



SAT-Kabel®
Schellen- und Kabelversandsgesellschaft mbH
Chemnitzer Straße 11 · 09217 Burgstädt

OPERATING INSTRUCTIONS

IRM 70

2014-06-26



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 **IRM 70** is a impulse reflectometer, processor controlled, with LCD display for check and locate faults in telecommunication and power cables. For a more accurate analysis the return loss of coaxial cables is measured additionally. It is handy and easy to operate. The special features are:

- already 20 cable types are pre-programmed, additional types can be added in the menu
- length measurement at the leading edge of the reflected pulse
- return loss measurement on the reflected pulse
- pulse amplification adjustable at cable bruise, bad connectors and other components with too less return loss.

2. Delivery volume

- 1 **IRM 70**, incl. high-quality NiMH accumulator
- 1 plugin charging device AC/DC
- 1 F measuring cable with adapter **MKA 150HQ**
- Plastic case
- operating instructions

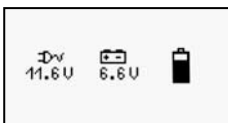
optional available:

- Symmetrical measuring cable with adapter **SMK-IRM**
- Car charging cable **KFZ-LK**
- Imitation leader bag

3. 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.

4. Charging



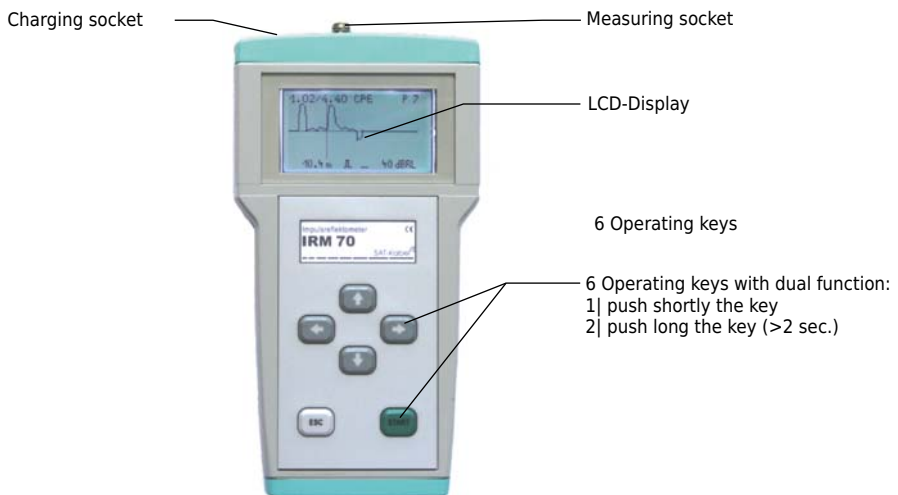
Connect the plugin charging device (containing in the delivery volume) to the charging socket of the IRM 70 (ø5.5/2.1 mm, plus pole inside). The power supply voltage (11...24 V) and charging control is shown on the display. After about 1 minute the backlight switches off. When battery is fully charged, it switches on again. An informational message appears in the display that the charging process has finished.

5. Important notes



- **Measurement only on strain-free objects!**
- Do not expose incident solar radiation, heat 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.

6. Operational elements



7. Operating

7.1 Operating functions standard

7.1.1 Switch on with cable selection

Push once more button START. Now select with buttons DOWN and UP to the desired cable type.

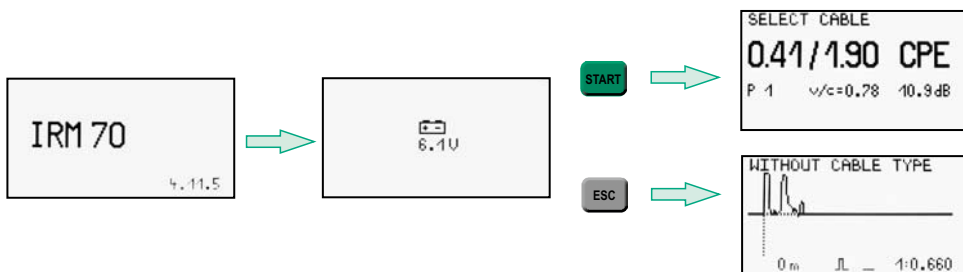


7.1.2 Switch on without cable selection

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. 5.6 V, charging: if <6.2 V!)



