8.2 <u>Antenna systems</u>

Different antenna systems can be used with the WIMAN radio modem:

| Part.-No.	750081	750083	750001	750040	750061	750062
Matchcode	AN-24-2MN360-FMEM	AN-24-8MN360-NF3	AN-24-8PL76-SMAF	AN-24-16PL24-NF	AN-24-24PF8-NF	AN-24-16PL85-NF
Type	Omni directional	Omni directional, 3° down-tilt	planar	planar	paraflector	Planar
Gain [dBi]	2	8	8,5	16	24	16.5
Azimuth [degrees]	360	360	75	27	7	85
Elevation [degrees]	> 60	13	60	27	10	6
Height [cm]	12	43	11	28	61	127
Width [cm]	3	3	9	28	92	8
Depth [cm]	3	3	3	4	38	5
Weight [kg]	0.04	0.2	0.1	0.9	2.4	2.1
Front/Back Ratio [dB]	N/a	n/a	20	40	31	25
VSWR (max.)	2	1.5	1.5	1.5	1.3	1.5
Connector	FME male	N female	SMA female	N female	N female	N female

- **Omni directional antennas**

Typically these antennas are used with WIMAN STAR stations.

AN-24-2MN360-FMEM

2 dBi
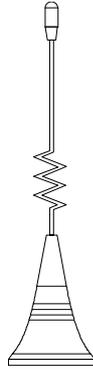
AN-24-8MN360-NF3

8 dBi, 3 deg downtilt
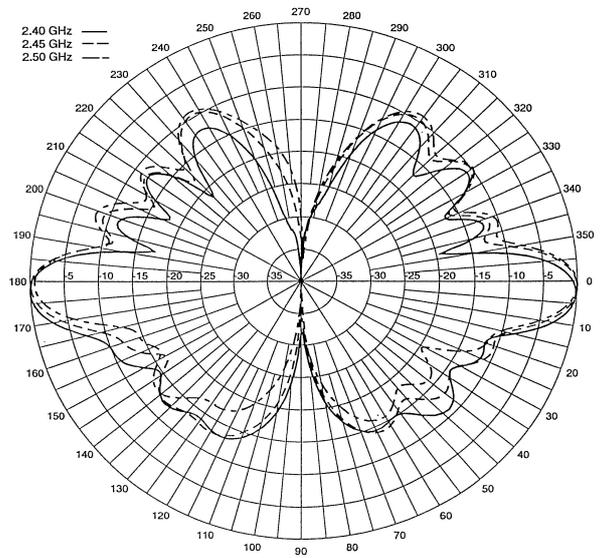
- **Planar antennas**

These antennas are mainly used at the customer side in connection with the WIMAN ACCESS. They can be used also for point-to-point connections with WIMAN LINE units.

### AN-24-8PL76-SMAF

8.5 dBi
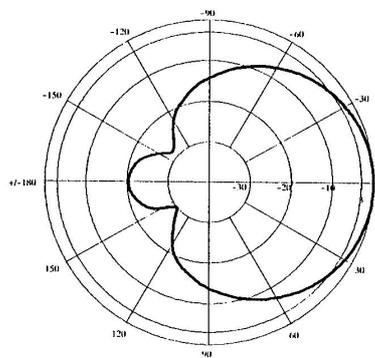
Picture	*Azimuth Pattern*	*Elevation Pattern*
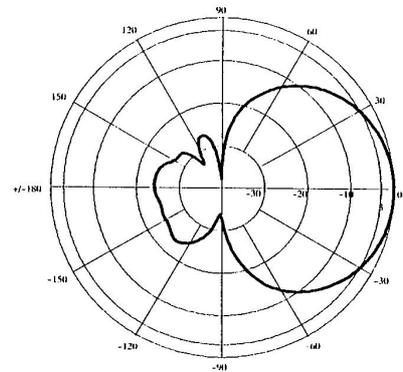
AN-24-16PL24-NF

