

Compact Amplifiers for modern trunk and distribution networks



Connecting of present and future

HUBER+SUHNER BKtel develops and produces active and passive components for modern FTTH and HFC broadband networks. A key focus lies on technological and high-performance solutions for the transition from modern fiber-optic access networks to existing HFC structures. With our products, the capacities of coax networks can be increased many times over and equipped for future data, telephony and TV services.

With more than 20 years of experience in research, development and production of communication technology, HUBER+SUHNER BKtel is the best partner to create flexible solutions to connect existing and new network structures.

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Compact amplifiers Best performance

HUBER+SUHNER BKtel offers a wide range of compact amplifiers for modern interactive HFC networks who are upgrading network capabilities for DOCSIS 3.1 transmission. They inherit an innovative commissioning and maintenance concept, high intermodulation free output levels and fast remote monitoring and control functions.

The compact amplifiers with electronic set-up

BKTEL® is delivering a compact amplifier class of the very latest generation with its amplifier product range, combining comprehensive setting options, electronic operation and outstanding technical data with an unrivalled price-performance ratio.

“Plug-and-Play” redefined

Electronic set-up of all significant parameters, automatic levelling and option of remote configuration via HMS or DOCSIS monitoring minimise commissioning and maintenance times. Thanks to the copy function supported by the HTE 20, all settings can be saved and transferred to other devices. As well as speeding up commissioning on site, not having to use plug-in cards for attenuation and slope simplifies logistics and reduces storage costs.



Compact amplifiers

General properties

Modern compact amplifiers upgrade existing HFC networks. The remote monitoring function makes it possible to configure all tuning parameters by means of a monitoring system. Alternatively, settings can be made by means of an innovative operating concept using a handheld device that can operate and store the electronic actuators.

Thanks to the built-in frequency-agile 2-pilot ALSC (Automatic Level and Slope Control), commissioning is accelerated. Automatic leveling on the forward path eliminates the need for time-consuming manual calibration. Furthermore, the return path can be pre-adjusted automatically.

The amplifier gain reaches up to 46 dB (uncontrolled), and adjustments can be made in steps. Despite the high reachable output level the intermodulation performace is best in class even if interstage attenuation is used.



Technical featurers

- Remote feed capability at each input/output, local feed: 10 A
- Insert position for monitoring transponder
- Test sockets at input/output and in the return path amplifier
- Plug-in diplexers
- Built-in return path amplifier, adjustable gain
- Ingress control switch
- Die cast aluminum housing

The compact amplifiers with electronic set-up

HUBER+SUHNER BKTel is delivering a compact amplifier class of the very latest generation with its VGx product range, combining comprehensive setting options, electronic operation and outstanding technical data with an unrivalled price-performance ratio.

"Plug-and-Play" redefined

Electronic set-up of all significant parameters, automatic levelling and option of remote configuration via HMS or DOCSIS monitoring minimise commissioning and maintenance times. Thanks to the copy function supported by the HTE 20, all settings can be saved and transferred to other devices. As well as speeding up commissioning on site, not having to use plug-in cards for attenuation and slope simplifies logistics and reduces storage costs.

Easy Commissioning of amplifiers

The setting is made with the HTE20 handheld unit. Thanks to automatic levelling, it takes only a few steps to put the compact amplifiers into operation:

- Simply enter the required output level for the upper and lower pilot frequency and start the levelling process.
- The device automatically sets itself to the required values in just a few seconds. The technical data is adjusted to the optimum settings. After this, manual fine adjustment is possible at any time.
- Next, automatic pre-adjustment can be started on the return path too.
- Levelling takes even less time to complete on subsequent devices. The copy function transfers the desired settings directly.

Characteristics of individual amplifier devices

VGX2143D-1G2

- Frequency range 1006/1218 MHz switchable
- Plug-in diplexers
- Latest GaN technology (Second Generation)
- Power supply unit with power factor correction
- Loop-through output (VGX2143-1G2 only)

VGP2143D-1G2

- Frequency range 1006/1218 MHz switchable
- Latest GaN technology (Second Generation)
- Power supply unit with power factor correction
- High gain (up to 44 dB uncontrolled)

VGP3243D-1G2

- Two active outputs with configuration of up to 3 high levels distribution outputs or one trunk output and up to two distribution outputs (via internal output splitter field)
- Gain and slope of the distribution network output can be set separately

VEG 12xxx-1G2 (Equalizer amplifier)

- Fixed gain and slope
- Passive or active return path up to 204 MHz
- Compact housing for easy retrofitting on the network

VGX2143D-1G2

Distribution network amplifier

The VGX2143D-1G2 is a distribution network amplifier designed for current and future DOCSIS 3.1 HFC networks. The amplifier features up to two outputs and an additional loop-through output. All electronic settings of the amplifier can be configured using the HTE20 handheld module. The return path bandwidth is determined by the plug-in diplex filter sets.



