SIM 25

08-2014

Combined measuring instrument
RF measuring instrument and pulse reflectometer

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.

This instruction has been performed to the best of our knowledge. Developments and technical amendments are subject to change without notice.
Topical made operating instructions in a PDF format can also downloaded from our Internet homepage (***www.sat-kabel.de***)
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1. General

The processor-controlled combined measuring instrument SIM 25 is due its small size and its high measuring accuracy an ideal device for testing and fault locating in aerial systems, CATV networks and satellite systems. It is an combination of SPM 22 and IRM 5. Many important RF- and cable parameters of the systems can be determined by one device only. The spectral view permits a slope evaluation of amplifiers. It is also used for displaying of interfering carriers, also in range of the return path in CATV systems. By the meter's automatic self calibration function the measured values are nearly temperature independent. The full-value pulse reflectometer is suitable for cable lengths up to 2000 m.
This unique combination is an optimal device for the ambitious practician!

2. Delivery volume

1 **SIM 25** incl. high-quality NiMH accumulator
1 plugin charging device AC/AC
1 operating instructions

optional available:

measuring cable **MKA 150 HQ** with adapter
Symmetrical measuring cable with adapter **SMK-IRM**
Imitation leather bag **KLT** or **KLT 2**
Plastic case **TKSI**
Protective housing green, with carrying strap **SGW**
Car charging cable **KFZ-LK**

3. Important notes!

- **Measurement only on strain-free objects!**
- Do not expose incident solar radiation, heath and extreme coldness!
- The working temperature range is 0 °C until +40 °C
- avoid shocks by bumps or falling down. We recommend the use of the imitation leather bag.
- The F-measuring socket is a high-quality component. **This one is designed for a maximum diameter of 1.1 mm of the inner conductor.** We recommend for a good care of the socket to use a measuring cable with F-connector plus an according adapter.
- The surface of the housing can be cleaned with a dry, soft and lintfree cloth. Do not use aggressive solvents for the cleaning.

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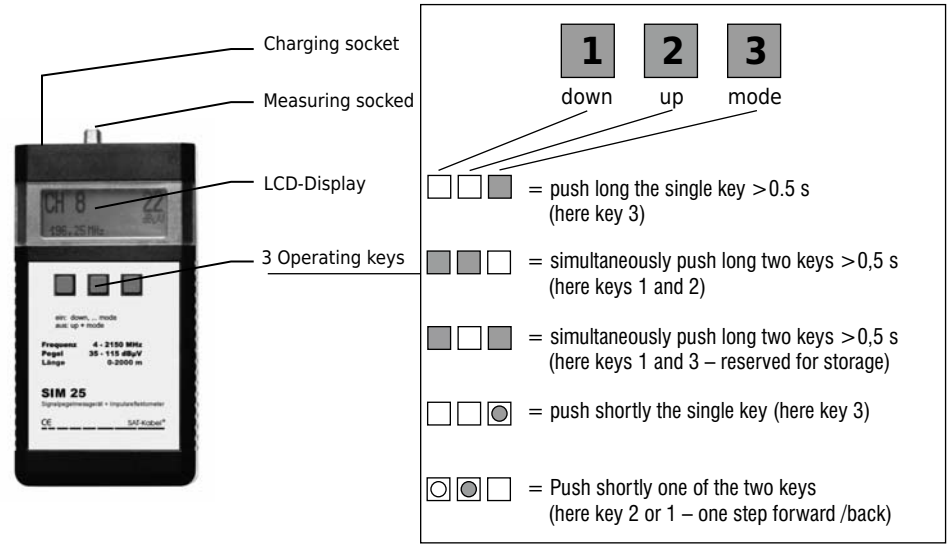
4. Charging the battery

Connect the plugin charging device (containing in the delivery volume) to the charging socket (ø5.5/2.1 mm, plus pole inside). The power supply voltage (11...24 V) and charging control is shown on the display.

