COMMSCOPE®

Extension Unit
ION™-M17P/26 EU
(Q-cabinet)

B0142A0A

User's Manual
MF0133AUA

Andrew Wireless Systems GmbH, 17-November -2011

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FIGURES AND TABLES

1. GENERAL

1.1. USED ABBREVIATIONS

3GPP	3rd Generation Partnership Project
AC/DC	Alternating current / Direct Current
AIMOS	Andrew Integrated Management and Operating System
ALC	Automatic Level Control
BITE	Built-In Test Equipment
BTS	Base Transceiver Station
CE	"Conformité Européenne" ("European Conformity")
CD	Compact Disk
CPD	Channel Power Detection
DL	Downlink
DoC	Declaration of Conformity
EDGE	Enhanced Data Rates for GSM Evolution
EN	European Norm
EP	Extension Port
ESD	Electrostatic Discharge
ETS	European Telecommunication Standard
EU	Extension Unit
GSM	Global System for Mobile Communication
GND	Ground
GUI	Graphical User Interface
ICP3	Intercept Point 3rd order
ID No	Identification Number
ION	Intelligent Optical Network
IP	Ingress Protection
ISO	International Organization for Standardization
LED	Light Emitting Diode
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
MIMO	Multiple Input Multiple Output
MS	Mobile Station
MU	Main Unit
NF	Noise Figure
OTRx	Optical Transceiver = SRMU (Subrack Master Unit)
PDU	Power Distribution Unit
PG	Packing Gland
PIM	Passive Intermodulation
R&TTE	Radio & Telecommunications Terminal Equipment
Rev	Revision
RF	Radio Frequency
RU	Remote Unit
RX	Receiver
SNMP	Simple Network Management Protocol
TS	Technical Specification
TX	Transmitter
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UPS	Uninterruptible Power Supply
VSWR	Voltage Standing Wave Ratio
WCDMA	Wideband Code Division Multiple Access
WDM	Wavelength Division Multiplex

1.2. HEALTH AND SAFETY WARNINGS

1. Only suitably qualified personnel is allowed to work on this unit and only after becoming familiar with all safety notices, installation, operation and maintenance procedures contained in this manual.

2. Read and obey all the warning labels attached to the unit. Make sure that the warning labels are kept in a legible condition and replace any missing or damaged labels.

3. Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.

4. Keep operating instructions within easy reach and make them available to all users.

5. It is the responsibility of the network provider to implement prevention measures to avoid health hazards which may be associated to radiation from the antenna(s) connected to the unit.

6. **Note for a Class A digital device or peripheral:**

   This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7. Make sure, access is restricted to qualified personnel.

8. Only licence holders for the respective frequency range are allowed to operate this unit.

9. Corresponding local particularities and regulations must be observed. For national deviations please refer to the respective documents included in the manual CD delivered.

10. Use this equipment only for the purpose specified by the manufacturer. Do not carry out any modifications or fit any spare parts which are not sold or recommended by the manufacturer. This could cause fires, electric shock or other injuries.

11. Due to power dissipation, the repeater may reach a very high temperature. Do not operate this equipment on or close to flammable materials.

12. Before opening the unit, disconnect mains.

13. 
ESD precautions must be observed! Before commencing maintenance work, use the available grounding system to connect ESD protection measures.

14. This unit complies with European standard EN60950.

15. Make sure the repeater settings are according to the intended use (see also product information of manufacturer) and regulatory requirements are met.

16. Although the repeater is internally protected against overvoltage, it is strongly recommended to earth the antenna cables close to the repeater's antenna connectors for protection against atmospheric discharge.

17. 
Laser radiation! Do not stare into the beam; do not view it directly or with optical instruments.

1.3. ABOUT ANDREW SOLUTIONS

Andrew Wireless Systems GmbH based in Buchdorf / Germany, is a leading manufacturer of coverage equipment for mobile radio networks, specializing in high performance, RF and optical repeaters. Our optical distributed networks and RF repeater systems provide coverage for every application: outdoor use, indoor installations, tunnels, subways and many more.

Andrew Wireless Systems GmbH has unparalleled experience in providing RF coverage and capacity solution for wireless networks in both indoor and outdoor environment and belongs to *Andrew Solutions, a CommScope Company*.

Andrew Solutions is the foremost supplier of one-stop, end-to-end radio frequency (RF) solutions. Our products are complete solutions for wireless infrastructure from top-of-the-tower base station antennas to cable systems and cabinets, RF site solutions, signal distribution, and network optimization.

Andrew Solutions has global engineering and manufacturing facilities. In addition, it maintains field engineering offices throughout the world.

We operate a quality management system in compliance with the requirements of ISO 9001. All equipment is manufactured using highly reliable material. In order to ensure constant first-rate quality of the products, comprehensive quality monitoring is conducted at all fabrication stages. Finished products leave the factory only after a thorough final acceptance test, accompanied by a test certificate guaranteeing optimal operation.

☞ **Note**: **Exceptions of and national deviations from this intended use may be possible. To observe corresponding local particularities and regulations, please refer to the respective documents (also in national language) which are included in the manual CD delivered.**

To make the most of this product, we recommend you carefully read the instructions in this manual and commission the system only according to these instructions.

For technical assistance and support, please also contact the local office or *Andrew Solutions* directly at one of the addresses listed in the following section.

1.4. INTERNATIONAL CONTACT ADDRESSES FOR CUSTOMER SUPPORT

Americas:

Canada	
Andrew Solutions Canada	
Mail	620 North Greenfield Parkway Garner, NC 27529 U.S.A.
Phone	+1-905-878-3457 (Office) +1-416-721-5058 (Mobile)
Fax	+1-905-878-3297
E-mail	Peter.Masih@commscope.com, WIsupport.us@commscope.com

United States	
Andrew Solutions, Andrew LLC, A CommScope Company	
Mail	620 North Greenfield Parkway Garner, NC 27529 U.S.A.
Phone	+1-888-297-6433
Fax	+1-919-329-8950
E-mail	WIsupport.us@commscope.com

Brazil & South America	
CommScope Cabos do Brasil Ltda.	
Mail	Av. Com. Camilo Julio 1256 Zonal Industrial CP 597 Sorocaba SP 18086-000 Brazil
Phone	+ 55-15-9104-7722
Fax	+ 55-15-2102-4001
E-mail	WIsupport@commscope.com