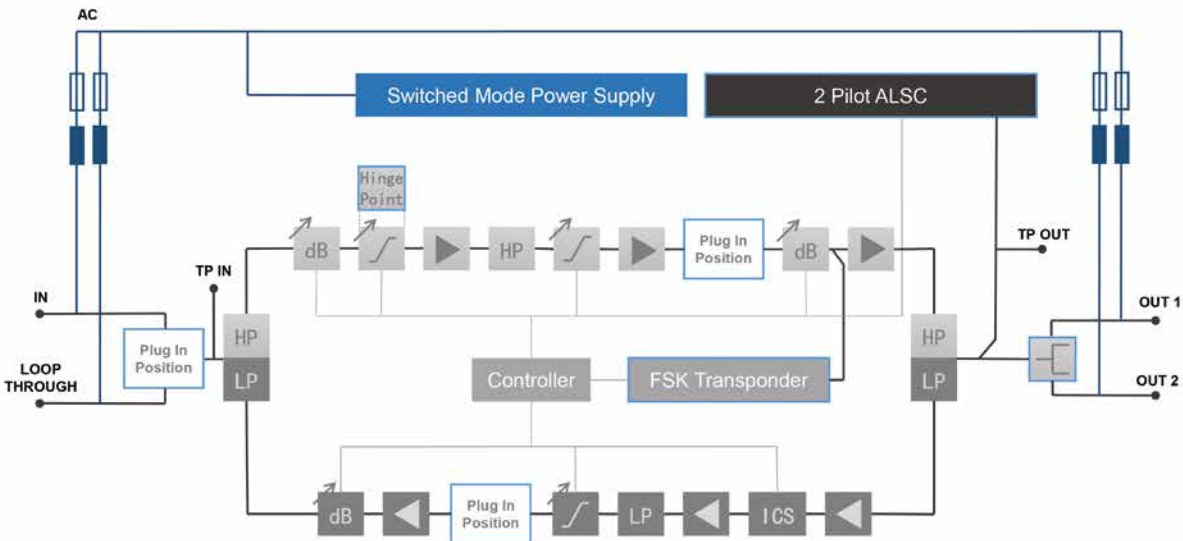
Standard version:

- 1 Connection socket for the hand held module
- 2 "Forward 1" insert position
- 3 "Forward 2" insert position
- 4 "Return" insert position
- 5 F test socket internal (-20 dB) output
- 6 F test socket internal (-20 dB) input
- 7 "Hingepoint" insert position

Modules for the following insert positions are not included in the product package:

- 8 Insert position for FSK multi-band transponder module
- 9 Insert position for 2-pilot control module
- 10 Plug-in input diplex filter
- 11 Plug-in output diplex filter
- 12 Plug-in low-pass filter
- 13 Plug-in high-pass filter
- 14 Splitter field output
- 15 Splitter field input "Loop-Through"

Block diagram



Features

- Modern compact amplifier for DOCSIS 3.1 HFC networks
- Frequency range: up to 1218 MHz
- High gain (up to 46 dB)
- Loop-through output, configurable via the input splitter field "Loop-Through"
- Two distribution outputs, configurable via the output splitter field
- End stage in the latest GaN technology
- Innovative operating concept: Electronic actuators, setting via a HTE 20 module
- Optional ALSC module with frequency-agile 2-pilot control speeds up commissioning
 - Automatic levelling on the forward path saves time-consuming manual calibration
- Return path can be pre-adjusted automatically
- Very high output level with lowest inter-modulation products even with interstage attenuation
- Insert positions in the forward and return path
- Remote feed capability: 7 A at each input/output
- Insert position for TVM 500S FSK transponder
- Test sockets at the input/output and in the return path amplifier
- Built-in return path amplifier, adjustable electronically
- Ingress control switch (ICS)
- Die-cast aluminium housing with 5/8" connections

Notice

During operation, an EBC/EAC xx must be plugged into the insert position at the output. Zero cards are already plugged into the insert positions No. 3, 4.

