
WEIGHT	ZG-version: Approx. 110 g ZGP4-version: Approx. 250 g
MOUNTING	21 mm dia. hole

## INSTALLATION

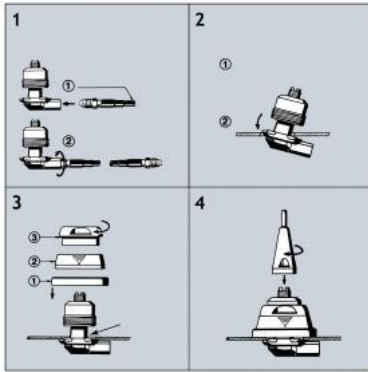


This antenna should always be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole. The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip. When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. Tuning

The antenna is delivered factory-tuned and requires no further tuning.



## MU 911-X/...

### Colinear 4 dB Mobile Antenna for the 900 MHz Band

- Encapsulated phasing coil.
- Black-chromed stainless steel whip.
- 3 models, type "l", "m" and "h", cover band segments suiting the most common 900 MHz CELLULAR networks such as EAMPS, ETACS, NMT-900 and EGSM.

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 911-X/l	130001238	824 - 894 MHz (EAMPS)	X-mount (oblong) with FME-system
MU 911-X/m	130001242	872 - 950 MHz (ETACS)	
MU 911-X/h	130001508	880 - 960 MHz (EGSM & NMT-900)	
MU 911-CX/l	130001239	824 - 894 MHz (EAMPS)	CX-mount (circular) with FME-system
MU 911-CX/m	130001243	872 - 950 MHz (ETACS)	
MU 911-CX/h	130001233	880 - 960 MHz (EGSM & NMT-900)	
MU 911-XP4/l	130001240	824 - 894 MHz (EAMPS)	XP4-mount (oblong) with 4 m cable + FME-connector
MU 911-XP4/m	130001244	872 - 950 MHz (ETACS)	
MU 911-XP4/h	130001234	880 - 960 MHz (EGSM & NMT-900)	
MU 911-CXP4/l	130001241	824 - 894 MHz (EAMPS)	CXP4-mount (circular) with 4 m cable + FME-connector
MU 911-CXP4/m	130001245	872 - 950 MHz (ETACS)	
MU 911-CXP4/h	130001235	880 - 960 MHz (EGSM & NMT-900)	

MU 911-MM/l	130001509	824 - 894 MHz (EAMPS)	MM-mount (magnetic) with FME-system
MU 91-MM/m	130001510	872 - 950 MHz (ETACS)	
MU 911-MM/h	130001511	880 - 960 MHz (EGSM & NMT-900)	

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 911-X/...
ANTENNA TYPE	Collinear mobile antenna
FREQUENCY	900 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 1.5$ $\geq 90$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and brass, black-chromed Durable plastics Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 32 cm
WEIGHT	X-version: Approx. 80 g XP4-version: Approx. 220 g MM-version: Approx. 280 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna should be mounted in the car roof to ensure best omnidirectional coverage. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

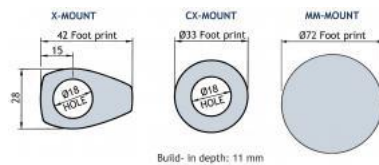
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner. As the X- and CX-mounts are internally equipped with a bendable section, the

antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

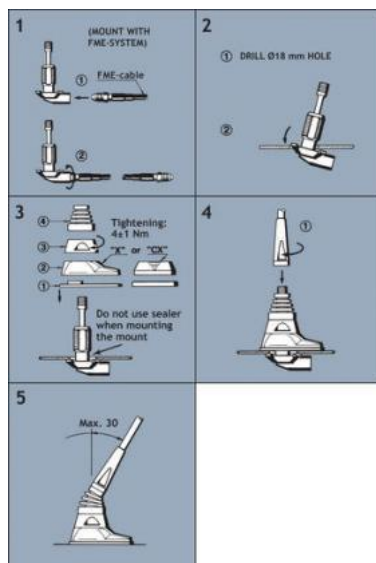
The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

Antennas with magnetic mount should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

#### For safety reasons

1. When using the MU 911-MM/..., car speed must not exceed 140 km/h.
2. If operating the MM-mount with other whips, whip length must never exceed 60 cm, and utilizing this maximum length, car speed must not exceed 115 km/h.





## MU 911-LX/...

### Collinear 4 dB Mobile Antenna for the 900 MHz Band

- 4 dB mobile antenna with encapsulated phasing coil.
- Black-chromed stainless steel whip.
- Models available for the most common 900 MHz cellular networks.

- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY RANGE
MU 911-LX/l	130001237	824 – 894 MHz (EAMPS)
MU 911-LX/m	130001512	870 – 950 MHz (ETACS)
MU 911-LX/h	130001236	880 – 960 MHz (EGSM & NMT-900)

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 911-LX/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	900 MHz band covered by three models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 40 @ SWR ≤ 1.5 ≥ 80 @ SWR ≤ 2.0
SWR	≤ 1.3 @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and black-chromed brass

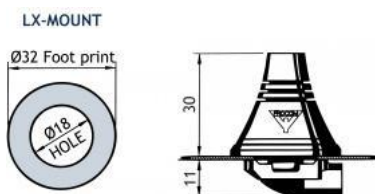
	Durable plastics Mount: Stainless steel Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 300 mm
WEIGHT	Approx. 58 g
MOUNTING	18 mm dia. hole

## INSTALLATION

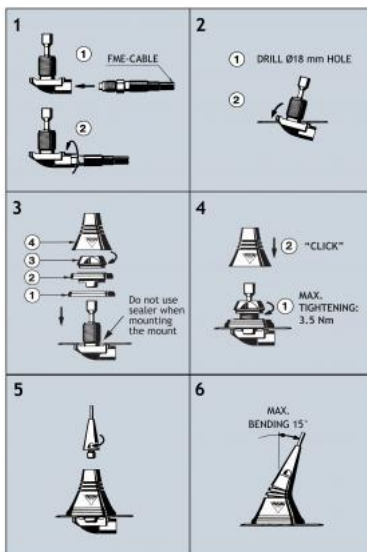
The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



### 2. PLEASE NOTE

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## MU 909-XP4/...

### 900 MHz 2 dB Mobile Antenna for Glassfiber Roof

- Groundplane independent antenna for installation on non-conducting surfaces.
- Ideal for glassfiber roofs as can be found on some trucks, busses, transport vans and trains.
- MU 909-XP4/I can be tuned by cutting within: 820 – 890 MHz.

- MU 909-XP4/h can be tuned by cutting within: 870 – 940 MHz.
- M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with oblong or circular mount.
- Delivered with permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY/ CELLULAR SYSTEM	MOUNT
FIELD TUNABLE MODELS			
MU 909-XP4/I	130001227	820...890 MHz	Oblong mount with 4 m cable + FME-connector
MU 909-XP4/h	130001222	870...940 MHz	Same mount as above
MU 909-CXP4/I	130001228	820...890 MHz	Circular mount with 4 m cable + FME-connector
MU 909-CXP4/h	130001223	870...940 MHz	Same mount as above
READY-TUNED MODELS (examples)			
MU 909-XP4/h, EGSM		EGSM	Oblong mount with 4 m cable + FME-connector
MU 909-XP4/h, ETACS		ETACS, USA	Same mount as above
MU 909-XP4/h, EAMPS		EAMPS, USA	Same mount as above
MU 909-CXP4/h, EGSM		EGSM	Circular mount with 4 m cable + FME-connector
MU 909-CXP4/h, ETACS		ETACS, USA	Same mount as above
MU 909-CXP4/h, EAMPS		EAMPS, USA	Same mount as above

The MU 909-XP4/... is delivered in two field tunable models but may also be delivered readytuned for CELLULAR systems. When ordering a ready-tuned model, the name of the desired CELLULAR system must be added to the antenna model number.

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 909-XP4/...
ANTENNA TYPE	End-fed $\frac{1}{2} \lambda$ mobile whip antenna
FREQUENCY	820...940 MHz - covered by two models
IMPEDANCE	Nom. 50 $\Omega$
POLAZISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 25$ MHz @ SWR $\leq 1.5$ $\geq 50$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Polyethylene-covered spring steel wire Mount: Black-chromed brass Weather- and shockproof plastics Surface treated steel
RECOMMENDED INSTALLATION TORQUE	Max. 3 Nm
CABLE	4 m cable terminated with FME-connector
COLOUR	Black
HEIGHT	Approx. 26 cm
WEIGHT	Approx. 200 g
MOUNTING	From outside: 21 mm dia. hole From inside: 14 mm dia. hole
ROOF THICKNESS	0.6 → 5.0 mm

Please note that the MU 909-XP4 type "l"- and "h"-mounts contain matching transformers. Consequently, these special mounts cannot operate with other whip types.

## INSTALLATION

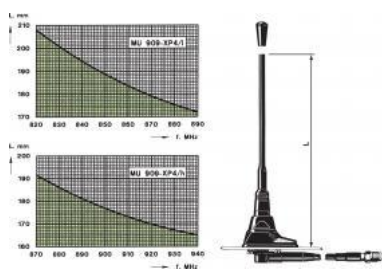
This antenna is especially designed for installation on non-conducting surfaces as e.g. glassfiber roofs, as can be found on some trucks, busses, transport vans and trains. The antenna is an end-fed,  $\frac{1}{2} \lambda$ -dipole concept which can be fed in such a way that the antenna does not require a "groundplane" as required by the standard  $\frac{1}{4} \lambda$ ,  $\frac{5}{8} \lambda$  or collinear mobile whips. It is useful to note that this antenna type can be used anywhere, where the ground-plane is poor or completely missing, as e.g.: side-mounted on a clamp as a pager antenna on a wall, or mounted at the very edge of a ground-plane without the loss induced by a tilted radiation pattern. The antenna must be mounted on a horizontal surface. When cleaning the vehicle in car-washing machines, the whip is easily dismounted using a spanner, size 9 mm. The whip is refitted again by screwing it onto the M6 thread stud on the mount and tightening it lightly with the spanner. A polyethylene-covered, closely spirally wound flat steel-band material causes the whip always to stand erect while at the same time being very flexible.

### 1. INSTALLATION DIMENSIONS:

### 2. INSTALLATION STEPS:

Do not use sealer on rubber gasket or other places.

### 3. TUNING:



The antenna should always be tuned using an SWR-indicating device. The cutting diagrams below serve as a guide for this procedure.



## MU 908-X/...

### Colinear 6 dB Antenna for 900 MHz CELLULAR Networks

- New whip design for optimum wind noise reduction.
- Black, conical glassfiber whip with shock spring.
- Models available for the most common 900 MHz cellular networks.

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 908-X/l	130001496	824 - 894 MHz (EAMPS)	X-mount (oblong) with FME-system
MU 908-X/m	130001497	872 - 950 MHz (ETACS)	
MU 908-X/h	130001498	880 - 960 MHz (EGSM & NMT-900)	
MU 908-CX/l	130001220	824 - 894 MHz (EAMPS)	CX-mount (circular) with FME-system
MU 908-CX/m	130001501	872 - 950 MHz (ETACS)	
MU 908-CX/h	130001221	880 - 960 MHz (EGSM & NMT-900)	
MU 908-XP4/l	130001420	824 - 894 MHz (EAMPS)	XP4-mount (oblong) with 4 m cable + FME-system
MU 908-XP4/m	130001499	872 - 950 MHz (ETACS)	
MU 908-XP4/h	130001500	880 - 960 MHz (EGSM & NMT-900)	
MU 908-CXP4/l	130001502	824 - 894 MHz (EAMPS)	CXP4-mount (circular) with 4 m cable + FME-system
MU 908-CXP4/m	130001503	872 - 950 MHz (ETACS)	
MU 908-CXP4/h	130001504	880 - 960 MHz (EGSM & NMT-900)	

To help selecting the correct model for a specific cellular network please consult the survey of cellular network frequencies under USEFUL DATA in our catalogues.

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 908-X/...
ANTENNA TYPE	ColLinear mobile glassfiber whip antenna
FREQUENCY	Cellular networks operating within the range 824 - 960 MHz. See frequency segmentation below.
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	6 dB (TX-range), 4 dB (RX-range)
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Sturdy, conical black-lacquered glass fibre tube Black-chromed metal parts Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 65 cm (dep. on freq.)
WEIGHT	X-version: Approx. 120 g XP4-version: Approx. 260 g
MOUNTING	18 mm dia. hole

## INSTALLATION

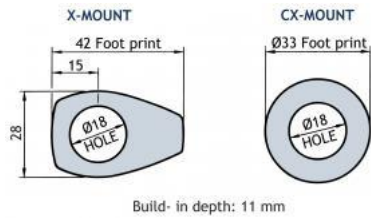
The shadowing effect of the car roof often produces deep nulls in the radiation pattern from short antennas mounted on trunk or wing. This problem is solved using the MU 908-X/...-antenna. Because of the colinear design this antenna provides a satisfactory omnidirectional gain even when mounted on trunk or wing. The X- and CX-mounts can be installed anywhere on the car.

The oblong X-mount is especially suitable for mounting on the often very narrow strip on the rear wing between the trunk lid and the side of the car. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

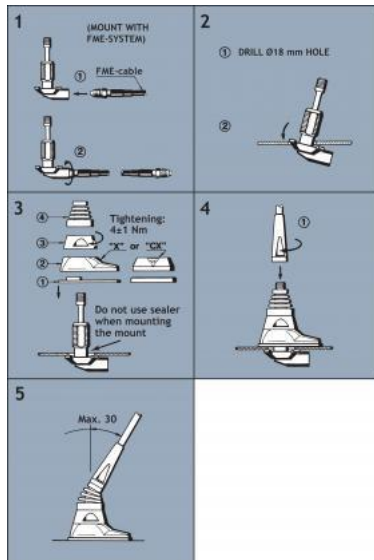
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner. As the mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

### 1. INSTALLATION DIMENSIONS:





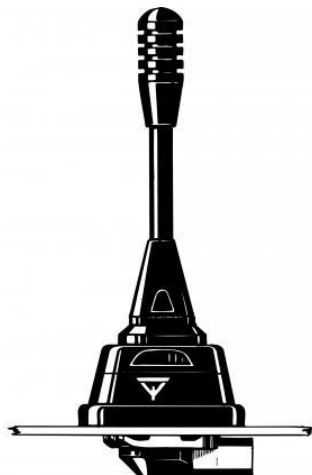
## 2. INSTALLATION STEPS:



Do not use sealer on rubber gasket or other places.

## 3. TUNING:

The antenna is delivered factory-tuned and requires no further tuning.



## MU 907-ZG/...

### Unity Gain $1/4 \lambda$ Mobile Antenna for the 900 MHz Band

- Silicone covered flexible steel wire whip.
- Type MU 907-ZG/l covers 820 – 905 MHz (e.g. for EAMPS).
- Type MU 907-ZG/h covers 870 – 960 MHz (e.g. for ETACS, NMT-900 and EGSM).

- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 907-ZG/l	130001218	820 - 905 MHz	ZG-mount with FME
MU 907-ZG/h	130001216	870 - 960 MHz	Same mount as above
MU 907-ZGP4/l	130001219	820 - 905 MHz	ZGP4-mount with 4 m cable and FME-connector
MU 907-ZGP4/h	130001217	870 - 960 MHz	Same mount as above

## SPECIFICATIONS

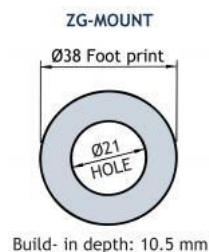
ELECTRICAL	
MODEL	MU 907-ZG/...
ANTENNA TYPE	$1/4 \lambda$ mobile antenna
FREQUENCY	900 MHz-band covered by two models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 80$ MHz @ SWR $\leq 1.5$ $\geq 170$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	60 W

MECHANICAL	
MATERIALS	Whip: Steel wire covered with silicone tubing Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 91 mm
WEIGHT	ZG-version: Approx. 90 g ZGP4-version: Approx. 230 g
MOUNTING	21 mm dia. hole

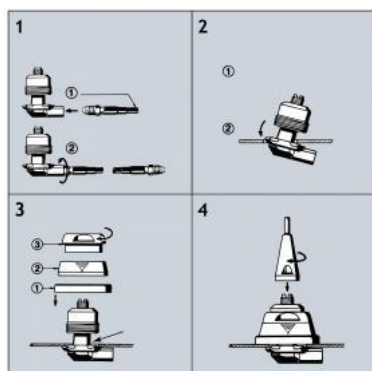
## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole. The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip. When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS:



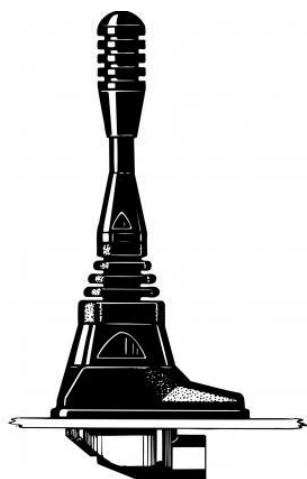
### 2. INSTALLATION STEPS:



Do not use sealer on rubber gasket or other places.

### 3. TUNING:

The antenna is delivered factory-tuned and requires no further tuning.



## MU 907-X/...

### Unity Gain $\frac{1}{4}$ $\lambda$ Mobile Antenna for the 900 MHz Band

- Silicone covered flexible steel wire whip.
- Type MU 907-X/l covers 820 – 905 MHz (e.g. for EAMPS).
- Type MU 907-X/h covers 870 – 960 MHz (e.g. for ETACS, NMT-900 and EGSM).

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 907-X/l	130001210	820 - 905 MHz	X-mount (oblong) with FME-system
MU 907-X/h	130001206	870 - 960 MHz	Same mount as above
MU 907-CX/l	130001211	820 - 905 MHz	CX-mount (circular) with FME-system
MU 907-CX/h	130001207	870 - 960 MHz	Same mount as above
MU 907-XP4/l	130001212	820 - 905 MHz	XP4-mount (oblong) with 4 m cable + FME-system
MU 907-XP4/h	130001208	870 - 960 MHz	Same mount as above
MU 907-CXP4/l	130001213	820 - 905 MHz	CXP4-mount (circular) with 4 m cable + FME-system
MU 907-CXP4/h	130001209	870 - 960 MHz	Same mount as above
MU 907-MM/l	130001214	820 - 905 MHz	MM-mount (magnetic) with FME-system
MU 907-MM/h	130001215	870 - 960 MHz	Same mount as above

## SPECIFICATIONS

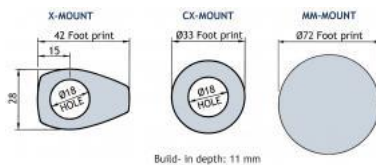
ELECTRICAL	
MODEL	MU 907-X...
ANTENNA TYPE	$\frac{1}{4}$ $\lambda$ mobile antenna

FREQUENCY	900 MHz-band covered by two models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 100 MHz @ SWR $\leq$ 1.5 > 180 MHz @ SWR $\leq$ 2.0
SWR	$\leq$ 1.2 @ f. res.
MAX. POWER	60 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Steel wire covered with silicone tubing Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 84 mm
WEIGHT	X-version: Approx. 55 g XP4-version: Approx. 195 g MM-version: Approx. 270 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter. When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner. The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS:



### 2. INSTALLATION STEPS:

Do not use sealer on rubber gasket or other places.

### 3. TUNING:

The antenna is delivered factory-tuned and requires no further tuning.

PLEASE NOTE

For safety reasons When using the MU 907-MM/..., car speed must not exceed 140 km/h.

If operating the MM-mount with other whips, whip length must never exceed 320 mm, and utilizing this maximum length, car speed must not exceed 115 km/h.



## MU 906-X/...

### Collinear 6 dB Mobile Antenna for the 900 MHz Band

- 6 dB omnidirectional gain when mounted on the car roof.
- Rear wing mounting possible with only minor reduction of gain.
- 3 models, type "l", "m" and "h", cover band segments suiting the most common 900 MHz CELLULAR networks such as EAMPS, ETACS, NMT-900 and EGSM.

- Excellent for use together with a diplexer (type LH 108/136) for combined car radio broadcast reception and 900 MHz transceiving.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 906-X/l	130001191	824 - 894 MHz (EAMPS)	X-mount (oblong) with FME-system
MU 906-X/m	130001195	872 - 950 MHz (ETACS)	
MU 906-X/h	130001187	880 - 960 MHz (EGSM&NMT-900)	
MU 906-CX/l	130001192	824 - 894 MHz (EAMPS)	CX-mount (circular) with FME-system
MU 906-CX/m	130001196	872 - 950 MHz (ETACS)	
MU 906-CX/h	130001188	880 - 960 MHz (EGSM&NMT-900)	
MU 906-XP4/l	130001193	824 - 894 MHz (EAMPS)	XP4-mount (oblong) with 4 m cable + FME-connector
MU 906-XP4/m	130001197	872 - 950 MHz (ETACS)	
MU 906-XP4/h	130001189	880 - 960 MHz (EGSM&NMT-900)	
MU 906-CXP4/l	130001194	824 - 894 MHz (EAMPS)	CXP4-mount (circular) with 4 m cable + FME-connector
MU 906-CXP4/m	130001198	872 - 950 MHz (ETACS)	
MU 906-CXP4/h	130001190	880 - 960 MHz (EGSM&NMT-900)	

## SPECIFICATIONS

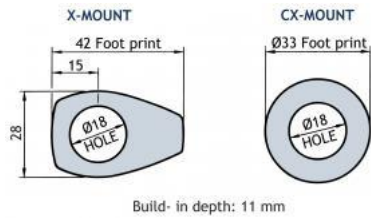
ELECTRICAL	
MODEL	MU 906-X/...
ANTENNA TYPE	Collinear mobile antenna
FREQUENCY	900 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	6 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 1.5$ $\geq 100$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 60 mm
WEIGHT	X-version: Approx. 100 g XP4-version: Approx. 240 g
MOUNTING	18 mm dia. hole

## INSTALLATION

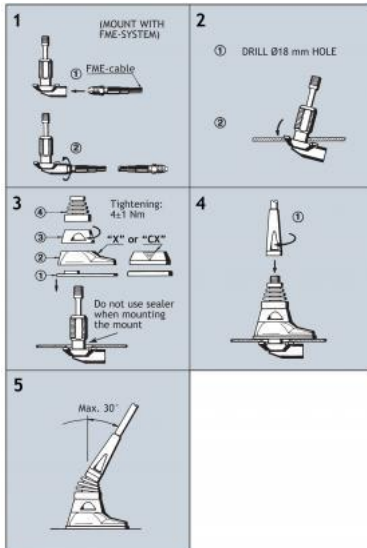
The shadowing effect of the car roof often produces deep nulls in the radiation pattern from short antennas mounted on trunk or wing. This problem is solved using the MU 906-X/... antenna. Because of the colinear design this antenna provides a satisfactory omnidirectional gain even when mounted on trunk or wing. The X- and CX-mounts can be installed anywhere on the car. The oblong X-mount is especially suitable for mounting on the often very narrow strip on the rear wing between the trunk lid and the side of the car. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter. When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner. As the mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

### 1. INSTALLATION DIMENSIONS





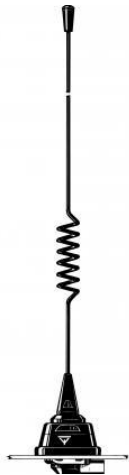
## 2. INSTALLATION STEPS



**Do not use sealer on rubber gasket or other places.**

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## MU 904-ZG/...

### Collinear 4 dB Mobile Antenna for the 900 MHz Band

- 4 dB mobile antenna with black-chromed, stainless steel whip.
- 3 models, type "l", "m" and "h", cover band segments suiting the most common 900 MHz CELLULAR networks such as EAMPS, ETACS, NMT-900 and EGSM.
- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.

- Simple mounting exclusively with access from the outside.
- Choice between two connection principles: ZG-mount: FME-connection (supplied without cable).
- ZGP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 904-ZG/l	130001182	824 - 894 MHz (EAMPS)	ZG-mount with FME
MU 904-ZG/m	130001185	872 - 950 MHz (ETACS)	
MU 904-ZG/h	130001180	880 - 960 MHz (EGSM&NMT-900)	
MU 904-ZGP4/l	130001184	824 - 894 MHz (EAMPS)	ZGP4-mount with 4 m cable and FME-connector
MU 904-ZGP4/m	130001186	872 - 950 MHz (ETACS)	
MU 904-ZGP4/h	130001181	880 - 960 MHz (EGSM&NMT-900)	

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 904-ZG/...
ANTENNA TYPE	Collinear mobile antenna
FREQUENCY	900 MHz-band covered by three models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 50 MHz @ SWR ≤ 1.5

	$\geq 100 \text{ MHz @ SWR} \leq 2.0$
SWR	$\leq 1.3 \text{ @ f. res.}$
MAX. POWER	60 W
MATERIALS	Whip: Stainless steel and brass, black-chromed Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1 \text{ Nm}$
COLOUR	Black
HEIGHT	Approx. 32 cm
WEIGHT	ZG-version: Approx. 100 g ZGP4-version: Approx. 240 g
MOUNTING	21 mm dia. hole

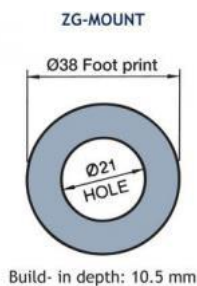
## INSTALLATION

This antenna should always be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole.

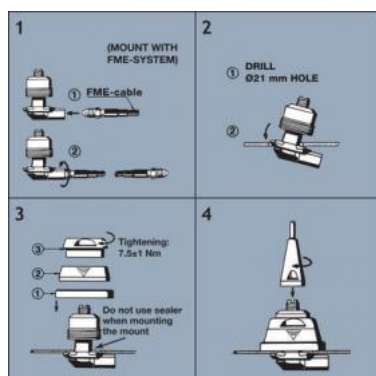
The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## MU 904-X/...

### Collinear 4 dB Mobile Antenna for the 900 MHz Band

- 4 dB mobile antenna with black-chromed, stainless steel whip.
- 3 models, type "l", "m" and "h", cover band segments suiting the most common 900 MHz CELLULAR networks such as EAMPS, ETACS, NMT-900 and EGSM.
- Stainless steel X-mount with M6-thread whip-fastening system.

- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 904-X/l	130001167	824 - 894 MHz (EAMPS)	X-mount (oblong) with FME-system
MU 904-X/m	130001172	872 - 950 MHz (ETACS)	
MU 904-X/h	130001159	880 - 960 MHz (EGSM & NMT-900)	
MU 904-CX/l	130001168	824 - 894 MHz (EAMPS)	CX-mount (circular) with FME-system
MU 904-CX/m	130001173	872 - 950 MHz (ETACS)	
MU 904-CX/h	130001160	880 - 960 MHz (EGSM & NMT-900)	
MU 904-XP4/l	130001170	824 - 894 MHz (EAMPS)	XP4-mount (oblong) with 4 m cable + FME-connector
MU 904-XP4/m	130001175	872 - 950 MHz (ETACS)	
MU 904-XP4/h	130001161	880 - 960 MHz (EGSM & NMT-900)	
MU 904-CXP4/l	130001171	824 - 894 MHz (EAMPS)	CXP4-mount (circular) with 4 m cable + FME-connector
MU 904-CXP4/m	130001176	872 - 950 MHz (ETACS)	
MU 904-CXP4/h	130001162	880 - 960 MHz (EGSM & NMT-900)	
MU 904-MM/l	130001154	824 - 894 MHz (EAMPS)	MM-mount (magnetic) with FME-system

MU 904-MM/m	130001155	872 - 950 MHz (ETACS)	
MU 904-MM/h	130001153	880 - 960 MHz (EGSM & NMT-900)	

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 904-X/...
ANTENNA TYPE	Collinear mobile antenna
FREQUENCY	900 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 1.5$ $\geq 100$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and brass, black-chromed Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 35 cm
WEIGHT	X-version: Approx. 70 g XP4-version: Approx. 210 g MM-version: Approx. 320 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

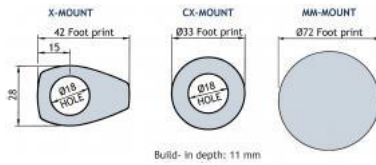
As the X- and CX-mounts are internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

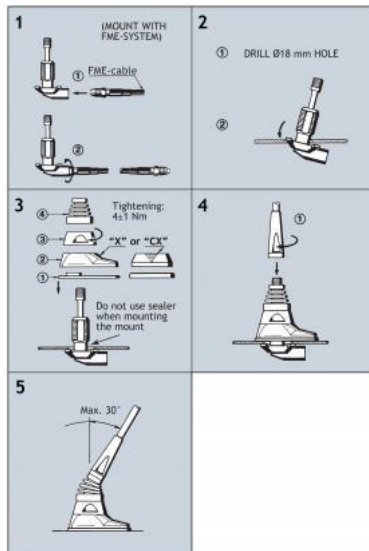
Antennas with magnetic mount should be mounted at the centre of the vehicle roof to ensure best omnidirectional

coverage.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

## PLEASE NOTE

### For safety reasons

When using the MU 904-MM/..., car speed must not exceed 150 km/h.

If operating the MM-mount with other whips, whip length must never exceed 320 mm, and utilizing this maximum length, car speed must not exceed 115 km/h.



## MU 904-LX/...

### Collinear 4 dB Mobile Antenna for the 900 MHz Band

- 4 dB mobile antenna with black-chromed, stainless steel whip.
- Models available for the most common 900 MHz cellular networks.
- Stainless steel LX-mount – professional quality in elegant and smooth design.

- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY RANGE
MU 904-LX/l	130001164	824 – 894 MHz (EAMPS)
MU 904-LX/m	130001165	870 – 950 MHz (ETACS)
MU 904-LX/h	130001166	880 – 960 MHz (EGSM & NMT-900)

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 904-LX/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	900 MHz band covered by three models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 40 @ SWR ≤ 1.5 ≥ 80 @ SWR ≤ 2.0
SWR	≤ 1.3 @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel Black-chromed brass



	Mount: Stainless steel Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 300 mm
WEIGHT	Approx. 48 g
MOUNTING	18 mm dia. hole

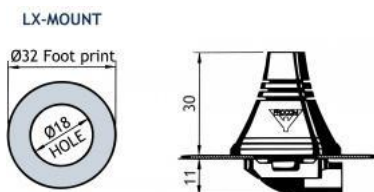
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

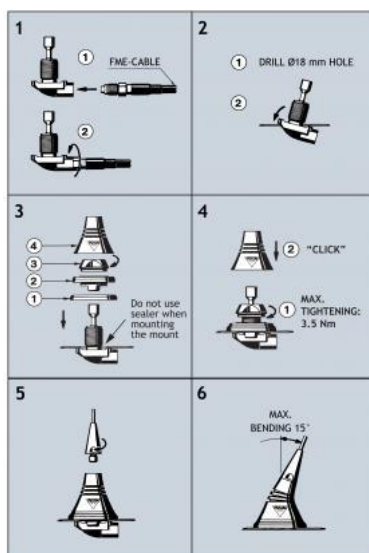
When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



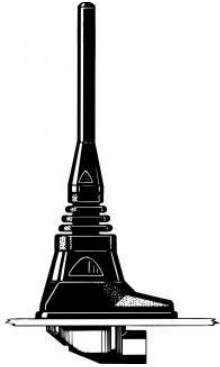
Do not use sealer on rubber gasket or other places.

### PLEASE NOTE

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position. Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

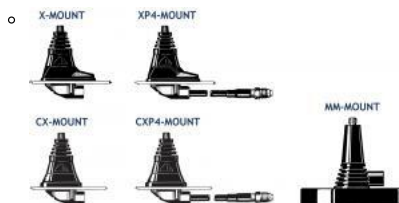


## MU 901-X/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 900 MHz Band

- Black-chromed whip with large bandwidth.
- Nice, discrete design.
- Type MU 901-X/I covers 820 - 905 MHz (e.g. for EAMPS).

- Type MU 901-X/h covers 870 - 960 MHz (e.g. for ETACS, NMT-900 and EGSM)
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low loss cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 901-X/I	130001149	820 - 905 MHz	X-mount (oblong) with FME-system
MU 901-X/h	130001142	870 - 960 MHz	Same mount as above
MU 901-CX/I	130001150	820 - 905 MHz	CX-mount (circular) with FME-system
MU 901-CX/h	130001143	870 - 960 MHz	Same mount as above
MU 901-XP4/I	130001151	820 - 905 MHz	XP4-mount (oblong) with 4 m cable + FME-system
MU 901-XP4/h	130001145	870 - 960 MHz	Same mount as above
MU 901-CXP4/I	130001152	820 - 905 MHz	CXP4-mount (circular) with 4 m cable + FME-system
MU 901-CXP4/h	130001146	870 - 960 MHz	Same mount as above
MU 901-MM/I	130001137	820 - 905 MHz	MM-mount (magnetic) with FME-system
MU 901-MM/h	130001138	870 - 960 MHz	Same mount as above

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 901-X...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	900 MHz-band covered by two models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 90 MHz @ SWR $\leq$ 1.5 > 180 MHz @ SWR $\leq$ 2.0
SWR	$\leq$ 1.2 @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Mount: Black-chromed brass Environment-proof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 82 mm
WEIGHT	X-version: Approx. 60 g XP4-version: Approx. 200 g MM-version: Approx. 270 g
MOUNTING	18 mm dia. hole

## INSTALLATION

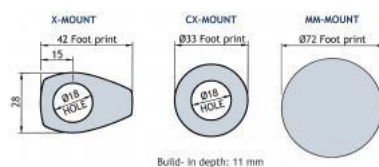
This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

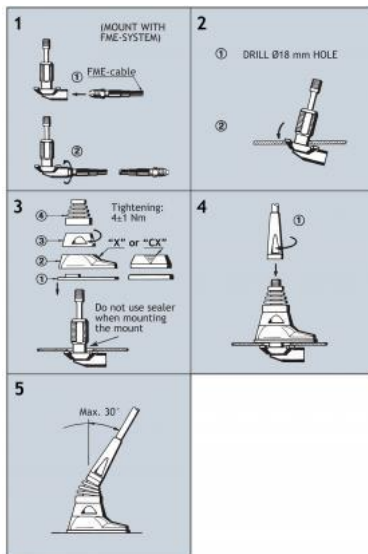
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

For safety reasons

When using the MU 901-MM/..., car speed must not exceed 140 km/h.

If operating the MM-mount with other whips, whip length must never exceed 320 mm, and utilizing this maximum length, car speed must not exceed 115 km/h.



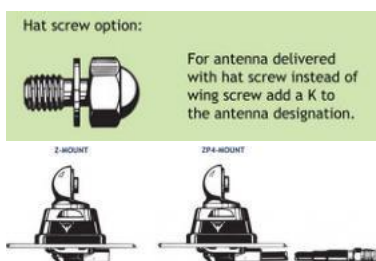
## MH 4-Z

### $\frac{1}{4} \lambda$ Mobile Rubber Antenna for the 160 MHz Band

- High-flexibility rubber whip with cast-in steel-wire radiating element.
- Ideal where the whip may be exposed to mechanical shock or severe deflection when driving under low objects.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
MH 4-Z	130000763	Z-mount with FME-system
MH 4-ZP4	130000766	ZP4-mount with 4 m cable and FME-connector

## SPECIFICATIONS

ELECTRICAL	
MODEL	MH 4-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical

GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	150 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Multicore steel wire moulded in elastomer Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 49 cm
WEIGHT	Z-version: Approx. 200 g ZP4-version: Approx. 350 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

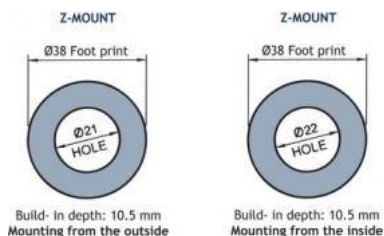
## INSTALLATION

This antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

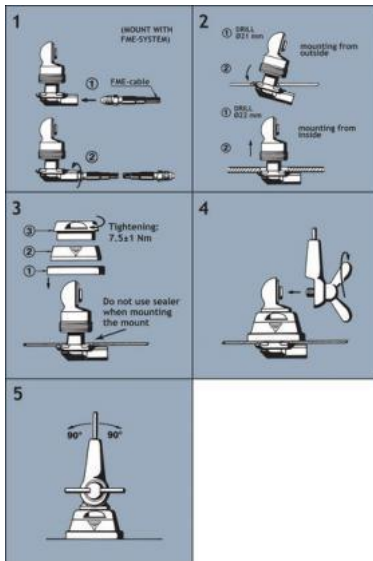
The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



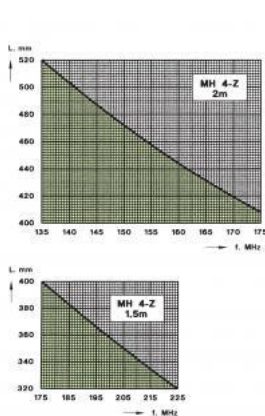
### 2. INSTALLATION STEPS



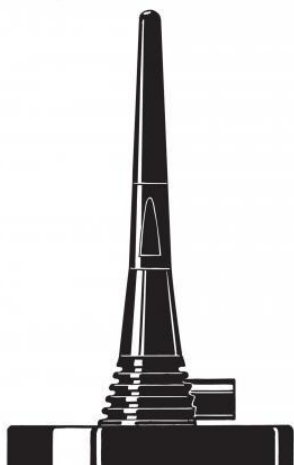
Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.







## MU 901/1801/UMTS-MMS

Magnetic Mount, Triple-frequency Mobile Antenna for the 900 MHz and UMTS Bands

- Triple-frequency antenna - three bands - one antenna!
- Covering both EGSM/NMT-900, DCS-1800/PCN and UMTS.

### DESCRIPTION

- For direct use with:
  - an EGSM/DCS-1800/PCN mobile phone (single or dual-band) or
  - an EGSM and a DCS-1800/PCN mobile phone or UMTS-terminal (requires diplexer, type DIPX 1000/1550).
- Stainless steel MMS-mount.
- Low profile magnetic mount.
- Provided with FME-connection (supplied without cable).

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 901/1801/UMTS-MMS	130001253

### SPECIFICATIONS

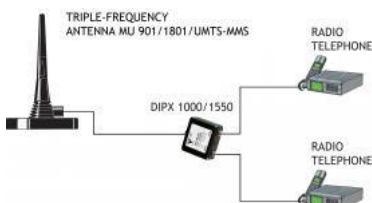
ELECTRICAL	
MODEL	MU 901/1801/UMTS-MMS
ANTENNA TYPE	Tripple-frequency mobile antenna
FREQUENCY	880-960 MHz (EGSM/NMT-900) 1710-1880 MHz (DCS-1800/PCN) and 1900-2200 MHz (UMTS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB on all bands (acc. to EIA RS-329-1)
BAND WIDTH	900 MHz: > 40 MHz @ SWR $\leq$ 1.5 1800 MHz: Approx. 200 MHz @ SWR $\leq$ 2.0 (typ.) 1900-2200 MHz @ SWR $\leq$ 2.0 (typ.)
SWR	$\leq$ 2.0 on transmitter frequencies
MAX. POWER	25 W
MECHANICAL	

MATERIALS	Whip: Black cover POM Black-chromed brass Mount: Stainless steel Brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 115 mm
WEIGHT	Approx. 300 g
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	180 km/h

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

## COUPLING DIAGRAM

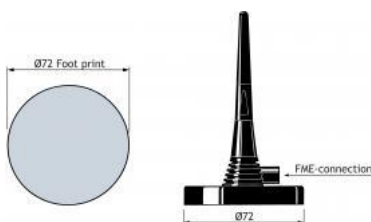


## INSTALLATION

The MU 901/1801/UMTS-MMS should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage. The MiniMag (MMS) magnetic mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MiniMag (MMS) is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

## 1. INSTALLATION DIMENSIONS



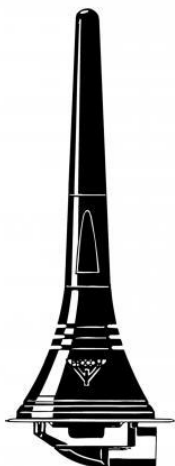
## 2. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

**PLEASE NOTE**

**For safety reasons:**

When using the MU 901/1801/UMTS-MMS, car speed must not exceed 180 km/h.



## MU 901/1801/UMTS-LX

Triple-frequency Mobile Antenna for the 900 MHz, 1800 MHz and UMTS BAnds

- Tripple-frequency antenna - three bands - one antenna!
- Covering both EGSM/NMT-900, DCS-1800/PCN and UMTS.

### DESCRIPTION

- For direct use with:
  - an EGSM/DCS-1800/PCN mobile phone (single or dual-band)
  - or
  - an EGSM and a DCS-1800/PCN mobile phone or UMTS-terminal (requires diplexer, type DIPX 1000/1550).
- Stainless steel LX-mount.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 901/1801/UMTS-LX	130001252

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 901/1801/UMTS-LX
ANTENNA TYPE	Tripple-frequency mobile antenna
FREQUENCY	880-960 MHz (EGSM/NMT-900) 1710-1880 MHz (DCS-1800/PCN) and 1900-2200 MHz (UMTS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB on all bands (acc. to EIA RS-329-1)
BAND WIDTH	900 MHz: > 40 MHz @ SWR $\leq$ 1.5 1800 MHz: Approx. 200 MHz @ SWR $\leq$ 2.0 (typ.) 1900-2200 MHz @ SWR $\leq$ 2.0 (typ.)
SWR	$\leq$ 2.0 on transmitter frequencies
MAX. POWER	25 W

MECHANICAL	
MATERIALS	Whip: Black cover POM Black-chromed brass Mount: Stainless steel Brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	93 mm
WEIGHT	Approx. 33 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

## COUPLING DIAGRAM

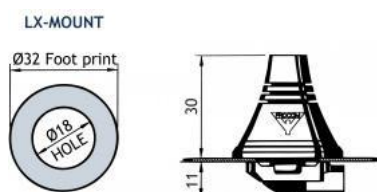


## INSTALLATION

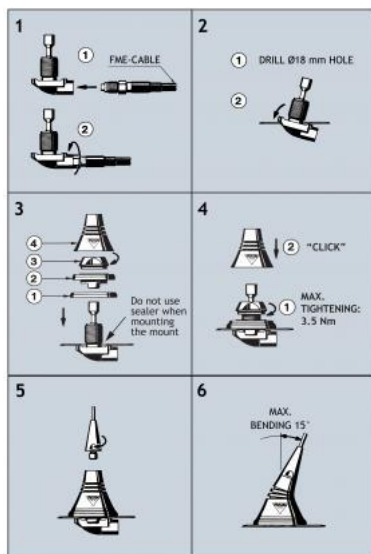
The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## MH 3-Z

### $\frac{5}{8} \lambda$ Mobile Antenna with Shock Spring for the 160 MHz Band

- Sturdy, 3 dB gain,  $\frac{5}{8} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  - MH 3-Z...: Bright version
  - MH 3-BZ...: Black version
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE WHIP Stainless steel	PRODUCT NO.	TYPE WHIP Glass fiber	PRODUCT NO.	MOUNT VERSION
MH 3-ZR	130000751	MH 3-Z	130000743	Z-mount with FME-system BRIGHT
MH 3-BZR	130000758	MH 3-BZ	130000747	BZ-mount with FME-system BLACK
MH 3-ZP4R	130000753	MH 3-ZP4	130000745	ZP4-mount with 4 m cable + FME-connector BRIGHT
MH 3-BZP4R	130000752	MH 3-BZP4	130000746	BZP4-mount with 4 m cable + FME-connector BLACK

## SPECIFICATIONS

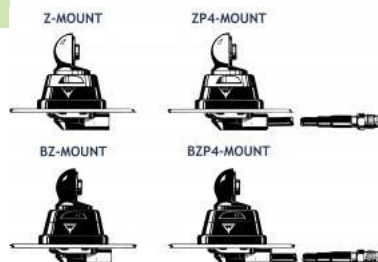
ELECTRICAL	
MODEL	MH 3-Z
ANTENNA TYPE	$\frac{5}{8} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz

IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	4 - 5 MHz @ SWR $\leq$ 2.0
SWR	$\leq$ 1.3 @ f.res.
MAX. POWER	150 W
<b>MECHANICAL</b>	
MATERIALS	<b>Whip:</b> Conical glass fiber or stainless steel Chromed brass <b>Spring:</b> Stainless steel <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright or black, see above
HEIGHT	Approx. 1.38 m
WEIGHT	Z-version: Approx. 360 g ZP4-version: Approx. 510 g
MOUNTING	$\varnothing$ 21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing$ 22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.



## INSTALLATION

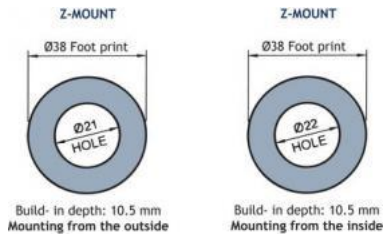
This antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

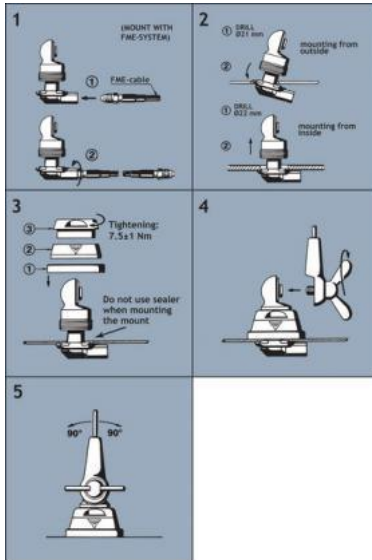
However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS





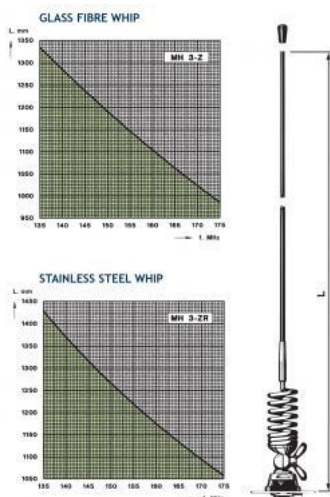
## 2. INSTALLATION STEPS

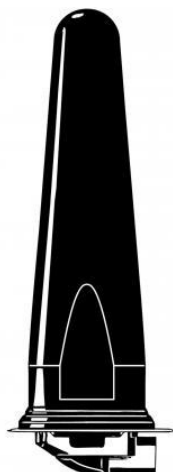


Do not use sealer on rubber gasket or other places.

## 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.





## MU 901/1801-LX-SP

### Dual-frequency Mobile Antenna for the 900 MHz and 1800 MHz Bands

- Dual-frequency antenna - two bands - one antenna!
- Covering both EGSM/NMT-900 and DCS-1800/PCN.

- For direct use with:
  - an EGSM/DCS-1800/PCN mobile phone (single or dual-band)
  - or
  - an EGSM and a DCS-1800/PCN mobile phone (requires diplexer, type DIPX 1000/1550).
- Stainless steel LX-mount.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 901/1801-LX-SP	130001343

## SPECIFICATIONS

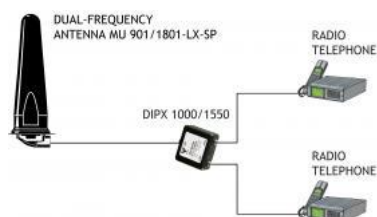
ELECTRICAL	
MODEL	MU 901/1801-LX-SP
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	880-960 MHz (EGSM/NMT-900) and 1710-1880 MHz (DCS-1800/PCN)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB on both bands (acc. to EIA RS-329-1)
BANDWIDTH	900 MHz: > 40 MHz @ SWR $\leq$ 1.5 1800 MHz: Approx. 200 MHz @ SWR $\leq$ 2.0 (typ.)
SWR	$\leq$ 2.0 @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black cover POM

	Mount:  Stainless steel  Brass  Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	100 mm
WEIGHT	Approx. 64 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

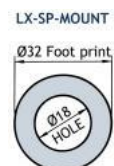
## COUPLING DIAGRAM



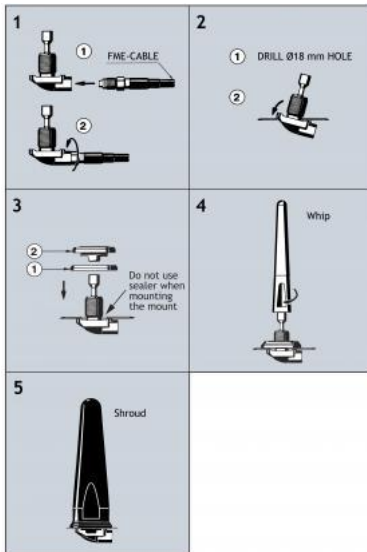
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

### 1. INSTALLATION DIMENSIONS:



### 2. INSTALLATION STEPS:

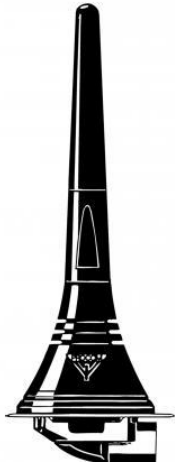


Do not use sealer on rubber gasket or other places.

PLEASE NOTE: When tightening the whip (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING:

The antenna is delivered factory-tuned and requires no further tuning



## MU 901/1801-LX

### Dual-frequency Mobile Antenna for the 900 MHz and 1800 MHz Bands

- Dual-frequency antenna - two bands - one antenna!
- Covering both EGSM/NMT-900 and DCS-1800/PCN.

## DESCRIPTION

- For direct use with:
  - an EGSM/DCS-1800/PCN mobile phone (single or dual-band) or
  - an EGSM and a DCS-1800/PCN mobile phone (requires diplexer, type DIPX 1000/1550).
- Stainless steel LX-mount.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 901/1801-LX	130001254

## SPECIFICATIONS

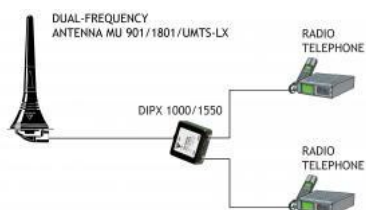
ELECTRICAL	
MODEL	MU 901/1801-LX
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	880-960 MHz (EGSM/NMT-900) and 1710-1880 MHz (DCS-1800/PCN)
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	Approx. 0 dB on both bands (acc. to EIA RS-329-1)
BAND WIDTH	900 MHz: > 40 MHz @ SWR ≤ 1.5 1800 MHz: Approx. 200 MHz @ SWR ≤ 2.0 (typ.)
SWR	≤ 2.0 @ f. res.
MAX. POWER	25 W
MECHANICAL	

MATERIALS	Whip: Black cover POM Black-chromed brass Mount: Stainless steel Brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	93 mm
WEIGHT	Approx. 33 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

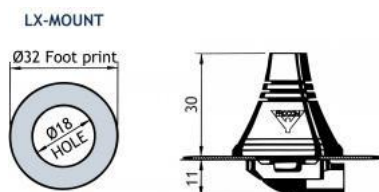
## COUPLING DIAGRAM



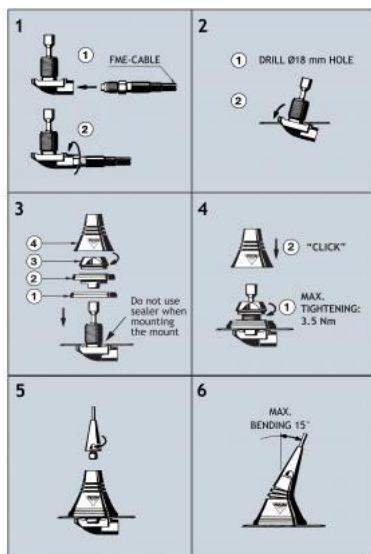
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner. The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## GPS-C R/FM

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip with a Shock Spring for the FM Band

- External antenna whip mounted on the GPS-Combi mount.
  - Black-chromed, conical stainless steel whip.

### Description

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high gain, low noise amplifier.
  - Right-Hand Circular Polarization (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C R/FM	132000057

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C R/FM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	FM band (88 - 108 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Spring: Black-chromed brass Black-chromed stainless steel
COLOUR	Black
HEIGHT	Approx. 500 mm
WEIGHT	Approx. 50 g
MOUNTING	On the GPS-Combi mount

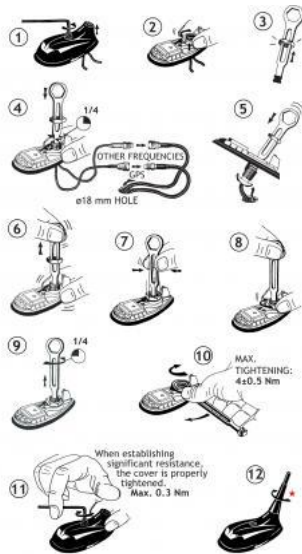
### SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT



ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

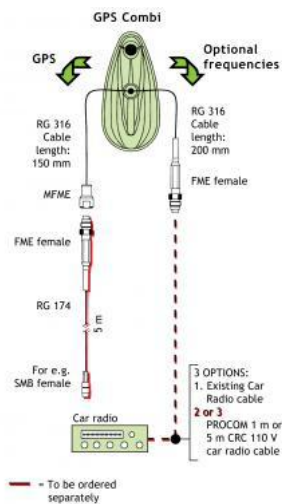
## MOUNTING INSTRUCTIONS



★ The whip should always be dismounted during car wash.

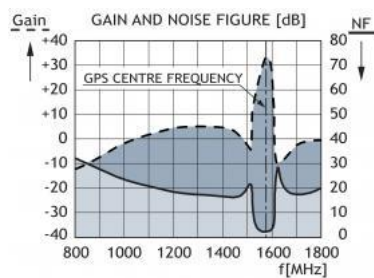
Do not use sealer on rubber gasket or other places.

## CABLE MOUNTING

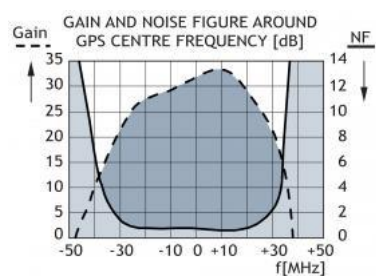


— To be ordered separately

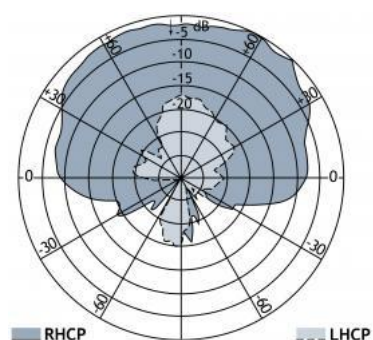
## TYPICAL RESPONSE CURVES



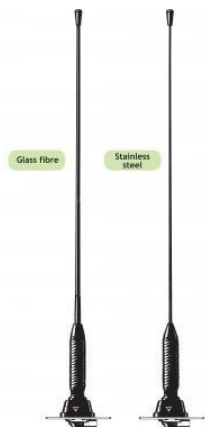
## TYPICAL RESPONSE CURVES



## TYPICAL RADIATION PATTERN



PROCOM A/S • Smedetøften 12  
DK-3600 Frederikssund • Denmark



## MH 2-ZG

$\frac{1}{4} \lambda$  Mobile Antenna with Shock Spring for the 160 MHz Band

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

### DESCRIPTION

- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m cable terminated with FME-connector.

### ORDERING DESIGNATIONS

TYPE WHIP Glass fiber	PRODUCT NO.	TYPE WHIP Stainless steel	PRODUCT NO.	MOUNT VERSION
MH 2-ZG	130000736	MH 2-ZGR	130000738	ZG-mount with FME-system
MH 2-ZGP4	130000737	MH 2-ZGP4R	130000739	ZGP4-mount with 4 m cable and FME-connector



### SPECIFICATIONS

ELECTRICAL	
MODEL	MH 2-ZG
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.

MAX. POWER	150 W
MECHANICAL	
MATERIALS	Whip: Conical glass fiber or black-chromed stainless steel. Black-chromed brass Spring: Black-chromed stainless steel Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 55 cm
WEIGHT	ZG-version: Approx. 200 g ZGP4-version: Approx. 350 g
MOUNTING	21 mm dia. hole

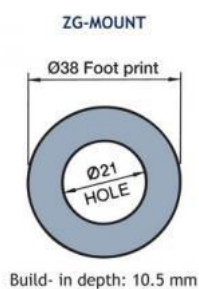
## INSTALLATION

This antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole on horizontal surfaces as e.g. roof top or trunk lid.

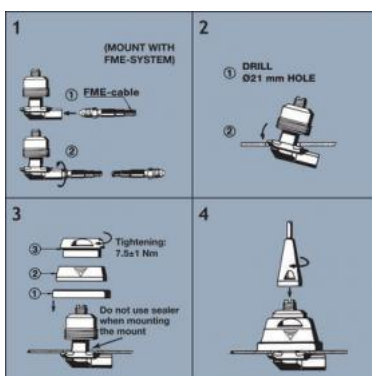
The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in automatic washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the M8 x 1 thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS

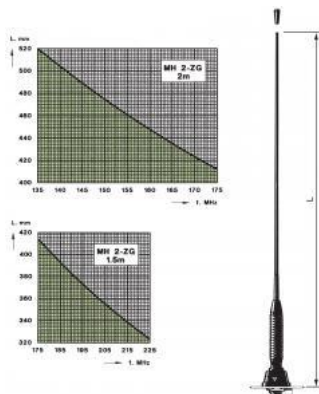


Do not use sealer on rubber gasket or other places.

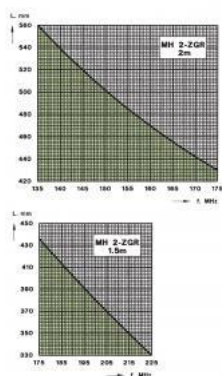
### 3. TUNING

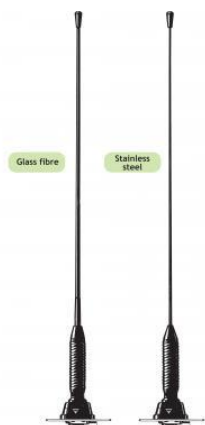
The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.

