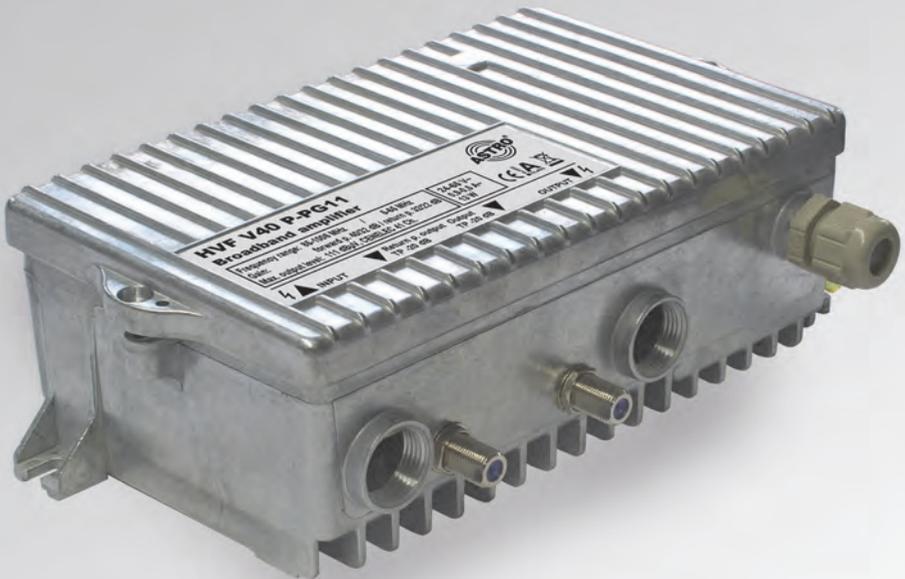


GOING FUTURE TODAY.



HVF V40 P

Universal broadband amplifier



Operating Manual

Before operating the device

NOTE: *Read this operating manual through carefully! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner or operator. A PDF version of this manual can be downloaded on the ASTRO website (there may be a more recent version).*

The ASTRO company confirms that the information in this manual was correct at the time of printing, but it reserves the right to make changes to the specifications, the operation of the device and the operating manual without prior notice.



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Symbols and conventions used

Symbols used in this manual

Pictograms are visual symbols with specific meanings. You will encounter the following pictograms in this installation and operating manual:



Warning about situations in which electrical voltage and non-observance of the instructions in this manual pose a risk of fatal injuries.



Warning about various dangers to health, the environment and material.



Warning about thermal dangers due to hot surfaces.



Recycling symbol: indicates components or packaging materials which can be recycled (cardboard, inserts, plastic film and bags). Used batteries must be disposed of at approved recycling points. Batteries must be completely discharged before disposal.



This symbol indicates components which must not be disposed of with household rubbish.

Intended use

The HVF V40 P is a universal broadband amplifier for bidirectional building distribution and broadband communication systems. It is exclusively designed for signal amplification in unidirectional and bidirectional distribution systems in single-family and multi-family dwellings.

Modification of the devices or use for any other purpose is not permitted and will immediately void any guarantee provided by the manufacturer.

Intended audience for this manual

Installation, configuration and start-up

ASTRO amplifiers are intended to be installed and put into operation by qualified experts who have training which enables them to perform the work required by EN 60728-11 and EN 62368-1. Unqualified persons are not permitted to install and operate the device.

Device description

The device packaging contains the following:

- HVF V40 P broadband amplifier (the design of the connection sockets of the version supplied may differ from the version shown in the illustrations)
- Pre-assembled jumpers for device configuration
- Operating manual
- 1x 7.5 A FKS fuse
- 2x 5 A FKS fuse
- Allen key 1.27 mm

- [A] Remote power supply with strain relief
- [B] Output, PG11 thread
- [C] Test socket, forward path output
- [D] Test socket, return path output before the setting elements
- [E] Input, PG11 thread
- [F] Operating status lamp
- [G] Housing cover screw mount
- [H] Earth connection

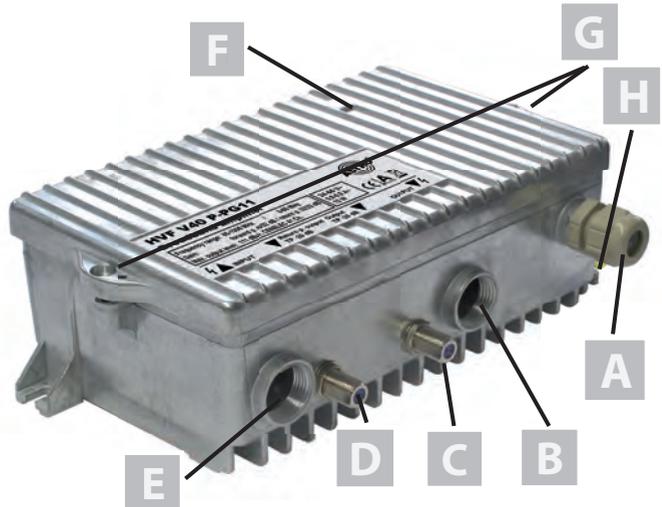


Fig. 1: HVF V40 P amplifier, 2x PG11 thread and 2x F socket at the test sockets

Amplifier variants are available with the following equipment:
 Part number 217 411: 3.5/12" socket (also known as PG11 5/8") at the input and output, F socket at the test sockets



Part number 217 412: PG11 thread at the input and output; F sockets at the test sockets **(If customers/users install the sockets themselves, ASTRO cannot guarantee their safety.)**



Part number 217 413: F sockets at all outputs and at the test sockets



Part number 217 414: IEC socket at the input, F sockets at the output and at the test sockets



NOTE: The connection adapters for the input and output are not factory-installed. Please use the Allen key provided to install the inner conductor of the connector. Installation of the sockets is described in the "Installation" section.