16 dBi

Picture	*Azimuth Pattern*	*Elevation Pattern*
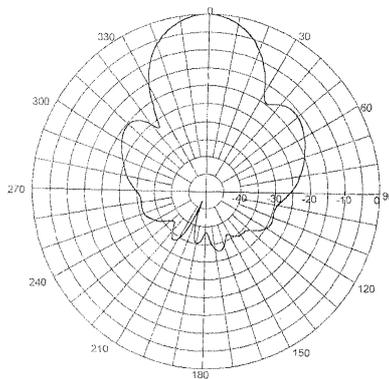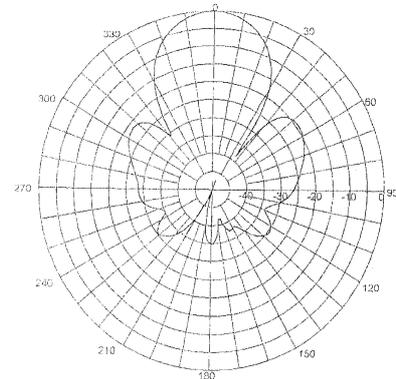
- **Paraflector antennas**

These antennas were developed mainly for point-to-point connections over long distances.

AN-24-24PF8-NF

24 dBi
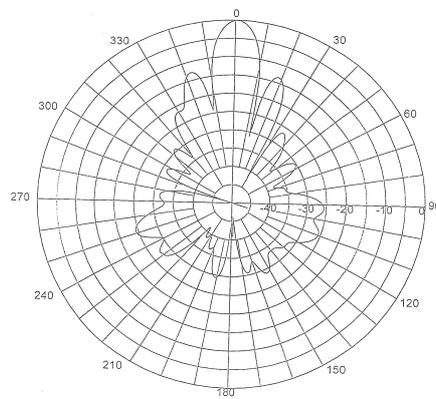
| *Picture*	*Azimuth Pattern*	*Elevation Pattern*
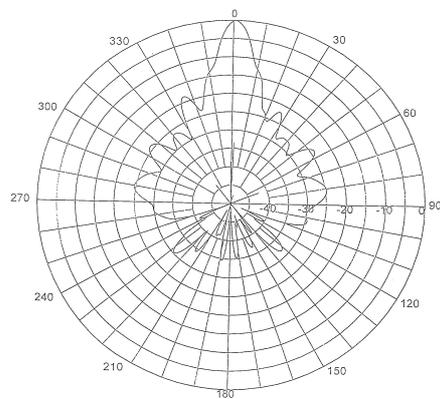
8.3 <u>Hybrid-cable sets</u>

Nachfolgend sind einige Anschlussbeispiele für die verschiedenen Hybridkabel aufgeführt. Eine genaue Beschreibung der einzelnen Hybridkabel ist in Kapitel 8.4 auf Seite 78 nachzulesen.

8.3.1 <u>Standard Connection (Indoor) using Hybrid cable Type 1</u>

Hybrid-cable Type 1 is only used when a WIMAN is directly connected to a Router (e.g. CISCO). This type of connection can be used for devices, which are in close range to the Router (Indoor-Installation).

(H1-X21C-37)
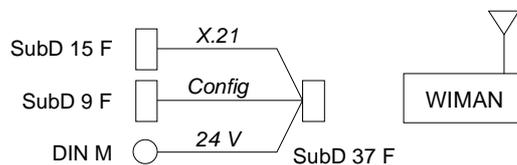
<u>Sample:</u>
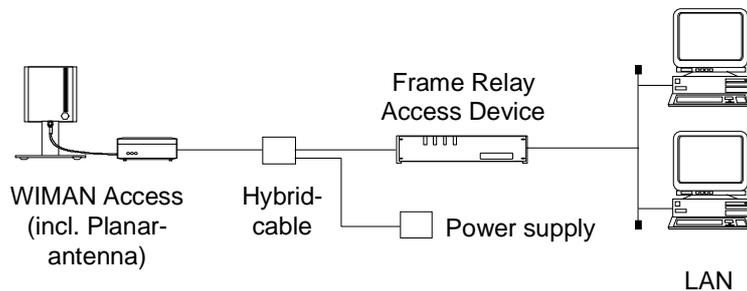
8.3.2   Outdoor Installation using Hybrid cable Type 2 & 3 and Datacable

This connection is used when the WIMAN is installed on a roof-top or a radio tower and is synchronized among other WIMAN devices. In addition a data cable (12x2) is needed.