Charging time: ca. 10 h at empty accumulator
Charging end: ca. 7.2 V accumulator bar stand idle

5. Control and functional elements



6. Operating functions

Function	**operated from:**		
Switch on 1 **SPM**	Push the key »down« after that key »mode« shortly (see p.6)		
Switch on 1 **IRM**	Push the key »down«>1 s after that key »up« shortly (see p. 13)		
Switch on 2 **IRM**	Push the key »down«>1 s after that key »up« shortly (see p. 13)		
Switch off	Push the keys »up« and »mode« simultaneously and shortly		
Cursor move	key »down«	shortly	– one step to left
	key »up«	shortly	– one step to right
Menu	key »mode«	long (>1 s)	– one menu point forward
	key »mode«	shortly	– one menu point back

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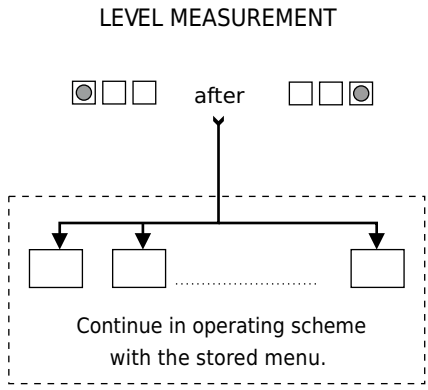
6.1 Switch on



Menu / Measure	Display
Scan / dB(µV)	
3K / dB(µV)	dBµV
BK / dB(µV)	dBµV
SAT / dB(µV)	
DVB-T / dB(µV) – with antenna	dBµV

After switch on of the instrument the last stored measuring range appears at the display. With the key »up« or the key »down« can be selected another measuring range. At the **SPM** the following ranges are available:

SCAN - 3-KANAL - BK - SAT - DVB-T

6.2 Store switch on measuring range

The measuring range, which shall be available after switch on, can be defined by storage.

For it the wanted measuring range has to activate:

SCAN - 3-KANAL - BK - SAT - DVB-T

Push now the keys »down« and »mode« simultaneously until the storage symbol appears. At the next switch on of the instrument this measuring range is available at once.

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6.3 Switch off

Push the keys »up« and »mode« simultaneously. This is general possible in all menu points and by that also a kind »emergency exit«.

7. Measuring ranges

SCAN | Used for quick overview of an existing frequency spectrum. It enables the selection of three ranges: channels in the CATV range, frequencies in an extended CATV range and frequencies in the SAT range. The highest measured level is displayed at channel/frequency (at digital signals are to add the following correction values: +10 dB at QAM, COFDM and +13 dB at QPSK). Now it can by repeatedly zooming the displayed channel or frequency range further be analyzed.

3-KANAL | This measuring range is suitable for a quick check, e. g. at the system outlets as ell as especially for evaluation and adjustment of slopes. Here the levels are measured of every three channels / frequencies / »D« channels, which are placed on one of the storage places. Digital frequencies must be stored at this as »D« channel; otherwise there is no automatic level correction! During the subsequent menu »SCAN« is usually carried out a channel scan. Should be programmed on a channel to be measured a frequency or a digital channel, it will then performed a frequency scan.

BK | This measuring range is suitable for fast measurements in CATV systems. In this case can go on switched in the channel raster inclusive return path and fm radio. Digital channels are automatically detected and the precise level value is displayed.

> ***Special feature from V 41.83:*** If the SPM 22… detect on S2/S3 digital signals, they are considered as 8 MHz channels. (S2: 109–117 MHz; S3: 117–125 MHz)

SAT | This range is designed for the service of SAT receiving systems. The receiving spectrum can be displayed in several resolutions. At digital QPSK-signals are to add +13 dB to the measured level value.

> ***ATTENTION!*** *For the control and power supply of LNB is the additional accumulator* ***AU-SPM*** *necessary. This one must be ordered separately as accessories.*

DVB-T | Here is measured the special frequency range only. This range contains menus for channel raster and frequency spectrum. As accessories there are several antennas and a preamplifier.

> ***NOTE:*** *In all displayed level values are usually the corresponding correction values calculated. However this is only ensured with the original accessories.*

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7.1 Additional functions

All instruments have a bar display (bargraph) for a faster overview in the CATV and SAT ranges for the level.

Bargraph

From software version 40.93 it is possible to measure digital level in CATV systems. For identification in the display is additionally displayed a **D**

Digital level in CATV channel

ATTENTION!

In the range »BK«, these »D«" channels are automatically detected.

If in the measurement of a digital channel a »D« appears in the display, it is NOT a level correction necessary.

