Compact Amplifiers

Controlled and uncontrolled amplifiers
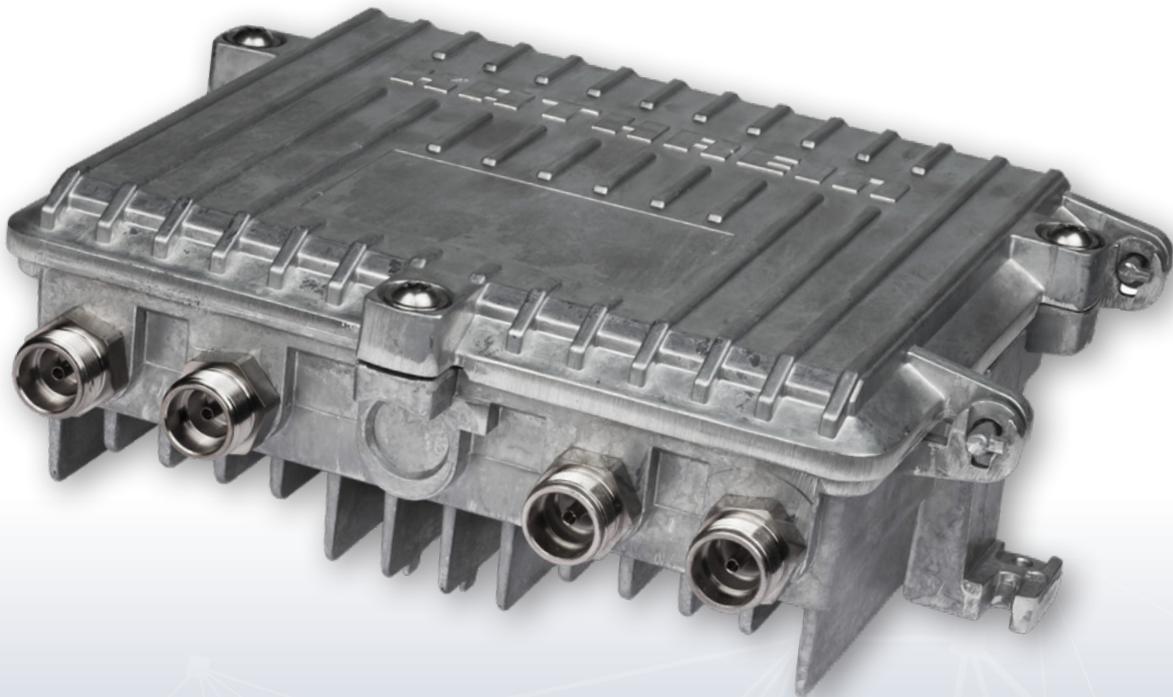
KATHREIN | Digital Systems GmbH

Who we are
and **what** we stand for

We ensure the best possible radio and TV reception

With decades of experience, Kathrein Digital Systems is an innovation and technology driver in the field of satellite reception. Our comprehensive portfolio ranges from antennas and components for signal processing to extensive installation accessories and high quality measuring instruments.

Thanks to extensive know-how in development and unsurpassed quality standards in production, our solutions and systems are absolutely top class. High-quality satellite reception systems in conjunction with sophisticated solutions for signal distribution, whether in single-family homes or in large building complexes, bring the signals to the receiving equipment in best HD quality.

New technologies such as SAT>IP, optical SAT distribution or modular headend technology for hotel TVs are closing the gap between traditional signal distribution and modern optical fibre and network technology.

Kathrein Digital System's advanced solutions are also the best choice for mobile TV reception in caravans and mobile homes.

Find out more about us at **www.kathrein-ds.com**

Our awards in 2019:

General Properties
of Compact Amplifiers

- Modern compact amplifiers with monitoring capability for interactive HFC networks
- Innovative operating concept: Electronic actuators, set up via Wi-Fi module and handheld device (settings can be saved in the Web browser and on PC/handheld device)
- Built-in (VGP xxxx) or optional (VGX xxxx), 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
- Remote configuration of all tuning parameters supported by the monitoring system (can be activated/deactivated)
- High gain (up to 46 dB uncontrolled), configurable interstage
- Very high output level with lowest intermodulation products even with interstage attenuation
- De-emphasis (inverse equalisation) insert position
- 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 aluminium housing

Additional properties for all VGP xxxxD-1G2

- Frequency range 1006/1218 MHz switchable
- The latest GaN technology (Second Generation)
- Power supply unit with power factor correction

Additional properties VGP 3243D-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

Additional properties VGX 2143D-1G2

- Frequency range 1006/1218 MHz pluggable
- The latest GaN technology (Second Generation)
- Power supply unit with power factor correction
- High gain (up to 46 dB uncontrolled)
- Loop-through output (VGX2143-1G2 only)

Equaliser amplifier 1285-1G2

- Fixed gain and slope
- Passive return path with 65/204 MHz
- Compact housing for easy retrofitting on the network

The compact amplifiers with electronic set-up

This product is a compact amplifier class of the very latest generation with its VGP 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 WTE 10, 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.

Commissioning of uncontrolled amplifiers without a meter

The setting is made with the Wi-Fi adapter or an handheld device. The Wi-Fi adapter provides a convenient means of configuring the connected amplifier via a PC, tablet or smartphone (a Web browser with active support for JavaScript is required). 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.