(H2-X21C-25)   **(H3-X21C-37)**

SMA F

SubD 15 F   *X.21*   *Datacable*   *Syncronization*

SubD 9 F   *Config*   *(max. 100m)*   WIMAN

DIN M   *24 V*   SubD 25 M   SubD 25 F   12 x 2   SubD 25 F   SubD 25 M   SubD 37 F

Sample:

WIMAN *Access*

Outdoor-Set
(incl. Planar-Antenna
and Hybrid-Cable)

Datacable
(max. 100m)

Frame Relay
Access Device

Hybrid-
Cable   Power Supply

LAN
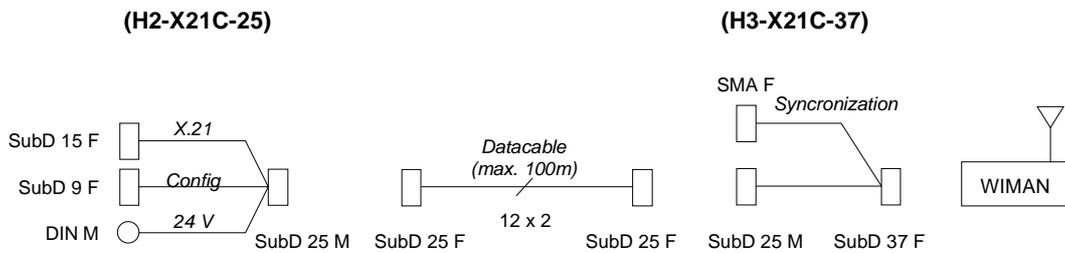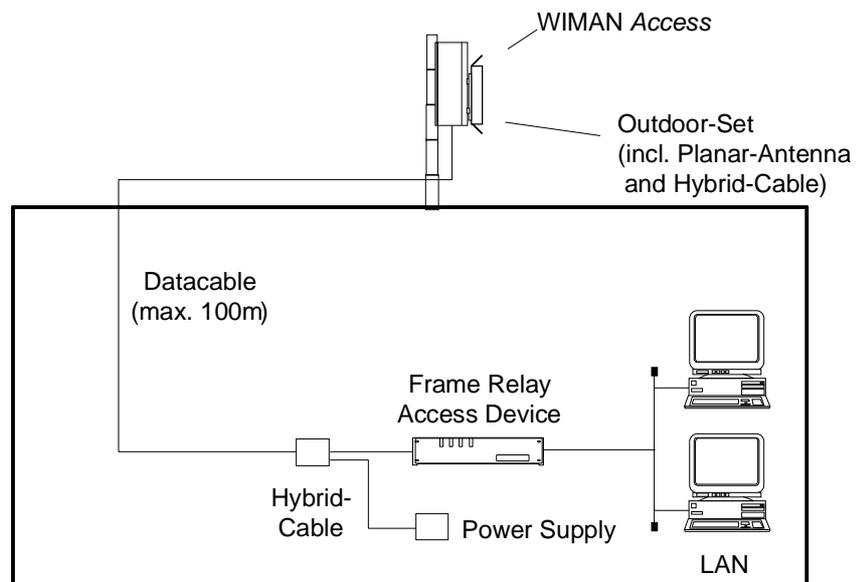
8.3.3 <u>Connection of a remote POP with WIMAN LINE and STAR</u>