The connection adapters for the variant with order number 217 412 are available separately (see left):

PG 11 to F socket: Part number 790 511

PG 11 to IEC socket: Part number 790 512

PG 11 to 3.5/12" socket: Part number 790 510

The amplifiers are equipped with automotive fuses (5 or 7.5 A, see centre left).





Depending on the part number, the amplifier's power supply connection can either be a flat cable socket or a PE cable gland (see bottom left).

- [1] Attenuator forward path (pad)
- [2] Equaliser, forward path (pad)
- [3] Inverse equaliser, forward path (pad)
- [4] Gain switch in the forward path (32 dB/40 dB)
- [5] Interstage attenuator, forward path (pad)
- [6] Interstage slope, forward path, jumpers
- [7] Power supply fuse, 7.5 A
- [8] Return path attenuator before the amplifier (Pad)
- [9] Output power supply unit fuse, 5 A
- [10] Input power supply unit fuse, 5 A
- [11] Equaliser, return path (pad)
- [12] Attenuator, return path (pad)
- [13] Jumper to select the gain in the return path (22 dB/32 dB)
- [14] Return path activation LED
- [15] Test socket, input
- [16] Return path activation switch

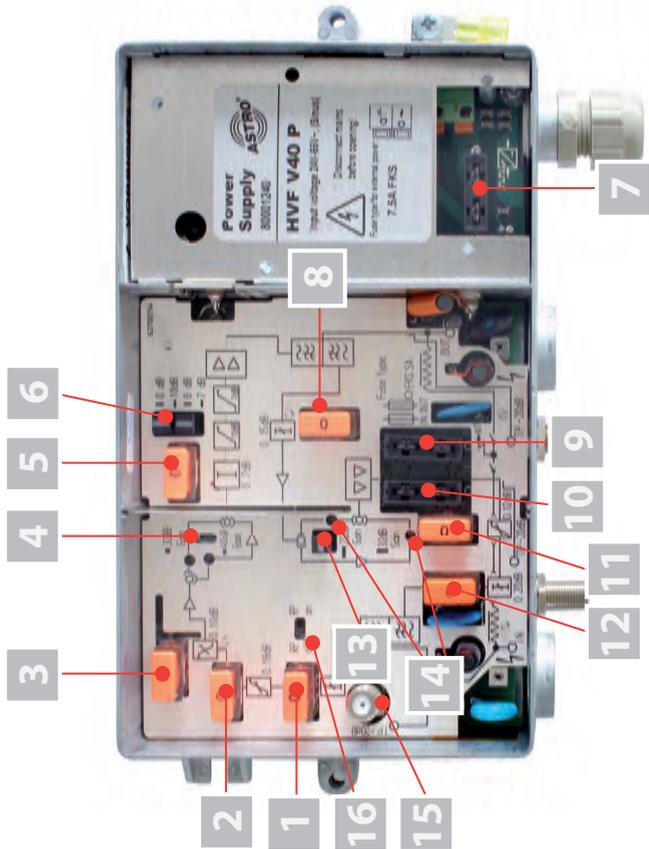


Fig. 2: HVF V40 P amplifier, here equipped with 2x 3.5/12" input and output sockets

The HVF V40 P amplifier has a CE marking. This confirms that the product complies with the relevant EC directives and adheres to the requirements specified therein.



Important safety information

To avoid any potential risks to the greatest extent possible, you must observe the following safety information:

ATTENTION: *Failure to observe this safety information may result in physical injury due to electrical and thermal dangers!*

Intended use

- Only use the device at approved operating sites and under approved ambient conditions (as described in the following), and only for the purpose described in the section "Proper use".

Before operating the device

NOTE: *Read this operating manual through carefully! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner or operator. A PDF version of this manual can be downloaded on the ASTRO website (there may be a more recent version).*

- Check the packaging and the device for transport damage immediately. Do not operate a device that has been damaged.
- Carrying the device by the power cable may damage the power cable or the strain relief and is therefore not permitted.

Installation and operation

- The device may only be installed and operated by qualified persons (in accordance with EN 62368-1) or by persons who have been instructed by qualified persons. Maintenance work may only be carried out by qualified service personnel.
- An installation site must be provided that prevents children from playing with the device and its connections.
- The electrical connection conditions must correspond to the specifications on the device type plate.