VGX Distribution Network Amplifiers

⟩ VGX 2143D-1G2

The VGX 2143D-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 WTE 10 Wi-Fi module together with a Web browser. The return path bandwidth is determined by the plug-in diplex filter sets.
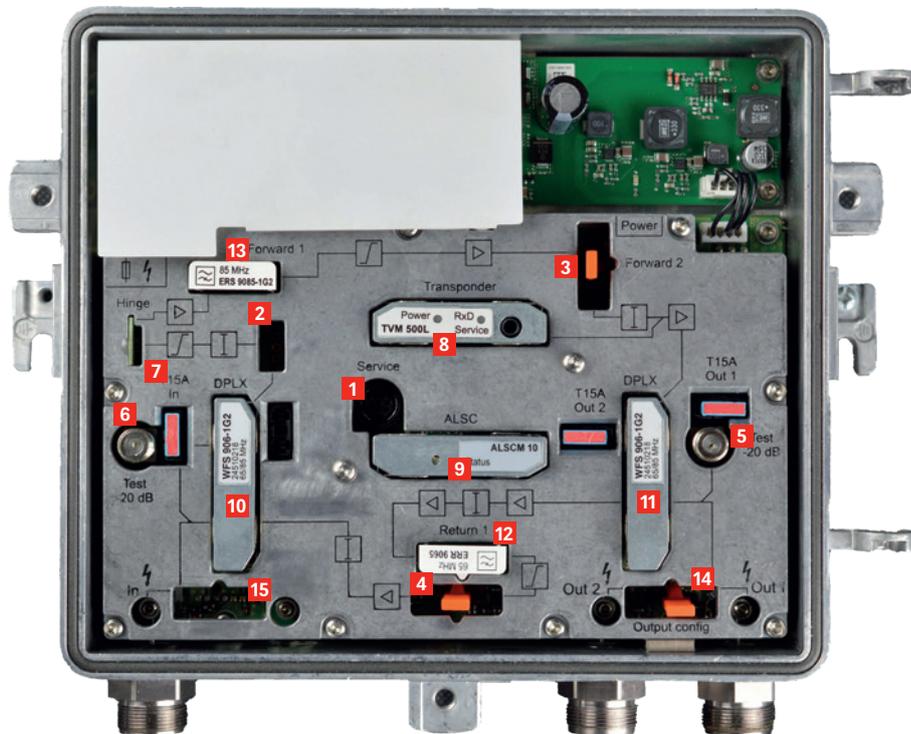

Standard version:

1 Connection socket for the handheld/WiFi
2 "Forward 1" insert position
3 "Forward 2" insert position
4 "Return 1" and "Return 2" 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"
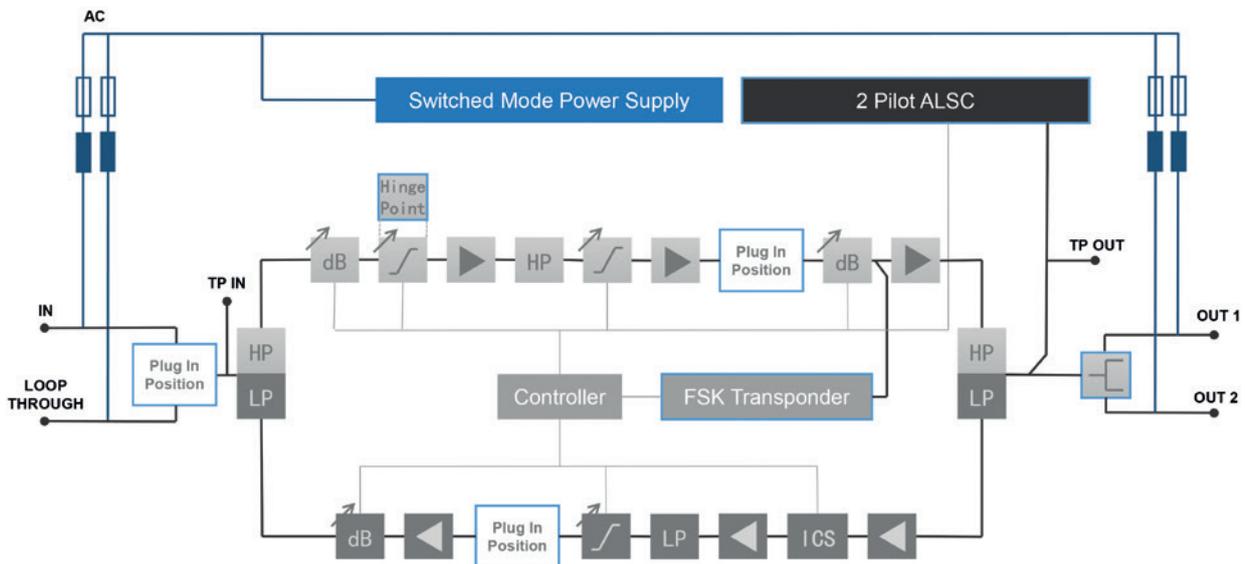
Block Diagram VGX 2143D-1G2

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 WTE 10 WiFi 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 intermodulation products even with interstage attenuation
- Insert positions in the forward and return path
- Remote feed capability: 10 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 $\frac{5}{8}$" connections

> **NOTE**
>
> **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. 2, 3, 4.**

Additional Properties of the VGX 2143D-1G2 Amplifiers in Detail

1 **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

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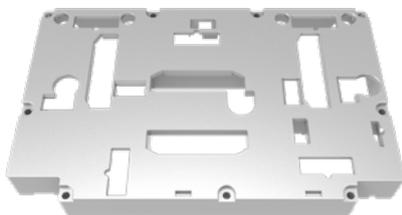
- High mutual shielding between forward path, return path and other functional areas in the device. This prevents cross modulation and other unwanted coupling effects
- Improved temperature discharge thanks to the built-in thermal dissipation domes on the bottom and top of the components. This results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

