

VOS 137/RA 2.0	209500003
VOS 138/RA 2.0	209500004
VOS 139/RA 2.0	209500005



## House connection amplifier

### Features

- House connection amplifier for modern HFC networks
- VOS 137/RA 2.0 - locally fed  
VOS 138/RA 2.0 - remotely fed via RF input (auto-supply)  
VOS 139/RA 2.0 - remotely fed
- Very high output level with good energy balance
- Modern GaAs-MMIC technology
- Highly efficient switched-mode power supply unit
- New innovative operational concept:
  - Simplified levelling using rotary switch, large adjustment range (20 dB), small step width (1 dB)
  - Basic configuration via jumpers
  - Exactly reproducible device settings
- Insert position for additional functions in the forwards path (e.g. de-emphasis, system equaliser)
- Gain is switchable 40/34/30 dB with interstage attenuation using jumper (setting as supplied: 34 dB)
- Diplexer can be bypassed (I-band operation available with no return path)
- Integrated return path (active/passive/disabled) with numerous setting facilities
- Classification to KDG 1 TS 140: Type D (4.4)
- Test sockets (F connectors):
  - two-way on the input (switchable)
  - with directional coupler on the output
- Test sockets are terminated with the EMK 03 in the delivery status
- Internal LED function indicator
- Voltage surge conductors on input and output
- Comprehensive remote feeding concept (VOS 139/RA 2.0):
  - Remote feed current: max. 5 A
  - Remote feed voltage: 32-65 V~
  - Remote feed possibilities: Optionally via RF input and RF output as well as via local connection (power passing)
- In conformity with: EN 60728-11, EN 50083-2 and EN 62368-1
- Die-cast housing with F connections (VOS 137/RA 2.0, VOS138/RA 2.0) or PG 11 connections (VOS 139/RA 2.0: order cable fittings separately, not included in the scope of delivery)
- For use in locations protected from weather conditions
- The amplifiers comply with the requirements of the EMC Directive 2014/30/EU and Low-Voltage Directive 2014/35/EU applicable at the time of shipping



### Basic safety precautions



- Installation must be carried out by authorised specialist staff.
- Described amplifiers are exclusively for installation of HFC networks up to 1006 MHz.
- Any other use or failure to comply with these instructions will invalidate the warranty.
- The amplifiers may only be installed in dry indoor areas. Do not install on or against highly combustible materials.
- The safety regulations set out in the current EN 60728-11 and EN 62368-1 standards must be complied with.



- The supply voltage of the amplifiers is 32-65 V or 230 V AC. This can give a fatal shock if touched!
- The only reliable method of disconnecting the amplifiers from the mains is to disconnect the power plug (VOS 137/RA 2.0).
- Do not touch live parts. This also applies after removing the device's internal fuse.
- The power plug must be easily operable as the means of cutting power to the amplifier, meaning the wall outlet must be close to the amplifier and easily accessible. Always disconnect the power plug during installation.
- Only install or deinstall the amplifier in the de-energised condition.
- The amplifiers must not be operated without the standard fitted power supply unit guard cover. The cover must be closed.
- No liquid-filled items may be placed on top of the amplifiers.
- The amplifiers must not be exposed to dripping or splashing water.
- Permissible ambient temperature -20 to +55°C
- The remote power feed transformer or converter required for supplying the VOS 138/RA 2.0 and VOS 139/RA 2.0 must comply with protection class II and with EN 62368-1. Its maximum fault current (short-circuit current) may not exceed double the nominal current value. Recommendation for VOS 138/RA 2.0 and VOS 139/RA 2.0: TVF 20 (BN 236678).

## Installation instructions for remotely fed devices (VOS 138/RA 2.0, VOS 139/RA 2.0)

In accordance with EN 60728-11, remote feed voltages up to a maximum of 65 V AC are permissible. Voltages above 50 V AC are already considered dangerous to touch. Therefore they may not be accessible to laymen and only accessible to persons with electrical instruction by using tools.

If the shield of the current-carrying coaxial cable (outer conductor) is broken at any point the remote power feed may appear at the metal housing of the device (touch hazard!). Therefore the outer conductor connection of the remote feed cable may never be separated before its inner conductor connection (for safety, always switch off the remote feed). Great care must be taken in establishing a safe outer conductor contact (be sure to follow the manufacturer's instructions!).

### Protective measures

#### Potential equipotential by local earthing point

An additional connection to earth potential must be made at the earthing point of the device by way of a copper conductor with at least 4 mm<sup>2</sup> cross-section. This connection can be made to an existing earthing rail or a local earth for example.

