# AF 20H

## Compact 20 watts IP amplifier and interface


Easy integration | Rugged housing | Compact size | IoIP® and SIP | ONVIF VMS integration

## Flexible amplification and standardisation

Thanks to its compact design, the AF 20H is ideal for a decentralised, cable saving installation next to PA loudspeakers and Intercom/SIP stations. The AF 20H cannot just be used as an amplifier, it also works as an IP interface between classic PA systems and a modern networked Intercom system.

Thanks to its high flexibility, the AF 20H 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

- 20 W total output power
- 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
- 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)
- Suitable for decentralised on-site use
- Rugged housing made of polycarbonate

# AF 20H
# Technical specifications

## Technical data

| | |
|---|---|
| **IP rating:** | IP20 (acc. EN 60529) |
| **Output power:** | 20 $W_{RMS}$ |
| **Loudspeaker outputs:** | low-resistance (min. impedance: 4 Ω) |
| **Microphone input:** | nominal level: 14 mV at 3.3 kΩ<br>microphone supply voltage: 2.5 V |
| **Line output:** | nominal level: 0 dBu (0.775 V) |
| **Inputs:** | 2 inputs for floating contacts<br>(IoIP: detection of 5 input states) |
| **Output:** | relay output (changeover contact):<br>max. 60 W (DC)/37.5 VA (AC),<br>max. 2 A,<br>max. 60 VDC/30 $VAC_{eff}$<br>expected life: min. 5 x $10^4$ (2 A), $10^5$ (1 A) |
| **Control input:** | 0 – 10 V (for remote volume control) |
| **Protocols (IoIP):** | IoIP protocol based on UDP/IP |
| **Protocols (SIP):** | IPv6,IPv4, TCP, UDP, HTTP (RFC 2617, RFC 3310),<br>RTP (RFC 3550), RTCP, DHCP, SDP (RFC 2327),<br>SIP (RFC 3261), SNMPv2, STUN, TFTP, URI (RFC 2396),<br>DTMF Decoding (RFC 2876, RFC 2833),<br>SIP User Agent (UDP RFC 3261),<br>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):** | 4 Ω, 8 Ω: < 0.2% |
| **Operating temperature range:** | –25 °C to +55 °C (–13 °F to +131 °F) |
| **Storage temperature range:** | –25 °C to +70 °C (–13 °F to +158 °F) |
| **Relative humidity:** | up to 95%, not condensing |
| **Connections:** | 2 RJ45 modular jacks with LEDs for connection to the Intercom/SIP server (IP Uplink, IP Downlink)<br>pluggable screw terminals (0.08 $mm^2$ – 1.5 $mm^2$):<br>power supply, outputs, microphone [1],<br>inputs, line output<br>pluggable screw terminals (0.08 $mm^2$ – 2.5 $mm^2$):<br>loudspeaker output<br>expansion plug for e.g. EB2E2A [2] |
| **Power supply:** | 20 – 26 VDC<br>(max. 1.2 A at 4 Ω / 20 W or max. 0.6 A at 8 Ω / 10 W)<br>Power supply [3]<br>or PoE |
| **Power consumption:** | idle mode: 3 W (DC main power supply),<br>3.5 W (PoE backup power supply) |
| **PoE (Power over Ethernet) [4]:** | IEEE 802.3af/Class 0, IEEE 802.3at/Type 1 |
| **Cabling:** | min. Cat. 5 |
| **Dimensions (W x H x D):** | 159 x 49 x 78 mm (6.26 x 1.93 x 3.07 in) |
| **Weight incl. package:** | approx. 240 g (0.53 lbs) |

[1] In order to fulfil the electromagnetic compatibility directive, the cable of a connected microphone has to be less than 30 m and shielded.
[2] The assembly in combination of AF 20H and EB2E2A must be protected against dust, dirt, humidity and possible environmental influences. The housing must protect against ES1/PS2 circuits.
[3] Use only power supply units with straight through earth (e.g. PA60W24V).
[4] If power supply over PoE is used, an attenuation of up to 9 dB is possible. This is equal to an output power of 6 W.

## Extent of supply

- Amplifier
- Device identification document
- Short reference

**NOTE:**
The power supply is not included in extent of supply.

## 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.

## 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 compatibility list "**Interoperability SIP**") or
- S3/S6/VirtuoSIS (min. 9.0) or
- GE 800 with G8-VOIPSERV or
- Serverless operation