REVOLUTIONARY CONCEPT

3 **New modularity**
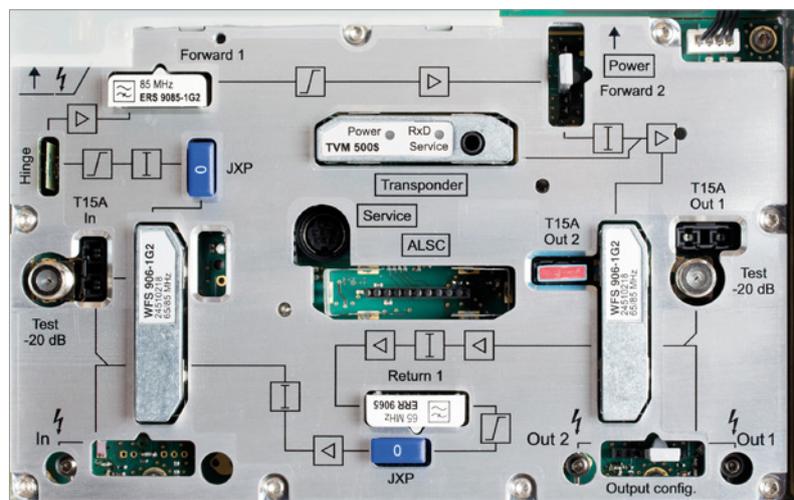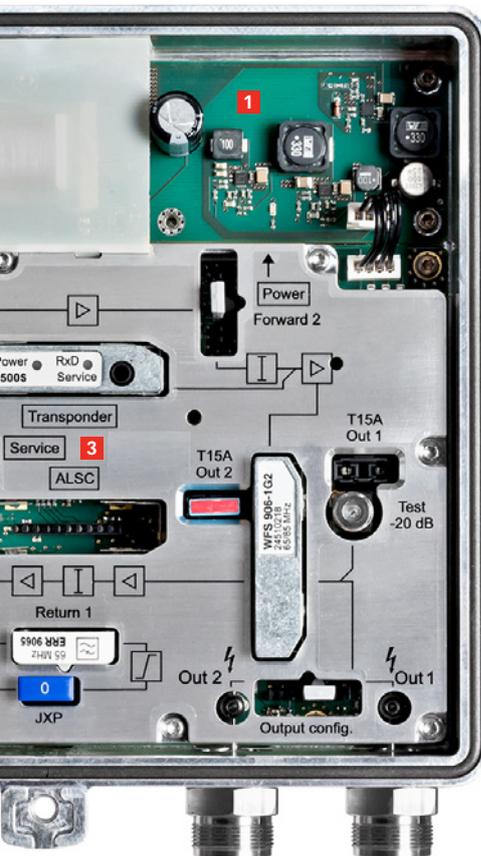
Function can be adjusted to suit requirements in a modular way

- 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 equalisers
- 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/EAC xx-1G2 splitter or tap plug-in cards
- Splitter field input (VGX 2143D-1G2 only) for individual loop-through output configuration using EBC/EAC xx-1G2 splitter and respectively tap plug-in cards

Controlled Dual Mode Trunk/Distribution Amplifiers

⟩ VGP 3243D-1G2

The VGP 3243D-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 handheld or Wi-Fi module with a Web browser.

Standard version:

1 Connection socket for the handheld/WiFi adapter
2 "Forward 1" insert position
3 "Forward 2" insert position
4 Plug in low pass filter "TP 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)
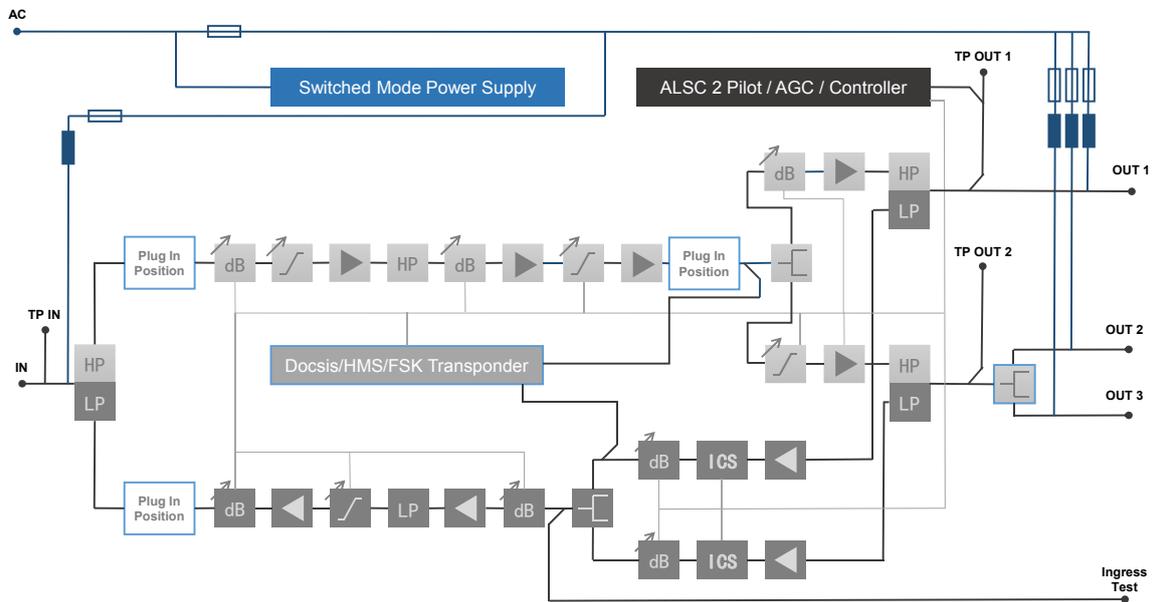
Block Diagram VGP 3243D-1G2

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 Wi-Fi 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 transpoder (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

NOTE

During operation, an EBC/EAC xx-1G2 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 20–28.

⟩ VGP 2143D-1G2

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 handheld or Wi-Fi module with a Web browser. The return path bandwidth is determined by various plug in diplex filter sets.
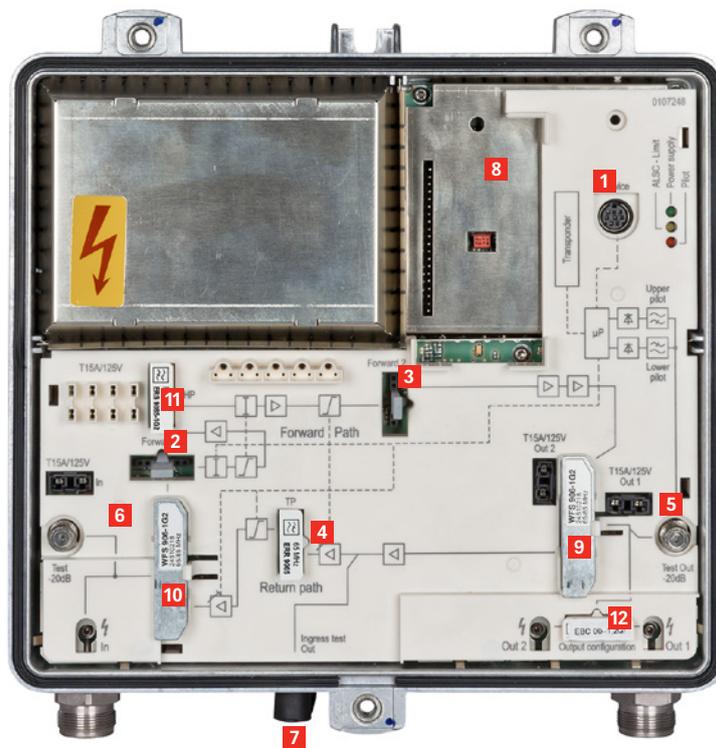
Standard version:

1 Connection socket for the handheld/WiFi adapter
2 "Forward 1" insert position
3 "Forward 2" insert position
4 Plug in low pass filter "TP 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)
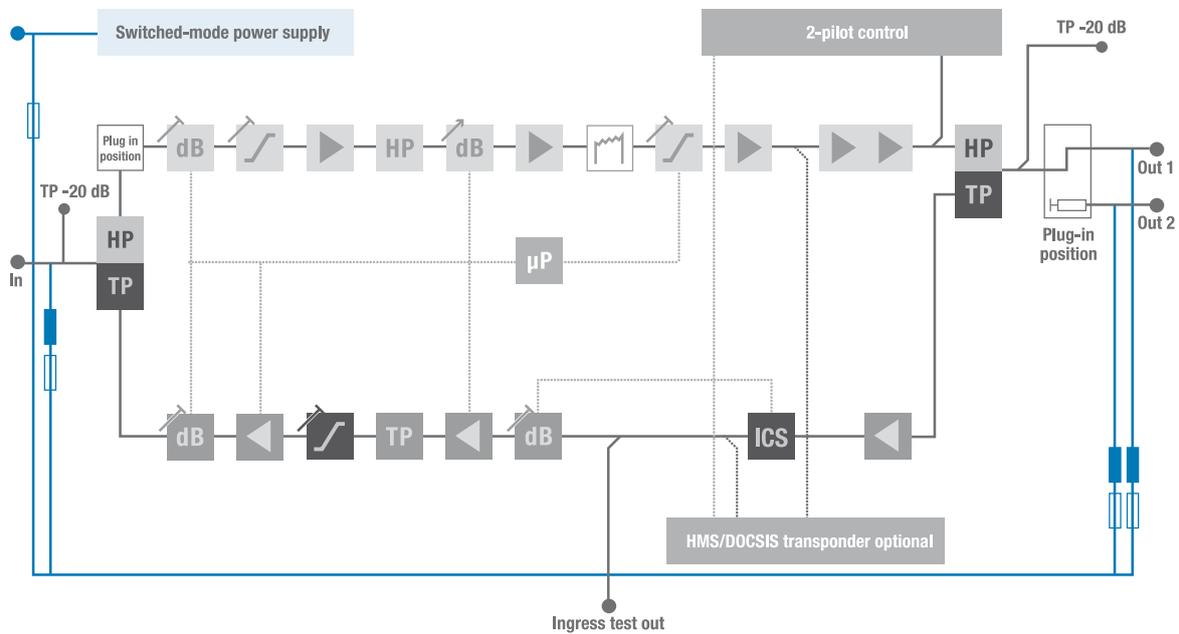
Block Diagram VGP 2143D-1G2

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 1 distribution network outputs
- High gain: up to 43 dB controlled
- GaN second generation 1 active output amplifier
- Innovative operating concept: Electronic actuators setting by Wi-Fi 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 transpoder (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

NOTE

During operation, an EBC/EAC xx-1G2 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.

Uncontrolled Equaliser Amplifier

❯ VGE 1285-1G2

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

The forward range starts at 85 MHz 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 65 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.

Actual product not shown
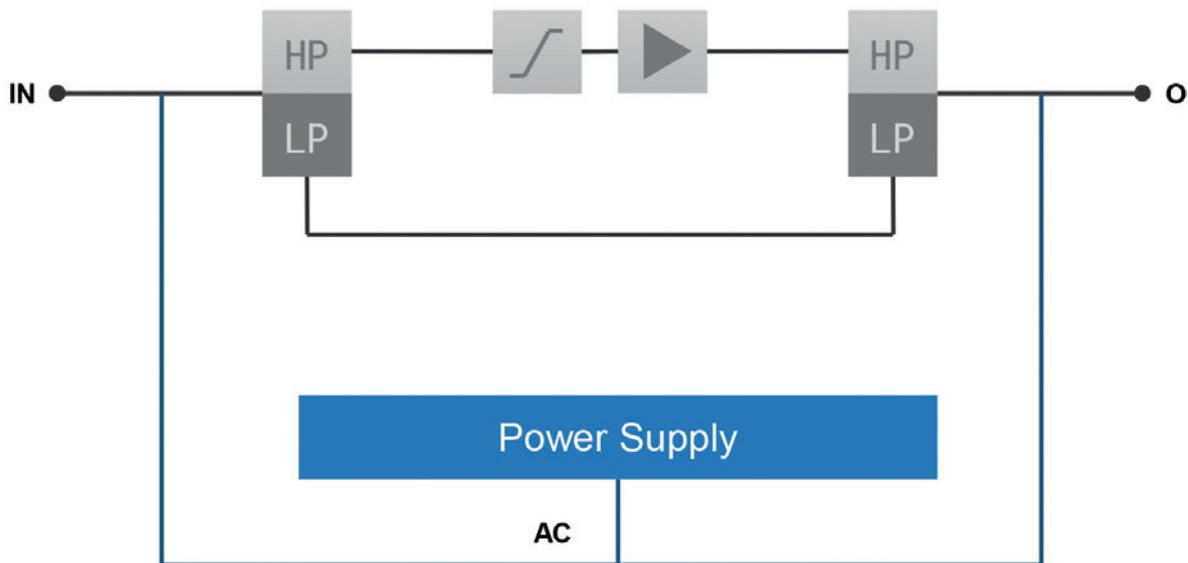
Block Diagram VGE 1285-1G2