- To avoid damage due to overheating, the device may only be installed on vertical surfaces. The connection for the power supply unit must point to the right. The installation basis should be level and non-flammable. Operating position: Device vertical, with power supply output on the right.
- The permitted ambient temperatures specified in the technical data must be complied with. If the device overheats, the insulation used to insulate the mains voltage may be damaged.
- The device and its cable may only be operated away from radiant heat and other sources of heat.
- To avoid trapped heat, ensure there is good ventilation on all sides (minimum interval of 20 cm to other objects). Installing the device in recesses or covering the installation location, for example using curtains, is not permitted. Ventilation openings must not be covered.
- If the device is installed in a cabinet, ensure adequate air convection is possible to avoid exceeding the maximum permitted ambient temperature.
- No objects may be placed on the device.
- The subscriber network must be earthed in accordance with EN 60728-11 and must remain earthed even when the device is removed. In addition, the earth connection on the device can be used. Devices within hand's reach must also be integrated into the potential equalisation. Operating the device without an earth conductor, without earthing the device or without equipotential bonding of the device is not permitted.
- The device does not feature protection against water and may therefore only be operated and connected in dry rooms. The device must not be exposed to spraying water, dripping water, condensation or similar sources of moisture.
- The electrical system supplying current to the device, such as a building installation, must incorporate protective devices against excessive currents, earth faults and short-circuits in accordance with EN 62368-1.
- Caution! Hot surface: Housing components near the cooling fins at the rear or the cooling fins themselves may become very hot. Do not touch these parts.
- The power supply plug is used to disconnect the device from the mains voltage for servicing and in the event of danger and must therefore be accessible and in good working condition at all times. The device is operational when connected to the mains voltage.



- Adhere to all applicable national safety regulations and standards.
- Excess mechanical loads (e.g. falling, impacts, vibrations) may damage the insulation used to provide protection from the mains voltage.
- High excess currents (lightning strikes, surges in the power utility grid) may damage the insulation used to provide protection from the mains voltage.
- If there is no information about the intended use (e.g. operating site, ambient conditions), or the operating manual does not include the corresponding information, you must consult the manufacturer of this device to ensure that the device may be installed. If you do not receive the required information from the manufacturer, do not operate the device.
- In rooms in which the climatic conditions vary (e.g. due to sunlight), the device may only be operated if the permissible ambient temperature can be maintained.
- Disconnect devices with a damaged power cable from the mains (unplug the power supply plug).
- Always use the supplied power adapter (power supply unit) and connect it to a power point with a voltage within the range specified in the "Technical data" section. Failure to observe this warning may result in personal injury or equipment/property damage.

Do not install the device in locations with excessive dust formation, as this may reduce the insulation from the mains voltage.

Electromagnetic compatibility (EMC)

In order to avoid malfunctions when operating radio and telecommunications equipment, as well as other operating units or broadcasting services, the following must be observed:

- Before installation, make certain that you have checked the device for mechanical damage. Do not use damaged or bent covers or housings.
- During operation, the device must always be covered by the components provided for this purpose. It is not permitted to operate the device when the cover is open.

- The braided shielding or the spring contacts must not be damaged or removed.

Maintenance

- The power indicator only shows whether the DC current, which supplies the device components, has been disconnected. However, if power indicators (on the power supply unit or the device) are not lit up, it is in no way an indication that the device is completely disconnected from the mains. There may still be voltage in the device that is dangerous to touch. Therefore, do not open the device.
- Read carefully: EN 60728-11, Safety requirements/No service work during electrical storms!

Repair

- Repairs may only be performed by the manufacturer. Improperly performed repairs may result in considerable dangers for the user.
- Do not operate devices with a damaged power cable. You must have the cable repaired by the manufacturer.
- If malfunctions occur, the device must be disconnected from the mains and authorised experts must be consulted. The device may need to be sent to the manufacturer.

General information

- Store or use the device in a safe location, well out of reach of small children. It may contain small parts that can be swallowed or inhaled. Dispose of any small parts that are not needed.
- Plastic bags may have been used for packaging the device. Keep these plastic bags away from babies and children to avoid any danger of suffocation. Plastic bags are not toys.
- Do not store the device near chemicals or in places in which any leakage of chemicals may occur. In particular, organic solvents or fluids may cause the housing and/or cables to melt or disintegrate, presenting a danger of fire or electric shock. They may also cause device malfunctions.
- Do not connect the supplied mains adapter to any other products.

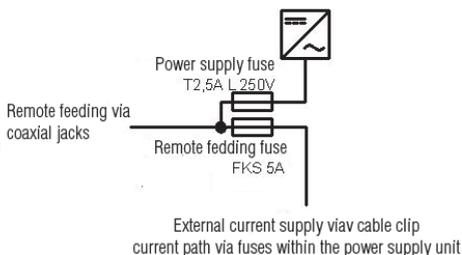


Information about supplying power remotely

Remote power can be supplied in the following ways:

- Via strain relief to a PCB terminal block ($\leq 2.5 \text{ mm}^2$) in the power supply unit of the device, if a flat connector socket is not available
- Via a flat connector socket (6.3 x 0.8), if present
- Via a coaxial input or output

Overview of the remote power supply:



Remote feeding fuses depend on configuration of the device.

Wire routing (remote power supply) via strain relief for devices without a remote power supply socket

The external wires must be routed using round cable lines of the minimum quality specified below in order for the strain relief to be effective. After the cables have been connected, they must be adequately secured using the screw cap from the strain relief, so that an effective seal against environmental influences is also achieved.

When using F or K litz wires, make sure that no strands are split. Split strands can lead to short circuits in the device and thus to damage in the cable network.

Observe the installation conditions specified in EN60728 T11.

Minimum requirement for the cable types:

Round cable lines with a diameter of 5 - 8 mm, for example:

- H03VV-F 2x 0.75 mm², minimum diameter 5 mm
- H03VV-U 2x 0.75 mm², minimum diameter 5 mm
- H03VV-K 2x 0.75 mm², minimum diameter 5 mm

(F: flexible, U: rigid, K: finely stranded, fixed)

Remote power supply via the flat connector socket

The external wires must be routed using cable lines of the following minimum quality:

- H03V-F 0.75 mm²
- H03V-U 0.75 mm²
- H03V-K 0.75 mm².