#### GLASS FIBRE WHIP



#### STAINLESS STEEL WHIP





## MH 2-Z

### $\frac{1}{4} \lambda$ Mobile Antenna with Shock Spring for the 160 MHz Band

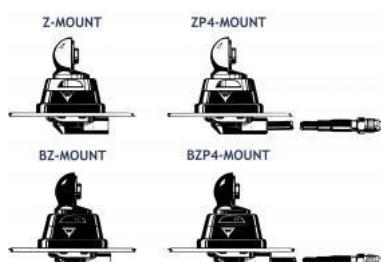
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  - MH 2-Z...: Bright version
  - MH 2-BZ...: Black version
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE WHIP Stainless steel	PRODUCT NO.	TYPE WHIP Glass fiber	PRODUCT NO.	MOUNT VERSION
MH 2-ZR	130000740	MH 2-Z	130000727	Z-mount with FME-system BRIGHT
MH 2-BZR	130000741	MH 2-BZ	130000733	BZ-mount with FME-system BLACK
MH 2-ZP4R	130000730	MH 2-ZP4	130000729	ZP4-mount with 4 m cable and FME-connector BRIGHT
MH 2-BZP4R	130000731	MH 2-BZP4	130000742	BZP4-mount with 4 m cable and FME-connector BLACK



## SPECIFICATIONS

ELECTRICAL	
MODEL	MH 2-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	150 W
MECHANICAL	
MATERIALS	Whip: Conical glass fiber or stainless steel Chromed brass Spring: Stainless steel Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright or black, see above
HEIGHT	Approx. 55 cm
WEIGHT	Z-version: Approx. 230 g ZP4-version: Approx. 380 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

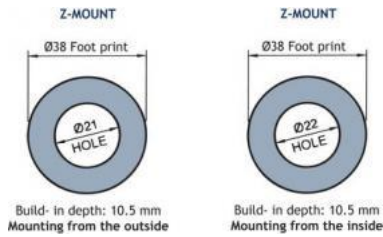
This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

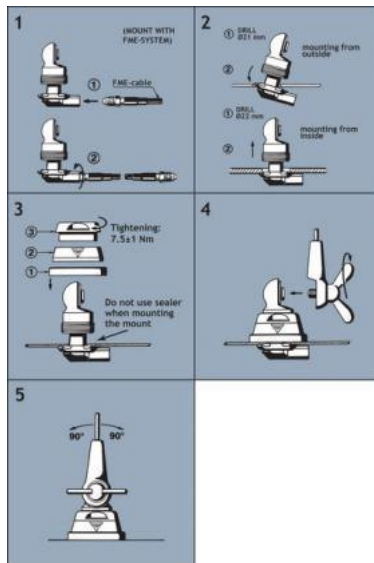
However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS





## 2. INSTALLATION STEPS

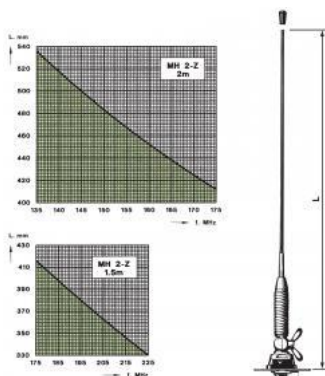


Do not use sealer on rubber gasket or other places.

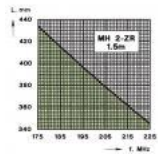
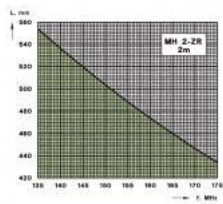
## 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.

### GLASS FIBRE WHIP



### STAINLESS STEEL WHIP





## MU 9-XP4R/...

### 450 MHz 2 dB Mobile Antenna for Glass fibre Roof

- Ground plane independent antenna for installation on non-conducting surfaces.
- Ideal for glass fibre roofs as can be found on some trucks, busses, transport vans and trains.
- Black-chromed, conical stainless steel whip.

## DESCRIPTION

- MU 9-XP4R/s can be tuned by cutting within 380...410 MHz.  
MU 9-XP4R/l can be tuned by cutting within 400...440 MHz.  
MU 9-XP4R/h can be tuned by cutting within 430...470 MHz.
- M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with oblong or circular mount.
- Delivered with permanently attached 4 m cable terminated with FME-connector (other models on request).

Please note that the MU 9-XP4R type "s"-, "l"- and "h"-mounts contain matching transformers. Consequently, these special mounts cannot operate with other whip types.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
FIELD TUNABLE MODELS			
MU 9-XP4R/s	130001549	380... 410 MHz	Oblong mount with 4 m cable and FME-conn.
MU 9-XP4R/l	130001550	400... 440 MHz	Same mount as above
MU 9-XP4R/h	130001551	430... 470 MHz	Same mount as above
MU 9-CXP4R/s	130001094	380... 410 MHz	Circular mount with 4 m cable and FME-conn.
MU 9-CXP4R/l	130001759	400... 440 MHz	Same mount as above
MU 9-CXP4R/h	130001606	430... 470 MHz	Same mount as above
MU 9-CXP1R/s-TNC	130001891	380... 410 MHz	Circular mount with 1 m cable and TNC-male conn.
MU 9-CXP1R/l-TNC	130001901	400... 440 MHz	Same mount as above
MU 9-CXP1R/h-TNC	130001902	430... 470 MHz	Same mount as above
TYPE	CELLULAR SYSTEM		MOUNT VERSION

READY-TUNED MODELS (examples)		
MU 9-XP4R/380-410 MHz	TETRA BOS, Germany	Oblong mount with 4 m cable and FME-conn.
MU 9-XP4R/410-430 MHz	Industrial Systems Germany	Same mount as above
MU 9-XP0.1R/380-410 MHz	TETRA BOS, Germany	Oblong mount with 0.1 m cable and FME-male conn.
MU 9-CXP4R/380-410 MHz	TETRA BOS, Germany	Circular mount with 4 m cable and FME-conn.
MU 9-CXP4R/410-430 MHz	Industrial Systems Germany	Same mount as above
MU 9-CXP0.1R/380-410 MHz	TETRA BOS, Germany	Circular mount with 0.1 m cable and FME-male conn.

When ordering a ready-tuned model, the name of the desired cellular system must be added to the antenna model number.

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 9-XP4R/...
ANTENNA TYPE	End-fed $\frac{1}{2} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 1.5$ $\geq 30$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	40 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Surface treated steel
RECOMMENDED INSTALLATION TORQUE	Max. 3 Nm
CABLE	4 m cable terminated with FME-connector (Other cable lengths and connector types on request)
COLOUR	Black

HEIGHT	Approx. 40 cm (see cutting diagram)
WEIGHT	Approx. 210 g
MOUNTING	From outside: 21 mm dia. hole From inside: 14 mm dia. hole
ROOF THICKNESS	0.6 → 5.0 mm

## INSTALLATION

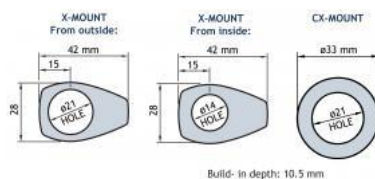
This antenna is especially designed for installation on non-conducting surfaces as e.g. glass fibre roofs, as can be found on some trucks, busses, transport vans and trains.

The antenna is an end-fed,  $\frac{1}{2} \lambda$ -dipole concept which can be fed in such a way that the antenna does not require a "ground plane" as required by the standard  $\frac{1}{4} \lambda$ ,  $\frac{5}{8} \lambda$  or collinear mobile whips.

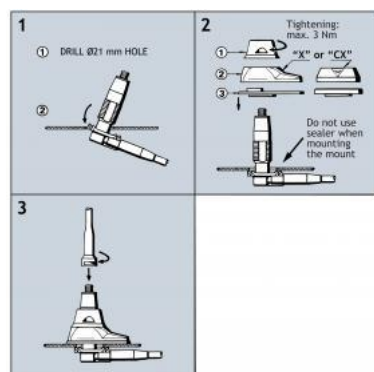
It is useful to note that this antenna type can be used anywhere where the ground plane is poor or completely missing, as e.g.: side-mounted on a clamp as a pager antenna on a wall or mounted at the very edge of a ground plane without the loss induced by a tilted radiation pattern.

The antenna must be mounted on a horizontal surface. When cleaning the vehicle in car-washing machines, the whip is easily dismounted using a spanner, size 9 mm. The whip is refitted again by screwing it onto the M6 thread stud on the mount and tightening it lightly with the spanner.

### 1. INSTALLATION DIMENSIONS



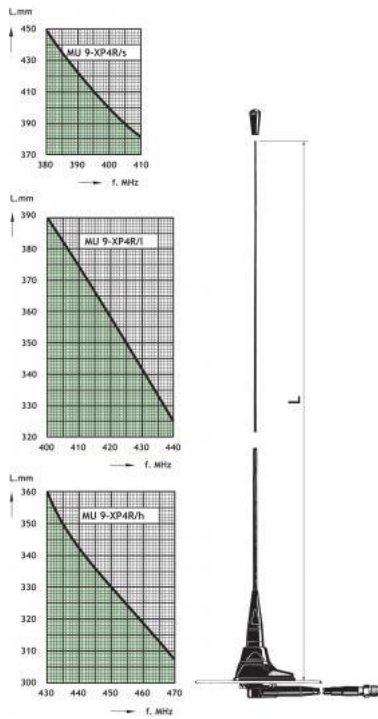
### 2. INSTALLATION STEPS (From outside)



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna should always be tuned using an SWR-indicating device. The cutting diagrams below serve as a guide for this procedure.





## GPS-C R/DAB/FM

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip with Shock Spring for the DAB and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations

### Description

- Black-chromed, conical stainless steel whip.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C R/DAB/FM	132000058

### SPECIFICATIONS FOR WHIP

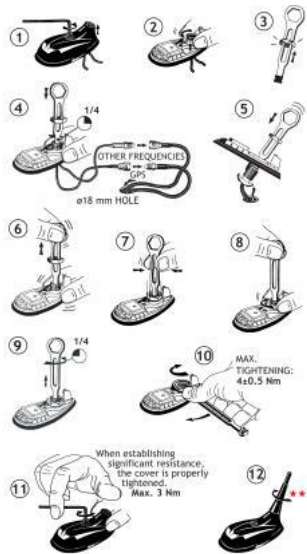
ELECTRICAL	
MODEL	GPS-C R/DAB/FM
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	DAB-Band (223 – 240 MHz) also receives FM band (88 - 108 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
SWR	$\leq 1.3$ @ f. res.
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	Approx. 290 mm
WEIGHT	Approx. 50 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

## MOUNTING INSTRUCTIONS

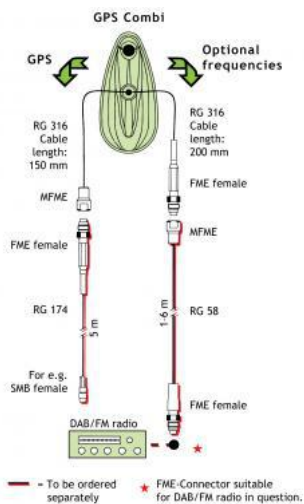




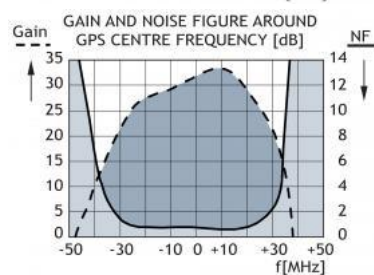
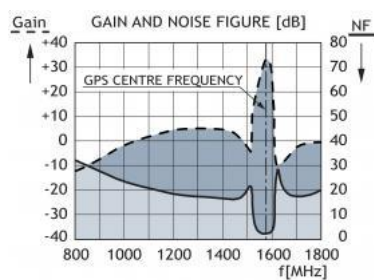
★ ★ The whip should always be dismantled during car wash.

Do not use sealer on rubber gasket or other places.

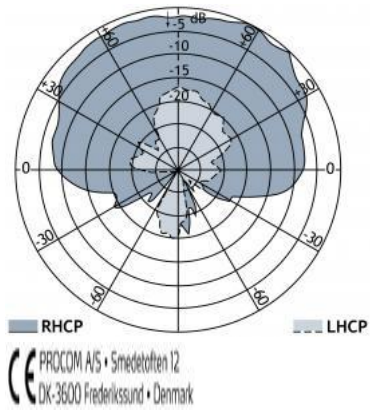
## CABLE MOUNTING

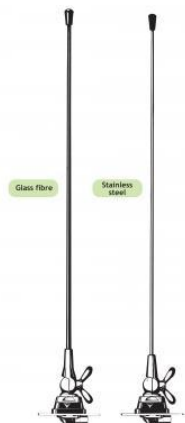


## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MH 1-Z

### $\frac{1}{4} \lambda$ Mobile Antenna for the 160 MHz Band

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  - MH 1-Z...: Bright version
  - MH 1-BZ...: Black version
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles: Z-mount:
  - FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

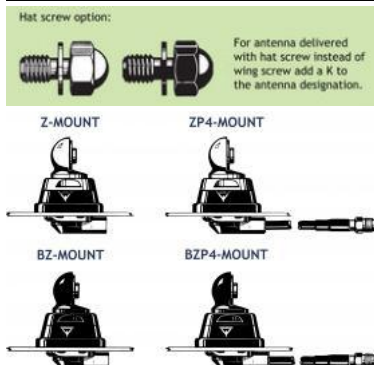
## ORDERING DESIGNATIONS

TYPE WHIP Stainless steel	PRODUCT NO.	TYPE WHIP Glass fiber	PRODUCT NO.	MOUNT VERSION
MH 1-ZR	130000720	MH 1-Z	130000714	Z-mount with FME-system BRIGHT
MH 1-BZR	130000725	MH 1-BZ	130000719	Z-mount with FME-system BLACK
MH 1-ZP4R	130000721	MH 1-ZP4	130000715	ZP4-mount with 4 m cable + FME-connector BRIGHT
MH 1-BZP4R	130000717	MH 1-BZP4	130000716	BZP4-mount with 4 m cable + FME-connector BLACK

## SPECIFICATIONS

ELECTRICAL	
MODEL	MH 1-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)

IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	150 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Conical glass fiber or stainless steel Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright or black, see above
HEIGHT	Approx. 53 cm
WEIGHT	Z-version: Approx. 150 g ZP4-version: Approx. 300 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

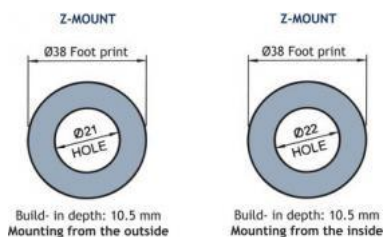


## INSTALLATION

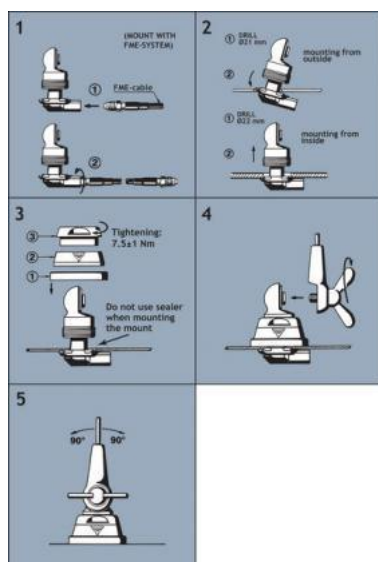
This antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the BZ-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS

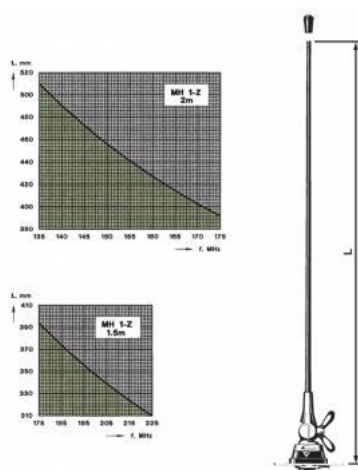


Do not use sealer on rubber gasket or other places.

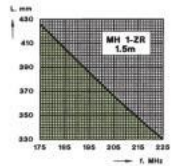
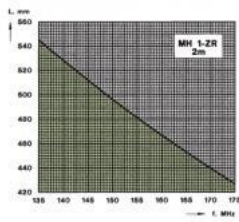
## 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.

### GLASS FIBRE WHIP



### STAINLESS STEEL WHIP





## MU 9-XP4/..., MU 9-CXP4/..., MU 9-XGP4/...

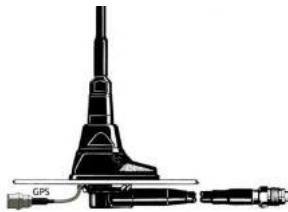
### 450 MHz 2 dB mobile antenna for glass fibre roof

- Ground plane independent antenna for installation on non-conducting surfaces.
- Ideal for glass fibre roofs as can be found on some trucks, busses, transport vans and trains.
- MU 9-XP4/s can be tuned by cutting within 380...410 MHz.  
MU 9-XP4/l can be tuned by cutting within 400...440 MHz.  
MU 9-XP4/h can be tuned by cutting within 430...470 MHz.

## DESCRIPTION

- M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with oblong or circular mount.
- Also oblong models with GPS are available.
- Delivered with permanently attached 4 m RG 58 cable terminated with FME-connector. (Other models on request)

## MU 9-XGP4 Mount



Please note that the MU 9-XP4 and MU 9-XGP4 type "s"-, "l"- and "h" mounts contain matching transformers. Consequently, these special mounts cannot operate with other whip types.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
FIELD TUNABLE MODELS			
MU 9-XP4/s	130001089	380... 410 MHz	Oblong mount with 4 m cable and FME-conn.
MU 9-XP4/l	130001097	400... 440 MHz	Same mount as above
MU 9-XP4/h	130001085	430... 470 MHz	Same mount as above
MU 9-CXP4/s	130001096	380... 410 MHz	Circular mount with 4 m cable and FME-conn.
MU 9-CXP4/l	130001098	400... 440 MHz	Same mount as above
MU 9-CXP4/h	130001086	430... 470 MHz	Same mount as above

MU 9-XGP4/s		380... 410 MHz	Oblong mount with 4 m and FME-conn., and GPS
MU 9-XGP4/l		400... 440 MHz	Same mount as above
MU 9-XGP4/h		430... 470 MHz	Same mount as above
TYPE	PRODUCT NO.	CELLULAR SYSTEM	MOUNT VERSION
READY-TUNED MODELS (examples)			
MU 9-XP4/ 380-410 MHz		TETRA BOS, Germany	Oblong mount with 4 m cable and FME-conn.
MU 9-XP4/ 410-430 MHz		Industrial Systems Germany	Same mount as above
MU 9-XP0.1/ 380-410 MHz-MFME		TETRA BOS, Germany	Oblong mount with 0.1 m cable and FME-male conn.
MU 9-CXP4/ 380-410 MHz		TETRA BOS, Germany	Circular mount with 4 m cable and FME-conn.
MU 9-CXP4/ 410-430 MHz		Industrial Systems Germany	Same mount as above
MU 9-CXP0.1/ 380-410 MHz- MFME		TETRA BOS, Germany	Circular mount with 0.1 m cable and FME-male conn.
MU 9-XGP4/ 380-410 MHz			Oblong mount with 4 m cable and FME-conn., and GPS
MU 9-XGP0.1/ 380-410 MHz- MFME	130002159	TETRA BOS, Germany	Oblong mount with 0.1 m cable and FME-male conn., and GPS

When ordering a ready-tuned model, the name of the desired cellular system must be added to the antenna model number.

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 9-XP4/..., MU 9-CXP4/..., MU 9-XGP4/...
ANTENNA TYPE	End-fed $\frac{1}{2} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 1.5$ $\geq 30$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	40 W
MECHANICAL	
MATERIALS	Whip: Polyethylene-covered spring steel wire Mount:



	Black-chromed brass Weather- and shockproof plastics Surface treated steel
RECOMMENDED INSTALLATION TORQUE	Max. 3 Nm
CABLE	4 m cable terminated with FME-connector. (Other cable lengths on request)
COLOUR	Black
HEIGHT	Approx. 41 cm
WEIGHT	Approx. 210 g
MOUNTING	From outside: 21 mm dia. hole From inside: 14 mm dia. hole
MOUNTING FOR GPS-MODELS	19 mm dia. hole
ROOF THICKNESS	0.6 → 5.0 mm
<b>ELECTRICAL FOR GPS-PART</b>	
OPERATING FREQUENCY	1575.42 ±1.023 MHz
LNA GAIN	22 dB ±2 dB
NOISE FIGURE	Max.1.5 dB (typical 1.1 dB)
VOLTAGE	DC 2.85 V ~ 5 V (typical 3 V)
CURRENT	≤ 20 mA
IMPEDANCE	Nom. 50 Ω
<b>MECHANICAL</b>	
CONNECTOR	Cable RG 178, length 150 mm Connector: FME-male

## INSTALLATION

This antenna is especially designed for installation on non-conducting surfaces as e.g. glass fibre roofs, as can be found on some trucks, busses, transport vans and trains.

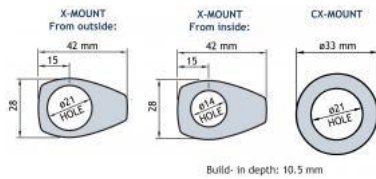
The antenna is an end-fed,  $\frac{1}{2} \lambda$ -dipole concept which can be fed in such a way that the antenna does not require a "ground plane" as required by the standard  $\frac{1}{4} \lambda$ ,  $\frac{5}{8} \lambda$  or collinear mobile whips.

It is useful to note that this antenna type can be used anywhere where the ground plane is poor or completely missing, as e.g.: side-mounted on a clamp as a pager antenna on a wall or mounted at the very edge of a ground-plane without the loss induced by a tilted radiation pattern.

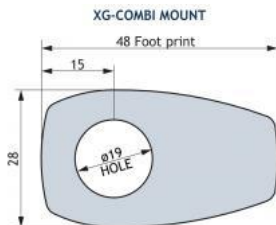
The antenna must be mounted on a horizontal surface. When cleaning the vehicle in car-washing machines, the whip is easily dismounted using a spanner, size 9 mm. The whip is refitted again by screwing it onto the M6 thread stud on the mount and tightening it lightly with the spanner.

A polyethylene-covered, closely spirally wound flat steel-band material causes the whip always to stand erect while at the same time being very flexible.

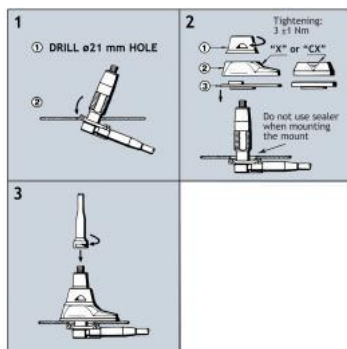
### 1a. INSTALLATION DIMENSIONS



## 1b. INSTALLATION DIMENSION FOR GPS-MODELS

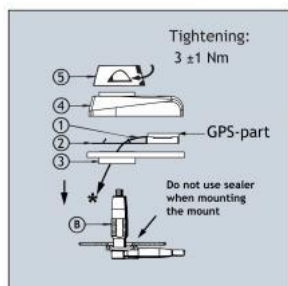


## 2a. INSTALLATION STEPS (From outside)



Do not use sealer on rubber gasket or other places.

## 2b. INSTALLATION STEPS FOR GPS-MODELS (From outside)



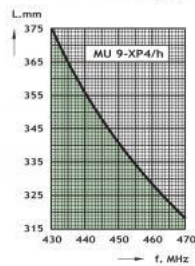
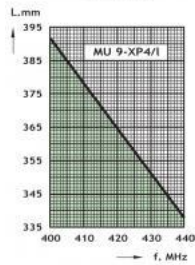
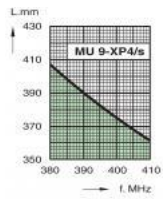
Do not use sealer on rubber gasket or other places.

## 2b. ASSEMBLY INSTRUCTIONS (for GPS-models)

1. Put GPS-FME-connector-cable through the gasket (2).
2. Put the gasket (3) + GPS-part (1) over the body (B).
3. Put the body (B) + gasket (3) + GPS-part (1) through the  $\varnothing 19$  mm hole.
4. Put the housing (4) over the body (B) and be sure that the GPS-part (1) fits into the square hole in the body (B).
5. Put the threaded part over the body (5) and tighten max.  $3 \pm 1$  Nm!
6. Mount the antenna whip.

## 3. TUNING

The antenna should always be tuned using an SWR-indicating device. The cutting diagrams below serve as a guide for this procedure.





## GPS-C MU 4/FM/...

### Colinear 4dB Mobile Antenna for the 450 MHz Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

## DESCRIPTION

- 4 dB mobile antenna with conical stainless steel whip.
- Receiving FM-radio when using a Diplexer (LH 108/136-2G).
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarisation (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

## ORDERING DESIGNATIONS

TYPE NO.	FREQUENCY	PRODUCT NO.
GPS-C MU 4/FM/s	380 - 410 MHz	132000055
GPS-C MU 4/FM/f	406 - 430 MHz	132000052
GPS-C MU 4/FM/l	420 - 450 MHz	
GPS-C MU 4/FM/h	440 - 470 MHz	132000053

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C MU 4/FM/...
ANTENNA TYPE	Colinear mobile whip antenna
FREQUENCY	Models within 380-470 MHz Also receiving FM-radio (88 - 108 MHz)
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1) for the 450 MHz band
BANDWIDTH	> 30 MHz @ SWR < 2.5
SWR	< 1.3 @ f.res. for the 450 MHz band
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed stainless steel
COLOUR	Black

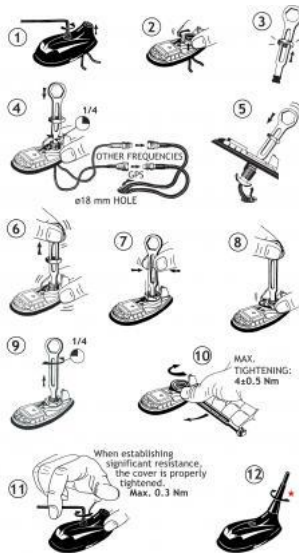
HEIGHT	Approx. 590 mm (dep. on frequency)
WEIGHT	Approx. 65 g (dep. on frequency)
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

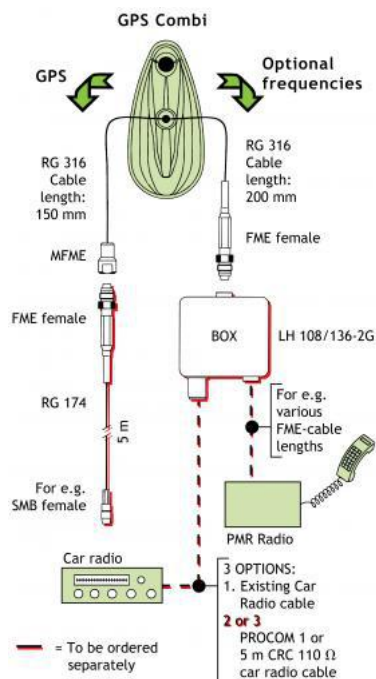


## MOUNTING INSTRUCTIONS

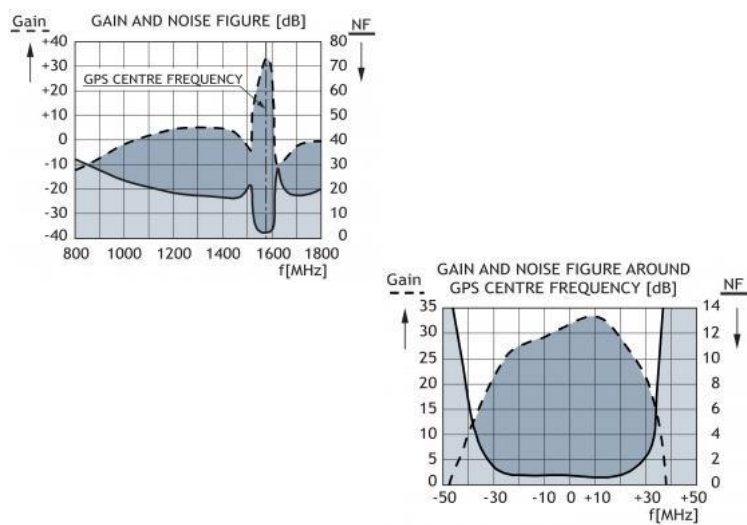


Do not use sealer on rubber gasket or other places.

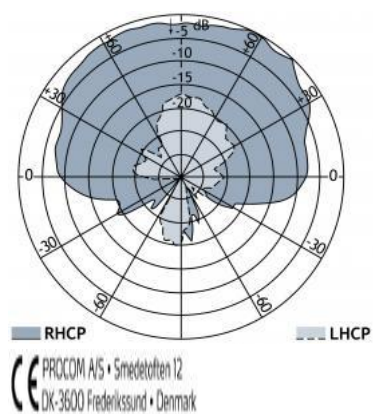
## CABLE MOUNTING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 807-XG/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 800 MHz band width GPS

- External antenna whip mounted on the XG-COMBI mount.
  - Silicone covered flexible steel wire whip.
  - Two models:
    - MU 807-XG/l: 768 - 806 MHz
    - MU 807-XG/h: 806 - 869 MHz

### DESCRIPTION

- Stainless steel XG-COMBI mount with M6-thread whip-fastening system.
- Choose between mount with FME-connection (without cable) or model with permanently attached 4 m cable with FME connector.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - **Right-Hand Circular Polarization (RHCP).**
  - 2.85 V - 5 V supply voltage (typical 3 V).

The whip is compatible with all below mounts



### ORDERING DESIGNATIONS

TYPE	FREQUENCY	MOUNT VERSION	PRODUCT NO.
MU 807-XG/l	768 - 806 MHz	XG-COMBI mount (oblong) with FME-system	130002081
MU 807-XG/h	806 - 869 MHz	Same mount as above	130002082
MU 807-XGP4/l	768 - 806 MHz	XGP4-COMBI mount (oblong) with 4 m cable + FME-system	130002083
MU 807-XGP4/h	806 - 869 MHz	Same mount as above	130002084

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 807-XG/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	800 MHz-band covered by two models
IMPEDANCE	Nom. 50 $\Omega$



POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 80 MHz @ SWR ≤ 1.5 > 140 MHz @ SWR ≤ 2.0
SWR	≤ 1.2 @ f. res.
MAX. POWER	60 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Steel wire covered with silicone tubing Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 100 mm
WEIGHT	XG-version: Approx. 70 g XGP4-version: Approx. 210 g
MOUNTING	19 mm dia. hole
<b>ELECTRICAL for GPS-part</b>	
OPERATING FREQUENCY	1575.42 ±1.023 MHz
LNA GAIN	22 dB ±2 dB
NOISE FIGURE	Max. 1.5 dB (typical 1.1 dB)
VOLTAGE	DC 2.85 V ~ 5 V (typical 3 V)
CURRENT	≤ 20 mA
IMPEDANCE	Nom. 50 Ω
<b>MECHANICAL</b>	
CONNECTOR	Cable: RG 178, length 150 mm Connector: FME-male

## INSTALLATION

The XG-antenna types can be mounted anywhere on the car, however, roof top mounting is always recommended.

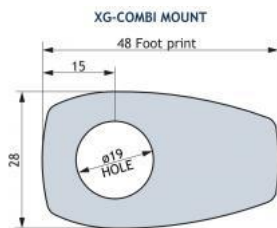
The oblong XG-COMBI mount can be mounted on the often very narrow strip on the rear wing between the hatch and the side of the car.

Mounting can take place with access from the outside or inside when drilling an 19 mm dia. hole.

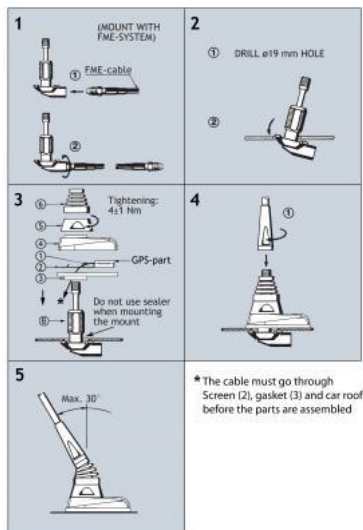
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

As the XG-COMBI mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## ASSEMBLY INSTRUCTIONS

1. Put GPS-FME-connector-cable through the gasket (2).
2. Put the gasket (2) + GPS-part (1) over the body (B).
3. Put the body (B) + gasket (3) + GPS-part (1) through the Ø19 mm hole.
4. Put the housing (4) over the body (B) and be sure that the GPS-part (1) fits into the square hole in the body (B).
5. Put the threaded part over the body (B) and tighten max.  $4 \pm 1$  Nm!.
6. Put the corrugated plastic unit (6) over the body (B).
7. Mount the antenna whip se figure 4.



## GPS-C MU 3/TETRA/I

### GPS Antenna with 3 dB Whip for the TETRA Band

- External antenna whip mounted on the GPS-Combi mount.
  - Black-chromed, stainless steel whip.
  - 3 dB Gain for the TETRA Band.
  - Easily removable whip for car wash.

## Description

- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular Polarization (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.

## ORDERING DESIGNATIONS

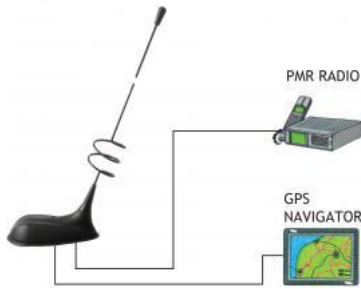
TYPE	PRODUCT NO.
GPS-C MU 3/TETRA/I	132000130

## SPECIFICATIONS FOR WHIP

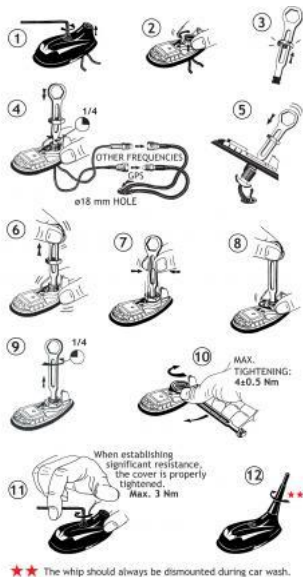
ELECTRICAL	
MODEL	GPS-C MU 3/TETRA/I
ANTENNA TYPE	5/8 $\lambda$ mobile whip antenna
FREQUENCY	380 - 400 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 3 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 20$ MHz @ SWR $\leq 2.5$
SWR	$\leq 1.5$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Spring: Black-chromed brass
COLOUR	Black
HEIGHT	Approx. 450 mm
WEIGHT	Approx. 60 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

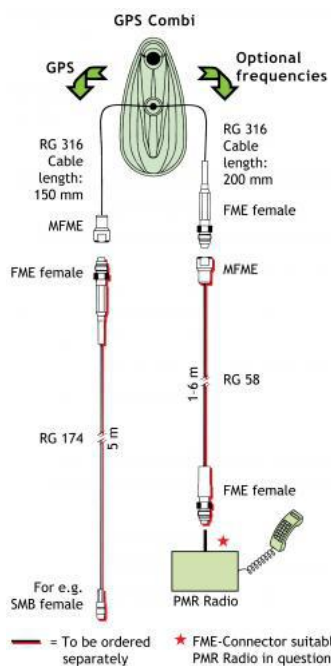
ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia hole for roof thickness 2.0 - 2.5 mm Tools for mounting included



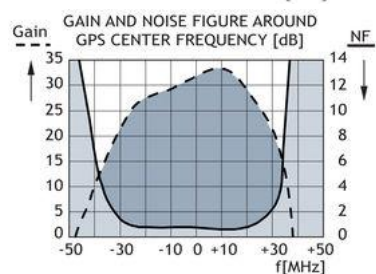
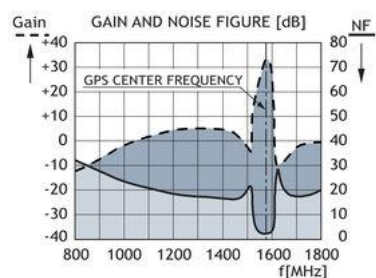
## MOUNTING INSTRUCTIONS



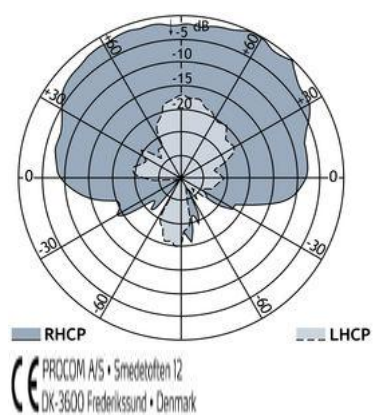
## CABLE MOUNTING



## TYPICAL RESPONSE CURVE



## VERTICAL RADIATION PATTERN





## MU 800/900/1800/2100/2600-LX

Multi-frequency Mobile Antenna for the 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz Bands

- Multi-frequency antenna – multi bands – one antenna!
- Stainless steel LX-mount.
- Especially suited for roof mounting.

### DESCRIPTION

- Provided with FME-connection (supplied without cable).
- Flexible section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 800/900/1800/2100/2600-LX	130001567

### SPECIFICATIONS

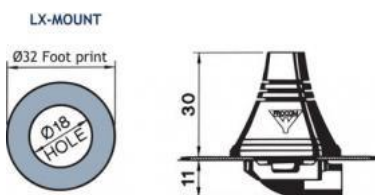
ELECTRICAL	
MODEL	MU 800/900/1800/2100/2600-LX
ANTENNA TYPE	Multi-frequency mobile antenna
FREQUENCY	790 - 862 MHz 880 - 960 MHz (EGSM/NMT-900) 1710 - 1880 MHz (DCS-1800/PCN) 1900 - 2200 MHz (UMTS) and 2500 - 2690 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB on all bands (acc. to EIA RS-329-1)
BANDWIDTH	800 MHz: > 50 MHz @ SWR $\leq$ 2.0 900 MHz: > 40 MHz @ SWR $\leq$ 1.5 1800 MHz: Approx. 200 MHz @ SWR $\leq$ 2.0 (typ.) 1900 - 2200 MHz @ SWR $\leq$ 2.0 (typ.) and 2600 MHz: > 200 MHz @ SWR $\leq$ 2.5 (typ.)
SWR	$\leq$ 2.5
MAX. POWER	15 W
MECHANICAL	

MATERIALS	Whip: Black cover POM Black-chromed brass Mount: Stainless steel Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	93 mm
WEIGHT	Approx. 33 g
MOUNTING	18 mm dia. hole

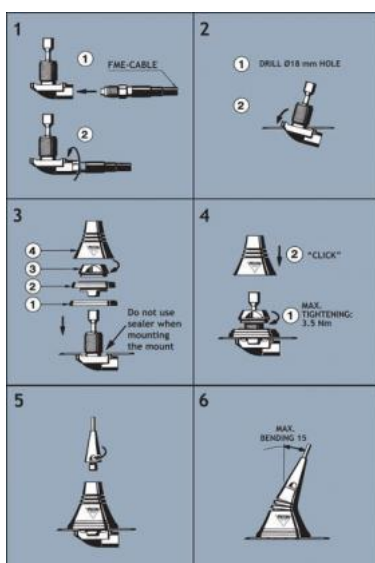
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner. The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS:



### 2. INSTALLATION STEPS:



Do not use sealer on rubber gasket or other places.

**PLEASE NOTE:** When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.



### **3. TUNING:**

The antenna is delivered factory-tuned and requires no further tuning.



## MU 800/2600-LX

### Dual-frequency Mobile Antenna for the 800 MHz and 2600 MHz Bands

- Dual-frequency antenna – two bands – one antenna!
- Stainless steel LX-mount.

## DESCRIPTION

- Especially suited for roofmounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 800/2600-LX	130001525

## SPECIFICATIONS

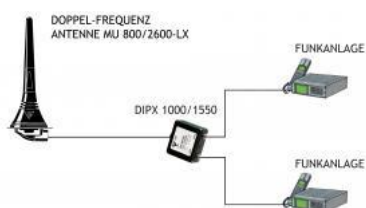
ELECTRICAL	
MODEL	MU 800/2600-LX
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	790 - 862 MHz and 2500 - 2690 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	Approx. 0 dB on both bands (acc. to EIA RS-329-1)
BANDWIDTH	800 MHz: > 50 MHz @ SWR ≤ 2.0 2600 MHz: > 200 MHz @ SWR ≤ 2.5 (typ.)
SWR	≤ 2.0 @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black cover POM Black-chromed brass Mount:

	Stainless steel Brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	93 mm
WEIGHT	Approx. 33 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

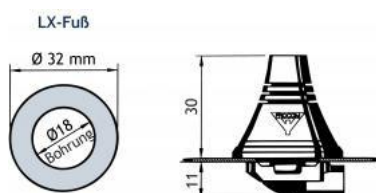
## COUPLING DIAGRAM



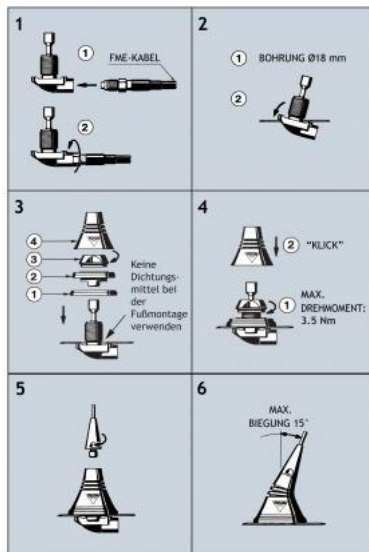
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner. The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



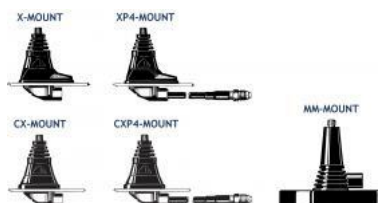
## MU 7-X/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Silicone covered flexible steel wire whip.
- MU 7-X/s covers 370 – 410 MHz  
MU 7-X/l covers 406 – 440 MHz  
MU 7-X/h covers 430 – 470 MHz  
– no tuning required.

## DESCRIPTION

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY RANGE
<b>X-mount (oblong) with FME-system</b>		
<b>MU 7-X/s</b>	<b>130001076</b>	<b>370 - 410 MHz</b>
<b>MU 7-X/l</b>	<b>130001070</b>	<b>406 - 440 MHz</b>
<b>MU 7-X/h</b>	<b>130001082</b>	<b>430 - 470 MHz</b>
<b>CX-mount (circular) with FME-system</b>		
<b>MU 7-CX/s</b>	<b>130001066</b>	<b>370 - 410 MHz</b>
<b>MU 7-CX/l</b>	<b>130001071</b>	<b>406 - 440 MHz</b>
<b>MU 7-CX/h</b>	<b>130001083</b>	<b>430 - 470 MHz</b>
<b>XP4-mount (oblong) with 4 m cable and FME-connector</b>		
<b>MU 7-XP4/s</b>	<b>130001080</b>	<b>370 - 410 MHz</b>
<b>MU 7-XP4/l</b>	<b>130001072</b>	<b>406 - 440 MHz</b>

<b>MU 7-XP4/h</b>	<b>130001073</b>	<b>430 - 470 MHz</b>
<b>CXP4-mount (circular) with 4 m cable and FME-connector</b>		
<b>MU 7-CXP4/s</b>	<b>130001065</b>	<b>370 - 410 MHz</b>
<b>MU 7-CXP4/I</b>	<b>130001068</b>	<b>406 - 440 MHz</b>
<b>MU 7-CXP4/h</b>	<b>130001074</b>	<b>430 - 470 MHz</b>
<b>MM-mount (magnetic) with FME-system</b>		
<b>MU 7-MM/s</b>	<b>130001060</b>	<b>370 - 410 MHz</b>
<b>MU 7-MM/I</b>	<b>130001061</b>	<b>406 - 440 MHz</b>
<b>MU 7-MM/h</b>	<b>130001062</b>	<b>430 - 470 MHz</b>

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 7-X/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Steel wire covered with silicone tubing Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 175 mm
WEIGHT	X-version: Approx. 65 g XP4-version: Approx. 205 g MM-version: Approx. 275 g
MOUNTING	18 mm dia. hole

## INSTALLATION

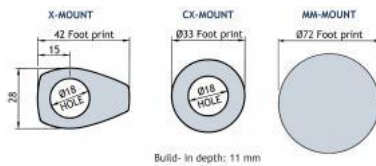
This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

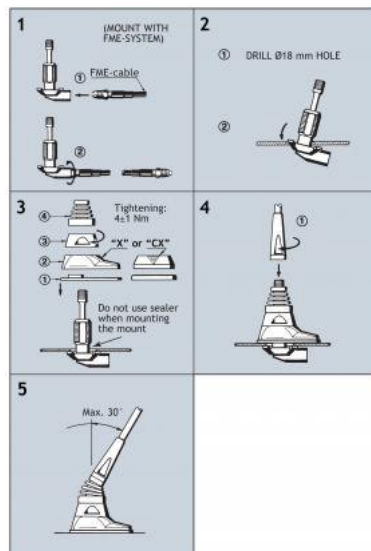
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

The MiniMag (abbreviated: MM) is a small, lightweight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEP



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

For safety reasons, when using the MU 7-MM, car speed must not exceed 180 km/h.



## MH 1-XR, MH 1-XGR, MH 1-CXR, MH 1-MMR

### $\frac{1}{4} \lambda$ Mobile Antenna for the 160 MHz Band

- Black-chromed, conical stainless steel whip.
- Elegant transition between whip and mounting surface due to slim-line mount.

The whip is compatible with all below mounts

## DESCRIPTION

- 30° tiltable whip. Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), XG-mount (oblong with GPS), CX-mount (circular) and MM-mount (magnetic).
- Choose between four connection possibilities:
  - X-mount, CX-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount, CXP4-mount: Permanently attached 4 m cable terminated with FME-connector.
  - XG-Combi mount: FME-connection and GPS (supplied without cable).
  - XGP4-Combi mount: Permanently attached 4 m cable terminated with FME-connector for whip and 0.15 m RG 178 with MFME for GPS.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - **Right-Hand Circular Polarization (RHCP).**
  - 2.85 V - 5 V supply voltage (typical 3 V).

## ORDERING DESIGNATIONS

TYPE	MOUNT VERSION	PRODUCT NO.
MH 1-XR	X-mount (oblong) with FME-system	130000708
MH 1-XP4R	XP4-mount with 4 m cable and FME-connector (oblong)	130000710
MH 1-XGR	XG-Combi mount (oblong) with FME-system and GPS	130002059
MH 1-XGP4R	XGP4-Combi mount with 4 m cable and FME-connector (oblong) and GPS	130002063
MH 1-CXR	CX-mount with FME-system (circular)	130000709
MH 1-CXP4R	CXP4-mount with 4 m cable and FME-connector (circular)	130000711
MH 1-MMR	MM-mount with FME-system (magnetic)	130000707



## SPECIFICATIONS

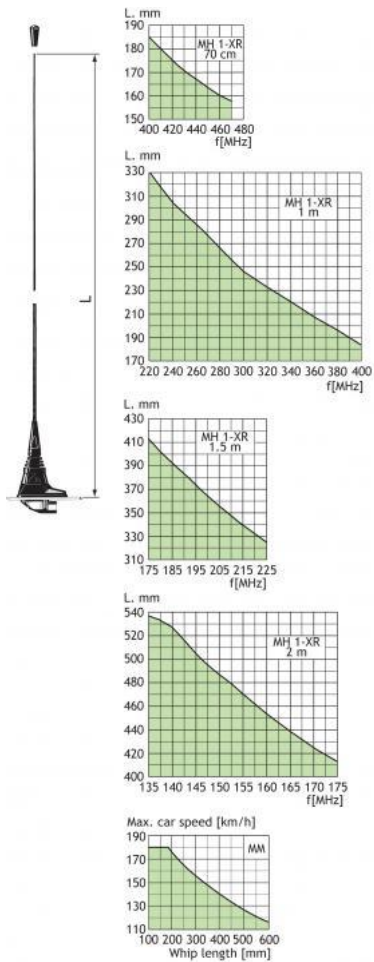
ELECTRICAL	
MODEL	MH 1-XR, MH 1-XGR, MH 1-CXR, MH 1-MMR
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	150 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Black-chromed Conical stainless steel Black-chromed brass <b>Mount:</b> Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 55 cm
WEIGHT	X-version: Approx. 70 g XP4-version: Approx. 210 g CX-version: Approx. 70 g CXP4-version: Approx. 210 g XG-version: Approx. 90 g XGP4-version: Approx. 230 g MM-version: Approx. 310 g

## INSTALLATION AND ASSEMBLY INSTRUCTIONS

Please refer to the data sheet of each individual mount to find the installation and assembly instructions.

## TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.



## PLEASE NOTE

For safety reasons: Do not operate the MiniMag with antenna whips longer than 60 cm. Please respect the maximum car speed limit corresponding to a particular whip length as appears from the above curve.



## GPS-C MU 1/...

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip for the 400 MHz Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Black-chromed, conical stainless steel whip.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna of professional quality.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- Right-Hand Circular Polarization (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

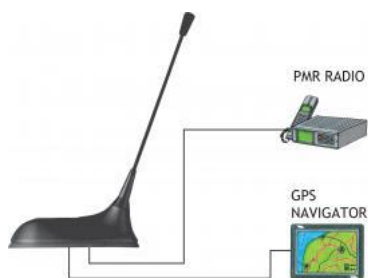
TYPE	PRODUCT NO.
GPS-C MU 1/...	132000145

### SPECIFICATIONS FOR WHIP ELECTRICAL

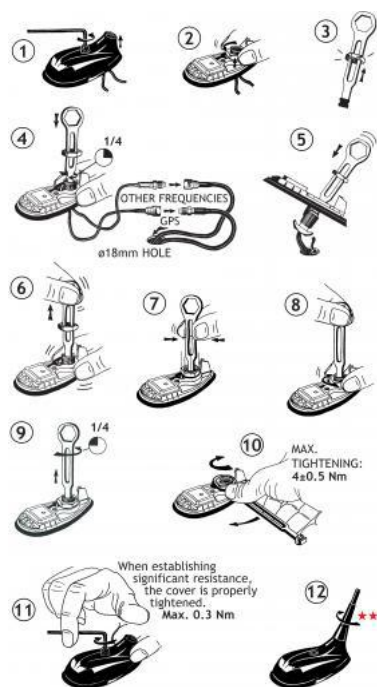
ELECTRICAL	
MODEL	GPS-C MU 1/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	370 - 470 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 60$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Spring: Black-chromed, stainless steel
COLOUR	Black
HEIGHT	Approx. 160 mm
WEIGHT	Approx. 50 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included



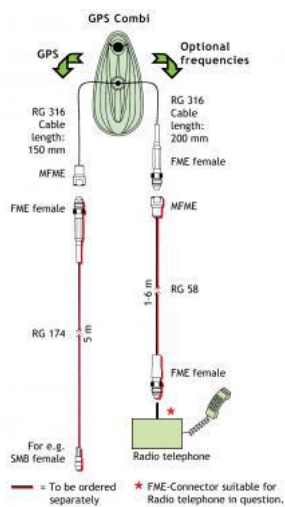
## MOUNTING INSTRUCTIONS



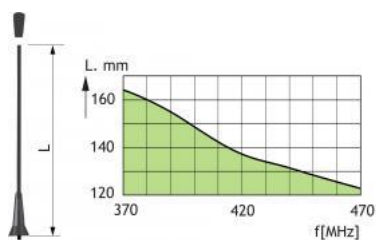
★★ The whip should always be dismounted during car wash.

Do not use sealer on rubber gasket or other places.

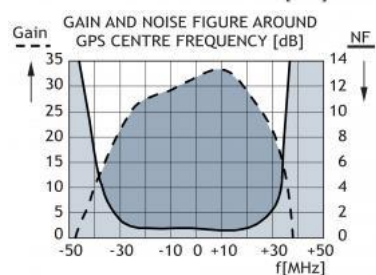
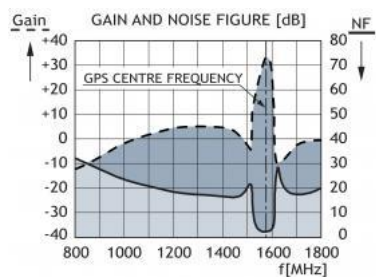
## CABLE MOUNTING



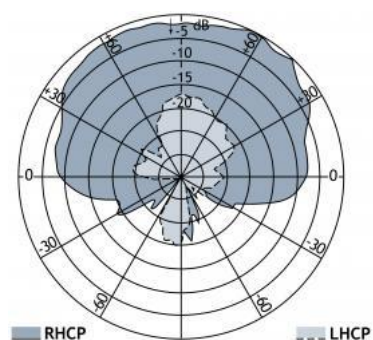
## TUNING



**TYPICAL RESPONSE CURVE**



**VERTICAL RADIATION PATTERN**



PROCOM A/S • Smedetøften 12  
DK-3600 Frederikssund • Denmark



## MU 7-LX/...

### Unity Gain $\frac{1}{4} \lambda$ Mobile Antenna for the 450 MHz Band

- 0 dB mobile antenna with silicone covered flexible steel wire whip.
- Type MU 7-LX/s covers 370 - 410 MHz  
Type MU 7-LX/l covers 406 - 440 MHz  
Type MU 7-LX/h covers 430 - 470 MHz  
- no tuning required.

## DESCRIPTION

- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATION

TYPE	PRODUCT NO.	FREQUENCY RANGE
MU 7-LX/s	130001077	370 - 410 MHz
MU 7-LX/l	130001079	406 - 440 MHz
MU 7-LX/h	130001078	430 - 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 7-LX/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 40$ MHz
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Steel wire covered with silicone tubing Black-

	chromed brass Mount: Stainless steel Brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 160 mm
WEIGHT	Approx. 45 g
MOUNTING	18 mm dia. hole

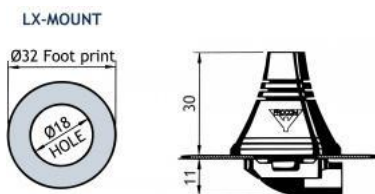
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

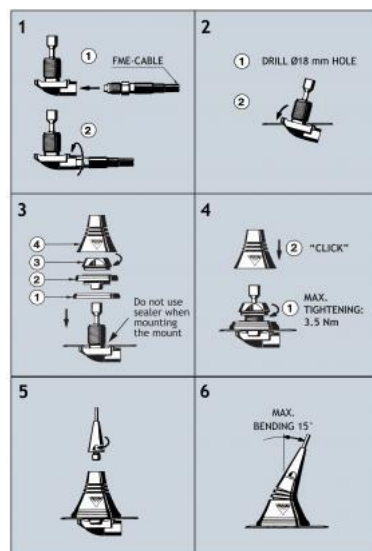
When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.







## MU 5-ZG/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Sturdy, conical, flexible rubber whip.
- MU 5-ZG/s covers 370–410 MHz  
MU 5-ZG/l covers 406–440 MHz  
MU 5-ZG/h covers 430–470 MHz  
– no tuning required.

### DESCRIPTION

- Stainless steel ZG-mount with M8-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable)
  - ZGP4-mount: Permanently attached 4 m cable terminated with FME-connector.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY RANGE
ZG-mount with FME		
MU 5-ZG/s	130001052	370 - 410 MHz
MU 5-ZG/l	130001054	406 - 440 MHz
MU 5-ZG/h	130001055	430 - 470 MHz
ZGP4-mount with 4 m cable and FME-conn.		
MU 5-ZGP4/s	130001058	370 - 410 MHz
MU 5-ZGP4/l	130001056	406 - 440 MHz
MU 5-ZGP4/h	130001057	430 - 470 MHz

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 5-ZG/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models

IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Sturdy, flexible rubber with cast-in multicore steel wire radiating element Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 175 mm
WEIGHT	ZG-version: Approx. 130 g ZGP4-version: Approx. 270 g
MOUNTING	21 mm dia. hole

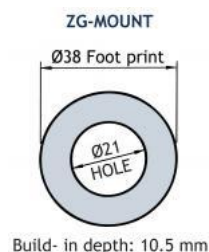
## INSTALLATION

This antenna should always be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole.

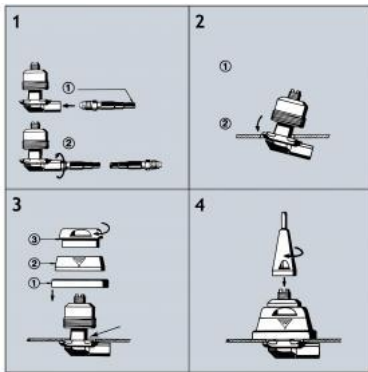
The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING/MODEL CONVERSION

The antenna is delivered factory-tuned and requires no further tuning.

To convert an MU 5-ZG/s model into an MU 5-ZG/l model, cut off 14 mm of the top end of the whip.

To convert an MU 5-ZG/l model into an MU 5-ZG/h model, cut off 8 mm of the top end of the whip.



## MH 1-MG/GPS/160-174

GPS Antenna with a  $\frac{1}{4} \lambda$  Mobile Antenna for the 160-174 MHz Band (VHF)

- Heavy-duty magnetic mount with toggle joint.
- External antenna whip mounted on the magnetic base (MG) which includes antenna for Global Positioning System (GPS).

