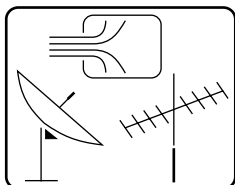
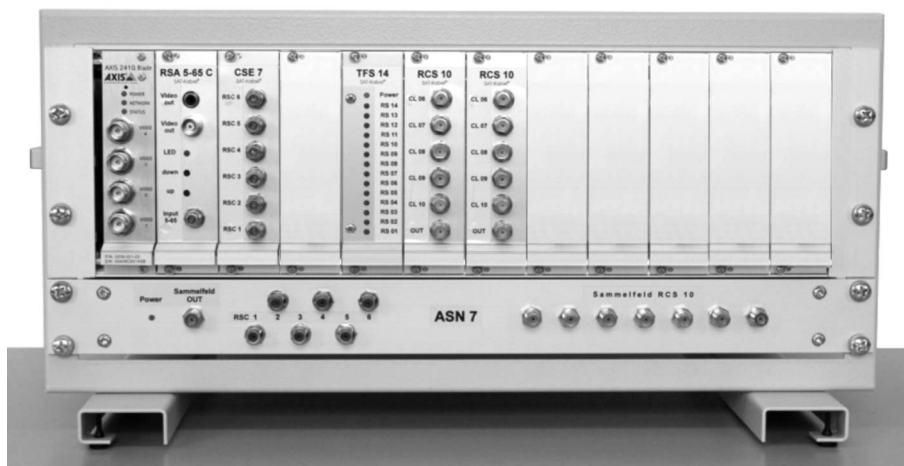


# OPERATING INSTRUCTION

# RCÜ 70

Return path monitoring for up to 70 cluster



**SAT-Kabel**<sup>®</sup>  
Satelliten- und Kabelfernsehanlagen/Industriervertretung GmbH  
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We thank you for buying of a product of the company SAT-Kabel®.

This operating instructions shall help you to understand the functions of the instrument and to ease its use. If you have questions about this instrument or suggestions for further improvements, please get in touch with us.

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## Notation

These operating instructions is basically applicable for all **RCÜ 70**. However some feature and possibilities have been added during the technical development. These are certainly not in all instruments available, depending of its manufacturing date. The description for it can be skipped in this case.

If you are interested, a few innovations can also be retrofitted. In this case get in touch with us.

### Description

The return path cluster monitoring **RCÜ 70** is a measuring and monitoring unit especially for the return path range from 5 to 65 MHz in cable TV networks (CATV). It is used for adjusting, checking and troubleshooting in this range. The modular assembly supports especially the return path monitoring of CATV networks, which are divided in areas, so called cluster. To a **RCÜ 70** can be connected from 1 (if required) up to 70! cluster.

By the remote control over phone is every time a fast checking of any single cluster is possible from any point of the system – e. g. from a subscriber in setting up an Internet connection. The measuring values are displayed as a visual display over video (CVBS). With a modulator this signal is fed into the cable system and can be seen on a usual TV set.

The **RCÜ 70** is assembled and delivered according the requirement of the customer. An upgrade till the maximal possible modules is every time applicable. Accessories you can find at the respective assemblies (module).

### Scope of delivery

<b>BGT 3HE</b>	assembly carrier 19 inch, 3 HE, mounted
<b>RSA 5-65 C</b>	Return path spectrum analyser 5–65 MHz for cluster control
<b>CSE 7</b>	Cluster control unit with phone connection for RSA control
<b>RCS 10</b>	Return path cluster switch 10-fold (up to 7 total), controlled from <b>CSE 7</b>
<b>ASN 7</b>	Power supply, combiner with amplifier (at several <b>RCS 10</b> necessary)
<b>TFS 14</b>	phone remote switch 14-fold, connected at <b>CSE 7</b>
<b>AXIS 241 QB</b>	Video display over network (Internet)

### System components

*Basis configuration*

*Options*

The modules are inserted into the assembly carrier **BGT 3HE** and with the both screws tightened on the front panel (hand-tight, without force). A fully equipped unit is no problem. This assembly carrier is designed to be installed in 19 inch rack/cabinets. The **ASN 7** is designed for a direct installation under the **BGT 3HE** (see operating instruction **ASN 7**). To adequate ventilation should be paid attention.

The F sockets of the **CSE 7** are in NO CASE to terminate with a load resistor, because they are control outputs, no RF outputs.

### Important advices



The surface of the housing can be cleaned with a dry, soft and lintfree cloth. Do not use aggressive solvents for the cleaning.