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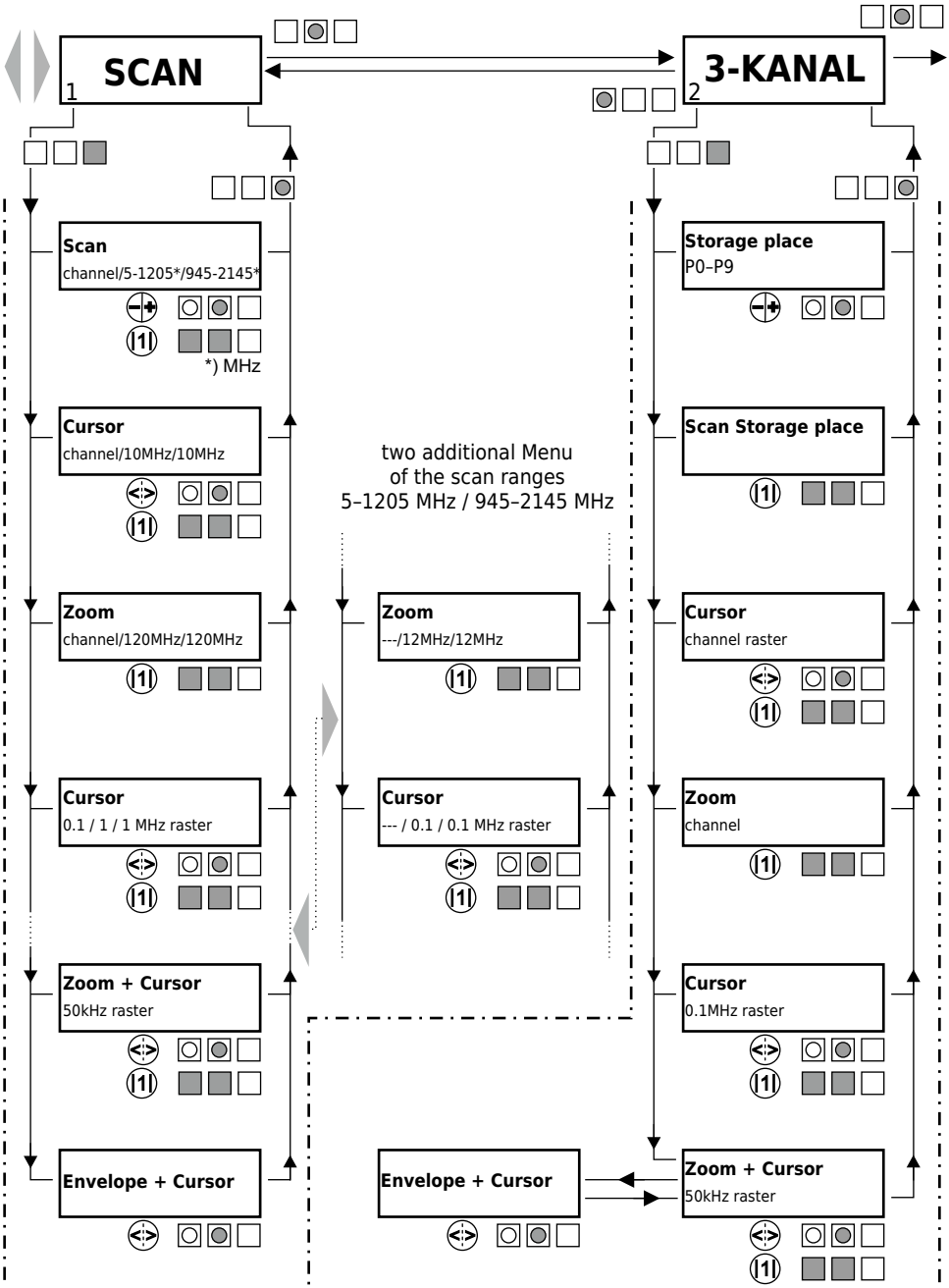
8. Operating scheme SPM

from software version V43.33

After switch on of the instrument a menu point from the highest row will be displayed.