This link is used for a remote Point Of Presence, if a WIMAN STAR is connected via a WIMAN LINE link. Here the STAR receives the synchronisation impulses likewise via the LINE link.
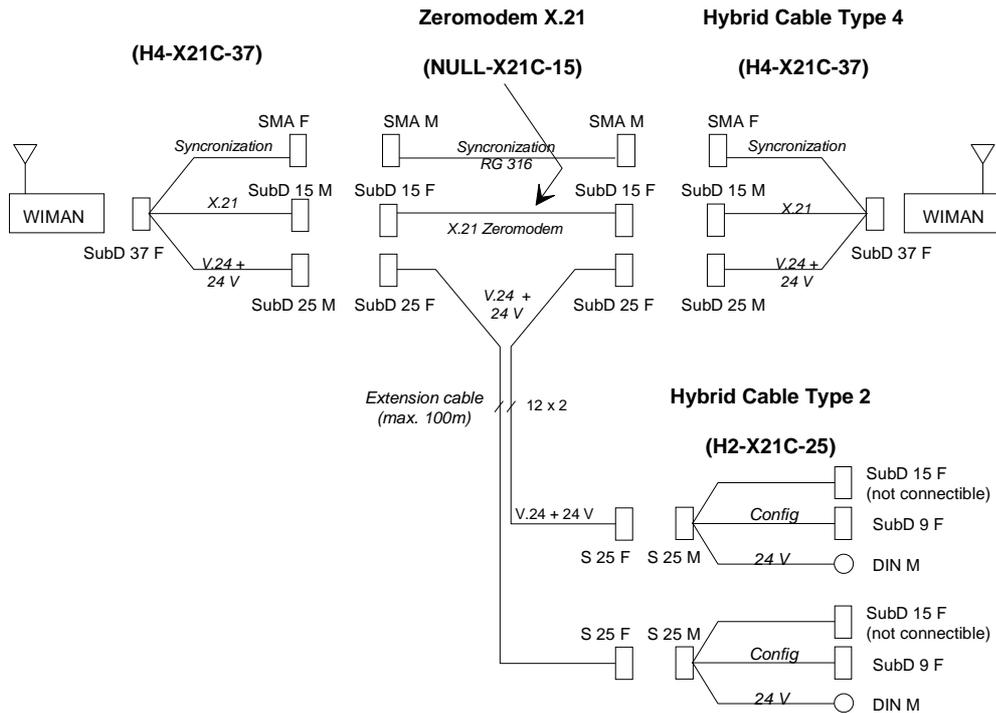

8.3.4 <u>Connections when using the IP-routing functionality</u>

Still being revised

8.4 Hybridcable

In the following, all hybrid cables with their appropriate area of application are described.

Note:

The 37-pin SubD link (female) is always attached to the 37-pin SubD link (male) of the WIMAN.

8.4.1 Hybridcable used for X21-configurations

Zeromodemcable (NULL-C21-15)

Zeromodemcable for direct connection of 2 WIMAN devices. In addition a Hybrid cable Type H4 is needed.
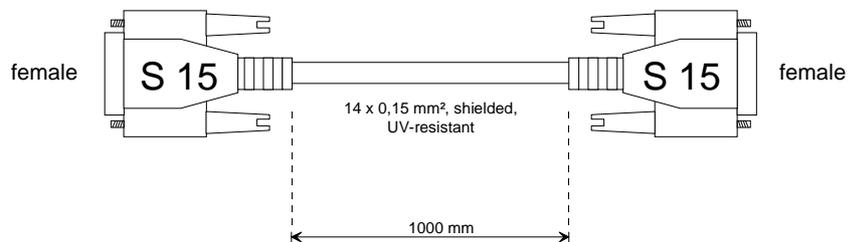
Hybridcable Type1 (H1-X21C-37)

This hybrid cable is used with indoor installations and provides the power connection, a direct link for a Frame Relay capable Router as well as a configuration interface (RS-232).
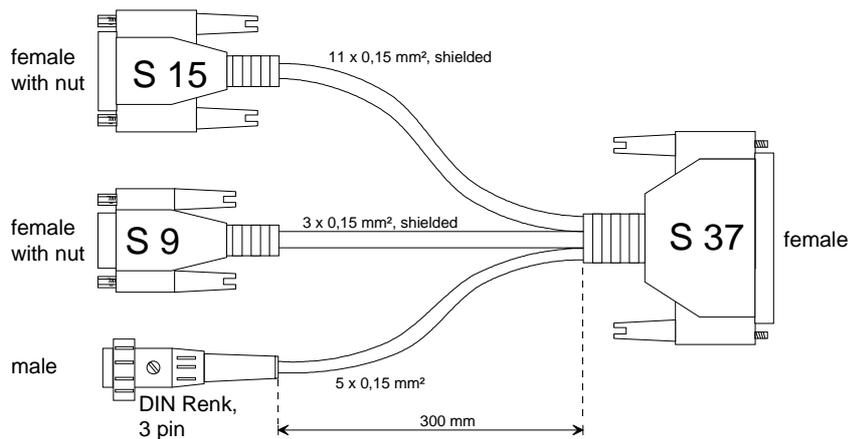
Hybridcable Type 2 (H2-X21C-25)

This Hybrid cable is being used as an internal termination cable when installing a WIMAN on a readio-tower on on a rooftop. The 25pin SubD-plug (male) is connected to the 12x2 Datacable, which leads from the WIMAN to the Router. All other connectors are the same as on Hybrid cable type 1.