Mexico, Central America & Caribbean region	
Andrew Corporation Mexico, SA DE CV	
Mail	Av. Insurgentes Sur 688, Piso 6 Col. Del Valle, CP: 03100 Mexico City Mexico
Phone	+52-55-1346-1900 (Office) +52-1-55-5419-5260 (Mobile)
Fax	+52-55-1346-1901
E-mail	WIsupport@commscope.com

APAC Countries:

China, India and Rest of Asia	
Andrew International Corporation	
Mail	Room 915, 9/F Chevalier Commercial Centre 8 Wang Hoi Rd Kowloon Bay Hong Kong
Phone	+852-3106-6100
Fax	+852-2751-7800
E-mail	WIsupport.China@commscope.com

Australia & New Zealand	
Andrew Corporation (Australia) Pty Ltd.	
Mail	Unit 1 153 Barry Road Campbellfield VIC 3061 Australia
Phone	+613-9300-7969
Fax	+613-9357-9110
E-mail	WIsupport.Australia@commscope.com

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United Kingdom	
Andrew Solutions UK Ltd	
Mail	Unit 15, Ilex Building Mulberry Business Park Fishponds Road Wokingham Berkshire RG41 2GY England
Phone	+44-1189-366-792
Fax	+44-1189-366-773
E-mail	WIsupport.uk@commscope.com

France	
CommScope France	
Mail	Immeuble Le Lavoisier 4, Place des Vosges 92052 Courbevoie France
Phone	+33-1 82 97 04 00
Fax	+33-1 47 89 45 25
E-mail	WIsupport@commscope.com

Germany	
Andrew Wireless Systems GmbH	
Mail	Industriering 10 86675 Buchdorf Germany
Phone	+49-9099-69-0
Fax	+49-9099-69-930
E-mail	WIsupport@commscope.com

Czech Republic	
Andrew Solutions Czech Republic C-Com, spol. s r.o	
Mail	U Moruší 888 53006 Pardubice Czech Republic
Phone	+420-464-6280-80
Fax	+420-464-6280-94
E-mail	WIsupport@commscope.com

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Andrew Wireless Systems (Austria) GmbH	
Mail	Weglgasse 10 2320 Wien-Schwechat Austria
Phone	+43-1706-39-99-10
Fax	+43-1706-39-99-9
E-mail	WIsupport.austria@commscope.com

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Andrew Wireless Systems AG	
Mail	Tiergartenweg 1 CH-4710 Balsthal Switzerland
Phone	+41-62-386-1260
Fax	+41-62-386-1261
E-mail	WIsupport.ch@commscope.com

Italy	
Commscope Italy S.r.l., Faenza, Italy	
Mail	Via Mengolina, 20 48018 Faenza (RA) Italy
Phone	+39-0546-697111
Fax	+39-0546-682768
E-mail	WIsupport.italia@commscope.com

Spain and Portugal	
Andrew Solutions España S.A. A Commscope Company	
Mail	Avda. de Europa, 4 - 2ª pta. Parque Empresarial La Moraleja 28108 Alcobendas (Madrid) Spain
Phone	+34-91-745-20 40
Fax	+34-91-661-87 02
E-mail	WIsupport.iberia@commscope.com

table 1-1 List of international contact addresses

2. FUNCTIONAL DESCRIPTION

2.1. PURPOSE

Cellular telephone systems transmit signals in two directions between base transceiver station (BTS) and mobile stations (MS) within the signal coverage area.

If weak signal transmissions occur within the coverage area because of indoor applications, topological conditions or distance from the transmitter, extension of the transmission range can be achieved by means of an optical distribution system.

Such a system contains an optical Master Unit and several Remote Units. The number of the Remote Units depends on the hardware and software configuration. The Remote Units are connected to the Master Unit with optical links. The optical loss must be less than 10 dB inclusive optical couplers or splitters.

The Master Unit is the connection to the base transceiver stations. The configuration of a Master Unit depends on the number of the Remote Units and the frequency range.

WDM (Wave Division Multiplex) filters are integrated in the optical modules. For the UL, a wavelength within 1540 nm – 1562 nm is used. For the DL, a wavelength of 1310 ±20 nm is used. The maximum output power for the UL and DL is 5.7 mW.

2.2. THE ION-M17P/26 EU

The ION-M17P/26 EU (Intelligent Optical Network; MMR) is a high-power dual-band Extension Unit (EU). It is used in conjunction with a Master Unit and a Main Unit containing the optical transceiver (OTRx) in the ION-M optical distribution system. This system is able to transport the whole AWS 1700 MHz band wide simultaneously, providing a cost-effective solution for distributing capacity from one or more base stations. Optionally, for 2600 MHz WiMAX in TDD * mode is available.

The ION-M17P/26 EU is connected via extension cable bridge to the Main Unit with extension port. For a frequency band extension, the additional band (for ION-M17P EU this is AWS) has just to be combined with the signal for the (Main) Remote Unit. Then, the additional band is available on the extension port of the Main Unit.

The ION-M17P/26 EU transports signals on the RF layer in a very inexpensive manner. This means that services from various operators can be transmitted simultaneously from a cluster of base stations to a remote location over the same fibre.

Any service or frequency band extension is achieved by adding an Extension Unit (EU) without any impact to the installed network.

* TDD is the abbrev. of time-division-duplex

The ION-M17P/26 EU has been specifically tested and optimized for CDMA2000, EV-DO, WCDMA, and UMTS. Furthermore, it is provisioned for future improvements to the modulation (e.g. HSDPA and OFDM) and frequency bands such as WiMAX.

The ION is easily set-up and supervised via a graphical user interface (GUI). Extension Units can be commissioned through the use of built-in test equipment with a minimum of commissioning required. The entire system may be monitored remotely via an Andrew OMC. This is a comprehensive management platform with SNMP protocol and X.733 standard implemented. Should a sophisticated interface not be required, the master unit can be directly connected to the alarm interface of a base station via relay alarming.

- High-power, multi-operator support
- Reduced visual impact form factor
- Efficient, high power amplifier
- Easy connection to Main Unit via cable bridge
- Comprehensive operations and management system for configuration and alarming
- OMC with SNMP according to X.733 standard
- Easy installation and commissioning

2.3. THE ION-M26 EU (STANDALONE VERSION) - FOR WIMAX

The ION-M26 EU is the most efficient solution to upgrade your Fiber-DAS to WiMAX. This upgrade has nearly no impact to your installation and offers the possibility to feed a common distribution or antenna network.