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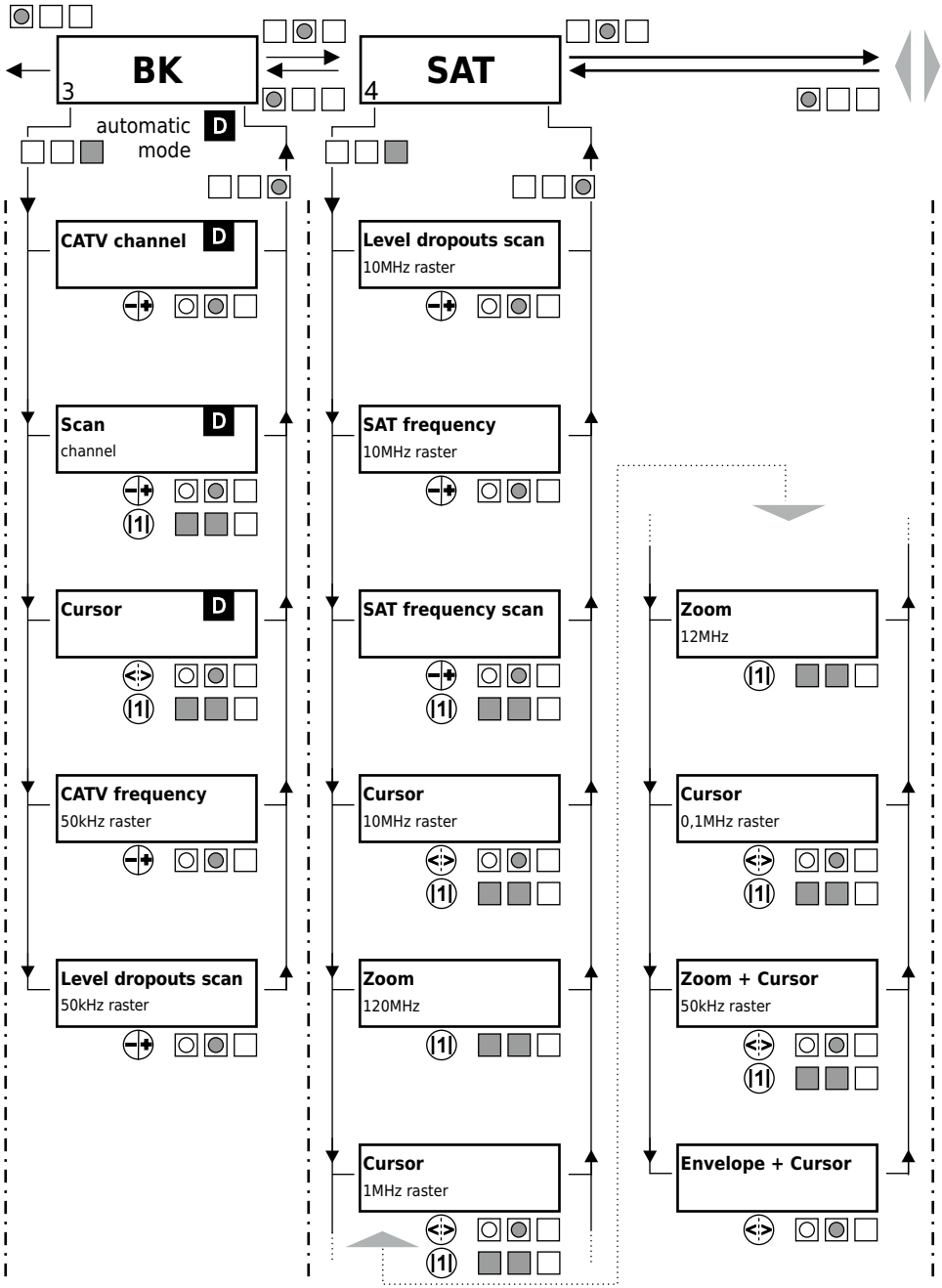

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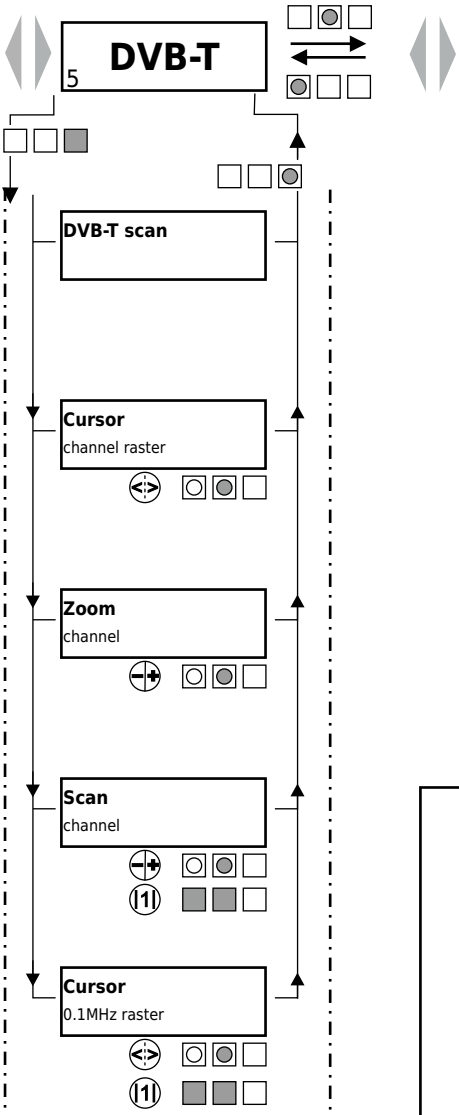

