AF 250H
Powerful 250 watt IP amplifier

Easy integration	Rugged housing	Loudspeaker line monitoring	IoIP® and SIP	ONVIF VMS integration

Strong performance

The AF 250H provides a high output range and various connections – from a microphone input to a relay output. That's why the amplifier is universally suitable for any size of application – even for complex public address and Intercom solutions. In order to avoid cabling costs and be more flexible, the AF 250H is specifically optimised for installation either in a 19″ rack or on-site.

Thanks to its high flexibility, the AF 250H is applicable in the most diverse areas where a reliable and powerful public address is needed. Thereby, this amplifier covers all requirements from public service facilities, critical infrastructure and smart city applications, office and school buildings up to the requirements of challenging and high-noise industrial environments.

Features and highlights

– 250 W total output power
– Loudspeaker connectors for 70 V or 100 V powered loudspeakers
– Class-D amplifier optimised for high efficiency at low operating temperatures
– Full IoIP® and SIP support
– Support of ONVIF Profile S for unidirectional audio transmission allows either audio announcements via a VMS (video management systems) or audio streaming to a VMS
– Short-circuit and over-range protected
– Line monitoring between amplifier and Intercom Server
– Loudspeaker line monitoring (requires licence L-AF-LM)
– Up to 16 kHz transmission bandwidth for highest speech intelligibility
– Easy integration in existing systems
– High level of reliability
– Support of Intercom station features (e.g. two-way communication and talk-back functionality, audio monitoring, IVC and equalizer)
– Installation in a 19″ rack or on-site
– Rugged metal housing

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AF 250H
Technical specifications

Technical data

IP rating:	IP20 (acc. EN 60529)
Output power:	250 W$_{RMS}$
Power supply:	main power supply: 100–240 VAC (50–60 Hz, max. 340 W) backup power supply: 24 VDC (21–28 VDC, max. 13 A) [1]
Protocols (IoIP):	IoIP protocol based on UDP/IP
Protocols (SIP):	IPv6,IPv4, TCP, UDP, HTTP (RFC 2617, RFC 3310), RTP (RFC 3550), RTCP, DHCP, SDP (RFC 2327), SIP (RFC 3261), SNMPv2, STUN, TFTP, URI (RFC 2396), DTMF Decoding (RFC 2876, RFC 2833), SIP User Agent (UDP RFC 3261), SIP Refer Method (RFC 3515)
Codecs (SIP):	G.711 a-Law, G.711 μ-Law, G.722
ONVIF specification:	ONVIF Profile S for unidirectional audio
IoIP audio bandwidth:	16 kHz
SIP audio bandwidth:	7 kHz
Total harmonic distortion (THD+N):	< 0.2% at 1 kHz at 250 W
Cabling:	min. Cat. 5
Connection:	2 shielded RJ45 modular jacks (IP uplink and IP downlink) pluggable screw terminals (0.08 mm^2–1.5 mm^2/AWG 28–16): outputs, inputs, microphone [2], line out pluggable screw terminals (0.08 mm^2–2.5 mm^2/AWG 28–12): loudspeaker pluggable screw terminals (0.2 mm^2–6 mm^2/AWG 24–10): DC input AC power supply (IEC-60320-C14)
Loudspeaker output:	100 V, switchable to 70 V
Microphone input:	nominal level: 14 mV at 3.3 kΩ –43 dBV/Pa (2.5 V feeding voltage)
Line output:	nominal level 0 dBu (0.775 V)
Inputs:	2 inputs for floating contacts (detection of 5 input states)
Outputs:	relay output (changeover contact): max. 60 W (DC)/37.5 VA (AC), max. 2 A, max. 60 VDC/30 VAC$_{eff}$ expected life: min. 5 x 10^4 (2 A), 10^5 (1 A)
Control input:	0–10 V (for remote volume control)
Operating temperature range:	–10 °C to +55 °C (+14 °F to +131 °F)
Storage temperature range:	–25 °C to +70 °C (–13 °F to +158 °F)
Relative humidity:	up to 95%, non-condensing
Dimensions (W x H x D):	401 x 44 x 267 mm (15.79 x 1.73 x 10.51 in)
Weight incl. package:	approx. 3,700 g (8.2 lbs)

[1] The backup power supply input may only be connected to an ES1 circuit as per IEC/EN 62368-1 (cf. SELV acc. EN 60950-1). Average power consumption for speech and music (acc. IEC-60268-3): 45 W

[2] In order to fulfil the electromagnetic compatibility directive, the cable of a connected microphone has to be less than 30 m and shielded.