⟩ Features

Features VGE 1285-1G2

- Forward path frequency range: 85–1218 MHz
- Forward path gain of 12 dB/10 dB pre-emphasis
- Return path frequency range: 5–65 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: ⅝"-24 (socket)

[1] Providing a suitable plug is used

⟩ _____

Accessories

⟩ Overview of Accessories for the VGX Distribution Network Amplifiers

Description	Type	Order no.	VGX 2143D-1G2
Zero card for operation with one output 1.2 GHz	EBC 00-1G2	24510217	✓
Splitter (two symmetrical outputs) 1.2 GHz	EBC 90-1G2	24510214	✓
Tap (3/6 dB) 1.2 GHz	EAC 93-1G2	24510216	✓
Tap (1.5/10 dB) 1.2 GHz	EAC 90-1G2	24510215	✓
Tap (0.8/20 dB) 1.2 GHz	EAC 94-1G2	24510220	✓
FSK multi-band transponder module	TVM 500	26210846	–
FSK multi-band transponder module, small	TVM 500S	26210868	✓
DOCSIS monitoring transponder	TVM 1000	26210086	–
WiFi module for wireless setting via a Webbrowser	WTE 10	25010086	✓
Automativ level and slope control module	ALSCM 10	24510232	✓
PG 11 to 3.5/12 connector (female)	EMP 53	208500002	–
PG 11 to IEC connector (female) with M14 male thread	EMP 34	275289	–
⅝" to F connector (female)	EMP 51	2080000106	✓
Plug-in diplex filter sets			
Diplexer 65/85 MHz	WFS 906-1G2	24510218	✓
Forward path equaliser 85 MHz	ERS 9085-1G2	24510219	✓
Return path equaliser 65 MHz	ERR 9065	24510156	✓
Diplexer 85/105 MHz	WFS 908-1G	208500007	✓
Forward path equaliser 105 MHz	ERS 9105-1G	208500006	✓
Return path equaliser 85 MHz	ERR 9085	208500005	✓
Diplexer 204/258 MHz	WFS 920-1G2	24510209	✓
Forward path equaliser 258 MHz	ERS 9258-1G2	24510210	✓

Overview of Accessories for Controlled Trunk/Distribution Network Amplifiers

Description	Type	Order no.	VGP xxxxD-1G2
Zero card for operation with one output 1.2 GHz	EBC 00-1G2	24510217	✓
Splitter (two symmetrical outputs) 1.2 GHz	EBC 90-1G2	24510214	✓
Tap (3/6 dB) 1.2 GHz	EAC 93-1G2	24510216	✓
Tap (1.5/10 dB) 1.2 GHz	EAC 90-1G2	24510215	✓
Tap (0.8/20 dB) 1.2 GHz	EAC 94-1G2	24510220	✓
FSK multi-band transponder module	TVM 500	26210846	✓
FSK multi-band transponder module, small	TVM 500S	26210868	–
DOCSIS monitoring transponder	TVM 1000	26210086	✓
WiFi module for wireless via a Webbrowser	WTE 10	25010086	✓
Adapter PG 11 to 3.5/12 socket	EMP 53	208500002	✓
PG 11 to IEC connector (f) with M14 male thread	EMP 34	275289	✓
PG 11 to F-socket (female)	EMP 35	275300	✓
Plug-in diplex filter sets			
Diplexer 65/85 MHz	WFS 906-1G2	24510218	✓
Forward path equaliser 85 MHz	ERS 9085-1G2	24510219	✓
Return path equaliser 65 MHz	ERR 9065	24510156	✓
Diplexer 85/105 MHz	WFS 908-1G	208500007	✓
Forward path equaliser 105 MHz	ERS 9105-1	208500006	✓
Return path equaliser 85 MHz	ERR 9085	208500005	✓
Diplexer 204/258 MHz	WFS 920-1G2	24510209	✓
Forward path equaliser 258 MHz	ERS 9258-1G2	24510210	✓

Overview of Plug-in Diplex Filter Sets

Return/Forward Frequency	Type	Order no.	VGX 2143D-1G2	VGP 2143D-1G2	VGP 3243D-1G2
65/85 MHz	WFS 906-1G2	24510218	2	2	3
	ERS 9085-1G2	24510219	1	1	1
	ERR 9065	24510156	1	1	1
85/105 MHz	WFS 908-1G	208500007	2	2	3
	ERS 9105-1G	208500006	1	1	1
	ERR 9085	208500005	1	1	1
204/258 MHz	WFS 920-1G2	24510209	2	2	3
	ERS 9258-1G2	24510210	1	1	1
	ERR 9204	24510211	1	1	1

The table shows the number of plug in modules for full configuration of each amplifier type.

› Robust Handheld
HTE 20

The HTE 20 can be connected to amplifiers and fiber nodes for configuration of these host devices using a data cable. This new handheld is the successor of the HTE10 and inherits the possibility to control also the devices supported by the HTE10. The HTE 20 handheld is conveniently powered by the controlled device (plug-and-play connection).

Features
- Display of all device settings on the integrated display.
- 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
- Software can be updated in order to support new devices and functions
- Very fast start up time

› WiFi Module
WTE 10

The WTE 10 WiFi moduleallows 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.

Features
- WiFi standard to IEEE 802 11 b/g/h
- 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 500 S

- FSK transponder for compact and house connection amplifiers and also optical compact receivers (see page 44)
- Control of the ingress control switch in devices that are equipped with this facility
- Robust Frequency Shift Keying (FSK) modulation
- 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 (see table on page 44)
- 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, EBC 90-1G2

- Plug-in modules to expand the corresponding device to two outputs
- Can also be used in the splitter field loop-through input depending on device type
- Suitable for amplifiers and legacy 1,2 GHz fiber nodes

Actual product not shown

Zero Card
EBC 00-1G2

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

De-emphasis Equaliser
ERZ 940

Features
- Cable simulation: 7 dB
- 7 dB de-emphasis equaliser for VOS 952-1G and VOS 953-1G

Equaliser
ERZ 630

Features
- Equaliser: 47–630 MHz
- Adjustable from 2-18 dB in 2 dB steps (cable equivalent)
- For use in the input insert position of the VOS 952-1G and VOS 953-1G and other amplifiers