VGX2143D-1G2

Additional properties in detail

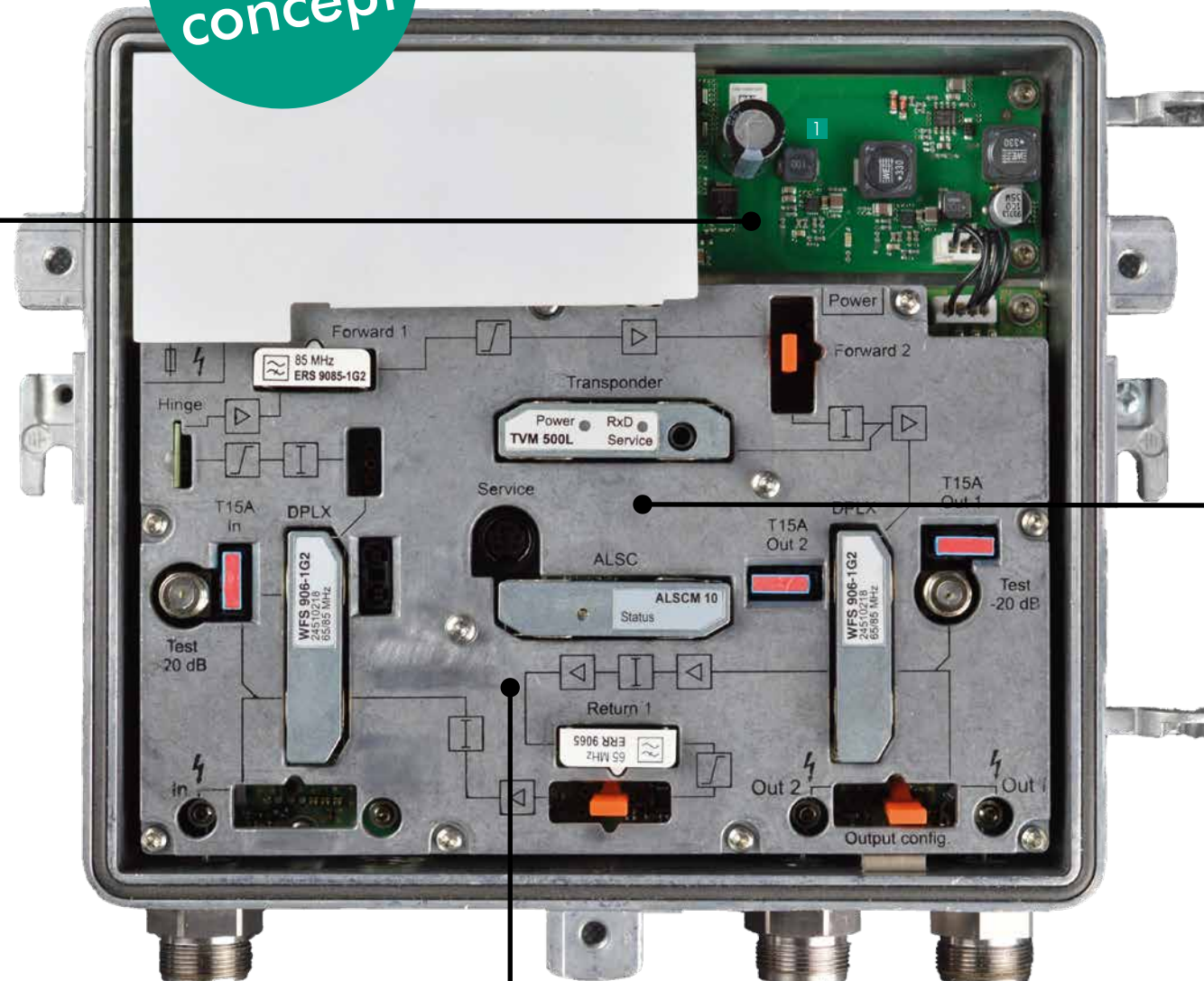
Power supply unit

- State-of-the-art switched-mode power supply unit technology with very long service life
- Active power factor correction with a factor of almost 1
- Improved dissipation of waste heat from the entire power supply unit thanks to the heatsink coating. This results in a lower heat load in the device itself and also helps to increase the maximum operating temperature range
- The power supply unit is easy to replace in the event of maintenance:
 - Easily accessible plug-in contacts and screw connections
 - No thermal pad required. This removes the need for positioning the pad and eliminates the risk of losing it

Single-chamber shielding system

- High mutual shielding between forward path, return path and other functional areas in the device. This prevents cross modulation and other unwanted coupling effects
- Improved temperature discharge thanks to the built-in thermal dissipation domes on the bottom and top of the components. This results in a lower heat load in the surrounding components and also helps to increase the maximum operating temperature range

Revolutionary concept



New modularity

- Insert position for 2-pilot control module. This enables cost-effective use of the device for controlled and uncontrolled operation
- FSK transponder insert position for TVM 500S for controlling the ICS switch and for carrying out base unit updates remotely
- Customer-specific insert positions in the forward and return path enable additional manual signal adjustment for built-in electronic set-up
- Insert position for operation in different frequency ranges (1.2 GHz/1 GHz) (Hingepoint for 1.2 GHz pre-mounted)