**If this cannot be achieved, one of the following protective measures may be taken:**

#### a) Potential equalisation by minimum cross section of the coaxial cable

It must be ensured at all times that the remote feed coaxial cable has an outer conductor cross-section of at least 4 mm<sup>2</sup> along its entire length (from the feed-in point) (Note: braided cables do not generally have this cross section).

or

#### b) Potential equalisation by several connected cables

It must be ensured that at least one other coaxial cable is permanently connected to earth potential on its shield along its entire length.

or

#### c) Potential equalisation in manual range

Potential equalisation must be carried out in the manual range of the device, i.e. within 2.50 m. For this, all live parts within this range must be connected to the device by way of at least a 4 mm<sup>2</sup> copper conductor.

or

#### d) Protection against contact by installation in closed operating rooms

Remotely powered devices must be operated in locked operating rooms. A relevant warning (such as a lightning symbol and the phrase "Shock hazard in case of fault") must be affixed indicating that in the event of a fault supply voltage potential may be connected to the unit chassis. Cables leading directly to the subscriber must in this case be equipped with electrical isolation on the outer conductor.

or

#### e) Maximum remote feed voltage limited to 50 V AC

The remote feed voltage in the system may not exceed a max. 50 V AC.



When supplying multiple VOS 139/RA 2.0 (via direct connection), it is essential to ensure the correct polarity!  
**Risk of short circuits!**

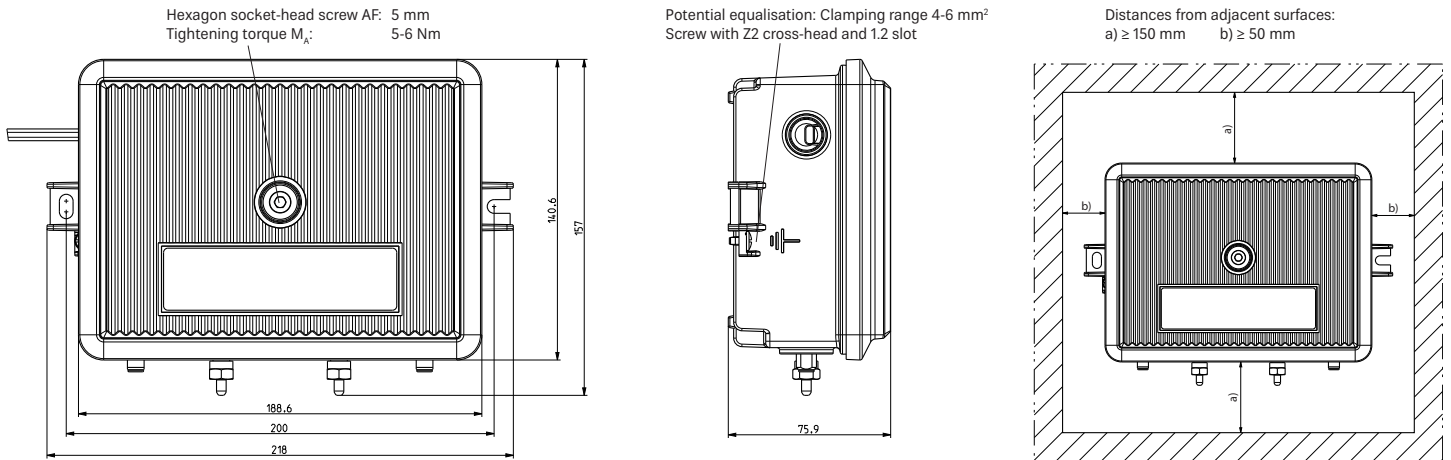
### Optional accessories

- De-emphasis equaliser: ERD 810, ERD 813, ERZ 940
- Pre-emphasis equaliser: ERZ 630, ERS 800
- Cable fittings: EMP 26, EMP 28, EMP 34, EMP 35
- Remote feed transformer: TVF 20

### Test sockets

Test socket on the amplifier input 5-1006 MHz two-way (switchable)	dB	-20
Test socket on the amplifier output 5-1006 MHz with directional coupler	dB	-20
Test signals for the return path can be injected at the output test socket.		

## Installation



### Current-carrying unit!

Always disconnect the power plug and switch off the remote feed prior to installation.

Safety regulations to EN 60728-11 and EN 62368-1 must be complied with.