SubD 15 female with nuts — S 15 — 11 x 0,15 mm², shielded — SubD 25 male

SubD 9 female with nuts — S 9 — 3 x 0,15 mm², shielded — S 25

DIN Renk, 3 pin, 180 degrees, male — 5 x 0,15 mm²

300 mm
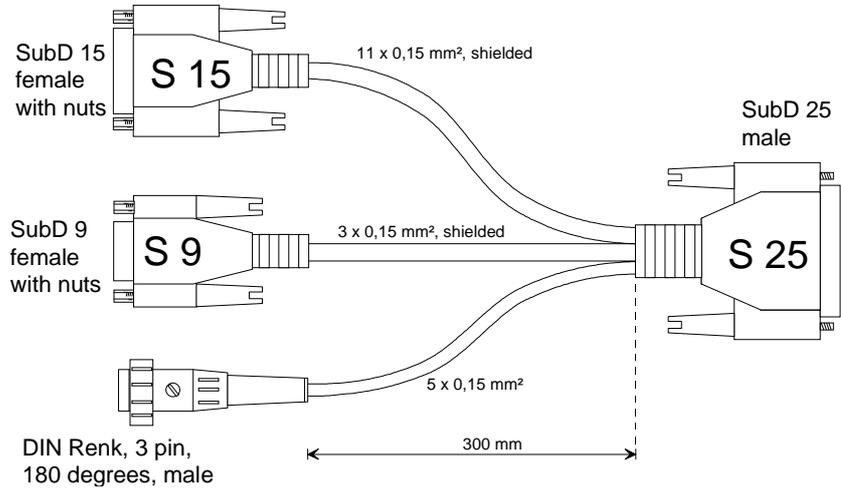
Hybrid cable Type 3 (H3-X21C-37)

This hybrid cable is attached with outdoor installations between the WIMAN and the data cable (12x2). The SMA socket serves for the link to the synchronisation bus, if several WIMAN devices are mounted in direct proximity.

6 mm 2 mm

SMA female — RG 316 — SubD 37 female

SubD 25 male with nuts — S 25 — 23 x 0,15 mm², shielded, paired — S 37

400 mm
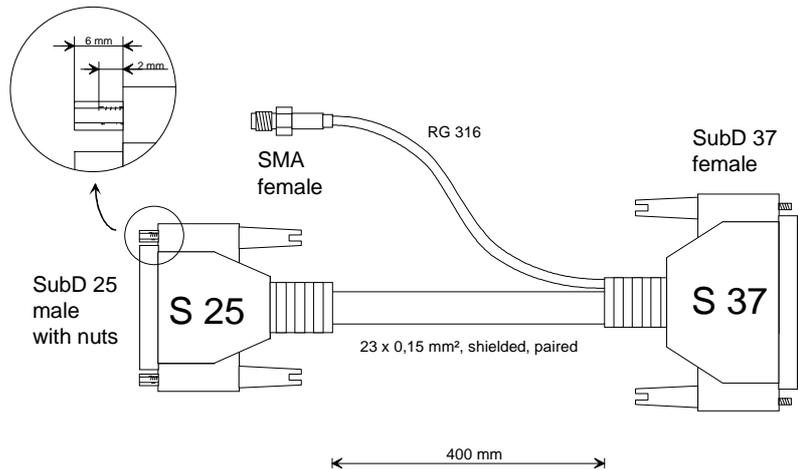
Date: 27. June 2000

Hybrid cable Type 4 (H4-X21C-37)

This hybrid cable is used with a Peer to Peer structure of a remote POP. For this an additional NULL-X21C-15 cable, a synchronisation bus, a data cable (12x2) and a hybrid cable Typ2 becomes necessary (schematic structure see further above.)