Observe the operating conditions specified in EN60728 T11. Single conductors should be laid in such a way that they are protected and must not be subjected to tensile stresses during operation. The flat connector must be covered by external insulation which is fully intact.

Remote power supply via the coaxial sockets

Remote power supply via coaxial inputs or outputs is only permitted with appropriate connectors permanently mounted on the coaxial cables. The cable cross-sections and operating conditions specified in EN60728-11 must be observed.

Precautionary measures during connection and use of fuses

The device chassis conducts GND and ground potential.

Devices with a flat connector socket:

The supply voltage is supplied using either the coaxial inputs or outputs or the device's flat connector socket.

If power is supplied via the flat connector socket, the fuse in the power supply unit must be inserted. The fuses in the HF section of the device can be inserted according to the application.

If power is supplied via the coaxial connectors, the corresponding remote supply fuse in the power supply unit must be removed, as the remote supply voltage would otherwise be exposed at the open flat connector socket.

Devices with strain relief:

Power is supplied using either the coaxial inputs or outputs or the PCB terminal block built into the power supply unit.

If power is supplied via the PCB terminal block, which is built into the power supply unit, the fuse in the power supply unit must be inserted. The fuses in the HF section of the device can be inserted according to the application.

When the device is delivered, the strain relief is sealed with a sealing washer, which can be removed after the screw cap has been removed, but only for the purpose of feeding a cable through.

If power is supplied via the coaxial connectors, the corresponding remote power supply fuse in the power supply unit can remain inserted.

Installation instructions for remotely powered equipment

According to DIN EN 50083-1, only remote supply voltages up to 65 V AC are permissible. Voltages above 50 V AC are regarded as dangerous to touch. Therefore, they must not be accessible to laypersons and only accessible to trained electricians using tools. If there is a rupture at any point in the shielding (outer conductor) of the coaxial cable which is conducting current, the remote supply voltage may be present on the metal housing of the device through contact with the inner conductor and the circuit (danger of electrocution!). Therefore, the outer conductor connection of the cable that is supplying power must never be disconnected before its inner conductor connection is disconnected. (As a precaution, always turn off the remote supply voltage.) A safe outer conductor contact should be made with great care (observe the manufacturer's instructions).

The following protective measures must be taken:

- Equipotential bonding via the local PE connection*
An additional connection with an earth potential must be made using a cable with at least 4 mm² of copper at the PE terminal of the device. This connection can be made to a PE rail supplied by the customer or a local earth.

If this is not possible, one of the following safety measures should be provided:

- Equipotential bonding via the minimum cross section of the coaxial cable*
It must be permanently ensured that the remotely powered coaxial cable has a continuous outer conductor cross section of at least 4 mm² (from the supply point onwards).
Note: Braided cables do not usually have this cross-section!
- Equipotential bonding via several connected cables*
It must be ensured that at least one other connected coaxial cable is permanently connected to an earth potential along the length of its shield.
- Equipotential bonding in the area within hand's reach*
Equipotential bonding in the area within hand's reach of the device (i.e. a radius of 2.5 m) must be ensured. In order to achieve this, all conducting parts must be connected with the device with a copper conductor of at least 4 mm².

- Protection against contact via insulation in enclosed operating areas*

Remotely powered devices must be operated in enclosed operating areas. A warning sign must be provided, stating that supply voltage potential may be present on the device chassis in the event of a failure (e.g. a lightning bolt + "High voltage! In case of failure, do not touch!"). Cables leading directly to subscribers must be fitted with a galvanic outer conductor disconnecter.

- Limit the maximum remote supply voltage to 50 V AC*
The remote supply voltage may not exceed 50 V AC.

***NOTE:** If several devices are supplied by separate cables, the polarity must not be reversed!*

Warranty conditions

The general terms and conditions of ASTRO Strobels GmbH apply. They can be found in the current catalogue or on the Internet under "www.astro-kom.de".

Performance description

The HVF V40 P is a remotely powered broadband amplifier for bidirectional building distribution and broadband communication systems. It is exclusively designed for signal amplification in unidirectional and bidirectional distribution systems as well as in single-family and multi-family dwellings.

In order to use the device properly, you must carefully read the following safety and operating instructions.

The HVF V40 P amplifier can be flexibly configured for future multi-media cable networks:

- Adjustment of local level conditions using plug-in attenuators and equalisers (pads)
- Pre-equalisation of the outgoing cable lines is possible using the interstage slope; activated with jumpers
- The return path can be activated with a switch
- Equaliser and attenuator in the return path (pads)
- Additional attenuator before the return path amplifier

The default configuration for the amplifier is as follows:

- 0 dB pads inserted into the slots in the forward path
- The return path is deactivated and the switch [16] in the return path is switched off; the associated LEDs [14] are not lit.
- The jumpers for activating the interstage attenuation and the interstage slope are set to 0 dB.
- The fuses between the input and the power supply unit [10] or the output and the power supply unit [9] as well as in the power supply unit [7] are not inserted and must be inserted according to the application.

NOTE: When connecting the mains voltage via the terminal [1] (see Fig. 1) or via the input or output, the mains voltage would be present on the feed-through capacitor [19] (Fig. 2). This would make it dangerous to touch!