- Provided with two 5m cables attached:
  - 5m RG58 cable with UHF-male connector for VHF.
  - 5m RG174 cable with SMA-male connector for GPS.
  - The whip is fixed on the mount using a "hat"-screw which is supplied with the mount together with a special fastening key.
  - Built-in high-gain, low-noise amplifier.
  - 5 V supply voltage (3 V available on request).
  - DC supply via SMA-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MH 1-MG/GPS/160-174	132000152

## SPECIFICATIONS

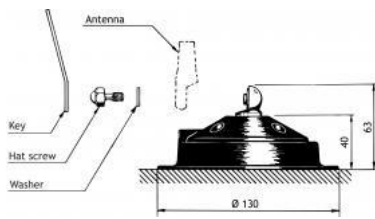
ELECTRICAL VHF	
MODEL	MH 1-MG/GPS/160-174
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	160 - 174 MHz
BANDWIDTH	$\geq 14$ MHz @ SWR $\leq 1.6$
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	25 W
ELECTRICAL GPS	
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$

POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN (in axial direction)	28 dBic in axial direction (typ.)
CROSS POLARIZATION ATT	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
<b>Built-in Amplifier</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
SELECTIVITY	> 20 dB down @ $\pm 100$ MHz
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (WHIP)</b>	
COLOUR	Black
MATERIALS	Black-chromed stainless steel
HEIGHT	Approx. 39 cm
WEIGHT	Approx. 39 g
MOUNTING	On the MG
MODEL	MG
APPLICATION	Magnetic mount for toggle-joint type mobile antenna whips. With "hat"-screw and key
MATERIALS	Stainless steel Black-chromed brass Weather- and shockproof plastics
TEMP. RANGE	-35° C $\rightarrow$ +75° C
COLOUR	Black
WEIGHT	Approx. 0.9 kg
CONNECTORS	UHF (male with 5m RG58 cable for VHF) SMA (male with 5m RG174 cable for GPS)
DIMENSIONS	Total height: Approx. 64 mm Diameter: 130 mm
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	170 km/h

## INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to obtain best omnidirectional

coverage.





## MU 5-Z/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Sturdy, conical, flexible rubber whip.
- MU 5-Z/s covers 370 - 410 MHz  
MU 5-Z/l covers 406 - 440 MHz  
MU 5-Z/h covers 430 - 470 MHz  
- no tuning required.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.



Z-MOUNT

ZP4-MOUNT



## ORDERING DESIGNATION

TYPE	PRODUCT NO.	FREQUENCY RANGE
Z-mount with FME-system		
MU 5-Z/s	130001041	370 - 410 MHz
MU 5-Z/l	130001042	406 - 440 MHz
MU 5-Z/h	130001045	430 - 470 MHz
ZP4-mount with 4 m cable and FME-connector		
MU 5-ZP4/s	130001050	370 - 410 MHz
MU 5-ZP4/l	130001047	406 - 440 MHz
MU 5-ZP4/h	130001048	430 - 470 MHz

## SPECIFICATIONS

ELECTRICAL	
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MODEL	MU 5-Z/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Sturdy, flexible rubber with cast-in multicore steel wire radiating element Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black/Bright chromium
HEIGHT	Approx. 190 mm
WEIGHT	Z-version: Approx. 160 g ZP4-version: Approx. 300 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

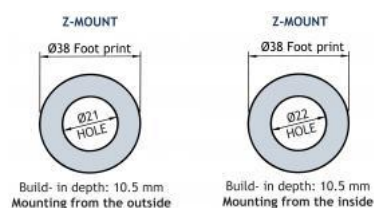
## INSTALLATION

This antenna should always be mounted on the car roof to ensure best omnidirectional coverage.

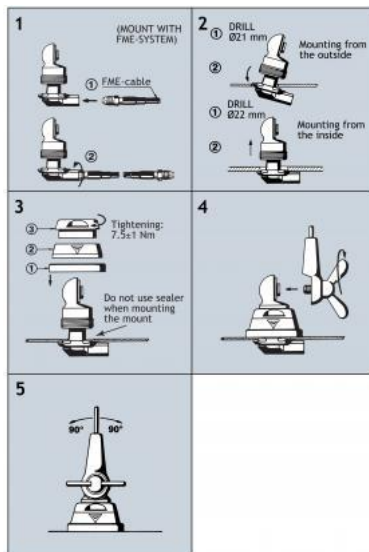
The antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING / MODEL CONVERSION

The antenna is delivered factory-tuned and requires no further tuning.

To convert an MU 5-Z/s model into an MU 5-Z/l model, cut off 13 mm of the top end of the whip.

To convert an MU 5-Z/l model into an MU 5-Z/h model, cut off 13 mm of the top end of the whip

#### PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.



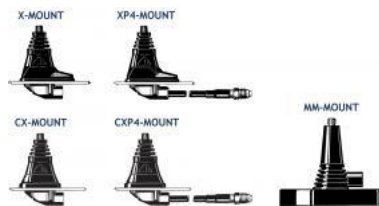
## MU 5-X/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Sturdy, conical, flexible rubber whip.
- MU 5-X/s covers 370 – 410 MHz  
MU 5-X/l covers 406 – 440 MHz  
MU 5-X/h covers 430 – 470 MHz  
– no tuning required.

## DESCRIPTION

- Stainless steel X-mount with M6-thread whip-fastening system.  
Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.
 All whips are compatible with all mounts.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY RANGE
X-mount (oblong) with FME-system		
MU 5-X/s	130001027	370 - 410 MHz
MU 5-X/l	130001028	406 - 440 MHz
MU 5-X/h	130001029	430 - 470 MHz
CX-mount (circular) with FME-system		
MU 5-CX/s	130001037	370 - 410 MHz
MU 5-CX/l	130001033	406 - 440 MHz
MU 5-CX/h	130001036	430 - 470 MHz
XP4-mount (oblong) with 4 m cable and FME-connector		
MU 5-XP4/s	130001477	370 - 410 MHz
MU 5-XP4/l	130001030	406 - 440 MHz

MU 5-XP4/h	130001031	430 - 470 MHz
CXP4-mount (circular) with 4 m cable + FME-connector		
MU 5-CXP4/s	130001038	370 - 410 MHz
MU 5-CXP4/l	130001035	406 - 440 MHz
MU 5-CXP4/h	130001034	430 - 470 MHz
MM-mount (magnetic) with FME-system		
MU 5-MM/s	130001024	370 - 410 MHz
MU 5-MM/l	130001025	406 - 440 MHz
MU 5-MM/h	130001026	430 - 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 5-X/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Sturdy, flexible rubber with cast-in multicore steel wire radiating element Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 170 mm
WEIGHT	X-version: Approx. 75 g XP4-version: Approx. 215 g MM-version: Approx. 325 g
MOUNTING	18 mm dia. hole

## INSTALLATION

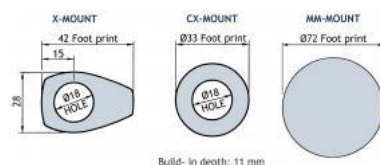
This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

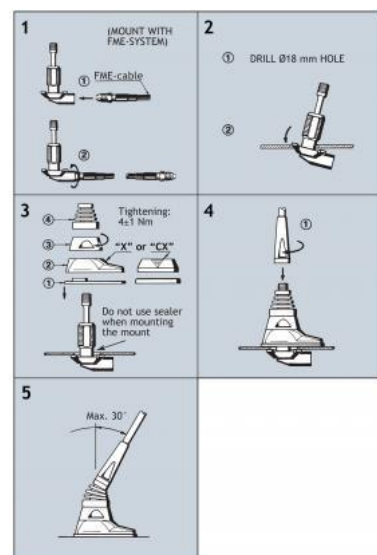
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## 3. TUNING/MODEL CONVERSION

The antenna is delivered factory-tuned and requires no further tuning.

To convert an MU 5-X/s model into an MU 5-X/l model, cut off 12 mm of the top end of the whip.

To convert an MU 5-X/l model into an MU 5-X/h model, cut off 11 mm of the top end of the whip.

### PLEASE NOTE

For safety reasons, when using the MU 5-MM, car speed must not exceed 180 km/h.



## GPS-C MHU 3/FM

GPS Antenna with WHip for the 160 MHz, 450 MHz and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Black-chromed, conical stainless steel whip.
- Easily removable for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.
- Unity gain for the 160 MHz band and 3 dB gain for the 450 MHz band.

TYPE	PRODUCT NO.
GPS-C MHU 3/FM	132000072
LH 108/136-1G (optional)	200000769
LH 108/136-2G (optional)	200000762
DIPX 225/330-FME (optional)	200000670

Not every combination of frequency pairs can be delivered.  
When ordering, please state frequencies between 140 - 170 MHz and 400 - 470 MHz.

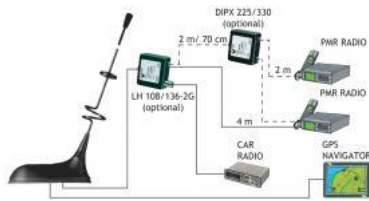
## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C MHU 3/FM
ANTENNA TYPE	Tripple-frequency mobile antenna
FREQUENCY	160 MHz: F.res. within: 140 - 170 MHz 450 MHz: F.res. within: 400 - 470 MHz FM band: 88 - 108 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	160 MHz: 0 dB (acc. to EIA RS-329-1) 450 MHz: 3 dB (acc. to EIA RS-329-1)
SWR	≤ 1.5 @ f.res. on both bands
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed, conical stainless steel Black-chromed brass
COLOUR	Black

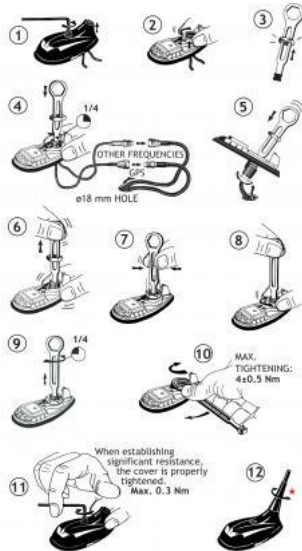
HEIGHT	Approx. 450 mm (dep. on freq.)
WEIGHT	Approx. 60 g (dep. on freq.)
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm. Tools for mounting included

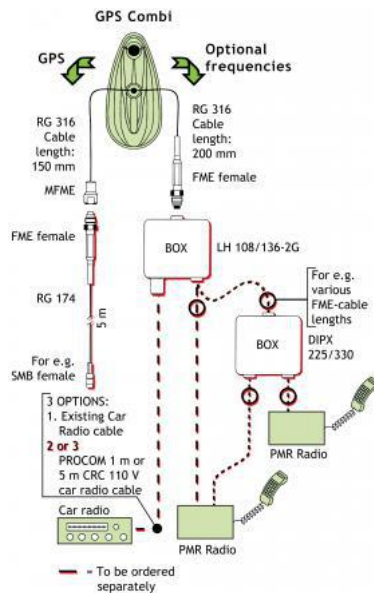


## MOUNTING INSTRUCTIONS



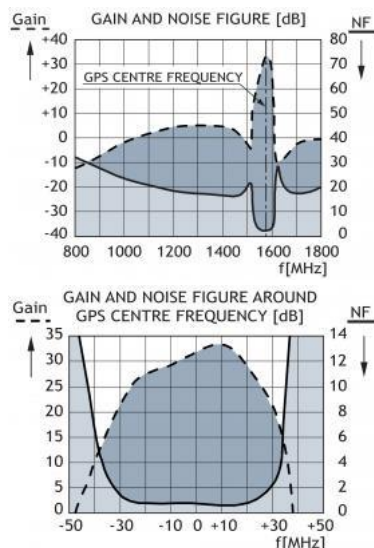
★ The whip should always be dismounted during car wash.

## CABLE MOUNTING

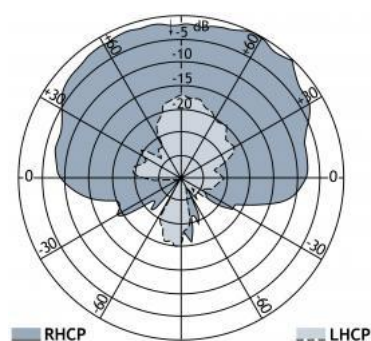


## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN



## TUNING INFORMATION

The GPS-C MHU 3/FM cannot be tuned to any pair of frequencies in the two bands. Further, the antenna must be equipped with a different kind of adjustment disc depending on the frequency pair in question.

The antenna can be used without adjustment disc, with a small adjustment disc or with a large adjustment disc. All adjustment disc types are supplied with the antenna.

### Use the diagrams below as follows

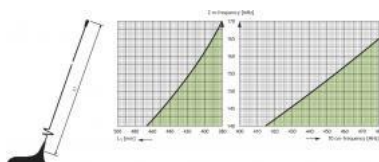
1. Draw a horizontal line through the point on the vertical axis which corresponds to the 2 m-frequency in question.
2. The drawn horizontal line intersects the shaded area over a certain band of 70 cm-frequencies.

If the 70 cm-frequency to be covered is not included in the shaded area, try another diagram (another adjustment disc type). If the 70 cm-frequency is not covered in any of the diagrams, coverage of the frequency pair in question is not possible using this type of antenna. Please note, however, that taking into account the inherent bandwidth of the antenna ( $\pm 2$  MHz in the 2 m-band and  $\pm 12$  MHz in the 70 cm-band) the combination area may be increased considerably.

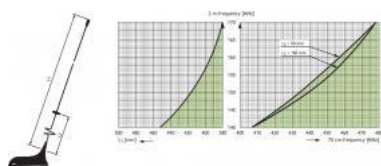
### For the relevant diagram

3. Read the total length L1 on the left horizontal axis and cut the whip to this length.
4. Locate the 70 cm-frequency in question on the right horizontal axis and read the corresponding length L2 from the curves in the shaded area.

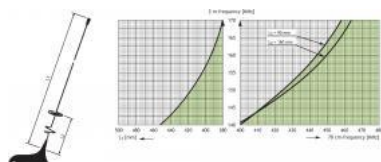
## WITH NO ADJUSTMENT DISC



## WITH THE SMALL ADJUSTMENT DISC



## WITH THE LARGE ADJUSTMENT DISC



Use an SWR-meter to fine-tune the settings



## MH 1-LXR

$\frac{1}{4} \lambda$  Mobile Antenna for the 160 MHz Band

- 0 dB mobile antenna.
- Black-chromed, conical stainless steel whip.

### DESCRIPTION

- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MH 1-LXR	130000713

### SPECIFICATIONS

ELECTRICAL	
MODEL	MH 1-LXR
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 144...175 MHz (Also applicable: 175...225 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Black-chromed stainless steel Black-chromed brass <b>Mount:</b>

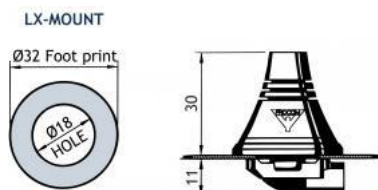
	Brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 550 mm
WEIGHT	Approx. 52 g
MOUNTING	18 mm dia. hole

## INSTALLATION

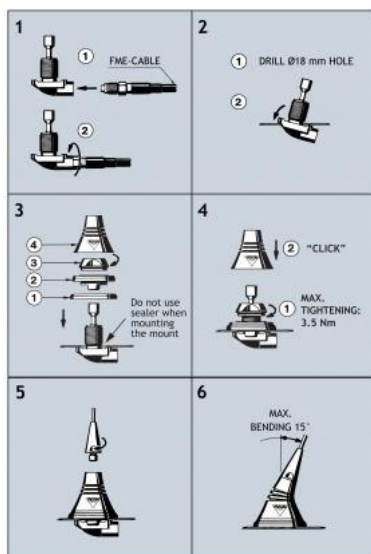
The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



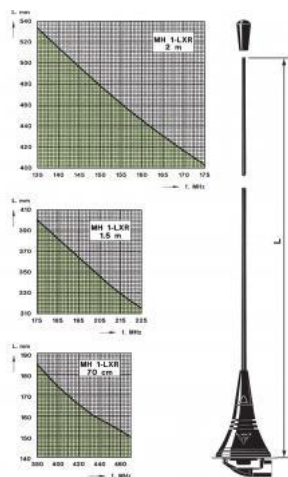
Do not use sealer on rubber gasket or other places.

## PLEASE NOTE:

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## 3. TUNING / MODEL CONVERSION

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.





## MU 4-ZG/...

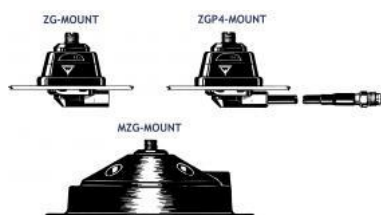
### Collinear 4 dB Mobile Antenna for the 450 MHz Band

- 4 dB mobile antenna with collinear, stainless steel whip with 8 mm thread joint.
- Models with ZG-mount or MZG-magnetic mount.

## DESCRIPTION

- Choice between ZG-mount with FME-connection (supplied without cable) or ZGP4-mount with 4 m factory fitted cable (terminated with FME-connector).
- MZG-models are provided with FME-connection directly on the mount (supplied without cable).
- Choice between general purpose tunable models and permanently tuned models for cellular systems.

Whips from the ZG/ZGP4 mounts and the MZG-mount are **NOT** compatible.



## ORDERING DESIGNATIONS

ZG-mount with FME	PRODUCT NO.	ZGP4-mount with 4 m cable and FME-conn.	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING
MU 4-ZG/s	130000972	MU 4-ZGP4/s	130000958	380...410
MU 4-ZG/f	130000957	MU 4-ZGP4/f	130000959	406...430
MU 4-ZG/l	130000963	MU 4-ZGP4/l	130000964	420...450
MU 4-ZG/h	130000960	MU 4-ZGP4/h	130000961	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY
MU 4-ZG/CEL4		MU 4-ZGP4/CEL4		414 - 430
MU 4-ZG/CEL3	130000968	MU 4-ZGP4/CEL3	130000971	425 - 440
MU 4-ZG/CEL2	130000967	MU 4-ZGP4/CEL2	130000970	440 - 455
MU 4-ZG/	130000966	MU 4-ZGP4/	130000969	450

CEL1		CEL1	
MZG-mount with FME	PROCUCT NO.	[MHz]	
Models for general application - tunable with adjustment disc:		TUNING	
MU 4-MZG/s	130000920	380...410	
MU 4-MZG/f	130000917	406...430	
MU 4-MZG/l	130000919	420...450	
MU 4-MZG/h	130000918	440...470	
Models for cellular systems - pretuned, without adjustment disc:		FREQUENCY	
MU 4-MZG/CEL4		414 - 430	
MU 4-MZG/CEL3		425 - 440	
MU 4-MZG/CEL2	130001329	440 - 455	
MU 4-MZG/CEL1		450 - 470	

## SPECIFICATION

ELECTRICAL	
MODEL	MU 4-ZG/...
ANTENNA TYPE	Collinear stainless steel mobile whip antenna
FREQUENCY	Models within 380 - 470 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 15 MHz @ SWR $\leq$ 1.5 > 30 MHz @ SWR < 2.5
SWR	$\leq$ 1.3 @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel and brass Mount: Black-chromed Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 59 cm (dep. on freq.)
WEIGHT	ZG-version: Approx. 180 g ZGP4-version: Approx. 320 g MZG-version: Approx. 860 g

MOUNTING	ø21 mm dia. hole
----------	------------------

## INSTALLATION

The antenna whip comprises a  $\frac{1}{4} \lambda$  section, a phase shifting coil, and a  $\frac{1}{2} \lambda$  section. The ZG-mount is designed for mounting from the outside in a 21 mm dia. hole on horizontal surfaces as e.g. roof top or trunk lid.

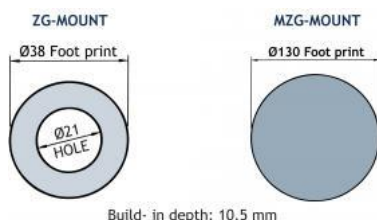
The mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

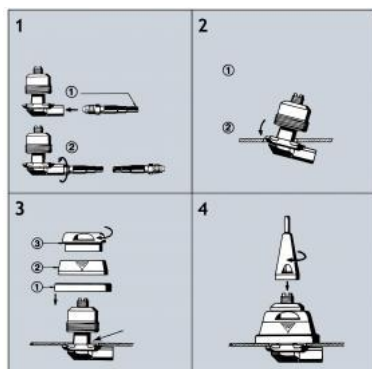
The MZG-mount antennas are provided with a large-diameter, thoroughly magnetized permanent ring magnet with an extraordinarily high attaching effect. A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction.

Please note that whips from the ZG/ZGP4 mounts and the whips from the MZG-mount are not compatible.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS

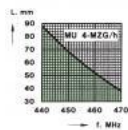
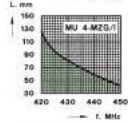
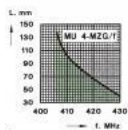
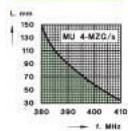


Do not use sealer on rubber gasket or other places.

## 3. TUNING



#### MZG-models



#### PLEASE NOTE

For safety reasons:  
When using the MU 4-MZG/..., car speed must not exceed 140 km/h.

## MG-Mount

### Magnetic Base for Mobile Antennas



- Heavy-duty magnetic mount with toggle joint.
- Provided with FME connecting system (FME-cable must be ordered separately).

## DESCRIPTION

- Can be used at: 27-400 MHz using standard whips and at: 400-470 MHz using specially accommodated whips.
- Extraordinarily high attaching power: takes up to 1.6 m long whips.
- Silicone layer on contact surface protects the car roof and ensures maximum friction.
- Whips are fixed on the mount using a "hat"-screw which is supplied with the mount together with a special fastening key.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MG-Mount	130000345
BMG-Mount	130000349
ORDERING	
Generally:	Order this magnetic base by simply asking for MG. (FME-cable and FME-connector are ordered separately).
Complete antennas within 27 - 400 MHz:	The whip and the MG are ordered separately. All whips available in normal Z-mount version also fit the MG. Whips are tuned with an SWR-meter using the Z-version cutting diagrams as a guide.
Complete antennas within 400 - 470 MHz:	The whip and the MG-Mount are ordered together by coding MG-Mount into the antenna designation as e.g. MU 4-MG/h. Please consult the Z-mount leaflet for the particular whip type in question to check if the whip is available with MG-Mount.

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064

6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
<b>FME-CONNECTORS</b>	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P Prolongation	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME.TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

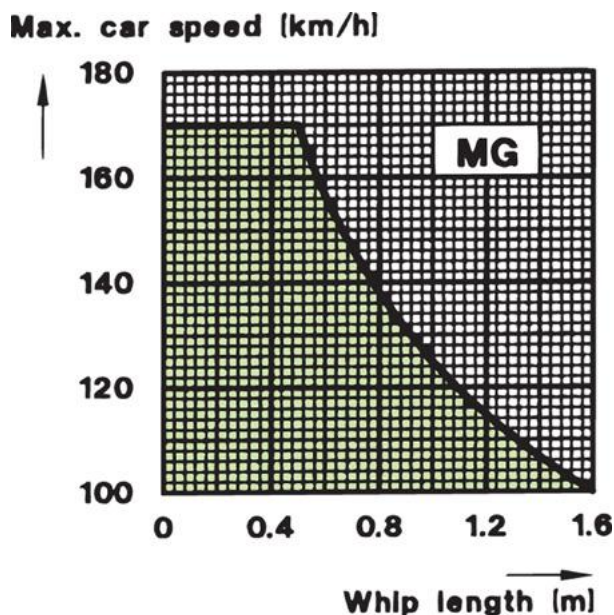
Or further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## SPECIFICATIONS

MODEL	MG-Mount
APPLICATION	Magnetic mount for toggle-joint type mobile antenna whips. With "hat"-screw and key
FREQUENCY	27 - 400 MHz using standard whips 400 - 470 MHz using special "MG"-whips
CONNECTION TO WHIP	Toggle joint (for wing screw or hat screw with key)
MATERIALS	Stainless steel Bright or black chromed brass Environment-proof plastics
CONNECTOR	FME-system
WEIGHT	Approx. 0.9 kg
DIMENSIONS	Total height: Approx. 64 mm.  Diameter: 130 mm.

MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	Depending on whip height. See curve below

## CURVE



Whip length (m)

## USING THE MG-Mount

This magnetic mount is used to make an occasional antenna installation where it is not desirable to drill holes in the mobile unit.

A magnetic mount antenna can advantageously serve several mobile units by shifting it from one unit to another. The MG is provided with a large-diameter, thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect.

The further extension of the supporting surface beyond the magnet area makes this mount stand for astounding values of bending moment and mechanical shock.

The low profile of the MG ensures low wind load.

A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction.

The magnetic mount cannot be used together with the usual wing screw normally employed when fastening mobile whips. On the MG the whip is mounted by means of a special "hat"-screw which together with a special fastening key is always supplied together with the mount.

TUNING	
Below 400 MHz	Use the cutting diagram for the corresponding Z-mount model using the same type of whip as a guide while using an SWR-meter to tune the whip.
Above 400 MHz	Whips tuned by cutting: Use an SWR-meter. Whips tuned with disc: Adjustment diagram accompanies the antenna.

## INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to produce best omnidirectional coverage.



## GPS-C MC-TETRA/FM

GPS Antenna with Whip with Shock Spring for the FM Band and TETRA Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C MC-TETRA/FM	132000150
GPS-C MC-TETRA/FM-21-23 mm	132000151
DIPX 225/330-FME (optional)	200000670

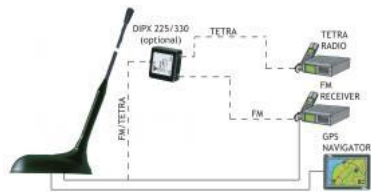
## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C MC-TETRA/FM
ANTENNA TYPE	Mobile antenna
FREQUENCY	FM band: 88 - 108 MHz, TETRA band: 380 - 400 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	FM band: Approx -3 dB (acc. to $\frac{1}{4} \lambda$ whip on a motorbike) TETRA band: Approx 0 dB (acc. to $\frac{1}{4} \lambda$ whip on a motorbike)
BANDWIDTH	TETRA band: $\geq 20$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f.res. in both bands
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Polyethylene-covered copper thread / glass fibre Black-chromed brass <b>Spring:</b> Black-chromed stainless steel
COLOUR	Black
HEIGHT	Approx. 550 mm

WEIGHT	50 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm. $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included
OPTIONAL	For mounting hole 21-23 mm use GPS-Combi mount 21-23 mm







## MCA 70/TETRA

### $\frac{1}{4} \lambda$ Motor Cycle Antenna for the TETRA Band

- MCA 70/TETRA is a rubber ground-plane antenna type with 2 radials, ideal for a motor cycle.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  ground-plane antenna in professional quality.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and hat screw whip-fastening system.
- Simple mounting by the Z-mount with FME-connection (supplied without cable).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MCA 70/TETRA	130000679

## SPECIFICATIONS

ELECTRICAL	
MODEL	MCA 70/TETRA
ANTENNA TYPE	$\frac{1}{4} \lambda$ ground-plane
FREQUENCY	380 - 400 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 20$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	150 W

>

MECHANICAL	
MATERIALS	<b>Whip:</b> Sturdy, flexible rubber with cast-in multicore steel wire radiating element Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel

	<b>Mounting plate:</b> Stainless steel
COLOUR	Black/bright chrome
HEIGHT	Approx. 340 cm
WEIGHT	Approx. 380 g
MOUNTING	On the rear side of a motor cycle

## FME-SYSTEM ACCESSORIES

FME-CABLES		FME-CONNECTORS	
TYPE	LENGTH	TYPE	CONNECTOR
1 m FME	1 m	FME-FME	FME-FME
2 m FME	2 m	FME-P	Prolongation
3 m FME	3 m	FME-N	N
4 m FME	4 m	FME-FSMA	FSMA
5 m FME	5 m	FME-BNC	BNC
6 m FME	6 m	FME-TNC	TNC
4 m FME-white	4 m white	FME-UHF	UHF
6 m FME-white	6 m white	FME-MUHF	Mini-UHF
12 m FME-white	12 m white	FME-EMUHF	Elbow-MUHF
18 m FME-white	18 m white	FME-EBNC	Elbow-BNC
For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.		FME-ETNC	Elbow-TNC
		FME-SMA	SMA



## MCA 4-Z

$\frac{1}{4} \lambda$  Glass fiber Motor Cycle Antenna with Shock Spring for the 80 MHz Band

- MCA 4-Z is a glass fiber ground-plane antenna type with 2 radials, ideal for a motor cycle.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  ground-plane antenna in professional quality.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and hat screw whip-fastening system.
- Simple mounting by the Z-mount with FME-connection (supplied without cable).

## ORDERING DESIGNATIONS

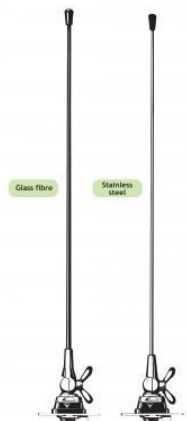
TYPE	PRODUCT NO.
MCA 4-Z	130000676

When ordering, please state the required frequency.

## SPECIFICATIONS

ELECTRICAL	
MODEL	MCA 4-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ ground-plane
FREQUENCY	Tunable by cutting within: 66-88 MHz Done by Procom
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 4$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	150 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Conical glass fiber Chromed brass <b>Spring:</b> Stainless steel <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
COLOUR	White/bright chrome
HEIGHT	Approx. 1200 mm
WEIGHT	Approx. 500 g
MOUNTING	On the rear side of a motor cycle



## MCA 1-Z/...

$\frac{1}{4} \lambda$  Glass fiber Motor Cycle Antenna with Shock Spring for the 160 MHz Band

- MCA 1-Z/... is a glass fiber ground-plane antenna type with 2 radials, ideal for a motor cycle.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  ground-plane antenna in professional quality.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and hat screw whip-fastening system.
- Simple mounting by the Z-mount with FME-connection (supplied without cable).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	L (mm)
MCA 1-Z/l	130000674	136 - 160 MHz	470
MCA 1-Z/h	130000680	150 - 174 MHz	430

## SPECIFICATIONS

ELECTRICAL	
MODEL	MCA 1-Z/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ ground-plane
FREQUENCY	136 - 174 MHz in two models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 24$ MHz @ SWR $\leq 2.0$
SWR	$< 1.3$ @ f.res.
MAX. POWER	150 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Conical glass fiber Chromed brass <b>Spring:</b> Stainless steel <b>Mount:</b> Chromed brass Weather- and shockproof plastics

	Stainless steel
COLOUR	White/bright chrome
HEIGHT	Approx. 900 mm
WEIGHT	Approx. 500 g
MOUNTING	On the back of a motor cycle

## FME-SYSTEM ACCESSORIES

FME-CABLES		FME-CONNECTORS	
TYPE	LENGTH	TYPE	CONNECTOR
1 m FME	1 m	FME-FME	FME-FME
2 m FME	2 m	FMEP	Prolongation
3 m FME	3 m	FME-N	N
4 m FME	4 m	FME-FSMA	FSMA
5 m FME	5 m	FME-BNC	BNC
6 m FME	6 m	FME-TNC	TNC
4 m FME-white	4 m white	FME-UHF	UHF
6 m FME-white	6 m white	FME-MUHF	Mini-UHF
12 m FME-white	12 m white	FME-EMUHF	Elbow-MUHF
18 m FME-white	18 m white	FME-EBNC	Elbow-BNC
		FME-ETNC	Elbow-TNC
		FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.



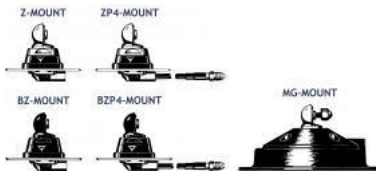
## MU 4-Z/...

### Collinear 4 dB Mobile Antenna for the 450 MHz Band

- 4 dB mobile antenna series with collinear, stainless steel whip with toggle joint.
- Models with Z-mount or MG-magnetic mount.
- Choice between Z-mount with FME-connection (supplied without cable) or ZP4-mount with factory fitted 4 m cable terminated with FME-connector.

## DESCRIPTION

- MG-models provided with FME-connection directly on the mount (without cable).
- Z-type models available in bright or black chromed versions. MG-models available in bright polished only.



Whips from the Z/ZP4 mounts and the MG-mount are **NOT** compatible.

Hat screw option (Z-/ZP4-type models only): By adding a K to the antenna designation the antenna is delivered with hat screw and key instead of wing screw.

## ORDERING DESIGNATIONS

Z-mount with FME BRIGHT	PRODUCT NO.	BZ-mount with FME BLACK	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING RANGE
MU 4-Z/s	130001015	MU 4-BZ/s	130000999	380...410
MU 4-Z/f	130000975	MU 4-BZ/f	130001001	406...430
MU 4-Z/l	130000992	MU 4-BZ/l	130000997	420...450
MU 4-Z/h	130000983	MU 4-BZ/h	130001004	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY RANGE
MU 4-Z/CEL4	130001002	MU 4-BZ/CEL4	130001010	414 - 430
MU 4-Z/CEL3	130001467	MU 4-BZ/CEL3	130001005	425 - 440
MU 4-Z/CEL2	130001466	MU 4-BZ/CEL2	130001011	440 - 455
MU 4-Z/CEL1	130001003	MU 4-BZ/CEL1	130001000	450 - 470
ZP4-mount with 4 m cable BRIGHT	PRODUCT NO.	BZP4-mount with 4 m cable BLACK	PRODUCT NO.	[MHz]

Models for general application - tunable with adjustment disc:				TUNING RANGE
MU 4-ZP4/s	130001016	MU 4-BZP4/s	130000976	380...410
MU 4-ZP4/f	130000978	MU 4-BZP4/f	130000977	406...430
MU 4-ZP4/l	130000994	MU 4-BZP4/l	130000993	420...450
MU 4-ZP4/h	130000986	MU 4-BZP4/h	130000987	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY RANGE
MU 4-ZP4/ CEL4	130001007	MU 4-BZP4/ CEL4	130000989	414 - 430
MU 4-ZP4/ CEL3	130001009	MU 4-BZP4/ CEL3	130000991	425 - 440
MU 4-ZP4/ CEL2	130001012	MU 4-BZP4/ CEL2	130000996	440 - 455
MU 4-ZP4/ CEL1	130001006	MU 4-BZP4/ CEL1	130000988	450 - 470
MG-mount with FME		PRODUCT NO.		[MHz]
Models for general application - tunable with adjustment disc:			TUNING RANGE	
MU 4-MG/s	130000902		380...410	
MU 4-MG/f	130000903		406...430	
MU 4-MG/l	130000905		420...450	
MU 4-MG/h	130000904		440...470	
Models for cellular systems - pretuned, without adjustment disc:			FREQUENCY RANGE	
MU 4-MG/CEL4	130000955		414 - 430	
MU 4-MG/CEL3	130000906		425 - 440	
MU 4-MG/CEL2	130001328		440 - 455	
MU 4-MG/CEL1	130000906		450 - 470	

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 4-Z/...
ANTENNA TYPE	Collinear stainless steel mobile whip antenna
FREQUENCY	Models within 380 – 470 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 15 MHz @ SWR ≤ 1.5 > 30 MHz @ SWR < 2.5
SWR	≤ 1.3 @ f. res.



MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and brass, bright polished/chromed or black-chromed Mount: Chromed brass (bright or black) Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Bright or black (see above)
HEIGHT	Approx. 59 cm (dep. on freq.)
WEIGHT	Z-version: Approx. 230 g ZP4-version: Approx. 370 g MG-version: Approx. 930 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

The antenna whip comprises a  $\frac{1}{4} \lambda$  section, a phase shifting coil, and a  $\frac{1}{2} \lambda$  section. The whip is fastened to the mount by means of our standard ball joint and wing screw system. The adjustable ball joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

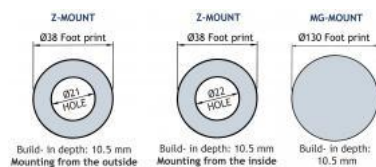
The Z-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

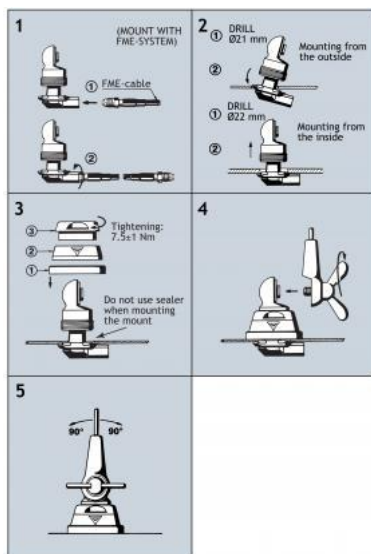
The "MG"-mount antennas are provided with a large-diameter, thoroughly magnetized permanent ring magnet with an extraordinarily high attaching effect. A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction.

Please note that the whips from the Z/ZP4-mounts and the whips from the MG-mount are not compatible.

## 1. INSTALLATION DIMENSIONS



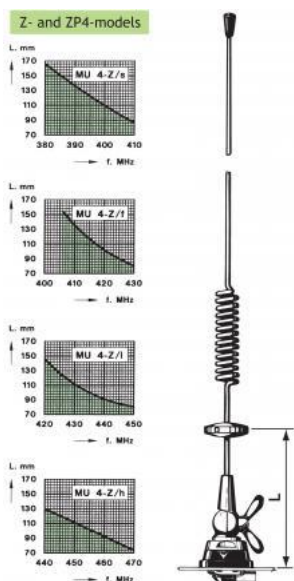
## 2. INSTALLATION STEPS

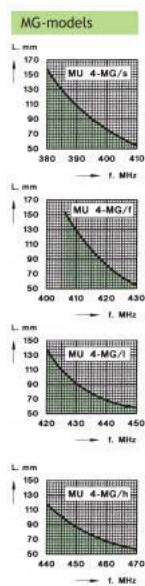


Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.





## PLEASE NOTE

For safety reasons:  
When using the MU 4-MG/..., car speed must not exceed 140 km/h.



## GPS-C HX 2/...

GPS Antenna with a  $\frac{1}{4} \lambda$  Helical Antenna for the 160 MHz Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Flexible, conical steel helix moulded in flexible thermoplastic rubber.
- Reduced-size  $\frac{1}{4} \lambda$  helical antenna whip.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C HX 2/...	132000049

### SPECIFICATIONS FOR WHIP

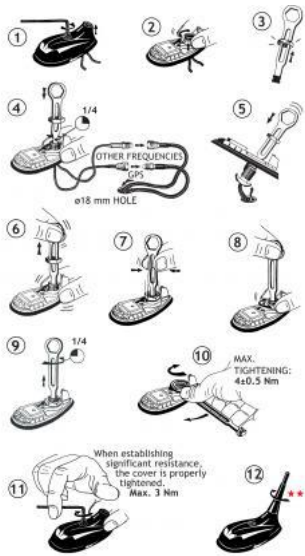
ELECTRICAL	
MODEL	GPS-C HX 2/...
ANTENNA TYPE	Shortened $\frac{1}{4} \lambda$ helical antenna
FREQUENCY	Tunable by cutting within: 144 - 175 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. -3 dB (acc. to EIA RS-329-1)
MAX. POWER	10 W
MECHANICAL	
MATERIALS	Steel helix moulded in flexible thermoplastic rubber Black-chromed brass
COLOUR	Black
HEIGHT	Approx. 130 mm (dep. on freq.)
WEIGHT	Approx. 34 g (dep. on freq.)
MOUNTING	On the GPS-Combi mount

### SPECIFICATIONS FOR GPS-COMBI MOUNT

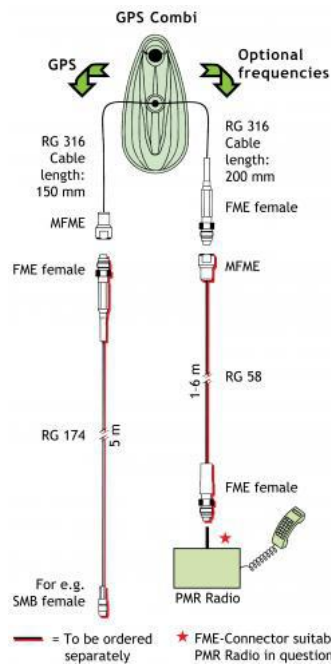
ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT

ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

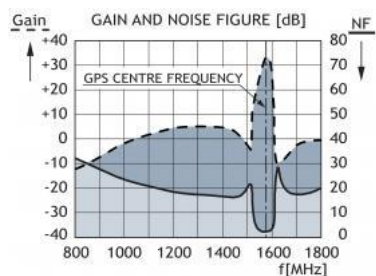
## MOUNTING INSTRUCTIONS

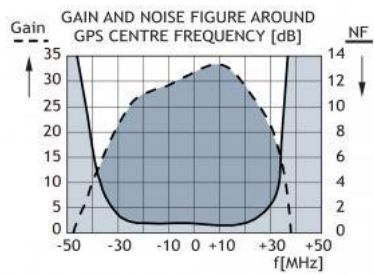


## CABLE MOUNTING

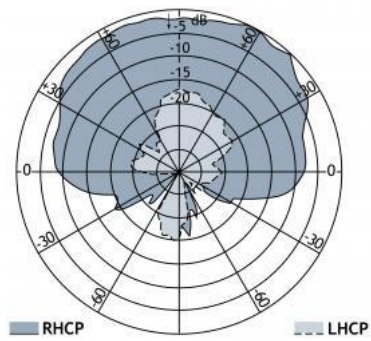


## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN





## GPS-C FLEX/TETRA/GSM

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the TETRA and EGSM Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Flexible antenna made of steel wire covered with black silicone tubing.
- Easily removable for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	ROOF THICKNESS
GPS-C FLEX/TETRA/GSM	132000066	Max. 2.5 mm
GPS-C FLEX/TETRA/GSM/7mm	132000069	3.5 - 7.5 mm

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C FLEX/TETRA/GSM
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	380 - 430 MHz (TETRA) 880 - 960 MHz (EGSM)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1) for the TETRA band
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 2.5$
SWR	$\leq 1.7$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Silicone tube over flexible bowden wire Chromed brass
COLOUR	Black
HEIGHT	Approx. 140 mm
WEIGHT	Approx. 25 g
MOUNTING	On the GPS-Combi mount

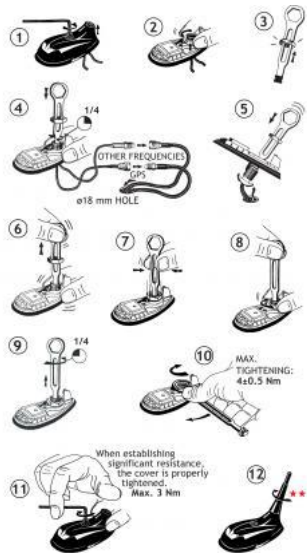


## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm or 3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm $\varnothing$ 19.0 mm dia. hole for roof thickness 3.5 - 7.5 mm Tools for mounting included

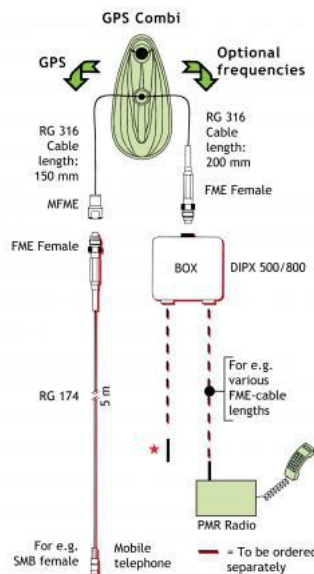


## MOUNTING INSTRUCTIONS



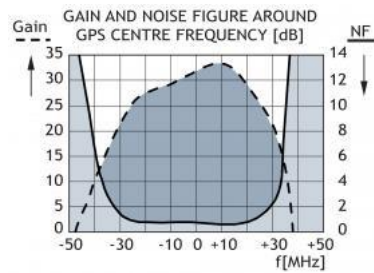
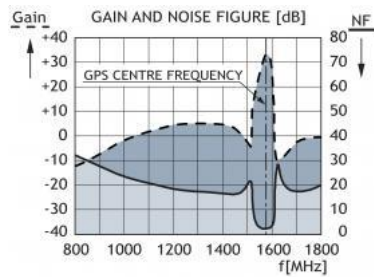
★ ★ The whip should always be dismounted during car wash.

## CABLE MOUNTING

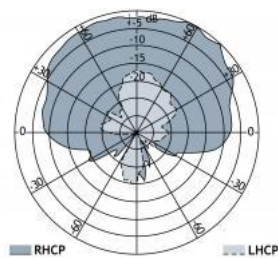


★ FME-Connector suitable for Mobile telephone in question.

## TYPICAL RESPONSE CURVES



### VERTICAL RADIATION PATTERN





## MU 4-X/..., MU 4-CX/..., MU 4-XG/..., MU 4-MM/...

### Collinear 4 dB Mobile Antenna for the 450 MHz Band

- 4 dB mobile antenna with collinear, stainless steel whip.
- Stainless steel X-mount with M6-thread whip-fastening system.

### The whip is compatible with all below mounts

- 

## DESCRIPTION

- Models available with X-mount (oblong), CX-mount (circular), XG-Combi mount (oblong) with GPS and MM-mount (magnetic).
- Choice between mounts with FME-connection (without cable) or models with permanently attached 4 m cable with FME connector.
- Choose between general purpose tunable models and permanently tuned models for cellular systems.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - **Right-Hand Circular Polarization (RHCP).**
  - 2.85 V - 5 V supply voltage (typical 3 V).

## ORDERING DESIGNATIONS

X-mount (oblong) with FME	PRODUCT NO.	CX-mount (circular) with FME	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING
MU 4-X/s	130000952	MU 4-CX/s	130000953	380...410
MU 4-X/f	130000922	MU 4-CX/f	130000923	406...430
MU 4-X/l	130000933	MU 4-CX/l	130000934	420...450
MU 4-X/h	130000927	MU 4-CX/h	130000928	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY
MU 4-X/CEL5	130001610	MU 4-CX/CEL5	130001612	380 - 410
MU 4-X/CEL4	130000951	MU 4-CX/CEL4	130000937	414 - 430
MU 4-X/CEL3	130000944	MU 4-CX/CEL3	130000940	425 - 440
MU 4-X/CEL2	130000941	MU 4-CX/CEL2	130000938	440 - 455
MU 4-X/CEL1	130000942	MU 4-CX/CEL1	130000943	450 - 470

## ORDERING DESIGNATIONS

XP4-mount (oblong) with 4 m cable and FME-conn.	PRODUCT NO.	CXP4-mount (circular) with 4 m cable and FME-conn.	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING
MU 4-XP4/s	130000954	MU 4-CXP4/s	130000955	380...410
MU 4-XP4/f	130000924	MU 4-CXP4/f	130000925	406...430
MU 4-XP4/l	130000935	MU 4-CXP4/l	130000936	420...450
MU 4-XP4/h	130000929	MU 4-CXP4/h	130000930	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY
MU 4-XP4/CEL5	130001611	MU 4-CXP4/ CEL5	130001613	380 - 410
MU 4-XP4/CEL4	130000950	MU 4-CXP4/CEL4	130000949	414 - 430
MU 4-XP4/CEL3	130001474	MU 4-CXP4/CEL3	130000948	425 - 440
MU 4-XP4/CEL2	130000947	MU 4-CXP4/CEL2	130000939	440 - 455
MU 4-XP4/CEL1	130000945	MU 4-CXP4/CEL1	130000946	450 - 470

#### ORDERING DESIGNATIONS

XG-COMBI mount (oblong) with FME	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:		TUNING
MU 4-XG/s	130002033	380...410
MU 4-XG/f	130002034	406...430
MU 4-XG/l	130002093	420...450
MU 4-XG/h	130002094	440...470
Models for cellular systems - pretuned, without adjustment disc:		FREQUENCY
MU 4-XG/CEL5	130002099	380 - 410
MU 4-XG/CEL4	130002098	414 - 430
MU 4-XG/CEL3	130002097	425 - 440
MU 4-XG/CEL2	130002096	440 - 455
MU 4-XG/CEL1	130002095	450 - 470

#### ORDERING DESIGNATIONS

XGP4-COMBI mount (oblong) with 4 m cable and FME-conn.	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:		TUNING
MU 4-XGP4/s	130002035	380...410
MU 4-XGP4/f	130002036	406...430
MU 4-XGP4/l	130002105	420...450
MU 4-XGP4/h	130002106	440...470
Models for cellular systems - pretuned, without adjustment disc:		FREQUENCY
MU 4-XGP4/CEL5	130002104	380 - 410

MU 4-XGP4/CEL4	130002103	414 - 430
MU 4-XGP4/CEL3	130002102	425 - 440
MU 4-XGP4/CEL2	130002101	440 - 455
MU 4-XGP4/CEL1	130002100	450 - 470

## ORDERING DESIGNATIONS

MM-mount with FME	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:		TUNING
MU 4-MM/s	130000916	380...410
MU 4-MM/f	130000909	406...430
MU 4-MM/l	130000915	420...450
MU 4-MM/h	130000914	440...470
Models for cellular systems - pretuned, without adjustment disc:		FREQUENCY
MU 4-MM/CEL5	130001614	380 - 410
MU 4-MM/CEL4	130000912	414 - 430
MU 4-MM/CEL3	130000911	425 - 440
MU 4-MM/CEL2	130000910	440 - 455
MU 4-MM/CEL1	130000913	450 - 470

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 4-X/..., MU 4-CX/..., MU 4-XG/..., MU 4-MM/...
ANTENNA TYPE	Collinear stainless steel mobile whip antenna
FREQUENCY	Models within 380 – 470 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 15 MHz @ SWR ≤ 1.5 > 30 MHz @ SWR < 2.5
SWR	≤ 1.3 @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel

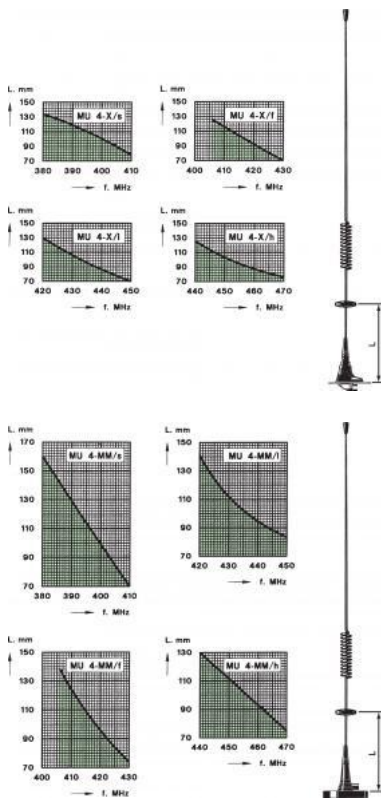
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 59 cm (dep. on freq.)
WEIGHT	X-version: Approx. 155 g XP4-version: Approx. 290 g CX-version: Approx. 155 g CXP4-version: Approx. 290 g XG-version: Approx. 170 g XGP4-version: Approx. 310 g MM-version: Approx. 380 g

## INSTALLATION AND ASSEMBLY INSTRUCTIONS

Please refer to the data sheet of each individual mount to find the installation and assembly instructions.

## TUNING

The diagrams apply to all models in the series



## PLEASE NOTE

For safety reasons:  
When using the MU 4-MM, car speed must not exceed 120 km/h.



## GPS-C FLEX/70/GSM/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- External antenna whip mounted on the GPS-Combi mount.
  - Flexible antenna made of steel wire covered with black silicone tubing.
  - Easily removable for car wash.

### Description

- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high gain, low noise amplifier.
  - Right-Hand Circularly Polarized antenna (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	ROOF THICKNESS
GPS-C FLEX/70/GSM/s	132000068	380 - 420 MHz	Max. 2.5 mm
GPS-C FLEX/70/GSM/l	132000069	410 - 450 MHz	Max. 2.5 mm
GPS-C FLEX/70/GSM/h	132000070	430 - 470 MHz	Max. 2.5 mm

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C FLEX/70/GSM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	GPS-C FLEX/70/GSM/s: 380 - 420 MHz GPS-C FLEX/70/GSM/l: 410 - 450 MHz GPS-C FLEX/70/GSM/h: 430 - 470 MHz Also useable for the GSM Band (890 - 960 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1) for the 70 cm band
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 2.5$
SWR	$\leq 1.7$ @ f.res. for the 70 cm band
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Silicone tube over flexible bowden wire Chromed brass
COLOUR	Black
HEIGHT	Approx. 140 mm



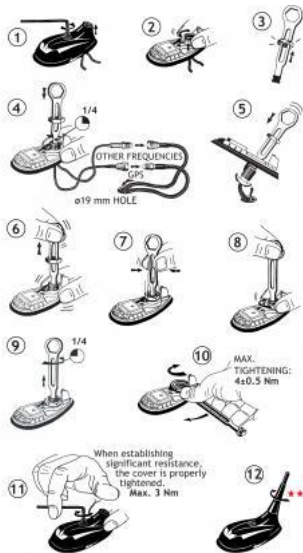
WEIGHT	Approx. 25 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up till 2.0 mm. $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm. Tools for mounting included.

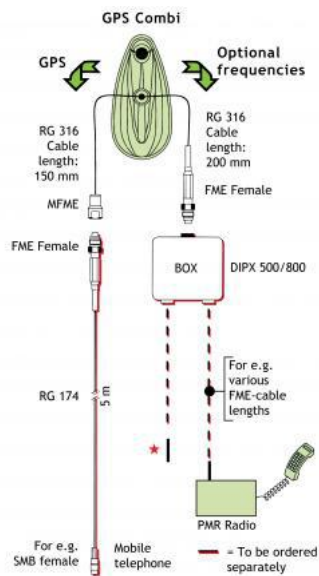


## MOUNTING INSTRUCTIONS



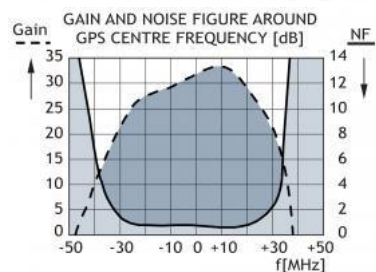
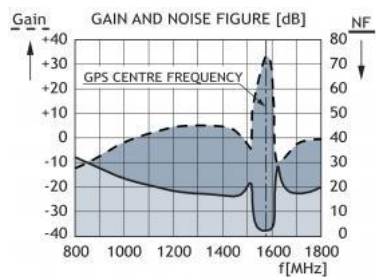
★★ The whip should always be dismounted during car wash.

## CABLE MOUNTING

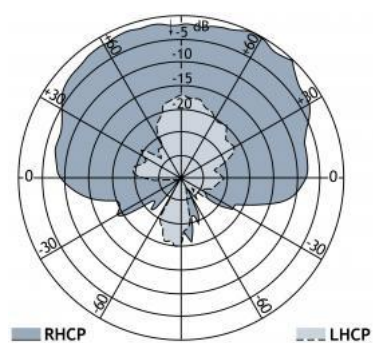


★ FME-Connector suitable for Mobile telephone in question.

## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 3-BZ/TETRA/I

3dB Gain  $\frac{5}{8} \lambda$  Mobile Antenna for the TETRA Band

- Black-chromed stainless steel whip with toggle joint.
- Factory tuned for the range 380 - 410 MHz.

### DESCRIPTION

- Stainless steel BZ-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles: BZ-mount: FME-connection (supplied without cable).
- BZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.

BZ-MOUNT



BZP4-MOUNT



### ORDERING DESIGNATIONS

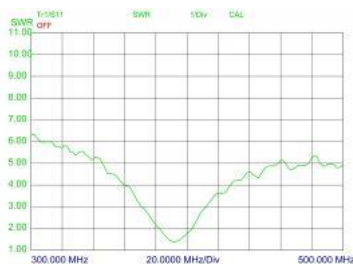
TYPE	MOUNT VERSION	PRODUCT NO.
MU 3-BZ/TETRA/I	BZ-mount with FME-system	130001374
MU 3-BZP4/TETRA/I	BZP4-mount with 4 m cable and FME-connector	130001389

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 3-BZ/TETRA/I
ANTENNA TYPE	$\frac{5}{8} \lambda$ mobile whip antenna
FREQUENCY	380 - 410 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 3 dB (acc. to EIA RS-329-1)

BANDWIDTH	$\geq 10 \text{ MHz @ SWR} \leq 2.0$ $\geq 30 \text{ MHz @ SWR} \leq 3.0$
SWR	$\leq 1.5 \text{ @ f. res.}$
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Stainless steel, black-chromed Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1 \text{ Nm}$
COLOUR	Black
HEIGHT	Approx. 49 cm
WEIGHT	BZ-version: Approx. 140 g BZP4-version: Approx. 280 g
MOUNTING	$\varnothing 21 \text{ mm}$ dia. hole (For roof thickness from 2 mm up to 7.5 mm mounting hole should be $\varnothing 22 \text{ mm}$ dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## TYPICAL SWR CURVE



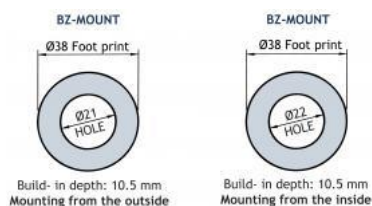
## INSTALLATION

This antenna is provided with type BZ-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

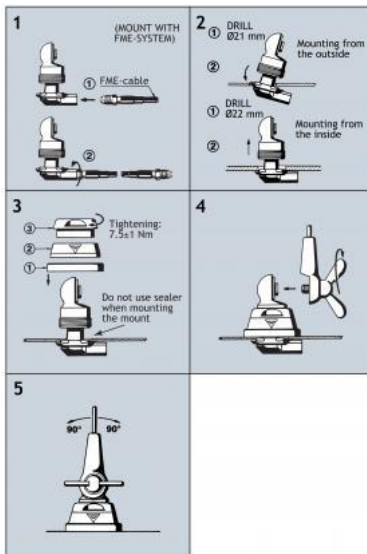
The BZ-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The BZ-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

However, the antenna can be installed anywhere on the car, as the BZ-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.



## GPS-C 900/1800/UMTS/WIFI

GPS Antenna with a 1/4  $\lambda$  Mobile Antenna for the 900 MHz, 1800 MHz, UMTS and WIFI Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Multiband antenna covering EGSM-900, DCS-1800, UMTS and WIFI.
  - Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular polarization (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.