System Equaliser
ERS 800

Features

- System equaliser for use in special application cases
- Cable-equivalent 3 dB pre-emphasis in range 47–700 MHz
  (equivalent to increase of 4 dB in range 47–862 MHz)
- Cable-equivalent 3 dB pre-emphasis in range 700–862 MHz
  (equivalent to increase of 2 dB in range 700–862 MHz)
- Suitable for compact amplifiers and compact fiber nodes
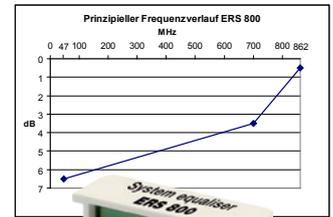
De-emphasis Equaliser/Attenuation Attachment
ERD 813, ERD 814, ERD 815

Equalisers and attenuation pads

Features

- Available types:
  - ERD 813: Cable-equivalent de-emphasis 7 dB [1]
  - ERD 814: 6 dB attenuation [1]
  - ERD 815: 10 dB attenuation [1]
- Suitable for amplifiers and fiber nodes

[1] Based on 862 MHz

› Connectors as Options for Die Cast Housings

Transitions:
- EMP 35 (BN 275300): PG 11 to F connector (female)
- EMP 53 (BN 208500002): PG 11 to 3.5/12 connector (female)
- EMP 51 (BN 2080000106): ⅝" to F connector (female)

EMP 35

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

Technical Data

⟩ VGX Distribution Network Amplifiers

Type	VGX 2143D-1G2	Comments
Order no.	208500165	
Forward path		
Number of outputs	1 or 2	
Loop-through output	Yes	
Frequency range [MHz]	85-1006/1218	
Gain (at 1218 MHz) uncontrolled/controlled with ALSC module ALSCM 10 [dB]	46/43	
Gain variation, uncontrolled/controlled [dB]	± 1.5/0.8	
Return loss [dB]	18 -1.5 dB/oct. (min. 13)	
Frequency response (85–1218 MHz at 25°C) [dB]	± 0.5	
Frequency response additional [dB]	± 0.8	
Attenuation range by electronical setting [dB]	0–20	
Interstage attenuation range [dB]	0–20	
Slope range by electronical setting [dB]	0–18	
Pre-emphasis range by elecronical setting [dB]	0–18	
Noise figure [dB]	7	
Automatic slope control range [dB]	± 2	
Automatic gain control range [dB]	± 3	
Max. input level [dBµV]	85	
Maximum output level BER 10^{-9}, 110 QAM 256, 258–1218 MHz, 10 dB slope [dBµV]	111	
Hum modulation [dB]	70	
Spurious (> 85 MHz) [dBµV]	15	
Return path		
Frequency range [MHz]	5–65/5–85/5–204	With WFS 906-1G2/WFS 908-1G2/WFS 920-1G2
Gain [dB]	28/29/33	With WFS 906-1G2/WFS 908-1G2/WFS 920-1G2
Amplitude response 5–204 MHz, at 25°C [dB]	± 0.5	

Type	VGX 2143D-1G2	Comments
Additional amplitude response over attenuation, slope and temperature [dB]	± 0.4	
Input noise density (CINR = 50 dB, 25 dB gain flat) [dBµV/Hz]	-9	
Dynamic range: CINR > 50 dB, 5–65 MHz, 25 dB gain [dB]	25	
Attenuation range, electronically adjustable [dB]	5–30/4–30/0–30	Depending on Diplex filter set (65/85/204 MHz)
Slope range, electronically adjustable [dB]	0.4–7.5/0.8–9/1–14	Depending on Diplex filter set (65/85/204 MHz)
ICS attenuation (can be switched via EMS or WiFi module) [dB]	0/6/> 45	
Hum modulation at 7A (>15 MHz) [dB]	70	
Spurious (> 15 MHz) [dBµV]	< 15	
General		
Impedance [Ω]	75	
AC supply voltage including tolerances [V]	30–90	
Power consumption (High/Low Mode) [W]	21/18	
Max. remote feed current per connection [A]	7	
RF input and output connections	⅝"	
Housing protection class	IP 54	(IP 65 on request)
Ambient temperature range (in operation, compliant with specified data) [°C]	-20 to 60	
Screening factor	Class A	
Over voltage protection	6 kV; 1.2/50 µs, (IEC 60-2)	
Dimensions (W × H × D) [mm]	250 × 201 × 95	

All data listed are typical values unless indicated otherwise.

❯ Controlled Compact Amplifiers

Type	VGP 3243D-1G2		Comments
Order no.	208500164		
Forward path			
Modes	Trunk	Distribution network	
Number of trunk outputs	1	0	
Number of distribution outputs	1 or 2	2 or 3	
Frequency range [MHz]; upper limit selectable	85–1006/1218		
Gain (at 1218 MHz) uncontrolled/controlled [dB]	40/37	46/43	
Return loss [dB]	18–1.5 dB/oct. (min.13)		
Frequency response (85–1218 MHz at 25°C) [dB]	± 0.5		
Frequency response additional [dB]	± 0.8		
Maximum input level [dBµV]	85		
Maximum operation output level [dBµV]	115		
CSO at 43dB gain, 10 dB slope at 1.2GHz, [dB] CENELEC 41 carriers, level at 862MHz [dBµV]	70 106	67 112	
CTB at 43dB gain, 10 dB slope at 1.2GHz, [dB] CENELEC 41 carriers, level at 862MHz [dBµV]	75 106	70 112	
Attenuation range, electronically adjustable [dB]	0–16		
Slope range, electronically adjustable [dB] 1006/1218 MHz	0–13/15		
Interstage pre-emphasis range [dB] 1006–1218 MHz	0–15/17		
Noise figure [dB]	8		
Automatic slope control range [dB]	± 2		
Automatic gain control range [dB]	± 3		
Frequency range of lower pilot Pu (PAL/CW/QAM) MHz [1]	120–450		
Frequency range of upper pilot Po (PAL/CW/QAM) MHz [1]	420–998		
Output level, BER 10^ -9, 110ch. 256QAM, 258–1218 MHz, 10 dB slope [dBµV]	111		
Pilot carrier level range (PAL/CW/QAM) [dBµV]	83–112	87–114	
Hum modulation ratio at 7 A [dB]	70		