Disposal



All of our packaging materials (cardboard boxes, inserts, plastic film and bags) are completely recyclable.

After use, this device must be disposed of in an orderly manner as electronic scrap, in accordance with the current disposal regulations of your district/country/state.

ASTRO Strobel is a member of the Elektro system solution for the disposal of packaging materials. Our contract number is 80395.

Installation

PREPARATION:

To install the amplifier, first drill two holes in a vertical installation surface and insert the supplied wall plugs into the holes. The required borehole distance is 196.5 mm horizontally and 69 mm vertically (see Fig. in the "Drilling distances" section, p. 21). The following describes how to install the device:

TASK

1. Place the back of the device against the installation surface so that its oblong holes are exactly above the two wall plugs. The connection sockets of the device must point downwards.
2. Screw the device into place using the supplied screws.

RESULT:

The module is now installed and can be connected. When using the variant with PG11 threaded connections (part number 217 412), the input and output sockets must be mounted before the device is connected:

NOTE: *ASTRO cannot guarantee safety if the customer/user installs the sockets himself!*

If you nevertheless wish to assemble the sockets yourself, please observe the following assembly instructions.

First, screw the desired adapters (see page 3) or the cable fitting with PG11 thread onto the input and output connections of the amplifier.

Proceed as follows (see Fig. 3 below):

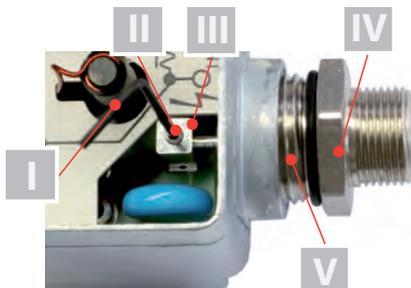


Fig. 3: Installing the input and output sockets

TASK

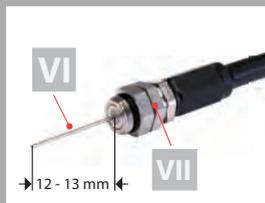
- Using the supplied Allen wrench [I], loosen the grub screws [II] of the inner conductor terminal blocks [III] until the borehole for receiving the inner conductor in the inner conductor terminal block [III] is free.

IMPORTANT: In order to prevent the screw from falling out, do not unscrew the grub screw too far. If the grub screw is lost, proper operation of the amplifier is no longer possible.

- Screw the previously selected connection adapter [IV] or the cable fitting [VII] (see left) to the housing connections [V] of the amplifier using a suitable wrench.

IMPORTANT: If you want to use a cable fitting with PG11 thread [VII] or a connection adapter from a third party, shorten the inner conductor [VI] to a length of 12 - 13 mm using pliers or another suitable tool.

A shorter contact pin cannot be used, as safe contact with the inner conductor terminal block [3] cannot be ensured. A contact pin that is too long would lead to safety problems and have a negative effect on the high-frequency characteristics of the amplifier.



3. Now use the Allen key [I] to tighten the grub screw [II] to ensure a safe contact between the inner conductor and the inner conductor connection block [III].

RESULT:

The device is now fitted with input and output sockets and can be connected.

Connection

PREPARATION:

To connect the amplifier to coaxial cables, you must first fit them with suitable connectors.

The following describes how to connect the amplifier and coaxial cables:

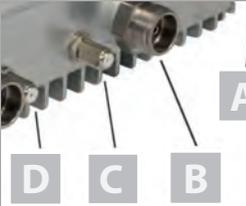
TASK

1. Attach the connectors to the corresponding connectors on the amplifier (input [E], output [B]).
2. Make sure the coaxial cables are laid with a sufficient bending radius.
3. Connect the device to the remote power supply and insert the appropriate fuse.

RESULT:

The device is now ready for operation. The operating status lamp is on and you can configure the device.

ATTENTION: *The maximum operating level must not be exceeded! (maximum input level = output level minus the set gain for 1006 MHz)*



Configuring the forward path

ATTENTION: The maximum operating level must not be exceeded! (maximum input level = output level minus the set gain for 1006 MHz)

TASK

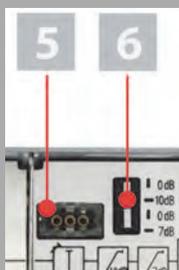
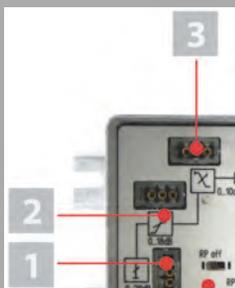
1. Remove the housing cover by loosening both cover screws.
2. The HVF V40 P amplifier has an attenuator and pad [1] in the forward path, as well as a tilt equaliser [2] and a cable attenuation simulator [3] and pad (see left). **Important: To achieve equalisation values between 14 and 18 dB with the tilt equaliser and 5 and 10 dB with the cable attenuation simulator, you may have to insert pads with values up to 2 dB higher.**

You can use them to set the required attenuation and equalisation by inserting the corresponding pads. This allows you to compensate for the residual pre-equalisation of incoming signals.

3. Select the gain (40 or 32 dB) in the forward path by moving the switch [4] to the corresponding position. Observe the label next to the switch. In the 32 dB position, the upper yellow diode lights up; in the 40 dB position, the lower red diode to the left of the switch lights up.
4. You can also set a pre-equalisation (0.7, 10 or 17 dB slope) for the outgoing cable length between the amplifier stages (inter-stage) by inserting the jumpers [6] (see picture left) accordingly. Observe the label next to the slot.
5. In addition, you can set an interstage attenuation between 0 and 7 dB by inserting the corresponding pad into the slot [5] (see left). When doing so, note the output level curve as a function of the interstage attenuation (see the “Technical data” section).