Extent of supply

– Amplifier
– 4 rubber feet
– Short reference

Line length in LAN

The maximum line length of Cat. 5 cabling in a LAN is 100 m (328 ft) – e.g. from switch to amplifier.

Power cable

For the AF 250H, the power cable with country-specific plug is available separately:

– C-KAB-C13-AU (Australia)
– C-KAB-C13-EU (Europe)
– C-KAB-C13-UK (United Kingdom)
– C-KAB-C13-US (USA)

System requirements

IoIP
Intercom Server

– GE 800 (min. PRO 800 6.3) with G8-IP (min. G3-8-IP 6.6D) or
– GE 300 (min. PRO 800 6.3) with G3-IP (min. G3-8-IP 6.6D) or
– IS 300 (min. PRO 800 6.3) or
– VirtuoSIS (min. 9.0) or
– GE 700 with GE700-UPG (min. PRO 800 6.3) with G7-DSP-IP

Configuration software

– min. CCT 800 9.0
– IP Station Config (included in setup of CCT 800)

SIP

– Compatible SIP server (see page TE | 2) or
– S3/S6/VirtuoSIS (min. 9.0) or
– GE 800 with G8-VOIPSERV or
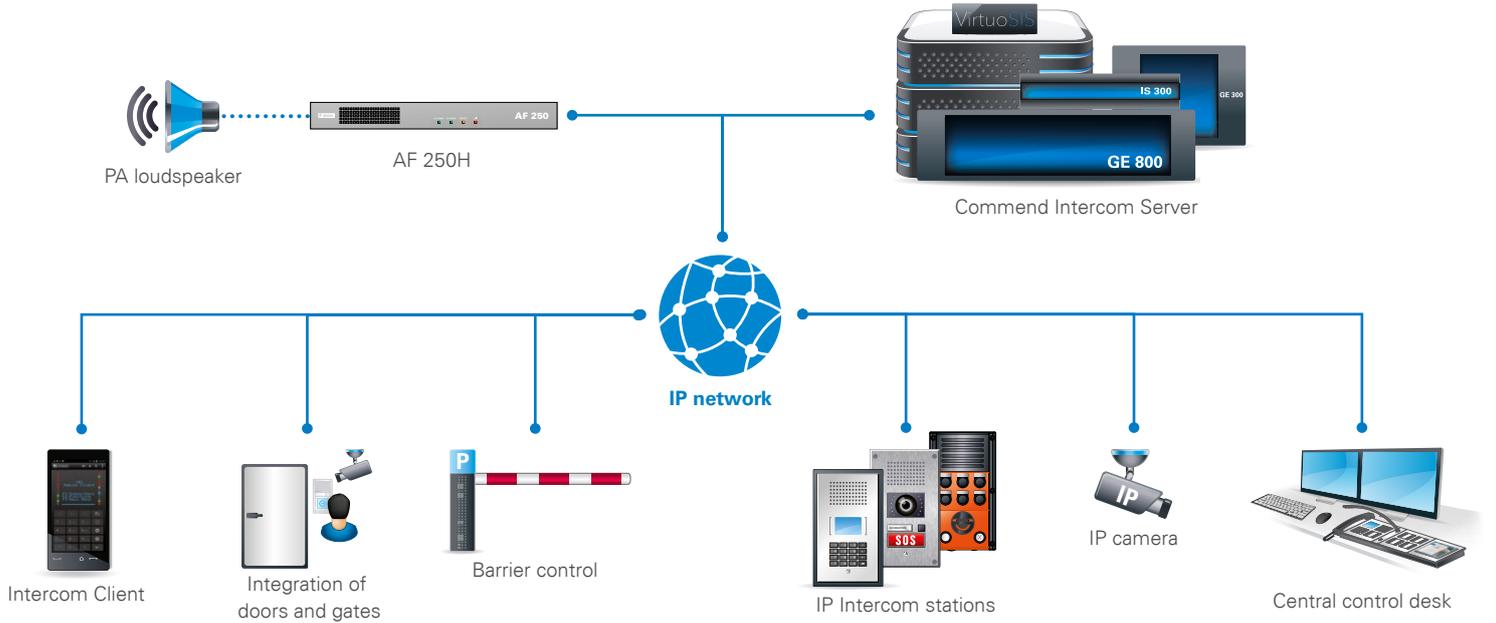– Serverless operation