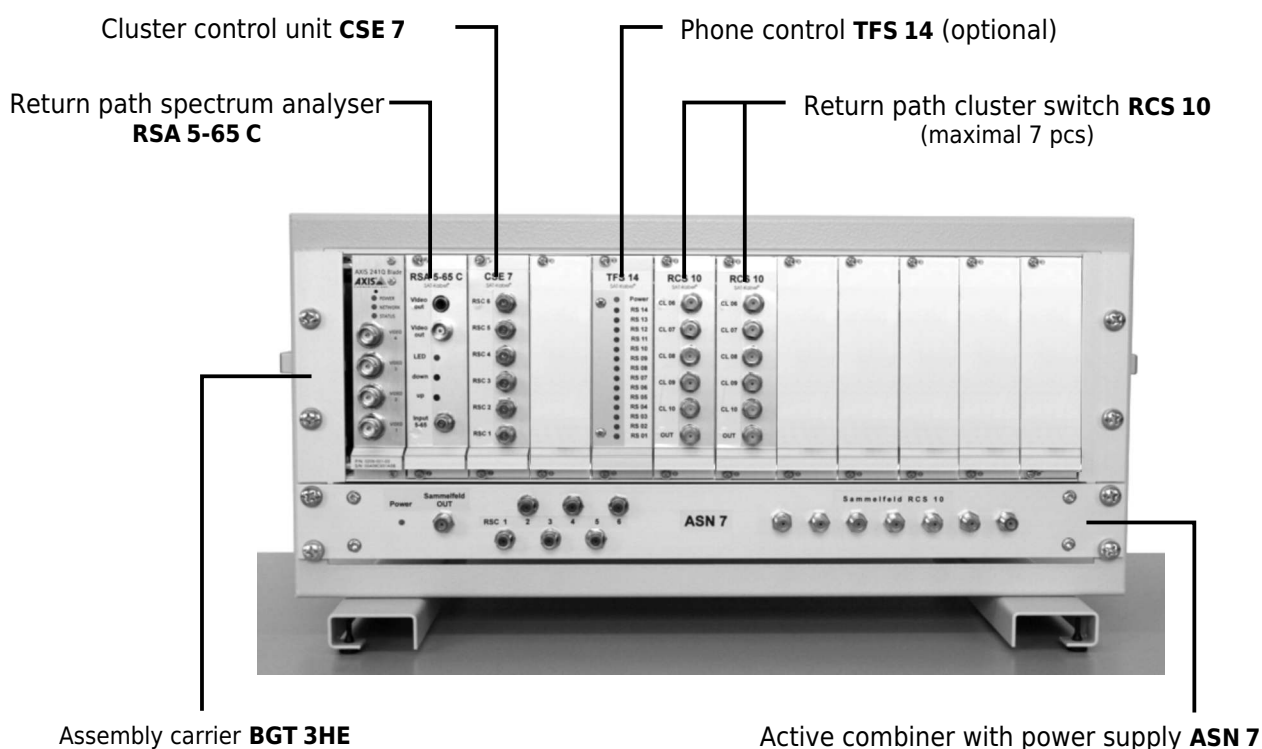
### Cleaning

## Special features

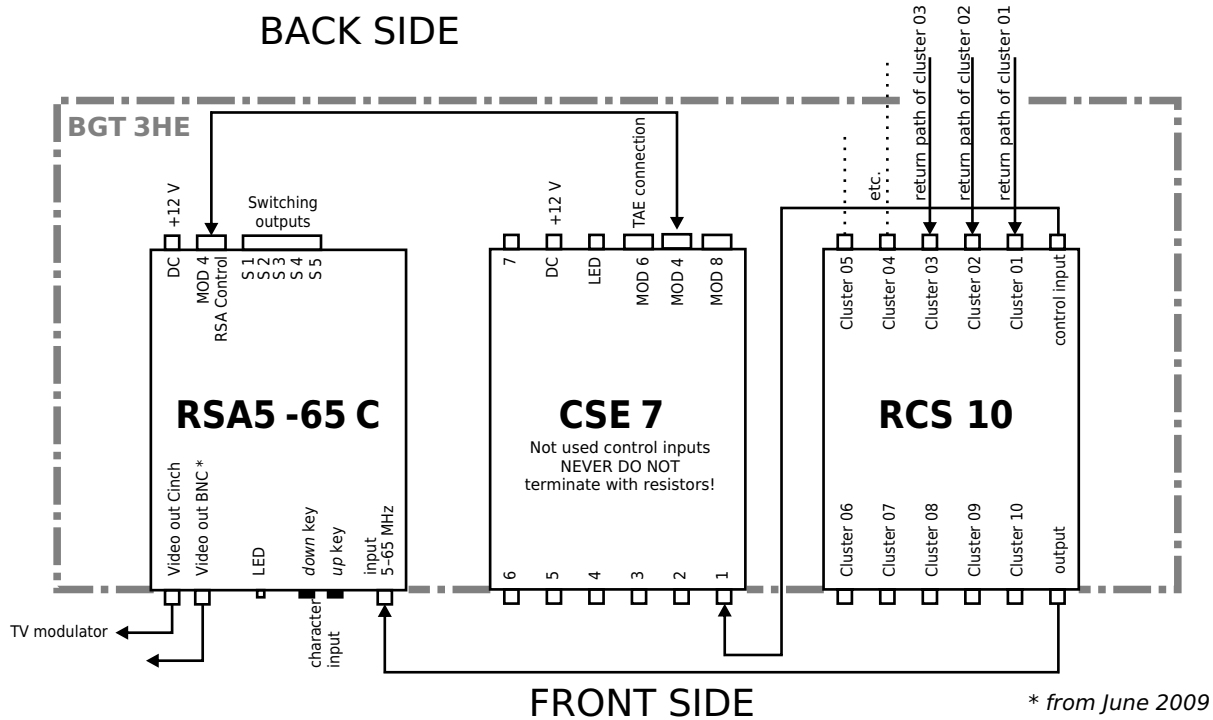
- programming is made over phone
- monitoring and control of maximal 70 cluster
- every cluster can be assigned a »name«
- the cluster scan is automatically or manually possible
  - automatically* - in predetermined time switches the system to the next cluster
  - manually* - permanent scan of a cluster  
Switching to the next one first after notification by phone and input of an order.
- The troubleshooting in the return path is alleviated, as by means of a mobile phone the **RCÜ 70** can be called and the desired cluster can be selected. So it stands to continuous assessment during the operation available.
- Flat carrier monitoring with threshold limit evaluation, see also return path channel twin generator of type **RTG 14+56**
- Video output with CVBS signal  
This is fed with an external modulator into the distribution network.
- Dynamics 40 dB
- The minimal configuration consist of the 19 inch assembly carrier **BGT 3HE** with **RSA 5-65 C**, **CSE 7** and a **RCS 10**. At larger HFC networks further **RCS 10** are to use.