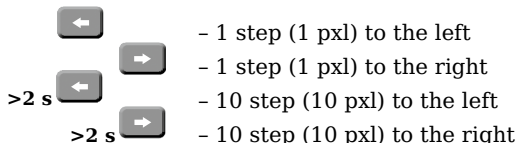
7.1.3 Switch off

>2 s

Push buttons 2 and 3 simultaneously until display disappears

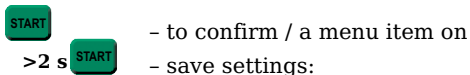
Without operation the device switches off itself after four minutes. If the battery voltage drop to 6.1 volts, there is a fade-in on the display. At 5.6 V the device switches off to protect the battery.

7.1.4 Arrow keys



Hold down for quick cursor movement the respective key.

7.1.5 START key



The previous settings will remain permanent.

7.2 Advanced operating functions

7.2.1 Pulse amplifier

To increase the sensitivity of the **IRM 70**, the gain can be adjusted in 4-dB steps from 0 to 36 dB. The gain »V« is starting from the length display to select by shortly pressing the button ESC. With the buttons LEFT and RIGHT the gain can be stepwise changed. Set it back by a short push on button ESC.



7.2.2 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 START - until the icons appear inverted - you get to the first parameter of the measurement. Here can be set with the buttons LEFT or RIGHT the required value.

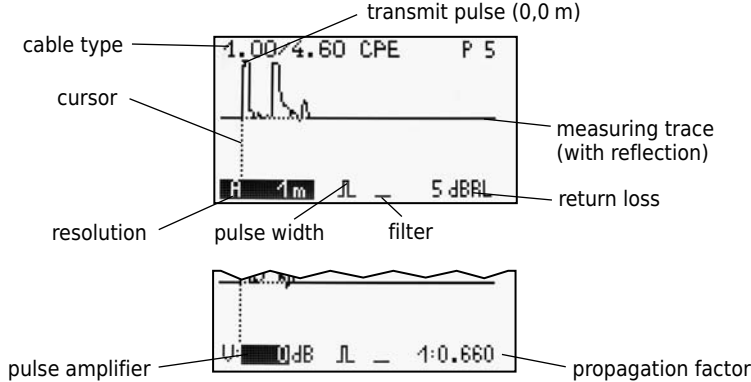
Pulse width | After repeated long pressing of button START (until icon inverted), the pulse width can be changed. Rule of thumb: short cable - short pulse

Filter | Next lets switch a filter »Fi«. 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 START. The propagation factor must always be set accordingly before measuring the cable.

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



7.2.3 Vertical resolution / fullscreen

By briefly pressing the button UP or DOWN the display is toggled between fullscreen and the view with measurement parameters. The set gain value is retained.

8. Settings

8.1 Change the language

To change the language of the device, press and hold the UP button in the battery and charging view (for at least 2 sec). The selected language will appear in the upper area of the display.

SPRACHE: DEUTSCH

or

LANGUAGE: ENGLISH

The selection is saved when switching off the IRM 70 with the ESC button.

8.2 Change display color

The color of the display's backlight can be changed. Press and hold the UP button (for at least 2 sec.) when the IRM 70 is switched on completely to set the next color. With the UP button held down, the color changes continuous.

The selection is saved when switching off the IRM 70 with the ESC button.

8.3 Save the settings

The manual saving of the settings is necessary when:

SETTINGS - set or change the cable parameters of the single presets

CABLE-SELECTION - preset (cable type) used at power on of the IRM 70

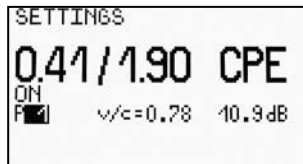
WITHOUT CABLE-TYPE - manual defined cable parameters (resolution, impulse, filter etc.) are loaded every time the device switched on

For manual saving press and hold the START button until the save symbol is shown in the upper right of the display.

8.4 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 get to the settings menu for the cable parameters, press the START button when the IRM 70 is powered off. The battery view is shown in the display. Press and hold the DOWN button for at least 5 seconds until the SETTINGS appears.

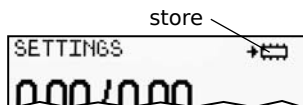


2 | By shortly pressing of the button ESC parameter to be changed are to be selected (inverted display) and to change by the buttons DOWN and UP. Unused memory locations can be displayed and disappear here with the parameter »ON« or »OFF«. Disappeared storage locations do not appear when switching on.

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

DO NOT FORGET to save the settings before exit by press and hold the START button until the save symbol appears.