	External antenna whip mounted on the GPS-Combi mount. <ul style="list-style-type: none"> <li>• Multiband antenna covering EGSM-900, DCS-1800, UMTS and WIFI.</li> <li>• Easily removable whip for car wash.</li> </ul>
	GPS-antenna for fixed installations. <ul style="list-style-type: none"> <li>• Full hemispherical coverage.</li> <li>• Built-in high-gain, low-noise amplifier.</li> <li>• Right-Hand Circular polarization (RHCP).</li> <li>• 5 V supply voltage (3 V respectively 12 V available on request).</li> <li>• DC supply via RF-connector.</li> </ul>

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 900/1800/UMTS/WIFI	132000146

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 900/1800/UMTS/WIFI
ANTENNA TYPE	Multiband antenna
FREQUENCY	880 - 960 MHz (EGSM) 1710 - 1880 MHz (DCS) 1900 - 2200 MHz (UMTS) 2400 - 2700 MHz (WIFI)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1) on all bands
BANDWIDTH	900 MHz: $\geq 80$ MHz @ SWR $\leq 2.0$ 1700 - 2700 MHz: $\geq 1000$ MHz @ SWR $\leq 2.5$

SWR	$\leq 1.5$ @ f. res.
MAX. POWER	25 W
<b>MECHANICAL</b>	
MATERIALS	Black-chromed brass Black POM
COLOUR	Black
HEIGHT	Approx. 71 mm
WEIGHT	Approx. 20 g
MOUNTING	On the GPS-WIFI Combi Mount

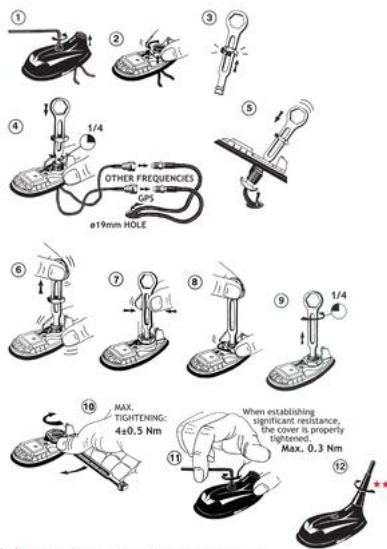
## SPECIFICATIONS FOR GPS-WIFI COMBI MOUNT

<b>ELECTRICAL General specifications</b>	
MODEL	GPS-WIFI COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + SMA (male for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm



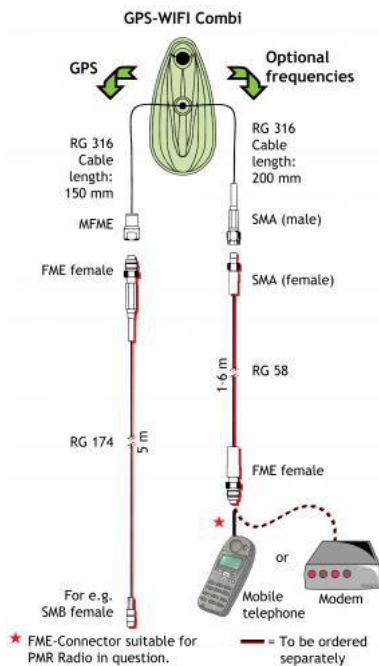
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	114 g
MOUNTING	<p>Ø18.0 mm dia. hole for roof thickness up to 2.0 mm</p> <p>Ø18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm</p> <p>Tools for mounting included</p>

## MOUNTING INSTRUCTIONS

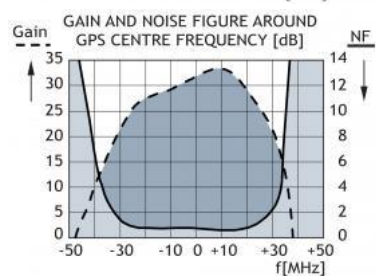
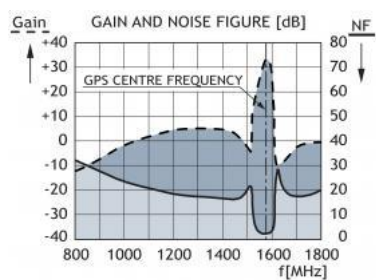


★★ The whip should always be dismounted during car wash.

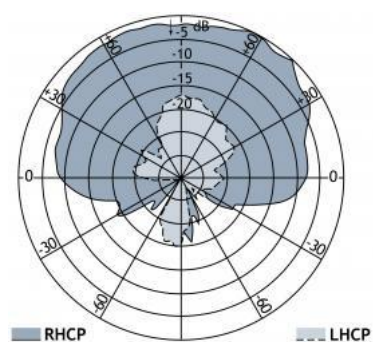
## CABLE MOUNTING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 3-BZ

3dB Gain  $\frac{5}{8} \lambda$  Mobile Antenna for the 450 MHz Band

- Black-chromed stainless steel whip with toggle joint.
- Tunable by cutting in the range 400...470 MHz.

### DESCRIPTION

- Stainless steel BZ-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - BZ-mount: FME-connection (supplied without cable).
  - BZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.



BZ-MOUNT

BZP4-MOUNT



### ORDERING DESIGNATIONS

	TYPE	PRODUCT NO.	MOUNT VERSION
	MU 3-BZ	130001422	BZ-mount with FME-system
	MU 3-BZP4	130000899	BZP4-mount with 4 m cable and FME-connector

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 3-BZ
ANTENNA TYPE	$\frac{5}{8} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 400...470 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical

GAIN	Approx. 3 dB
BAND WIDTH	$\geq 12$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Stainless steel, black-chromed Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 58 cm
WEIGHT	BZ-version: Approx. 140 g BZP4-version: Approx. 280 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness from 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

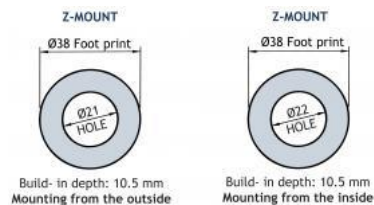
## INSTALLATION

This antenna is provided with type BZ-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

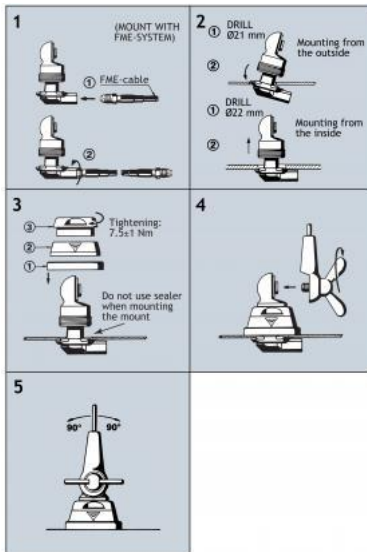
The BZ-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The BZ-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

However, the antenna can be installed anywhere on the car, as the BZ-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

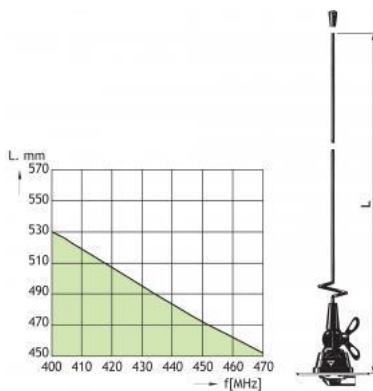
### 3. TUNING

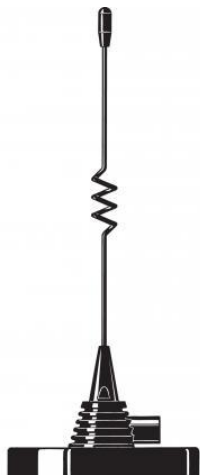
The antenna should always be tuned using an SWR-meter.

The cutting diagram below serves as a guide for this procedure.

#### PLEASE NOTE

1. As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.
2. The antenna can be delivered factory-tuned to customer's frequencies. Please consult our price list concerning additional charges for adjustment by cutting.





## MU 2404/UMTS-MMS

colinear 2 dB Mobile Magnetic Antenna for the UMTS Band

- Mobile magnetic antenna for the UMTS band (1900 - 2200 MHz). Colinear, stainless steel whip.
- 2 dB gain compared to a  $1/4 \lambda$  whip.

### DESCRIPTION

- Stainless steel MMS-mount - professional quality in elegant and smooth design.
- Low profile magnetic mount.
- Provided with FME-connection (supplied without cable).
- Silicone layer on contact surface protects the car roof and ensures maximum friction.

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2404/UMTS-MMS	130001279

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2404/UMTS-MMS
ANTENNA TYPE	Colinear magnetic mobile whip antenna
FREQUENCY	UMTS band (1900-2200 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	> 200 MHz @ SWR < 2.25
SWR	< 2.0 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, stainless steel Black-chromed brass Mount: Black-chromed brass and steel Silicone layer on contact surface All materials are chosen to avoid corrosion

CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 190 mm
WEIGHT	Approx. 255 g
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	170 km/h

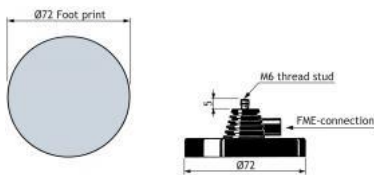
## INSTALLATION

The MU 2404/UMTS-MMS should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage.

The MMS-mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MMS-mount is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

## INSTALLATION DIMENSIONS



## TUNING

The antenna is delivered factory-tuned and requires no further tuning.

## PLEASE NOTE

For safety reasons:

When using the MU 2404/UMTS-MMS car speed must not exceed 170 km/h.



## GPS-C 900/1800/UMTS

GPS Antenna with a  $\frac{1}{4} \lambda$  Mobile Antenna for the 900 MHz, 1800 MHz and UMTS Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Triple-frequency antenna covering EGSM-900, DCS-1800 and UMTS.
- Easily removable whip for car wash.

- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- Right-Hand Circular Polarization (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 900/1800/UMTS	132000046

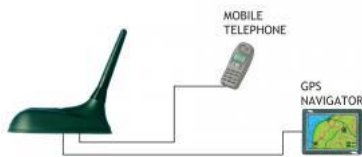
### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 900/1800/UMTS
ANTENNA TYPE	Triple-frequency antenna
FREQUENCY	880-960 MHz (EGSM) 1710-1880 MHz (DCS) 1900-2200 MHz (UMTS)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1) on all bands
BANDWIDTH	900 MHz: $\geq 80$ MHz @ SWR $\leq 1.6$ 1800 MHz: $\geq 170$ MHz @ SWR $\leq 2.25$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed brass Black POM
COLOUR	Black
HEIGHT	Approx. 67 mm
WEIGHT	Approx. 16 g
MOUNTING	On the GPS-Combi mount

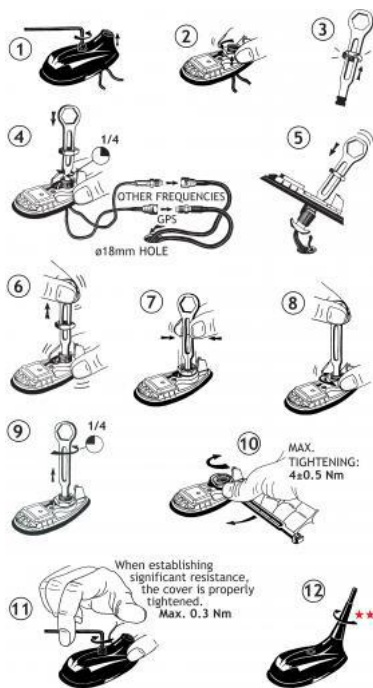


## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz (DCS)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia hole for roof thickness 2.0 - 2.5 mm Tools for mounting included



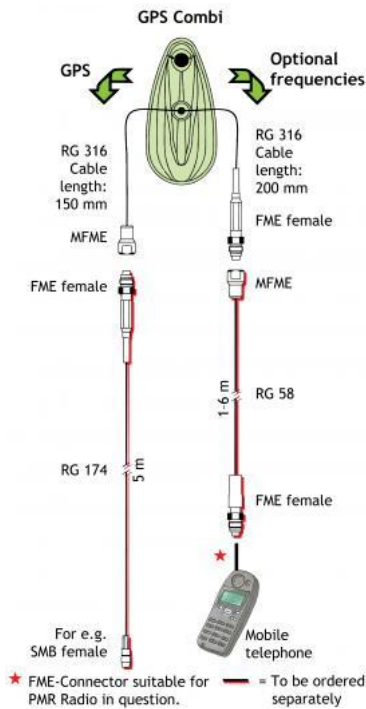
## MOUNTING INSTRUCTIONS



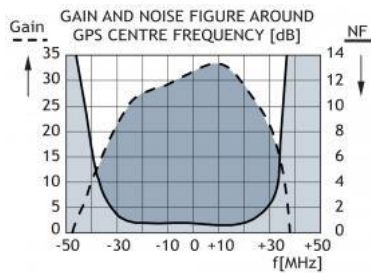
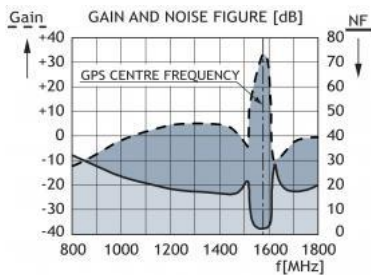
★★ The whip should always be dismantled during car wash.

Do not use sealer on rubbergasket or other places.

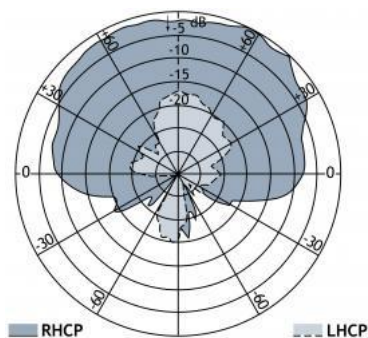
## CABLE MOUNTING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 2404/UMTS-LX

Colinear 2 dB Mobile Antenna for the UMTS Band (1900 - 2200 MHz)

- Mobile antenna for the UMTS band (1900 - 2200 MHz).
- Colinear, stainless steel whip.

### DESCRIPTION

- 2 dB gain compared to a  $1/4 \lambda$  whip.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2404/UMTS-LX	130001274

ELECTRICAL	
MODEL	MU 2404/UMTS-LX
ANTENNA TYPE	Colinear mobile whip antenna
FREQUENCY	UMTS band (1900 - 2200 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel Black-chromed brass Mount: Stainless steel

	Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 180 mm
WEIGHT	Approx. 34 g
MOUNTING	18 mm dia. hole

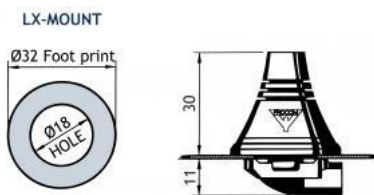
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

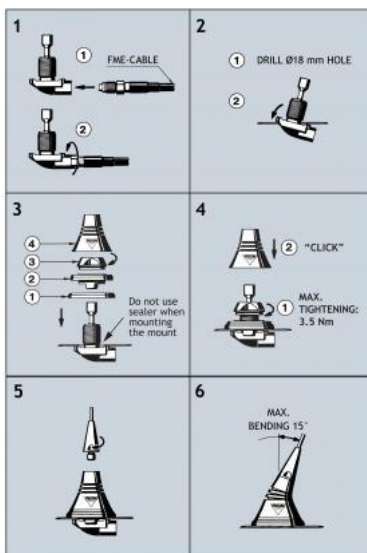
When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

## INSTALLATION DIMENSIONS



## INSTALLATION STEPS



PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## TUNING

The antenna is delivered factory-tuned and requires no further tuning.





## GPS-C 900

GPS Antenna with a  $\frac{1}{4} \lambda$  Mobile Antenna for the 900 MHz Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Mobile antenna for the 900 MHz cellular systems.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarization (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 900	132000073

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 900
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	807 - 960 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 200$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed brass Black POM
COLOUR	Black
HEIGHT	Approx. 67 mm
WEIGHT	Approx. 16 g
MOUNTING	On the GPS-Combi mount

### SPECIFICATIONS FOR GPS-COMBI MOUNT

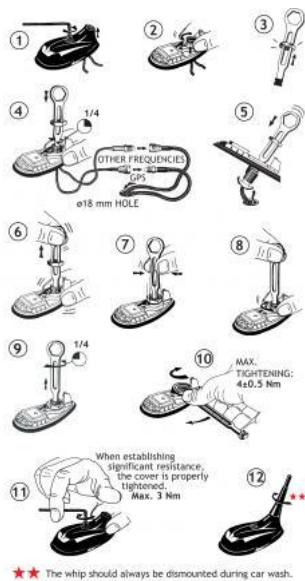
ELECTRICAL General specifications

MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

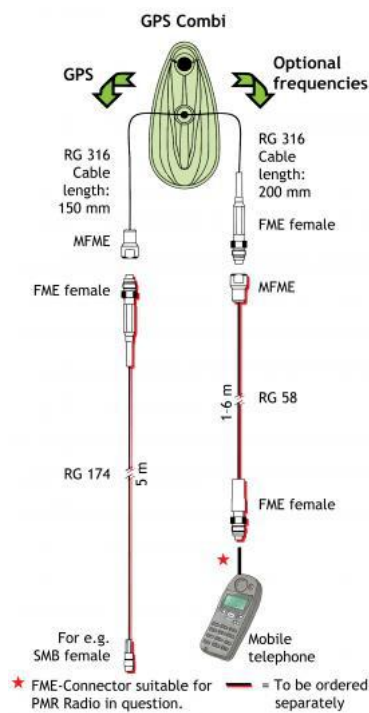




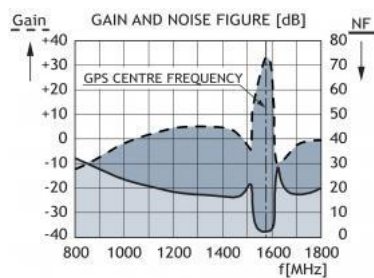
## MOUNTING INSTRUCTIONS

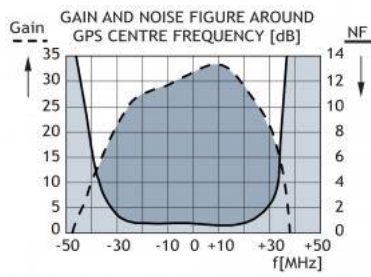


## CABLE MOUNTING

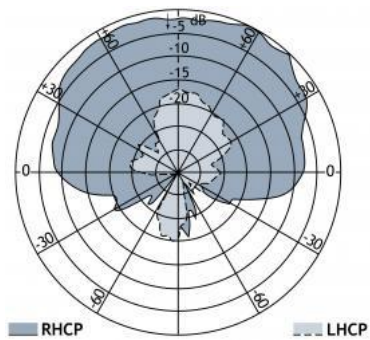


## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN





## MU 2404-MMSP2/...

### Collinear 2 dB Mobile Antenna for the 2400 MHz Band

- Mobile antenna for the 2400 MHz band.
- Collinear, stainless steel whip.

## DESCRIPTION

- 2 dB gain compared to a  $\frac{1}{4} \lambda$  whip.
- Stainless steel MMSP2-mount - professional quality in elegant and smooth design.
- Low-profile magnetic mount.
- Delivered with permanently attached 2 m low loss cable terminated with FME-connector.
- Silicone layer on contact surface protects the car roof and ensures maximum friction.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.	FREQUENCY
MU 2404-MMSP2/UMTS	130002003	1900 - 2200 MHz
MU 2404-MMSP2/2300-2500 MHz	130002004	2300 - 2500 MHz
MU 2404-MMSP2/2530-2572 MHz	130002005	2530 - 2572 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2404-MMSP2/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	2400 MHz band, models within 1900 - 2572 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, stainless steel Black-chromed brass Mount:

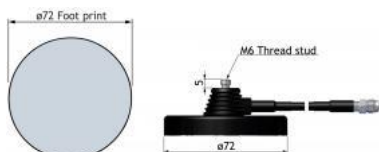
	Black-chromed brass and steel Silicone layer on contact surface All materials are chosen to avoid corrosion
CABLE	2 m cable terminated with FME-connector (female)
COLOUR	Black
HEIGHT	Approx. 180 mm (dep. on model)
WEIGHT	Approx. 350 g
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	180 km/h

## INSTALLATION

The MU 2404-MMSP2/... should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage. The MMSP2-mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MMSP2-mount is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount tolerate very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



### 2. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

For safety reasons: When using the MU 2404-MMSP2/... car speed must not exceed 180 km/h.



## MU 2404-MMS

### Colinear 2 dB Mobile Antenna for the 2400 MHz Band

- Mobile antenna for the 2400 MHz band.
- Collinear, stainless steel whip.
- 2 dB gain compared to a  $\frac{1}{4} \lambda$  whip.

## DESCRIPTION

- Stainless steel MMS-mount - professional quality in elegant and smooth design.
- Low profile magnetic mount.
- Provided with FME-connection (supplied without cable).
- Silicone layer on contact surface protects the car roof and ensures maximum friction.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2404-MMS	130001273

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2404-MMS
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	2400 MHz band (2300 - 2500 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass stainless steel Black-chromed brass Mount: Black-chromed brass and steel Silicone layer on contact surface

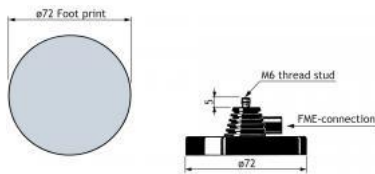
	All materials are chosen to avoid corrosion
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 160 mm
WEIGHT	Approx. 250 g
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	140 km/hv

## INSTALLATION

The MU 2404-MMS should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage. The MMS-mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MMS-mount is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



### 2. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

For safety reasons: When using the MU 2404-MMS car speed must not exceed 140 km/h.



## GPS-C 4/TETRA-S BBMU/...

### Collinear Mobile Antenna for the 4m and TETRA Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Polyethylene-covered flexible whip.
  - Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular Polarization (RHCP).
  - 5 V supply voltage (3 V and 12 V respectively available on request).
  - DC supply via RF-connector.
  - Matching unit (BBMU) included.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	ROOF THICKNESS
GPS-C 4/TETRA-S BBMU	132000139	Max. 2.5 mm
GPS-C 4/TETRA-S BBMU/7mm	132000129	3.5 - 7.5 mm

## SPECIFICATIONS FOR WHIP

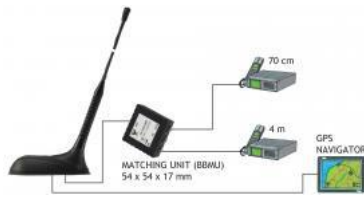
ELECTRICAL	
MODEL	GPS-C 4/TETRA-S BBMU/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 70 cm: 380 - 400 MHz
SWR	74.2 - 77.7 and 84 - 87.5 MHz: $\leq 2.5$ 380 - 400 MHz: $\leq 2.0$
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 m: approx. -3 dB 70 cm: approx. 1 dB (acc. to EIA RS-329-1)
MAX. POWER	15 W
MECHANICAL	
MATERIALS	Whip: Glass fibre whip with copper wire winding, polyethylene-covered Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	670 mm
WEIGHT	60 g

MOUNTING	On the GPS-Combi mount
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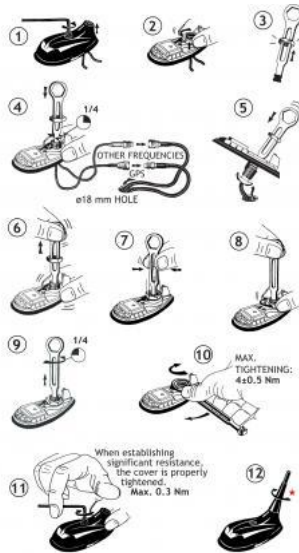
## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
Built-in amplifier	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P1 dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass. Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm or 3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm $\varnothing$ 19 mm dia. hole for roof thickness 3.5 - 7.5 mm Tools for mounting included



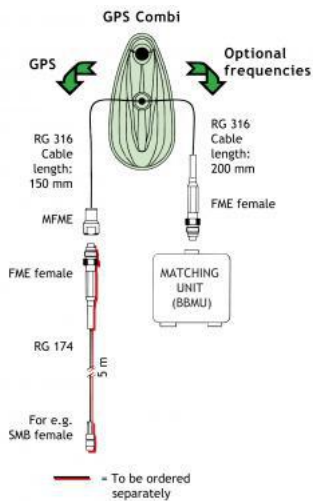


## MOUNTING INSTRUCTIONS



★ The whip should always be dismounted during car wash.

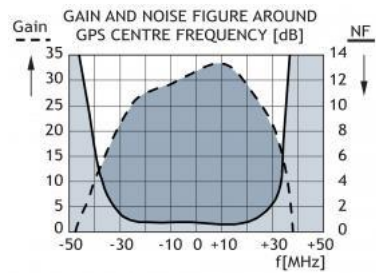
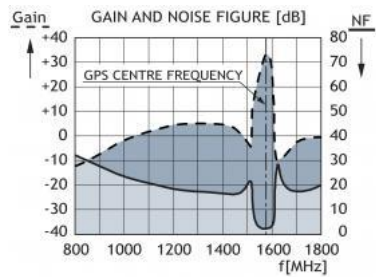
## CABLE MOUNTING



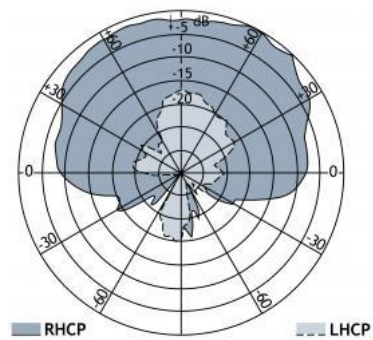
## PLEASE NOTE

The cable between the GPS-C Mount and BBMU box must not be extended.

## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 2404-LX

### Colinear 2 dB Mobile Antenna for the 2400 MHz Band

- Mobile antenna for the 2400 MHz band.
- Colinear, stainless steel whip.

## DESCRIPTION

- 2 dB gain compared to a  $1/4 \lambda$  whip.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2404-LX	130001267

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2404-LX
ANTENNA TYPE	Colinear mobile whip antenna
FREQUENCY	2400 MHz band (2300 – 2500 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Black-chromed brass stainless steel

	Mount: Stainless steel Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 140 mm
WEIGHT	Approx. 34 g
MOUNTING	18 mm dia. hole

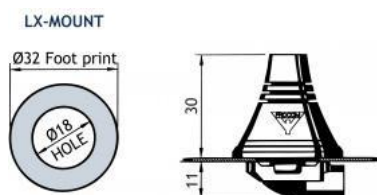
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

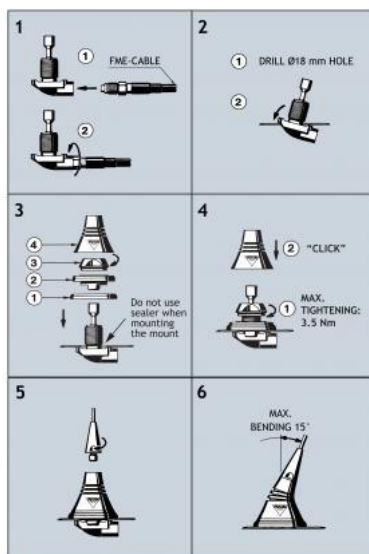
The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

## INSTALLATION DIMENSIONS



## INSTALLATION STEPS

The antenna is delivered factory-tuned and requires no further tuning.



PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## TUNING



## GPS-C 4/70/FM

Collinear Mobile Antenna for the 80 MHz, 400 MHz and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Mobile antenna with conical stainless steel whip.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarization antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### SPECIFICATIONS FOR WHIP

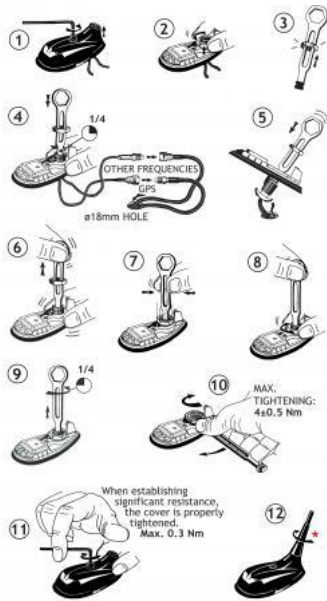
ELECTRICAL	
MODEL	GPS-C 4/70/FM
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	80 MHz: 83 - 86 MHz 400 MHz: 380 - 410 MHz FM band: 88 - 108 MHz
SWR	80 MHz: $\leq 2.0$ 400 MHz: $\leq 1.5$
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	80 MHz: Approx. 0 dB (acc. to EIA RS-329-1) 400 MHz: 4 dB (acc. to EIA RS-329-1)
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed conical, stainless steel Black-chromed brass
COLOUR	Black
HEIGHT	640 mm
WEIGHT	65 g
MOUNTING	On the GPS-Combi mount

### SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz

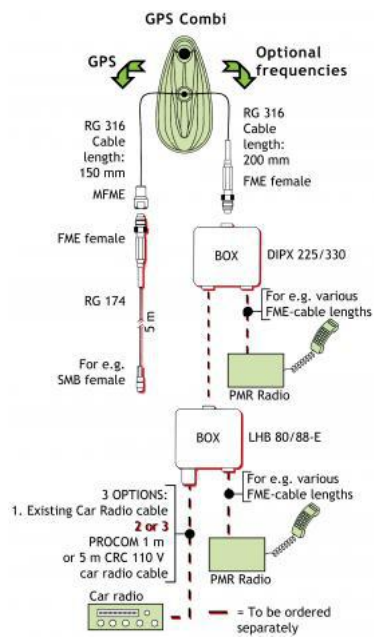
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

## MOUNTING INSTRUCTIONS

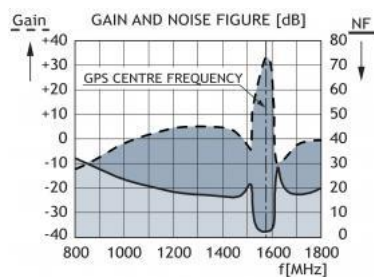


★ The whip should always be dismantled during car wash.

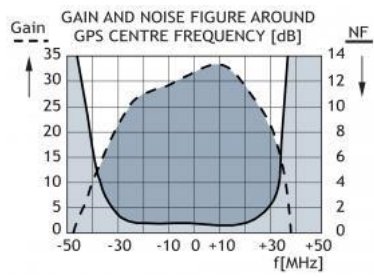
## CABLE MOUNTING



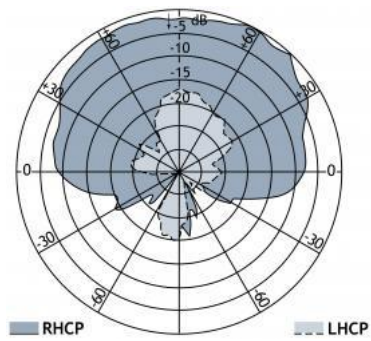
## TYPICAL RESPONSE CURVES







## VERTICAL RADIATION PATTERN





## MU 2401/UMTS-MMS

0 dB Mobile Antenna for the UMTS Band (1900 - 2200 MHz)

- Mobile antenna for the UMTS Band (1900 – 2200 MHz).
- Black-chromed whip in nice, discrete design.

### DESCRIPTION

- Approx. 0 dB gain.
- MMS-mount – professional quality in elegant and smooth design.
- Low profile magnetic mount.
- Provided with FME-connection (supplied without cable).

### ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2401/UMTS-MMS	130001276

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2401/UMTS-MMS
ANTENNA TYPE	1/4 $\lambda$ mobile antenna
FREQUENCY	UMTS band (1900 – 2200 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2$
SWR	$\leq 1.75$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Mount: Black-chromed brass and steel Silicone layer on contact surface All materials are chosen to avoid corrosion
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 60 mm
WEIGHT	Approx. 250 g

MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	180 km/h

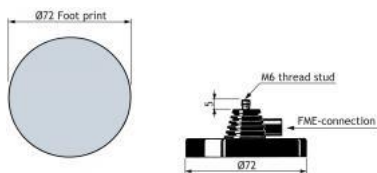
## INSTALLATION

The MU 2401/UMTS-MMS should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage.

The MMS-mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MMS-mount is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

## INSTALLATION DIMENSIONS



## 2. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

## PLEASE NOTE

For safety reasons: When using the MU 2401/UMTS-MMS car speed must not exceed 180 km/h.



## GPS-C 4/2/TETRA-S BBMU/...

Collinear Mobile Antenna for the 4m, 2m and TETRA Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Polyethylene-covered flexible whip.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarization antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.
- Matching unit (BBMU) included.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	ROOF THICKNESS
GPS-C 4/2/TETRA-S BBMU	132000084	Max. 2.5 mm
GPS-C 4/2/TETRA-S BBMU/7mm	132000096	3.5 - 7.5 mm

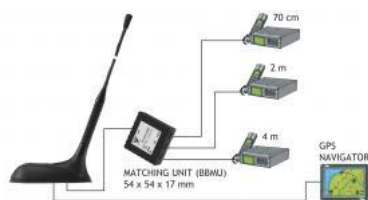
### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 4/2/TETRA-S BBMU/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 2 m: 167.5 - 174 MHz 70 cm: 380 - 400 MHz
SWR	74.2 - 77.7 and 84 - 87.5 MHz: $\leq 2.5$ 167.5 - 169.5 and 172 - 174 MHz: $\leq 2.0$ 380 - 400 MHz: $\leq 2.0$
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 m: approx.. -3 dB 2 m: approx. -4 dB 70 cm: approx. 2 dB (acc. to EIA RS-329-1)
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Glass fibre whip with copper wire winding, polyethylene-covered. Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	670 mm

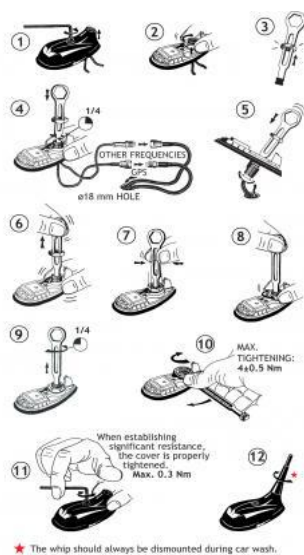
WEIGHT	60 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
Built-in amplifier	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P1 dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass. Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm or 3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm $\varnothing$ 19 mm dia. hole for roof thickness 3.5 - 7.5 mm Tools for mounting included

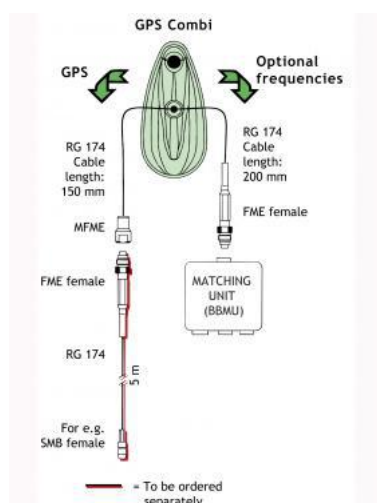


## MOUNTING INSTRUCTIONS

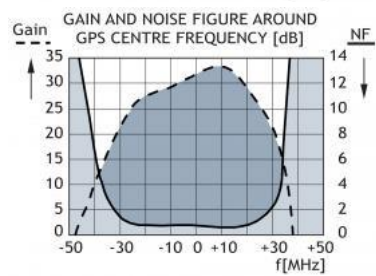
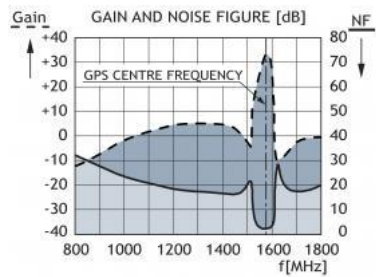


Do not use sealer on rubber gasket or other places.

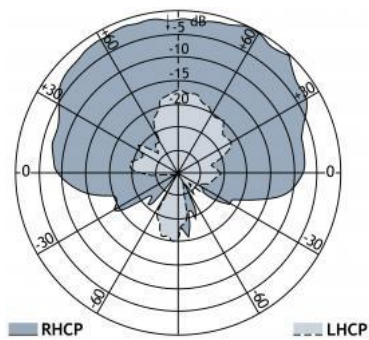
## CABLE MOUNTING

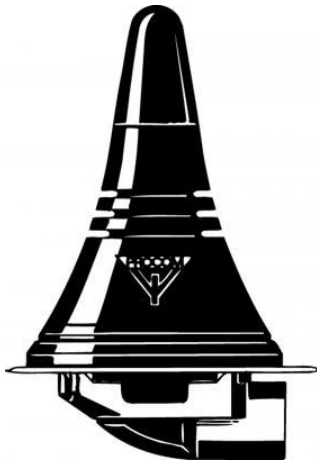


## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 2401/UMTS-LX

0 dB Mobile Antenna for the UMTS Band (1900 - 2200 MHz)

- Mobile antenna for the UMTS Band (1900 – 2200 MHz).
- Black-chromed whip in nice, discrete design.

### DESCRIPTION

- Approx. 0 dB gain.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

### ORDERING DESIGNATION

TYPE NO.	PRODUCT NO.
MU 2401/UMTS-LX	130001275

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 2401/UMTS-LX
ANTENNA TYPE	1/4 λ mobile antenna
FREQUENCY	UMTS band (1900 – 2200 MHz)
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BAND WIDTH	≥ 200 MHz @ SWR ≤ 2
SWR	≤ 1.75 @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Mount: Stainless steel

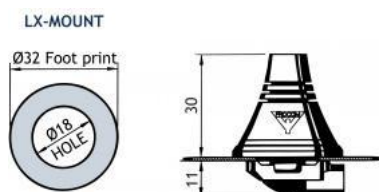


	Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 40 mm
WEIGHT	Approx. 30 g
MOUNTING	18 mm dia. hole

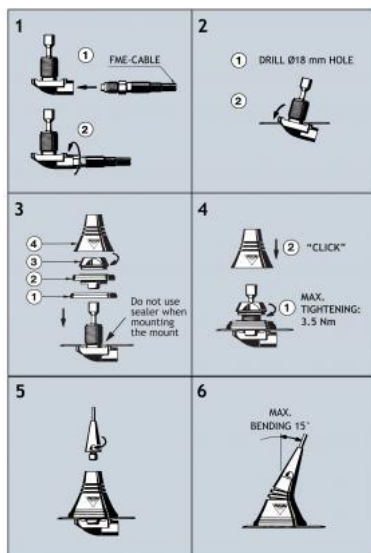
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

## INSTALLATION DIMENSIONS



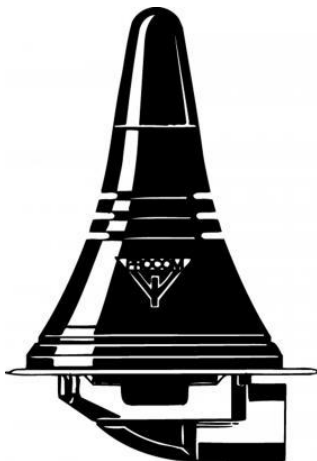
## INSTALLATION STEPS



PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## MU 2401-LX

### 0 dB Mobile Antenna for the 2400 MHz Band

- Mobile antenna for the 2400 MHz band.
- Black-chromed whip in nice, discrete design.

## DESCRIPTION

- Approx. 0 dB gain.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 2401-LX	130001270

## SPECIFICATIONS

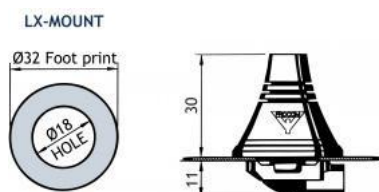
ELECTRICAL	
MODEL	MU 2401-LX
ANTENNA TYPE	1/4 $\lambda$ mobile antenna
FREQUENCY	2400 MHz band (2300 – 2500 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2$
SWR	$\leq 1.75$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Mount: Stainless steel

	Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 40 mm
WEIGHT	Approx. 30 g
MOUNTING	18 mm dia. hole

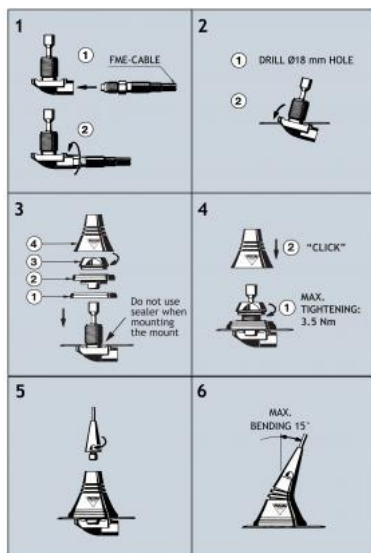
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

## INSTALLATION DIMENSIONS



## INSTALLATION STEPS



PLEASE NOTE: When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



## GPS-C 4/2/TETRA-FM-S BBMU/PH/...

Collinear Mobile Antenna for the 4 m, 2 m, FM and TETRA Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Polyethylene-covered flexible whip.
  - Easily removable whip for car wash.

### Description

- GPS-antenna for fixed installations. Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular Polarization antenna (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.
  - Matching unit (BBMU) included.
  - Matching unit without FM (PH-BOS3 BBMU) available.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	ROOF THICKNESS
GPS-C 4/2/TETRA-FM-S BBMU/PH	132000106	Max. 2.5 mm
GPS-C 4/2/TETRA-FM-S BBMU/PH/7mm	132000113	3.5 - 7.5 mm
ACCESSORIES		
PH-BOS3 BBMU	132000172	

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 4/2/TETRA-FM-S BBMU/PH/...
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 2 m: 167.5 - 174 MHz 70 cm: 380 - 410 MHz FM band: 93 - 108 MHz (Limited in 88 - 93 MHz)
SWR	74.2 - 77.7 and 84 - 87.5 MHz: < 2.5 167.5 - 169.5 and 172 - 174 MHz: < 2.0 380 - 400 MHz: < 2.0 400 - 410 MHz: < 2.5 880 - 960 MHz: < 2.5 1710 - 1880 MHz: < 4.0
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 m: approx. -8 dB 2 m: approx. -4 dB 70 cm: approx. -3.5 dB (acc. to EIA RS-329-1) 880 - 960 MHz: approx. -10 dB / -12 dB 1710 1880 MHz: approx. -7 dB / -9 dB

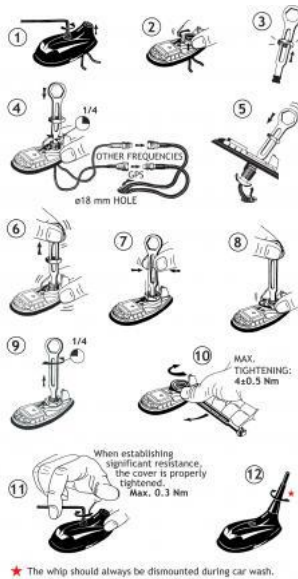
MAX. POWER	15 W
MECHANICAL	
MATERIALS	Whip: Glass fibre whip with copper wire winding, polyethylene-covered. Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	575 mm
WEIGHT	60 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
Built-in amplifier	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P1 dB	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass. Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm

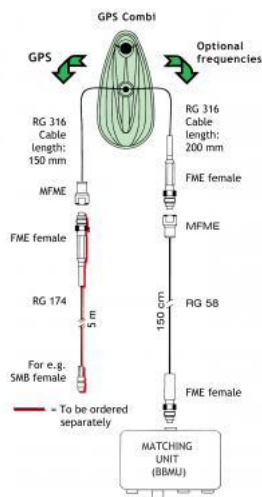
ROOF THICKNESS	Max. 2.5 mm or 3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	ø18 mm dia. hole for roof thickness up till 2.0 mm ø18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm ø19 mm dia. hole for roof thickness 3.5 - 7.5 mm Tools for mounting included

## MOUNTING INSTRUCTIONS



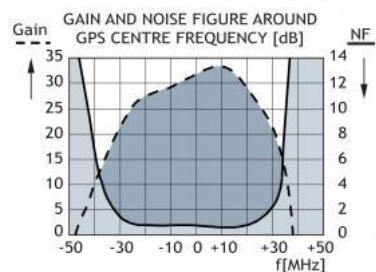
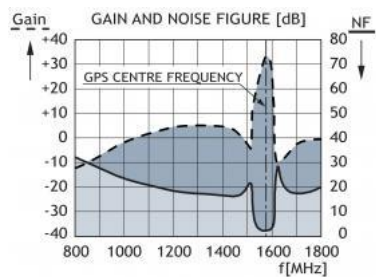
Do not use sealer on rubber gasket or other places.

## CABLE MOUNTING

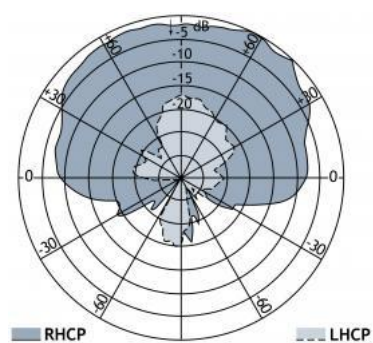


PLEASE NOTE: The cable between the GPS-C Mount and BBMU box must not be extended.

## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 23-3-ZG

Colinear 3 dB Mobile Antenna for the 23 cm Amateur Band: 1240 - 1300 MHz

- 3 dB collinear whip comprising a  $\frac{3}{4}$   $\lambda$  section, a phasing coil and a  $\frac{5}{8}$   $\lambda$  section.
- All materials in top professional quality.

### DESCRIPTION

- Broadband-performance 1240 - 1300 MHz - no tuning required.
- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.
- Simple mounting in a 21 mm hole with access from the outside only.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m low-loss RG 58 cable terminated with FME-connector.



### ORDERING DESIGNATION

TYPE	PRODUCT NO.	MOUNT VERSION
MU 23-3-ZG	130001263	ZG-mount with FME-system
MU 23-3-ZGP4	130001265	ZGP4-mount with 4 m cable and FME-connector

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 23-3-ZG
ANTENNA TYPE	Collinear mobile antenna
FREQUENCY	23 cm amateur band: 1240 - 1300 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 60$ MHz @ SWR $\leq 2.5$
SWR	$\leq 2.0$ @ f. res.



MAX. POWER	40 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel and brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 22 cm
WEIGHT	ZG-version: Approx. 120 g ZGP4-version: Approx. 260 g
MOUNTING	21 mm dia. hole

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF

FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

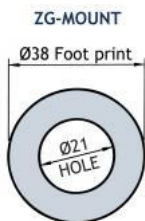
## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole.

The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

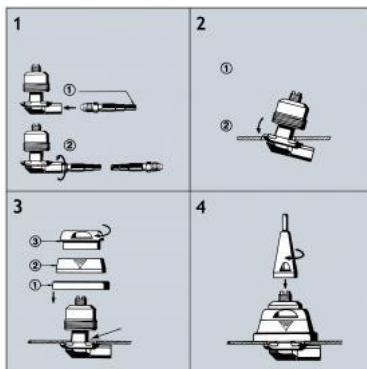
When cleaning the car in automatic washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the M8 x 1 thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



Build-in depth: 10.5 mm

### 2. INSTALLATION STEPS



### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

## LX-Mount

### Mini Mobile Mount for Antennas up to 2400 MHz



- Professional quality in an elegant and smooth design.
- Wind tunnel optimized pyramidal shape.

## DESCRIPTION

- Especially suited for roof-mounting.
- Low installation depth.
- Built-in bendable section for adjustment of the whip (tiltable 15° by hand).
- Internal M5 thread whip-fastening system.
- Total height of only 30 mm – satisfies the EC-directive 79/488/EEC.
- Stainless steel mounting body.
- Provided with FME-connection system – cable to be ordered separately.
- Designed for the future – works up to and beyond 2400 MHz.
- Whips available for communications systems in the frequency range 150 – 2400 MHz.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
LX-mount	130000371

Other frequencies on request

## SPECIFICATIONS

MODEL	LX-Mount
APPLICATION	Mount for mobile antennas
FREQUENCY	150 - 2400 MHz
CONNECTION TO WHIP	M5 internal thread
CONNECTOR	FME-connection system (supplied without cable)
MATERIALS	Stainless steel Cu-nite brass Environment-proof plastics
COLOUR	Black
HEIGHT	Approx. 30 mm
INSTALLATION DIA.	31.5 mm
BUILD-IN DEPTH	Active : 25 mm Passive : 11 mm
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.

WEIGHT	22 g
MOUNTING	18 mm dia. hole
ROOF THICKNESS	Max. 2 mm

## FME-SYSTEM ACCESSORIES

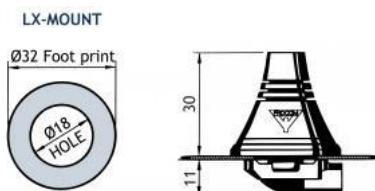
FME-CABLES		FME-CONNECTORS	
LENGTH	TYPE NO.	CONNECTOR	ORDER NO.
1 m	1 m FME	FME-FME	FME-FME
2 m	2 m FME	Prolongation	FMEP
3 m	3 m FME	N	FME-N
4 m	4 m FME	FSMA	FME-FSMA
5 m	5 m FME	BNC	FME-BNC
6 m	6 m FME	TNC	FME.TNC
4 m white	4 m FME-white	UHF	FME-UHF
6 m white	6 m FME-white	Mini-UHF	FME-MUHF
12 m white	12 m FME-white	Elbow-MUHF	FME-EMUHF
18 m white	18 m FME-white	Elbow-BNC	FME-EBNC
		Elbow-TNC	FME-ETNC
		SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue

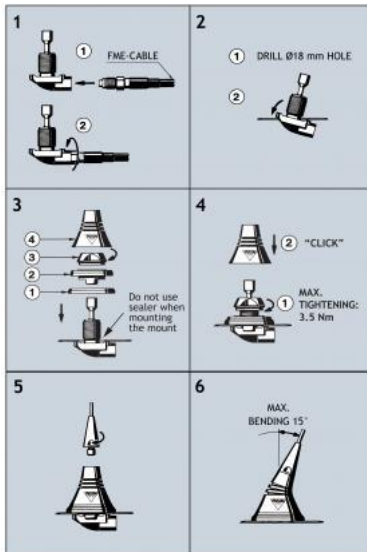
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only. A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna. When cleaning the car in car-washing machines, the whip should be removed. After wash, the whip is refitted and tightened lightly. The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



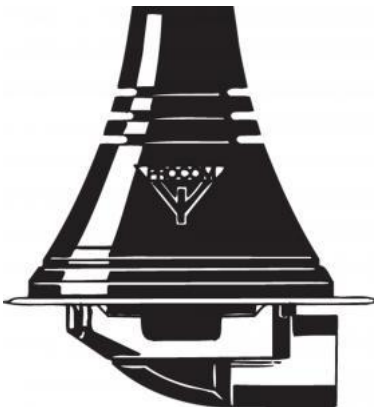
### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### PLEASE NOTE

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.





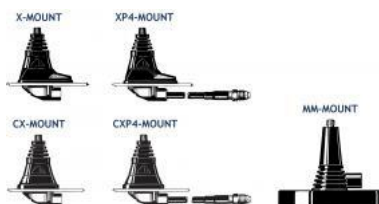
## MU 23-3-X

Colinear 3 dB Mobile Antenna for the 23 cm Amateur Band: 1240 - 1300 MHz

- 3 dB collinear whip comprising a  $\frac{3}{4} \lambda$  section, a phasing coil and a  $\frac{5}{8} \lambda$  section.
- All materials in top professional quality.

### DESCRIPTION

- Broadband-performance 1240 - 1300 MHz – no tuning required.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting in an 18 mm hole with access from the outside only.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles:
  - X-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m low-loss RG 58 cable terminated with FME-connector.



### ORDERING DESIGNATION

TYPE	PRODUCT NO.	MOUNT VERSION
MU 23-3-X	130001259	X-mount (oblong) with FME-system
MU 23-3-CX	130001261	CX-mount (circular) with FME-system + FME-connector
MU 23-3-XP4	130001260	XP4-mount (oblong) with 4 m cable + FME-connector
MU 23-3-CXP4	130001262	CXP4-mount (circular) with 4 m cable
MU 23-3-MM	130001264	MM-mount (magnetic) with FME-system

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 23-3-X
ANTENNA TYPE	Collinear mobile antenna

FREQUENCY	23 cm amateur band: 1240 – 1300 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 60 MHz @ SWR ≤ 2.0
SWR	≤ 1.5 @ f. res.
MAX. POWER	40 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Black-chromed stainless steel and brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 22 cm
WEIGHT	X-version: Approx. 60 g XP4-version: Approx. 200 g MM-version: Approx. 230 g
MOUNTING	18 mm dia. hole

## FME-SYSTEM ACCESSORIES

<b>FME-CABLES</b>	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
<b>FME-CONNECTORS</b>	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation

FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## INSTALLATION

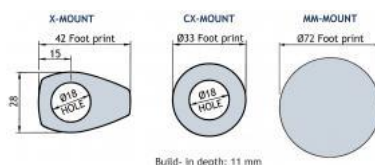
This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

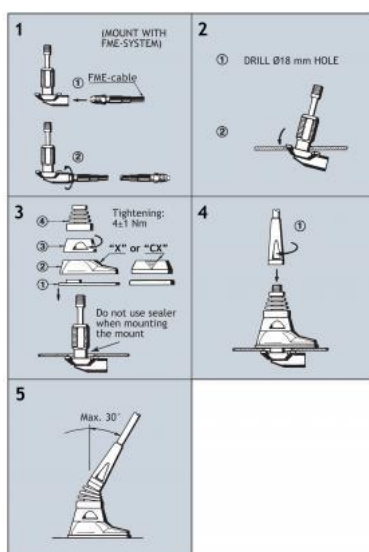
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

## INSTALLATION DIMENSIONS



## INSTALLATION STEPS





## **TUNING**

The antenna is delivered factory-tuned and requires no further tuning.

## **PLEASE NOTE**

### **For safety reasons**

1. When using the MU 23-3-MM, car speed must not exceed 130 km/h.
2. If operating the MM-mount with other whips, whip length must never exceed 320 mm, and utilizing this maximum length, car speed must not exceed 115 km/h.



## GPS-C 4/2/TETRA-FM-S BBMU/...

Collinear Mobile Antenna for the 4m, 2m, FM and TETRA Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Polyethylene-covered flexible whip.
  - Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - Right-Hand Circular Polarization antenna (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.
  - Matching unit (BBMU) included.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	ROOF THICKNESS
GPS-C 4/2/TETRA-FM-S BBMU	132000090	Max. 2.5 mm
GPS-C 4/2/TETRA-FM-S BBMU/7mm	132000110	3.5 - 7.5 mm

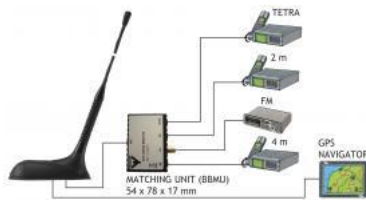
### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 4/2/TETRA-FM-S BBMU/...
ANTENNA TYPE	Colinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 2 m: 167.5 - 174 MHz 70 cm: 380 - 400 MHz FM band: 93 - 108 MHz (Limited in 88 - 93 MHz)
SWR	74.2 - 77.7 and 84 - 87.5 MHz: < 2.5 167.5 - 169.5 and 172 - 174 MHz: < 2.0 380 - 400 MHz: < 2.0
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 m: approx. -3 dB 2 m: approx. -4 dB 70 cm: approx. 2 dB (acc. to EIA RS-329-1)
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Glass fibre whip with copper wire winding, polyethylene-covered. Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	670 mm

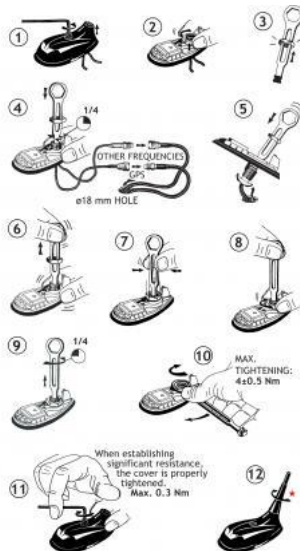
WEIGHT	60 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
Built-in amplifier	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P1 dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass. Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm or 3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm $\varnothing$ 19 mm dia. hole for roof thickness 3.5 - 7.5 mm Tools for mounting included



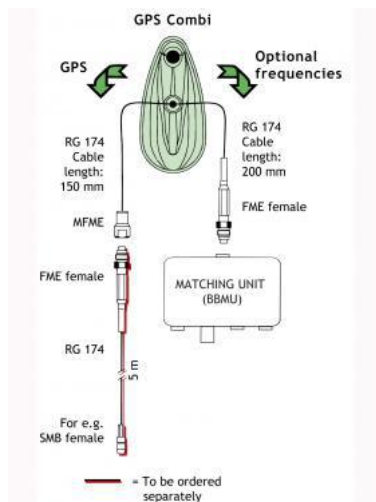
## MOUNTING INSTRUCTIONS



★ The whip should always be dismounted during car wash.

Do not use sealer on rubber gasket or other places.

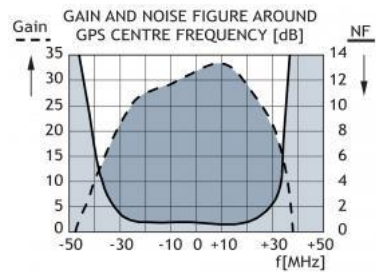
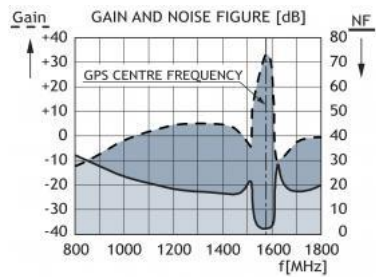
## CABLE MOUNTING



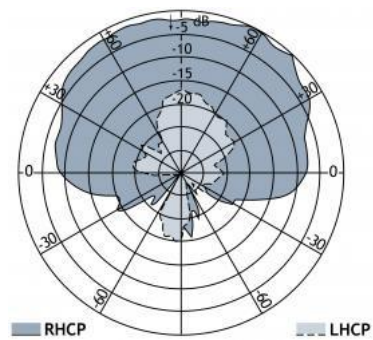
### PLEASE NOTE:

The cable between the GPS-C Mount and BBMU box must not be extended.

## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 1804-LX

### Colinear 3 dB Mobile Antenna for the 1800 MHz Band

- Mobile antenna for the 1800 MHz cellular systems (DCS-1800/PCN).
- Colinear, stainless steel whip.

## DESCRIPTION

- 3 dB gain compared to a  $1/4 \lambda$  whip.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 1804-LX	130001269

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1804-LX
ANTENNA TYPE	Colinear mobile whip antenna
FREQUENCY	1800 MHz band (1700 – 1900 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Black-chromed stainless steel

	Mount: Stainless steel Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 170 mm
WEIGHT	Approx. 34 g
MOUNTING	18 mm dia. hole

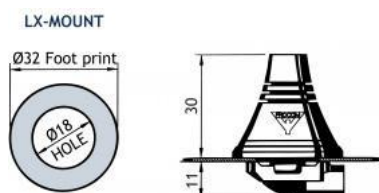
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

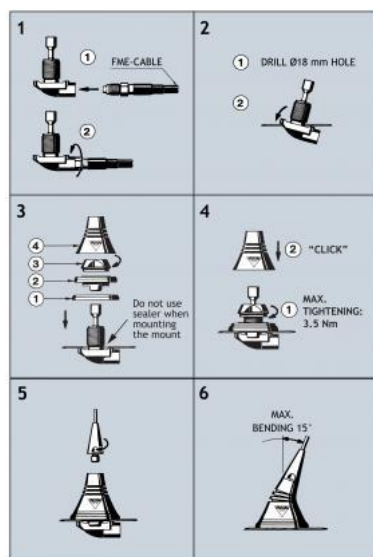
When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



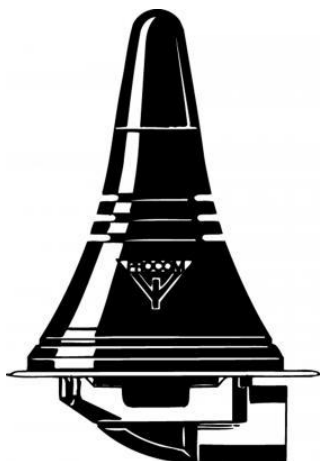
#### PLEASE NOTE

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.





## MU 1801-LX

### 0 dB Mobile Antenna for the 1800 MHz Band

- Mobile antenna for the 1800 MHz cellular systems (DCS-1800/PCN).
- Black-chromed whip in nice, discrete design.

## DESCRIPTION

- Approx. 0 dB gain.
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MU 1801-LX	130001268

## SPECIFICATIONS

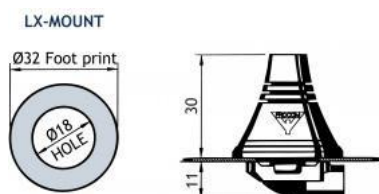
ELECTRICAL	
MODEL	MU 1801-LX
ANTENNA TYPE	1/4 $\lambda$ mobile antenna
FREQUENCY	1800 MHz band (1700–1900 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 200$ MHz @ SWR $\leq 2.25$
SWR	$\leq 2.0$ @ f. res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass Mount: Stainless steel

	Cu-nite brass Environment-proof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 40 mm
WEIGHT	Approx. 30 g
MOUNTING	18 mm dia. hole

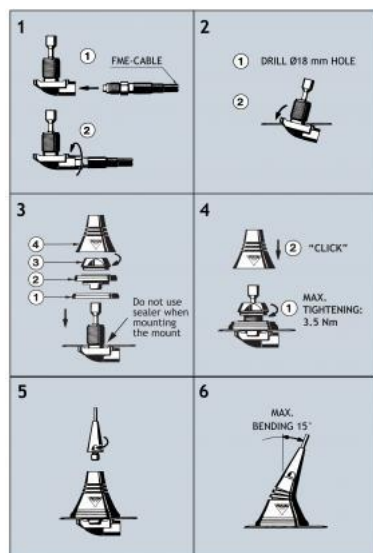
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

### 1. INSTALLATION DIMENSIONS:



### 2. INSTALLATION STEPS:



### PLEASE NOTE:

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING:

The antenna is delivered factory-tuned and requires no further tuning.

Procom A/S reserve the right to amend specifications without prior notice.





## GPS-C 2R/GSM/FM/...

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip with Shock Spring for the 160 MHz, EGSM and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Black-chromed, conical stainless steel whip.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 2R/GSM/FM/...	132000063
TRI 2/900-1800-UMTS/FM (optional)	200000792

Can also be supplied factory-cut for the required frequency (between 144 - 175 MHz).

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 2R/GSM/FM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	Tunable by cutting within: 144 - 175 MHz also receives EGSM (880 - 960 MHz) and FM-radio (88 - 108 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1) for the 160 MHz band
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black
HEIGHT	Approx. 450 mm (dep. on frequency)

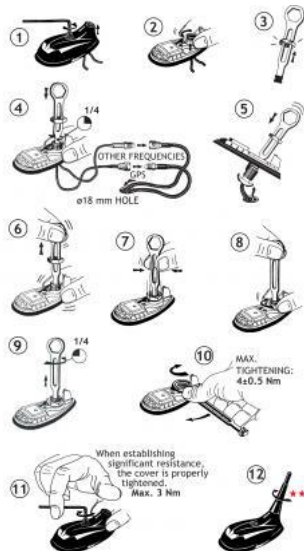
WEIGHT	Approx. 60 g (dep. on frequency)
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

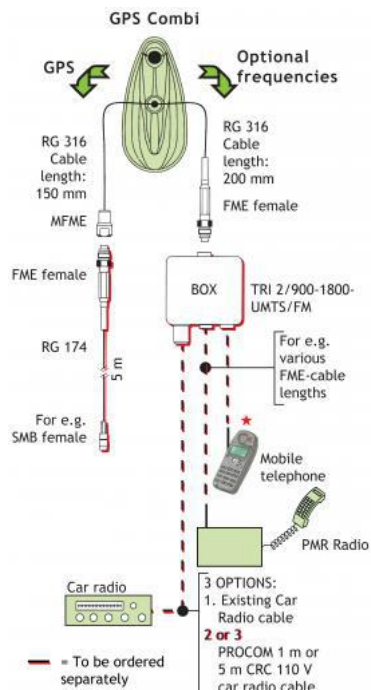


## MOUNTING INSTRUCTIONS

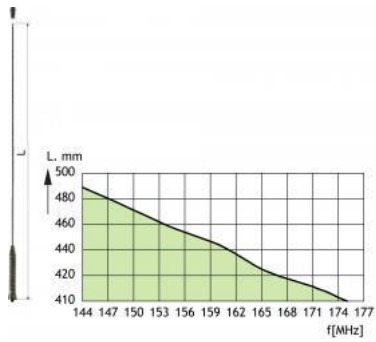


★★ The whip should always be dismounted during car wash.

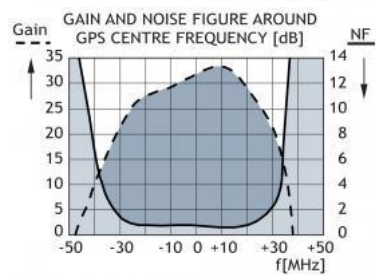
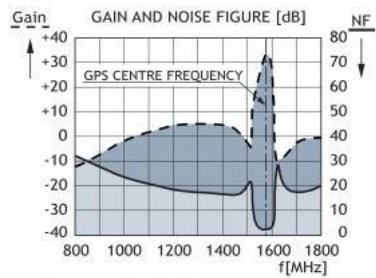
## CABLE MOUNTING



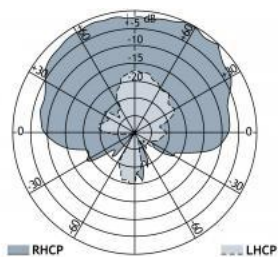
## TUNING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





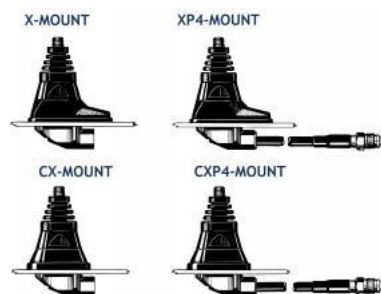
## MU 11-X/...

### Colinear 4 dB Mobile Antenna for the 450 MHz Band

- Encapsulated phasing coil.
- Black-chromed, stainless steel whip.

## DESCRIPTION

- Choice between general purpose tunable models.
  - Stainless steel X-mount with M6-thread whip-fastening system.
  - Simple mounting exclusively with access from the outside.
  - Models available with X-mount (oblong) and CX-mount (circular).
  - Choice between two connection principles:
    - X-mount: FME-connection (supplied without cable).
    - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.
- All whips are compatible with all mounts.



## ORDERING DESIGNATIONS

X-mount (oblong) with FME	PRODUCT NO.	CX-mount (circular) with FME	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING
MU 11-X/s	130000813	MU 11-CX/s	130000814	380...410
MU 11-X/f	130000795	MU 11-CX/f	130000796	406...430
MU 11-X/l	130000803	MU 11-CX/l	130001483	420...450
MU 11-X/h	130000799	MU 11-CX/h	130000800	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY
MU 11-X/CEL4	130000818	MU 11-CX/CEL4	130001487	414 - 430



MU 11-X/CEL3	130000819	MU 11-CX/CEL3	130001486	425 - 440
MU 11-X/CEL2	130001478	MU 11-CX/CEL2	130001485	440 - 455
MU 11-X/CEL1	130000806	MU 11-CX/CEL1	130001484	450 - 470
XP4-mount (oblong) with 4 m cable and FME-conn.	PRODUCT NO.	CXP4-mount (circular) with 4 m cable and FME-conn.	PRODUCT NO.	[MHz]
Models for general application - tunable with adjustment disc:				TUNING
MU 11-XP4/s	130000816	MU 11-CXP4/s	130000817	380...410
MU 11-XP4/f	130000797	MU 11-CXP4/f	130000798	406...430
MU 11-XP4/l	130000804	MU 11-CXP4/l	130000805	420...450
MU 11-XP4/h	130000801	MU 11-CXP4/h	130000802	440...470
Models for cellular systems - pretuned, without adjustment disc:				FREQUENCY
MU 11-XP4/CEL4	130000809	MU 11-CXP4/CEL4	130000811	414 - 430
MU 11-XP4/CEL3	130001482	MU 11-CXP4/CEL3	130000812	425 - 440
MU 11-XP4/CEL2	130000810	MU 11-CXP4/CEL2	130000815	440 - 455
MU 11-XP4/CEL1	130000807	MU 11-CXP4/CEL1	130000808	450 - 470

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 11-X/...
ANTENNA TYPE	Collinear stainless steel whip mobile antenna
FREQUENCY	450 MHz-band covered by four models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 20 MHz @ SWR ≤ 1.5
SWR	≤ 1.3 @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel and brass Durable plastics Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
COLOUR	Black

HEIGHT	Approx. 60 cm (dep. on freq.)
WEIGHT	X-version: Approx. 160 g XP4-version: Approx. 300 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna can be mounted anywhere on the car, however, roof top mounting is always recommended.

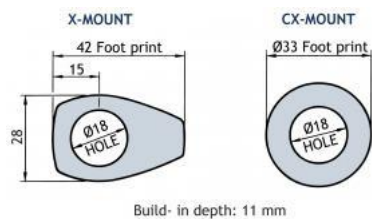
The oblong X-mount can be mounted on the often very narrow strip on the rear wing between the trunk lid and the side of the car.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

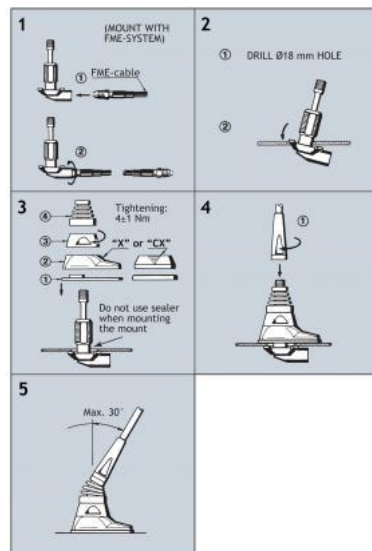
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

As the mounts are internally equipped with a bendable section, the antennas can always be adjusted to an upright position independent of the tilt angle of the installation spot

### 1. INSTALLATION DIMENSIONS



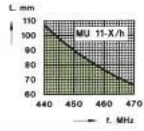
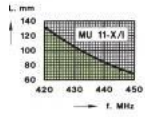
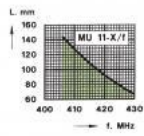
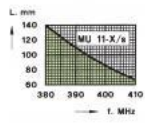
### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The tunable models are tuned to the desired frequency within the indicated tuning range by positioning the adjustment disc according to the diagrams below.





## MU 1-ZG/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Black-chromed stainless steel whip.
- Type MU 1-ZG/s covers 370 - 410 MHz  
Type MU 1-ZG/l covers 406 - 440 MHz  
Type MU 1-ZG/h covers 430 - 470 MHz  
- no tuning required.

### DESCRIPTION

- Stainless steel ZG-mount with M8-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - ZG-mount: FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m cable terminated with FME-connector.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 1-ZG/s	130000884	370 - 410 MHz	ZG-mount with FME-system
MU 1-ZG/l	130000886	406 - 440 MHz	Same mount as above
MU 1-ZG/h	130000890	430 - 470 MHz	Same mount as above
MU 1-ZGP4/s	130000887	370 - 410 MHz	ZG-mount with 4 m cable and FME-connector
MU 1-ZGP4/l	130000888	406 - 440 MHz	Same mount as above
MU 1-ZGP4/h	130000889	430 - 470 MHz	Same mount as above

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1-ZG/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$

POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Stainless steel and brass, black-chromed Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 180 mm
WEIGHT	ZG-version: Approx. 90 g ZGP4-version: Approx. 230 g
MOUNTING	21 mm dia. hole

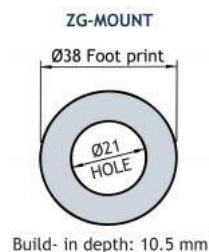
## INSTALLATION

This antenna should always be mounted on the car roof to ensure best omnidirectional coverage. The antenna is provided with our type ZG-mount for mounting from the outside in a 21 mm dia. hole.

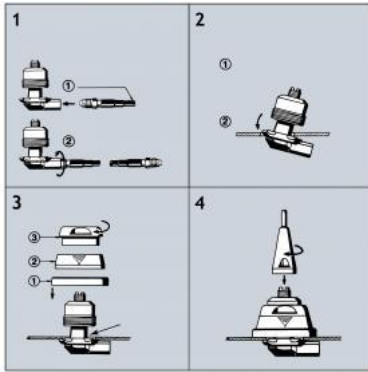
The ZG-mount is provided with an M8 x 1thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a spanner, size 12 mm. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



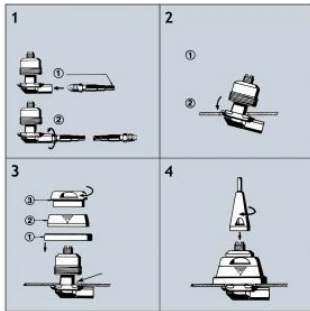
### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING/MODEL CONVERSION

- The antenna is delivered factory-tuned and requires no further tuning.
- To convert an MU 1-ZG/s model into an MU 1-ZG/l model, cut off 15 mm of the top end of the whip.
- To convert an MU 1-ZG/l model into an MU 1-ZG/h model, cut off 8 mm of the top end of the whip.



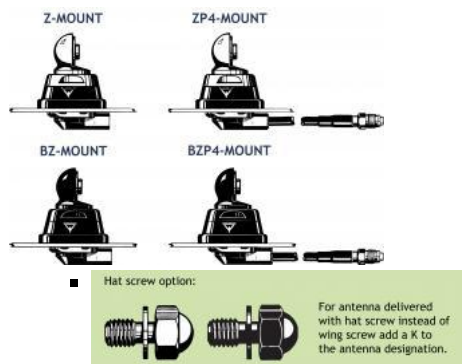
## MU 1-Z/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Stainless steel whip with toggle joint.
- Type MU 1-Z/s covers 370 - 410 MHz

## DESCRIPTION

- Type MU 1-Z/l covers 406 - 440 MHz
- Type MU 1-Z/h covers 430 - 470 MHz - no tuning required
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  - MU 1-Z/...: Bright version
  - MU 1-BZ/...: Black version
- Simple mounting exclusively with access from the outside.  
Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY	MOUNT VERSION
MU 1-Z/s	130000880	370 - 410 MHz	Z-mount with FME-system BRIGHT
MU 1-Z/l	130000872	406 - 440 MHz	Same mount as above
MU 1-Z/h	130000875	430 - 470 MHz	Same mount as above
MU 1-BZ/s	130000881	370 - 410 MHz	BZ-mount with FME-system BLACK
MU 1-BZ/l	130000883	406 - 440 MHz	Same mount as above
MU 1-BZ/h	130000882	430 - 470 MHz	Same mount as above
MU 1-ZP4/s	130000870	370 - 410 MHz	ZP4-mount with 4 m cable and FME-connector BRIGHT
MU 1-ZP4/l	130000876	406 - 440 MHz	Same mount as above
MU 1-ZP4/h	130000877	430 - 470 MHz	Same mount as above

MU 1-BZP4/s	130000871	370 - 410 MHz	BZP4-mount with 4 m cable and FME-connector BLACK
MU 1-BZP4/l	130000873	406 - 440 MHz	Same mount as above
MU 1-BZP4/h	130000874	430 - 470 MHz	Same mount as above

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1-Z/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Stainless steel, bright polished or black-chromed Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright or black, see above
HEIGHT	Approx. 185 mm
WEIGHT	Z-version: Approx. 140 g ZP4-version: Approx. 280 g
MOUNTING	21 mm dia. hole

## INSTALLATION

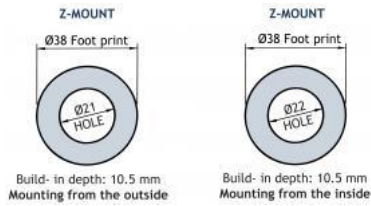
This antenna should always be mounted on the car roof to ensure best omnidirectional coverage.

The antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wings crew system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

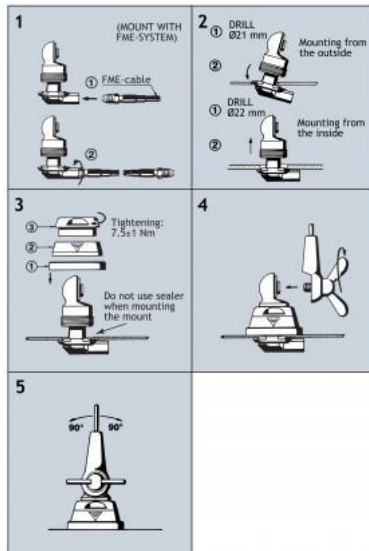
The Z-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.

### 1. INSTALLATION DIMENSIONS





## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## 3. TUNING/MODEL CONVERSION

- The antenna is delivered factory-tuned and requires no further tuning.
- To convert an MU 1-Z/s model into an MU 1-Z/l model, cut off 12 mm of the top end of the whip.
- To convert an MU 1-Z/l model into an MU 1-Z/h model, cut off 10 mm of the top end of the whip.

### PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.



## MU 1-X/..., MU 1-CX/..., MU 1-XG/..., MU 1-MM/...

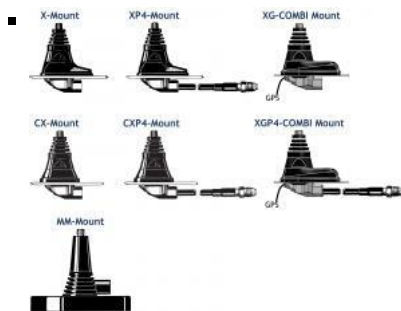
Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Black-chromed stainless steel whip.
- Type MU 1-X/s covers 370 - 410 MHz  
Type MU 1-X/l covers 406 - 440 MHz  
Type MU 1-X/h covers 430 - 470 MHz  
- no tuning required.

### DESCRIPTION

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular), XG-Combi mount (oblong with GPS) and MM-mount (magnetic).
- Choose between four connection possibilities:
  - X-mount, CX-mount, MM-mount: FME-connection (supplied without cable).
  - XP4-mount, CXP4-mount: Permanently attached 4 m cable terminated with FME-connector.
  - XG-Combi mount: FME-connection and GPS (supplied without cable).
  - XGP4-Combi mount: Permanently attached 4 m cable terminated with FME-connector for whip and 0.15 m RG 178 with MFME for GPS.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - **Right-Hand Circular Polarization (RHCP).**
  - 2.85 V - 5 V supply voltage (typical 3 V).

The whip is compatible with all below mounts



### ORDERING DESIGNATIONS

TYPE	FREQUENCY	MOUNT VERSION	PRODUCT NO.
MU 1-X/s	370 - 410 MHz	X-mount (oblong) with FME-system	130000866
MU 1-X/l	406 - 440 MHz	Same mount as above	130000858
MU 1-X/h	430 - 470 MHz	Same mount as above	130000862
MU 1-CX/s	370 - 410 MHz	CX-mount (circular) with FME-system	130000867

MU 1-CX/l	406 - 440 MHz	Same mount as above	130000861
MU 1-CX/h	430 - 470 MHz	Same mount as above	130000859
MU 1-XG/s	370 - 410 MHz	XG-Combi mount (oblong) with FME-system and GPS	132000200
MU 1-XG/l	406 - 440 MHz	Same mount as above	132000201
MU 1-XG/h	430 - 470 MHz	Same mount as above	132000202
MU 1-XP4/s	370 - 410 MHz	XP4-mount (oblong) with 4 m cable and FME-connector	130000869
MU 1-XP4/l	406 - 440 MHz	Same mount as above	130000855
MU 1-XP4/h	430 - 470 MHz	Same mount as above	130000857
MU 1-CXP4/s	370 - 410 MHz	CXP4-mount (circular) with 4 m cable and FME-connector	130000868
MU 1-CXP4/l	406 - 440 MHz	Same mount as above	130000863
MU 1-CXP4/h	430 - 470 MHz	Same mount as above	130000853
MU 1-XGP4/s	370 - 410 MHz	XGP4-Combi mount (oblong) with 4 m cable, FME-connector and GPS	132000205
MU 1-XGP4/l	406 - 440 MHz	Same mount as above	132000206
MU 1-XGP4/h	430 - 470 MHz	Same mount as above	132000207
MU 1-MM/s	370 - 410 MHz	MM-mount (magnetic) with FME-system	130000849
MU 1-MM/l	406 - 440 MHz	Same mount as above	130000850
MU 1-MM/h	430 - 470 MHz	Same mount as above	130000851

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1-X/..., MU 1-CX/..., MU 1-XG/..., MU 1-MM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz-band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 45$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Stainless steel and black-chromed brass

	Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 180 mm
WEIGHT	X-version: Approx. 60 g XP4-version: Approx. 200 g CX-version: Approx. 60 g CXP4-version: Approx. 200 g XG-version: Approx. 80 g XGP4-version: Approx. 220 g MM-version: Approx. 290 g

## INSTALLATION AND ASSEMBLY INSTRUCTIONS

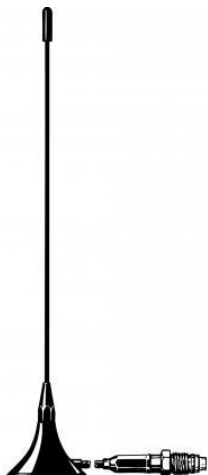
Please refer to the data sheet of each individual mount to find the installation and assembly instructions.

## TUNING/MODEL CONVERSION

- The antenna is delivered factory-tuned and requires no further tuning.
- To convert an MU 1-X/s model into an MU 1-X/l model, cut off 15 mm of the top end of the whip.
- To convert an MU 1-X/l model into an MU 1-X/h model, cut off 11 mm of the top end of the whip.

## PLEASE NOTE

For safety reasons: When using the MU 1-MM, car speed must not exceed 140 km/h.



## MU 1-NM/...

Unity Gain  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Ultra small magnetic mount antenna.
- Black-chromed stainless steel whip.

### DESCRIPTION

- Type MU 1-NM/s covers 380 - 410 MHz  
Type MU 1-NM/l covers 406 - 440 MHz  
Type MU 1-NM/h covers 430 - 470 MHz  
- no tuning required.
- Magnetic mount with high magnet power.
- Permanently attached 3 m cable terminated with FME-connector.

### ORDERING DESIGNATION

TYPE	PRODUCT NO.	FREQUENCY RANGE
MU 1-NM/s	130000891	380 - 410 MHz
MU 1-NM/l	130000892	403 - 440 MHz
MU 1-NM/h	130000893	430 - 470 MHz

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1-NM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna with magnetic mount
FREQUENCY	450 MHz band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 40$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.2$ @ f. res.
MAX. POWER	40 W
MECHANICAL	

MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount:</b> Brass Weather- and shockproof plastics Ferro-magnet
CABLE	3 m RG 174 terminated with FME-connector
INSTALLATION TORQUE	3.5 Nm max.
COLOUR	Black
HEIGHT	MU 1-NM/s: 162 mm (total height)
	MU 1-NM/l : 175mm (total height)
	MU 1-NM/h: 188mm (total height)
WEIGHT	Approx. 60 g
MOUNTING	Magnetic mount (directly on metal parts of the car)



## GPS-C 2R/FM/...

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip with Shock Spring for the 160 MHz and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Black-chromed, conical stainless steel whip.
  - Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high gain, low noise amplifier.
  - Right-Hand Circularly Polarized antenna (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.
  - Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 2R/FM/...	132000062
LH 108/136-2G (optional)	200000762

Can also be supplied factory-cut for the required frequency (between 144 - 175 MHz).

## SPECIFICATIONS FOR WHIP ELECTRICAL

ELECTRICAL	
MODEL	GPS-C 2R/FM/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	Tunable by cutting within: 144 - 175 MHz also receives FM band (88 - 108 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	2 m: $\geq 20$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	30 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Spring: Black-chromed, stainless steel
COLOUR	Black

HEIGHT	Approx. 450 mm
WEIGHT	Approx. 50 g
MOUNTING	On the GPS-Combi mount

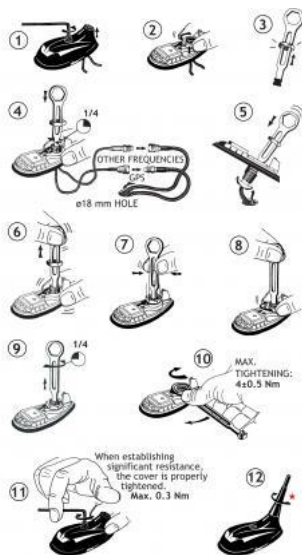
## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included





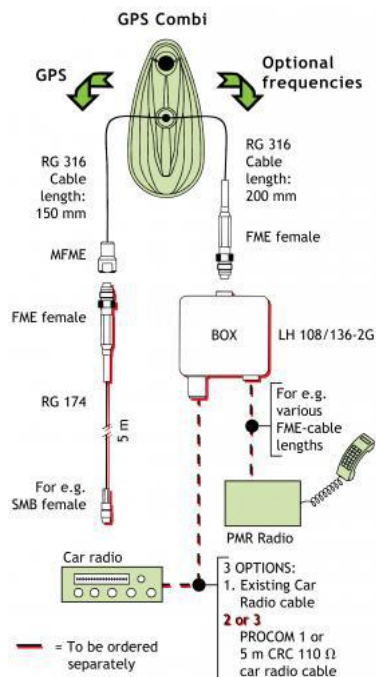
## MOUNTING INSTRUCTIONS



★ The whip should always be dismounted during car wash.

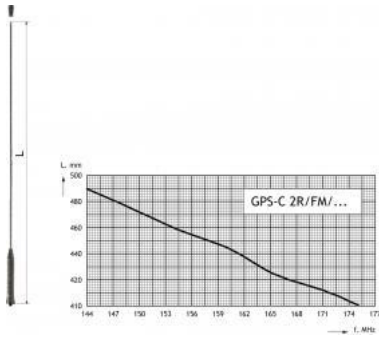
Do not use sealer on rubber gasket or other places

## CABLE MOUNTING

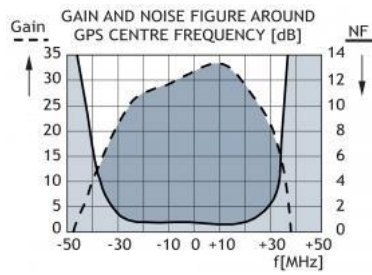
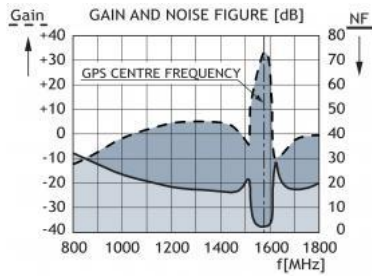


## TUNING

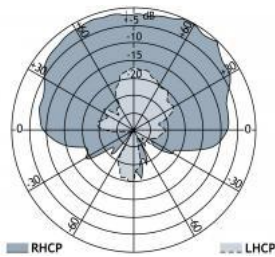
The antenna should always be tuned using an SWR-meter. The cutting diagram below serves as a guide for this procedure.



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MU 1-LX/...

### Unity Gain $\frac{1}{4} \lambda$ Mobile Antenna for the 450 MHz Band

- 0 dB mobile antenna with black-chromed, stainless steel whip.
- Type MU 1-LX/s covers 370 - 410 MHz  
Type MU 1-LX/l covers 406 - 440 MHz  
Type MU 1-LX/h covers 430 - 470 MHz  
- no tuning required.

## DESCRIPTION

- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATION

TYPE	PRODUCT NO.	FREQUENCY RANG
MU 1-LX/s	130000865	370 - 410 MHz
MU 1-LX/l	130000864	403 - 440 MHz
MU 1-LX/h	130000894	430 - 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 1-LX/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	450 MHz band covered by three models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 40$ MHz
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip:

	Black-chromed brass Black-chromed stainless steel Mount: Stainless steel Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 160 mm
WEIGHT	Approx. 40 g
MOUNTING	18 mm dia. hole

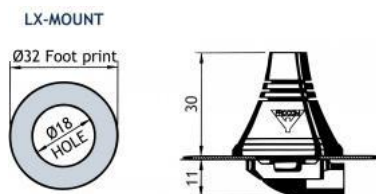
## INSTALLATION

The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

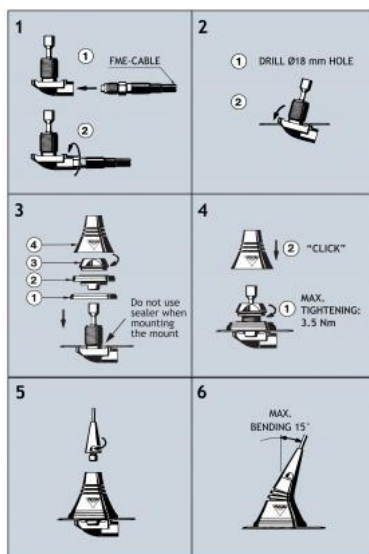
When cleaning the car in car-washing machines, the whip should be removed – a 9 mm fork spanner can be used. After wash, the whip is refitted and tightened lightly with the spanner.

The mount is equipped with a bendable section ( $\pm 15^\circ$ ) to make it possible to adjust the antenna to an upright position.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEP



Do not use sealer on rubber gasket or other places.

## **PLEASE NOTE**

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## **3. TUNING/MODEL CONVERSION**

The antenna is delivered factory-tuned and requires no further tuning.

To convert an MU 1-LX/s model into an MU 1-LX/l model, cut off 13 mm of the top end of the whip.

To convert an MU 1-LX/l model into an MU 1-LX/h model, cut off 13 mm of the top end of the whip.



## GPS-C 2R/70/FM

GPS Antenna with Whip with Shock Spring for the 160 MHz, 450 MHz and FM Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

- Black-chromed, conical stainless steel whip.
- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 2R/70/FM	132000061
LH 108/136-2G (optional)	200000762
DIPX 225/330-FME (optional)	200000670

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C 2R/70/FM
ANTENNA TYPE	Mobile antenna
FREQUENCY	2 m: 145 MHz 70 cm: 435 MHz FM band: 88-108 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
BANDWIDTH	2 m: 20 MHz 70 cm: 40 MHz @ SWR $\leq$ 2.0
SWR	$\leq$ 1.3 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Spring: Black-chromed stainless steel
COLOUR	Black

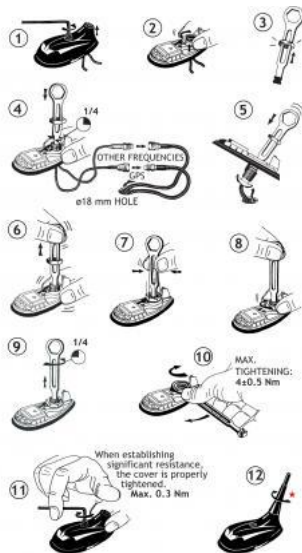
HEIGHT	492 mm
WEIGHT	50 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included



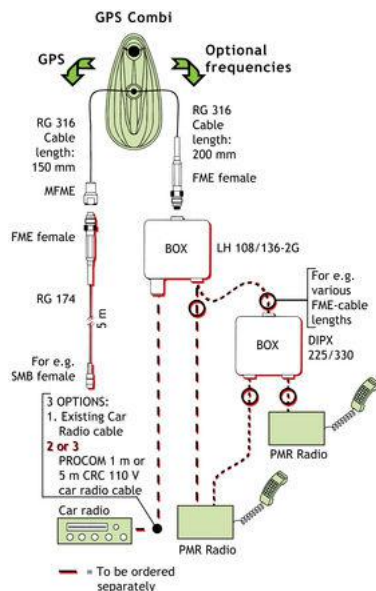
## MOUNTING INSTRUCTIONS



★ The whip should always be dismounted during car wash.

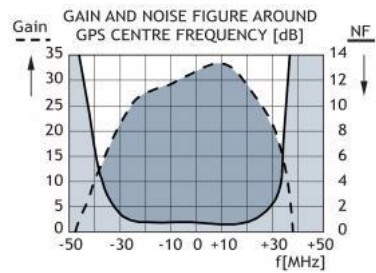
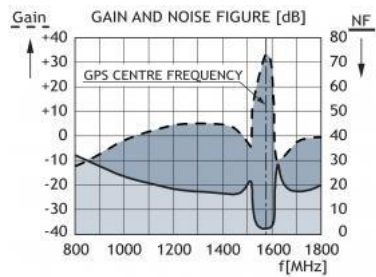
Do not use sealer on rubber gasket or other places.

## CABLE MOUNTING

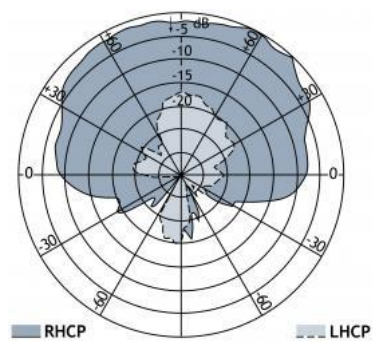


## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN





## GPS-C 2/70/.../...

GPS Antenna with Whip with Shock Spring for the 160 MHz and 450 MHz Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.
- When ordering the antenna, please state the centre frequency on each band.

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C 2/70/.../...	132000085
ACCESSORIES	
DIPX 225/330-FME (optional)	200000670

When ordering the antenna, please state the centre frequency on each band.

## SPECIFICATIONS FOR WHIP

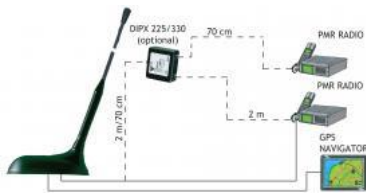
ELECTRICAL	
MODEL	GPS-C 2/70/.../...
ANTENNA TYPE	Mobile antenna
FREQUENCY	160 MHz freq. to be stated within: 144 - 175 MHz 450 MHz freq. to be stated within: 380 - 470 Mhz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	160 MHz: Approx 0 dB (acc. to EIA RS-329-1) 450 MHz: Approx 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	160 MHz: $\geq 8$ MHz @ SWR $\leq 2.0$ 450 MHz: $\geq 15$ MHz @ SWR $\leq 2.0$
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Polyethylene covered copper thread / glass fibre Black-chromed brass Spring: Black-chromed stainless steel

COLOUR	Black
HEIGHT	Approx. 350 mm / 13.7 in.
WEIGHT	50 g / 1.1 lb
MOUNTING	On the GPS-Combi mount

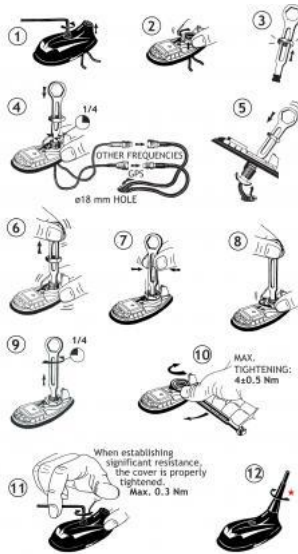
## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm / 0.9 x 2.9 in.
ROOF THICKNESS	Max. 2.5 mm / 0.98 in.
WEIGHT	Approx. 114 g / 0.25 lb
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm

Tools for mounting included



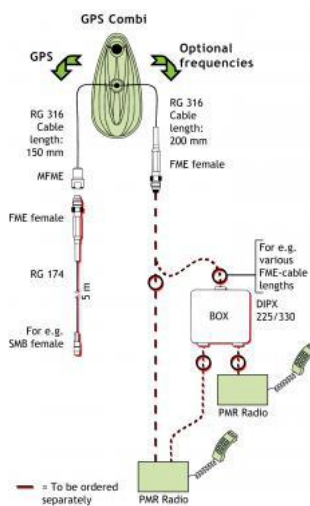
## MOUNTING INSTRUCTIONS



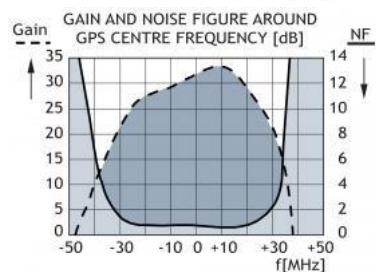
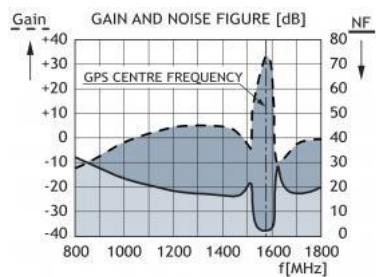
★ The whip should always be dismounted during car wash.

Do not use sealer on rubber gasket or other places.

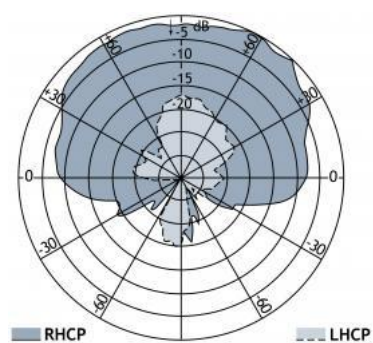
## CABLE MOUNTING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## GPS-C 1800/UMTS

GPS Antenna with a  $1/4 \lambda$  Mobile Antenna for the 1800 MHz and UMTS Bands

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

### Description

- Black-chromed whip in nice, discrete design.
- Mobile antenna for the 1800 MHz cellular systems (DCS-1800), and for the UMTS band.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarisation (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### Ordering designations

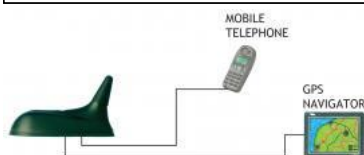
TYPE NO.	PRODUCT NO.
GPS-C 1800/UMTS	132000080

### SPECIFICATIONS FOR WHIP

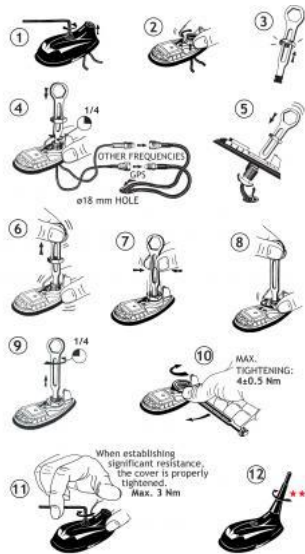
ELECTRICAL	
MODEL	GPS-C 1800/UMTS
ANTENNA TYPE	$1/4 \lambda$ mobile antenna
FREQUENCY	1700–1900 MHz (DCS) 1900–2200 MHz (UMTS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
BANDWIDTH	$\geq 500$ MHz @ SWR $\leq 2.25$
SWR	$\leq 1.3$ @ f. res.
GAIN	Approx. 0 dB (acc. to EIA RS-329-1) on both bands
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed brass
COLOUR	Black
HEIGHT	Approx. 25 mm
WEIGHT	Approx. 16 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz (DCS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia hole for roof thickness 2.0 - 2.5 mm Tools for mounting included



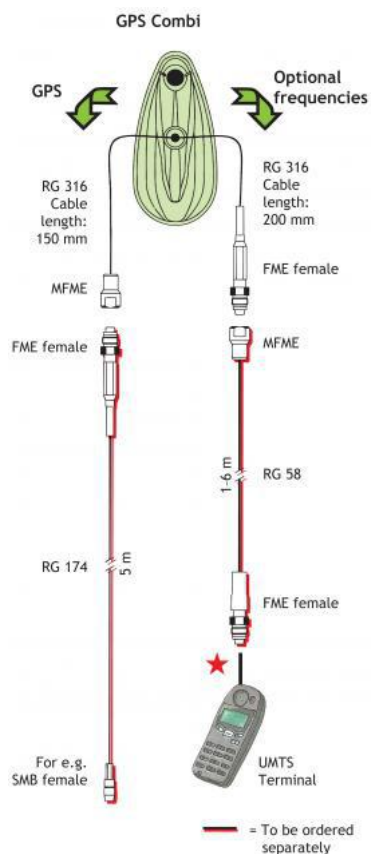
## MOUNTING INSTRUCTIONS



★★ The whip should always be dismantled during car wash.

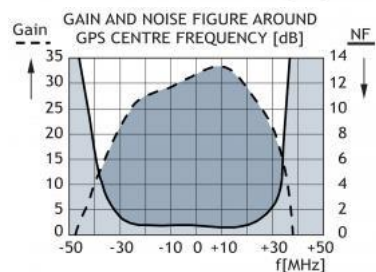
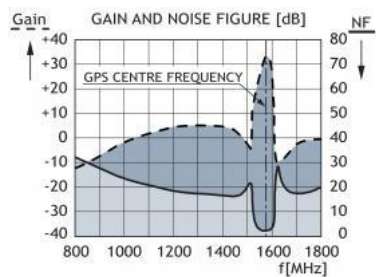
Do not use sealer on rubber gasket or other places.

## CABLE MOUNTING

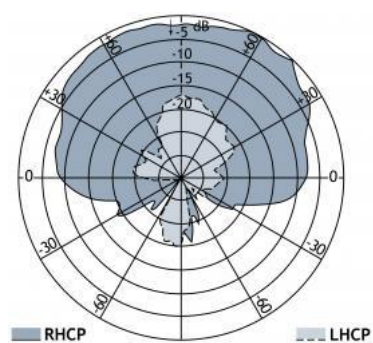


## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN





## GPS-C 162-174/851-869 MHz

### GPS Antenna with Whip for the 162-174 MHz and 851-869 MHz Bands

- External antenna whip mounted on the GPS-Combi mount without amplifier.
- GPS-antenna for fixed installations.
- When ordering the antenna, please state the centre frequency on each band.
- DIPX 225/330 included.

### Description

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Right-Hand Circularly Polarized antenna (RHCP).

### ORDERING DESIGNATIONS

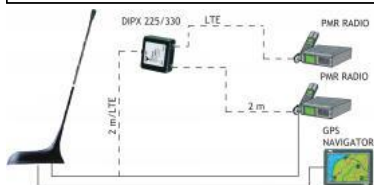
TYPE	PRODUCT NO.
GPS-C 162-174/851-869 MHz	132000175

### SPECIFICATIONS FOR WHIP

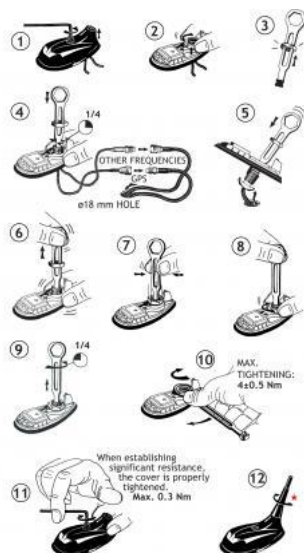
ELECTRICAL	
MODEL	GPS-C 162-174/851-869 MHz
ANTENNA TYPE	Mobile antenna
FREQUENCY	162-174 MHz 851-869 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	162-174 MHz: Approx 0 dB (acc. to EIA RS-329-1) 851-869 MHz: Approx 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	162-174 MHz: $\geq 10$ MHz @ SWR $\leq 2.5$ 851-869 MHz: $\geq 18$ MHz @ SWR $< 2.0$
SWR	$\leq 1.5$ @ f.res. in both bands
MAX. POWER	35 W
MECHANICAL	
MATERIALS	Whip: Polyethylene covered copper thread / glass fibre Black-chromed brass
COLOUR	Black
HEIGHT	Approx. 375 mm
WEIGHT	28 g
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C → +75° C
CONNECTOR	SMA (male for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 ± 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	<p>ø18.0 mm dia. hole for roof thickness up to 2.0 mm ø18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm</p> <p>Tools for mounting included</p>



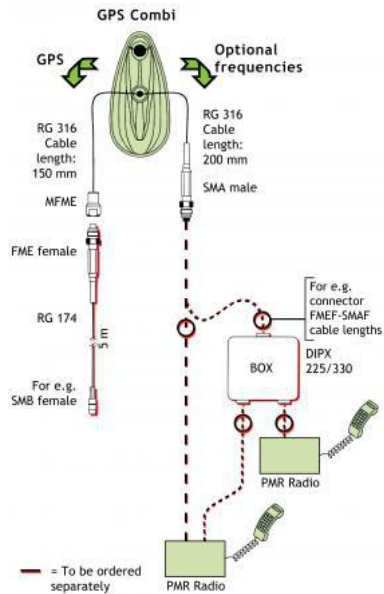
## MOUNTING INSTRUCTIONS



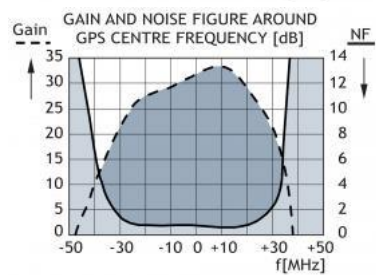
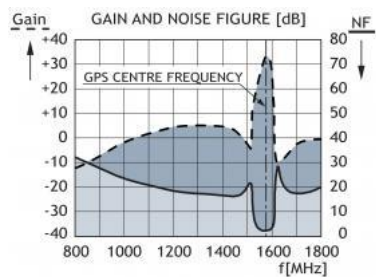
★ The whip should always be dismounted during car wash.

Do not use sealer on rubber gasket or other places.

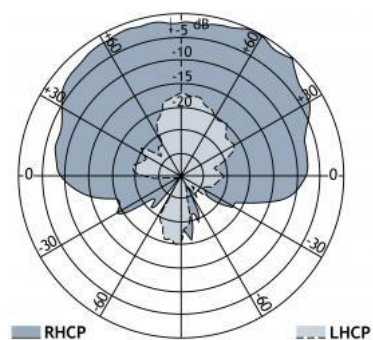
## CABLE MOUNTING



## TYPICAL RESPONSE CURVES



## VERTICAL RADIATION PATTERN





## MLH 6/2-BZ

### Dual-frequency Mobile Antenna for the 6 m and 2 m Amateur Bands

- Dual-frequency antenna for the 6 m and the 2 m bands (see note).
- Covers 50 – 52 MHz and 144 – 146 MHz – no tuning required.

## DESCRIPTION

- Shortened  $\frac{1}{4} \lambda$  antenna at 6 m.
- $\frac{5}{8} \lambda$  antenna at 2 m – approx. 3 dB gain.
- Choice between glass fiber and stainless steel whip.
- Stainless steel BZ-mount with ball-joint and wing screw.
- Easy mounting from the outside only. Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - BZ-mount: FME-connection (supplied without cable).
  - BZP4-mount: Permanently attached 4 m cable terminated with FME-connector.
- Sturdy mobile antenna of high quality.

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.

BZ-MOUNT

BZP4-MOUNT



## ORDERING DESIGNATIONS

WHIP Stainless steel	PRODUCT NO.	WHIP Glass fiber	PRODUCT NO.	MOUNT VERSION
MLH 6/2-BZR	130000660	MLH 6/2-BZ	130000659	BZ-mount with FME-system
MLH 6/2-BZP4R	130000661	MLH 6/2-BZP4	130000662	BZP4-mount with 4 m cable + FME-connector

## SPECIFICATIONS

ELECTRICAL	
MODEL	MLH 6/2-BZ
ANTENNA TYPE	Mobile whip antenna:

	Shortened $\frac{1}{4} \lambda$ at 6 m, $\frac{5}{8} \lambda$ at 2 m
FREQUENCY	50 – 52 MHz (6 m amateur band) 144 – 146 MHz (2 m amateur band) – no tuning required
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Equal to shortened $\frac{1}{4} \lambda$ at 6 m. Approx. 3 dB at 2 m
BANDWIDTH	$\geq 12$ MHz @ SWR $\leq 1.5$
SWR	< 2.0 @ f.res. at 6 m < 1.3 @ f.res. at 2 m
MAX. POWER	150 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Conical glass fiber or stainless steel Black chromed brass Spring: Black stainless steel Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 1300 mm
WEIGHT	BZ-version: Approx. 350 g BZP4-version: Approx. 500 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## NOTE

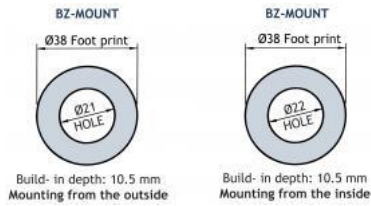
A diplexer type DIPX 88/136 can be used, when operating two transceivers at the same time.

## INSTALLATION

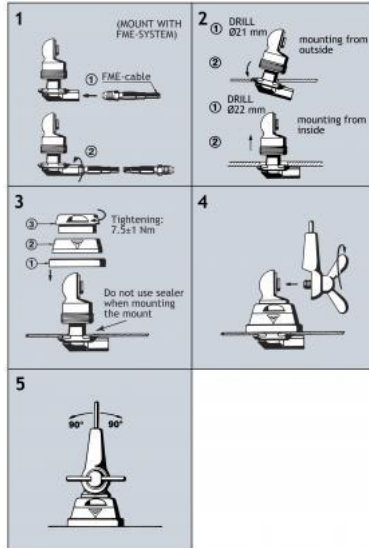
This antenna is provided with type BZ-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The BZ-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The BZ-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the BZ-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



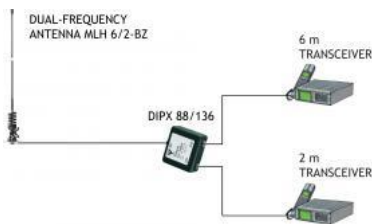
Do not use sealer on rubber gasket or other places.

## 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

## 4. OPERATING USING A DIPLEXER

This antenna makes it possible to operate two transceivers at the same time. In this case, a diplexer type DIPX 88/136 is necessary to complete the system ( see the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 88/136. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.





## ML 3-ZP4

### Helical Mobile Antenna for the 80 MHz Band

- Reduced-size quarter-wave antenna for all applications where height is a problem.
- Ideal on busses, trucks, building-site machines, forestry vehicles etc.

## DESCRIPTION

- High efficiency due to the “continuous loading” helical principle.
- Stainless steel ZP4-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models for roof thickness from 2 mm to 7.5 mm with mounting from the inside.
- Delivered with 4 m cable permanently attached to the mount and terminated with FME-connector.

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.

ZP4-MOUNT



Please note that the ML 3-type ZP4-mount is provided with a built-in matching unit. Consequently, the mount cannot be used together with other whips.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
ML 3-ZP4	130000655

## SPECIFICATIONS

ELECTRICAL	
MODEL	ML 3-ZP4
ANTENNA TYPE	Shortened $\frac{1}{4} \lambda$ helical antenna
FREQUENCY	Tunable by cutting within: 66....88 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical



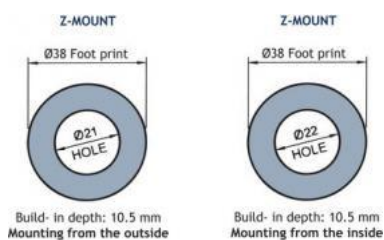
GAIN	Approx. - 3 dB (acc. to EIA RS-329-1)
SWR	$\leq 2.5 @ f_c \pm 0.5 \text{ MHz}$
MAX. POWER	30 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Steel helix moulded in flexible thermoplastic rubber Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1 \text{ Nm}$
CABLE	4 m RG 58
COLOUR	Bright/black
HEIGHT	Approx. 37 cm
WEIGHT	Approx. 400 g
MOUNTING	$\varnothing 21 \text{ mm}$ dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22 \text{ mm}$ dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

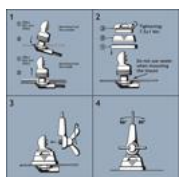
This antenna is supplied with type ZP4-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The ZP4-mount is particularly well suited for mounting on carroofs as it can be installed exclusively with access from the outside. The ZP4-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the ZP4-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna should always be post-adjusted using an SWR 3000 or the like.  
DO NOT cut too much at a time - one complete winding of the helix moves the antenna resonance considerably.



#### PLEASE NOTE

To make this antenna operate as efficiently as possible, a matching unit has been built into the antenna mount. Consequently, neither mount nor whip can be used together with other mounts/whips.



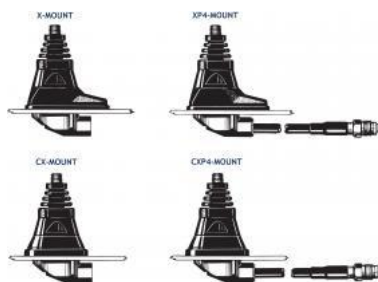
## ML 3-XR

$\frac{1}{4} \lambda$  Mobile Antenne for the 80 MHz Band

- Black-chromed, conical stainless steel whip with shock spring.
- Whip design for optimum wind noise reduction.

### DESCRIPTION

- Elegant transition between whip and mounting surface due to slim-line mount.
- 30° tiltable whip.
- Ideal for installation on the narrow strip on rear wing between trunk lid and side of car.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
ML 3-XR	130001457	X-mount (oblong) with FME-system
ML 3-CXR	130000652	CX-mount with FME-system (circular)
ML 3-XP4R	130001339	XP4-mount with 4 m cable and FME-connector (oblong)
ML 3-CXP4R	130001435	CXP4-mount with 4 m cable and FME-connector (circular)

### SPECIFICATIONS

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ELECTRICAL	
MODEL	ML 3-XR
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 66...88 MHz (Also applicable: 88...175 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	250 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 1.1 m (dep. on freq.)
WEIGHT	X-version: Approx. 110 g XP4-version: Approx. 270 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna can be mounted anywhere on the vehicle.

The oblong X-mount is especially suited for mounting on the often very narrow strip on the rear wing between the trunk lid and the side of the car.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

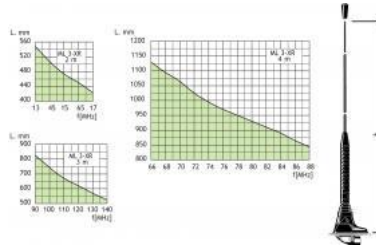
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

As the mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

### 1. INSTALLATION DIMENSIONS

### 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.





## HX 30-KZ

### Very Short Helical Mobile Antenna for the 27 MHz CB-Band

- Ultra-short ( $0.03 \lambda$ ) mobile antenna for short-distance communication.
- Ideal where normal-sized antennas cannot be used, as on building-site machines, forest vehicles etc.

## DESCRIPTION

- Amazingly good performance despite a very low height, due to top loading.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Ready-tuned and tested from the factory to assure minimum SWR.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
HX 30-KZ	130000599	Z-mount with FME-system
HX 30-KZP4	130000600	ZP4-mount with 4 m cable and FME connector

## SPECIFICATIONS

ELECTRICAL	
MODEL	HX 30-KZ
ANTENNA TYPE	Toploaded helical mobile antenna
FREQUENCY	27 MHz CB-band
IMPEDANCE	Nom. $50 \Omega$
POLARISATION	Vertical
BAND WIDTH	$\geq 250 \text{ kHz @ SWR} \leq 2.0$
SWR	$\leq 1.3 \text{ @ f. res.}$
MAX. POWER	5 W
MECHANICAL	
MATERIALS	<b>Whip:</b>

	Electroplated steel helix moulded in elastomer Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 34 cm
WEIGHT	Approx. 330 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

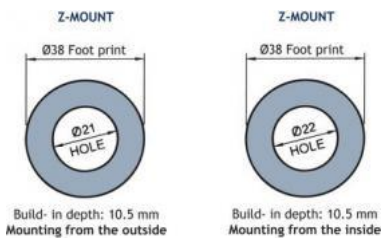


## INSTALLATION

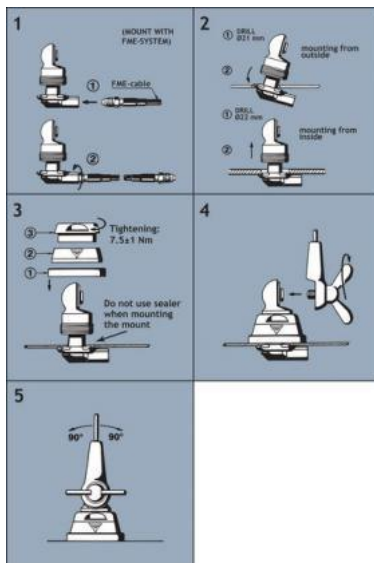
This antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS

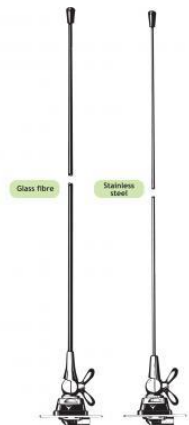


Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna is factory-tuned for minimum SWR.  
No additional tuning is required.