As the standard Andrew fiber DAS ION-M is service agnostic which enables a transparent WiMAX TDD transport to 30 MHz adjacent spectrum for the Master Unit to any Remote Unit. Only a single extension box (ION-M26 EU) has to be connected to the Remote-Unit and the system upgrade to WiMAX is established.
With this easy upgrade leverages a fast WiMAX rollout especially in those areas where difficult propagation conditions require a DAS solution even for 2G and 3G services.

The small extension box ION-M26 EU co-sites to the standard ION-M Remote Unit and needs no separate fiber back haul but a cable bridge to the Remote Unit.
At the Master Unit the WiMAX signal is combined with the 2G and 3G signals and transported to the Remote Unit.

The Master Unit (MU) contains the interfaces to the BTS and towards the fiber network. The MU also provides the system control functionality with interface for local (web browsing) or remote-control (web browsing and SNMP), and also the backhaul connection towards the OMC (SNMP).
The Remote Unit (RU) is connected by a single fiber, converts the optical signal back to RF and holds the antenna ports and extension interface to the Extension-Unit (EU) ION-M26 EU.

The Extension Unit (EU) supports the TDD mechanism for a SISO * channel with multiple carriers up to an instantaneous bandwidth of 30 MHz. The TDD switching information is retrieved for the WiMAX signal by analyzing the associated DL Map in the master unit.

For the RU and the attached EU the alarm and control information is exchanged with Master Unit on a sub carrier. At the Master Unit the alarms can be presented to the BTS via alarm contact relays or can be sent to the Andrew OMC.

- Efficient, high power amplifier
- No additional fiber needed. WiMAX and 2G, 3G signals are transported on the same optical link.
- Compliant to 802.16e-2005, 802.16e, and the WiMAX approved Corrigenda, two modifications
- SNMP alarming and web-GUI

* SISO is the abbrev. of Single Input Single Output

3. COMMISSIONING

3.1. MECHANICAL INSTALLATION

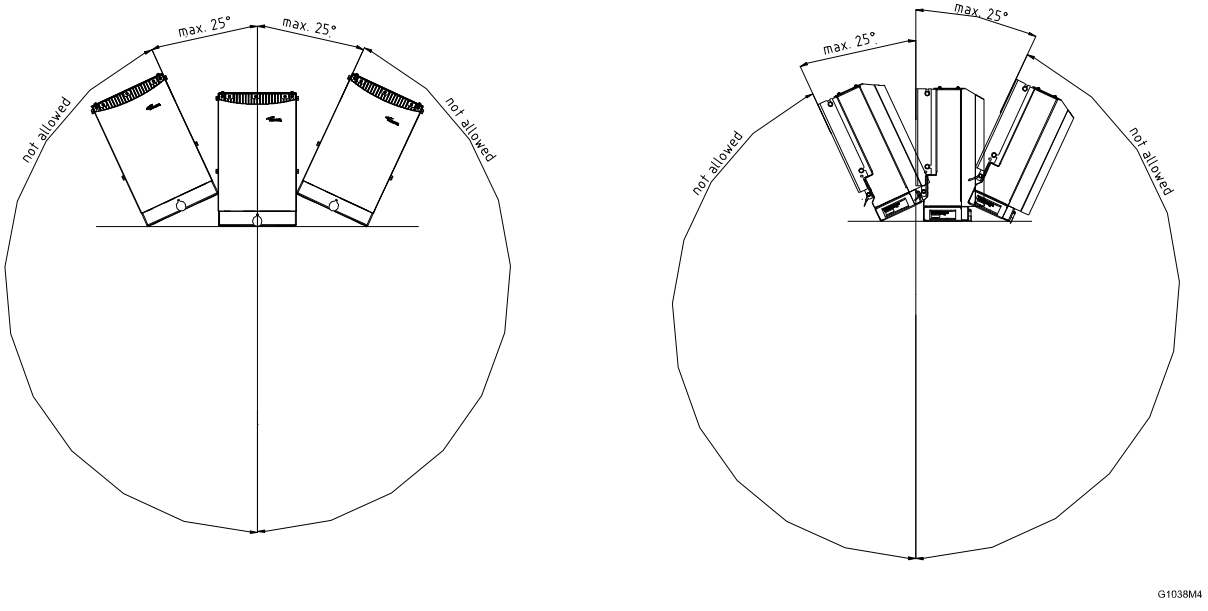
3.1.1. General

Read the health and safety warnings in section *1.2 Health and Safety Warnings*.

1. **Do not install the unit in a way or at a place where the specifications outlined in the Environmental and Safety Specifications leaflet of the manufacturer are not met.**

2. **It is strongly recommended to install the unit vertically.**

3. **When mounting the Remote Unit, the connector flange (illustrated in chapter 3.2.2 *Connections*) with the cables must point to the ground. A maximum tilt angle of 25° to the horizontal position of the connector flange must be kept in each mounting direction. For details, refer to chapter *5.4.3 Mechanical Specifications of ION-M17P/26EU*. If a different installation of the Remote Unit is required, please contact customer service for further information.**



4. **It is recommended only to use the mounting hardware delivered by the manufacturer. If different mounting hardware is used, the specifications for stationary use of the Remote Unit must not be exceeded.**

☞ **Note: Exceeding the specified load limits may cause the loss of warranty!**

5. **The unit is considerably heavy. Make sure that a suitable mounting surface is used. Ensure there is adequate manpower to handle the weight of the system.**

6. **Due to power dissipation, the Remote Unit may reach a very high temperature. Ensure sufficient airflow for ventilation. Above and below the unit a minimum distance of 300 mm to ceiling, floor, etc. has to be kept. Also observe the instructions in the individual mounting procedures.**

7. **For outdoor installations, the pre-mounted front cover must be installed.**

8. **For indoor installations where the ambient temperature can reach above 40°C, the cover has to be removed.**

9. **When connecting and mounting the cables (RF, optical, mains, ...) ensure no water can penetrate into the unit through these cables.**

If any different or additional mounting material is used, ensure that the mounting remains as safe as the mounting designed by the manufacturer. Ensure that the static and dynamic strengths are adequate for the environmental conditions of the site. The mounting itself must not vibrate, swing or move in any way that might cause damage to the Remote Unit.