## Assembly

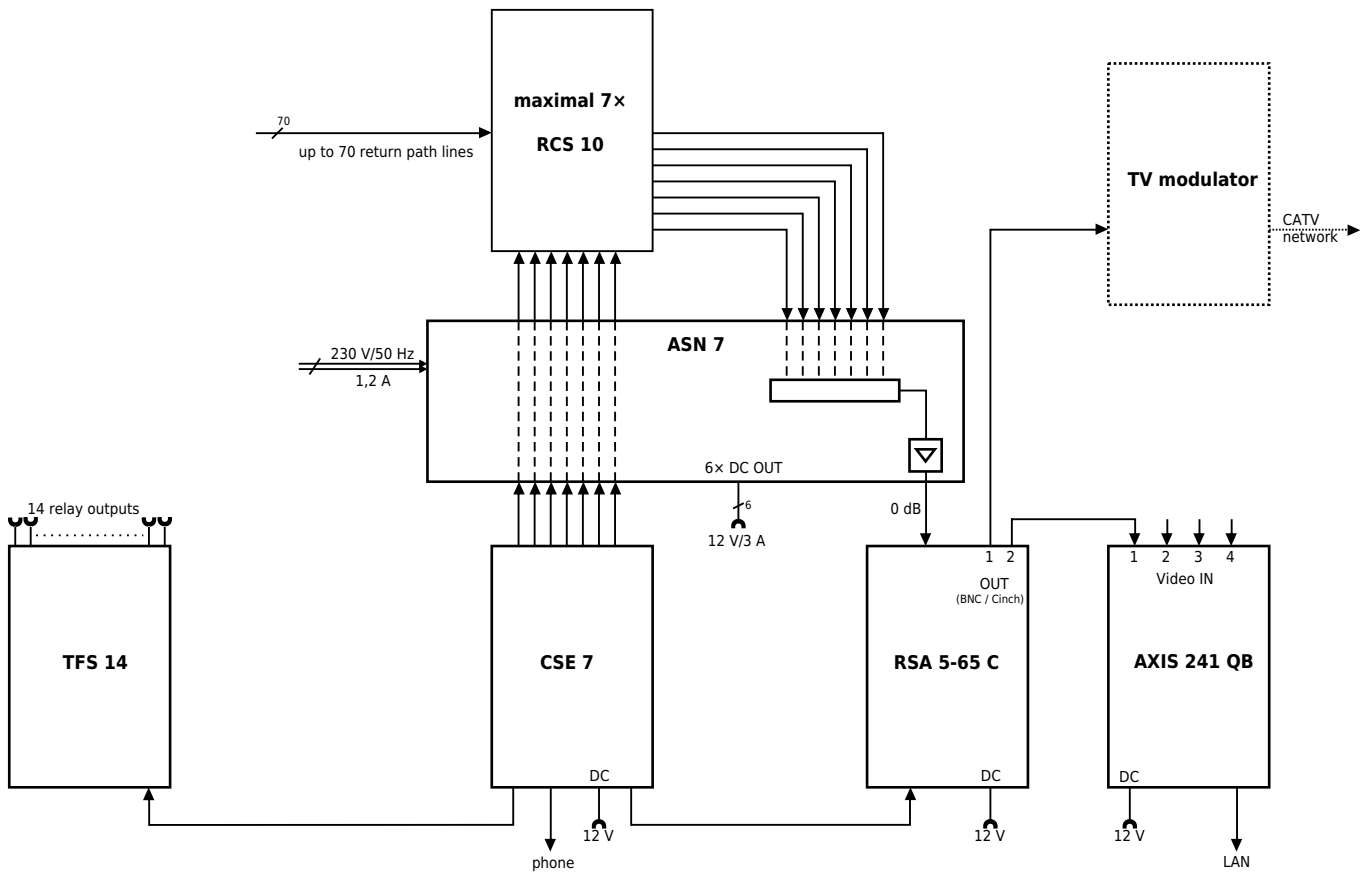
- Example without cabling



## Circuit diagram Minimal configuration



## Circuit diagram Maximal extension



**Description**

The **RSA 5-65 C** is a return path spectrum analyser. This analyser scans the signals of the return path in the spectrum 5–65 MHz. The signals are converted for a visual display in a PAL signal according the TV standard B/G. This procedure is patented. Thereby the return path signals from 5 to 65 MHz are displayed on the Y-axis with a grating of 5 MHz and on the X-axis the normalized level in  $dB(\mu V)$ .

The manually operating of the **RSA 5-65 C** is possible by the keys »up« and »down«. However it can also be programmed in the system by the **CSE 7**.

At front side the video signal is available at the cinch socket – from June 2009 additional at the BNC socket. This can be connected to a respective modulator of the head end. This feeding into the distribution network allows a visually assessment of the return path by means of a measuring instrument or with a usual TV set of the subscriber on every point of the distribution network.

At the back side of the assembly are located the 5 switching outputs S1–S5. The load capacity of a switching output is 24 V/500 mA. In the programming mode can be assigned to the 5 corresponding relays per a return path frequency with an allowed level tolerance. Precondition is however the existence of flat carriers – one or more – in the return path spectrum (e.g. from a **RTG 14-65**).