Type	VGP 3243D-1G2	Comments
Return path		
Frequency range [MHz]	5–65/85/204	With WFS 906-1G2/WFS 908-1G/ WFS 920-1G2
Gain for return path 65/85/204 MHz [dB]	28/29/33	
Frequency response 8–204 MHz [dB]	± 0.35	
Attenuation range, electronically adjustable [dB]	5–30/4–30/0–30	Depending on Diplex filter set (65/85/204 MHz)
Slope range, electronically adjustable [dB]	0.4–8/0.8–9.5/1–15	Depending on Diplex filter set (65/85/204 MHz)
Return loss 8–65/85/204 MHz [dB]	19	
ICS attenuation (can be switched via EMS or Wi-Fi module) [dB]	0/6/>45	
Hum modulation at 7A (>15 MHz) [dB]	> 70	
Test point [dB]	0	
General data		
Impedance [Ω]	75	
Nominal supply voltage range, sine wave [VAC]	28–65	
Power consumption without transponder [W]	42	
Max. remote feed current, local injection [A]	10	
Max. remote feed current, normal operation per RF port [A]	10	
RF input and output interfaces	4 × PG11	
Protection class acc. to DIN EN 60529	IP 54	
Ambient temperature range (in operation, compliant with specified data) [°C]	-25 to +60	
Over voltage protection	6kV; 1.2/50µs, (IEC 60-2)	
Housing material	Aluminum die cast	
Dimesions (W × H × D) [mm] 2)	240 × 115 × 240	
Network management (optional)		
Parameters for remote management and configuration	Remote feed voltage, secondary current, supply voltage booster amplifier, temperature, electronic tuning element values, pilot settings and alarms, automatic levelling, summer/winter offset, ICS, remote inventory date, downstream frequency range, diplex filter set	

1) Setting via handheld/Wi-Fi module. Min. ratio between pilot frequency Pu and Po 250 MHz
2) Width incl. lid hinges: 267 mm
All data are typical values unless indicated otherwise.

Type	VGP 2143D-1G2	Comments
Order no.	208500166	
Forward path		
Number of outputs	1 or 2	
Frequency range [MHz]; upper limit selectable	85–1006/1218	
Gain (at 1218 MHz) uncontrolled/controlled [dB]	46/43	
Gain variation ALSC off, -10°C to +55°C [dB]	± 1.2	
Return loss [dB]	18–1.5 dB/oct. (min.13)	
Frequency response (85–1218 MHz at 25°C) [dB]	± 0.5	
Frequency response additional [dB]	± 0.8	
Maximum input level [dBµV]	85	
Maximum operating level [dBµV]	115	
CSO ratio, 1 × 106 dBµV [dB] [1]	67	
CTB ratio, 1 × 106 dBµV [dB] [1]	70	
Attenuation range, electronically adjustable [dB]	0–16	
Slope range, electronically adjustable [dB] 1006/1218 MHz	0–13/15	
Interstage pre-emphasis range [dB] 1006/1218 MHz	0–15/17	
Noise figure [dB]	8	
Automatic slope control range [dB]	± 2	
Automatic gain control range [dB]	± 3	
Frequency range of lower pilot Pu (PAL/CW/QAM) MHz [2]	120–450	
Frequency range of upper pilot Po (PAL/CW/QAM) MHz [2]	420–998	
Output level, BER 10^ -9, 110ch. 256QAM, 258–1218 MHz, 10 dB slope [dBµV]	111	
Pilot carrier level range (PAL/CW/QAM) [dBµV]	87–114	
Hum modulation [dB]	70	
Spurious (> 85 MHz) [dBµV]	< 15	

Type	VGP 2143D-1G2	Comments
Return path		
Frequency range [MHz]	5–65/85/204	With WFS 906-1G2/WFS 908-1G/ WFS 920-1G2
Gain for return path 65/85/204 MHz [dB]	28/29/33	
Frequency response 8–204 MHz [dB]	± 0.35	
Attenuation range, electronically adjustable [dB]	5–30/4–30/0–30	Depending on Diplex filter set (65/85/204 MHz)
Slope range, electronically adjustable [dB]	0.4–8/0.8–9.5/1–15	Depending on Diplex filter set (65/85/204 MHz)
Return loss 8–65/85/204 MHz [dB]	19	
ICS attenuation (can be switched via EMS or WiFi module) [dB]	0/6/>45	
Hum modulation at 7A (>15 MHz) [dB]	> 70	
Test point [dB]	0	
General data		
Impedance [Ω]	75	
Nominal supply voltage range, sine wave [VAC]	28–65	
Power consumption without transponder [W]	27	
Max. remote feed current, local injection [A]	10	
Max. remote feed current, normal operation per RF port [A]	10	
RF input and output interfaces	3 × PG11	
Protection class acc. to DIN EN 60529	IP 54	
Ambient temperature range (in operation, compliant with specified data) [°C]	-25 to +60	
Over voltage protection	6kV; 1.2/50µs, (IEC 60-2)	
Housing material	Aluminum die cast	
Dimesions (W × H × D) [mm] 3)	240 × 95 × 240	
Network management (optional)		
Parameters for remote management and configuration	Remote feed voltage, secondary current, supply voltage booster amplifier, temperature, electronic tuning element values, pilot settings and alarms, automatic levelling, summer/winter offset, ICS, remote inventory date, downstream frequency range, diplex filter set	

[1] CENELEC 41 channels, level at 862 MHz, 10 dB slope hinge at 1.2 GHz
[2] Setting via handheld/Wi-Fi module. Min. ratio between pilot frequency Pu and Po 250 MHz
[3] Width incl. lid hinges: 267 mm
All data are typical values unless indicated otherwise.