Familiar modularity

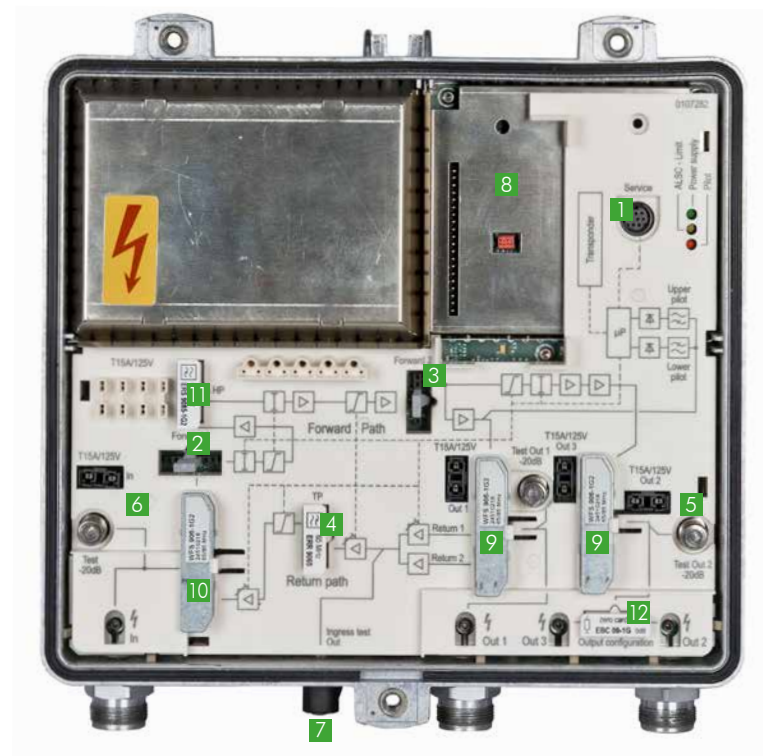
- Customer-specific interstage forward insert position for plug-in cards such as system equalizers
- Plug-in diplexers for adjusting the frequency split of forward and return path
- Output insert field, individually configurable for one to two outputs with EBC/EACxx-1G2 splitter or tap plug-in cards
- Splitter field input for individual loop-through output configuration using EBC/EACxx-1G2 splitter and respectively tap plug-in cards

VGP3243D-1G2

Trunk / distribution amplifier

The VGP3243D-1G2 is a dual mode trunk / distribution network amplifier designed for current and future DOCSIS 3.1 HFC networks. Two active output stages can be configured for up to 3 high level distribution network, or 1 trunk level

and up to 2 distribution network outputs. The output level of the amplifier are 2 pilot controlled. All amplifier settings are made electronically using the HTE20 handheld module or the WTE 10 Wi-Fi module with a Web browser.



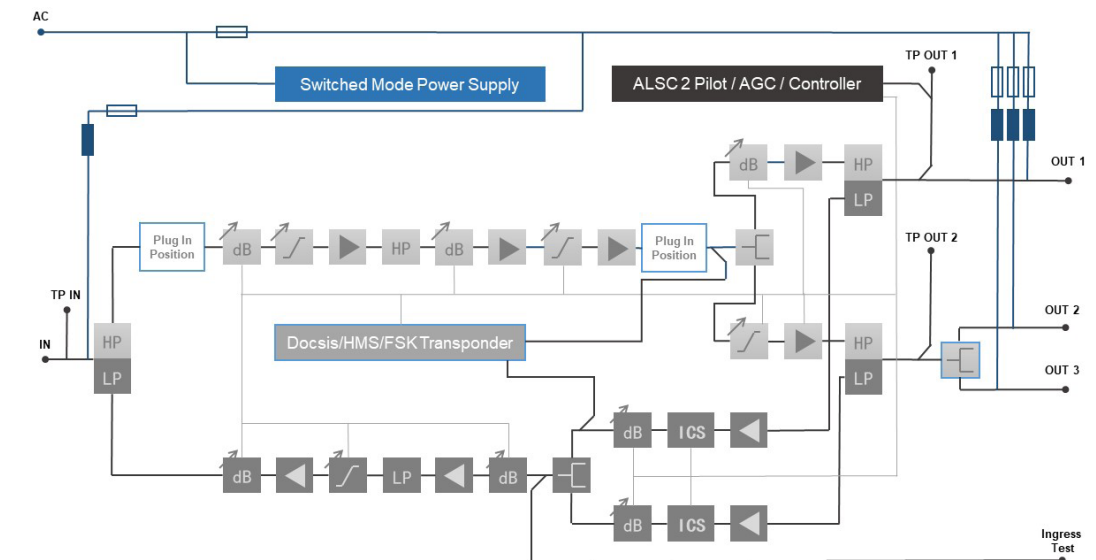
Standard version:

- 1 Connection socket for handheld module
- 2 "Forward 1" insert position
- 3 "Forward 2" insert position
- 4 Plug in low pass filter "Return Path"
- 5 F test socket internal (-20 dB) output
- 6 F test socket internal (-20 dB) input
- 7 Ingress test point external

Modules for the following insert positions are not included in the product package:

- 8 Insert position for monitoring transponder module
- 9 Plug-in output diplex filter
- 10 Plug-in input diplex filter
- 11 Plug-in high pass filter "HP Forward Path"
- 12 Splitter field output (splitters, taps)

Block diagram



Features

- Modern controlled amplifier with remote monitoring for DOCSIS 3.1 HFC networks
- Frequency range: up to 1218 MHz (selectable between 1006 MHz and 1218 MHz)
- Configuration of up to 3 high level distribution or 1 trunk level and up to 2 distribution network outputs
- GaN second generation 2 active outputs amplifier
- Innovative operating concept: Electronic actuators setting by handheld module (minimizing plug in cards and attenuation pads. Exactly readable and reproducible settings)
- Built-in frequency agile 2-pilot control speeds up commissioning:
 - Automatic levelling on the forward path saves time consuming manual setting
 - Return path can be adjusted automatically
- Remote configuration of all tuning parameters supported by monitoring system (can be deactivated)
- Very high output level (115 dBμV) with very low intermodulation products even with interstage attenuation
- Remote feed capability: Up to 10 A at each input/output, local feed: 10 A
- Insert position for monitoring transponder (FSK/HMS/DOCSIS)
- Test sockets at the input/output and in the return path amplifier
- Built-in return path amplifier, adjustable electronically
- Ingress control switches (ICS)
- Die-cast aluminum housing with PG 11 connections

Notice

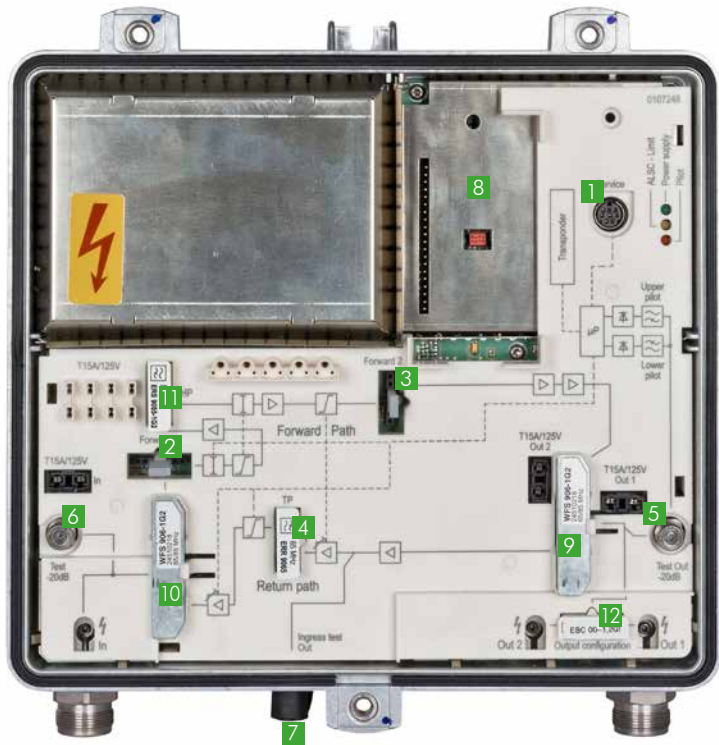
During operation, an EBC/EAC xx must be plugged into the output splitter field. Pass-through cards are already plugged into the insert positions no. 2 and 3. The optional HMS monitoring transponder TVM 850 can only be used up to a maximum return path frequency of 65 MHz.

VGP2143D-1G2

Distribution amplifier

The VGP 2143D-1G2 is a distribution network amplifier designed for current and future DOCSIS 3.1 HFC networks. One active output stage can be configured for up to 2 high level distribution network outputs.

All amplifier settings are made electronically using the the HTE20 handheld module or the WTE 10 Wi-Fi module. The return path bandwidth is determined by various plug in diplex filter sets.