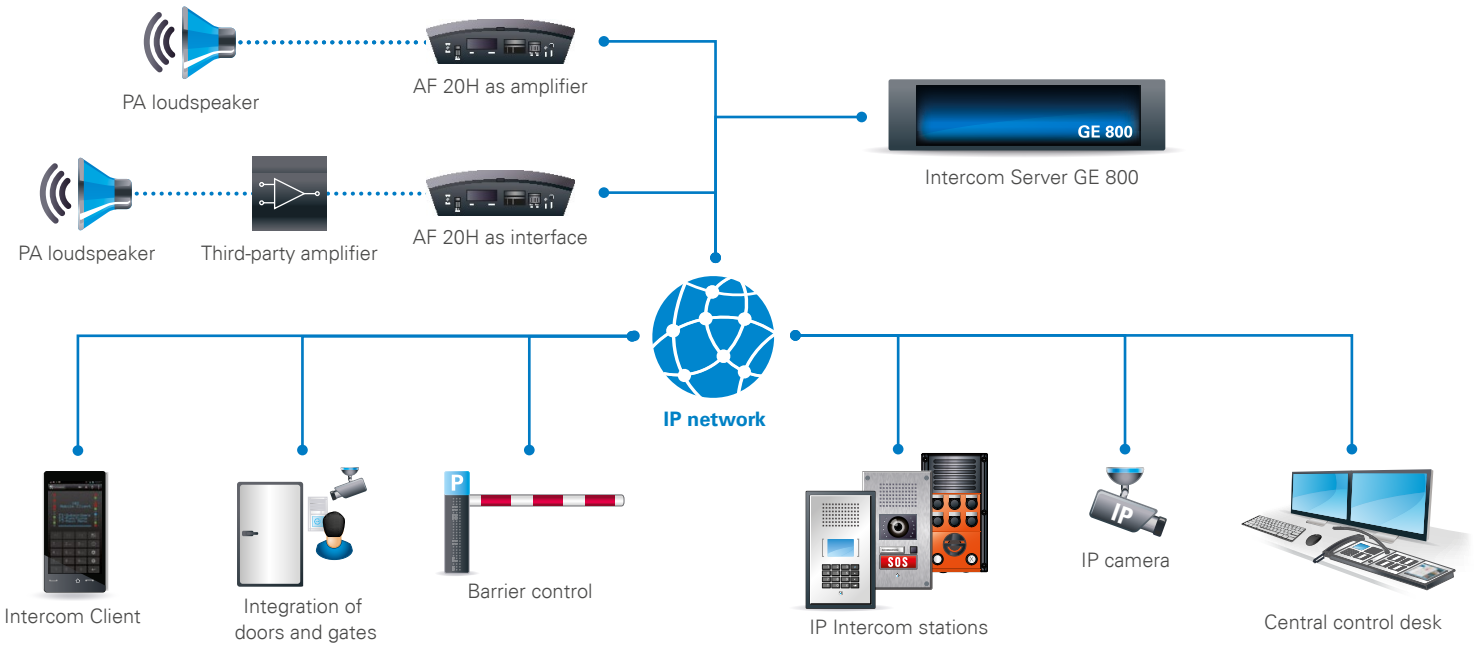
### Device firmware

- 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.

## System overview

The following illustration shows an example of the integration of an AF 20H amplifier into an IP network.




## 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 20H, the DHCP functionality is available. If DHCP is not used, the AF 20H must have a fixed IP address.
- In case of a changing public IP address, dynamic registration of an AF 20H is possible.
- Communication from the program IP Station Config is done via port 16399 (cannot be configured).
- Communication from the AF 20H 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 guideline "**IoIP Technology**".

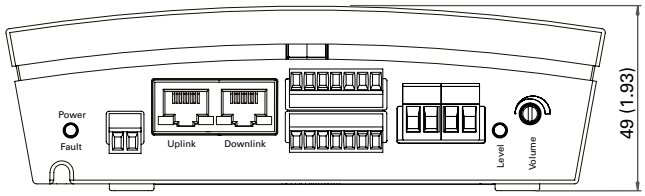
# AF 20H
# Installation instructions

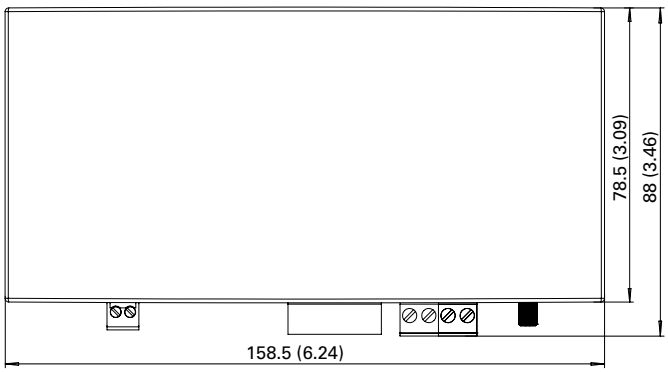
## Mounting instructions

- 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.
- Loudspeaker cable size: 0.08 to 2.5 mm².
- The Ethernet cable shall only be connected to an inside network environment where over-voltage transients are not likely.
- Do not cover the device.
- Use shielded Ethernet cables only.
- To prevent foreign objects from entering, vertical mounting is only permitted within a control cabinet or together with a physical barrier/cover above the housing openings.
- Before using the device, ensure all cables are connected correctly and not damaged.
- Use only power supply units with straight through earth (e.g. PA60W24V).