▷ Uncontrolled Equaliser Amplifier

Type	VGE 1285-1G2
Order no.	24410145
Forward path	
Frequency range [MHz]	85–1218
Gain (at 1218 MHz) ± 0.5 dB [dB]	12
Return loss, at and above 40 MHz [dB]	18 -1.5 dB/oct. min. 13 dB
Frequency response (85–1218 MHz at 25°C) [dB]	± 0.75
Max. operating level to CENELEC–CTB > 67 [dB] [2])	95
Max. operating level to CENELEC–CSO > 64 [dB] [2])	95
Pre-emphasis (fixed) [dB]	10
Noise figure[dB]	7
Hum modulation at 7A [dB]	70
Return path	
Frequency range [MHz]	5–65
Attenuation (fixed) ± 0.75 dB [dB]	2.5
Spurious (> 15 MHz) [dBµV]	< 15
General data	
Power supply [V AC]	30-72
Power consumption, max. [W]	5
Max. remote feed current (power passing) [A]	7
RF connections	⅝"
Housing protection class	IP 65 [1])
Ambient temperature range [°C]	-40 to +60
Housing material	Aluminum die cast
Overvoltage protection to IEC 60-2	6 kV (1.2/50 µs)
Dimensions (W × H × D) [mm]	142 × 113 × 68

[1]) Providing a suitable plug is used [2]) CENELEC, 41 channels output level @862 MHz
All data are typical values unless indicated otherwise.

⟩ Acessories

Type	TVM 500	TVM 500S
Order no.	26210846	26210868
Input frequency range [MHz]	300–320; 425–450; 863–870; 902–928	
Input level range [dBµV]	48–95	
Impedance [Ω]	75	
Power consumption [W]	0.4	0.2
Modulation type	FSK	
Suitable for device types	Fiber nodes and controlled trunk/ distribution network amplifiers	VGX 2143D-1G2

Type	TVM 1000
Order no.	26210086
Input frequency range [MHz]	90–862
Input level range [dBµV]	48–78
Output frequency range [MHz]	5–65
Max. output level [dBµV]	113–118
Power consumption [W]	3.5
Transmission protocol	DOCSIS/EuroDOCSIS 2.0
Suitable for device types	Fiber nodes, controlled trunk/distribution network amplifiers, house connection amplifiers

Type	WTE 10
Order no.	25010086
WiFi standard	IEE 802.11 b/g/n
Frequency range [GHz]	2.4
Encryption	WPA-PSK (AES), WPA2-PSK (AES)
Maximum transmission power [dBm]	+ 18
Power consumption [W]	3.5
Ambient temperature range [°C]	-20 to +50
Housing protection class (to EN 60529)	IP 54

Type	EAC 90-1G2	EAC 93-1G2	EAC 94-1G2	EBC 90-1G2
Order no.	24510215	24510216	24510220	24510214
Frequency range [MHz]	5–1218	5–1218	5–1218	5–1218
Through loss 5–15 MHz [dB] [1]	< 1.5	< 2.2	< 0.3	< 3.4
Through loss 15–65 MHz [dB] [1]	< 1.3	< 2.0	< 0.3	< 3.4
Through loss 65–862 MHz [dB] [1]	< 1.3	< 2.7	< 0.6	< 3.5
Through loss 862–1006 MHz [dB] [1]	< 1.5	< 3.1	< 0.7	< 3.7
Through loss 1006–1218 MHz [dB] [1]	< 1.6	< 3.1	< 0.9	< 3.9
Tap loss [dB]	10	6	20	Same as through loss
Isolation/directional attenuation [dB]	28	28	28	26
Impedance [Ω]	75	75	75	75

[1] The through loss is the attenuation of the signal between the signal output of the device and output 1 if used in the output insert position or between the input and tap input if used in the input insert position (loop-through input splitter field)

Type	EBC 00-1G2
Order no.	24510217
Frequency range [MHz]	5–1218
Through loss [dB] [1]	0.5

Type	ERZ 940	ERZ 630	ERS 800
Order no.	24510059	24510108	24510109
Transmission range [MHz]	47–862	47–630	47–862
Nominal impedance [Ω]			
Pre-emphasis	< 2.0	–	–
De-emphasis [dB]	7 ± 1	–	–
Equalisation, adjustable in 2 dB steps [dB]	–	2-18	–
Cable-equivalent pre-emphasis, 47–700 MHz/(equivalent to 47–862 MHz) [dB]	–	–	3/(4)
Cable-equivalent pre-emphasis in range 700–862 MHz [dB]	–	–	3
Basic loss (at 862 MHz) [dB]	0.3	–	0.5
Basic loss (at 47/630 MHz) [dB]	–	0.5/1.5	–
Return loss [dB]	typ. 20 min. 17	–	> 15

Type	ERD 813	ERD 814	ERD 815
Order no.	24510117	24510120	24510127
Transmission range [MHz]		85–1006	
Nominal impedance [Ω]		75	
Attenuation (linear) [dB]	1	6	10
Tap loss E -> A2 @ 85 MHz [dB]	–	–	–
De-emphasis (862 MHz) [dB]	7	–	–
De-emphasis (1 GHz) [dB]	8	–	–
Return loss [dB]		20 -1.5/octave	25

Order Number Overview

Type	Order no.
A	
ALSCM 10	24510232
E	
EAC 90-1G2	24510215
EAC 93-1G2	24510216
EAC 94-1G2	24510220
EBC 00-1G2	24510217
EBC 90-1G2	24510214
EMP 34	275289
EMP 35	275300
ERD 813	24510117
ERD 814	24510120
ERD 815	24510127
ERR 9065	24510156
ERR 9085	208500005
ERR 9204	24510211
ERS 630	24510108
ERS 800	24510109
ERS 9085-1G2	24510219
ERS 9105-1G2	208500212
ERS 9258-1G2	24510210
ERZ 940	24510059
T	
TVM 1000	26210086
TVM 500	26210846
TVM 500S	26210868
V	
VGE 1285-1G2	24410145
VGP 2143D-1G2	208500166
VGP 3243D-1G2	208500164
VGX 2143D-1G2	208500165

Type	Order no.
W	
WFS 906-1G2	24510218
WFS 908-1G2	208500007
WFS 920-1G2	24510209
WTE 10	25010086

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