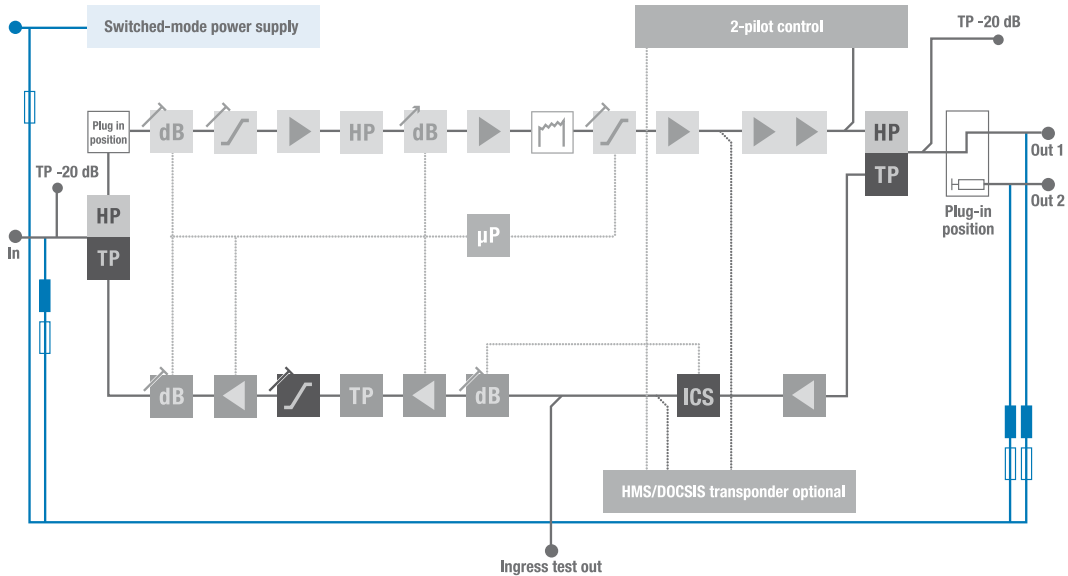
Standard version:

- 1 Connection socket for the HTE 20 module
- 2 "Forward 1" insert position
- 3 "Forward 2" insert position
- 4 Plug in low pass filter "Return Path"
- 5 F test socket internal (-20 dB) output
- 6 F test socket internal (-20 dB) input
- 7 Ingress test point external

Modules for the following insert positions are not included in the product package:

- 8 Insert position for monitoring transponder module
- 9 Plug-in output diplex filter
- 10 Plug-in input diplex filter
- 11 Plug-in high pass filter "HP Forward Path"
- 12 Splitter field output (splitters, taps)

Block diagram



Features

- Modern controlled amplifier with remote monitoring for DOCSIS 3.1 HFC networks
- Frequency range: up to 1218 MHz (selectable between 1006 MHz and 1218 MHz)
- Configuration of up to 2 distribution network outputs
- High gain: up to 43 dB controlled
- GaN second generation 1 active output amplifier
- Innovative operating concept: Electronic actuators setting by handheld module (minimizing plug in cards and attenuation pads. Exactly readable and reproducible settings)
- Built in frequency agile 2 pilot control speeds up commissioning:
 - Automatic levelling on the forward path saves time consuming manual setting
 - Return path can be adjusted automatically
- Remote configuration of all tuning parameters supported by monitoring system (can be deactivated)
- Very high output level (115 dBμV) with very low intermodulation products even with interstage attenuation
- Remote feed capability: Up to 10A at each input/output, local feed: 10 A
- Insert position for monitoring transponder (FSK/HMS/DOCSIS)
- Test sockets at the input/output and in the return path amplifier
- Built in return path amplifier, adjustable electronically
- Ingress control switches (ICS)
- Die cast aluminum housing with PG 11 connections

Notice

During operation, an EBC/EAC xx must be plugged into the output splitter field. Pass-through cards are already plugged into the insert positions no. 2 and 3. The optional HMS monitoring transponder TVM 850 can only be used up to a maximum return path frequency of 65 MHz.

For an overview of accessories, see page 21.

VGE 12105-1G2 / VGE 12258-1G2

Uncontrolled equalizer amplifiers

The VGE equalizer amplifier is ideal for supplementary compensation of cable attenuation in the case of a network upgrade.

The forward range starts at 105 MHz or 258 MHz respectively and goes up to 1218 MHz. A slope of 10 dB or 11 dB respectively on the upstream cable network resulting from long cable lengths is compensated. As the amplifier requires no manual set-up, it offers an plug-and-play solution that is easy to install. The return path, which goes from 5 to 85 MHz or 5 to 204 MHz respectively, is passive with a low attenuation of max. 2.5 dB. Power can be supplied to the amplifier by connecting a remote feed to the input or output. The input or output can also be used to supply looped-through remote feed currents up to 7 A to the upstream or downstream amplifiers.