Device firmware

– IoIP-Device (min. version 8.0)
– SIP Series (min. version 4.1)

ATTENTION

– Downgrading to firmware version lower than IoIP-Device 8.0 is not supported.
– Downgrading to firmware version lower than SIP Series 4.1 is not supported.

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System overview

The following illustration shows an example of the integration of an AF 250H amplifier into an IP network.

PA loudspeaker

AF 250H

Commend Intercom Server

IP network

Intercom Client

Integration of doors and gates

Barrier control

IP Intercom stations

IP camera

Central control desk

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Requirements to the network for use as SIP device

Ports

– The configuration via the web interface is done via TCP port 80 (cannot be configured).
– The communication from the SIP device to the SIP server is done via the following ports (both are configurable):
    – SIP: UDP port 5060
    – RTP: UDP port 16384 (incoming)

Requirements to the network for use as IoIP device

IP addresses and ports

– For the AF 250H, the DHCP functionality is available. If DHCP is not used, the AF 250H must have a fixed IP address.
– In case of a changing public IP address, dynamic registration of an AF 250H is possible.
– Communication from the program IP Station Config is done via port 16399 (cannot be configured).
– Communication from the AF 250H to the Intercom Server (UDP protocol) is done via port 16400 (configurable).

QoS requirements

– One-way delay max. 100 ms
– Delay jitter max. 50 ms
– 0% packet loss for perfect audio quality

Bandwidth

For further information on bandwidth, see "**IoIP Technology Guideline**".

Compatibility SIP PBX

Generally, the SIP device can be used with any SIP server.
The following server types have been tested explicitly by Commend and therefore a proper functionality can be confirmed:

Manufacturer [1]	Type	Version
Cisco	Cisco Call Manager Cisco Unified Communication Manager	Versions 5, 6, 7, 8, 9
Digium	Asterisk	Versions 1.2, 1.4, 1.6
Avaya (former: Nortel)	CS1000	Version 6
Avaya	Avaya AuraTM (Avaya Communication Manager, Avaya Session Manager)	Release 6.1
Innovaphone	Virtual Appliance IPVA	Version 9 final
Alcatel	OmniPCX Enterprise (OXE)	Release 9
Siemens	Hipath 4000 Hipath 3000 + HG 1500	Version 5
3CX	3CX for Windows	3CX PhoneSystem Versions 9, 10, 11
Starface	Starface free	Versions 4.x, 5.x
Aastra (former: Ericsson)	MX-ONE	Version 4.1 SP 1
Kamailio	Kamailio (OpenSER)	Version 3.3.0
FreeSWITCH	FreeSWITCH	Version 1.1 Beta1
ELMEG	elmeg ICT880	Version 7.67D
2N®	2N® Netstar IP	Version 3.1.0.96
AVM	Fritz!Box Fon 7170 Fritz!Box Fon 7270	Version 29.04.87 Version 54.05.05
Sipgate	sipgate.de	tested in Dec 2010
Vodafone Arcor	vodafone.de	tested in Jan 2011
blue SIP	blueSIP.net	tested in May 2011
Mitel	3300ICP	12.0.0.49

[1] The listed products and company names are brand names or registered trademarks of their respective owners.

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# Installation instructions

Mounting instructions

– Do not place the device in areas where it may become wet or damp, and avoid dusty, humid and high temperature environments. The device shall only be used indoor.
– For ventilation clearance, min. 100 mm space has to be left on the front and rear of the device.
– If the device is used with a backup power supply, it has to be connected to protective earth (⏚). For this, size the grounding cable according to the national installation requirements.
– The electrical connections of the device have to face downwards when mounting it on a wall.
– Use shielded Ethernet cables only.
– Do not cover the device.
– Before using the device, ensure all cables are connected correctly and not damaged.