Signs and symbols

- = Do not push the key!
- = Push key long >0.5 s
- = Push shortly the key
- = Alternative push key shortly
- = Selection back/forward
- = Shift cursor left/right
- = Display sensitivy (3 steps)
- = Tone and LEDswitch on/off
- = Automatic digital identification

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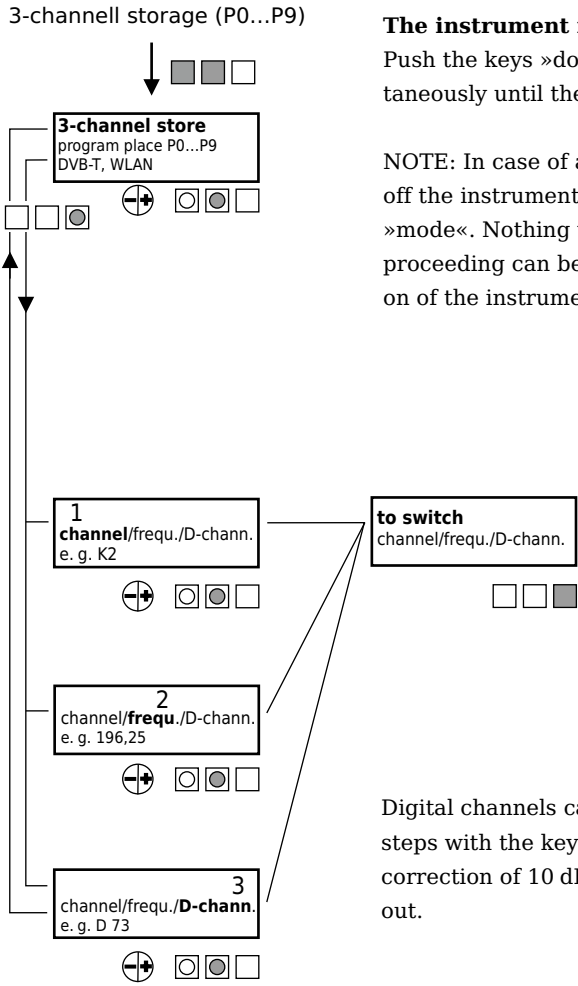
9. Memory values change

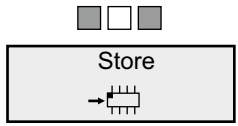


The instrument is switched off!
Push the keys »down« and »up« simultaneously until the 3-channel store appears.

NOTE: In case of an incorrect input switch off the instrument with the keys »up« and »mode«. Nothing will be stored and the proceeding can begin new with the switch on of the instrument.

Digital channels can be changed in 1 MHz steps with the keys »up« und »down«. A correction of 10 dB is automatically carried out.

9.1 Storage



DO NOT FORGET!

Push the keys »down« and »mode« simultaneously until the circuit symbol appears. After that with the keys »up« and »mode« switch off the instrument.

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10. Operating IRM

10.1 Measurement principle

Fed into a cable measuring pulses are reflected by the inhomogenities of the cable impedance (cable fault) and made visible on the display. From the form and the time displacement of the reflection, the nature of the fault and the fault distance can be determined. It is also advisable to acquire practical experience by sample measurements.

10.2 Operating functions standard

Switch on IRM

1 | Push button »down« >1 s and then button »up«. Now select with buttons »down« and »up« to the desired cable type and then press button »mode« – Propagation factor and cable loss are preset for the measurement

2 | Push button »down« >1 s and then button »mode«, selection of the cable type is skipped –propagation factor and cable loss must be yet adjusted manually to measure .

During switching on the state of charge of the battery in the display will briefly appear (battery is full: ca. 7 V, low battery: ca. 5.5 V).

Switch off Push buttons 2 and 3 simultaneously until display disappears

Without operation the device switches off itself after four minutes. If the battery voltage drop to 5.9 volts, there is a fade-in on the display. At 5.5 V the device switches off to protect the battery.

10.3 Advanced operating functions

Move the cursor button »down« press briefly – one step left
button »up« press briefly – one step to the right
Hold down for quick cursor movement the respective key

Menu button »mode« push long – a menu item continue
button »mode« push short – a menu item back

Save settings push button »down« and »mode« simultaneously – the previous settings will remain permanent

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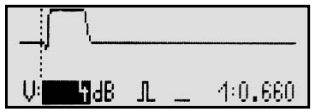
10.3.1 Pulse amplifier

To increase the sensitivity of the **IRM**, the gain can be adjusted in 4-dB steps from 0 to24 dB. The gain »V« is starting from the length display to select by shortly pressing the button »mode«. With the buttons »down« and »up« the gain can be stepwise changed. Set it back by a short push on button »mode«.