VGE 1285-1G2

- Forward path gain of 12 dB/10 dB pre-emphasis
- Return path frequency range: 5-65 MHz

VGE 12105-1G2

- Forward path frequency range: 105-1218 MHz
- Forward path gain of 12 dB/10 dB pre-emphasis
- Return path frequency range: 5-85 MHz

VGE 12258-1G2

- Forward path frequency range: 258-1218 MHz
- Forward path gain of 12,5 dB/ 11 dB pre-emphasis
- Return path frequency range: 5-204 MHz

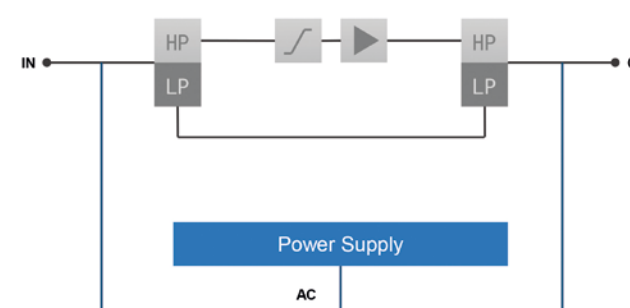
Common features

- Low return loss of 2.5 dB
- Input and output can be fed remotely
- High screening factor - class A
- High corrosion resistance
- Protection class: IP 65 ¹⁾
- Simple installation
- Connections: 5/8"-24 (socket)
- Optional mounting plate ZMP 200



Actual product not shown

Block diagram (VGE 12105-1G2 / VGE 12258-1G2)



VGE 12258-1G2-RA

Uncontrolled equalizer amplifier

The VGE equalizer amplifier is ideal for the supplementary compensation of cable attenuation in the case of a network upgrade.

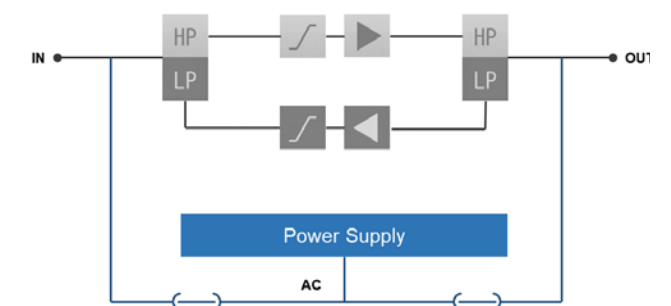
The forward range starts at 258 MHz and is used up to 1218 MHz. A slope of 7 dB on the forward path cable network resulting from long cable lengths is compensated. As the amplifier requires no manual set-up, it offers an easy to install plug-and-play solution. The return path, available with a bandwidth of 5 to 204 MHz, is active with a gain of 4.5 dB. A slope of 3.7 dB on the return path of the cable network resulting from long cable lengths is compensated.

The amplifier is powered by remote feed over the coaxial cable at the input or output. The input or output can also be used to supply looped-through remote feed currents up to 7 A to the upstream or downstream amplifiers.

- Forward path frequency range: 258 to 1218 MHz
- Forward path gain: 12 dB / 7 dB pre-emphasis
- Return path frequency range: 5 to 204 MHz
- Return path gain: 4.5 dB / 3.7 dB pre-emphasis
- Input and output can be feed remotely
- High screening factor - class A
- High corrosion resistance
- Protection class: IP 65 ¹⁾
- Simple installation
- Connections: 5/8"-24 (socket)



Block diagram (VGE12258-1G2-RA)



¹⁾ Providing a suitable plug is used

Components

Handheld module: HTE 20

The handheld module HTE 20 permits direct access to fibre nodes and amplifiers in order to configure them. The handheld module HTE 20 is attached to the device to be controlled; it is started by Plug & Play and is supplied with power by the device.

- Controlling all device settings with a few button presses
- Display of all device settings
- Ambient conditions:
 - Operating temperature: -10°C to +40°C
 - Suitable for outdoor use
 - Housing protection class: IP 54
- Language: English
- Extensive copy function with 20 memory positions for comfortable setting procedure
- No additional power supply necessary
- Can be updated in order to support new devices and functions



WiFi module: WTE 10

The WTE 10 WiFi module allows connected amplifiers and fibre nodes to be accessed conveniently from a PC, tablet or smartphone for configuration purposes. To view the configuration, only a Web browser supporting JavaScript is required. The WTE 10 Wi-Fi module simply has to be connected to the controlling device (plug-and-play connection); it draws its power supply from the controlling device.