## Dimensions

Measuring units in mm (in), not to scale!




## 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.

## Safety instructions

- This device shall be installed or replaced by trained and qualified personnel only.
- To disconnect the device safely from the power supply, unplug the DC power supply and all Ethernet connectors.
- Do not make any modifications to the device and do not open the housing.
- The DC power supply of the device must comply with the requirements for LPS (acc. to IEC/EN 60950-1) or PS2 (acc. to IEC/EN 62368-1) (max. 100 W). If one power supply (> 100 W) is used for multiple devices, a overcurrent protective device must be installed in each device's supply line.
- Avoid touching the device housing during operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

## LED status indication

**LED "Power"**

- Permanent green: power supply applied
- Green blinking: only PoE power supply applied

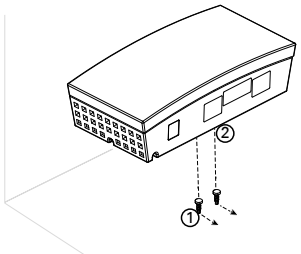
**LED "Fault"**

- Permanent red: short-circuit detected at the loudspeaker output (4–16 Ω)

**LED "Level"**

- Red: clipping detected
- Green/orange: amplification okay

## Mounting



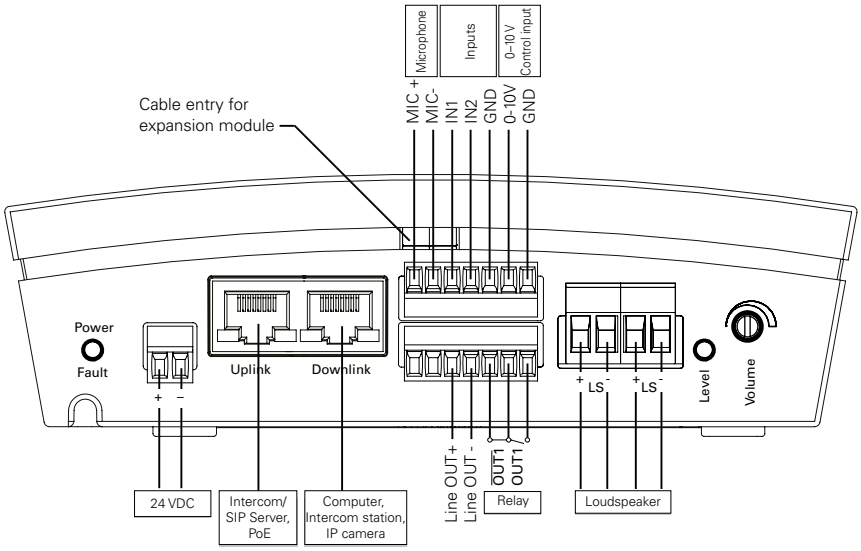

① Install screws and dowels.

② Break out the mounting opening on the back side of the housing and hook onto the screws.

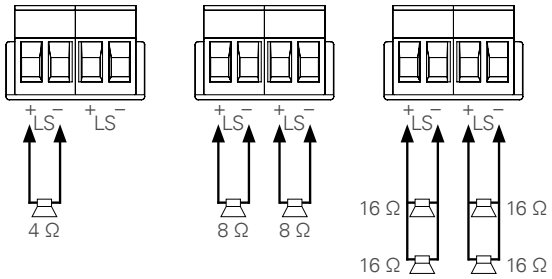
The AF 20H can be placed on a desk or be mounted on a wall using screws and dowels or the top hat rail clamp ET 901-HSH35.

## Connection

### Connection diagram




### Connection loudspeakers




## Volume settings

The volume can be adjusted using the following methods:

- In IoIP mode via CCT 800 and in SIP mode via the web interface.
- Using the "Volume" potentiometer.
- Using a 0–10V interface connected to the "IN3" input (0 V = muted, 10 V = volume level 9).
- Via an external potentiometer (1 MΩ, log B) connected to the "IN3" input, according to the following table:

  **Note:** The use of IN3 must be activated via CCT 800.

| Volume level | dB | Volt | Ohm |
|---|---|---|---|
| 9 | 0 | >8,7 | >900k |
| 8 | –3 | >7,7 | >370k |
| 7 | –6 | >6,7 | >220k |
| 6 | –9 | >5,7 | >136k |
| 5 | –12 | >4,7 | >91k |
| 4 | –15 | >3,8 | >61k |
| 3 | –18 | >2,8 | >39k |
| 2 | –21 | >1,9 | >24k |
| 1 | –24 | >0,9 | >10k |
| 0 | mute | <0,9 | <10k |

## 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**.



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