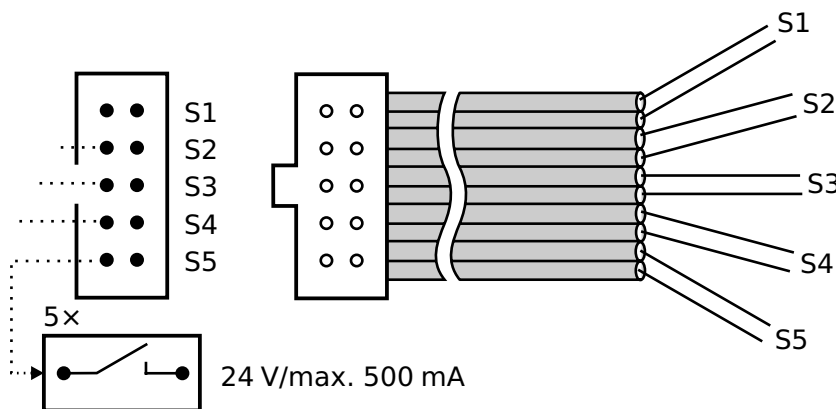
Furthermore in the programming mode there are the possibility to furnish the single cluster with a recognizable alphanumeric marking.



**Scope of delivery**

- 1 **RSA 5-65 C** – plug-in module for **BGT 3HE**
- 1 plug-on power supply 12 V/400 mA
- 1 ribbon cable line 10-pole, 1,5 m, with pin socket connector for the connection of the alarm relays

**Connection cable for alarm relays**



## Connexions and controls

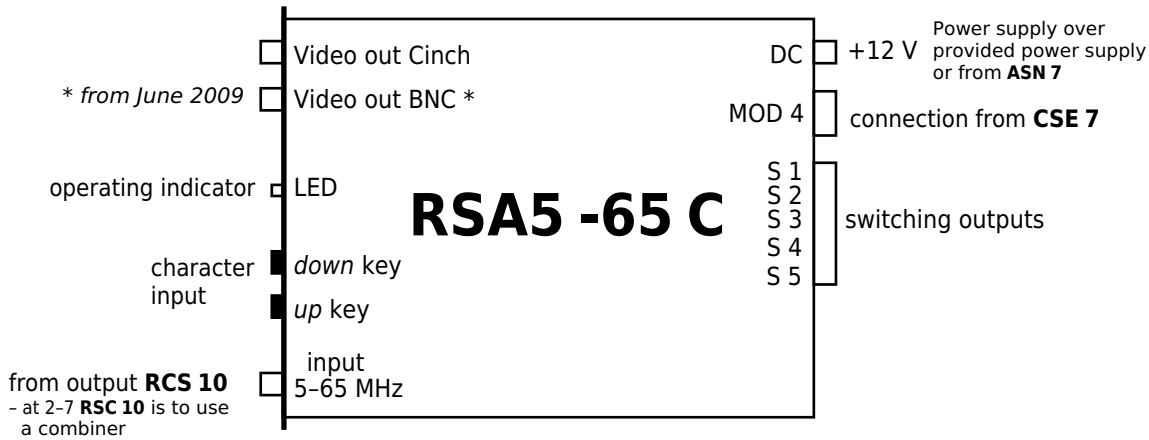
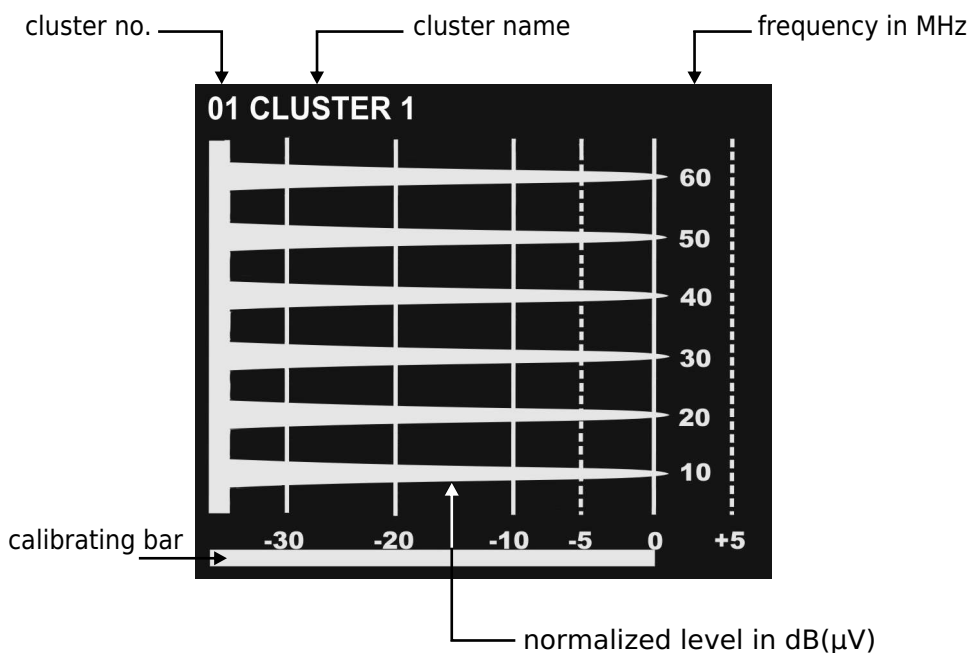


Image of a normalized return path cluster monitoring of 0 dB calibrated by means of a return path fixed frequency generator **RSA 5-65 C** resp. an according levelled return path cluster (perfect condition). This correspond to 70 dB(μV) at the RF input of the **RSA 5-65 C**.