The device is now configured for the transmission of forward signals. If you want to put the return path into operation, read the notes in the section “Configuring the return path” below.

ATTENTION: In cable networks that do not use a return path, the return path must remain deactivated and the attenuation pads must be pulled out. This is the only way to terminate return path filters with 75 Ω!



Configuring the return path

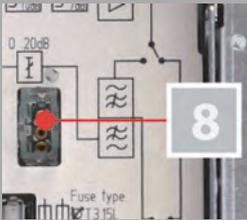
PREPARATION:

To transmit return signals, the amplifier must first be configured accordingly.

The following describes how to configure the amplifier for the transmission of return signals:

TASK

1. To activate the return path, you must first set the return path activation switch [16] (cf. Fig. 2) to the "On" position (note the label next to the switch when doing this).
2. Select the gain (32 or 22 dB) in the return path by moving the switch [13] (cf. Fig. 2) to the corresponding position. Observe the label next to the switch.
3. To reduce excessively high input levels, there is an attenuator [8] before the return path amplifier, which you can adjust as needed by inserting the pad (0...15 dB).
4. Set the tilt equaliser in the return path [11] (see picture left) according to the required cable pre-equalisation.
5. Adjust the attenuator [12] after the return path amplifier by inserting the appropriate pad to match the attenuation in the downstream network (see left).



RESULT:

The device is now configured for the transmission of return signals.

Measurements



At the input, there is a bidirectional test socket [15] with 20 dB decoupling attenuation. You can use it to:

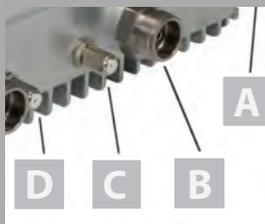
- Estimate the input level for the forward range
- Determine the output level and its course for the return range after the setting elements
- Feed in return signals behind the return path amplifier in the upstream direction
- Feed in downstream signals in the forward direction

At the output, there is a directionally coupled test socket [C] (cf. Fig. 1, page 2) with 20 dB decoupling attenuation. You can use it to:

- Feed in the return signal to set the return path level
- Determine the output level for the forward range

There is another directionally coupled test socket [D] in the return path. You can use it to measure the level of the return signal before the setting elements.

NOTE: After configuring the amplifier and completing the measurements, it is strongly recommended to terminate both test sockets with FUR 75 terminating resistors to ensure operation in compliance with the standards.



Troubleshooting

If the device is not functioning correctly, perform the following checks:

- Check whether the device is connected to the required remote supply voltage (24 - 65 V~).
- Check whether the fuses are working.
- Check whether the coaxial cables are connected correctly and make sure there are no breaks or short circuits in the connectors.
- Check whether the output level on the device is within the permissible limits for the operating level.

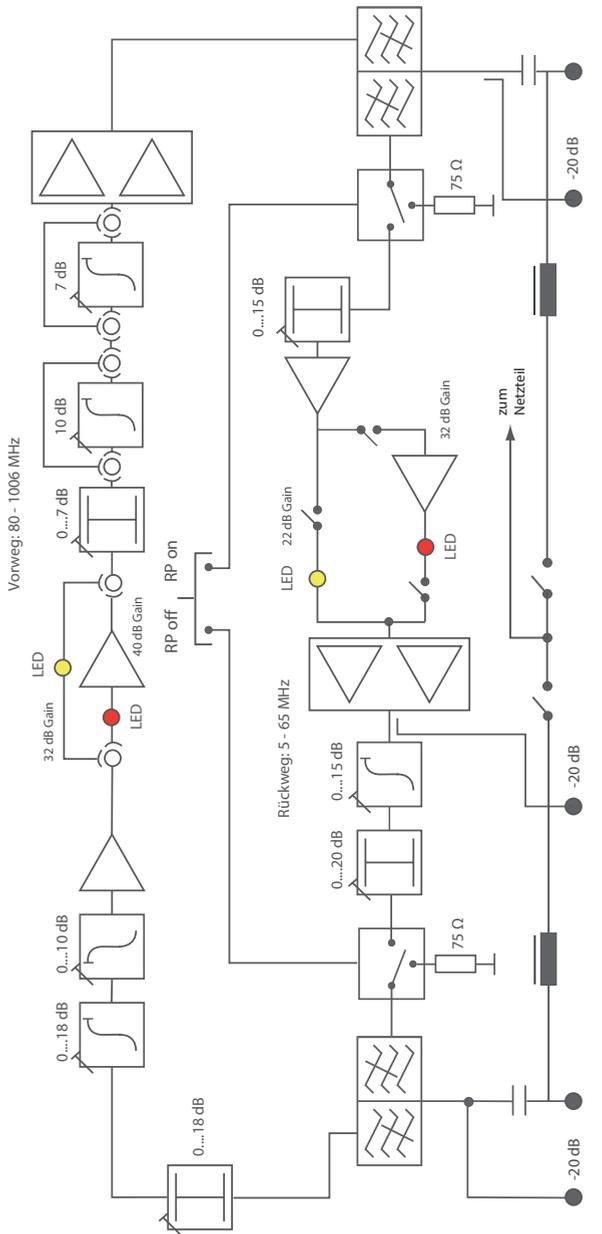
If the problem cannot be resolved, please contact ASTRO customer service.