10.3.2 Parameter of length measurement adjust

Resolution | Firstly can be adjusted in the menu the resolution of the trace in steps. By long pressing of the button »mode« - until the icons appear inverted - you get to the first parameter of the measurement. Here can be set with the buttons »down« or »up« the required value.

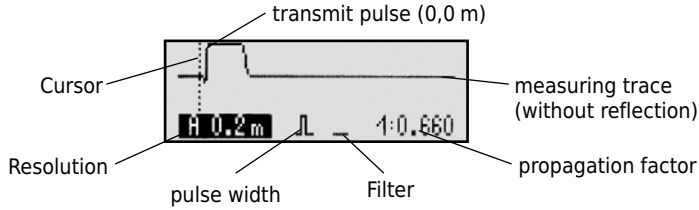
Pulse width| After repeated long pressing of button »mode« (until icon inverted), the pulse width can be changed. Rule of thumb: short cable - short pulse

Filter | Next lets switch a filter. This can make at a restless trace by interference from external voltages a better visibility. The disadvantage of pulse reflectometer is generally: The presentation of the measured curve is delayed. In our case, at about three seconds.

Storage space for propagation factors | The next setting option is to select a stored propagation factor. If the propagation factor is not already selected when switched on or it will need a change in use, this can be done here.

Propagation factor| As the last the propagation factor can be adjusted manually by repeatedly long press of the button »mode«. The propagation factor must always be set accordingly before measuring the cable.

If the necessary settings have been made, by briefly pressing button »mode« the parameter settings are stepwise leaving again.



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10.3.3 Vertical resolution

By long pushing of the buttons »down« and »up« the zoom can be switched on or off. Referred to the operating scheme on page 16 and 17, the zoom only can used to functions under the dashed line. If the zoom is switched on, the entire display is used for the display of the measuring curve. An already set gain keeps remained. The zoom can switch off by a repeated long pushing of the buttons »down« and »up«.

10.3.4 Setting start mode

If you want immediately after switching on the IRM to have a certain setting of the resolution available, it will be stored by pressing button »down« and »mode«.

10.4 Change of the cable characteristic values

If necessary the cable parameters can be changed in the memory locations or also add new ones. It is essential to ensure to work very carefully, because these values are critical for each measurement. It may happen, for example, that the propagation factor must be determined first.

1 | To enter the programming mode, when switched off the device, the buttons »down« + »up« are to press simultaneously so long until the display of the memory locations appear.

2 | By shortly pressing of the button »mode« parameter to be changed are to be selected (inverted display) and to change by the buttons »down« and »up«. Unused memory locations can be displayed and disappear here with the parameter »ON« or »OFF«. Disappeared storage locations do not appear when switching on.

The adjustable parameters are:

0.80	– diameter inner conductor
3.50	– diameter screening
CPE	– dielectric
ON/OFF	– memory location displayed/disappeared
P: 1	– memory location (e. g. 1)
v/c=0.83	– propagation factor – 0.83 here
5.7 dB	– cable attenuation at 100 m at 50 MHz

3 | The saving is done by simultaneously pressing buttons »down«+ »up« – DO NOT FORGET!