Safety warnings

– This device shall be installed or replaced by trained and qualified personnel only.
– ⚠ Caution: Exposed connections or cables. During operation, up to 100 volts may be present. Touching uninsulated terminals or wiring may result in an unpleasant sensation.
– To disconnect the device safely from the power supply, switch off the device by flipping the power switch and disconnect the DC-IN plug (backup power supply). For this reason, the rear of the device must be easily accessible.
– Only operation via main power supply: Ensure that the PE contact within the power cable is present and connected to protective earth on the source side.
– Do not make any modifications to the device and do not open the housing.
– All connections of the device are intended for installation within a building or a grounding system.
– For connections leaving the building, protective measures must be taken according to the national installation requirements.

Dimensions front panel

Measuring units in mm (in), not to scale!
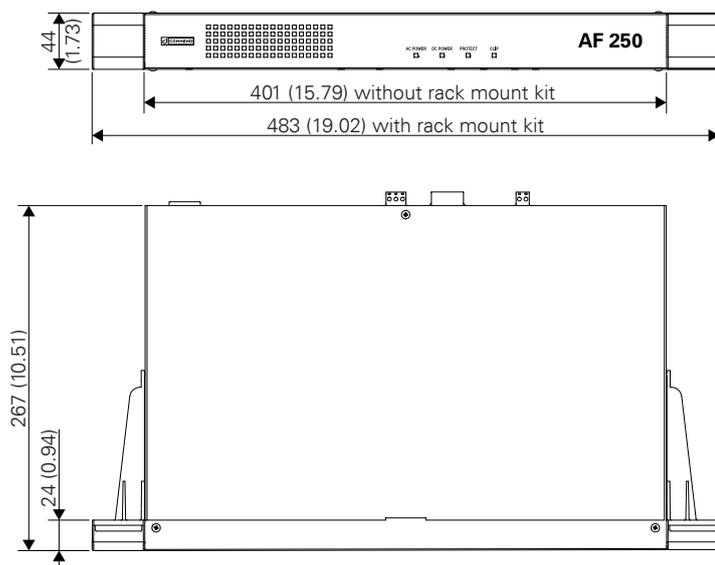
LED status indication

LED "AC POWER"
– Permanent green: main power supply applied

LED "DC POWER"
– Permanent green: backup power supply applied

LED "PROTECT"
– Permanent yellow: amplifier fault detected
– Yellow blinking: loudspeaker output fault detected by means of line monitoring

LED "CLIP"
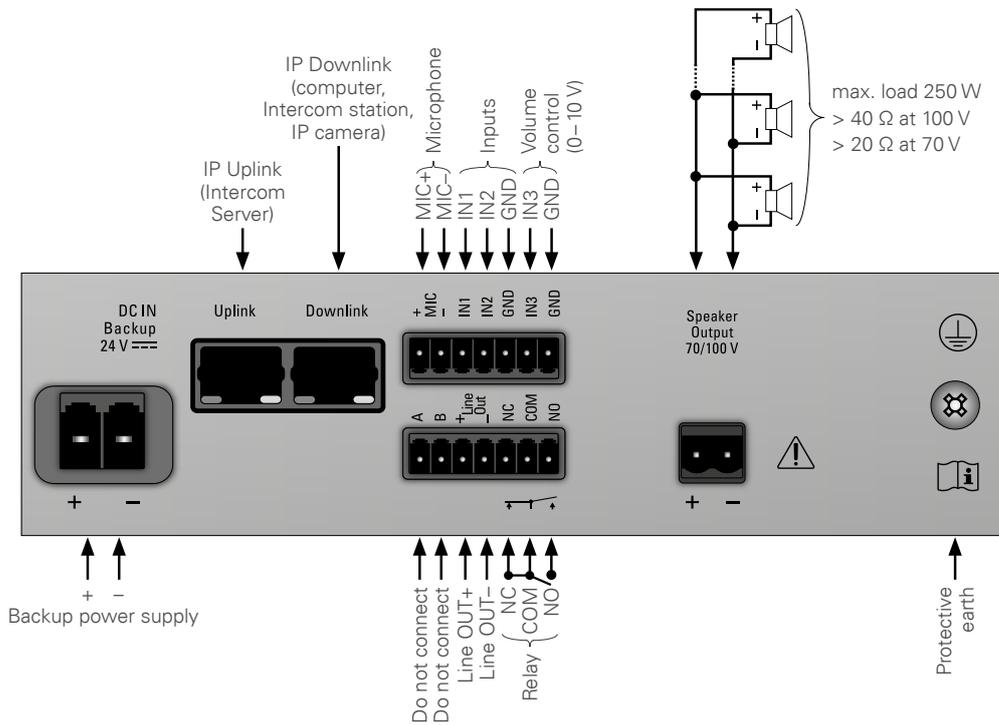– Flickering red: clipping detected