Mount the amplifier vertically with the cable input facing down. Ensure sufficient air circulation around all sides.

Install correctly in accordance with EN 60728-11.

The connected network must be earthed in accordance with regulations, even if the amplifier has been removed.

Only qualified personnel are permitted to perform servicing work.

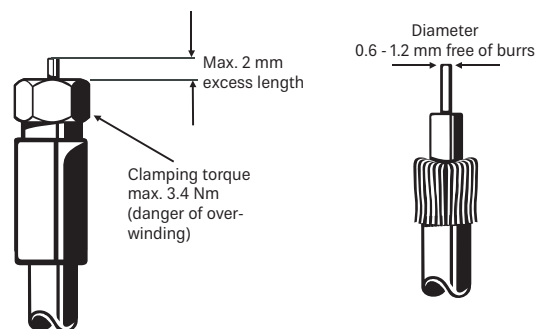
- The specified torques must be adhered to for compliance with the electrical and mechanical data.
- Wall attachment to be performed using dowel screws with a thread diameter of 5-6 mm

For installation you need:

- Fixings: Screws, max.  $\varnothing$ : 4.5 mm
- F connector in compliance with EN 61169-24.



If the cable inner conductor diameter is greater than 1.2 mm, or in case of burr, the device sockets may be destroyed.



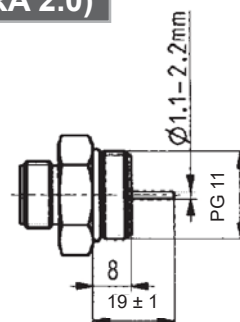
## Installation of the RF cable connection fitting (VOS 139/RA 2.0)

When installing the RF cable connection fittings (PG 11), the fitting manufacturer's instructions should be complied with.



### Safety instructions:

There may already be a remote feed voltage applied to the RF cable!



Shorten the inner conductor to the specified length, leaving no burrs. Longer inner conductors can lead to defects.

PG 11 adapter

Installation procedure:

- 1) Completely unscrew the inner conductor clamp
- 2) Screw in the PG 11 fitting
- 3) Tighten the inner conductor clamp ( $M_A = 1-1.2$  Nm)

Required tools:

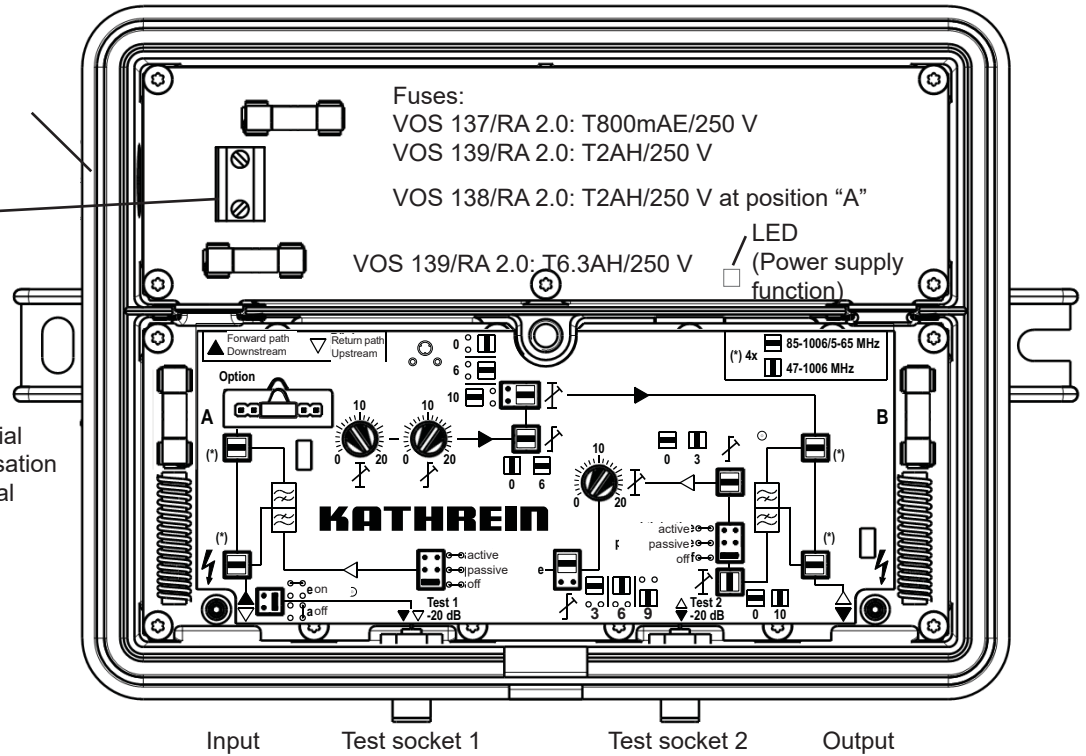
- Screwdriver for socket-head screws 5 AF (housing cover),  $M_A$ : 5-6 Nm
- Screwdriver for socket-head screws 2 AF (inner conductor clamp)
- Open-ended wrench 22 AF (PG 11 fitting)