3.1.2. Wall and Pole Mounting

Wall and pole mounting equipment for the unit is available. For the according mounting please refer to the mounting plan (drawing) that is part of the delivery.

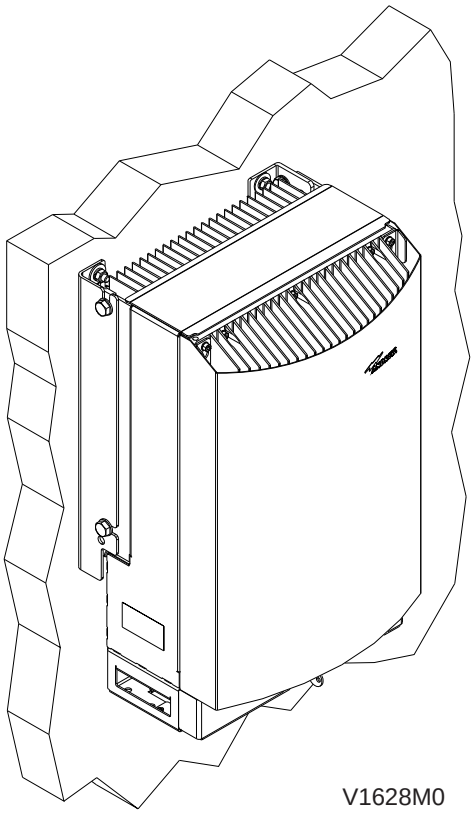


figure 3-1 Wall mounting

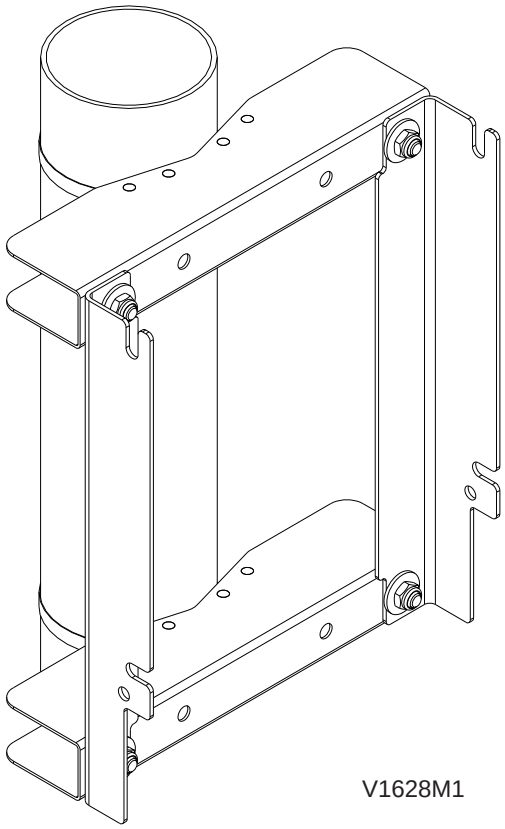


figure 3-2 Pole mounting

3.2. ELECTRICAL INSTALLATION

3.2.1. General

Read the health and safety warnings in section *1.2 Health and Safety Warnings*.

1. This unit contains dangerous voltages. Loss of life, severe personal injury or property damage can be the result if the instructions contained in this manual are not followed.
2. Ground the unit before connecting power supply. A grounding bolt is provided on the cabinet to connect the ground-bonding cable.
3. Although the Remote Unit is internally protected against over-voltage, it is strongly recommended to earth the antenna cables close to the antenna connectors of the Remote Unit for protection against atmospheric discharge. In areas with strong lightning it is highly recommended to insert additional lightning protection.
4. If the mains connector of the Remote Unit is not easily accessible, a disconnect device in the mains circuit must be provided within easy reach.
5. Before connecting or disconnecting the mains connector at the Remote Unit, ensure that mains supply is disconnected.
6. Make sure that an appropriate circuit breaker and an over-current limiting device are connected between mains and Remote Unit.
7. A connection of mains supply to a power socket requires the power socket to be nearby the Remote Unit.
8. Incorrectly wired connections can destroy electrical and electronic components.
9. To avoid corrosion at the connectors caused by electrochemical processes, the material of the cable connectors must not cause a higher potential difference than 0.6 V (see electrochemical contact series).
10. Use an appropriate torque wrench for the coupling torque (25 N-m / 19 ft lb) of 7-16 DIN connectors with 1-1/4 in opening to tighten the 7/16-type antenna connectors. For example, use torque wrench of item no. 244377 available from the *Andrew e-catalog*. Do NOT use your hands or any other tool (e.g. a pair of pliers)! This might cause damage to the connector and lead to a malfunction of the Remote Unit.
11. Use a voltage limiting device for unstabilized electric networks that frequently generate spikes.
12. The unit complies with the surge requirement according to EN 61000-4-5 (fine protection); however, it is recommended to install an additional medium (via local supply connection) and/or coarse protection (external surge protection), depending on the individual application, in order to avoid damage caused by overcurrent.
13. Observe the labels on the front panels before connecting or disconnecting any cables.