Microphone loudspeaker distance for IVC

If IVC (Intelligent Volume Control) is used, the distance between microphone and the nearest loudspeaker has to be less than 3 m. In this way, an unwanted increase of the loudspeaker volume level is prevented.

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Connection

NOTE

The main power supply is provided via the IEC socket (not shown in the illustration below).

Volume settings

The volume can be controlled via CCT 800 in IoIP operation mode and via the web interface in SIP operation mode or via the volume control ("IN3").

Mounting

The AF 250H can be placed on a desk using the rubber feet in extent of supply or be mounted using a wall mount kit or a rack mount kit:
– For wall mounting, a wall mount kit PF-WM is required (available separately; for mounting, see short reference "PF-WM").
– For rack mounting, a 19" rack mount kit PF-RM-1HE is required (available separately; for mounting, see short reference "PF-RM-1").

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AF 250H
Complementary information

Loudspeaker line monitoring (IoIP operation only)

Functionality

With loudspeaker line monitoring, it is possible to detect the following errors at the loudspeaker output:
- **Short-circuit** (impedance < 20 Ω at 100 V/< 10 Ω at 70 V)
  ATTENTION: Loop impedance
  The loop impedance for the loudspeaker cable must be lower than 20 Ω at 100 V/10 Ω at 70 V in order to be able to detect short-circuits.
- **Short circuit to ground** (impedance to ground < 50 kΩ)
- **Disconnection** (impedance > 1 kΩ)
- **Impedance changing** (± 10 %, ± 20 %, ± 30 %, ± 40 % and ± 50 %)

Loudspeaker line monitoring is based on an impedance measurement with adjustable tolerance values of ± 10 %, ± 20 %, ± 30 %, ± 40 % and ± 50 %. These values obviate against errors depending on temperature value changing, deterioration and so on. During the impedance measurement, a pilot signal (67 Hz with –23 dBFS) is put out. The measurement is also carried out during audio output. An error is displayed with measurement cycles every 60 seconds.

System requirements

Software
- Licence "L-AF-LM"

Configuration

ATTENTION: Required configuration
For the configuration of loudspeaker line monitoring, an active connection between CCT 800 and the amplifier is required.

- Go to: *Subscriber > Station Properties > AF series > AF 250H >* tab *Line Monitoring*
- Activate the checkbox **Line Monitoring**.
- In the drop-down list **Line**, select the used line type ("70 V" or "100 V").
- In the drop-down list **Tolerance**, select the tolerance value for measurements. Within this tolerance, a deviation from the reference value will not be interpreted as error. It is recommended to set the tolerance value to ± 30 %.
- Click on **Measure ...** to measure the impedance of the loudspeaker line. The measurement is displayed in the filed "Impedance".
- Click on **Accept ...** to set the current measured value as nominal value. The current nominal value is displayed in the filed "Impedance nominal value".
- After the configuration, send the CCT 800 configuration to the Intercom Server.

Quality tested. Reliable. Smart.

COMMEND products are developed and manufactured by Commend International in Salzburg, Austria.

The development and manufacturing processes are certified in accordance with **EN ISO 9001:2015**.

A strong worldwide network

COMMEND is represented all over the world by local Commend Partners and helps to improve security and communication with tailored Intercom solutions.

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