9. Technical data

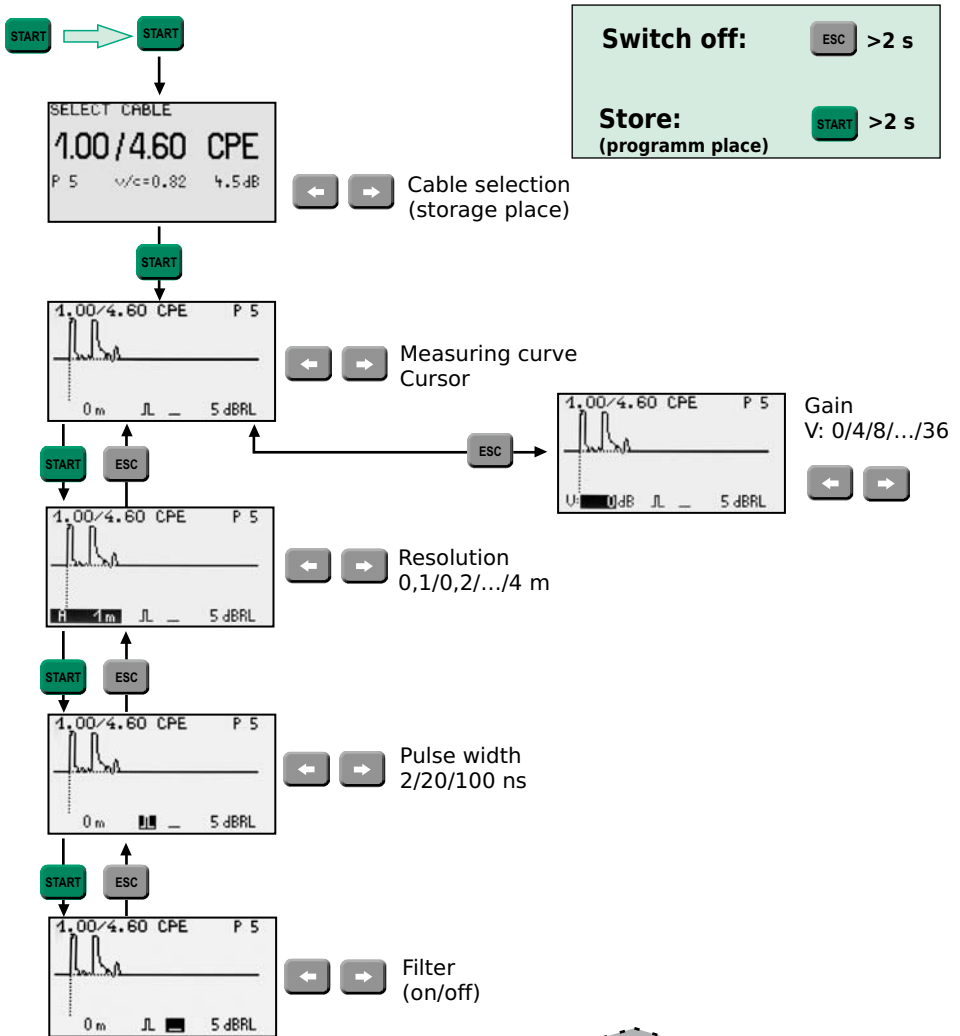
Measuring ranges	0-2000 m
Resolution	0.1 m / 0.2 m / 0.4 m / 1 m / 2 m / 4 m, switchable
Accuracy	0.2 % of the measuring range
Propagation factor	0.250-0.999
Storage places	30 for cable type and propagation factor already 20 pre-programmed
Dynamic	64 dB
Sensitivity	80 dB
Digital filter	switchable for suppression of external voltages on the cable
Impedance	75 Ohm
Output	F-socket
Output pulse	4 V, 2 ns / 20 ns / 100 ns wide
Display	LCD 128 × 64 pixel, illuminated visible size 67 mm × 37 mm
Operation	with 6 keys
Power supply	NiMH-accumulator 6V/1800 mAh; AC/DC adapter
Powwer consumption	max. 200 mA
Dimensions	210 mm × 110 mm × 45 mm
Weight	530 g