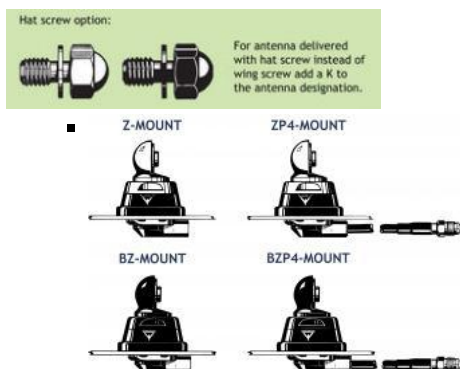
## ML 2-Z

### $\frac{1}{4} \lambda$ Mobile Antenne for the 80 MHz Band

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  - ML 2-Z....: Bright version
  - ML 2-BZ....: Black version
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles: Z-mount:
  - FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE WHIP Glass fiber	PRODUCT NO.	TYPE WHIP Stainless steel	PRODUCT NO.	MOUNT
ML 2-Z	130000639	ML 2-ZR	130000643	Z-mount with FME-system BRIGHT
ML 2-BZ	130000638	ML 2-BZR	130000650	BZ-mount with FME-system BLACK
ML 2-ZP4	130000642	ML 2-ZP4R	130000646	ZP4-mount with 4 m cable and FME-connector BRIGHT
ML 2-BZP4	130000641	ML 2-BZP4R	130000648	BZP4-mount with 4 m cable and

## SPECIFICATIONS

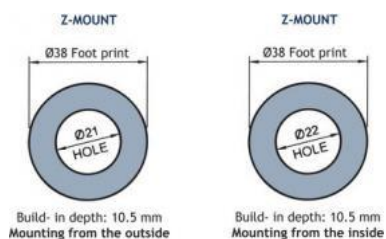
ELECTRICAL	
MODEL	ML 2-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 66...88 MHz (Also applicable: 88...175 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	250 W
MECHANICAL	
MATERIALS	Whip: Conical glass fiber or stainless steel Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black or bright, see above
HEIGHT	Approx. 1.1 m
WEIGHT	Z-version: Approx. 170 g ZP4-version: Approx. 330 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

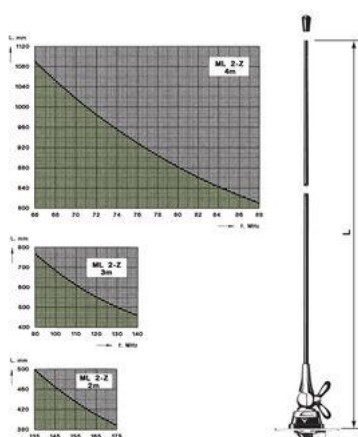
### 1. INSTALLATION DIMENSIONS



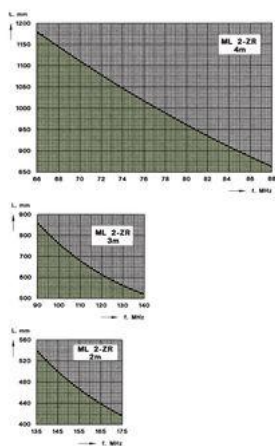
### 3. TUNING

The antenna should always be tuned using an SWR-meter.  
The cutting diagrams below serve as a guide for this procedure.

#### GLASS FIBRE WHIP



#### STAINLESS STEEL WHIP





## HX 27-KZ

### Very Short Helical Mobile Antenna for the 27 MHz CB-Band

- Ultra-short ( $0.03 \lambda$ ) mobile antenna for short-distance communication.
- Ideal where normal-sized antennas cannot be used, as on building-site machines, forest vehicles etc.

## DESCRIPTION

- Amazingly good performance despite a very low height, due to top loading.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Ready-tuned and tested from the factory to assure minimum SWR.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
HX 27-KZ	130000598	Z-mount with FME-system
HX 27-KZP4	130001316	ZP4-mount with 4 m cable and FME connector

## SPECIFICATIONS

ELECTRICAL	
MODEL	HX 27-KZ
ANTENNA TYPE	Toploaded helical mobile antenna
FREQUENCY	27 MHz CB-band
IMPEDANCE	Nom. $50 \Omega$
POLARIZATION	Vertical
BANDWIDTH	$\geq 250 \text{ kHz @ SWR} \leq 2.0$
SWR	$\leq 1.3 \text{ @ f. res.}$
MAX. POWER	5 W
MECHANICAL	
MATERIALS	<b>Whip:</b>

	Electroplated steel helix moulded in elastomer Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 34 cm
WEIGHT	Approx. 330 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

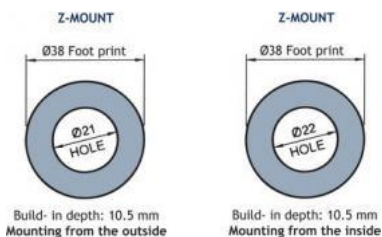


## INSTALLATION

This antenna is provided with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 3. TUNING

The antenna is factory-tuned for minimum SWR.  
No additional tuning is required.



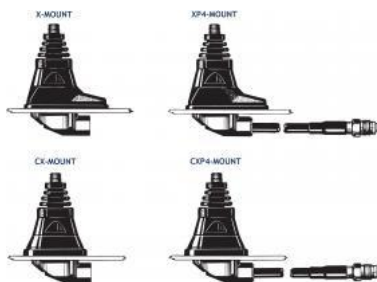
## ML 2-XR

$\frac{1}{4} \lambda$  Mobile Antenne for the 80 MHz Band

- Black-chromed, conical stainless steel whip.
- Elegant transition between whip and mounting surface due to slim-line mount.

### DESCRIPTION

- 30° tiltable whip.
- Ideal for installation on the narrow strip on rear wing between trunk lid and side of car.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
ML 2-XR	130000632	X-mount (oblong) with FME-system
ML 2-CXR	130000633	CX-mount with FME-system (circular)
ML 2-XP4R	130000634	XP4-mount with 4 m cable and FME-connector (oblong)
ML 2-CXP4R	130000635	CXP4-mount with 4 m cable and FME-connector (circular)

### SPECIFICATIONS

ELECTRICAL	
MODEL	ML 2-XR

ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 66...88 MHz (Also applicable: 88...175 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	250 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Black-chromed, conical stainless steel Black-chromed brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 1.3 m
WEIGHT	X-version: Approx. 80 g XP4-version: Approx. 240 g
MOUNTING	18 mm dia. hole

## INSTALLATION

This antenna can be mounted anywhere on the vehicle.

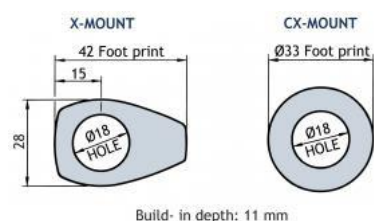
The oblong X-mount is especially suited for mounting on the often very narrow strip on the rear wing between the trunk lid and the side of the car.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

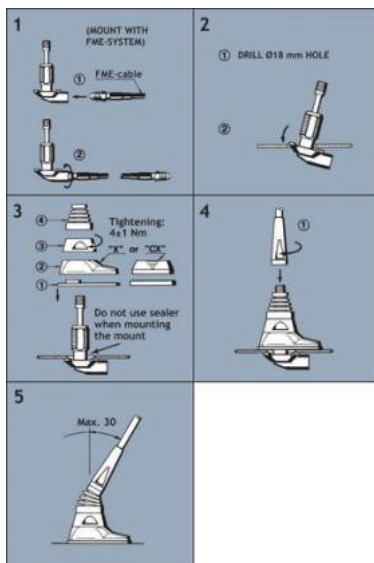
When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

As the mount is internally equipped with a bendable section, the antenna can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

### 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS

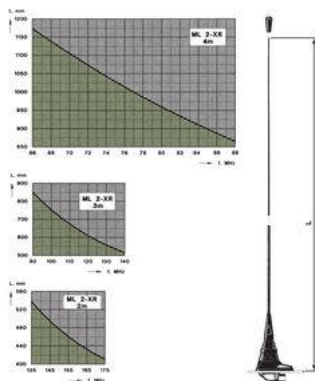


Do not use sealer on rubber gasket or other places.

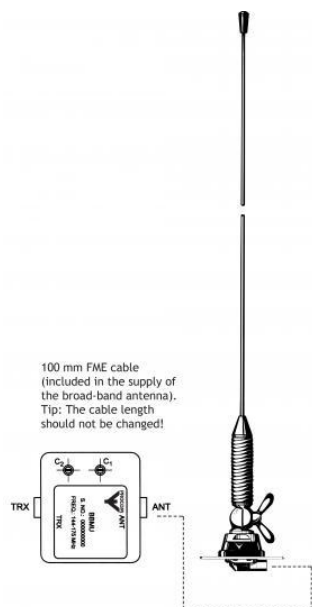
## 3. TUNING

The antenna should always be tuned using an SWR-meter.

The cutting diagrams below serve as a guide for this procedure.







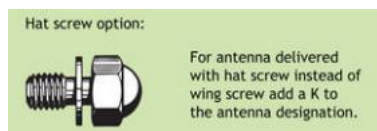
## ML 1-ZR/160/BBMU/...

### 160 MHz 2 dB Mobile Antenna for Glass Fibre Roof

- Sturdy  $\frac{1}{2} \lambda$  mobile antenna in professional industry standard quality.
- Groundplane independent antenna for mounting on non-conducting surfaces.

## DESCRIPTION

- Ideal for glass fibre roofs as can be found on some trucks, lorries, transport vans, busses and farm machinery.
- The ML 1-ZR/160/BBMU/... can be tuned from 144 - 175 MHz via the adapter box.
- Necessary cable length between the adapter box and the mount: 100 mm (FME junction cable included).
- Simple mounting exclusively with access from the outside. Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- FME antenna cable can be mounted direct in the adapter box.



Z-MOUNT



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
ML 1-ZR/160/BBMU/...	130000627

## SPECIFICATIONS

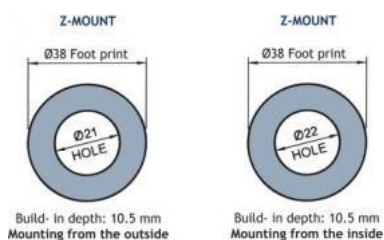
ELECTRICAL	
MODEL	ML 1-ZR/160/BBMU/...
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile whip antenna

FREQUENCY	Tunable within 144 - 175 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	$\geq 4$ MHz @ SWR $\leq 2.0$ $\geq 6$ MHz @ SWR $\leq 3.0$
SWR	$\leq 1.3$ @ f.res
MAX. POWER	25 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Stainless steel Chromed brass Spring: Stainless steel Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright/black
DIMENSIONS	Antenna : Approx. 800 mm Matching unit : 50 x 50 x 20 mm FME junction cable : 100 mm
MOUNTING	21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be 22 mm dia.)
ROOF THICKNESS	0.5 - 2 mm and 5 - 7.5 mm respectively depending on mounting ring

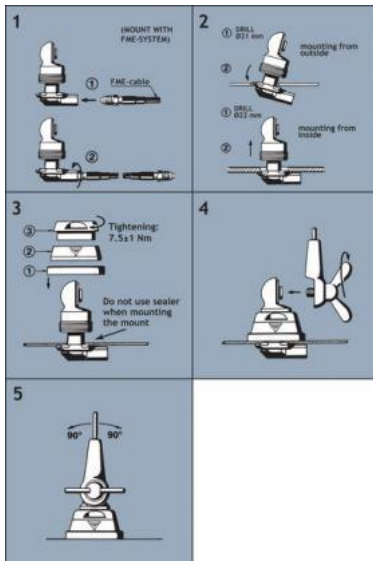
## INSTALLATION

1. Mount and adapter box to be connected by means of the 100 mm junction cable included in the supply.
2. Connect the FME cable for the radio station to the adapter box.
3. The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.
4. Adjust the frequency by means of an SWR-analyzer via C1 and C2 on the adapter box.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



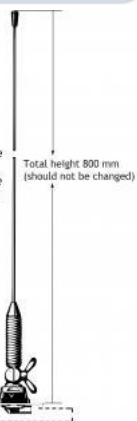
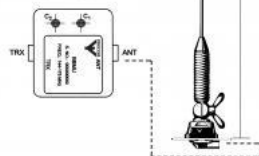
Do not use sealer on rubber gasket or other places.

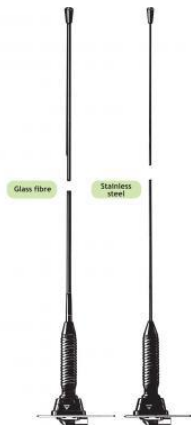
### 3. TUNING

SWR 4000 Analyser with built-in signal generator and graphic display range of measurement 30-2700 MHz



Tune the SWR in on the desired centre frequency and suitable spacing (for instance 30 MHz).  
Adjust C1 till the SWR curve emerges on the display. Adjust C2 till the best possible SWR minimum is reached on the required frequency.  
Fine-tune the SWR minimum and the bandwidth step by step by means of C1 and C2.





## ML 1-ZG

$\frac{1}{4} \lambda$  Mobile Antenna with Shock Spring for the 80 MHz BAnd

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel ZG-mount with M8 x 1-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles: ZG-mount:
  - FME-connection (supplied without cable).
  - ZGP4-mount: Permanently attached 4 m cable terminated with FME-connector.



## ORDERING DESIGNATIONS

TYPE WHIP Glass fiber	PRODUCT NO.	TYPE WHIP Stainless steel	PRODUCT NO.	MOUNT VERSION
ML 1-ZG	130000609	ML 1-ZGR	130000611	ZG-mount with FME-system
ML 1-ZGP4	130000610	ML 1-ZGP4R	130000612	ZGP4-mount with 4 m cable and FME-connector

## SPECIFICATIONS

ELECTRICAL	
MODEL	ML 1-ZG
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 66...88 MHz (Also applicable: 88...175 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$

SWR	$\leq 1.3$ @ f. res.
MAX. POWER	250 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Conical glass fiber or black-chromed stainless steel. Black-chromed brass Spring: Black-chromed stainless steel Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$7.5 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 1.1 m
WEIGHT	ZG-version: Approx. 210 g ZGP4-version: Approx. 360 g
MOUNTING	21 mm dia. hole

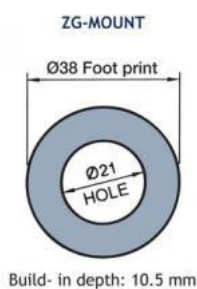
## INSTALLATION

This antenna is supplied with our type ZG-mount for mounting from the outside in a 21 mm dia. hole on horizontal surfaces as e.g. roof top or trunk lid.

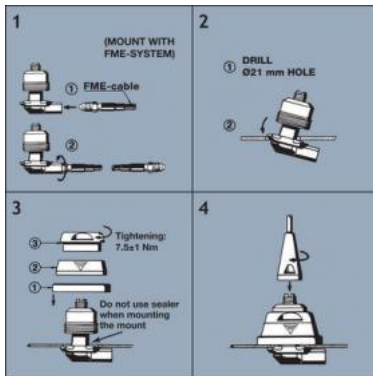
The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low-profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in automatic washing machines, the whip is easily removed using a spanner size 12 mm. The whip is refitted again by screwing it onto the M8 x 1 thread stud and tightening it with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



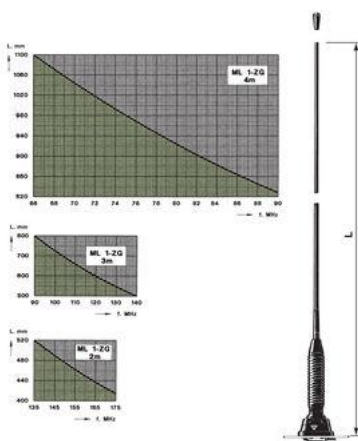
Do not use sealer on rubber gasket or other places.

### 3. TUNING

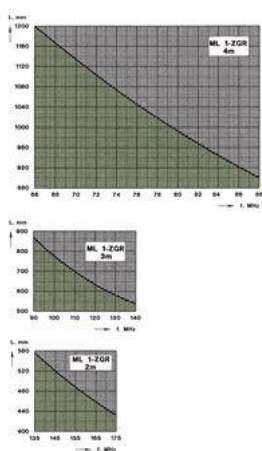
The antenna should always be tuned using an SWR-meter.

The cutting diagrams below serve as a guide for this procedure.

#### GLASS FIBRE WHIP



#### STAINLESS STEEL WHIP





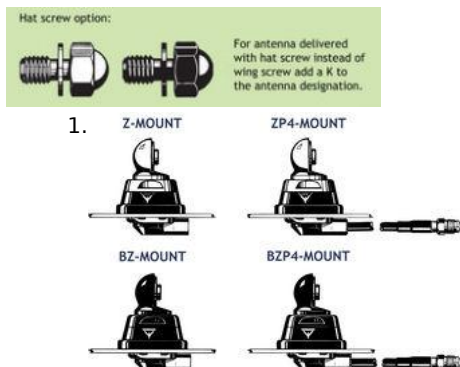
## ML 1-Z

### $\frac{1}{4} \lambda$ Mobile Antenna with Shock Spring for the 80 MHz Band

- Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
- Available with glass fiber or stainless steel whip.

## DESCRIPTION

- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Available with bright or black-chromed metal parts (mount and whip):
  1. ML 1-Z....: Bright version
  2. ML 1-BZ....: Black version
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles: Z-mount:
  1. FME-connection (supplied without cable)
  2. ZP4-mount: Permanently attached 4 m cable terminated with FME-connector



## ORDERING DESIGNATIONS

TYPE Whip Glass fiber	PRODUCT NO.	TYPE Whip Stainless steel	PRODUCT NO.	MOUNT
ML 1-Z	130000605	ML 1-ZR	130000616	Z-mount with FME-system BRIGHT
ML 1-BZ	130000606	ML 1-BZR	130000621	BZ-mount with FME-system BLACK
ML 1-ZP4	130000607	ML 1-ZP4R	130000618	ZP4-mount with 4 m cable and FME-connector BRIGHT
ML 1-BZP4	130000608	ML 1-BZP4R	130000622	BZP4-mount with 4 m cable and FME-connector BLACK

## SPECIFICATIONS

ELECTRICAL	
MODEL	ML 1-Z
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	Tunable by cutting within: 66...88 MHz (Also applicable: 88...175 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	250 W
MECHANICAL	
MATERIALS	Whip: Conical glass fiber or Stainless steel Chromed brass Spring: Stainless steel Mount: Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black or bright, see above
HEIGHT	Approx. 1.1 m
WEIGHT	Z-version: Approx. 250 g ZP4-version: Approx. 400 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

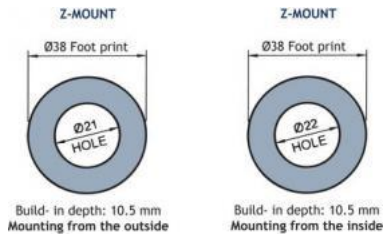
## INSTALLATION

This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

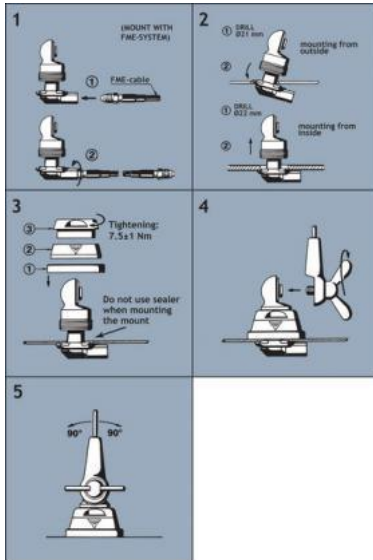
The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS





## 2. INSTALLATION STEPS



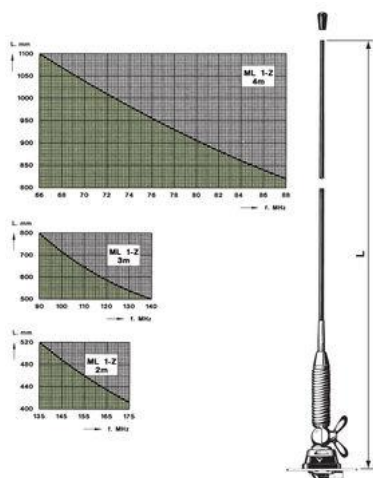
Do not use sealer on rubber gasket or other places.

## 3. TUNING

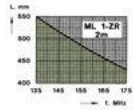
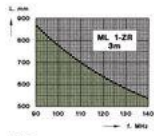
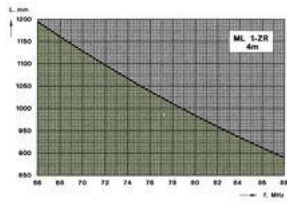
The antenna should always be tuned using an SWR-meter.

The cutting diagrams below serve as a guide for this procedure.

### GLASS FIBRE WHIP



### STAINLESS STEEL WHIP





## MM-Mount - MiniMag

### Miniature Magnetic Mount for Mobile Antenna Whips

- Small, low-profile magnetic mount intended to carry short mobile antenna whips (height below 60 cm).
- Full compatibility with the X-mount, i.e. all X-type whips can be used on the MM-Mount.

## DESCRIPTION

- Provided with FME connecting system (FME-cable must be ordered separately).
- Silicone layer on contact surface protects the car roof and ensures maximum friction.

## ORDERING DESIGNATION

TYPE	PRODUCT NO.
MM-Mount - MiniMag	130000351
ORDERING	
Generally	Order this magnetic base by simply asking for MM-Mount. (FME-cable and FME-connector are ordered separately).
Complete antennas can be ordered	-by ordering X-type whips and MM separately, or -by coding MM-Mount into the antenna designation. (In this case please consult the X-mount leaflet for the particular whip type in question to check if the combination is available).

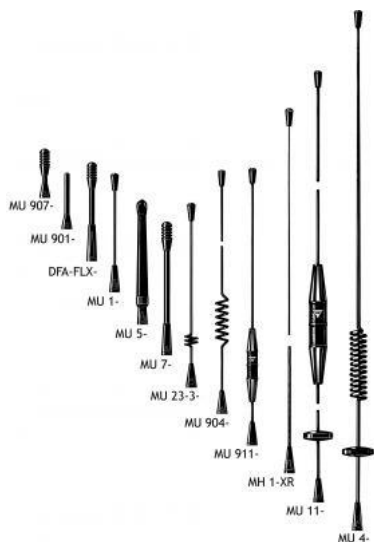
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.

FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

### A SELECTION OF THE VARIOUS WHIPS WHICH CAN BE CONNECTED TO THE MM-Mount - MiniMag (all shorter than 60 cm)



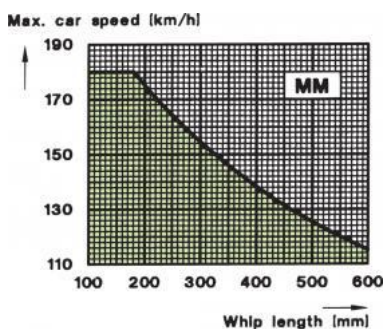
### SPECIFICATIONS

MODEL	MM-Mount - MiniMag
APPLICATION	Magnetic mount for all X-type mobile antenna whips shorter than 60 cm
FREQUENCY	135 - 1000 MHz
MATERIALS	Black chromed brass

	Environment-proof plastics Electrostatic powder laquer
CONNECTION TO WHIP	M6 thread stud
CONNECTOR	FME-system
COLOUR	Black
WEIGHT	Approx. 270 g
DIMENSIONS	Total height: Approx. 59 mm. Diameter: 72 mm.
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	Depending on whip height. See curve below

### USING THE MiniMag - MM-Mount

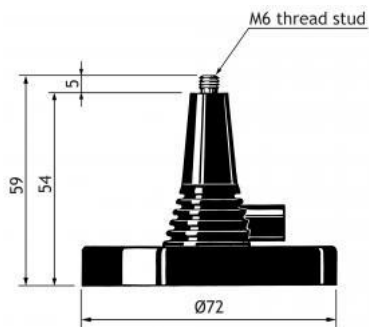
This magnetic mount is used to make an occasional antenna installation where it is not desirable to drill holes in the vehicle. A magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MiniMag is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock. A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction.



### INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to produce best omnidirectional coverage.

TUNING		
Below 400 MHz	Use the cutting diagram for the corresponding X-mount model using the same type of whip as a guide while using an SWR-meter to tune the whip.	
Above 400 MHz	Whips tuned by cutting: Use an SWR-meter. Whips tuned with disc: Adjustment diagram accompanies the antenna.	



#### PLEASE NOTE

For safety reasons:

Do not operate the MiniMag with antenna whips longer than 60 cm. Please respect the maximum car speed limit corresponding to a particular whip length as appears from the curve on page 1 of this leaflet.



## MHU 3-X, MHU 3-CX, MHU 3-XG

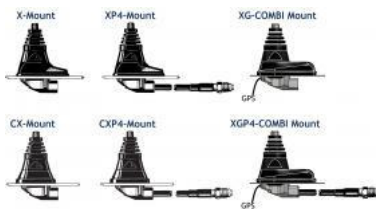
### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

- Field-tunable dual-frequency antenna which makes it possible to:
  - operate 160 and 450 MHz transceivers alternately on the same antenna
  - operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 – must be ordered separately).

## DESCRIPTION

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an “antenna farm”.
- Ideal for covert services.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles:
  - X-mount, CX-mount: FME-connection (supplied without cable).
  - XP4-mount, CXP4-mount: Permanently attached 4 m cable terminated with FME-connector.
  - XG-Combi mount: FME-connection and GPS (supplied without cable).
  - XGP4-Combi mount: Permanently attached 4 m cable terminated with FME-connector for whip and 0.15 m RG 178 with MFME for GPS.
- Easily removable whip for car wash.
- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high-gain, low-noise amplifier.
  - **Right-Hand Circular Polarization (RHCP).**
  - 2.85 V - 5 V supply voltage (typical 3 V).

### The whip is compatible with all below mounts



## ORDERING DESIGNATIONS

TYPE NO.	MOUNT VERSION	PRODUCT NO.
MHU 3-X	X-mount (oblong) with FME-system	130000770
MHU 3-CX	CX-mount (circular) with FME-system	130000771
MHU 3-XG	XG-combi mount (oblong) with FME-system and GPS	Contact for availability
MHU 3-XP4	XP4-mount (oblong) with 4 m cable and FME-connector	130000776

MHU 3-CXP4	CXP4-mount (circular) with 4 m cable and FME-connector	130000772
MHU 3-XGP4	XGP4-combi mount (oblong) with 4 m cable, FME-connector and GPS	Contact for availability

## SPECIFICATIONS

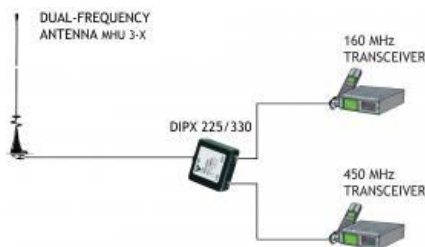
ELECTRICAL	
MODEL	MHU 3-X, MHU 3-CX, MHU 3-XG
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz frequency within: 140 – 170 MHz 450 MHz frequency within: 400 – 480 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	160 MHz: 0 dB 450 MHz: 3 dB
BANDWIDTH	160 MHz: $\geq 4$ MHz @ SWR $\leq 2.0$ 450 MHz: $\geq 24$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	100 W
MECHANICAL	
MATERIALS	Whip: Black-chromed stainless steel and brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 56 cm
WEIGHT	X-version: Approx. 170 g XP4-version: Approx. 305 g CX-version: Approx. 170 g CXP4-version: Approx. 305 g XG-version: Approx. 185 g XGP4-version: Approx. 325 g

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

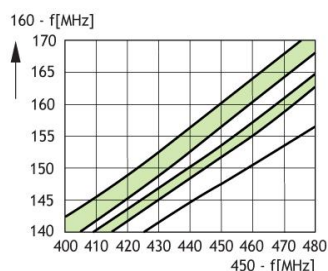
## COUPLING DIAGRAM





## PLEASE NOTE

With this type of combination antenna only certain frequencies from the segments 140 - 170 MHz and 400 - 480 MHz can be covered at the same time. The combination area corresponding to "allowable" frequency pairs is shown in the diagram below. However, taking into account the inherent bandwidth of the antenna the combination area may be increased significantly. The antenna can also be delivered factory tuned. Please consult our price list concerning additional charges for adjustment by cutting.



## TUNING INFORMATION

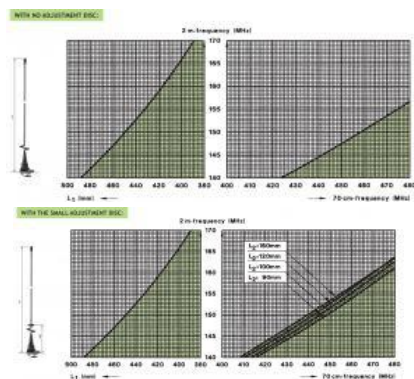
The MHU 3-X cannot be tuned to any pair of frequencies in the two bands. Further, the antenna must be equipped with a different kind of adjustment disc depending on the frequency pair in question. The antenna can be used without adjustment disc, with a small adjustment disc or with a large adjustment disc. All adjustment disc types are supplied with the antenna.

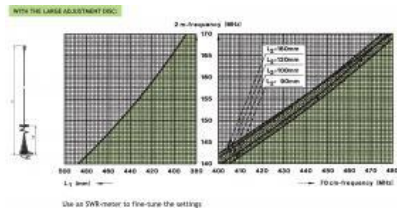
### Use the diagrams below as follows:

1. Draw a horizontal line through the point on the vertical axis which corresponds to the 2 m-frequency in question.
2. The drawn horizontal line intersects the shaded area over a certain band of 70 cm-frequencies. If the 70 cm-frequency to be covered is not included in the shaded area, try another diagram (another adjustment disc type). If the 70 cm-frequency is not covered in any of the diagrams, coverage of the frequency pair in question is not possible using this type of antenna. Please note, however, that taking into account the inherent bandwidth of the antenna ( $\pm 2$  MHz in the 2 m-band and  $\pm 12$  MHz in the 70 cm-band) the combination area may be increased considerably.

### For the relevant diagram:

3. Read the total length  $L_1$  on the left horizontal axis and cut the whip to this length.
4. Locate the 70 cm-frequency in question on the right horizontal axis and read the corresponding length  $L_2$  from the curves in the shaded area.





## GPS-COMBI MOUNT 3.5-7.5 mm

### GPS mount for GPS Antennas



- GPS-antenna for fixed installations.
- Special mount for roof thickness 3.5-7.5 mm.

### DESCRIPTION

- External antenna whip mounted on the GPS-Combi mount.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarisation (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.
- Tools for mounting included.

Applicable to all GPS-C whip models



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-COMBI MOUNT 3.5-7.5 mm	132000006

### SPECIFICATIONS

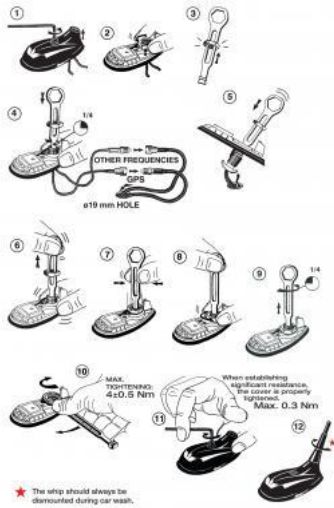
ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT 3.5-7.5 mm
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 Ω

POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm 45$ MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	<2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	3.5 - 7.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 19 mm dia. hole Tools for mounting included

## TOOLS



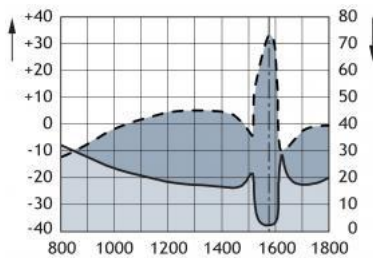
## MOUNTING INSTRUCTIONS



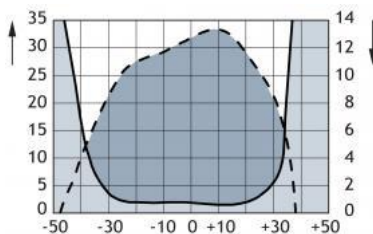
Do not use sealer on rubber gasket or other places.

## TYPICAL RESPONSE CURVE

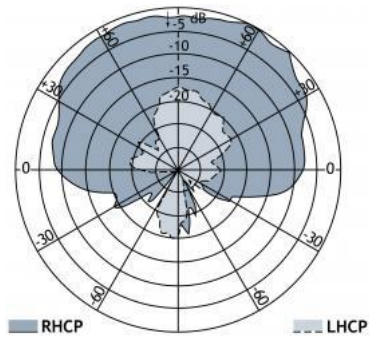
GAIN AND NOISE FIGURE (dB)



GAIN AND NOISE FIGURE AROUND GPS CENTER FREQUENCY (dB)



## VERTICAL RADIATION PATTERN





## MHU 3-SM

### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

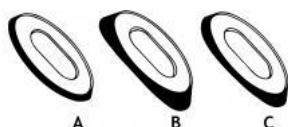
Field-tunable dual-frequency antenna which makes it possible to:

- operate 160 and 450 MHz transceivers alternately on the same antenna
- operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 - must be ordered separately).

## DESCRIPTION

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an "antenna farm".
- Ideal for covert services.
- Elegantly designed SM-mount especially suited for mounting on the curved wings.
- Supplied with three different packing gaskets for optimum adjustment to the wing contour.
- M6-thread whip-fastening system.
- Mount provided with FME-connection (supplied without cable).

## PACKING GASKETS



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MHU 3-SM	130000777

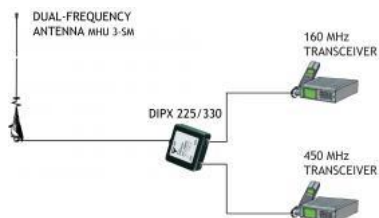
## SPECIFICATIONS

ELECTRICAL	
MODEL	MHU 3-SM
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz frequency within: 140-170 MHz 450 MHz frequency within: 410-490 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	160 MHz: 0 dB 450 MHz: 3 dB
BANDWIDTH	160 MHz: ≥ 4 MHz @ SWR ≤ 2.0

	450 MHz: $\geq 24$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Black-chromed stainless steel Black-chromed brass Mount: Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	$6.5 \pm 0.5$ Nm
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 45 cm (dep. on freq.)
WEIGHT	Approx. 150 g
MOUNTING	Wing mounting using one of three packing gaskets supplied with the mount

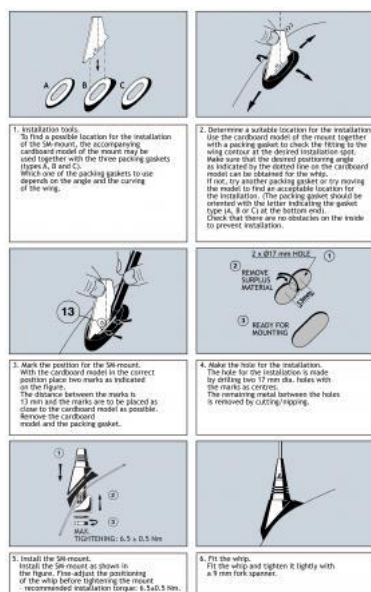
## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.



## INSTALLATION STEP





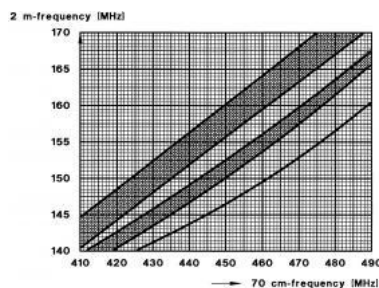
Do not use sealer on rubber gasket or other places.

## PLEASE NOTE

With this type of combination antenna only certain frequencies from the segments 140 – 170 MHz and 410 – 490 MHz can be covered at the same time. The combination area corresponding to “allowable” frequency pairs is shown in the diagram below.

However, taking into account the inherent bandwidth of the antenna the combination area may be increased significantly.

The antenna can also be delivered factory tuned. Please consult our price list concerning additional charges for adjustment by cutting.



## TUNING INFORMATION

The MHU 3-SM cannot be tuned to any pair of frequencies in the two bands. Further, the antenna must be equipped with a different kind of adjustment disc depending on the frequency pair in question. The antenna can be used without adjustment disc, with a small adjustment disc or with a large adjustment disc. All adjustment disc types are supplied with the antenna.

### Use the diagrams below as follows:

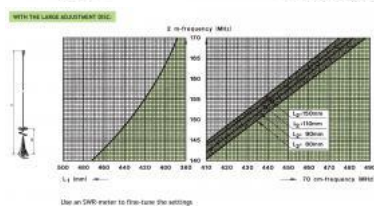
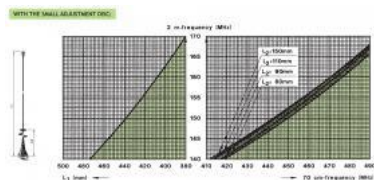
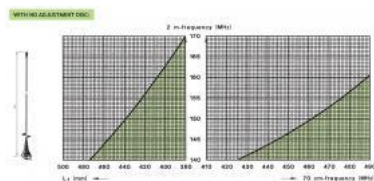
1. Draw a horizontal line through the point on the vertical axis which corresponds to the 2 m-frequency in question.
2. The drawn horizontal line intersects the shaded area over a certain band of 70 cm-frequencies.

If the 70 cm-frequency to be covered is not included in the shaded area, try another diagram (another adjustment disc type). If the 70 cm-frequency is not covered in any of the diagrams, coverage of the frequency pair in question is not possible using this type of antenna. Please note, however, that taking into account the inherent bandwidth of the antenna ( $\pm 2$  MHz in the 2 m-band and  $\pm 12$  MHz in the 70 cm-band), the combination area may be increased considerably.

### For the relevant diagram:

3. Read the total length  $L_1$  on the left horizontal axis and cut the whip to this length.

4. Locate the 70 cm-frequency in question on the right horizontal axis and read the corresponding length  $L_2$  from the curves in the shaded area.





## MHU 3-LX

### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

Field-tunable dual-frequency antenna which makes it possible to:

- operate 160 and 450 MHz transceivers alternately on the same antenna
- operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 - must be ordered separately).

## DESCRIPTION

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an "antenna farm".
- Ideal for covert services.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MHU 3-LX	130000769

## SPECIFICATIONS

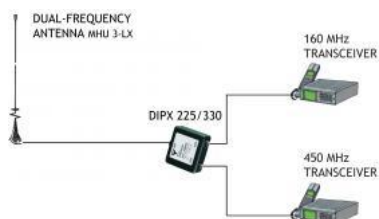
ELECTRICAL	
MODEL	MHU 3-LX
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz frequency within: 140-170 MHz 450 MHz frequency within: 400-480 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	160 MHz: 0 dB 450 MHz: 3 dB
BANDWIDTH	160 MHz: ≥ 4 MHz @ SWR ≤ 2.0 450 MHz: ≥ 24 MHz @ SWR ≤ 2.0
SWR	≤ 1.5 @ f. res.
MAX. POWER	100 W
MECHANICAL	

MATERIALS	Whip: Black-chromed stainless steel Black-chromed brass Mount: Stainless steel Cu-nite brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 ± 1 Nm max.
COLOUR	Black
HEIGHT	Approx. 550 mm
WEIGHT	Approx. 100 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

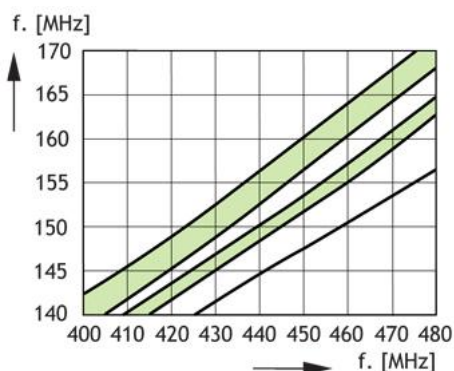
## COUPLING DIAGRAM



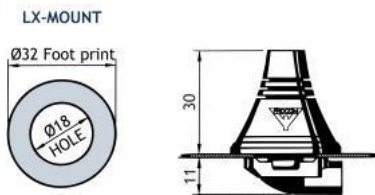
## PLEASE NOTE

With this type of combination antenna only certain frequencies from the segments 140 - 170 MHz and 400 - 480 MHz can be covered at the same time. The combination area corresponding to "allowable" frequency pairs is shown in the diagrams below. However, taking into account the inherent bandwidth of the antenna the combination area may be increased significantly. The antenna can also be delivered factory tuned. Please consult our price list concerning additional charges for adjustment by cutting.

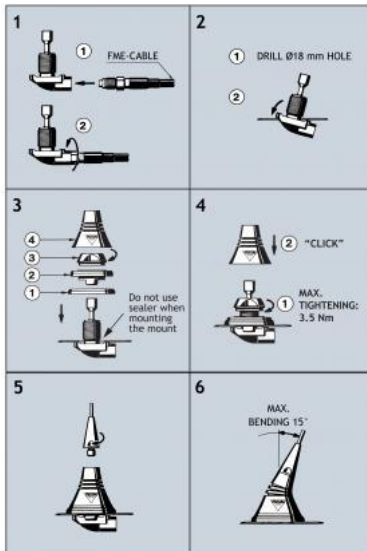
## TYPICAL RESPONSE CURVE



## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## PLEASE NOTE:

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

## TUNING INFORMATION

The MHU 3-LX cannot be tuned to any pair of frequencies in the two bands. Further, the antenna must be equipped with a different kind of adjustment disc depending on the frequency pair in question. The antenna can be used without adjustment disc, with a small adjustment disc or with a large adjustment disc. All adjustment disc types are supplied with the antenna.

### Use the diagrams below as follows:

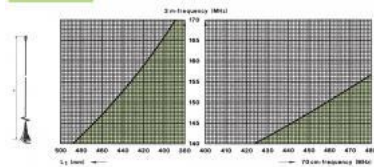
1. Draw a horizontal line through the point on the vertical axis which corresponds to the 2 m-frequency in question.
2. The drawn horizontal line intersects the shaded area over a certain band of 70 cm-frequencies. If the 70 cm-frequency to be covered is not included in the shaded area, try another diagram (another adjustment disc type).

If the 70 cm-frequency is not covered in any of the diagrams, coverage of the frequency pair in question is not possible using this type of antenna. Please note, however, that taking into account the inherent bandwidth of the antenna ( $\pm 2$  MHz in the 2 m-band and  $\pm 12$  MHz in the 70 cm-band) the combination area may be increased considerably.

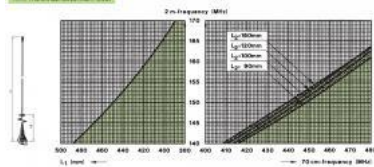
### For the relevant diagram:

3. Read the total length L1 on the left horizontal axis and cut the whip to this length.
4. Locate the 70 cm-frequency in question on the right horizontal axis and read the corresponding length L2 from the curves in the shaded area.

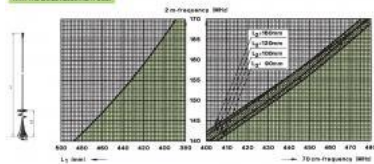
### WITH NO ADJUSTMENT SWG



### WITH THE SMALL ADJUSTMENT SWG



### WITH THE LARGE ADJUSTMENT SWG



Use an SWR meter to fine tune the settings



## MHU 3-BZ

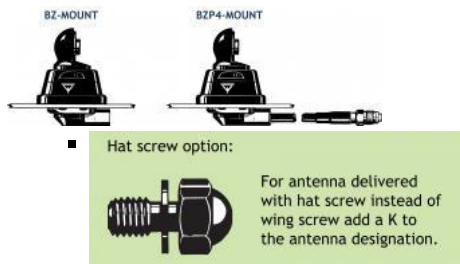
### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

Field-tunable dual-frequency antenna which makes it possible to:

- operate 160 and 450 MHz transceivers alternately on the same antenna
- operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 – must be ordered separately).

## DESCRIPTION

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an “antenna farm”.
- Ideal for covert services.
- Stainless steel BZ-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - BZ-mount: FME-connection (supplied without cable).
  - BZP4-mount: Permanently attached 4 m cable terminated with FME-connector



## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
MHU 3-BZ	130000774
MHU 3-BZP4	130000775

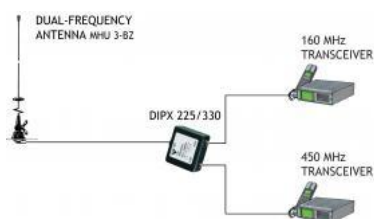
## SPECIFICATIONS

ELECTRICAL	
MODEL	MHU 3-X
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz frequency within: 140 – 170 MHz 450 MHz frequency within: 400 – 480 MHz

IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	160 MHz: 0 dB 450 MHz: 3 dB
BANDWIDTH	160 MHz: $\geq 4$ MHz @ SWR $\leq 2.0$ 450 MHz: $\geq 24$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	100 W
<b>MECHANICAL</b>	
MATERIALS	Whip: Black-chromed stainless steel and brass Mount: Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	4 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 56 cm
WEIGHT	BZ-version: Approx. 170 g BZP4-version: Approx. 320 g
MOUNTING	18 mm dia. hole

## OPERATION USING A DIPLEXER

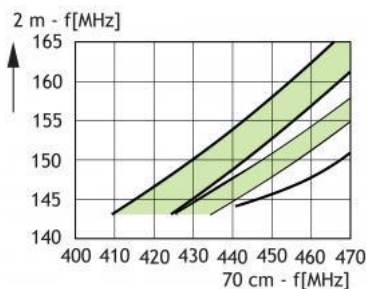
In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.



## PLEASE NOTE

With this type of combination antenna only certain frequencies from the segments 140 - 170 MHz and 400 - 480 MHz can be covered at the same time. The combination area corresponding to "allowable" frequency pairs is shown in the diagram below. However, taking into account the inherent bandwidth of the antenna the combination area may be increased significantly. The antenna can also be delivered factory tuned. Please consult our price list concerning additional charges for adjustment by cutting.





## TUNING INFORMATION

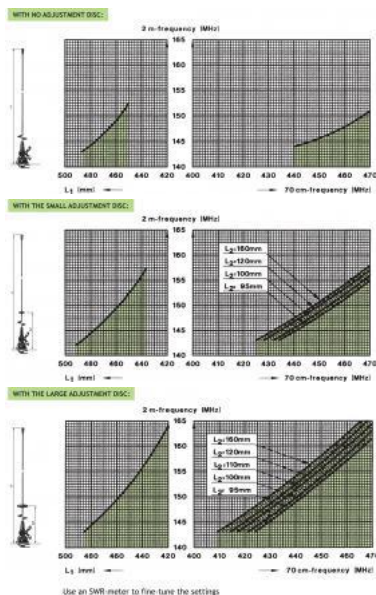
The MHU 3-BZ cannot be tuned to any pair of frequencies in the two bands. Further, the antenna must be equipped with a different kind of adjustment disc depending on the frequency pair in question. The antenna can be used without adjustment disc, with a small adjustment disc or with a large adjustment disc. All adjustment disc types are supplied with the antenna.

### Use the diagrams below as follows

1. Draw a horizontal line through the point on the vertical axis which corresponds to the 2 m-frequency in question.
2. The drawn horizontal line intersects the shaded area over a certain band of 70 cm-frequencies. If the 70 cm-frequency to be covered is not included in the shaded area, try another diagram (another adjustment disc type). If the 70 cm-frequency is not covered in any of the diagrams, coverage of the frequency pair in question is not possible using this type of antenna. Please note, however, that taking into account the inherent bandwidth of the antenna ( $\pm 2$  MHz in the 2 m-band and  $\pm 12$  MHz in the 70 cm-band) the combination area may be increased considerably.

### For the relevant diagram

3. Read the total length  $L_1$  on the left horizontal axis and cut the whip to this length.
4. Locate the 70 cm-frequency in question on the right horizontal axis and read the corresponding length  $L_2$  from the curves in the shaded area.





## GF-RK 900/1800

### Reinstallation Kit for the GF 900/1800 GlassFix® Antenna

- The “GF-RK 900/1800” GlassFix® reinstallation kit contains all new parts necessary to reinstall the GF 900/1800 GlassFix® antenna. The following tools are necessary: A knife with a long, bendable blade.
- Acetone and a dry cloth.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

## 1. DISMANTLING AN EXISTING INSTALLATION

- The external antenna mount and the internal matching unit are removed using a knife with a long, bendable blade. While bent, the knife blade is led in between the glass surface and the unit to be removed, and with slow, twisting movements the units can be eased off.
- The external antenna mount is scrapped.
- Clean the glass surface with acetone.

## 2. REGENERATING THE GLASSFIX® ANTENNA

- Strip off the double adhesive tape remains on the matching unit. The old tape may stick very effectively to the printed circuit board surface, and the tape may have to be scraped off carefully with a knife.
- Clean the exposed surface with acetone and mount the new double-sided tape-pad from the “GF-RK 900/1800” kit on the unit. Align the tape carefully while fixing it.

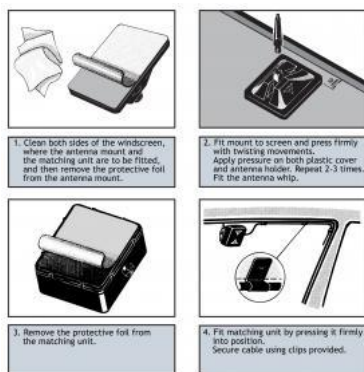
The antenna is now re-established and can be mounted following the normal GlassFix® mounting procedure.

## REINSTALLATION

### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATION



### ORDERING DESIGNATION

TYPE NO.	PRODUCT NO.
GF-RK 900/1800	

### TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

### ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
- To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun. PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

### WARNING SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

- To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
  - The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.
- It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF-RK 900

### Reinstallation Kit for the GF 900 GlassFix® Antenna Operating above 500 MHz

- The “GF-RK 900” GlassFix® reinstallation kit contains all new parts necessary to reinstall a GlassFix® antenna. The following tools are necessary: A knife with a long, bendable blade.
- Acetone and a dry cloth.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

## 1. DISMANTLING AN EXISTING INSTALLATION

- The external antenna mount and the internal matching unit are removed using a knife with a long, bendable blade. While bent, the knife blade is led in between the glass surface and the unit to be removed, and with slow, twisting movements the units can be eased off.
- The external antenna mount is scrapped.
- Clean the glass surface with acetone.

## 2. REGENERATING THE GLASSFIX® ANTENNA

- Strip off the double adhesive tape remains on the matching unit. The old tape may stick very effectively to the printed circuit board surface, and the tape may have to be scraped off carefully with a knife.
- Clean the exposed surface with acetone and mount the new double-sided tape-pad from the “GF-RK 900” kit on the unit. Align the tape carefully while fixing it.

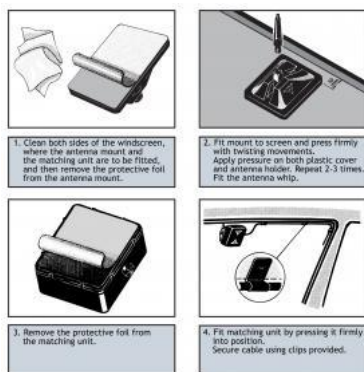
The antenna is now re-established and can be mounted following the normal GlassFix® mounting procedure.

## REINSTALLATION

### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATION



## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
GF-RK 900	

## TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

## ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
- To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun.

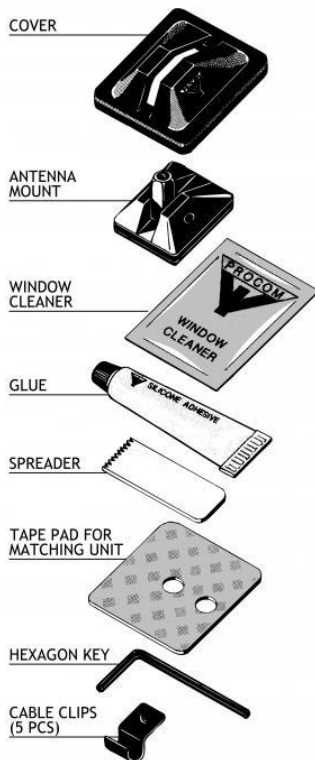
PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

## WARNING SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

- To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
- The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF-RK

### Reinstallation Kit for GlassFix® Antennas Operating Below 500 MHz

The GF-RK GlassFix® reinstallation kit contains all new parts necessary to reinstall a GlassFix® antenna. The following tools are necessary:

- A knife with a long, bendable blade.
- A sharp razor blade with holder (or equivalent) for cleaning/ scraping.
- Acetone and a dry cloth.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

## 1. DISMANTLING AN EXISTING INSTALLATION

- The external antenna mount and the internal matching unit are removed using a knife with a long, bendable blade. While bent, the knife blade is led in between the glass surface and the unit to be removed, and with slow, twisting movements the units can be eased off.
- The above process usually leaves a bit of silicone glue on the glass. These remnants are easily removed using a sharp razor blade, preferably on a holder.
- The old cover and mount are scrapped.
- Finish up by cleaning the glass surface with acetone.

## 2. REGENERATING THE GLASSFIX® ANTENNA

- Strip off the double adhesive tape remains on the matching unit. The old tape may stick very effectively to the printed circuit board surface, and the tape may have to be scraped off carefully with a knife.
- Clean the exposed surface with acetone and mount the new double-sided tape-pad from the "GF-RK" kit on the unit. Align the tape carefully while fixing it.

The antenna is now re-established and can be mounted following the normal GlassFix® mounting procedure.

## REINSTALLATION

### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and surfaces to be glued must be dry and clean.

### 2. INSTALLATION:



### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### ORDERING DESIGNATION

TYPE NO.	PRODUCT NO.
GF-RK	

### TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

### WARNING SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

- To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
- The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.

Procom A/S reserve the right to amend specifications without prior notice.



## GF 911/...

### 3 dB Mobile GlassFix® Antenna for the 900 MHz Band with Encapsulated Phasing Coil

- Collinear, 3 dB mobile antenna for the 900 MHz-band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required

**NOTE:**

GF antennas are not suitable for car models with windows that have heat reflective coating.

## Description

- Instant-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave collinear design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 911/l	130001135	824 ... 894 MHz
GF 911/h	130001129	870 ... 960 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 911/...
ANTENNA TYPE	Collinear mobile GlassFix® antenna
FREQUENCY	900 MHz-band covered by two tunable models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 60 MHz @ SWR ≤ 1.5
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W



MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 32 cm
WEIGHT	Approx. 80 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

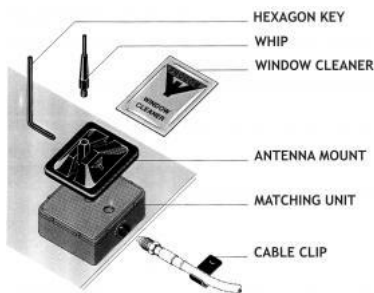
#### FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF

FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### Glue option

For the antenna to be delivered with silicone glue to secure the mount using a double-adhesion procedure, add an M to the antenna designation, e.g. GF 911M/h.

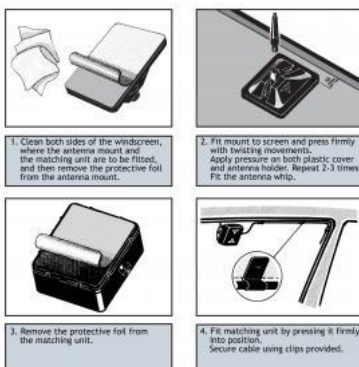


## INSTALLATION

### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATION



### 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

#### 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
- To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun.  
PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

#### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900«.

#### WARNING

#### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts).  
(DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 904/...

### 3 dB Mobile GlassFix® Antenna for the 900 MHz Band

- Collinear, 3 dB mobile antenna for the 900 MHz-band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

## Description

- Instant-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave collinear design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 904/l	130001128	824 ... 894 MHz
GF 904/h	130001125	870 ... 960 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 904/...
ANTENNA TYPE	Collinear mobile GlassFix® antenna
FREQUENCY	900 MHz-band covered by two tunable models
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BAND WIDTH	≥ 60 MHz @ SWR ≤ 1.5
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 33 mm
WEIGHT	Approx. 75 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

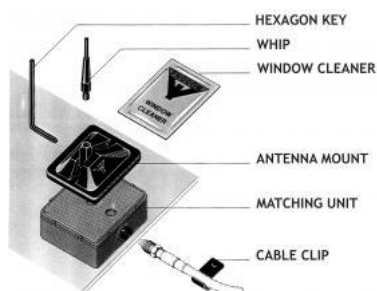
#### FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF

FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### Glue Option

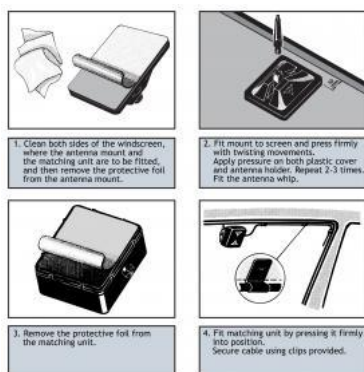
For the antenna to be delivered with silicone glue to secure the mount using a double-adhesion procedure, add an M to the antenna designation, e.g. GF 904M/h.



#### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

#### 2. INSTALLATIONS



### 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

### 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
  - A high application pressure improves the binding power.
  - Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
  - Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
  - To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun.
- PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900«.

### WARNING

#### SAFETY PRECAUTIONS

**Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.**

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 901/...