## TV display of the measuring value



**Programming**

*with the keys*

*»up« and »down« on the **RSA 5-65 C***

**mode ON**            *»up« and »down« key push simultaneously, until cursor (dash under a character) appears.*

**Cursor position**    *Push any key long (ca. 1 s) (depending of the key one position to left or to right)*

*Cluster name*

**cluster switch to the next or change name**    *At the cursor position push shortly a key (tip) – character selection forward or backward*

**text store**            *If the cursor is in the text area, push both keys simultaneously. After 1-2 s the cursor jumps to the cluster No. **00-70**. Now can be selected for a further text input a further cluster-No.*

**mode OFF**            *If the cursor is on a cluster number, push both keys simultaneously. After 1-2 s the cursor disappears.*

Text, which is stored on cluster No. **00**, appears at switch on of the **RSA 5-65 C** without the cluster No. **00** and is not selectable by the cluster control unit **CSE 7**.

*Switching outputs – relays*

In the programming mode can be adjusted on the cluster No. 71-75 the function of 5 relays. Thereby can be programmed up to 5 frequencies with level thresholds, at which this relays switch:

e.g. **»71 10.00 MHz AL< -05 3U -05«**

- 71**                    - adjustments for the relays resp. monitoring frequency 1
- 10.00 MHz**        - monitoring frequency
- AL<**                - at undercut of the level threshold an alarm is given
- AL>**                - at exceeding of the level threshold an alarm is given
- At an alarm the relays is activated and drops out only at undercutting or exceeding of the level threshold by 5 dB from.*
- 05 dB**            - specified level limit (-5 dB)
- 3U**                 - number of the successive cluster circulation (here 3x) at which the level limits must undercut or exceeded, that alarm is given
- 05**                 - measured level (5 dB)

*Scan range*

In the programming mode can be changed on the cluster No. 90-92 the scan adjustment.

- cluster No. 90**    Scan adjustment    from 5,0 MHz to 65,0 MHz
- cluster No. 91**    Scan adjustment    from 5,0 MHz to 32,5 MHz
- cluster No. 92**    Scan adjustment    from 32,5 MHz to 65,0 MHz



The **CSE 7** is the central assembly of the return path monitoring system for control of the moduls **RSA 5-65 C**, **RCS 10** and **TFS 14**. The specific feature are:

- controls the switch over of the lines of the cluster, connected at the **RCS 10**
- support up to seven **RCS 10** with each 10 lines, thus a total of 70 lines (cluster)
- every line can be controlled individually by phone
- controls the automatic circulation with cluster detection
- the respective maximal number of the connected lines can be programmed
- controls the relays of the phone remote switch **TFS 14**
- allows the programming of the **RSA 5-65 C** via phone

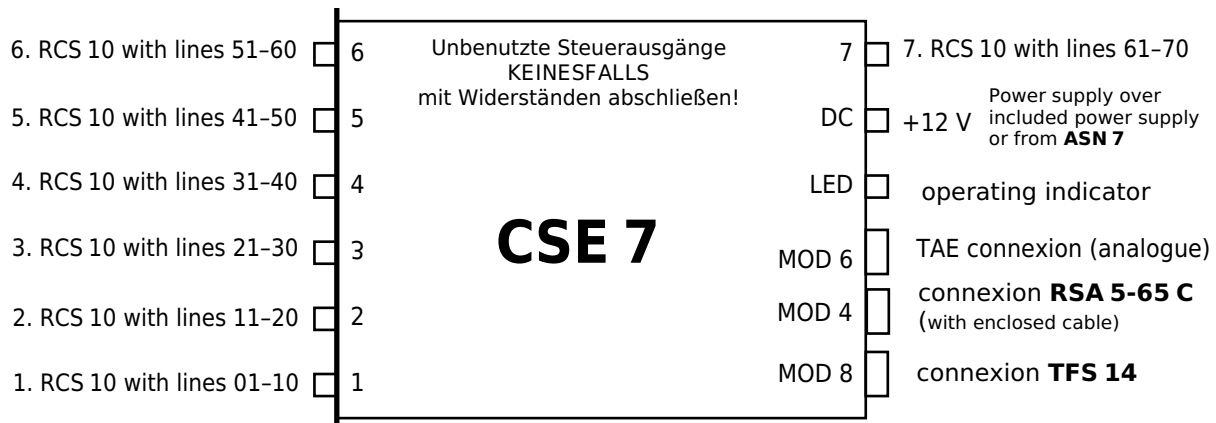
## Description



- 1 **CSE 7** – plug-in module for **BGT 3HE**
- 1 plug-on power supply 12 V/400 mA
- 1 connecting cable for connection of a **RSA 5-65 C**

## Scope of delivery

## Connexions



For the operating and programming of the **CSE 7** is an analogue phone connexion mandatory! This could be done as follows:

- analogue line network connexion at the place of installation of the **RCÜ 70** is available
- connexion over VOIP modem with analogue phone output
- connexion over GSM module for conversion of mobile radio to an analogue phone connexion

For **ONLY**-on-site service (e.g. only programming or for testing)

- use of an analogue private branch exchange (from 2 subscriber)
  1. subscriber is the phone, 2. Subscriber the **CSE 7**



At the connexion of the cluster switch **RCS 10** it is important to ensure, that these are to connect always sequentially, thus beginning at 1, to the **CSE 7**. Not used control outputs must not IN NO CASE terminate with resistors! Tip: Use to protect the connectors when needed simply with the needless protection caps of the F taps or splitter.

## Instructions for operation

**Operating**

**Call** The cluster control is called over a phone and is activated after ca. 3 ringing tones. To welcome sounds a melody.

**Control** The control is done over the key input of the phone. (see subsequent table)

**Power blackout** After a power blackout the cluster control starts with the last given order over the phone

**Ring off** After the ring off the cluster control rings off also after maximal 20 s and can be called now again.

The cluster control also rings off, if no keystroke is done within 5 minutes. Than it can be called again. The last dialled line remain interconnected after the ring off , till the cluster control gets a new order over the phone.