**Operating elements and insert positions (Fig. VOS 139/RA 2.0)**

PG 9 thread for the connection of an IP 54 cable gland (for VOS 139/RA 2.0 remote feeding via external cable - not included in the scope of delivery)

Terminal for remote feed voltage (only VOS 139/RA 2.0)

Potential equalisation terminal



Position "A" and "B": Position of the fuses for remote feeding

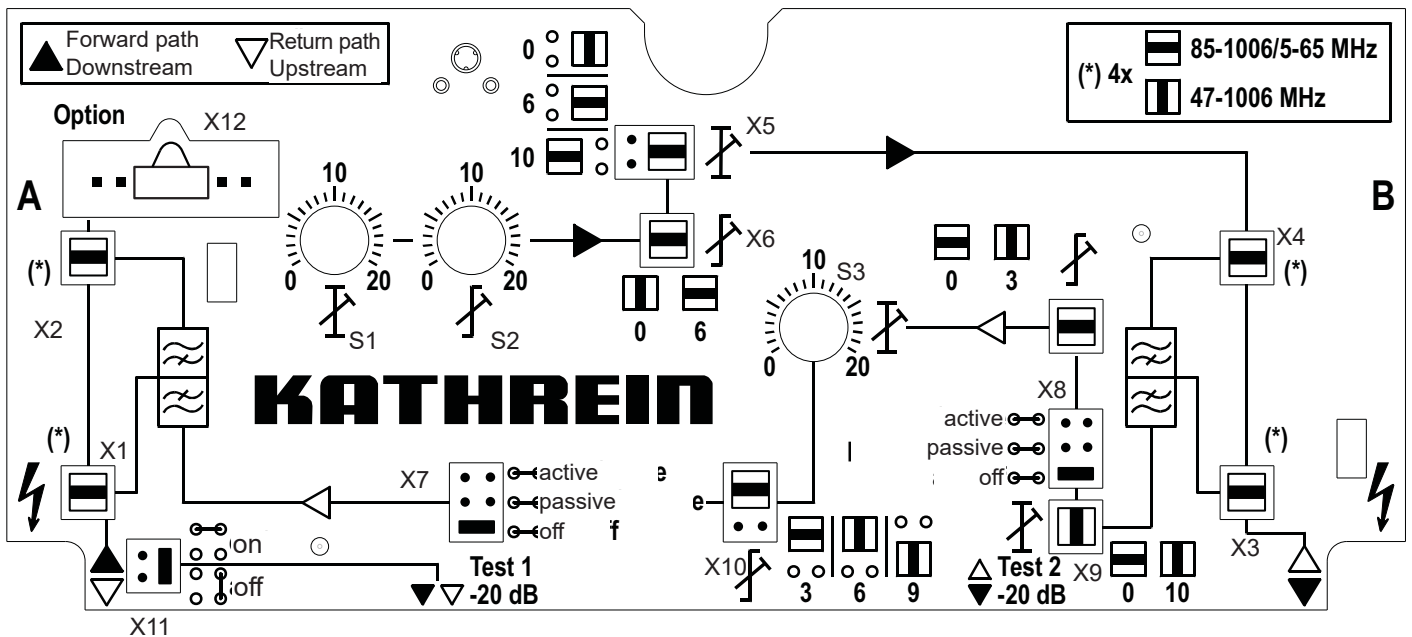
**VOS 138/RA 2.0:**

- Fuse T2AH/250 V with insert holder in position "A" as power supply unit fuse

**VOS 139/RA 2.0:**

- 2 fuses T6.3AH/250V with insert holders (included in the scope of delivery)
- Fuse fitted in position A: Remote feeding via the input
- Fuse fitted in position B: Remote feeding via the output
- Both fuses fitted in position A and B: Remote feeding via input or output with through feed

The remote feed fuses function as connection elements.