3.2.2. Connections

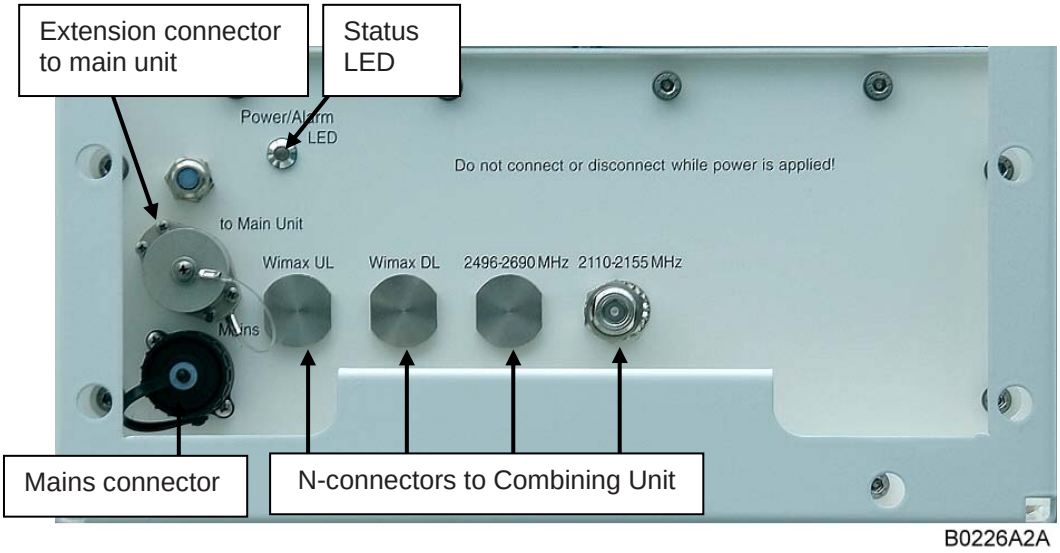


figure 3-3 ION-M17P/26 EU, connector flange, exemplary

3.2.3. Grounding

Grounding must be carried out. Connect an earth-bonding cable to the grounding connection provided at the outside of the remote unit (see chapter *3.2.2 Connections*). Do not use the grounding connection to connect external devices.

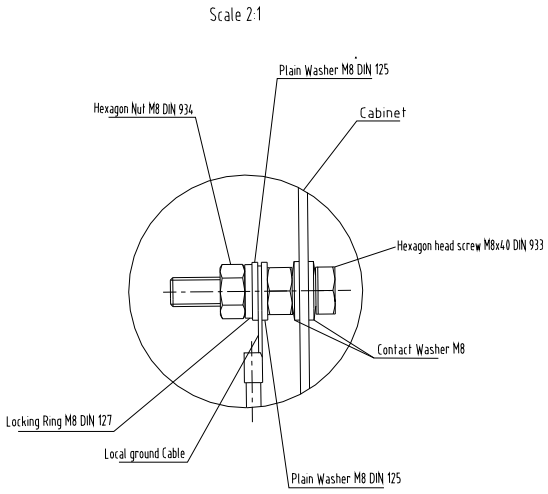


figure 3-4 Grounding bolt

After loosening the hex nut, connect the earth-bonding cable between the two washers as illustrated in the figure above. Then, fasten all parts again with the hex nut.

 **The PE cables must have a minimum cross section of 16 mm^2.**

3.2.4. Connection to the Main Unit

In order to connect the Extension Unit (EU) with the Main Remote Unit (RU), use a cable bridge. Connect this cable bridge at the extension connector of the EU (illustrated in *3.2.2 Connections*) with the corresponding connector to EU at the RU. Which connector to EU of the RU is exactly used is described in the corresponding User's Manual for the RU.

3.2.5. Connection of RF Cables to Combining Unit

The remote unit has N-connectors for connection to the Combining Unit. For its location, please refer to chapter *3.2.2 Connections*. For mounting the cable connectors, it is recommended to refer to the corresponding documentation of the connector manufacturer. The bending radius of the RF cables must remain within the given specifications.

For the selection of cable and antenna it should be considered that, on the one hand, a cable with higher loss is less expensive but, on the other hand, it impairs performance.

 **Use an appropriate torque wrench for the coupling torque of N-type connectors (2 N-m / 20 in lb), with 13/16 in opening to tighten the N-type antenna connectors. For example, use torque wrench of item no. 244379 available from the *Andrew e-catalog*. Do NOT use your hands or any other tool (e.g. a pair of pliers)! This might cause damage to the connector and lead to a malfunction of the Remote Unit.**

 **To minimize passive inter-modulation (PIM) distortion, attention has to be paid to the physical condition of the connector junctions. Do not use connectors that show signs of corrosion on the metal surface. Prevent the ingress of water into the connector. Attach and torque the connectors properly.**

3.2.6. Power Connection

Before connecting electrical power to the units, the system must be grounded as described in the previous chapter.

Mains power must be connected at the mains connector of the unit (see chapter *3.2.2 Connections*).

The power supply plug is part of the delivery. The correct wiring of the power supply plug is as follows:

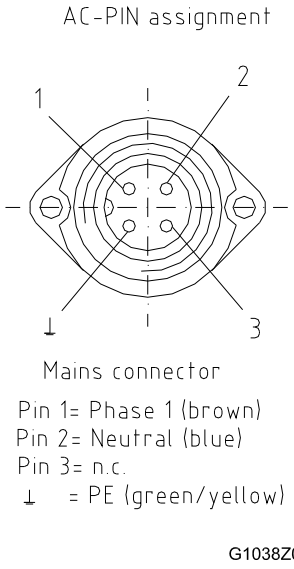


figure 3-5 AC mains plug

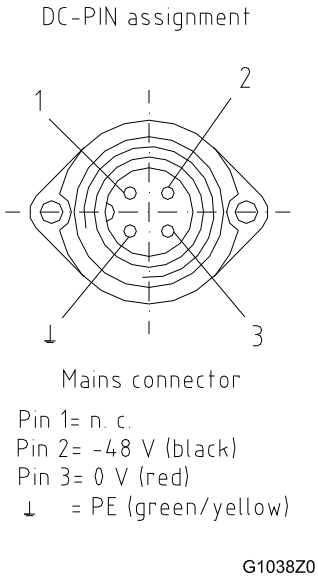


figure 3-6 DC mains plug

For the AC power supply connection, a minimum cross section of 1.5 mm^2 is required, and for the DC power supply connection a minimum cross section of 2.5 mm^2 is required. Each wire must observe the applicable national regulations regarding loop impedance, voltage drop, and methods of installation. Make sure to connect the correct voltage to the unit.

☞ **Note: Do not connect or disconnect the power cord at the mains connector while power is on. Turn off mains * power before connecting the power cord at the remote unit, then, engage mains again.**

* Mains power must be interrupted with an external mains breaker. For the mains breaker, observe the following recommendation:

120 Volt / 20 Amp max. or 240 Volt / 16 Amp, single-phase, 50 / 60 Hz AC service is needed, i.e. the external AC breaker should be 20 Amps max. for 120-Volt service or 16 Amps for 240-Volt service.

For the DC power supply, observe the local regulations of the DC service provider.

3.3. COMMISSIONING

Read the health and safety warnings in chapter *1.2* as well as the description carefully to avoid mistakes and proceed step by step as described!