After a power blackout will be set again the last interconnected line resp. the automatic circulation is set.

**Programming**

- **For 2-digit number input keys must be pressed within 2 seconds**
- **At the correct input is heard a fast sequence of notes.**
- **At incorrect input are two notes slowly played with a low frequency.**

	Key input						Explanation
<b>Control of lines of the connected RCS 10</b>							
<b>all cluster switch off</b>			0				
<b>Control of single lines at RCS 10 of a defined cluster</b>							
<i>For cluster 1</i>							
Line 1 at cluster 1 on			1				
Line 2 at cluster 1 on			2				
etc. up to							
Line 10 at cluster 1 on			1	0			
<i>etc. up to for cluster 7</i>							
Line 1 at cluster 7 on			6	1			
Line 2 at cluster 7 on			6	2			
etc. up to							
Line 10 at cluster 7 on			7	0			
<b>Automatic circulation with new time input</b> shall be started. The time setting must be done within 4 s, otherwise the old time setting remains.			9	9	x	x	<b>x x:</b> stands for the input of the time (1-99 s) for the next line switch over. At no input persist the last preset time
<b>Adjustments of the cluster control CSE 7</b>							
<b>Adjustment of the maximal connected lines at the cluster</b> The setting of the lines <b>xx</b> must be done within 4 s.	0	0	9	8	x	x	<b>x x:</b> stand for the input of the number of max. connected lines (input from 1 to including 70 possible). But the lines must connected in turn on the <b>CSE 7</b> (1. line = cluster 1 etc.).
<b>Greeting melody</b>	0	0	9	7	x	x	<b>x x:</b> stand for the input of a 15-digit melody, which is played at a call

	Key input				Explanation	
<b>Control of the RSA 5-65 C</b>						
<b>Input of the street name at RSA over the cluster control</b> 1) In the programming mode of the RSA comes only at incorrect keys a fast note sequence, so can the character fast be changed. 2) The line setting resp. automatic circulation persist in the time of the programming.	0	0	5		Mode starts (than the following keys are available for this functions)	
			8		character at one decrease (character down)	
			2		character at one increase (character up)	
			4		Cursor at one shift to the left (Position down)	
			6		Cursor at one shift to the right (Position up)	
			0		Inputted values store	
			5		Programming mode conclude	
<b>Adjustment of the alarm relays show</b>			7	1	Adjustment for alarm relay 1 show	
			7	2	Adjustment for alarm relay 2 show	
			7	3	Adjustment for alarm relay 3 show	
			7	4	Adjustment for alarm relay 4 show	
			7	5	Adjustment for alarm relay 5 show	
<b>Picture resolution change (Zooming)</b>			9	0	range 5...65 MHz	
			9	1	range 5...35 MHz	
			9	2	range 35...65 MHz	
<b>Control of the relays on TFS 14</b>						
<b>Relays for 3 s energize</b>			7	6	Relay 11 is for 3 s energized	
			7	7	Relay 12 is for 3 s energized	
			7	8	Relay 13 is for 3 s energized	
			7	9	Relay 14 is for 3 s energized	
<b>Relays 1 to 10 switch on/off</b>			8	0	State of Relay 1 is shown (ON/OFF)	
			8	0	0	Relay 1 ⇒ OFF
			8	0	1	Relay 1 ⇒ ON
			8	1		State of Relay 2 is shown (ON/OFF)
			8	1	0	Relay 2 ⇒ OFF
			8	1	1	Relay 2 ⇒ ON
						etc.
			8	9		State of Relay 10 is shown (ON/OFF)
			8	9	0	Relay 10 ⇒ OFF
		8	9	1	Relay 10 ⇒ ON	

## Summary

Which number stand for which line at cluster switch

Zahleneingabe	Leitungen am entsprechenden Cluster
1 to 10	line 1 to 10 at cluster 1
11 to 20	line 1 to 10 at cluster 2
21 to 30	line 1 to 10 at cluster 3
31 to 40	line 1 to 10 at cluster 4
41 to 50	line 1 to 10 at cluster 5
51 to 60	line 1 to 10 at cluster 6
61 to 70	line 1 to 10 at cluster 7

**Description**



The **RCS 10** is the really return path cluster switch, over which the switching of the single return path signals is taken place. These are than over its output transferred to the **RSA 5-65 C** for the evaluation. The control of the switches is carried out by the **CSE 7**. It can be connected maximal 10 return path cluster to a **RCS 10**. Not used inputs can be terminated with a F-resistor of 75 Ohm, but it is not really necessary.

The power supply of the **RCS 10** is done over the control line (an usual F-patch cable) from the **CSE 7**. A separate power supply is therefore not necessary. For installation the **RCS 10** is to insert into the assembly carrier **BGT 3HE** and by means of the two screws to tighten at the front side.