## Overview of controls

The basic configuration of the device is made using jumpers:

	Element	Delivery status
Operating mode: Operation only with forwards path, including band I (47-1006 MHz) or Operation with return path (5 – 65 MHz) and forwards path (85-1006 MHz)	X1, X2, X3, X4	X
Forwards path: Setting for the gain (40 / 34 / 30 dB) via interstage attenuation	X5	34 dB
Setting for the interstage pre-emphasis (0 / 6 dB)	X6	6 dB
Return path: Setting for the operating mode for the return path amplifier active / passive / switched off	X7, X8	switched off
Connection of an attenuation (10 dB) to the input of the return path amplifier	X9	10 dB
Setting for the interstage pre-emphasis (0 / 3 / 6 dB)	X10	0 dB
Adding a pre-emphasis (3 dB) to the input of the return path amplifier	X13	0 dB
Test socket 1: The test socket 1 must be enabled during the measurement.	X11	switched off
Option: Insert position for additional functions in the forwards path	X12	0 dB bridge

The amplifier is levelled using rotary switches:

Forwards path: Setting for the attenuation on the amplifier input (0 – 20 dB in 1 dB steps)	S1	20 dB
Setting for the equalisation on the amplifier input (0 – 20 dB in 1 dB steps)	S2	0 dB
Return path: Setting for the interstage attenuation (0 – 20 dB in 1 dB steps)	S3	0 dB

## Set-up

Before switching on the amplifier, i.e. before connecting the remote feed path that supplies power or connecting a remote feed transformer, make sure that:

1. The RF cable connections on the amplifier's inputs and outputs are correctly installed and connected
2. The fuses (= connection elements) in the RF paths, through which the remote power feed is planned to be delivered and which at this point in time already can be delivered (involving perhaps installation work at the next downstream amplifier point), have been inserted.

Do not switch on the AC remote feed voltage at the VOS 138/RA2.0 and VOS 139/RA2.0 until the amplifier has been fully installed, i.e. only after the RF connections and the potential equalisation have been connected.

An external remote feed voltage on the VOS 139/RA 2.0 (power passing) is connected using the specified terminal in the power supply casing (max. 5 A).



**Use only genuine fuses and power cables as replacements!**

■ Replacement fuses:	T 800mAE 250 V	BN 094 070
	T 2AH 250 V	BN 094 039
	T 6.3AH 250 V	BN 094 078

**If several amplifiers are fed from one remote feeding transformer, it is crucial to ensure that the polarity is correct! Risk of short circuits!**

The spare parts can be obtained through:

autronic electronic-service GmbH

Hauptstraße 2a

35798 Löhnberg-Oberhausen

Telefon +49 6477 6123 101

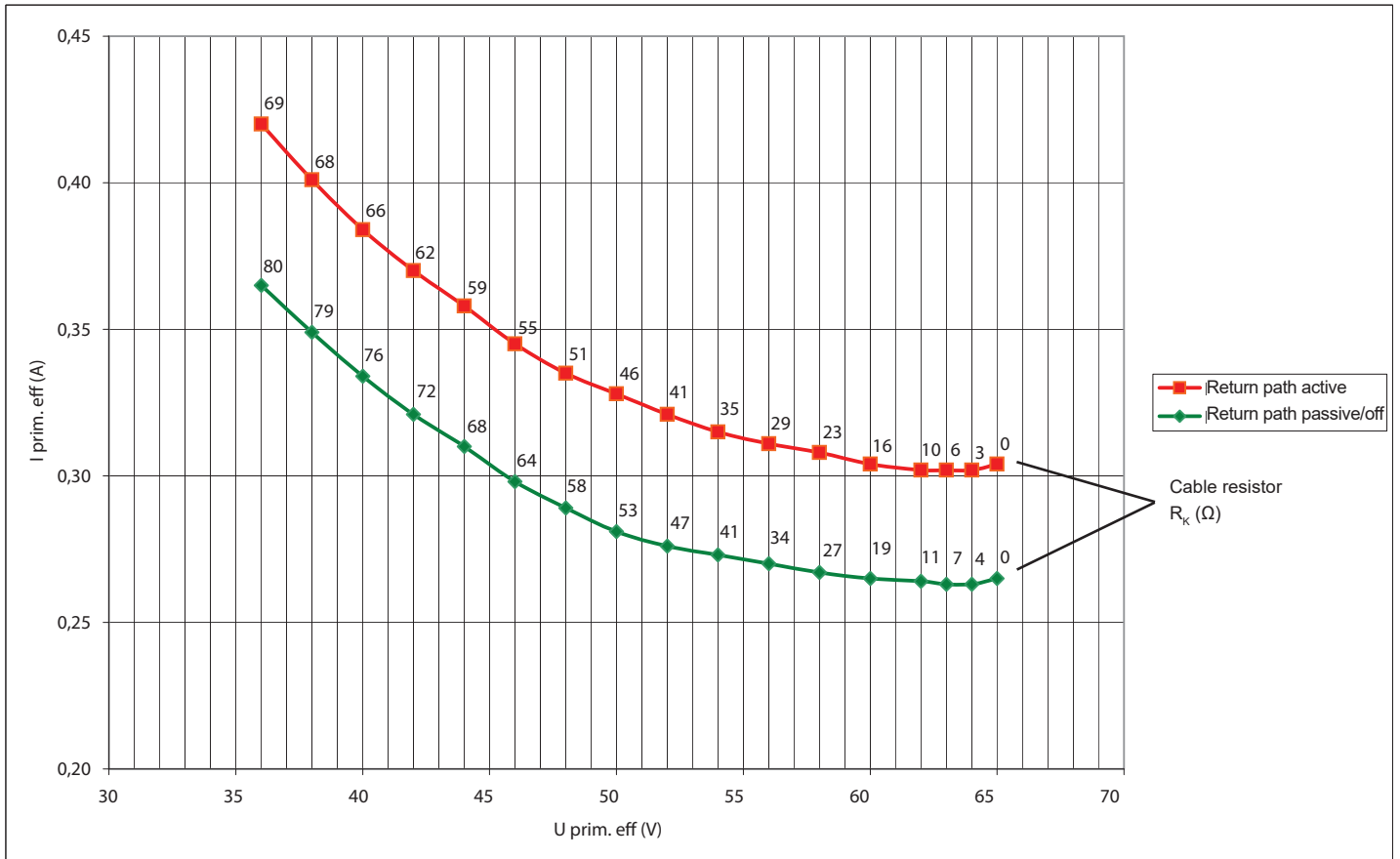
Fax +49 6477 6123 020

E-Mail: [service-kathrein@autronic-service.de](mailto:service-kathrein@autronic-service.de)