Maintenance and repair

ATTENTION: *It is essential that the following safety information be observed when performing maintenance and repair work. Failure to observe this safety information may result in physical injury due to electrical and thermal dangers!*

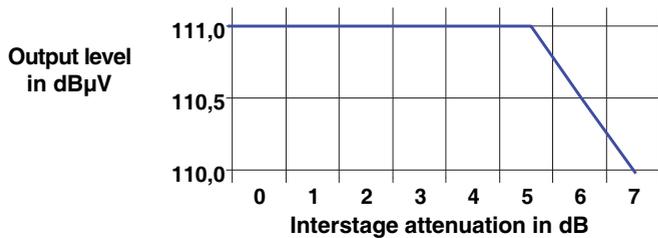


- The power indicator only shows whether the DC current, which supplies the device components, has been disconnected from the mains voltage. If the power indicator (for the power supply unit or the device) does not light up, it does not mean that the device has been fully disconnected from the mains voltage. There may still be voltage in the device that is dangerous to touch. Therefore, do not open the device.
- Read carefully: EN 60728-11 Safety requirements: No service work during thunderstorms.
- Disconnect the mains plug before cleaning the device!
- A defective device may only be repaired by the manufacturer to ensure that components with the original specification are used (e.g. power cable, fuse). Improperly performed repairs may result in considerable dangers for the user or installer. If malfunctions occur, the device must therefore be disconnected from the mains and authorised experts must be consulted. The device may need to be sent to the manufacturer.