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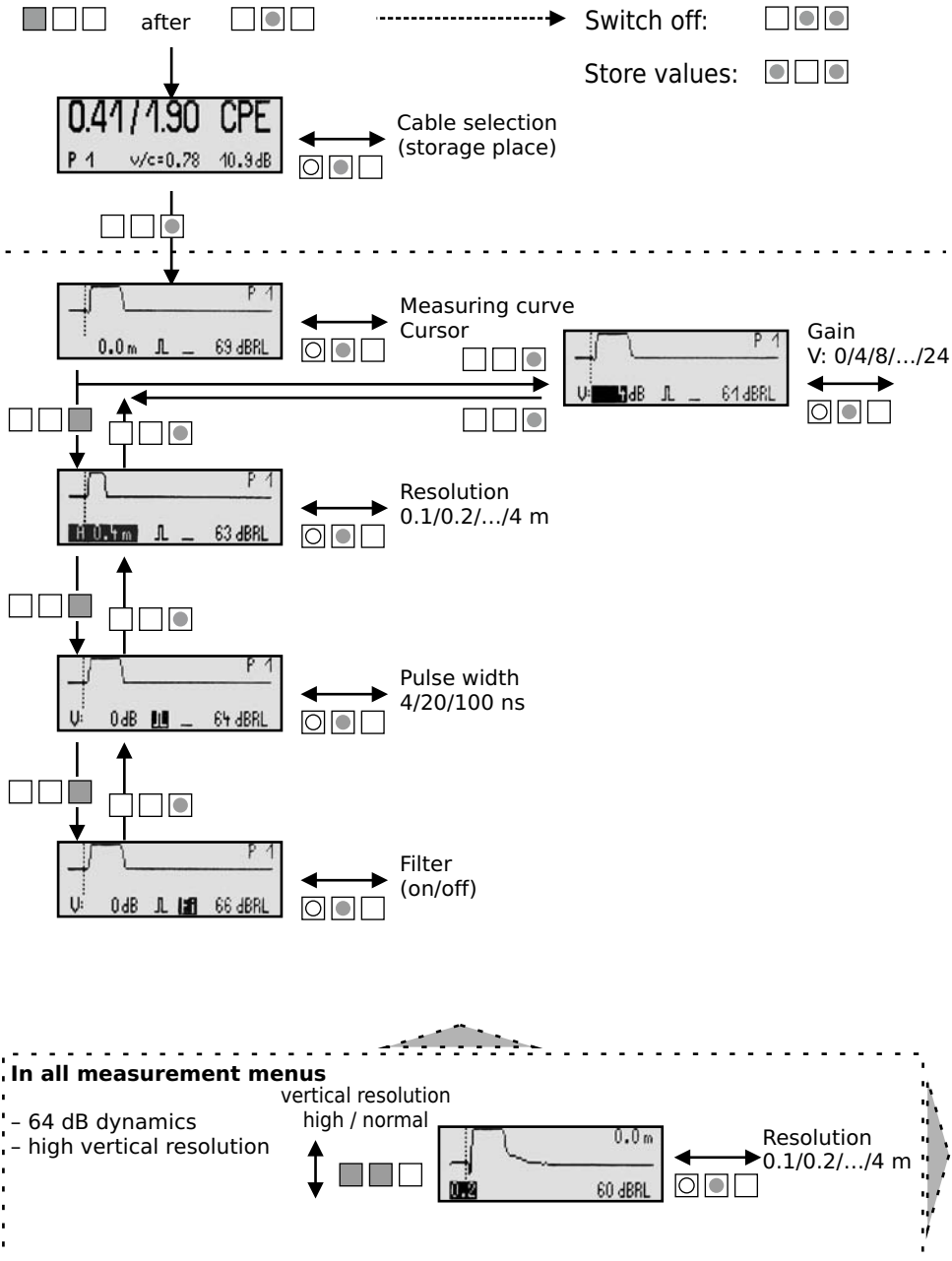
11. Operating scheme IRM

Measuring of the return loss



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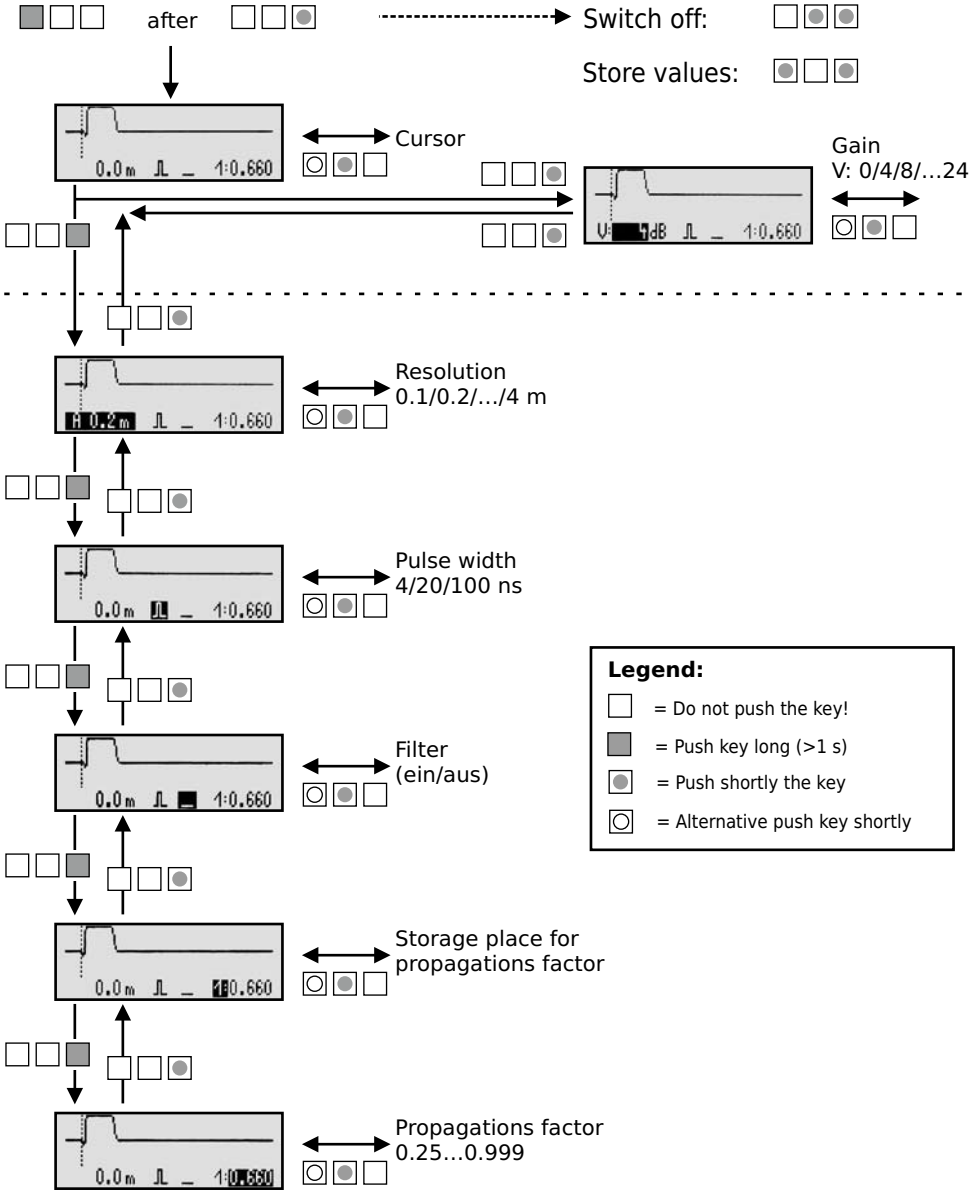
Measuring without return loss