### 0 dB Mobile GlassFix® Antenna for the 900 MHz Band

- Half-wave, 0 dB mobile antenna for the 900 MHz-band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

- Instant-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 901/l	130001124	824 ... 894 MHz
GF 901/h	130001120	870 ... 960 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 901/...
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile GlassFix® antenna
FREQUENCY	900 MHz-band covered by two tunable models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 50$ MHz @ SWR $\leq 1.5$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b>



	Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 110 mm
WEIGHT	Approx. 60 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

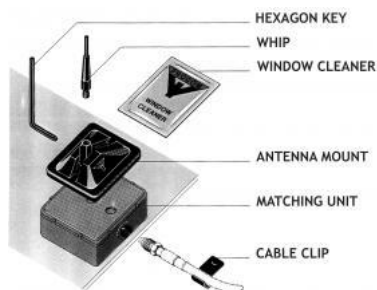
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC

FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### Glue Option

For the antenna to be delivered with silicone glue to secure the mount using a double-adhesion procedure, add an M to the antenna designation, e.g. GF 901M/h.



## 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

## 2. INSTALLATIONS

## 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

## 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
- To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun. PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

## REINSTALLATION KIT

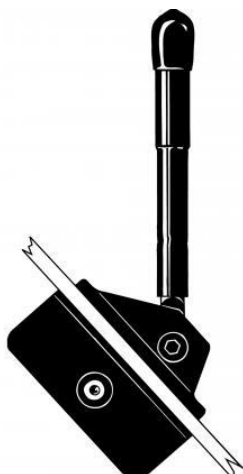
A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900«.

## WARNING

## SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 900/1800

### Dual-frequency GlassFix® Antenna for the 900 MHz and 1800 MHz Bands

- Dual-frequency antenna using the GlassFix® mounting principle.
- Covers both EGSM/NMT-900 and DCS-1800/PCN in one antenna.

#### NOTE:

GF antennas are not suitable for car models with windows that have heat reflective coating.

- For direct use with:
  - an EGSM/DCS-1800/PCN mobile phone (single or dual-band)
  - or
  - an EGSM and a DCS-1800/PCN mobile phone (requires diplexer, type DIPX 1000/1550).
- Mounting on car window glass – no holes required.
- Instant-adhesion procedure for fast and reliable fixing.
- Half-wave design – no ground plane required.
- Internal matching unit provided with FME-connection (FME-cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Swivel joint for 180° angle adjustment of the antenna.
- If removal of the antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## Ordering designations

TYPE NO.	PRODUCT NO.
GF 900/1800	130001136

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 900/1800
ANTENNA TYPE	Dual-frequency GlassFix® antenna
FREQUENCY	880–960 MHz (EGSM/NMT-900) 1710–1880 MHz (DCS-1800/PCN)
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
BAND WIDTH	900 MHz: Approx. 25 MHz @ SWR ≤ 2.0 (typ.) 1800 MHz: Approx. 100 MHz @ SWR ≤ 2.0 (typ.)
SWR	≤ 2.0 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Black-chromed stainless steel

	Black-chromed brass <b>Mount and indoor unit:</b> Environment-proof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 100 mm
WEIGHT	Approx. 60 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME.TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC

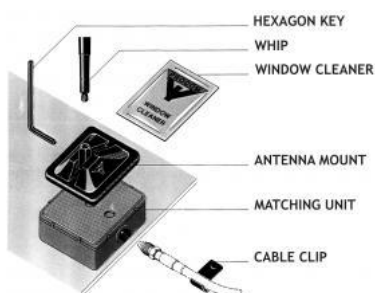
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 1000/1550, is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 1000/1550. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

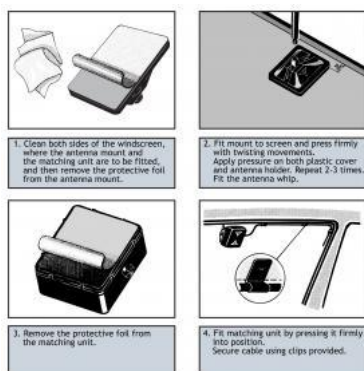
## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATION



### 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

### 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.

- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours. To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun.

PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

## REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900/1800«.

## WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 405/...

### 0 dB Mobile GlassFix® Antenna for the 450 MHz Band

- Shortened half-wave, mobile antenna for the 450 MHz band using the GlassFix® mounting principle.
- Attractive appearance with encapsulated shortening coil.

## NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

- Mounting on car window glass – no holes required.
- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## SPECIFICATIONS

ELECTRICAL		
MODEL	GF 405/...	
ANTENNA TYPE	Shortened $\frac{1}{2} \lambda$ mobile GlassFix® Antenna	
FREQUENCY	450 MHz-band covered by three tunable models	
IMPEDANCE	Nom. 50 $\Omega$	
POLARIZATION	Vertical	
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)	
BANDWIDTH	$\geq 8 \text{ MHz @ SWR} \leq 2.0$ $\geq 15 \text{ MHz @ SWR} \leq 3.0$	
SWR	$\leq 1.5 \text{ @ f.res.}$	
MAX. POWER	25 W	
MECHANICAL		
MATERIALS	Whip:	Stainless steel and black-chromed brass
	Mount and indoor unit:	Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately	



COLOUR	Black
HEIGHT	Approx. 24 cm
WEIGHT	Approx. 30 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

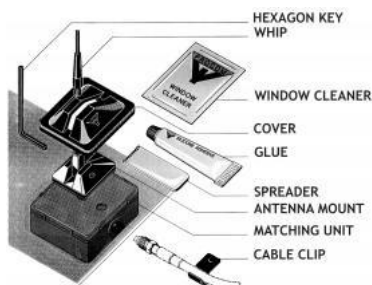
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC	130000581

(Elbow-TNC)	
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



## 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and surfaces to be glued must be dry and clean.

## 2. INSTALLATION



## 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

## 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

## REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK«.

## WARNING

## SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 404/...

### 3 dB Mobile GlassFix® Antenna for the 450 MHz Band

- Collinear, 3 dB mobile antenna for the 450 MHz band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows having heat reflective coating.

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave collinear design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easily removable whip for cleaning in car-washing machine
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 404/s	130000786	380 ... 410 MHz
GF 404/l	130000787	406 ... 440 MHz
GF 404/h	130000784	430 ... 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 404/...
ANTENNA TYPE	Collinear mobile GlassFix® antenna
FREQUENCY	450 MHz-band covered by three tunable models
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	≥ 8 MHz @ SWR ≤ 2.0 ≥ 15 MHz @ SWR ≤ 3.0
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 78 mm
WEIGHT	Approx. 100 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

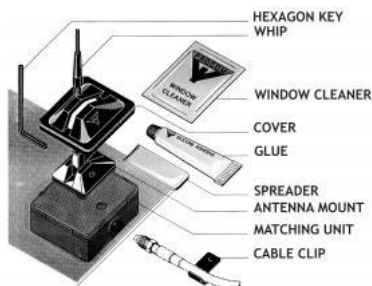
#### FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF	130000573

(Mini-UHF)	
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defrosting wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation and installation surfaces must be dry and clean.

### 2. INSTALLATION



Do not use sealer on rubber gasket or other places.

### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

## REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK« (130000329).

## WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The supplied silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 402/...

### 2 dB Mobile GlassFix® Antenna for the 450 MHz Band

- Collinear, 2 dB mobile antenna for the 450 MHz band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows having heat reflective coating.

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave collinear design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easily removable whip for cleaning in car-washing machine
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 402/s	Replaced by GF 404/s (130000786)	380 ... 410 MHz
GF 402/l	130000783	406 ... 440 MHz
GF 402/h	130000781	430 ... 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 402/...
ANTENNA TYPE	Collinear mobile GlassFix® antenna
FREQUENCY	450 MHz-band covered by two tunable models
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BAND WIDTH	≥ 8 MHz @ SWR ≤ 2.0 ≥ 15 MHz @ SWR ≤ 3.0
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W



MECHANICAL	
MATERIALS	<b>Whip:</b> Black-chromed stainless steel <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 58 cm / 22.83 in.
WEIGHT	Approx. 90 g / 0.2 lb.
MOUNTING	On car windows with silicone glue (52 mm x 47 mm / 2,05 x 1.85 in. obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm / 0.1 - 0.28 in.

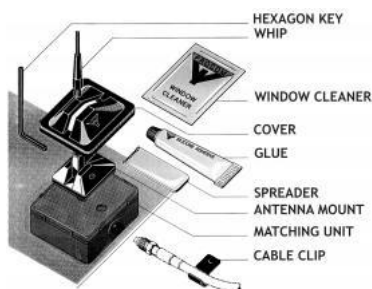
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572

FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defrosting wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation and surfaces to be glued must be dry and clean.

### 2. INSTALLATION



Do not use sealer on rubber gasket or other places.

### 3. AFTER INSTALLATION

- Allow the silicone gluing to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

#### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

#### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK« (130000329).

#### WARNING

#### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The supplied silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 401/...

### 0 dB Mobile GlassFix® Antenna for the 450 MHz Band

- Half-wave, 0 dB mobile antenna for the 450 MHz band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows having heat reflective coating.

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easily removable whip for cleaning in car-washing machine.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	TUNING RANGE
GF 401/s	130001117	380 ... 410 MHz
GF 401/l	130001115	406 ... 440 MHz
GF 401/h	130000780	430 ... 470 MHz

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 401/...
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile GlassFix® antenna
FREQUENCY	450 MHz band covered by three tunable models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 8$ MHz @ SWR $\leq 2.0$ $\geq 15$ MHz @ SWR $\leq 3.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 28 cm
WEIGHT	Approx. 65 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

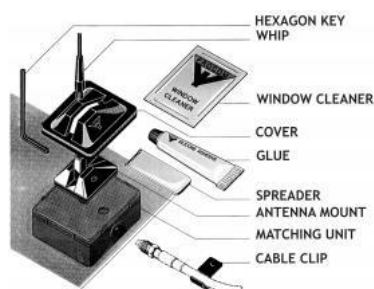
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF	130000573

(Mini-UHF)	
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defrosting wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation and surfaces to be glued must be dry and clean.

### 2. INSTALLATION



Do not use sealer on rubber gasket or other places.

### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

## REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK« (130000329).

## WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The supplied silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 27

### Mobile GlassFix® Antenna for the 27 MHz Band

- Shortened half-wave mobile antenna for the 27 MHz band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by cutting top end of whip.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GF 27	130000597

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 27
ANTENNA TYPE	Shortened $\frac{1}{2} \lambda$ mobile GlassFix® antenna
FREQUENCY	27 MHz band
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Equal to shortened roof-mount antennas
BANDWIDTH	$\geq 500$ kHz @ SWR $\leq 1.7$
SWR	$\leq 1.5$ @ f.res.
MAX. POWER	10 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b>



	Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 94 cm
WEIGHT	Approx. 140 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

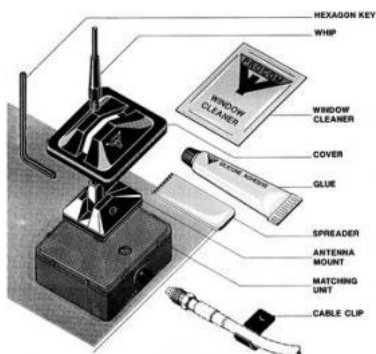
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FMEP	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC

FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

### ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Environmental- and car temperature must be above 15° C at installation, and surfaces to be glued must be dry and clean.

### 2. INSTALLATION



### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

#### 4. TUNING INSTRUCTIONS

- Insert an SWR-meter between the transmitter and the antenna.
- Key the transmitter on ch. 1 and measure SWR.
- Remove the rubber top. Cut off the top end of the whip (approx. 1 cm at a time) until SWR is minimum.
- Key the transmitter on ch. 20. Cut off the top end of the whip (approx. 5 mm at a time) until SWR is minimum.
- Fit the rubber top. Tuning is completed.

#### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK«.

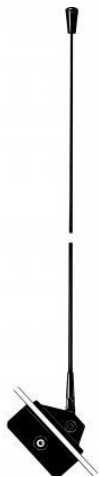
#### WARNING

#### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 230-DAB

### 0 dB Mobile GlassFix® Antenna for the DAB Band

- Half-wave, 0 dB mobile antenna for the DAB band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

## Description

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GF 230-DAB	130000705

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 230-DAB
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile GlassFix® Antenna
FREQUENCY	Tunable 223...240 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 6$ MHz @ SWR $\leq 1.5$ $\geq 10$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 61 mm
WEIGHT	Approx. 87 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

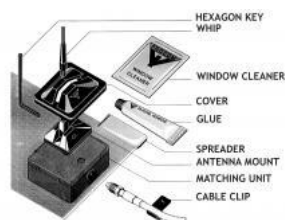
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF

FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATIONS



### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK«.

**WARNING****SAFETY PRECAUTIONS**

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

- To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
- The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 23-3

### 3 dB Mobile GlassFix® Antenna for the 23 cm Amateur Band: 1240 – 1300 MHz

- Collinear, 3 dB mobile antenna for the 23 cm band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

NOTE: GF antennas are not suitable for car models with windows that have heat reflective coating.

- Instant-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GF 23-3	130001256

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 23-3
ANTENNA TYPE	Collinear mobile GlassFix® antenna
FREQUENCY	23 cm amateur band: 1240...1300 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	3 dB (acc. to EIA RS-329-1)
BANDWIDTH	100 MHz @ SWR ≤ 1.5
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and black-chromed brass <b>Mount and indoor unit:</b> Weather- and shockproof plastics



	Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 23 cm
WEIGHT	Approx. 85 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

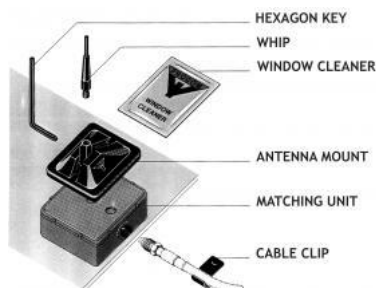
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC

FME-SMA	SMA
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For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

### 2. INSTALLATION



### 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

### 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
  - A high application pressure improves the binding power.
  - Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
  - Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
  - To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun.
- PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900«.

### WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 2/70

### Dual-frequency Mobile GlassFix® Antenna for the 2 m and 70 cm Amateur Bands

- Dual-frequency mobile antenna for the 2 m and 70 cm amateur bands using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

- Makes it possible to:
  - operate 2 m and 70 cm transceivers alternately on the same antenna
  - operate two transceivers (2 m and 70 cm) at the same time using a diplexer (type DIPX 225/330 – to be ordered separately).
- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Shortened half-wave (2 m) / half-wave colinear design (70 cm) – no ground-plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of two tuning screws on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GF 2/70	130000706

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 2/70
ANTENNA TYPE	Dual-frequency mobile GlassFix® antenna
FREQUENCY	2 m amateur band: 144 – 146 MHz 70 cm amateur band: 432 – 438 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	2 m: equal to shortened roof-mount antenna 70 cm: 1 dB (acc. to EIA RS-329-1)
BANDWIDTH	2 m: 3 MHz 70 cm: 6 MHz @ SWR ≤ 2.0
SWR	≤ 1.3 @ f.res.
MAX. POWER	2 m: 20 W

	70 cm: 20 W discontinuous
<b>MECHANICAL</b>	
MATERIALS	<b>Whip:</b> Stainless steel and brass, black-chromed <b>Mount and indoor unit:</b> Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 78 cm
WEIGHT	Approx. 125 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

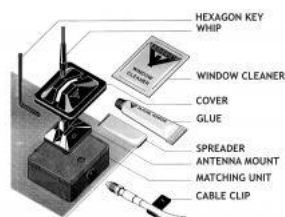
#### FME-SYSTEM ACCESSORIES

<b>FME-CABLES</b>	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
<b>FME-CONNECTORS</b>	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF

FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC
FME-SMA	SMA

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

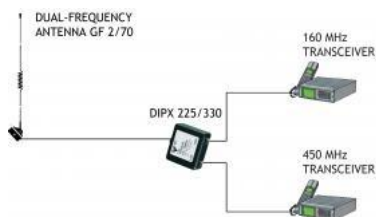
## ASSEMBLY DETAILS



## OPERATION USING A DIPLEXER

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

## COUPLING DIAGRAM



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and surfaces to be glued must be dry and clean.

### 2. INSTALLATION



### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter on the 2 m band and observe the forward and the reflected power.
- Adjust the tuning screw marked "2 m" on the matching unit until minimum returned power is obtained.
- Repeat steps 2. and 3. with the transmitter on the 70 cm band and using the tuning screw marked "70 cm".
- Check that the reflected power is still minimum at the 2 m band. Fine-tune using the "2 m" tuning screw if necessary.

### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK«.

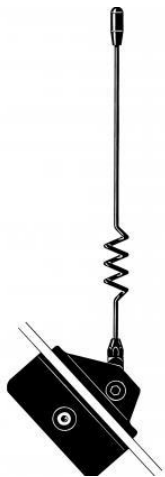
### WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## GF 1804

### Mobile GlassFix® Antenna for the 1800 MHz Band

- Colinear mobile antenna for the 1800 MHz band (e.g. DCS-1800/PCN) using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

NOTE: GF antennas are not suitable for car models with windows that have heat reflective coating.

- Instant-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave colinear design – no ground plane required.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE NO.	PRODUCT NO.
GF 1804	130001514

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 1804
ANTENNA TYPE	Colinear mobile GlassFix® antenna
FREQUENCY	1800 MHz-band (1700 - 1900) MHz
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
BAND WIDTH	≥ 170 MHz @ SWR ≤ 1.75
SWR	≤ 1.3 @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and brass, black-chromed <b>Mount and indoor unit:</b> Environment-proof plastics Corrosion-safe and corrosion-protected metals



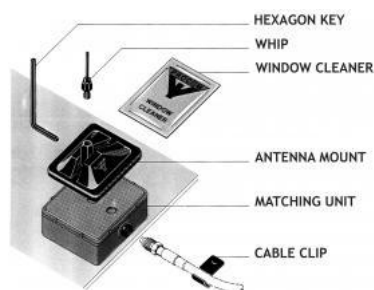
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 110 mm
WEIGHT	Approx. 60 g
MOUNTING	On car windows (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME.TNC
UHF	FME-UHF
Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### Glue option

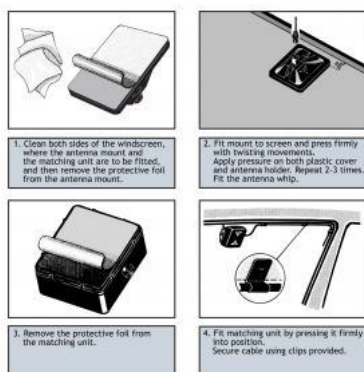
For the antenna to be delivered with silicone glue to secure the mount using a double-adhesion procedure, add an M to the antenna designation: GF 1804M.



## 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and installation surfaces must be dry and clean.

## 2. INSTALLATION



## 3. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained. For duplex operation, the antenna can be off-tuned slightly to favorize the matching on the RX. Turning the screw clockwise will shift the antenna resonance to a lower frequency and vice versa. The SWR on the TX should, however, never exceed 1:1.5.

## 4. ADHESION ADVICE

- It is essential for a good adhesion result that the surfaces are properly cleaned and dry.
- A high application pressure improves the binding power.
- Ideal application temperature range is +20° C to +38° C but may be extended down to +15° C. When applied, binding strength is maintained between -30° C and +70° C.
- Binding power increases considerably with time. To ensure full strength of the assembly it is recommended to keep the whip off the mount for 24 hours.
- To accelerate attainment of full binding power, the joined parts may be heat-treated with a warm-air gun. PLEASE NOTE: Do not heat parts to more than 65° C and take care not to spoil other nearby car parts.

## REINSTALLATION KIT

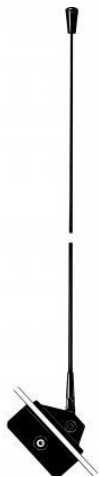
A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK 900«.

## WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 watts). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others. It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.



## GF 151

### 0 dB Mobile GlassFix® Antenna for the 160 MHz Band

- Half-wave, 0 dB mobile antenna for the 2 m band using the GlassFix® mounting principle.
- Mounting on car window glass – no holes required.

#### NOTE

GF antennas are not suitable for car models with windows that have heat reflective coating.

- Double-adhesion procedure ensures fast and reliable fixing.
- Internal matching unit feeds external antenna through window glass.
- Half-wave design – no ground plane required.
- High positioning gives performance equal to conventionally mounted car roof antenna.
- FME FastCabling system (cable to be ordered separately).
- Simple tuning procedure by means of tuning screw on matching unit.
- Easy removable whip for car wash.
- Swivel joint for 180° angle adjustment.
- If removal of antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GF 151	130000704

## SPECIFICATIONS

ELECTRICAL	
MODEL	GF 151
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile GlassFix® antenna
FREQUENCY	Tunable 138...175 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 6$ MHz @ SWR $\leq 1.5$ $\geq 10$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.3$ @ f.res.
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel and brass, black-chromed <b>Mount and indoor unit:</b>

	Weather- and shockproof plastics Corrosion-safe and corrosion-protected metals
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 92 cm
WEIGHT	Approx. 90 g
MOUNTING	On car windows with silicone glue (52 mm x 47 mm obstruction-free mounting area required)
GLASS THICKNESS	2.5 – 7.0 mm

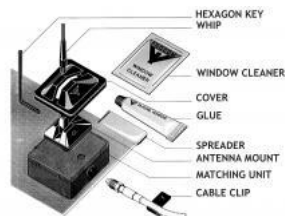
## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	LENGTH
1 m FME	1 m
2 m FME	2 m
3 m FME	3 m
4 m FME	4 m
5 m FME	5 m
6 m FME	6 m
4 m FME-white	4 m white
6 m FME-white	6 m white
12 m FME-white	12 m white
18 m FME-white	18 m white
FME-CONNECTORS	
TYPE	CONNECTOR
FME-FME	FME-FME
FME-P	Prolongation
FME-N	N
FME-FSMA	FSMA
FME-BNC	BNC
FME-TNC	TNC
FME-UHF	UHF
FME-MUHF	Mini-UHF
FME-EMUHF	Elbow-MUHF
FME-EBNC	Elbow-BNC
FME-ETNC	Elbow-TNC

FME-SMA	SMA
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For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## ASSEMBLY DETAILS



### 1. BEFORE INSTALLATION

- When selecting mounting location take into consideration: positions of back view mirror, wiper blade paths and defogger wires (when mounting on rear window). The driver's view should not be obstructed.
- Max. allowed curvature of the glass surface on the mounting spot is 2 mm deflection per 100 mm length.
- Environmental- and car temperature must be above 15° C at installation, and surfaces to be glued must be dry and clean.

### 2. INSTALLATION



### 3. AFTER INSTALLATION

- Allow the silicone gluings to dry off 2 hours at a temperature above 15° C. To ensure full strength of the glue, it is recommended to keep the whip off the mount for 24 hours.

### 4. TUNING INSTRUCTIONS

- Insert a forward/reflection-type wattmeter between the transmitter and the antenna.
- Key the transmitter and observe the forward and the reflected power.
- Adjust the tuning screw on the matching unit until minimum returned power is obtained.

### REINSTALLATION KIT

A reinstallation kit including all necessary parts for transfer of the antenna to another vehicle is available under order No. »GF-RK«.

### WARNING

### SAFETY PRECAUTIONS

Antennas mounted on the windscreen may cause relatively high field strengths in the passenger cabin and near the

dashboard.

1. To prevent health hazard due to RF radiation, persons must not be closer than 30 cm to the antenna whip (transmitter output power to the matching unit: 20 W). (DIN 57 848).
2. The RF signals at the dashboard may cause interference in the car's electronic equipment such as broadcast radio, computer automatics, braking systems, electronic ignition, relays etc. Some cars are more susceptible to disturbances than others.  
It is the responsibility of the installer to carry out a thorough check of the proper functioning under any conditions of such circuits before finishing installation.

The enclosed silicone adhesive contains acetic acid and fungicides. Keep out of reach of children and dispose properly.



## DHX 27 5/8-KFZ

Log.-periodic

- 0.9 m high top-quality antenna with high efficiency.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.

### Description

- Despite the very small physical dimensions, the toploading and the log.-periodic distance between the helical windings yield exceptionally good performance.
- Simple mounting with access from the outside only.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount : FME-connection (FME-cable to be ordered separately).
  - ZP4-mount : Permanently attached 4 m RG 58 cable terminated with FME-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	MOUNT VERSION
DHX 27 5/8-KFZ	130000593	Z-mount with FME-system
DHX 27 5/8-KFZP4	130000594	ZP4-mount with 4 m cable and FME connector

### SPECIFICATIONS

ELECTRICAL	
MODEL	DHX 27 5/8-KFZ
ANTENNA TYPE	Log.-periodically wound helical mobile antenna
FREQUENCY	27 MHz CB-band
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
BANDWIDTH	≥ 500 kHz @ SWR ≤ 2.0
MAX. POWER	200 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Copper-wire wound on glass fiber, covered by polyethylene Chromed brass



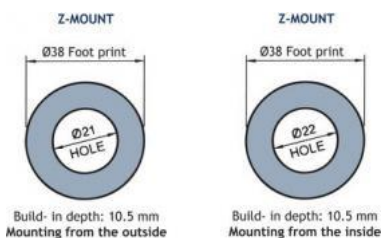
	<b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Bright/black
HEIGHT	Approx. 0.9 m
WEIGHT	Z-mount: Approx. 210 g ZP4-mount: Approx. 370 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

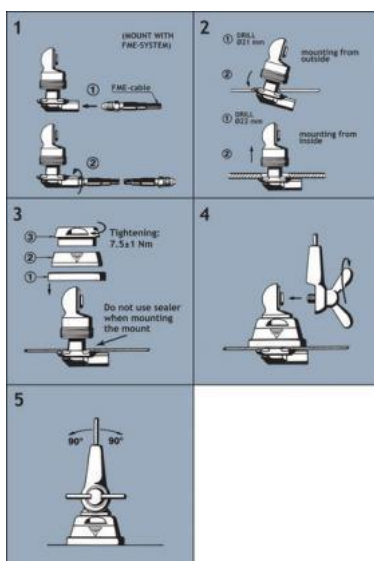
This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

## INSTALLATION DIMENSIONS



## INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

## TUNING

The antenna must be tuned using SWR-meter. Unfasten the union nut at the top end of the whip and pull out the adjusting pin approx. 1 cm at a time until best possible SWR is obtained. Re-fasten the union nut thoroughly.

## MOUNTING





## DFSA 4/TETRA-BZ BBMU2

### Dual-frequency shortened Mobile Antenna for the 4 m and TETRA Bands

- External antenna whip mounted on the BZ-mount.
- Stainless steel BZ-mount with ball-joint and wing screw whip-fastening system.
- Polyethylene-covered flexible whip.

## Description

- Dual-frequency mobile antenna for the 4 m and TETRA bands with two separate outputs.
- Easily removable whip for car wash.
- BZP0.1-mount permanently attached 100 mm cable terminated with FME-connector.
- Matching unit (BBMU) with 2 TNC female output connectors included.
- Separate outputs for the 4 m and TETRA bands

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
DFSA 4/TETRA-BZ BBMU2	130001587

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFSA 4/TETRA-BZ BBMU2
ANTENNA TYPE	Dual-frequency shortened mobile antenna
FREQUENCY	4 m: 73 - 80 MHz TETRA: 380 - 410 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 m: approx. -6 dB ±2 dB TETRA: approx. 1 dB (acc. to EIA RS-329-1)
SWR	≤ 1.9 in both bands
MAX. POWER	25 W

MECHANICAL	
MATERIALS	<b>Whip:</b> Glass fibre whip with copper wire winding, polyethylene-covered Black-chromed brass  <b>Mount:</b> Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 670 mm
WEIGHT	Approx. 150 g
DIMENSIONS	Antenna: approx. 670 mm Connecting cable: 100 mm RG 58 with FME-conn. Matching unit: 50 x 50 x 20 mm
MOUNTING	ø21 mm dia. hole (For roof thicknesses 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

Hat screw option:



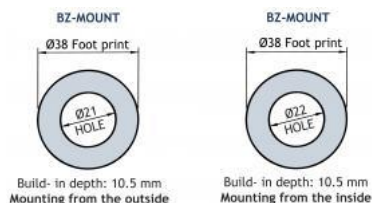
For antenna delivered  
with hat screw instead of  
wing screw add a K to  
the antenna designation.

## INSTALLATION

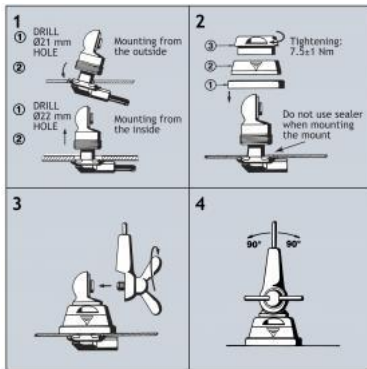
This antenna is supplied with type BZ-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The BZ-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. The BZ-mount for roof thicknesses from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car as the BZ-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS

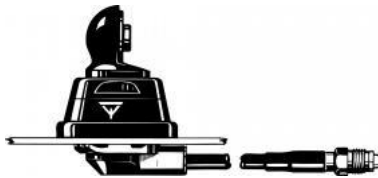


Do not use sealer on rubber gasket or other places.

## PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.

## BZP0.1-MOUNT WITH 0.1 M FME RG 58





## DFSA 4/TETRA-BZ BBMU1

>Dual-frequency shortened Mobile Antenna for the 4 m and TETRA Bands

- External antenna whip mounted on the BZ-mount.
- Stainless steel BZ-mount with ball-joint and wing screw whip-fastening system.
- Polyethylene-covered flexible whip.

### Description

- Dual-frequency mobile antenna for the 4 m and TETRA bands with one common output.
- Easily removable whip for car wash.
- BZP0.1-mount permanently attached 100 mm cable terminated with FME-connector.
- Matching unit (BBMU) with TNC female output connector included.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
DFSA 4/TETRA-BZ BBMU1	130001586

### SPECIFICATIONS

ELECTRICAL	
MODEL	DFSA 4/TETRA-BZ BBMU1
ANTENNA TYPE	Dual-frequency shortened mobile antenna
FREQUENCY	4 m: 73 - 80 MHz TETRA: 380 - 410 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	4 m: approx. -6 dB $\pm$ 2 dB TETRA: approx. 1 dB (acc. to EIA RS-329-1)
SWR	$\leq 1.9$ in both bands
MAX. POWER	25 W
MECHANICAL	

MATERIALS	<b>Whip:</b> Glass fibre whip with copper wire winding, polyethylene-covered Black-chromed brass  <b>Mount:</b> Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 670 mm
WEIGHT	Approx. 150 g
DIMENSIONS	Antenna: approx. 670 mm  Connecting cable: 100 mm RG 58 with FME-conn. Matching unit: 50 x 50 x 20 mm
MOUNTING	ø21 mm dia. hole (For roof thicknesses 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

Hat screw option:



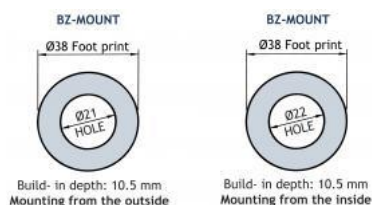
For antenna delivered  
with hat screw instead of  
wing screw add a K to  
the antenna designation.

## INSTALLATION

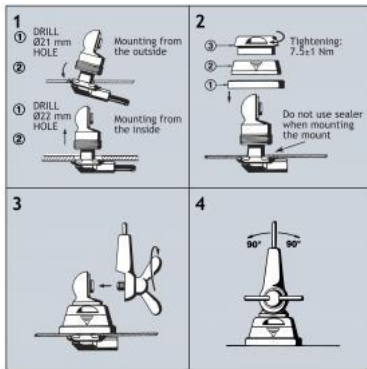
This antenna is supplied with type BZ-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The BZ-mount is particularly well suited for mounting on car roofs because of its ability to be installed exclusively with access from the outside. The BZ-mount for roof thicknesses from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car as the BZ-mount is equally well suited for mounting on e.g. trunk or wing

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS

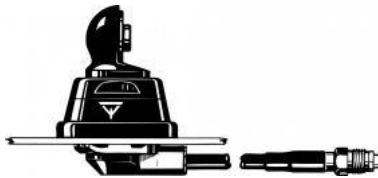


Do not use sealer on rubber gasket or other places.

## PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.

## BZP0.1-MOUNT WITH 0.1 M FME RG 58







## DFA-FLX-X/410-430/890-960 MHz

### 400 MHz / 900 MHz Dual-frequency Mobile Antenna

- Ready-tuned and unity gain on both bands.
- Stainless steel X-mount with M6-thread whip-fastening system.

## Description

- This antenna makes it possible to:
  - operate 400 MHz and 900 MHz transceivers alternately on the same antenna
  - operate two transceivers (400 and 900 MHz) at the same time on one antenna using a diplexer (type DIPX 500/800 - to be ordered separately)
  - operate a dual-frequency transceiver (400 and 900 MHz) on one antenna (diplexer not required).
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) or CX-mount (circular).
- XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## Ordering designations

TYPE NO.	PRODUCT NO.
DFA-FLX-X/410-430/890-960 MHz	130001912

When ordering, the operating frequencies in both bands must be stated. In case of duplex operation please specify TX and RX frequencies. In case of application for CELLULAR systems please state names of CELLULAR networks.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA-FLX-X/410-430/890-960 MHz
ANTENNA TYPE	Dual-frequency mobile antenna.
FREQUENCY	400 MHz-frequency to be stated within: 410-430 MHz. 900 MHz-frequency to be stated within: 890-960 MHz.
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical.
GAIN	Approx. 0 dB in both bands (acc. to EIA RS-329-1)
BAND WIDTH	400 MHz: > 20 MHz @ SWR $\leq$ 2.5 (typ.) 900 MHz: > 70 MHz @ SWR $\leq$ 2.0 (typ.)
SWR	$\leq$ 1.5 @ f. res.

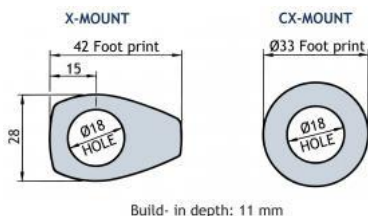
MAX. POWER	25 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Silicone tube over flexible steel wire. Black-chromed brass. <b>Mount:</b> Black-chromed brass. Environment-proof plastics. Stainless steel.
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 125 mm. / 4.92 inches.
WEIGHT	X-version: Approx. 60 g. / 0.13 lb. XP4-version: Approx. 200 g. / 0.44 lb.
MOUNTING	18 mm dia. hole. / 0.71 inches.

## INSTALLATION

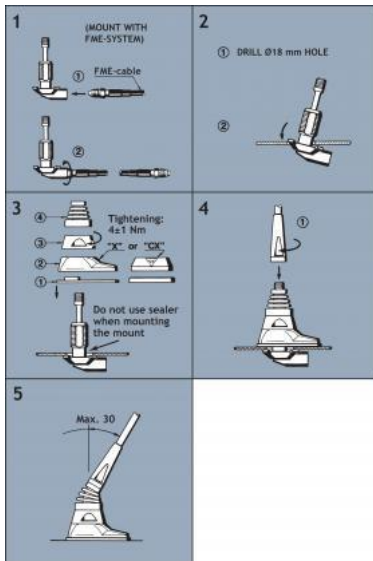
This antenna should be mounted on the car roof to ensure best omnidirectional coverage. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS

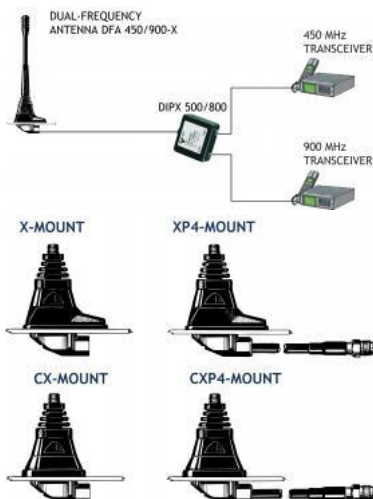


Do not use sealer on rubber gasket or other places.

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cabl installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 500/800, is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 500/800. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

### COUPLING DIAGRAM





## CX-Mount

### Circular Mini Mobile Mount

- Mobile mount gradually merging with the car roof.
- Although mainly designed for roof mounting, installation can take place anywhere on the car.

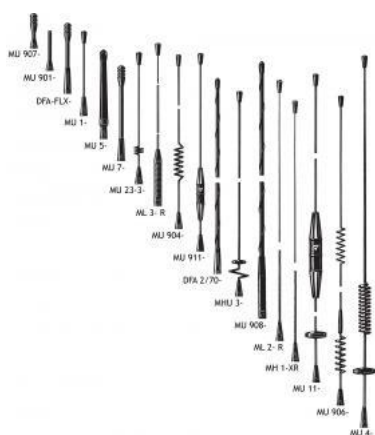
## DESCRIPTION

- M6 thread whip-mounting system.
- Designed for installation with access from the outside only.
- Very low requirements to installation depth both during and after installation.
- With access available from the inside, installation is possible in a 14 mm dia. hole.
- Bendable section in mount makes whip tiltable 30° by hand.
- Complete line of whips available for all communication bands up to 1300 MHz.
- Mounting body made of stainless steel!
- Choice between two connection principles:
  - CX-mount: FME-connection (supplied without cable).
  - CXP4-mount: Permanently attached 4 m cable terminated with FME-connector

## ORDERING DESIGNATIONS

TYPE	VERSION	PRODUCT NO.
CX-Mount	CX-mount with FME-system	130000416
CXP4-Mount	CXP4-mount with 4 m cable and FME-connector	130000423
CXP5-Mount	CXP5-mount with 5 m cable and FME-connector	130000426

## A SELECTION OF THE VARIOUS WHIPS WHICH CAN BE CONNECTED TO THE CX-MOUNT



## SPECIFICATIONS

MODEL	CX-Mount
APPLICATION	Mount for mobile antennas

FREQUENCY	0 - 1300 MHz
CONNECTION TO WHIP	M6 thread stud
MATERIALS	Stainless steel Black chromed brass Cu-nite brass Weather- and shockproof plastics
COLOUR	Black
HEIGHT	Approx. 42 mm
INSTALLATION DIA.	32.5 mm
BUILD-IN DEPTH	Active : 30 mm Passive : 11 mm
RECOMMENDED INSTALLATION TORQUE	4 ± 1 Nm
WEIGHT	CX-version : Approx. 45 g CXP4-version : Approx. 180 g
MOUNTING	18 mm dia. hole
ROOF THICKNESS	Max. 2 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569

FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## INSTALLATION

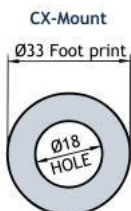
CX-mount antenna types can be mounted anywhere on the car, however, roof top mounting is always recommended. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole, in which case the bottom plastic ring of the gasket should be removed with a sharp cutter.

A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna.

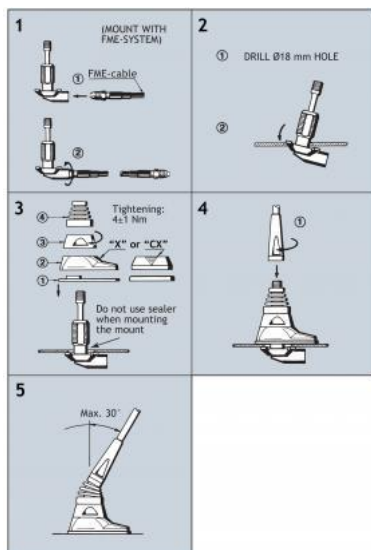
When cleaning the car in car-washing machines, the whip can easily be removed using a fork spanner.

The whip is refitted again by screwing it onto the threaded stud and tightening it lightly with the spanner. As the CX-mount is internally equipped with a bendable section, the antennas can always be adjusted to an upright position independent of the tilt angle of the installation spot (up to 30° tilt).

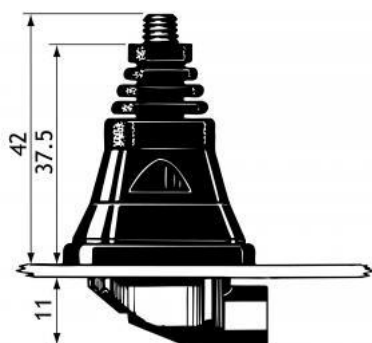
### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.





## DFA 450/900-ZG/..

### 450 MHz / 900 MHz Dual-frequency Mobile Antenna

- Ready-tuned and unity gain on both bands.
- Stainless steel ZG-mount with M8-thread whip-fastening system.

## Description

- This antenna makes it possible to:
  - operate 450 MHz and 900 MHz transceivers alternately on the same antenna
  - operate two transceivers (450 and 900 MHz) at the same time on one antenna using a diplexer
  - (type DIPX 500/800 - to be ordered separately)
  - operate a dual-frequency transceiver (450 and 900 MHz) on one antenna (diplexer not required).
- Simple mounting exclusively with access from the outside.
- Choice between two connection principles: ZG-mount : FME-connection (supplied without cable).
- ZGP4-mount : Permanently attached 4 m cable terminated with FME-connector.

## Ordering designations

TYPE NO.	PRODUCT NO.
DFA 450/900-ZG/...	

When ordering, the operating frequencies in both bands must be stated. In case of duplex operation please specify TX and RX frequencies. In case of application for CELLULAR systems please state names of CELLULAR networks.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 450/900-ZG/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	450 MHz-frequency to be stated within: 380-470 MHz 900 MHz-frequency to be stated within: 800-960 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
GAIN	Approx. 0 dB in both bands (acc. to EIA RS-329-1)
BAND WIDTH	450 MHz: > 25 MHz @ SWR $\leq$ 2.0 (typ.) 900 MHz: > 80 MHz @ SWR $\leq$ 1.5 (typ.)
SWR	$\leq$ 1.5 on transmitter frequencies
MAX. POWER	50 W



MECHANICAL	
MATERIALS	<b>Whip:</b> Black glassfiber Black-chromed brass <b>Mount:</b> Black-chromed brass Environment-proof plastics. Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	Approx. 160 mm
WEIGHT	ZG-version: Approx. 70 g ZGP4-version: Approx. 250 g
MOUNTING	21 mm dia. hole

## FME-SYSTEM ACCESSORIES

FME-CABLES	
LENGTH	TYPE NO.
1 m	1 m FME
2 m	2 m FME
3 m	3 m FME
4 m	4 m FME
5 m	5 m FME
6 m	6 m FME
4 m white	4 m FME-white
6 m white	6 m FME-white
12 m white	12 m FME-white
18 m white	18 m FME-white
FME-CONNECTORS	
CONNECTOR	ORDER NO.
FME-FME	FME-FME
Prolongation	FMEP
N	FME-N
FSMA	FME-FSMA
BNC	FME-BNC
TNC	FME.TNC
UHF	FME-UHF

Mini-UHF	FME-MUHF
Elbow-MUHF	FME-EMUHF
Elbow-BNC	FME-EBNC
Elbow-TNC	FME-ETNC
SMA	FME-SMA

For further information about other types of FME-cables please compare the cable data sheets under accessories in our catalogue.

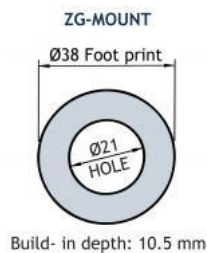
## Installation

The ZG-mount is designed for mounting in a 21 mm dia. hole on horizontal surfaces as e.g. roof top or trunk lid, with access from the outside only.

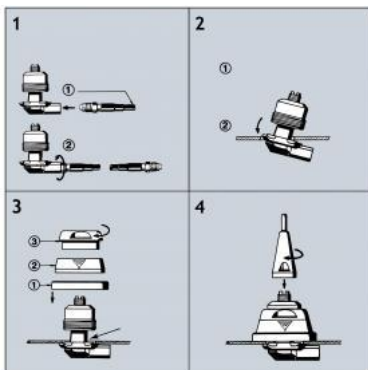
A good contact surface on the inside of the car body must always be ensured, thus enabling the base plate to get in direct contact with the metal parts of the car, which is of utmost importance for proper performance of the antenna. The ZG-mount is provided with an M8 x 1 thread mount system. This construction meets the demand for a low profile mobile mount with a slim appearance and with protection against theft of the antenna whip.

When cleaning the car in car-washing machines, the whip is easily removed using a fork spanner. The whip is refitted again by screwing it onto the thread stud and tightening it with the spanner.

## 1. INSTALLATION DIMENSIONS



## 2. INSTALLATION STEPS

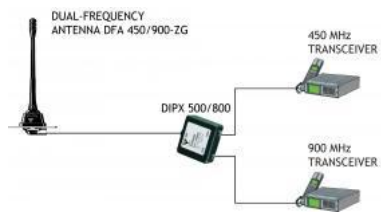


Do not use sealer on rubber gasket or other places.

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 500/800, is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 500/800. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

## COUPLING DIAGRAM



## MOUNTING



All whips are compatible with all mounts



## CT 30-ZP4

### Short Centre-loaded Mobile Antenna for the 30 MHz Band

- Short antenna with attractive appearance ideal for mounting on the car roof.
- High efficiency in spite of low height due to high-Q centre-loading coil and matching unit built into mount.

## DESCRIPTION

- Stainless steel ZP4-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.  
Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Delivered with 4 m cable permanently attached to the mount and terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
CT 30-ZP4	130000601

## SPECIFICATIONS

ELECTRICAL	
MODEL	CT 30-ZP4
ANTENNA TYPE	Centre-loaded mobile antenna
FREQUENCY	30 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
BANDWIDTH	$\geq 350$ kHz @ SWR $\leq 1.5$
SWR	$\leq 1.3$
MAX. POWER	200 W
MECHANICAL	
MATERIALS	Whip: Stainless steel Nylon Chromed brass Mount: Chromed brass Weather- and shockproof plastics Stainless steel

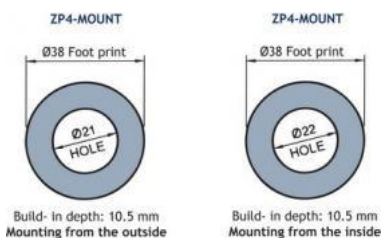
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
CABLE	4 m RG 58
COLOUR	Bright/black
HEIGHT	Approx. 0.68 m (0.06λ)
WEIGHT	Approx. 490 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

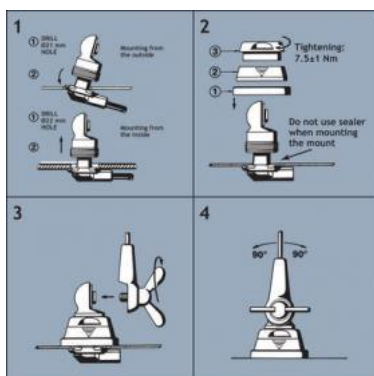
This antenna is supplied with type ZP4-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The ZP4-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The ZP4-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the ZP4-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna should always be post-adjusted using an SWR-meter, especially if mounted near metal parts parallel to the whip.

Loosen the union nut at the top of the coil and pull out the whip approx. 5 mm at a time until best possible SWR is obtained.

Fasten the union nut thoroughly.

**PLEASE NOTE**

To make this antenna operate as efficiently as possible, a matching unit has been built into the antenna mount. Consequently, neither mount nor whip can be used together with other mounts/whips.



## DFA 450/900-X/...

### 450 MHz / 900 MHz Dual-frequency Mobile Antenna

- This antenna makes it possible to:
  - operate 450 MHz and 900 MHz transceivers alternately on the same antenna
  - operate two transceivers (450 and 900 MHz) at the same time on one antenna using a diplexer (type DIPX 500/800 - to be ordered separately)
  - operate a dual-frequency transceiver (450 and 900 MHz) on one antenna (diplexer not required).
- Ready-tuned and unity gain on both bands.

## Description

- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong), CX-mount (circular) and MM-mount (magnetic).
- Choice between two connection principles: X-mount, MM-mount: FME-connection (supplied without cable).
- XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## Ordering designations

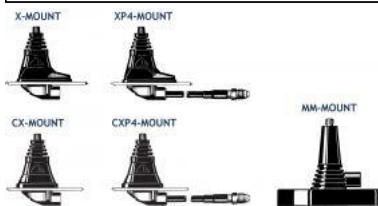
TYPE NO.	PRODUCT NO.
DFA 450/900-X/...	130001109

When ordering, the operating frequencies in both bands must be stated. In case of duplex operation please specify TX and RX frequencies. In case of application for CELLULAR systems please state names of CELLULAR networks.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 450/900-X/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	450 MHz-frequency to be stated within: 380–470 MHz 900 MHz-frequency to be stated within: 800–960 MHz
IMPEDANCE	Nom. 50 Ω
POLARISATION	Vertical
GAIN	Approx. 0 dB in both bands (acc. to EIA RS-329-1)
BAND WIDTH	450 MHz: > 25 MHz @ SWR ≤ 2.0 (typ.) 900 MHz: > 80 MHz @ SWR ≤ 1.5 (typ.)
SWR	≤ 1.5 @ f. res.
MAX. POWER	50 W
MECHANICAL	
MATERIALS	<b>Whip:</b>

	Black glassfiber Black-chromed brass <b>Mount:</b> Black-chromed brass Environment-proof plastics. Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 140 mm
WEIGHT	X-version: Approx. 60 g XP4-version: Approx. 200 g MM-version: Approx. 270 g
MOUNTING	18 mm dia. hole



All whips are compatible with all mounts.

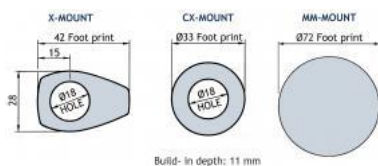
## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage. Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

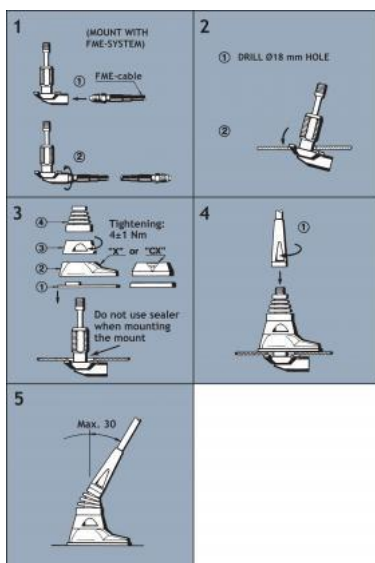
The MiniMag (abbreviated: MM) is a small, light-weight magnetic mount with a high attaching effect. A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS'



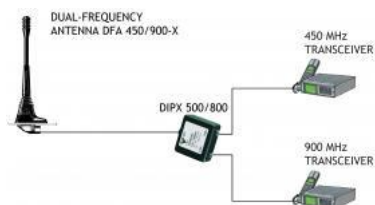


Do not use sealer on rubber gasket or other places.

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 500/800, is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 500/800. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

#### COUPLING DIAGRAM



#### PLEASE NOTE

For safety reasons:

When using the DFA 450/900-MM, car speed must not exceed 180 km/h.



## CT 27-ZP4

### Short Centre-loaded Mobile Antenna for the 27 MHz CB-Band

- Short antenna with attractive appearance ideal for mounting on the car roof.
- High efficiency in spite of low height due to high-Q centre-loading coil and matching unit built into mount.

## DESCRIPTION

- Stainless steel ZP4-mount, with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Delivered with 4 m cable permanently attached to the mount and terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
CT 27-ZP4	130000591

## SPECIFICATIONS

ELECTRICAL	
MODEL	CT 27-ZP4
ANTENNA TYPE	Centre-loaded mobile antenna
FREQUENCY	27 MHz CB-band
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
BANDWIDTH	$\geq 350$ kHz @ SWR $\leq 1.5$
SWR	$\leq 1.3$
MAX. POWER	200 W
MECHANICAL	
MATERIALS	Whip: Stainless steel Nylon Chromed brass Mount: Chromed bras Weather- and shockproof plastics Stainless steel

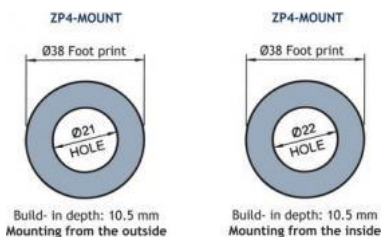
RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
CABLE	4 m RG 58
COLOUR	Bright/black
HEIGHT	Approx. 0.68 m (0.06 λ)
WEIGHT	Approx. 490 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

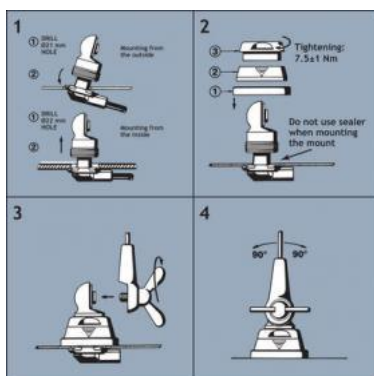
This antenna is supplied with type ZP4-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The ZP4-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. However, the antenna can be installed anywhere on the car, as the ZP4-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

### 3. TUNING

The antenna should always be post-adjusted using an SWR-meter, especially if mounted near metal parts parallel to the whip. Loosen the union nut at the top of the coil and pull out the whip approx. 5 mm at a time until best possible SWR is obtained. Fasten the union nut thoroughly.

### PLEASE NOTE



To make this antenna operate as efficiently as possible, a matching unit has been built into the antenna mount. Consequently, neither mount nor whip can be used together with other mounts/whips.



## DFA 4/70-Z/...

### Dual-frequency Mobile Antenna for the 80 and 450 MHz Bands

- New whip design for optimum wind noise reduction.
- This antenna makes it possible to:
  - operate 80 and 450 MHz transceivers alternately on the same antenna
  - operate two transceivers (80 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 – must be ordered separately).

## Description

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an “antenna farm”.
- Ideal for covert services.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY PAIR	MOUNT VERSION
DFA 4/70-Z/71.7/460.6	130000671	80: TX: 71.7 MHz 80: RX: 76.2 MHz 450: 460.6 MHz	Z-mount with FME-system
DFA 4/70-Z/76.5/446.0		80: 76.5 MHz 450: 446.0 MHz	Z-mount with FME-system
DFA 4/70-ZP4/71.7/460.6	130000672	80: TX: 71.7 MHz 80: RX: 76.2 MHz 450: 460.6 MHz	ZP4-mount with 4 m cable and FME-connector
DFA 4/70-ZP4/76.5/446.0		80: 76.5 MHz 450: 446.0 MHz	ZP4-mount with 4 m cable and FME-connector

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 4/70-Z/...
ANTENNA TYPE	Dual-frequency mobile antenna

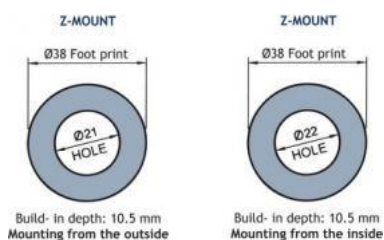
FREQUENCY	80 MHz-band freq. to be stated within: 66...88 MHz 450 MHz-band freq. to be stated within: 406...470 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	80 MHz: Approx. 0 dB 450 MHz: Approx. 2 dB
BANDWIDTH	80 MHz: $\geq 3$ MHz @ SWR $\leq 2.0$ 450 MHz: $\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f.res in both bands
MAX. POWER	30 W
<b>MECHANICAL</b>	
MATERIALS	<b>Whip:</b> Conical glass fibre Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 1.1 m
WEIGHT	Z-version: Approx. 170 g ZP4-version: Approx. 320 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



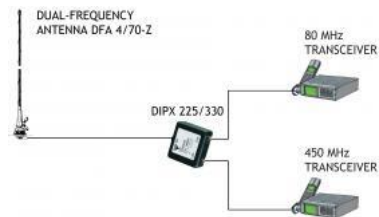
### 3. OPERATION USING A DIPLEXER

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330.

The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

### COUPLING DIAGRAM



### PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.



## CT 27 1/2-BZ-BBMU

### Mobile Roof Antenna for the 27 MHz Band

- Shortened high-performance half-wave mobile antenna for the 27 MHz band for roof mounting, whip only 95 cm long.
- For installation on glass fibre roofs - no ground plane required.

## DESCRIPTION

- Broad-band matching unit placed under the roof.
- High positioning gives performance equal to conventionally mounted roof antenna.
- Simple tuning procedure by trimming capacitor.
- Easily removable whip for cleaning in car-washing machine.
- Swivel joint for 180° angle adjustment.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
CT 27 1/2-BZ-BBMU	130001763

## SPECIFICATIONS

ELECTRICAL	
MODEL	CT 27 1/2-BZ-BBMU
ANTENNA TYPE	Shortened $\frac{1}{2} \lambda$ mobile roof antenna
FREQUENCY	27 MHz band
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Equal to shortened roof-mount antennas
BANDWIDTH	$\geq 500$ kHz @ SWR $\leq 2$
SWR	$\leq 1.5$ @ f.res.
MAX. POWER	10 W
MECHANICAL	
MATERIALS	Whip: Polyethylene-covered copper thread/glass fibre Black-chromed brass Spring: Black-chromed stainless steel



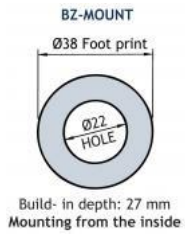
CABLE	FME-cable to be ordered separately
COLOUR	Black
DIMENSIONS	Antenna: Approx. 950 mm BBMU(W x H x D): Approx. 52 x 27 x 80 mm
WEIGHT	Approx. 340 g
MOUNTING	On roof of agriculture machines or other vehicles with non-conducting roof (22 mm hole required)
ROOF THICKNESS	5.0 – 7.0 mm

## FME-SYSTEM ACCESSORIES

FME-CABLES	
TYPE	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	
TYPE	PRODUCT NO.
FME-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578
FME-BNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC	130000581

(Elbow-TNC)	
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.