- Do not operate the Remote Unit without terminating the antenna connectors. The antenna connectors may be terminated by connecting them to their respective antennas or to a dummy load.
- Only qualified personnel should carry out the electrical, mechanical, commissioning and maintenance activities that require the unit to be powered on when open.
- When opening the Remote Unit do not damage the warranty labels on the internal devices. The warranty is void if the seals are broken.
- Ensure that all connections have been performed according to chapter *3.2.1 General*.

☞ **Note: When an Extension Unit (EU) is installed to a Remote Unit (RU), the Automatic Level Control (ALC) must be set in the RU, as described in the software manual of the ION-M Master Controller.**

Commissioning an ION-M Extension Unit

Manual for Extension Unit

Philips screwdriver

Mounting kit
Spanner, size 13 mm
Drilling machine
Dowels
Screw driver

Screw driver
Spanner, size 13 mm

Earth cable
Spanner 13 mm

Cable bridge

Mains cable
Connecting kit

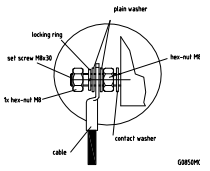
Start

Preparation
Unpack EU, EU accessories and mounting kit.

Mechanical installation
Fasten wall or pole mounting kit to wall or pole.

Mechanical installation
Mount EU to mounting kit, ensure suffient air flow and avoid thermal short circuits.

Electrical connections
Connect grounding cable and ground the EU.

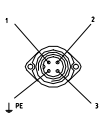


Connections to Main Unit
Use the cable bridge to connect the EU with the Main Unit.

RF connection
Connect antenna cable to antenna port.

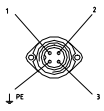
Electrical connections
Connect AC (DC) power to the power cable. Ensure there is a circuit breaker between mains and EU.

AC PIN assignment



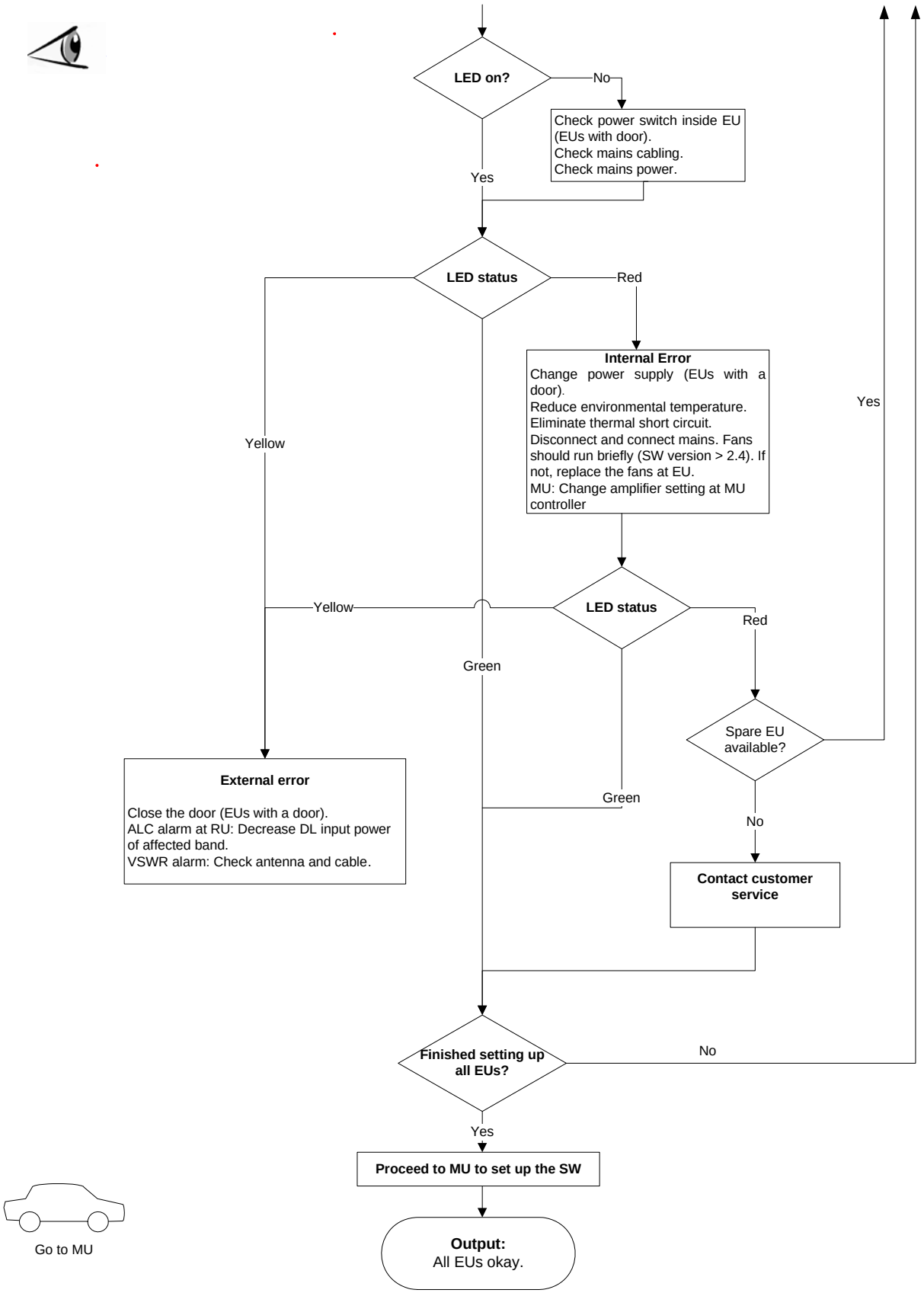
Mains connector
Pin 1 = Phase (brown)
Pin 2 = Neutral (blue)
Pin 3 = n.c.
⏚ = PE (green/yellow)
G1055Z0

DC PIN assignment



Mains connector
Pin 1 = n.c.
Pin 2 = -48V (black)
Pin 3 = 0V (red)
⏚ = n.c.
G1055Z0

Mains
Switch mains power on.