12. Technical data

RF measuring instrument

frequency range	4–2150 MHz
resolution	50 kHz
measuring bandwidth	200 kHz
levgel measuring range	35 … 115 dB(µV)
accuracy	BK(CATV) ±2 dB, SAT ±3 dB (–10 to +50 °C)
spectrum display	4–950 MHz/950–2150 MHz or TV channels cursor fade in with level display
spectrum resolution	1, 2, 3 dB/pixel, switchable
storage places	10 for 3 channels/frequencies each
measurements	- automatic analog and digital measurement in CATV and 3-CHANNEL mode - DVB-T measurement - level difference measurement in 3-CHANNEL mode

Pulse reflectometer

measuring range	0–2000 m
resolution	0.1 m - 0.2 m - 0.4 m - 1 m - 2 m - 4 m
accuracy	0.2 % of the measuring ranges
propagation factor	0.25 – 0.99
storage places	10 for propagation factor and cable type
dynamic	44 dB
sensitivity	64 dB
filter	for noise suppression of external interferences on the cable
output pulse	4 V/4 ns, 20 ns, 100 ns

General

RF input	F-socket 75 Ohm
handling	with 3 keys
display	LCD display, 120 × 32 pixel, illuminated
power supply	NiMH accumulator 6 V/700 mAh, AC/AC adapter
current consumption	SPM: 100 mA, IRM: 130 mA
charging	with power supply 11–14 V/200 mA DC or AC
charging socket	5.5/2.1 mm
dimensions, weight	157 mm × 84 mm × 30 mm, 350 g

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13. Garantie – *Stand Juli 2006*

Für das Gerät wird eine Haltbarkeitsgarantie (nachfolgend Garantie genannt) zu nachstehenden Bedingungen eingeräumt:

- Diese Garantie gilt für in Deutschland erworbene Neugeräte.
- Neugeräte und deren Komponenten, die aufgrund von Fabrikationsfehlern und/oder Materialfehlern innerhalb von 24 Monaten ab Kauf einen Defekt aufweisen, werden von SAT-Kabel® repariert.
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- Der Garantieanspruch erlischt bei Eingriffen durch den Käufer oder durch Dritte.
- Schäden, die durch unsachgemäße Behandlung oder Bedienung, durch falsches Aufstellen oder Aufbewahren, durch unsachgemäßen Anschluss oder Montage entstanden sind, fallen nicht in die Garantieleistung.
- Die nichtgerechtfertigte Inanspruchnahme unseres Service berechnen wir mit den für unsere Dienstleistungen üblichen Entgelt für Material, Arbeitszeit und Versandkosten.
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Irrtümer sowie Änderungen im Zuge technischer Weiterentwicklung vorbehalten!

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