female   SMA   RG 316

male with nut   S 15

13 x 0,15 mm², shielded

male with nut   S 25

9 x 0,15 mm², shielded

S 37   female

400 mm
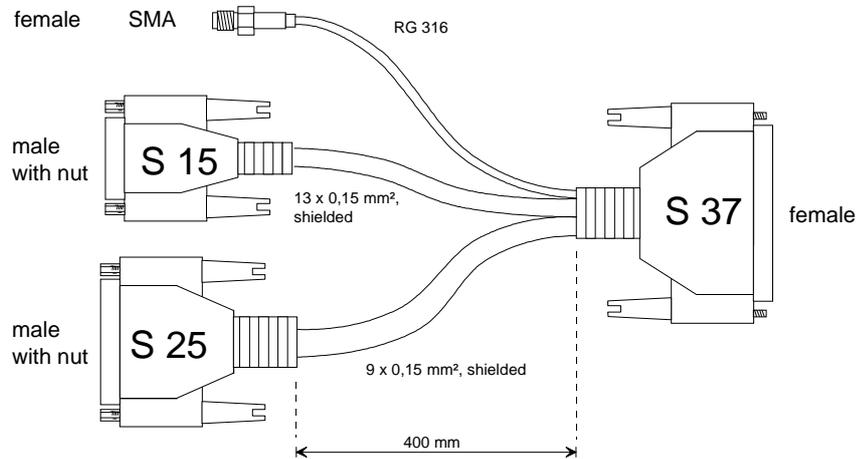
8.4.2   <u>Hybrid cable when using the IP-routing-functionality</u>

<u>RJ45-Connectionbox (HA-ETH-45)</u>

This link box is attached between the Ethernet cable of the local network and the hybrid cable H3-eth-37ext. Into the box the current supply link of the WIMAN, which is connected to the power pack, is integrated.

RJ 45 female

RJ 45 female
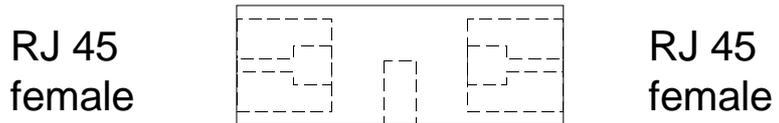
<u>Hybrid cable Ethernet 1 (H1-ETH-37)</u>

This Ethernet hybrid cable is used for indoor installations and provides the power connection, a direct link to the local network (over Ethernet cable) and a configuration interface (RS-232).

6 mm
2 mm

RJ45, female

4 x 0,15 mm², shielded, paired

SubD 9 female with nuts

3 x 0,15 mm², shielded

SubD 37 female

5 x 0,15 mm²

DIN Renk, 3 pin, 180 degrees, male

300 mm

Date: 10. July 2000
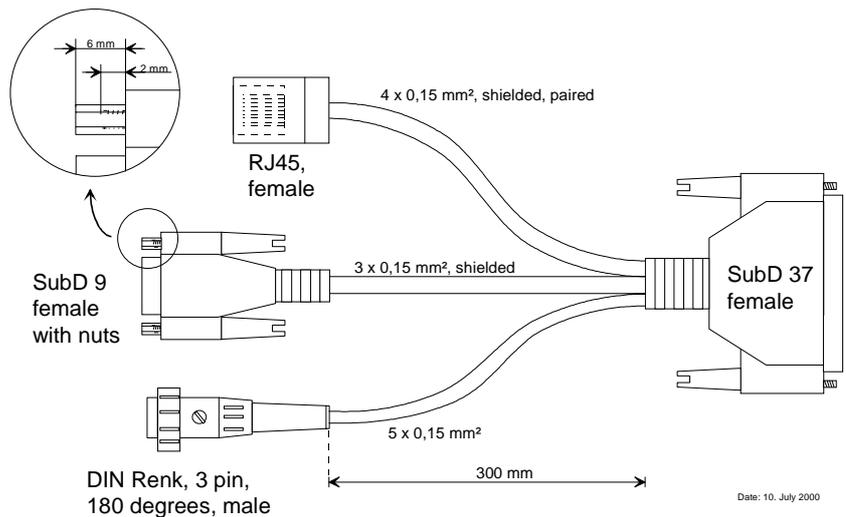
Hybrid cable Ethernet 2 (H2-ETH-25)