LED on?
No
Check power switch inside EU (EUs with door).
Check mains cabling.
Check mains power.
Yes
LED status
Red
Internal Error
Change power supply (EUs with a door).
Reduce environmental temperature.
Eliminate thermal short circuit.
Disconnect and connect mains. Fans should run briefly (SW version > 2.4). If not, replace the fans at EU.
MU: Change amplifier setting at MU controller
Yellow
Yes
LED status
Yellow
Red
Green
Spare EU available?
External error
Close the door (EUs with a door).
ALC alarm at RU: Decrease DL input power of affected band.
VSWR alarm: Check antenna and cable.
Green
No
Contact customer service
Finished setting up all EUs?
No
Yes
Proceed to MU to set up the SW
Output:
All EUs okay.
Go to MU

For your notes:

4. ALARMS

4.1. BITe AND ALARMS

The Built-In Test (BITe) concept comprises the monitoring of the power supplies, the power amplifiers and the optical interface.

All alarms occurring can be checked via software at the Master Unit.

4.2. HANDLING OF ALARMS

In alarm condition, an alarm message is sent to the Master Controller.

If the reason for the alarm is cleared, the alarm will disappear. Otherwise, i.e. if the alarm continues, a new alarm message will not be repeated.

A new alarm message will be generated if the alarm is interrupted for at least five seconds after alarm clearance by the RU.

4.3. ALARM STATUS

Refer to the corresponding software documentation of the Master Unit for details.

For local supervision, a status LED on the connector flange of the remote unit gives an indication of possible reasons for alarms. The position of the status LED is illustrated in chapter *3.2.2 Connections*. This table shows possible on-site measures that could be checked before referring to the master unit alarm list.

Status LED indication	***Alarms***	***Possible on-site measures***
Green	No alarm → Status ok	
Orange	Door alarm	Close the door (RUs with door).
	Alarms not directly related to RU:	
	External alarms	Check externally connected devices.
	Optical alarm Rx	Check fibre loss of optical link. Check optical connectors. Clean optical connectors. *(MU: Check optical output power of corresponding OTRx at master unit).*
	ALC alarm	*(MU: Decrease DL input power of affected band).*
Red	*Alarms directly related to RU:*	
	Power 28 V	Change power supply (RUs with door). Replace the affected remote unit.
	Temperature	Reduce environmental temperature. Eliminate thermal short circuit.

	Fan *	Disconnect and connect mains. Fans should run. If not, replace the fans at RU.
	I²C	Disconnect and connect mains.
	Optical alarm Tx	Exchange RU.
	Amplifier “Power Down”	*(MU: Change amplifier setting at MU controller).*
Status LED off	Mains	Check power switch inside of RU (RUs with door). Check mains cabling. Check mains power.

table 4-1 Status LED alarms

* only applicable if the RU is equipped with a fan

For the position of the LED see chapter *3.2.2 Connections*.

Explicit troubleshooting is available in the MU software, (software manual or WEB Interface).

4.4. TROUBLESHOOTING

The status of the remote unit can be checked via the master unit (for details please refer to the software manual of the Master Controller). Locally, the status can be checked at the LED, see chapter *3.2.2 Connections*.

5. MAINTENANCE

Read the health and safety warnings in chapter *1.2*.

☞ **Note: The remote unit does not require preventative maintenance measures.**

Maintenance of the ION-Mxxx should be performed on an FRU (Field Replaceable Unit) basis only. Do not damage the warranty labels on the components, as this voids the warranty.

The spare parts list contains only units that can be replaced without tuning or soldering work.

☞ **Note: When sending back the unit, use an appropriate packaging, see chapter *5.4.4 Environmental and Safety Specifications of ION-M17P/26EU*. We strongly recommend using the original packaging!**

☞ **Note: Defect parts should only be replaced by original parts from the supplier. All interventions inside the housing are at one's own risk.**

☞ **Note: During maintenance ensure that the unit has been disconnected from mains.**

☞ **Note: Before disconnecting any cables, label any unlabelled cables to ensure correct reconnection.**

To replace an FRU, use the appropriate tools. Replacement tools may be ordered from the supplier. All screws have a right-hand thread, turn the tool clockwise for tightening and counter-clockwise for loosening.

Do not over-tighten the connectors or screws. The table below shows various screws with their respective torques.

Screw Type	**Tallow-drop**	**Socket-head-cap**	**Countersunk-head**
Thread size	*Specified Torque (in Ncm)*		
M 2.0	40	not in use	40
M 2.5	82	not in use	82
M 3.0	145	100	145
M 4.0	330	330	330
M 5.0	650	tbd.	650

table 5-1 Specified torques for various screw types

If any FRU not contained in the following chapter needs to be replaced, contact customer service for additional instructions.

5.1. OPENING AND CLOSING OF THE CABINET

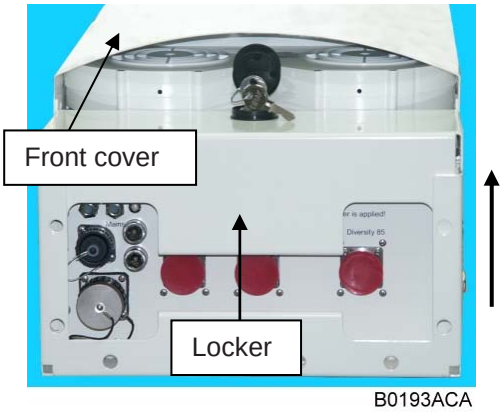


figure 5-1 Locker with key

- To open the cabinet of the remote unit, first dismount the locker by unlocking it with the key (which is part of the delivery) and pulling it out carefully in direction of the arrow marked in *figure 5-1 Locker with key*.
- If the front cover is installed (see mechanical installation in chapter) remove the cover by loosening the four M5 socket head cap screws (circle-marked in *figure 5-2 Front and top cover screws*). Do ***not*** remove those screws. When they are loosened, the front cover can be taken off.
- **Before opening the cabinet, disconnect the mains connector illustrated in chapter *3.2.2 Connections*.**
- To open the cabinet, unscrew the nine M5 socket head cap screws (captive) of the top cover of the remote unit (see *figure 5-2 Front and top cover screws*).
- After maintenance work, re-connect mains.
- Close the cabinet.
- To ensure safe operation, mount the front cover if required (see mechanical installation in chapter *3.1.1 General*).
- Check the status of the status LED. Ensure it is showing a green light.

figure 5-2 Front and top cover screws

5.2. REPLACEMENT OF POWER SUPPLY

- To remove the power supply, disconnect mains, mains cable and DC cable.
- Unscrew the five hexagon socket head cap screws (circle-marked in illustration below) with an Allen key.
- Pull the power supply out.
- Apply heat-conducting paste to the mounting surface of the new power supply.
- Carefully insert the new power supply.
- Fasten the five socket head cap screws.
- Re-connect all cables.