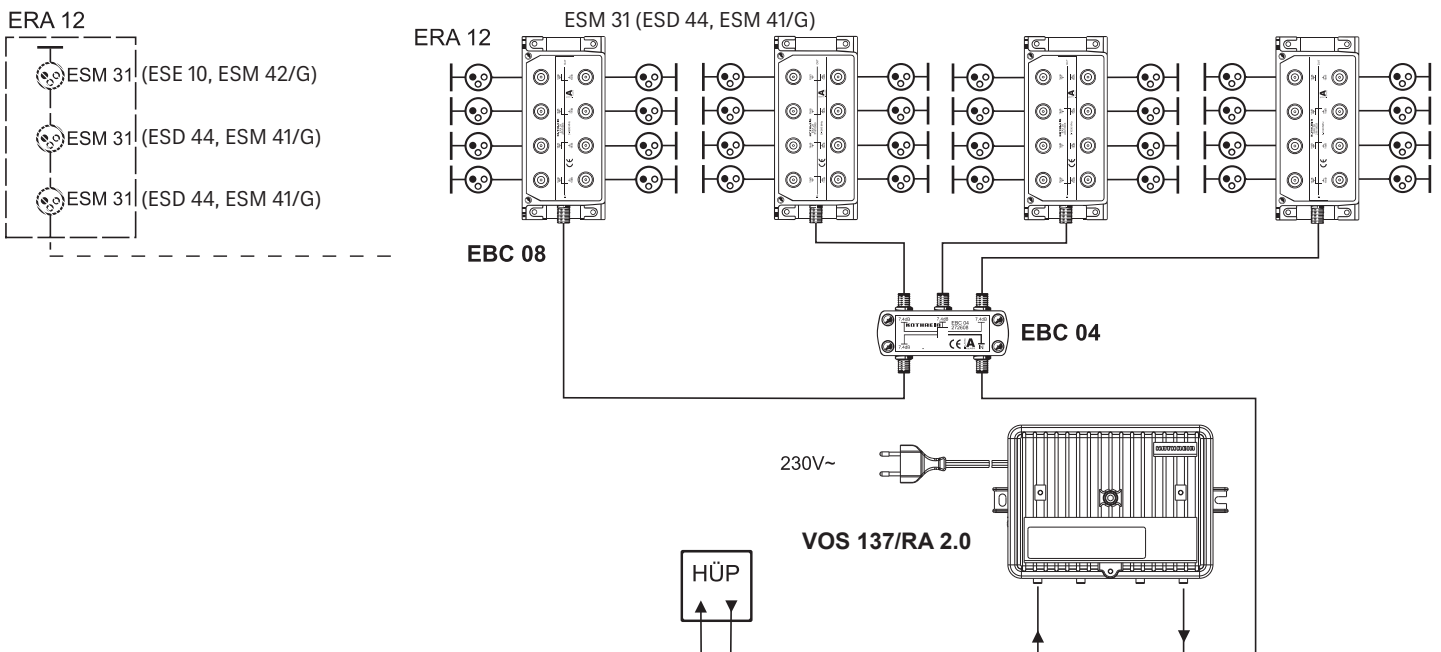


**Before changing the power supply unit fuse or the remote feed fuses (= connection elements) always disconnect the power plug or disconnect the remote feed voltage!**

**Remote feeding (VOS 138/RA 2.0, VOS 139/RA 2.0)**



**Connection example**



## Technical specifications

Type		VOS 137/RA 2.0	VOS 138/RA 2.0	VOS 139/RA 2.0
Part no.		209500003	209500004	209500005
<b>Forward path</b>				
Frequency range <sup>1)</sup>	MHz	47/85-1006	47/85-1006	47/85-1006
Gain	dB	40/34/30	40/34/30	40/34/30
Adjustable attenuator adjustment range	dB	0-20	0-20	0-20
Equalisation setting range	dB	0-20	0-20	0-20
Interstage attenuation adjustment range	dB	0/6/10	0/6/10	0/6/10
Interstage equalisation adjustment range	dB	0/6	0/6	0/6
Maximum operating level at 862 MHz <sup>2)</sup> with 6 dB interstage pre-emphasis (60 dB CTB/CSO)	dB $\mu$ V	113/116	113/116	113/116
Noise figure (interstage attenuation 0/6/10 dB)	dB	Typ. 6/7/7	Typ. 6/7/7	Typ. 6/7/7
<b>Return path</b>				
Frequency range	MHz	5-65	5-65	5-65
Gain	- active	dB	30	30
	- passive	dB	-2	-2
Input attenuation adjustment range	dB	0/10	0/10	0/10
Interstage attenuation adjustment range	dB	0-20	0-20	0-20
Interstage equalisation adjustment range	dB	0/3/6	0/3/6	0/3/6
Max. output level (60 dB IMA2/IMA3)	dB $\mu$ V	107/116	107/116	107/116
Maximum output level KDG 1 TS 140 (full system load)	dB $\mu$ V	120	120	120
Noise factor	dB	Typ. 5	Typ. 5	Typ. 5
Input level density (CINR at 50 dB, EN 60728-3; 4.7)	dB $\mu$ V/Hz	-10	-10	-10
Dynamic range (EN 60728-3; 4.7)	dB	17	17	17
<b>Test sockets (F connector)</b>				
Amplifier input (5-1006 MHz, two-way)	dB	-20	-20	-20
Amplifier output (5-1006 MHz, with directional coupler)	dB	-20	-20	-20
<b>Switched-mode power supply unit</b>				
Nominal input voltage	V~	230	32-65	32-65
Typical nominal power consumption <sup>3)</sup>				
Return path passive or deactivated	W	13	14	14
Return path active	W	14	15	15
<b>General information</b>				
Impedance input/output	Ohm	75	75	75
RF connections		F connector	F connector	PG 11
Remote feed power-capacity	A	-	-	5
Hum-modulation ratio (forwards path/return path)	dB	-	-	70/60
Protection class		II	-	-
Protection class (in accordance with EN 60529) <sup>5)</sup>		IP 54	IP 54	IP 54
Temperature range	°C	-20 to +55	-20 to +55	-20 to +55
Dimensions	mm	218 x 141 x 76	218 x 141 x 76	218 x 141 x 76
Packing unit/weight	Units/kg	1 (10)/1.25	1 (10)/1.25	1 (10)/1.25
Classification to KDG 1 TS 140		Type D (4.4)	Type D (4.4)	Type D (4.4)