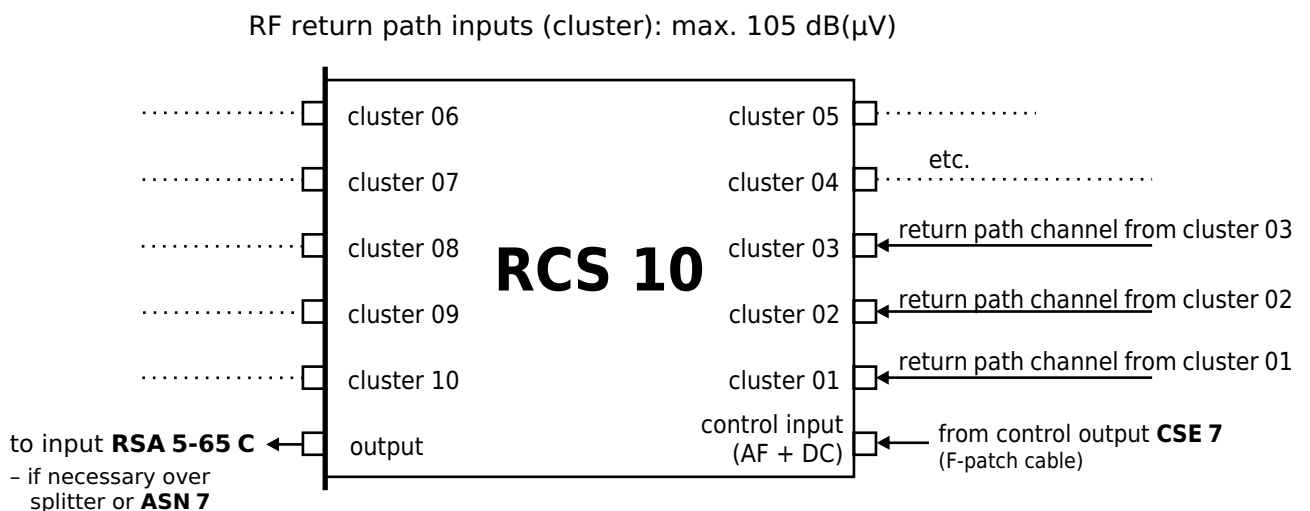
The system **RCÜ 70** can manage till seven **RCS 10**. If several of this modules are used, they must combined over a splitter (inverse, i. e. over the RF outputs to the RF input of the splitter) or at best with the **ASN 7**. The RF output is to connect after that with the RF input of the **RSA 5-65 C**.

To gate out not needed return path inputs use at the **CSE 7** the setting »maximal connected lines« (keyboard order 0098xx, see table page 10). However precondition is, the inputs of all **RCS 10** are occupied sequentially. It has to begin with cluster 1 at switch 1 and successive to continue. Thereby the maximal RF level of 105 dB(µV) at each input must not exceed to protect mutual disturbances. Furthermore it is to consider, that at the signal analysis by the **RSA 5-65 C** already 70 dB(µV) at its input a display of 0 dB produce on the screen, i. e. the input signal at the **RSA 5-65 C** is adequate to match - best with fixed attenuator.

**Scope of delivery**

- 1 **RCS 10** - plug-in modul for **BGT 3HE**

**Connexions**



## Description

The phone control **TFS 14** is an optional assembly of the return path cluster monitoring **RCÜ 70**. It extends this one with the possibility, to activate different switching operations, e. g. devices to switch on or off... .

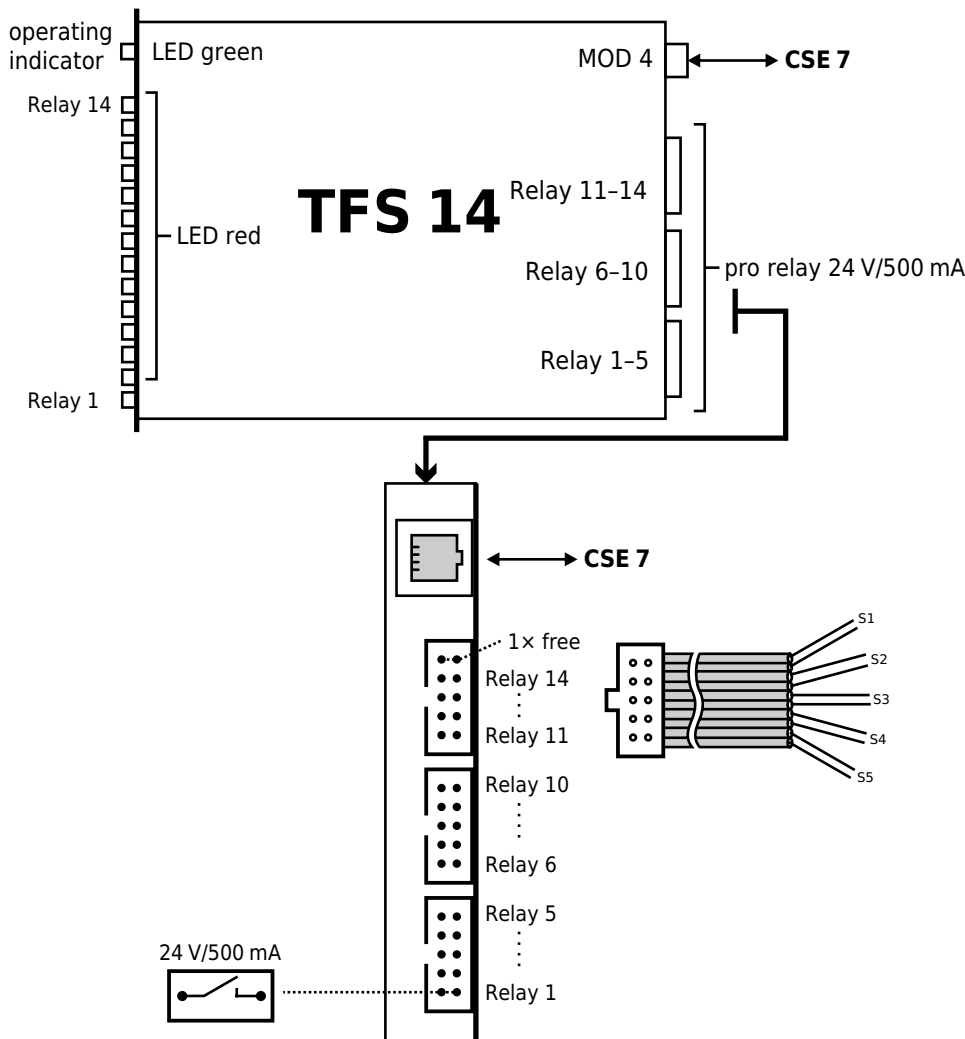
For this purpose the **TFS 14** is equipped with 14 relays, whose switching contacts are amenable by means of connecting cable (see **RSA 5-65 C**). Over a control line the phone control is connected with the **CSE 7**. So it is possible to activate the relays from one phone, which is connected with the **CSE 7**.