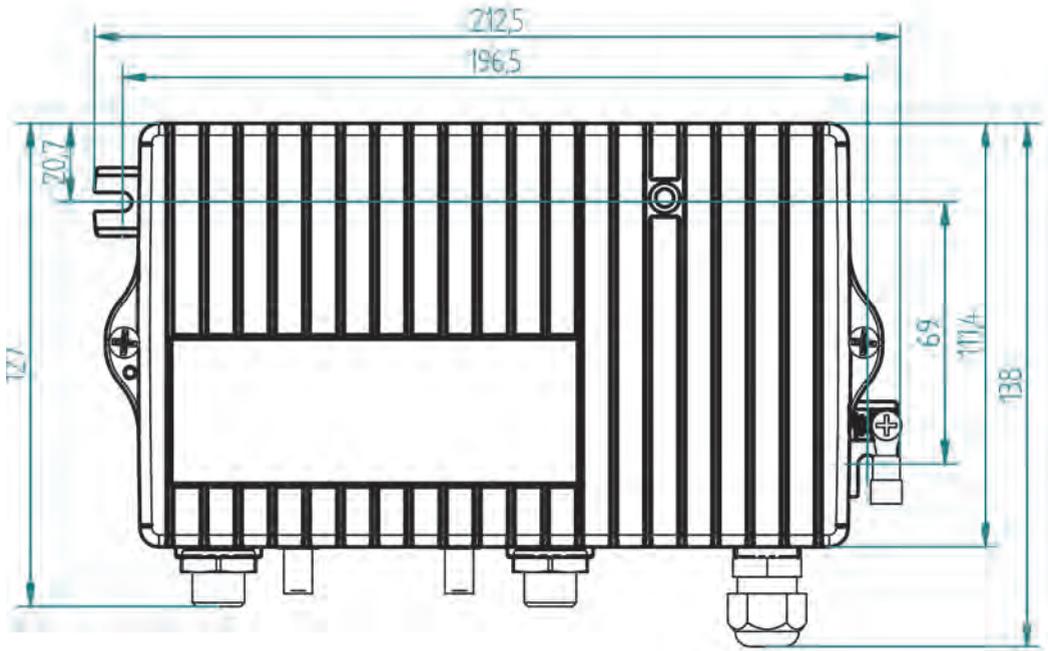
Technical data

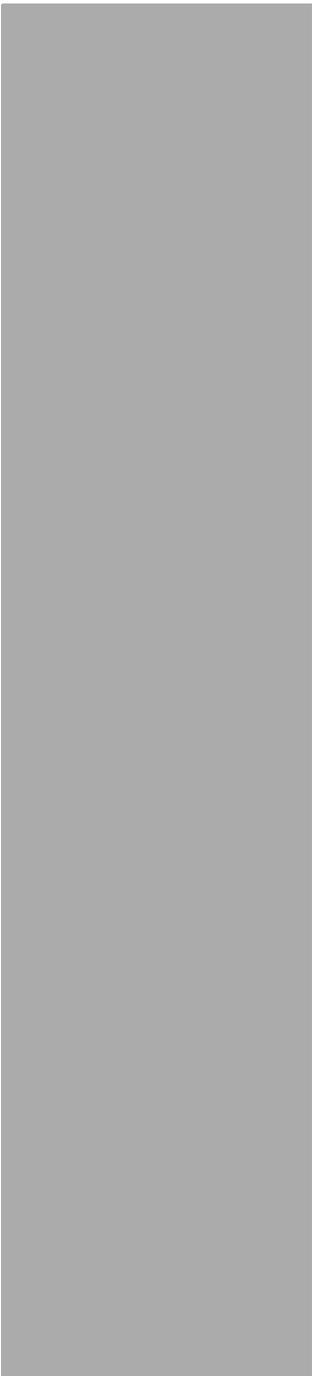
Type	HVF V40 P-IEC-F	HVF V40 P-FF	HVF V40 P-3,5/12"	HVF V40 P-PG11
Order number	217 414	217 413	217 411	217 412
EAN-Code 4026187....	192006	191993	191962	191986
Connectors (75 Ω) at in - and output	1 x IEC, 1 x F	2 x F	1 x 3,5/12", 1 x F	2 x PG-11-thread
Connectors at testpoints	2 x F	2 x F	2 x F	2 x F
Cable connection	latch	screwed cable PE		
Forward path		85 - 1006 MHz		
Gain	[dB]	40 / 32 ± 1 (switchable)		
Flatness	[dB]	± 1		
Noise figure	[dB]	≤ 6		
Inverse equalizer at input	[dB]	0 - 10, Pad		
Attenuator at input / interstage	[dB]	0 - 18 / 0 - 7*, Pad		
Equalizer at input	[dB]	0 - 18, Pad		
Interstage Slope	[dB]	0, 7 or 10, pluggable		
Testpoint input / output	[dB]	Bi, 20 ± 2 / RK, 20 ± 1		
Maximum output level				
60 dB CSO/CTB (EN 80083-3)	[dBμV]	111*		
Return path		5 - 65 MHz, activation via switch		
Gain	[dB]	32 / 22 ± 1 (pluggable via jumper)		
Noise figure	[dB]	≤ 5 dB**		
Attenuator: input / output	[dB]	0 - 15, Pad / 0 - 20, Pad		
Output equalizer	[dB]	0 - 15, Pad; Preemphasis		
Testpoints	[dB]	RK, 20 ± 1 (before setting elements) Bi, 20 ± 1 (behind setting elements)		
Maximum output level				
IMA 2 (EN 50083-3)	[dBμV]	114		
KMA3 (EN 50083-5)		120		
accord. KDG 1 TS 140		full load		
accord. UM TS 401		medium load		
Common data				
Return loss	[dB]	≥ 18 & from 40 MHz -1,5 dB/Octave		
Maximum remote current	[A]	5 via input and/or output; 6 via mains adapter jack plus internal current consumption		
Max. internal current consumption	[A]	0,9 / 24 V~; 0,5 / 65 V~		
Remote powering voltage	[V~]	24 to 65 (50 Hz)		
Maximum power consumption	[W]	13 including upstream; 11 without upstream		

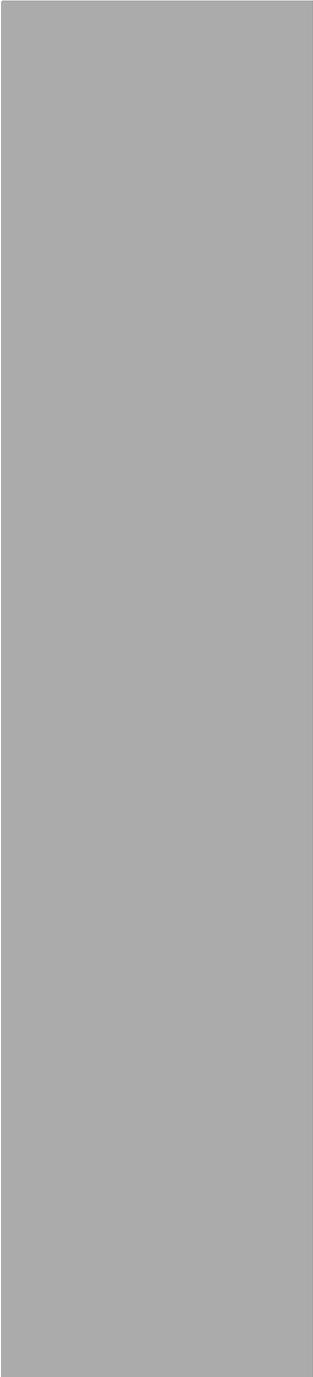


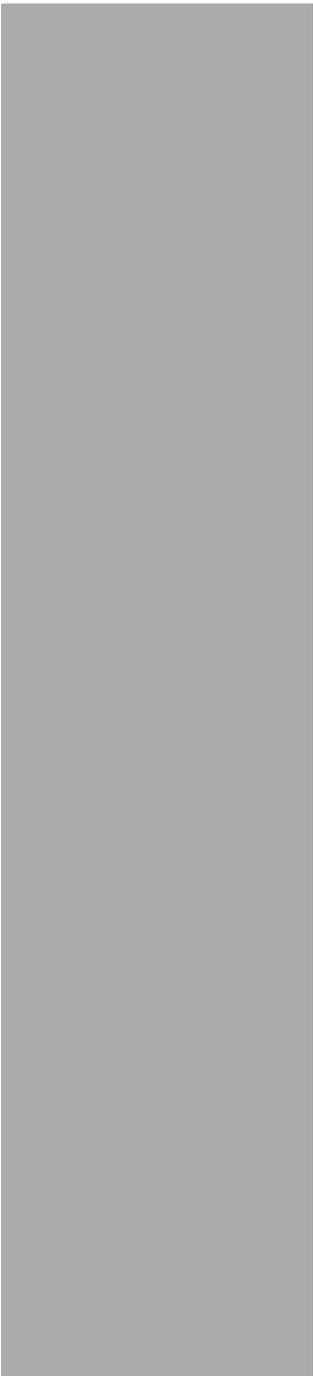
The output voltage as a function of the interstage attenuation value

Drilling distances











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