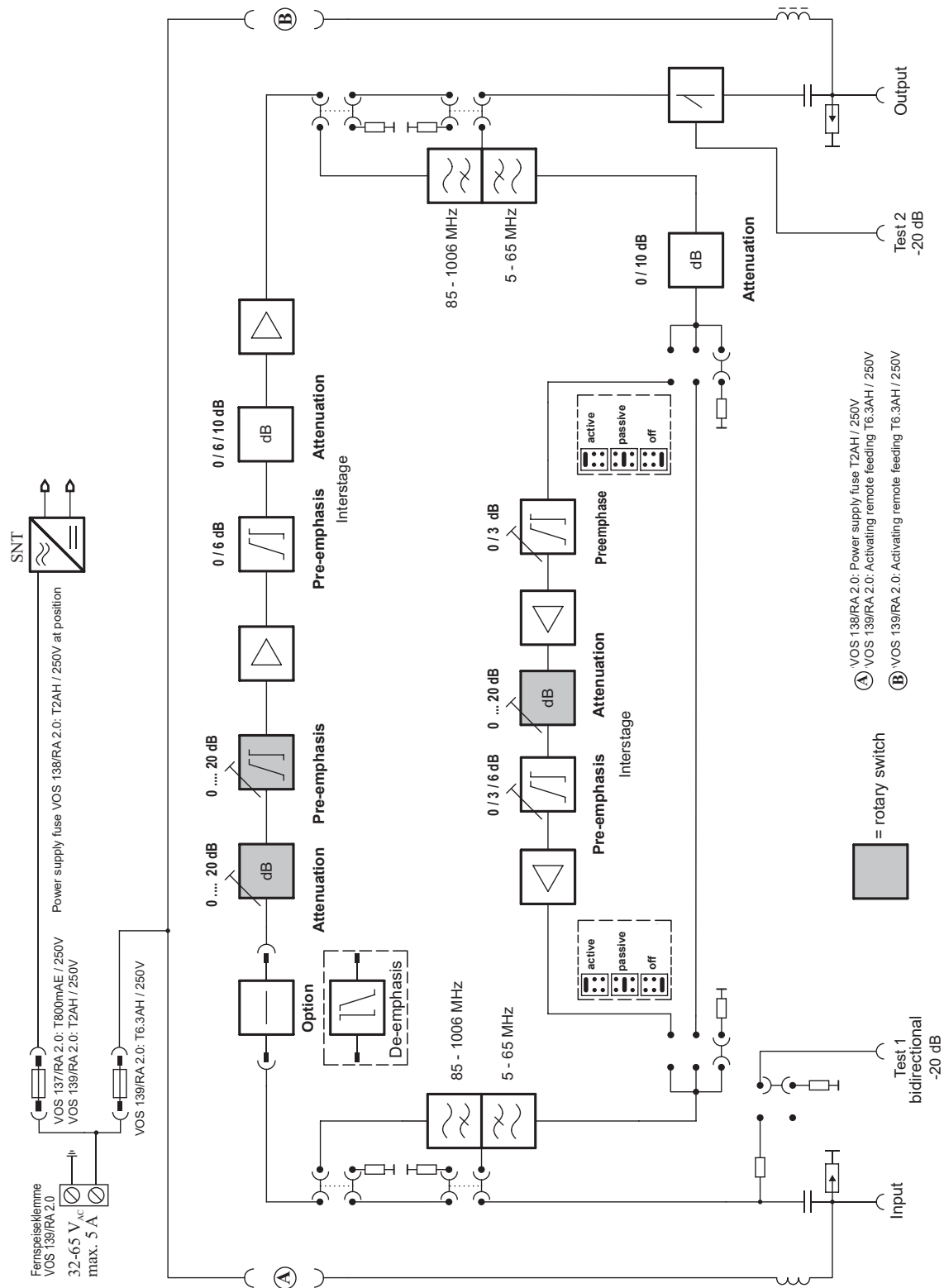
<sup>1)</sup> Frequency range from 47 MHz without return path use

<sup>2)</sup> In accordance with EN 60728-3; GENELEC channel plan with 42 carriers

<sup>3)</sup> VOS 138/RA 2.0 and VOS 139/RA 2.0: Nominal power consumption subject to the infeed voltage during operation via the cable resistance

<sup>4)</sup> Outdoors use only in cabinets with protection against the weather

**Block diagram (VOS 139/RA 2.0)**



**Electronic equipment**

Electronic equipment is not domestic waste – in accordance with directive 2012/19/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL dated 4th July 2012 concerning used electrical and electronic appliances, it must be disposed of properly. At the end of its service life, take this unit for disposal at a designated public collection point.