A separate power supply for the **TFS 14** is not necessary, because it is done from the **CSE 7**.

- 1 **TFS 14** - plug-in module for **BGT 3HE**
- 1 connecting cable to the **CSE 7**
- 3 ribbon cable line 10-pole, 1.5m, with pin socket (see down)

## Scope of delivery

## Connexions



**Description**

The active combiner **ASN 7** is a component of the return path monitoring system **RCÜ 70**. It allows a clearly arranged connection of the system components among each other and serves simultaneously for a central power supply of the single components. The main feature are:

- installation under the »RCÜ 70« systems
- 6× feed-through of the six signal lines at the front of the **CSE 7** at the back side of the system to realize a clearly arranged connection of the **RCS 10**
- central power supply for the components of the »RCÜ 70« system and accessories
- combiner for 7× **RCS 10** for common connection at the **RSA 5-65C**

**Scope of delivery**

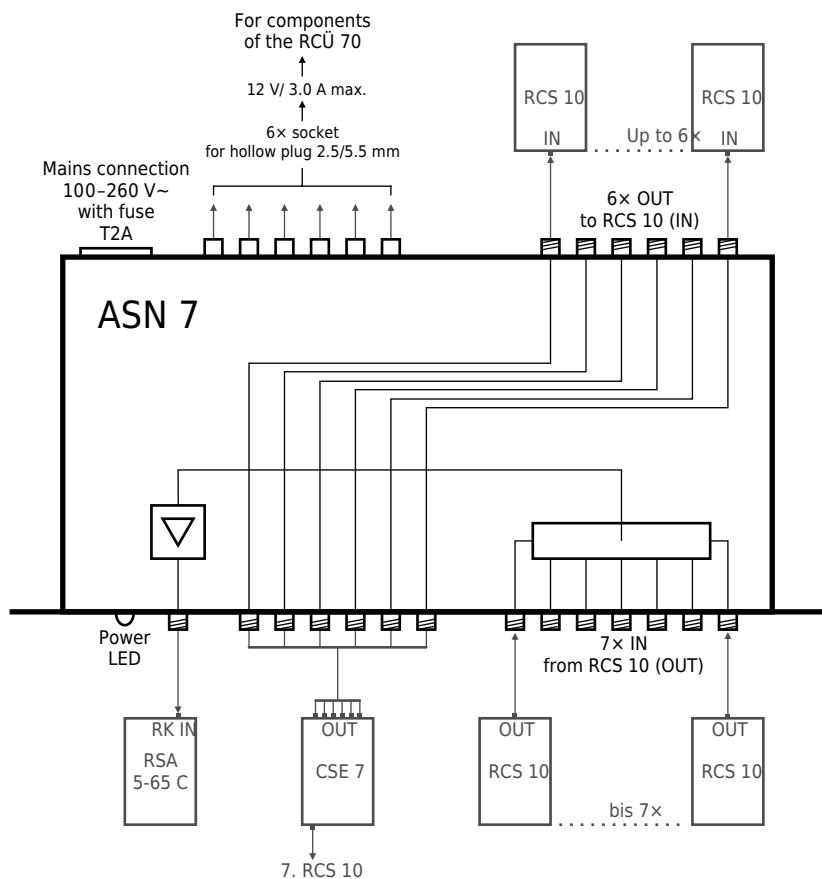
- 1 **ASN 7** (19 inch plug-in 1 HE)
- 1 Cold device connecting cable
- 4 DC connecting cable 35 cm long
- 2 DC connecting cable 50 cm long
- Operating instructions

**Important advice for installation**



The device is designed for installation in 19 inch racks/cabinets. It should not be strongly heated from below. For it is to leave free at least 1 HE under the device and to ensure a ventilation (cover with openings).

**Installation scheme**



Mains connection .....	100-260 V <sub>AC</sub> , 47-63 Hz
Current consumption .....	1.2 A/115 V; 0.6 A/230 V
Fuse .....	2 A inert
.....	Glass fuse in the mains connection
Load inrush current .....	60 A
Special features .....	overload protection, short circuit proof
Ambient temperature .....	0 °C to +40 °C
dimensions .....	19 inch plug-in 1 HE
.....	D 447 mm x B 220 mm x H 44 mm

## Technical Data

For this instrument will be granted a service life (in following called guarantee) to following conditions:

**Guarantee**  
State July 2006

- This guarantee is valid for new instruments purchased in Germany.
- New instruments and their components, which are defective because of production faults and/or material faults, are repaired or are replaced from SAT-Kabel® against a corresponding instrument.
- For wear parts, like accumulators, keyboards, housings, bags, connecting cables this guarantee is valid for 6 month from the purchasing date.
- The guarantee claim expires at matings by the purchaser or third persons.
- At defects, caused by improper handling or operating, by wrong installation or store, by improper connection or mounting, no guarantee is granted .
- For not justified demand of our service we charge for our service the usual payment for material, working hours and forwarding costs.
- Repairs are only made with filled service covering.

(Forms for service coverings and further information are found in the standard form contracts under: [www.sat-kabel.de](http://www.sat-kabel.de) )

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