This hybrid cable is used as internal terminal cable with radio tower installations or installation of the WIMAN on a rooftop. The 25-pin SubD (male) link is connected to the data cable (12x2), which leads from the WIMAN (outdoor) to the inward. The further interfaces correspond to those of the hybrid cable Type Ethernet 1.
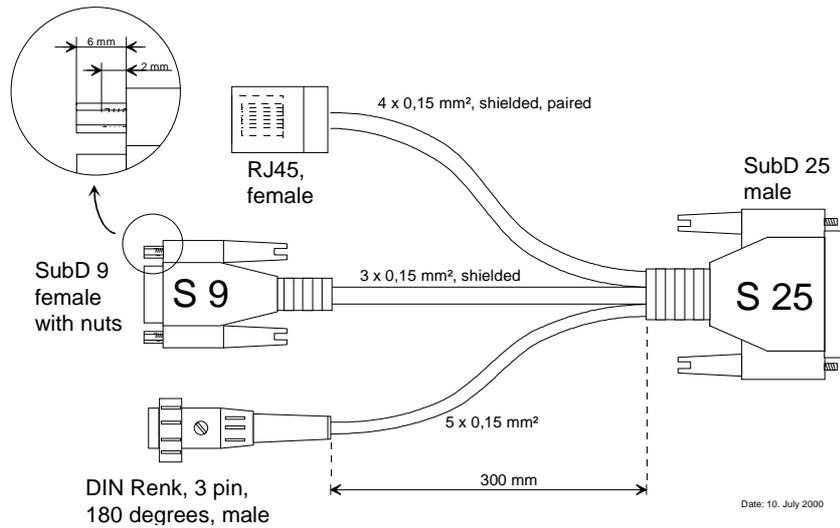
Hybrid cable Ethernet 3 (H3-ETH-37EXT)

This hybrid cable serves for the link of the WIMAN to the local Ethernet. The current supply lines of the WIMAN are already integrated in this cable. This cable can be used only together with the link port HA-ETH-45.
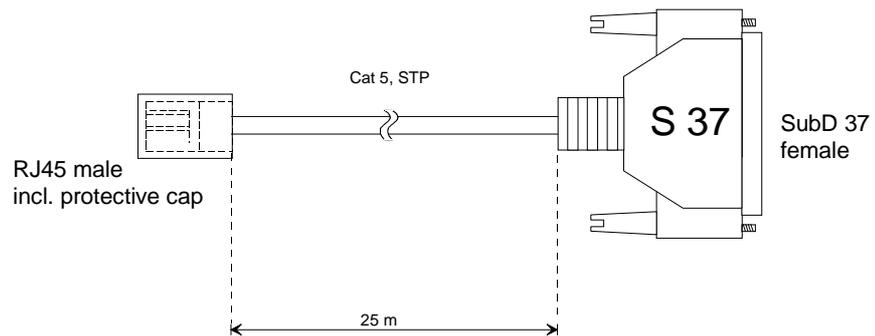
9   <u>Appendix B: Technical data</u>

Product outline

WIMAN Star, Access	high-speed transfer in point-to-multi-point mode
WIMAN Line	flexible point-to-point transfer

Radio

Frequency range	2.400 - 2.4835 GHz
Type of modulation	Spread Spectrum Frequency Hopping 2-FSK, 4-FSK
Number of channels	80, non-overlapping
Wireless interface	1 Mbps, 2-FSK 2 Mbps, 4-FSK
Transmitting power	100 mW (ETSI-Version) (E.I.R.P.) 4 W (FCC-Version) (E.I.R.P.) (650 mW max output-power @ RF-connector)
Transfer capacity	256 KBps @ 2-FSK 512 KBps @ 4-FSK
Max. input-level	0 dBm
Recipient-sensitivity	-94 dBm @ 2-FSK -88 dBm @ 4-FSK
Range	up to 5 km (ETSI-Version with planar array antennas) up to 25 mi (FCC-Version)
RF-connector	SMA plug connector

RF interface

Configurable block-repetition

CRC-based error correction

In-slot acknowledgement

Device-specific data encryption

Data-interface

Synchronous	X.21 / V.35 (optional) max. 2 Mbps

Appendix B: Technical data

Protocols

Point-to-point-mode

Synchronous	Transparent (HDLC-frame structure)

Point-to-Multipoint-mode

Synchronous operation	Frame Relay Packet Switching

Antennas

Mobile antenna	Omnidirectional 2 dBi
Fixed antennas	Omnidirectional 8 dBi Planar 8.5 dBi Planar 16 dBi Paraflector 24 dBi

Mass & weights (without antennas)