## DFA 4/2-Z/...

### Dual-frequency Mobile Antenna for the 80 and 160 MHz Bands

- New whip design for optimum wind noise reduction.
- This antenna makes it possible to:
  - operate 80 and 160 MHz transceivers alternately on the same antenna
  - operate two transceivers (80 and 160 MHz) at the same time on one antenna using a diplexer (type DIPX 88/136 – must be ordered separately).

## Description

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an “antenna farm”.
- Ideal for covert services.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.	FREQUENCY PAIR	MOUNT VERSION
DFA 4/2-Z/71.7/149.3	130000665	80: TX: 71.7 MHz 80: RX: 76.2 MHz 160: 149.3 MHz	Z-mount with FME-system
DFA 4/2-Z/76.5/166.0		80: 76.5 MHz 160: 166.0 MHz	Z-mount with FME-system
DFA 4/2-ZP4/71.7/149.3	130000667	80: TX: 71.7 MHz 80: RX: 76.2 MHz 160: 149.3 MHz	ZP4-mount with 4 m cable and FME-connector
DFA 4/2-ZP4/76.5/166.0		80: 76.5 MHz 160: 166.0 MHz	ZP4-mount with 4 m cable and FME-connector

Hat screw option:



For antenna delivered with hat screw instead of wing screw add a K to the antenna designation.

ELECTRICAL	
MODEL	DFA 4/2-Z/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	80 MHz-band freq. to be stated within: 66...88 MHz

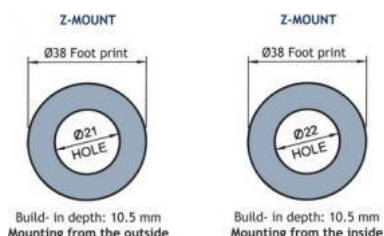
	160 MHz-band freq. to be stated within: 144...175 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB in both bands (acc. to EIA RS-329-1)
BANDWIDTH	80 MHz: $\geq 3$ MHz @ SWR $\leq 2.0$ 160 MHz: $\geq 6$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ in both bands
MAX. POWER	30 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Conical glass fiber Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Black
HEIGHT	Approx. 1.1 m
WEIGHT	Z-version: Approx. 170 g ZP4-version: Approx. 320 g
MOUNTING	$\varnothing 21$ mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be $\varnothing 22$ mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

## INSTALLATION

This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS

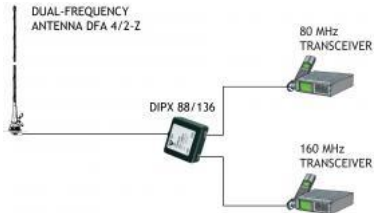


### 3. OPERATION USING A DIPLEXER

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 88/136, is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 88/136. The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

### COUPLING DIAGRAM



### PLEASE NOTE

As standard the antenna is provided with wing screw. However, the wing screw may be replaced by the less obtrusive hat screw (with key), which also gives an improved protection against theft. To order the antenna with hat screw, please add a "K" to the antenna designation.



## DFA 2/900-X/...

### Dual-frequency Mobile Antenna for the 160 and 900 MHz Bands

- New whip design for optimum wind noise reduction.
- This antenna makes it possible to:
  - operate 160 MHz and 900 MHz transceivers alternately on the same antenna.
  - operate two transceivers (160 and 900 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 - to be ordered separately).
  - operate a dual-frequency transceiver (160 and 900 MHz) on one antenna (diplexer not required).

## Description

- Ready-tuned and unity gain on both bands.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

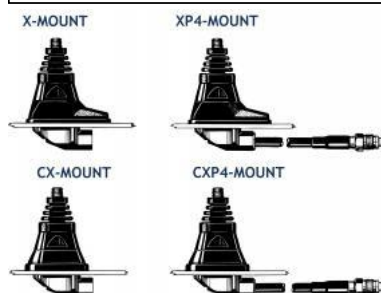
TYPE	PRODUCT NO.	MOUNT VERSION
DFA 2/900-X/...	130000690	X-mount (oblong) with FME-system
DFA 2/900-CX/...	130000696	CX-mount (circular) with FME-system
DFA 2/900-XP4/...	130000693	XP4-mount (oblong) with 4 m cable and FME-system
DFA 2/900-CXP4/...	130000695	CXP4-mount (circular) with 4 m cable and FME-system

When ordering, the operating frequencies in both bands must be stated. In case of duplex operation, only the TX frequency should be stated. In case of application for a CELLULAR system in the 900 MHz band, the name of the CELLULAR network can be stated.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 2/900-X/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz-band freq. to be stated within: 144...175 MHz 900 MHz-band freq. to be stated within: 820...960 MHz
IMPEDANCE	Nom. 50 Ω

POLARIZATION	Vertical
GAIN	0 dB on both bands (acc. to EIA RS-329-1)
BANDWIDTH	160 MHz: $\geq 8$ MHz @ SWR $\leq 2.0$ 900 MHz: $\geq 50$ MHz @ SWR $\leq 2.0$
SWR	160 MHz: $\leq 1.75$ @ f.res. 900 MHz: $\leq 1.2$ @ f.res.
MAX. POWER	30 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Conical glass fiber Black-chromed brass <b>Mount:</b> Black-chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 50 cm
WEIGHT	X-version: Approx. 80 g XP4-version: Approx. 220 g
MOUNTING	18 mm dia. hole



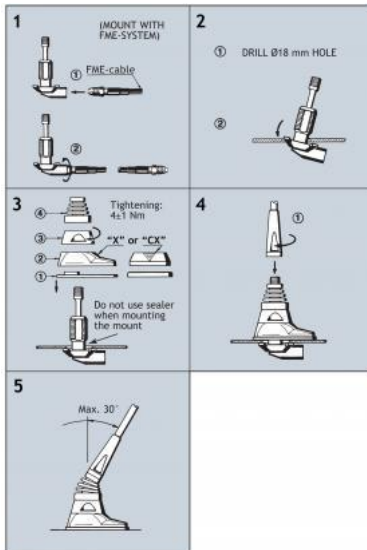
## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

## 1. INSTALLATION DIMENSIONS



Do not use sealer on rubber gasket or other places.

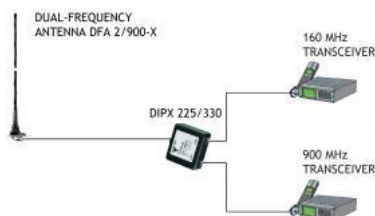
### 3. OPERATION USING A DIPLEXER

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330.

The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

### COUPLING DIAGRAM







## DFA 2/70-Z/...

### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

- New whip design for optimum wind noise reduction.
- This antenna makes it possible to:
  - operate 160 and 450 MHz transceivers alternately on the same antenna
  - operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 - must be ordered separately).

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an "antenna farm".
- Ideal for covert services.
- Stainless steel Z-mount with ball-joint and wing screw whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- Choice between two connection principles:
  - Z-mount: FME-connection (supplied without cable).
  - ZP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 2/70-Z/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz-band freq. to be stated within: 144...175 MHz 450 MHz-band freq. to be stated within: 380...470 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	160 MHz: Approx. 0 dB 450 MHz: Approx. 2 dB
BAND WIDTH	160 MHz: ≥ 8 MHz @ SWR ≤ 2.0 450 MHz: ≥ 15 MHz @ SWR ≤ 2.0
SWR	≤ 1.5 @ f.res in both bands
MAX. POWER	30 W
MECHANICAL	
MATERIALS	<b>Whip:</b> Conical glass fiber Chromed brass <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel

RECOMMENDED INSTALLATION TORQUE	7.5 ± 1 Nm
COLOUR	Black
HEIGHT	53 cm
WEIGHT	Z-version: Approx. 160 g ZP4-version: Approx. 310 g
MOUNTING	ø21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be ø22 mm dia.)
ROOF THICKNESS	Max. 2.0 mm (Models up to 7.5 mm on request)

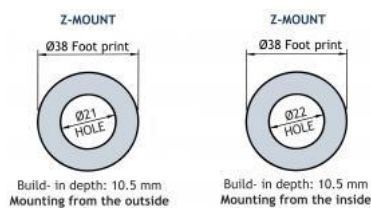
## INSTALLATION

This antenna is supplied with type Z-mount. The whip is fastened to the mount by means of our standard ball-joint and wing screw system. The adjustable ball-joint ensures that the whip can always be mounted in a vertical position independent of the angle of the installation spot.

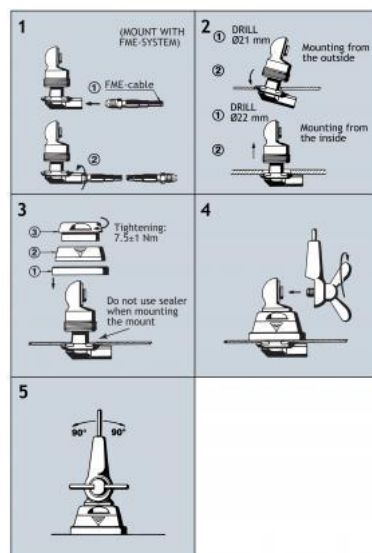
The Z-mount is particularly well suited for mounting on car-roofs because of it's ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside.

However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



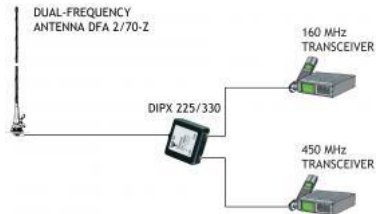
Do not use sealer on rubber gasket or other places.

### 3. OPERATION USING A DIPLEXER

Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

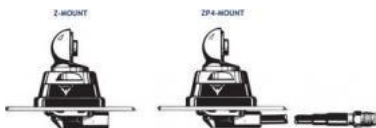
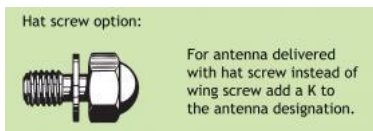
In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330.

The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.



### PLEASE NOTE

To obtain a more discrete appearance, the antenna can be delivered with hat nut and key instead of the wing screw. For this version please add a "K" to the full antenna designation.





## DFA 2/70-X/...

### Dual-frequency Mobile Antenna for the 160 and 450 MHz Bands

- New whip design for optimum wind noise reduction.
- This antenna makes it possible to:
  - operate 160 MHz and 450 MHz transceivers alternately on the same antenna
  - operate two transceivers (160 and 450 MHz) at the same time on one antenna using a diplexer (type DIPX 225/330 - to be ordered separately).

## Description

- Only a single hole has to be drilled instead of two.
- Car appearance is not destroyed by an "antenna farm".
- Ideal for covert services.
- Stainless steel X-mount with M6-thread whip-fastening system.
- Simple mounting exclusively with access from the outside.
- Models available with X-mount (oblong) and CX-mount (circular).
- Choice between two connection principles:
  - X-mount: FME-connection (supplied without cable).
  - XP4-mount: Permanently attached 4 m cable terminated with FME-connector.

## ORDERING DESIGNATIONS

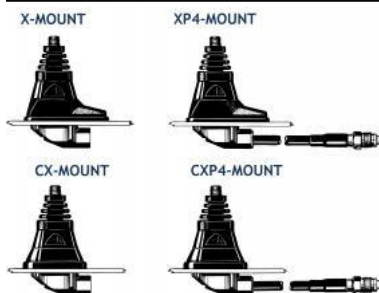
TYPE	PRODUCT NO.	MOUNT VERSION
DFA 2/70-X/...	130000688	X-mount with FME-system
DFA 2/70-XP4/...	130000684	XP4-mount with 4 m cable and FME-connector

The antenna is delivered factory-tuned to two single frequencies, one frequency in each band. These two frequencies (stated in MHz) must be specified when ordering as can be seen from the ordering designations. In case of duplex operation, only the TX frequency should be stated.

## SPECIFICATIONS

ELECTRICAL	
MODEL	DFA 2/70-X/...
ANTENNA TYPE	Dual-frequency mobile antenna
FREQUENCY	160 MHz-band freq. to be stated within: 144...175 MHz 450 MHz-band freq. to be stated within: 380...470 MHz
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	160 MHz: Approx. 0 dB 450 MHz: Approx. 2 dB

BANDWIDTH	160 MHz: $\geq 8$ MHz @ SWR $\leq 2.0$ 450 MHz: $\geq 15$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f.res in both bands
MAX. POWER	30 W
<b>MECHANICAL</b>	
MATERIALS	<b>Whip:</b> Conical glass fiber Black chromed brass <b>Mount:</b> Black chromed brass weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	$4 \pm 1$ Nm
COLOUR	Black
HEIGHT	Approx. 50 cm
WEIGHT	X-version: Approx. 160 g XP4-version: Approx. 310 g
MOUNTING	18 mm dia. hole



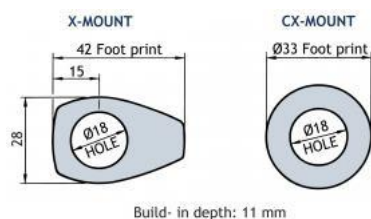
## INSTALLATION

This antenna should be mounted on the car roof to ensure best omnidirectional coverage.

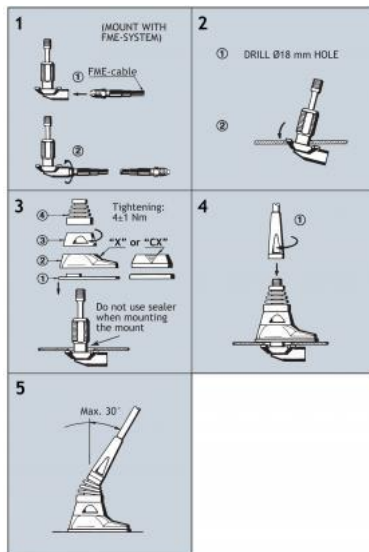
Mounting can take place exclusively with access from the outside when drilling an 18 mm dia. hole. Mounting can take place from the inside by drilling a 14 mm dia. hole. When mounting in a 14 mm dia. hole, remove the bottom plastic ring of the packing gasket with a sharp cutter.

When cleaning the car in car-washing machines, remove the whip using a spanner, size 9 mm. After wash, refit the whip and tighten it lightly with the spanner.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



Do not use sealer on rubber gasket or other places.

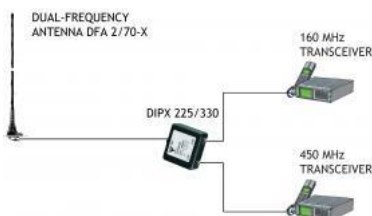
### 3. OPERATION USING A DIPLEXER

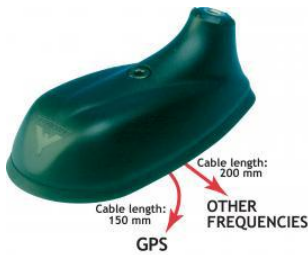
Several advantages are gained by using only one antenna. Only one single hole has to be drilled into the car body, only one cable installation has to be run, the car appearance is not destroyed by carrying several whips and also, it may be a particular demand that it should not be too obvious to see that the car is equipped with transceiving equipment.

In case of operating two transceivers on one antenna at the same time, a diplexer, type DIPX 225/330 is necessary to complete the system. (See the coupling diagram below). The tasks of the diplexer are to protect the two receiver inputs from being destroyed by the transmitter in the contrary band, and to ensure a low-loss path between the transceiver and the antenna, which is not loaded by the other branch. For further details please see the separate data sheet on the DIPX 225/330.

The diplexer fully covers both bands and, consequently, tuning to specific frequencies is not required.

### COUPLING DIAGRAM





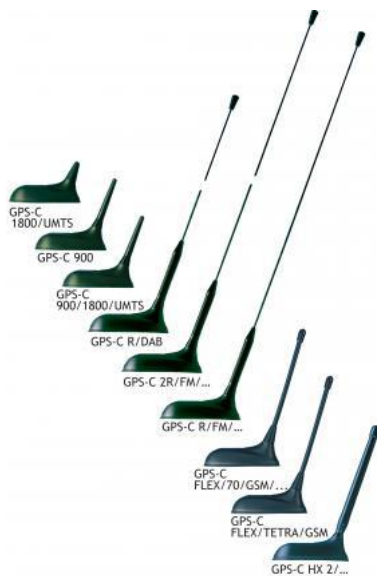
## GPS-COMBI MOUNT

GPS mount for GPS Antennas for Other Frequencies

- GPS-antenna for fixed installations.
- External antenna whip mounted on the GPS-Combi mount.

### DESCRIPTION

- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- **Right-Hand Circular Polarization (RHCP).**
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.
- Tools for mounting included.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-COMBI MOUNT	132000003

### SPECIFICATIONS

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 Ω

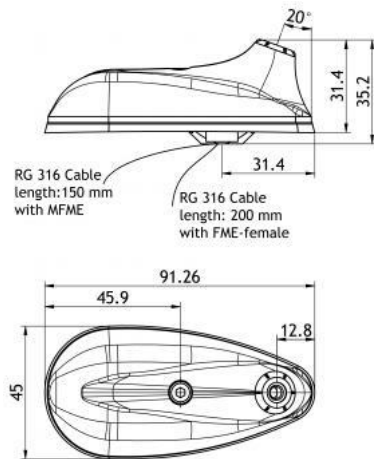
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
<b>BUILT-IN AMPLIFIER</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1</sub> dB	Approx. +7 dBm
SWR (output)	<2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (only for the GPS-part)</b>	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDE INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	114 g
MOUNTING	ø18 mm dia. hole for roof thickness up to 2.0 mm ø18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

## TOOL

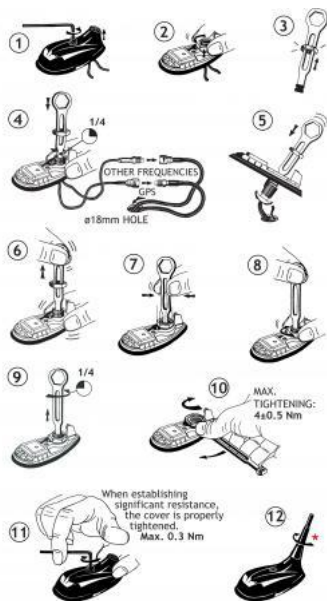


## MOUNTING DETAILS





## MOUNTING INSTRUCTIONS



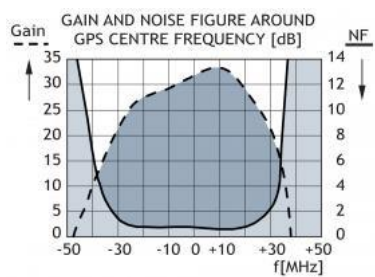
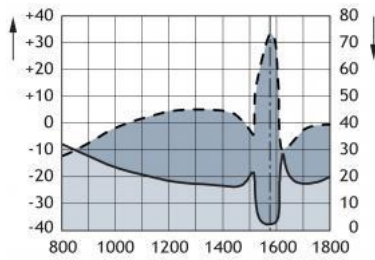
★ The whip should always be dismantled during car wash.

Do not use sealer on rubber gasket or other places.

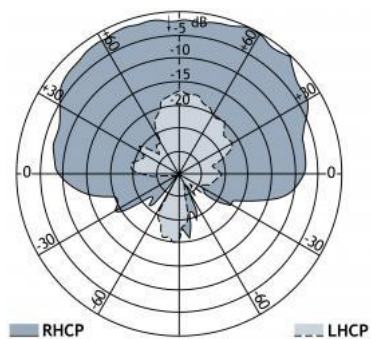
## Installation



## TYPICAL RESPONSE CURVE



## VERTICAL RADIATION PATTERN





## GPS-C TETRA-I

GPS Antenna with a  $\frac{1}{2} \lambda$  Groundplane Independent Whip with Shock Spring for the TETRA Band

- GPS-antenna for fixed installations.
- Special mount for roof thickness 3.5 - 7.5 mm.
- Groundplane independent  $\frac{1}{2} \lambda$  antenna for mounting on nonconductive surfaces.

### Description

- Built-in high gain, low noise amplifier for GPS.
- DC supply via RF-connector.
- Black-chromed, conical stainless steel whip.
- Matching unit BBMU TETRA-I included.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C TETRA-I	132000182

### SPECIFICATIONS FOR WHIP

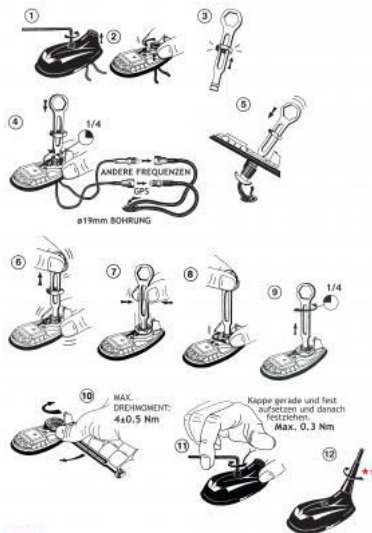
ELECTRICAL	
MODEL	GPS-C TETRA-I
ANTENNA TYPE	$\frac{1}{2} \lambda$ mobile antenna
FREQUENCY	380 - 410 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
SWR	380 - 400 MHz: < 2.0 400 - 410 MHz: < 2.5
MECHANICAL	
MATERIALS	<b>Whip:</b> Black-chromed, conical stainless steel Black-chromed brass <b>Spring:</b> Black-chromed stainless steel
COLOUR	Black

HEIGHT	Approx. 350 mm / 13.78 in.
WEIGHT	Approx. 50 g / 0.11 lb.
MOUNTING	On the GPS-Combi mount

## SPECIFICATIONS FOR GPS-COMBI MOUNT

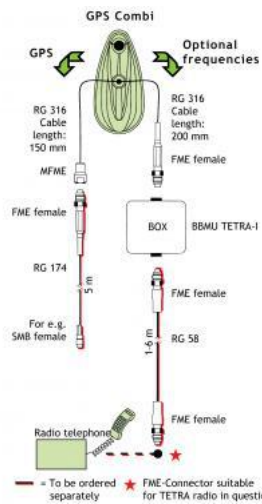
ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARIZATION ATT.	> 10 dB (typ.)
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
POWER CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + (FME (female for mobile antenna)) FME (male) on output of BBMU filter
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm / 1.18 x 3.50 in.
ROOF THICKNESS	3.5 - 7.5 mm / 0.14 - 0.30 in.
WEIGHT	Approx. 114 g / 0.25 lb.
MOUNTING	$\varnothing$ 19 mm / 0.75 in. dia. hole Tools for mounting included

## MOUNTING INSTRUCTIONS



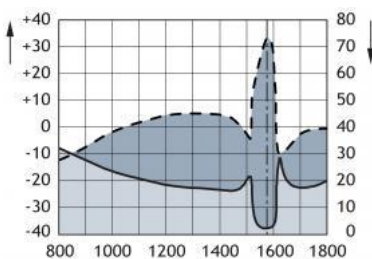
★ ★ Den Antennenstrahler vor der Fahrzeugwäsche abschrauben.

## CABLE MOUNTING

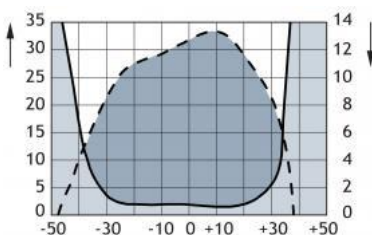


Do not use sealer on rubber gasket or other places.

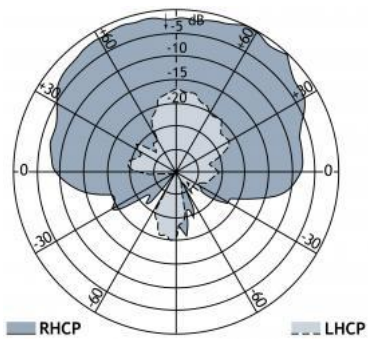
## GAIN AND NOISE FIGURE (dB)



## GAIN AND NOISE FIGURE AROUND GPS CENTER FREQUENCY (dB)



## VERTICAL RADIATION PATTERN

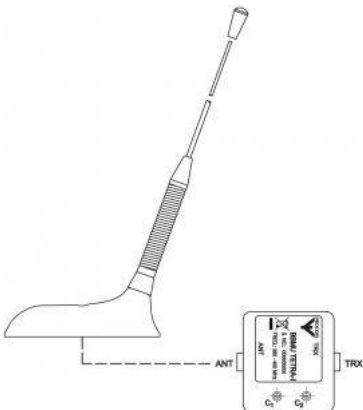


## TUNING

SWR 3000 Analyzer with built-in signal generator and graphic display range of measurement 30-2700 MHz.



Tune the SWR in on the desired centre frequency and suitable spacing (for instance 30 MHz). Adjust C1 till the SWR curve emerges on the display. Adjust C2 till the best possible SWR minimum is reached on the required frequency. Fine-tune the SWR minimum and the bandwidth step by step by means of C1 and C2.





## GPS-C R/GSM/FM

GPS Antenna with a  $\frac{1}{4} \lambda$  Whip with Shock Spring for the EGSM and FM Radio Bands

- External antenna whip mounted on the GPS-Combi mount.
  - Black-chromed, conical stainless steel whip.
  - Sturdy, general-purpose  $\frac{1}{4} \lambda$  antenna in professional quality.
  - Easily removable whip for car wash.c

### Description

- GPS-antenna for fixed installations.
  - Full hemispherical coverage.
  - Built-in high gain, low noise amplifier.
  - Right-Hand Circular Polarization (RHCP).
  - 5 V supply voltage (3 V respectively 12 V available on request).
  - DC supply via RF-connector.



### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
GPS-C R/GSM/FM	132000056

### SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	GPS-C R/GSM/FM
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	FM-Radio (88-108 MHz) EGSM band (880-960 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Whip: Black-chromed, concial stainless steel Spring:

	Black-chromed brass Black-chromed stainless steel
COLOUR	Black
HEIGHT	Approx. 500 mm
WEIGHT	Approx. 50 g
MOUNTING	On the GPS-Combi mount

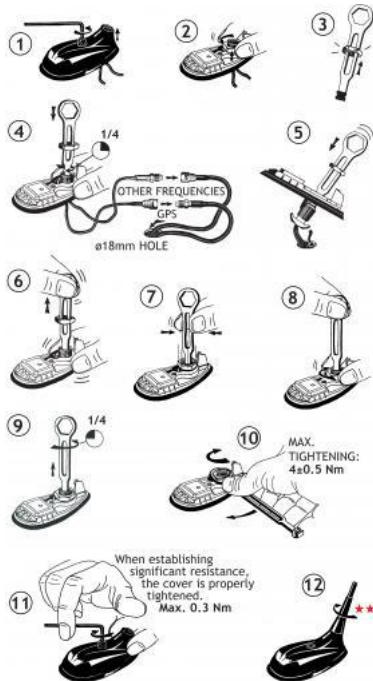
## SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS (H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18 mm dia. hole for roof thickness up till 2.0 mm



ø18.5 mm dia. hole for roof thickness 2.0 - 2.5 mm  
Tools for mounting included

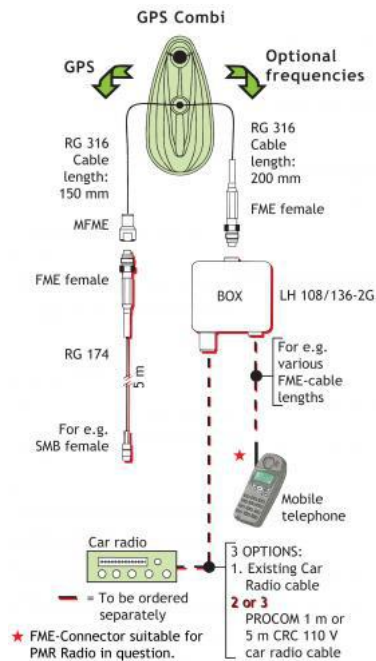
## MOUNTING INSTRUCTIONS



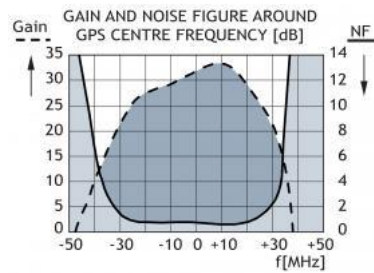
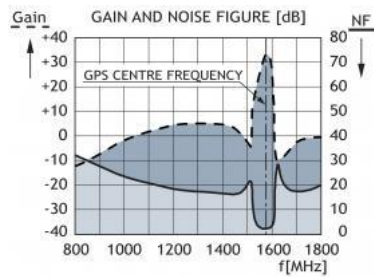
★★ The whip should always be dismantled during car wash.

Do not use sealer on rubber gasket or other places.

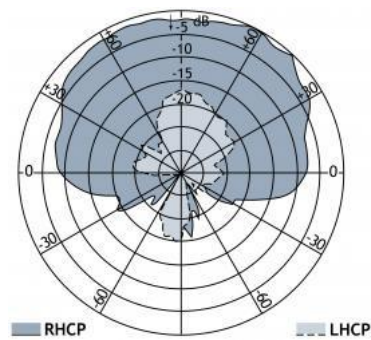
## CABLE MOUNTING

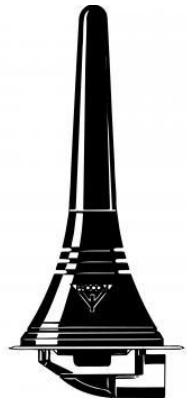


## TYPICAL RESPONSE CURVES



### TYPICAL RADIATION PATTERN





## MU 901-LX/...

### 0 dB Mobile Antenna for the 900 MHz Band

- 0 dB mobile antenna for the 900 MHz band.
- Black-chromed whip in nice, discrete design.

## DESCRIPTION

- Type MU 901-LX/l covers 820 – 905 MHz (e.g. for the EAMPS cellular system).
- Type MU 901-LX/h covers 870 – 960 MHz (e.g. for the ETACS, NMT-900 and EGSM cellular systems).
- Stainless steel LX-mount – professional quality in elegant and smooth design.
- Especially suited for roof-mounting.
- Provided with FME-connection (supplied without cable).
- Bendable section in mount for adjustment of whip (tiltable 15° by hand).
- Installation with access from the outside only (requiring an 18 mm dia. hole).

## ORDERING DESIGNATION

TYPE	PRODUCT NO.	FREQUENCY
MU 901-LX/l	130001141	820 – 905 MHz (EAMPS)
MU 901-LX/h	130001144	870 – 960 MHz (EGSM, NMT-900, ETACS)

## SPECIFICATIONS

ELECTRICAL	
MODEL	MU 901-LX/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile antenna
FREQUENCY	900 MHz band covered by two models
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 90$ @ SWR $\leq 1.75$ $\geq 180$ @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f. res.
MAX. POWER	60 W
MECHANICAL	
MATERIALS	Whip: Black-chromed brass

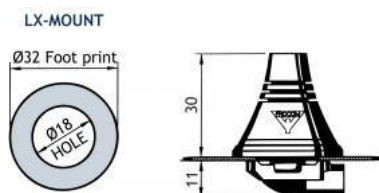
	Mount: Stainless steel Brass Weather- and shockproof plastics
RECOMMENDED INSTALLATION TORQUE	3.5 Nm max.
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	Approx. 80 mm
WEIGHT	Approx. 50 g
MOUNTING	18 mm dia. hole

## INSTALLATION

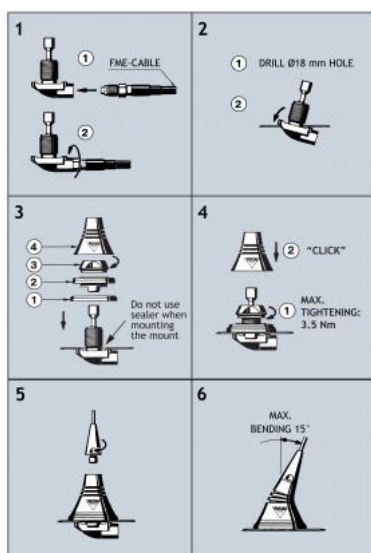
The LX-mount is especially suited for roof-mounting. It is recommended to mount the antenna at the centre of the roof to ensure the best omnidirectional coverage. Mounting can take place in an 18 mm dia. hole with access from the outside only.

When cleaning the car in car-washing machines, the whip should be removed. After wash, the whip is refitted and tightened lightly.

### 1. INSTALLATION DIMENSIONS



### 2. INSTALLATION STEPS



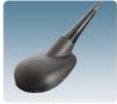
Do not use sealer on rubber gasket or other places.

### PLEASE NOTE

When tightening the revolving nut (see picture 4), special care must be taken to keep the spanner in the correct position.

### 3. TUNING

The antenna is delivered factory-tuned and requires no further tuning.



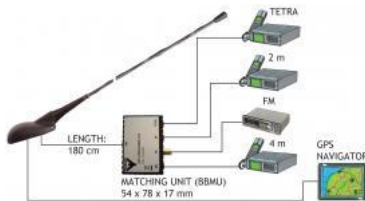
## FF 4/2/TETRA/FM/GPS-BBMU

### Disguise Antenna for Ford Focus

- 4-Band mobile antenna with 4 m, 2 m, 70 cm and FM bands.
- GPS-antenna for fixed installations.
- External antenna whip mounted on the FORD GPS mount.

## DESCRIPTION

- Full hemispherical coverage.
- Built-in high-gain, low-noise amplifier.
- Right-Hand Circularly Polarized antenna (RHCP).
- DC supply via RF-connector.
- Polyethylene-covered flexible whip.
- Easily removable whip for car wash.
- Matching unit (BBMU) included.



## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
FF 4/2/TETRA/FM/GPS-BBMU	132000107

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	FF 4/2/TETRA/FM/GPS-BBMU
ANTENNA TYPE	Collinear mobile whip antenna
FREQUENCY	4 m: 74.2 - 87.5 MHz 2 m: 167.5 - 174 MHz 70 cm: 380 - 400 MHz FM band: 93 - 108 MHz (Limited in 88 - 93 MHz)
SWR	74.2 - 77.7 and 84 - 87.5 MHz: < 2.5 167.5 - 169.5 and 172 - 174 MHz: < 2.0 380 - 400 MHz: < 2.0
IMPEDANCE	Nom. 50 Ω
POLARIZATION	Vertical
GAIN	4 m: Approx. -10/-15 dB 2 m: Approx. -10/-15 dB 70 cm: Approx. -5/-10 dB (acc. to EIA RS-329-1)
MAX. POWER	15 W

MECHANICAL	
MATERIALS	Glass fibre whip with copper wire winding, polyethylene-covered. Black-chromed brass
COLOUR	Black
HEIGHT	660 mm
WEIGHT	102 g
MOUNTING	On standard FORD GPS mount



## PMA 5.5-TNC

### 0 dB Low-profile Antenna for the 5500 MHz band

- Low-profile antenna for the 5500 MHz band for fixed installations.
- Approx. 0 dB gain.

## DESCRIPTION

- Omnidirectional coverage.
- Provided with TNC (female) connector.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
PMA 5.5-TNC	130001789

## SPECIFICATIONS

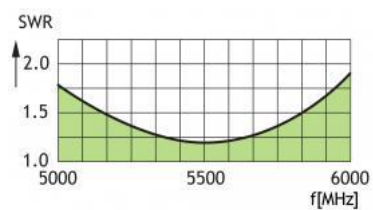
ELECTRICAL	
MODEL	PMA 5.5-TNC
ANTENNA TYPE	$\frac{1}{4} \lambda$ antenna
FREQUENCY	5500 MHz band (5000 - 6000 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
COVERAGE	Omnidirectional
GAIN	Approx. 0 dB
BANDWIDTH	$\geq 1000$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.2$ @ f.res.
MAX. POWER	10 W
MECHANICAL	
TEMP. RANGE	-50° C $\rightarrow$ +70° C
MATERIALS	Cu-nite brass, POM
COLOUR	Black
CONNECTOR	TNC (female)
RECOMMENDED INSTALL. TORQUE	8.5 $\pm$ 1 Nm
HEIGHT	35 mm
OUTER HEIGHT	56 mm total
WIDTH/LENGTH	$\varnothing 55$ mm

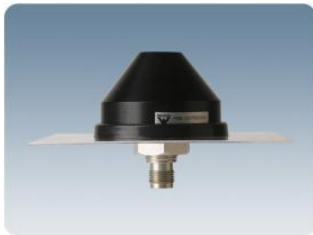


WEIGHT	Approx. 100 g
MOUNTING	14 mm dia. hole
MOUNTING THICKNESS	0.7 → 4.5 mm



## TYPICAL RESPONSE CURVE





## PMA 2.4-TNC

### 0 dB Low-profile Antenna for the 2400 MHz band

- Low-profile Antenna for the 2400 MHz band for fixed installations.
- Approx. 0 dB gain.
- Omnidirectional coverage.

## DESCRIPTION

- Ground plane of minimum 10 x 10 cm is needed.
- Provided with TNC (female) connector.
- The gasket should be entirely supported by the mounting plane.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
PMA 2.4-TNC	130001790

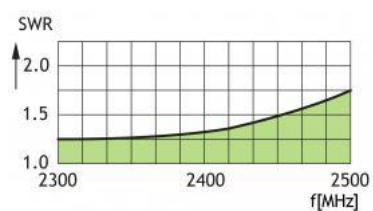
## SPECIFICATIONS

ELECTRICAL	
MODEL	PMA 2.4-TNC
ANTENNA TYPE	$\frac{1}{4} \lambda$ antenna
FREQUENCY	2400 MHz band (2300 - 2500 MHz)
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
COVERAGE	Omnidirectional
GAIN	Approx. 0 dB
BANDWIDTH	$\geq 200$ MHz @ SWR $\leq 2.0$
SWR	$\leq 1.5$ @ f.res.
MAX. POWER	10 W
MECHANICAL	
TEMP. RANGE	-50° C $\rightarrow$ +70° C
MATERIALS	Cu-nite brass, POM
COLOUR	Black
CONNECTOR	TNC (female)
RECOMMENDED INSTALL. TORQUE	8.5 $\pm$ 1 Nm
HEIGHT	35 mm
OUTER HEIGHT	56 mm total

WIDTH/LENGTH	ø55 mm
WEIGHT	Approx. 100 g
MOUNTING	14 mm dia. hole
MOUNTING PLATE THICKNESS	0.7 → 4.5 mm



## TYPICAL RESPONSE CURVE





## GPS-C UMTS

GPS Antenna with a  $1/4 \lambda$  Mobile Antenna for the UMTS Band

- External antenna whip mounted on the GPS-Combi mount.
- GPS-antenna for fixed installations.

### Description

- Mobile antenna for the UMTS band.
- Black-chromed whip in nice, discrete design.
- Easily removable whip for car wash.
- Full hemispherical coverage.
- Built-in high gain, low noise amplifier.
- Right-Hand Circular Polarisation (RHCP).
- 5 V supply voltage (3 V respectively 12 V available on request).
- DC supply via RF-connector.

### ORDERING DESIGNATIONS

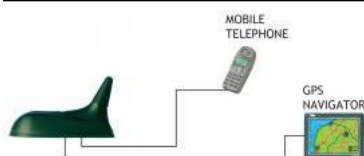
TYPE NO.	PRODUCT NO.
GPS-C UMTS	132000081

### SPECIFICATIONS FOR WHIP

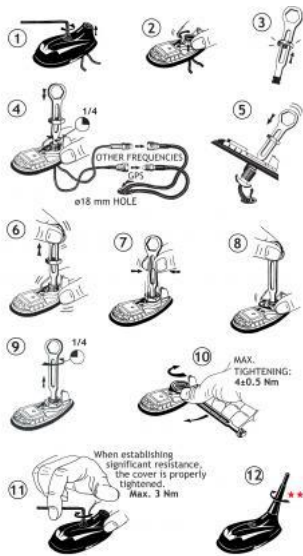
ELECTRICAL	
MODEL	GPS-C UMTS
ANTENNA TYPE	$1/4 \lambda$ mobile antenna
FREQUENCY	1900-2200 MHz (UMTS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Vertical
BANDWIDTH	$\geq 300$ MHz @ SWR $\leq 2.25$
SWR	$\leq 1.3$ @ f. res.
GAIN	Approx. 0 dB (acc. to EIA RS-329-1)
MAX. POWER	25 W
MECHANICAL	
MATERIALS	Black-chromed brass
COLOUR	Black
HEIGHT	Approx. 25 mm
WEIGHT	Approx. 16 g
MOUNTING	On the GPS-Combi mount

### SPECIFICATIONS FOR GPS-COMBI MOUNT

ELECTRICAL General specifications	
MODEL	GPS-COMBI MOUNT
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz (DCS)
IMPEDANCE	Nom. 50 $\Omega$
POLARISATION	Circular right-hand
COVERAGE	Hemispherical
GAIN	28 dBic in axial direction (typ.)
CROSS-POLARISATION ATT.	> 10 dB (typ.)
SELECTIVITY	> 45 dB down at $\pm$ 45 MHz
BUILT-IN AMPLIFIER	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P 1dB	Approx. +7 dBm
SWR (output)	$\leq$ 2.0
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
CURRENT CONSUMPTION	Approx. 25 mA
MECHANICAL (only for the GPS-part)	
MATERIALS	Cu-nite brass Stainless steel Reinforced thermoplastic
ANTENNA COLOUR	Black
TEMP. RANGE	-35° C $\rightarrow$ +75° C
CONNECTOR	FME (male for GPS) + FME (female for mobile antenna)
RECOMMENDED INSTALL. TORQUE	4 $\pm$ 0.5 Nm
DIMENSIONS(H x L)	Approx. 30 x 89 mm
ROOF THICKNESS	Max. 2.5 mm
WEIGHT	Approx. 114 g
MOUNTING	$\varnothing$ 18.0 mm dia. hole for roof thickness up to 2.0 mm $\varnothing$ 18.5 mm dia hole for roof thickness 2.0 - 2.5 mm Tools for mounting included

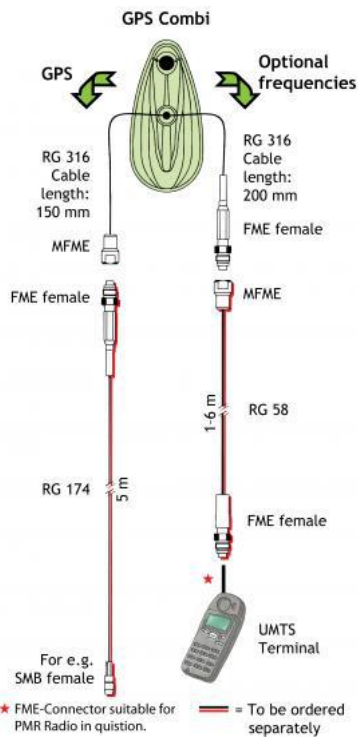


## MOUNTING INSTRUCTIONS

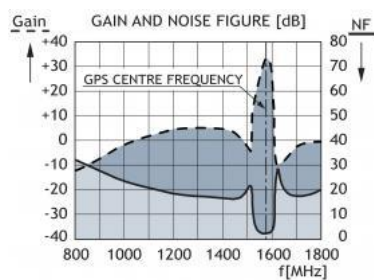


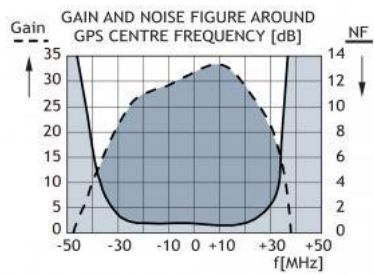
Do not use sealer on rubber gasket or other places.

## CABLE MOUNTING

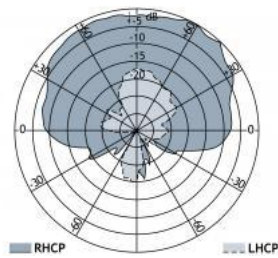


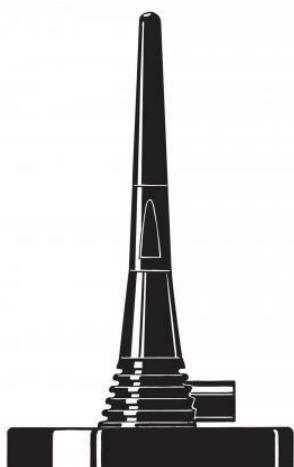
## TYPICAL RESPONSE CURVES





## VERTICAL RADIATION PATTERN





## MU 800/900/1800/2100/2600-MMS

Multi-frequency Mobile Antenna for the 800 MHz, 900 MHz 1800 MHz, 2100 MHz and 2600 MHz

- Multi-frequency antenna – multi bands – one antenna!

### DESCRIPTION

- Stainless steel MMS-mount.
- Low profile magnetic mount.
- Provided with FME-connection (supplied without cable).

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 800/900/1800/2100/2600-MMS	130001561

### SPECIFICATIONS

ELECTRICAL	
MODEL	MU 800/900/1800/2100/2600-MMS
ANTENNA TYPE	Multi-frequency mobile antenna
FREQUENCY	790 - 862 MHz 880 - 960 MHz (EGSM/NMT-900) 1710 - 1880 MHz (DCS-1800/PCN) 1900 - 2200 MHz (UMTS) and 2500 - 2690 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	Approx. 0 dB on all bands (acc. to EIA RS-329-1)
BANDWIDTH	800 MHz: > 50 MHz @ SWR $\leq$ 2.0 900 MHz: > 40 MHz @ SWR $\leq$ 1.5 1800 MHz: Approx. 200 MHz @ SWR $\leq$ 2.0 (typ.) 1900 - 2200 MHz @ SWR $\leq$ 2.0 (typ.) and 2600 MHz: > 200 MHz @ SWR $\leq$ 2.5 (typ.)
SWR	$\leq$ 3.0
MAX. POWER	25 W
MECHANICAL	



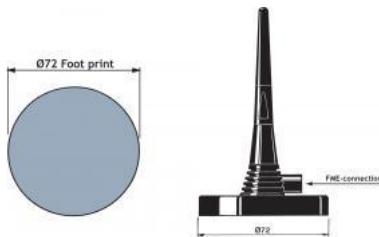
MATERIALS	Whip: Black cover POM Black-chromed brass Mount: Stainless steel Brass Weather- and shockproof plastics
CABLE	FME-cable to be ordered separately
COLOUR	Black
HEIGHT	115 mm
WEIGHT	Approx. 300 g
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	180 km/h

## INSTALLATION

The MU 800/900/1800/2100/2600-MMS should be mounted at the centre of the vehicle roof to ensure best omnidirectional coverage. The MiniMag (MMS) magnetic mount is especially suited for temporary antenna installations where it is not desirable to drill a hole in the vehicle. The magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MiniMag (MMS) is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock.

A silicone layer applied to the contact surface protects the car roof and ensures maximum friction.

### 1. INSTALLATION DIMENSIONS



### 2. TUNING

The antenna is delivered factory-tuned and requires no further tuning.

### PLEASE NOTE

For safety reasons:

When using the MU 800/900/1800/2100/2600-MMS, car speed must not exceed 180 km/h



## MU 1-MG/GPS/...

GPS Antenna with a  $\frac{1}{4} \lambda$  Mobile Antenna for the 450 MHz Band

- Heavy-duty magnetic mount with toggle joint.
- External antenna whip mounted on the magnetic base (MG) which includes antenna for Global Positioning System (GPS).

### DESCRIPTION

- Provided with two 5m cables attached:
  - 5m RG 58 cable with UHF-male connector for TETRA.
  - 5m RG 174 cable with SMA-male connector for GPS.
- The whip is fixed on the mount using a “hat”-screw which is supplied with the mount together with a special fastening key.
- Built-in high-gain, low-noise amplifier.
- 5 V supply voltage (3 V available on request).
- DC supply via SMA-connector.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 1-MG/GPS/380-410	132000209

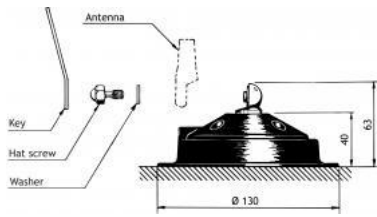
### SPECIFICATIONS

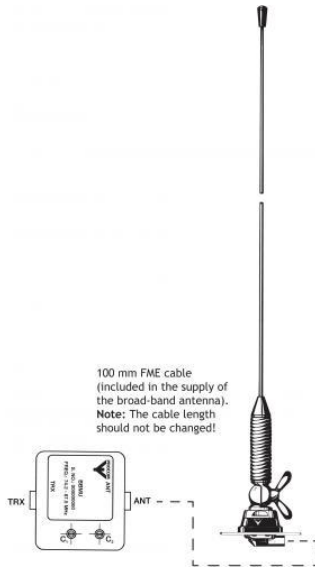
ELECTRICAL	
MODEL	MU 1-MG/GPS/...
ANTENNA TYPE	$\frac{1}{4} \lambda$ mobile whip antenna
FREQUENCY	TETRA 380 - 410 MHz
BANDWIDTH	$\geq 30$ MHz @ SWR $\leq 1.5$
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	0 dB (acc. to EIA RS-329-1)
SWR	$\leq 1.3$ @ f. res.
MAX. POWER	25 W
ELECTRICAL GPS	
ANTENNA TYPE	Active patch antenna
FREQUENCY	1575 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Circular right-hand
COVERAGE	Hemispherical

GAIN (in axial direction)	28 dBic in axial direction (typ.)
CROSS POLARIZATION ATT	> 10 dB (typ.)
SELECTIVITY	> 45 dB down @ $\pm 45$ MHz
<b>Built-in Amplifier</b>	
GAIN	> 30 dB (typ.)
NOISE FIGURE	< 1 dB (typ.)
P <sub>1 dB</sub>	Approx. +7 dBm
SWR (output)	$\leq 2.0$
SUPPLY VOLTAGE	5 $\pm$ 0.5 VDC (3 V resp. 12 V on request)
SELECTIVITY	> 20 dB down @ $\pm 100$ MHz
CURRENT CONSUMPTION	Approx. 25 mA
<b>MECHANICAL (WHIP)</b>	
COLOUR	Bright polished or black-chromed
MATERIALS	Black-chromed stainless steel
HEIGHT	Approx. 175 mm / 6.89 in.
WEIGHT	Approx. 34 g / 0.075 lb.
MOUNTING	On the MG
MODEL	MG
APPLICATION	Magnetic mount for toggle-joint type mobile antenna whips. With "hat"-screw and key
MATERIALS	Stainless steel Black-chromed brass Weather- and shockproof plastics
TEMP. RANGE	-35° C $\rightarrow$ +75° C
COLOUR	Black
WEIGHT	Approx. 0.9 kg / 1.98 lb.
CONNECTORS	UHF (male with 5m RG58 cable for VHF) SMA (male with 5m RG174 cable for GPS)
DIMENSIONS	Total height: Approx. 64 mm / 2.52 in. Diameter: 130 mm / 5.12 in.
MOUNTING	Centre of vehicle roof for best omnidirectional coverage
MAX. CAR SPEED	170 km/h / 105.63 mph.

## INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to obtain best omnidirectional coverage.





## ML 1-ZR/BOS1 BBMU

### $\frac{1}{4}$ $\lambda$ Broad-Band Mobile Antenna for the 4 m BOS Band

- Turdy  $\frac{1}{4}$   $\lambda$  mobile antenna in professional industry standard quality.
- Factory-adjusted broad-band matching unit for 74.2 - 87.5 MHz (optimized for 74.21 - 77.66 MHz and 84.01 - 87.46 MHz).
- Tuning not necessary – can be fine-tuned if needed.

## DESCRIPTION

- Separate broadband matching unit for time-saving mounting.
- Necessary cable length between the matching unit and the antenna mount: 100 mm (FME junction cable included).
- Stainless steel Z-mount with socket joint and wing screw.
- Simple mounting exclusively with access from the outside. Models with roof thickness from 2 mm to 7.5 mm mounting from the inside.
- FME antenna cable for 4 m BOS can be mounted direct in the matching unit without special antenna connectors.

## ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
ML 1-ZR/BOS1 BBMU	130000628

## SPECIFICATIONS

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ELECTRICAL	
MODEL	ML 1-ZR/BOS1 BBMU
ANTENNA TYPE	$\frac{1}{4} \lambda$ Broad-Band Mobile whip Antenna
FREQUENCY	Factory adjusted: 74.2 - 87.5 MHz (optimized for 74.21 - 77.66 MHz and 84.01 - 87.46 MHz).
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	2 dB (acc. to EIA RS-329-1)
BANDWIDTH	$\geq 4$ MHz @ SWR $\leq 2.0$ ???
SWR	$\leq 1.3$ @ f.res ????
MAX. POWER	25 W ????
MECHANICAL	
MATERIALS	<b>Whip:</b> Stainless steel Chromed brass <b>Spring:</b> Stainless steel <b>Mount:</b> Chromed brass Weather- and shockproof plastics Stainless steel
RECOMMENDED INSTALLATION TORQUE	7.5 $\pm$ 1 Nm
COLOUR	Bright/black
DIMENSIONS	Antenna : Approx. 1 m Matching unit : 50 x 50 x 20 mm FME junction cable : 100 mm
MOUNTING	21 mm dia. hole (For roof thickness 2 mm up to 7.5 mm mounting hole should be 22 mm dia.)
ROOF THICKNESS	0.5 - 2 mm and 5 - 7.5 mm respectively depending on mounting ring

SUNDRIES: For connection of special cables (RG 213, H2000, RG 223 etc.) to the matching unit the jumper cable JPC 40/RG 58/FN can be used. This is a 40 cm long RG 58 cable with one FME connector and one N-female connector.

### **INSTALLATION (if mounted from the outside)**

1. Equip the matching unit with FME antenna cables and the supplied 100 mm junction cable.
2. Draw the 100 mm junction cable through the antenna hole from the outside (e.g. with a drawstring between the car roof and the dome).
3. The Z-mount is particularly well suited for mounting on car-roofs because of its ability to be installed exclusively with access from the outside. The Z-Mount for roof thickness from 2 mm to 7.5 mm must be mounted from the inside. However, the antenna can be installed anywhere on the car, as the Z-mount is equally well suited for mounting on e.g. trunk or wing.
4. Attach the cable to the Z-mount and install the mount from the outside following the below given instructions.

### **1. INSTALLATION DIMENSIONS**

## 2. INSTALLATION STEPS

Do not use sealer on rubber gasket or other places.

## 3. TUNING

SWR 4000 Analyser with built-in signal generator and graphic display range of measurement 30 - 2700 MHz







## MU 150/450/.../...-MM

Dual band mobile antenna with Shock Spring for the 150 MHz and 450 MHz Bands, mounted on a Magnet-Mount

- External antenna whip mounted on the MM-Mount – Mini Magnetic Mount
- When ordering the antenna, please state the centre frequency on each band.
- Sturdy, general-purpose ¼ ? antenna in professional quality.

### ORDERING DESIGNATIONS

TYPE	PRODUCT NO.
MU 174/320-MM	130002235
MU 174/350-MM	130002236
MU 149.125/420-MM	130002237
ACCESSORIES	
DIPX (on request)	

### FME-SYSTEM ACCESSORIES

FME-CABLES	PRODUCT NO.
1 m FME	130000437
2 m FME	130000447
3 m FME	130000457
4 m FME	130000466
5 m FME	130000474
6 m FME	130000483
4 m FME-white	110000064
6 m FME-white	110000066
12 m FME-white	110000068
18 m FME-white	110000069
FME-CONNECTORS	PRODUCT NO.
FMF-FME	130000583
FME-P (Prolongation)	130000565
FME-N	130000571
FME-FSMA (Female-SMA)	130000578

FMEBNC	130000566
FME-TNC	130000569
FME-UHF	130000572
FME-MUHF (Mini-UHF)	130000573
FME-EMUHF (Elbow-MUHF)	130000582
FME-EBNC (Elbow-BNC)	130000580
FME-ETNC (Elbow-TNC)	130000581
FME-SMA	130000577

For further information about other types of FME-cables and FME-connectors, please compare the cable and connector data sheets under accessories in our catalogue.

## SPECIFICATIONS FOR WHIP

ELECTRICAL	
MODEL	MU 150/450/.../...-MM
ANTENNA TYPE	Mobile antenna
FREQUENCY	174/320 MHz 174/350 MHz 149.125/420 MHz
IMPEDANCE	Nom. 50 $\Omega$
POLARIZATION	Vertical
GAIN	150 MHz: Approx. 0 dB (acc. to EIA RS-329-1) 450 MHz: Approx. 0 dB (acc. to EIA RS-329-1)
MECHANICAL	
MATERIALS	Whip: Polyethylene covered copper thread / glass fibre. Black-chromed brass Spring: Black-chromed, stainless steel
COLOUR	Black
HEIGHT	Approx. 360 mm
WEIGHT	Approx. 50 g
MOUNTING	MM-Mount

## SPECIFICATIONS FOR MM-MOUNT

MODEL	
APPLICATION	Magnetic mount for all X-type mobile antenna whips shorter than 60 cm.
FREQUENCY	135 - 1000 MHz
MATERIALS	Black chromed brass Environment-proof plastics Electrostatic powder laquer
CONNECTION TO WHIP	M6 thread stud
CONNECTOR	FME-system



COLOUR	Black
WEIGHT	Approx. 270 g
DIMENSIONS	Total height: Approx. 59 mm Diameter: ø72 mm
MOUNTING	Centre of vehicle roof for best omnidirectional cover
MAX. CAR SPEED	Depending of whip

## USING THE MINIMAG - MM-MOUNT

This magnetic mount is used to make an occasional antenna installation where it is not desirable to drill holes in the vehicle. A magnetic mount can advantageously serve several vehicles by shifting it from one vehicle to another. The MiniMag is provided with a thoroughly magnetized permanent ring magnet positioned in a carefully shaped magnetic circuit which yields an extraordinarily high attaching effect and makes this mount stand for very high values of bending moment and mechanical shock. A silicone layer applied to the whole contact surface protects the car roof and ensures maximum friction.

## INSTALLATION

The magnetic mount should be mounted in the middle of the vehicle roof or rear locker to produce best omnidirectional coverage.



# PROCOM A/S

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Smedetoften 12, 3600  
Frederikssund, Denmark

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PROCOM A/S  
Smedetoften 12  
3600 Frederikssund  
Denmark