- WiFi standard to IEEE 802.11 b/g/n
- Display of all device settings via a Web interface
- Ambient conditions:
 - Operating temperature: -20 to +50°C
 - Suitable for outdoor use
 - Housing protection class: IP 54
- Language: English
- Copy function for saving the device settings
- No additional power supply necessary
- Can be updated in order to support new devices and functions



FSK multi-band transponder module: TVM 500/TVM 500S

- FSK transponder for compact and house connection amplifiers and also optical compact receivers
- Control of the ingress control switch in devices that are equipped with this facility
- Interference-free FSK subrack
- Frequency-agile in selected frequency ranges

DOCSIS/Euro-DOCSIS 2.0 monitoring transponder, frequency-agile: TVM 1000

- Monitoring transponder for amplifiers and optical compact receivers
- Monitoring of various parameters such as voltage, current consumption, internal temperature, etc.
- Transmission in DOCSIS or EuroDOCSIS protocol
- 10/100 BaseT service interface
- Frequency-agile in the range 5-65/90-862 MHz
- Additional monitoring functions



Tap/splitter plug-in cards: EAC 90-1G2, EAC 93-1G2, EAC 94-1G2, EAC 95-1G2, EBC 90-1G2

- Plug-in modules to expand the corresponding device to two outputs
- Can be used in the splitter field loop-through input
- Suitable for amplifiers and fibre nodes



Actual product not shown

Zero cards: EBC 01E-1G, EBC 00-1G2

EBC 01E-1G2: for use at the input splitter field "Loop-Through" of VGX2143D-1G2 amplifier

EBC 00-1G2: for use at the output splitter field of all VGP and VGX amplifiers

- Plug-in modules for trough connection e.g. for operation with one output



Actual product not shown

Components

De-emphasis equalizer: ERZ 940

- Cable simulation, 7 dB
- 7 dB de-emphasis equalizer for VOS 95x and VGP 95x



Equalizer, 630 MHz: ERZ 630

- Equalizer, 47-630 MHz
- Adjustable from 2-18 dB in 2 dB steps (cable equivalent)
- For use in the input insert position of the VOS 95x and other amplifiers



De-emphasis equalizer/attenuation attachment: ERD 813-1G, ERD 814-1G, ERD 815-1G, ERP 101

Equalizers and attenuation pads

- Available types:
 - ERD 813-1G: Cable-equivalent de-emphasis 7 dB ¹⁾
 - ERD 814-1G: 6 dB attenuation ¹⁾
 - ERD 815-1G: 10 dB attenuation ¹⁾
- ERP 101: Tap 2/6 dB, de-emphasis 3 dB ¹⁾
- Suitable for amplifiers and fiber nodes



¹⁾ Based on 862 MHz

Accessories

Connectors as options for die cast housings EMP 34, EMP 35

Transitions:

- EMP 34 (BN 275289): PG 11 to IEC connector (female)
- EMP 35 (BN 275300): PG 11 to F connector (female)
- EMP 53 (BN 25010011): PG 11 to 3.5 / 12 connector (female)



Plug-in diplex filters

WFS 906-1G2, ERS 9085-1G2, ERR 9065
WFS 908-1G2, ERS 9105-1G2, ERR 9085
WFS 920-1G2, ERS 9258-1G2, ERR 9204

Diplex filters and return path system equalizers for bandwidth selection.

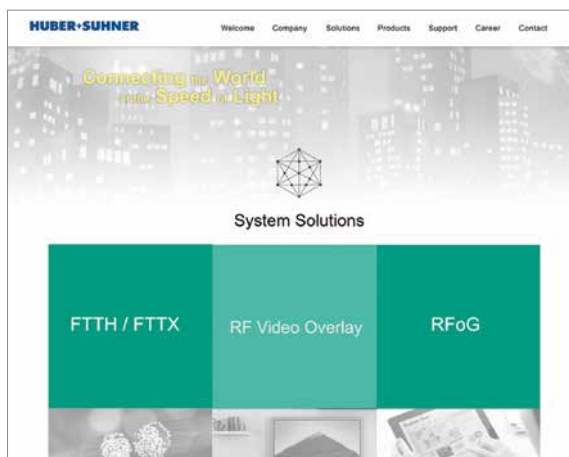
- Components for frequency split 65/85 MHz:
 - WFS 906-1G2: Input and output diplexer 65/85 MHz
 - ERS 9085-1G2: Interstage downstream equalizer (downstream from 85 MHz)
 - ERR 9065 return path system equalizer (upstream up to 65 MHz)
- Components for frequency split 85/105 MHz:
 - WFS 908-1G2: Input and output diplexer 85/105 MHz
 - ERS 9105-1G2: Interstage downstream equalizer (downstream from 105 MHz)
 - ERR 9085: Return path system equalizer (upstream up to 85 MHz)
- Components for frequency split 204/258 MHz:
 - WFS 920-1G2: Input and output diplexer 204/258 MHz
 - ERS 9258-1G2: Interstage downstream equalizer (downstream from 258 MHz)
 - ERR 9204: Return path system equalizer (upstream up to 204 MHz)



You have questions?

Visit our website. You will find a lot of information about FTTH, Video Overlay and other network solutions as well as an overview of our product range:

Network solution:



Futureproof with Fiber-to-the-home:

<https://www.bktel.com/systems-solutions.htm>



Our product range:

<https://www.bktel.com/products.htm>

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