WIMAN-device	176 x 110 x 40 mm, 1050 g
Outdoor box	300 x 190 x 85 mm, 2200 g

General

Voltage supply	12 – 26 V =; max. 10 W 110 – 230 V, 50 -60 Hz~
Temperature range	-20°C - +55°C
Humidity	100 %, not condensing
IP enclosure	IP63, mounted in security housing
Display	3 LEDs, two-colored

Administration

Remote looptest

SNMP-based status-query and error signaling

Network access via TCP / IP, password protected

Software-update via TFTP

Individual bandwidth management

10 Appendix C: Pin-allocation of the Datacables

10.1 WIMAN Datacable (10 x 2)

Pin	Wire color (1. line)	Pin	Wire color (2. line)
1	White/Grey	14	White/Green
2	-	15	Brown/Green
3	White/Yellow	16	Pink/Brown
4	Yellow/Brown	17	White/Pink
5	White	18	Grey/Pink
6	Brown	19	Red/Blue
7	-	20	-
8	Grey/Brown	21	Black
9	Green	22	Purple
10	Yellow	23	-
11	Pink	24	Red
12	Grey	25	Blue
13			

Table 7 *WIMAN data cable (10 x 2), pin assortment*

Attention:

Provide a correct grounding of the data cable screen.

Paired-wire	Wire color	Pin number	Wire color	Pin number
1	White	5	Brown	6
2	Green	9	Yellow	10
3	Grey	12	Pink	11
4	Blue	25	Red	24
5	Black	21	Purple	22
6	Grey/Pink	18	Red/Blue	19
7	White/Green	14	Brown/Green	15
8	White/Yellow	3	Yellow/Brown	4
9	White/Grey	1	Grey/Brown	8
10	White/Pink	17	Pink/Brown	16
Shield		Shield		

Table 8 *WIMAN data cable (10 x 2) paired-wire assortment*

10.2 WIMAN Datacable (12 x 2)

Pin	Wire color (1. line)	Pin	Wire color (2. line)
1	White/Grey	14	White/Green
2	Grey/Brown	15	Brown/Green
3	White/Yellow	16	Pink/Brown
4	Yellow/Brown	17	White/Pink
5	White	18	Grey/Pink
6	Brown	19	Red/Blue
7	White/Blue	20	White/Red
8	Brown/Blue	21	Black
9	Green	22	Purple
10	Yellow	23	Brown/Red
11	Pink	24	Red
12	Grey	25	Blue
13			

Table 9   *WIMAN data cable (12 x 2) pin assortment*

Attention:

Provide a correct grounding of the data cable screen.

Paired-wire	Wire color	Pin number	Wire color	Pin number
1	White	5	Brown	6
2	Green	9	Yellow	10
3	Grey	12	Pink	11
4	Blue	25	Red	24
5	Black	21	Purple	22
6	Grey/Pink	18	Red/Blue	19
7	White/Green	14	Brown/Green	15
8	White/Yellow	3	Yellow/Brown	4
9	White/Grey	1	Grey/Brown	8
10	White/Pink	17	Pink/Brown	16
11	White/Blue		Brown/Blue	
12	White/Red		Brown/Red	
Screen		Screen		

Table 10   *WIMAN data cable (12 x 2) Paired-wire assortment*

11   <u>Appendix D: Alphabetical list of instructions</u>

Instruction	Applicable in command mode starting from authorization level	Applicable in configuration mode starting from authorization level	Remarks
<parname> <value>	-	1	
Checkcfg	-	1	
Clear	1	1	
Clear stat <type>	1	-	
Config	1	-	
Del config	-	1	
Del <parname>	-	1	
Del passwd console	-	1	
Enable	1	-	No help available
Exit	1	-	No help available
Export	1	1	
Help	1	-	
Help <parname>	1	1	
Passwd console	-	1	
Passwd console crypt	-	1	No help available
Passwd enable	-	1	
Passwd enable crypt	-	2	No help available
Reset	1	-	
Reset config	-	1 (configuration password)	No help available
Restore	-	1	
Save	1	-	
Show	1	1	
Show <regexp>	1	1	
Stat <type>	1	1	
Swupdate	1		

Table 11   *alphabetical list of instructions*

12 <u>Index</u>

Will be created later

13   <u>Index of figures</u>

14   <u>Index of tables</u>