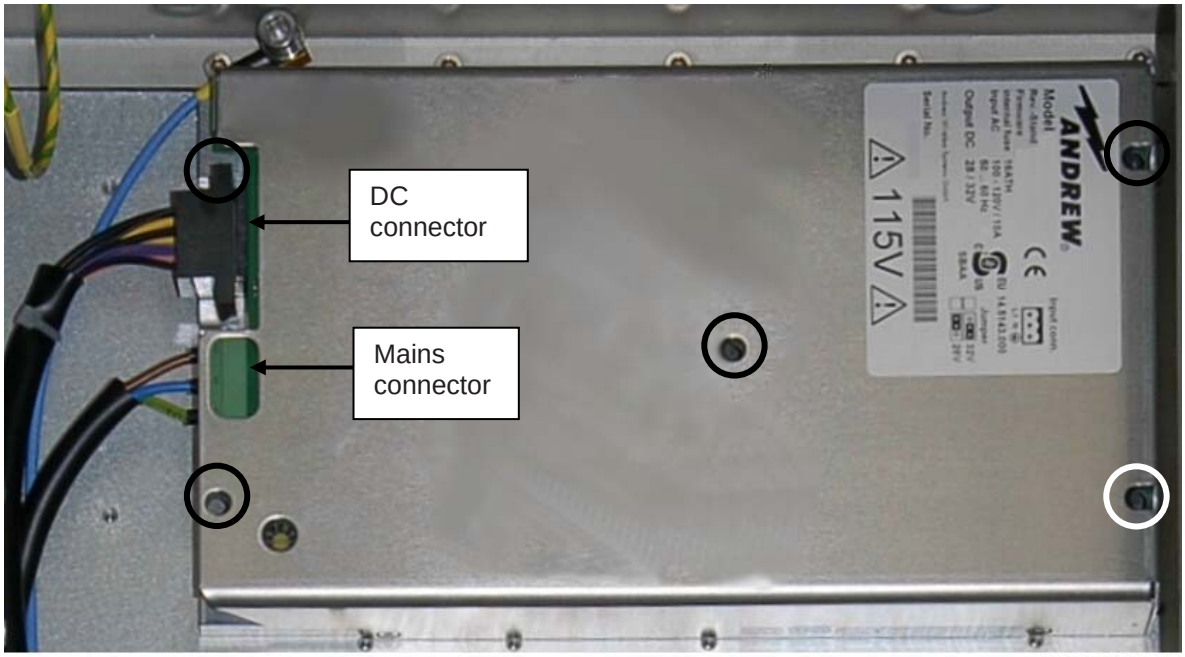


figure 5-3 Power supply screws

5.3. REPLACEMENT OF FAN UNIT

The fan unit is an FRU in the ION-M17P/26 EU.

figure 5-4 Fan unit screws

Unscrew the three M5x16 socket-head screws by which the fan unit is screwed to the cabinet. Be careful not to lose the according washers.

Take off the fan unit and disconnect the connector cable from the cabinet.

To install the new fan unit, proceed in reverse order.

In order not to squeeze the fan connector cable, take care to position it correctly after its re-connection.

figure 5-5 Fan-connector cable

5.4. SPECIFICATIONS

5.4.1. Electrical Specifications of ION-M17P EU

Electrical		
Power supply	Mains power	115 Vac or 230 Vac
	Power consumption	250 Watts (*AWS only*)
Optical Link		
BTS side (SMA) connectors		4
System optimized for BTS power		33 dBm 43 dBm
Antenna port (N)	Connector	N female

All data is subject to change without notice.

5.4.2. Electrical Specifications of ION-M26 EU

Electrical		
Power supply	Mains power	78 Vac to 264 Vac; 36 Vdc to 72 Vdc
Power consumption per power class	for SISO	130 W @ Med 220 W @ High
BTS side	Connectors @ MU	Single duplexed RF ports (SMA or N-type)
	BTS types	Micro: 33/43 dBm typical
Antenna port	Connector	7/16 Female

5.4.3. Mechanical Specifications of ION-M17P/26EU

Height, width, depth *	546 x 320 x 260 mm (21.5x 12.6 x 10.3 in)
Weight	28 kg (61.7 lb)

* Spacing required: 40 mm (1.66 in) around unit. Do not block air inlet and outlet. Vertical mounting - 300 mm above and below - is compulsory.

All data is subject to change without notice.

5.4.4. Environmental and Safety Specifications of ION-M17P/26EU

☞ **Note: For detailed information, please refer to the Environmental and Safety Specifications leaflet of the supplier, related to ETS 300 019 (European Telecommunication Standard).**

		ION-M17P EU	ION-M26EU
Operating temperature range		-10° C to +50° C *	-40 °C to +50°C
Ingress protection	RF part Fan part	IP66 IP55	IP66 ---

* with passive cooling maximum temperature: +40° C

All data is subject to change without notice.

5.5. SPARE PARTS LIST

The following lists contains all parts available for the remote unit. The configuration of the delivered unit meets the requirements of the customer and can differ depending on the state of the delivery.

Spare Parts List of the Extension Unit ION-M17P/26 EU:

Designation:	**ID No**	**FRU**
ION-M17P/26 EU	***7576454***	
Cover	7160735	x
Locker	7163617	x
Fan Unit	7159547	
Fin. Ampl. 350 W 2110-2155 43 dB	7542601-01	
Fin. Ampl. 2640.5-2673.5 40 dB	7596193-00	
RCM161 Kit EU OTRxRU 28V-NSO	7556916	
PCB P3046 Connecting board ION	7512916	
Power Supply Unit AC IN 115 V	7516410-00	x
Power Supply Unit DC IN 48 V	7159125	x
Manuals for ION-M17P/26 EU	7577576-00	
Wall Mounting Kit	7160068	x
Cable RF Patch N-N 1000 mm	7544249	x

Accessory		
Cable bridge 1200 mm RF Sucoform141	7164680	x
Pole Mounting Kit for K-/ L-/ Q-Cabinet	7163746	x
Protective Tube Kit	7162182	x

The manufacturer reserves the right to replace the spare parts listed above by equivalent substitutes!

6. INDEX