9.1 Fault, clearance

- Device can not be switched off: push the buttons LEFT and RIGHT simultaneously

10. Operating scheme IRM 70

Measuring of the return loss - programm place



In all measurement menus

- 64 dB dynamics
- high vertical resolution

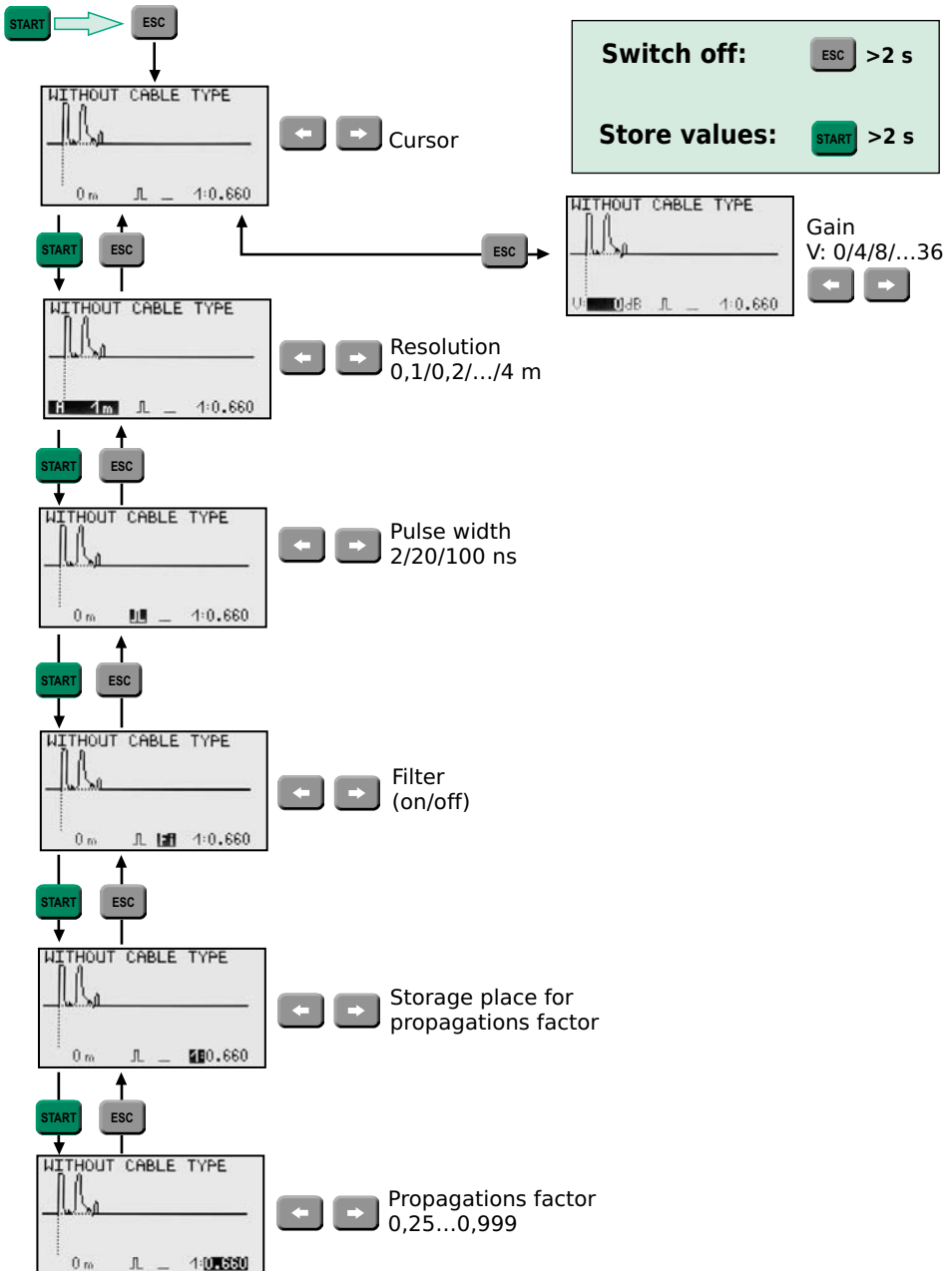
vertical resolution
high / normal



Resolution
0,1/0,2/.../4 m



Measuring without return loss - cable data adjustable



11. Stored cable data (State 01/2012)

program place	cable type designation	inner conductor	cable diameter dielectric	kind of dielectric	propagation factor	cable attenuation at 50 MHz at 100 m
P 1	Mini-Kabel	0,41 mm	1,90 mm	CPE	0,78	10,9 dB
P 2	H 123	0,65 mm	2,90 mm	CPE	0,85	7,5 dB
P 3	COAX 12	0,70 mm	4,60 mm	PF	0,66	5,6 dB
P 4	H 121., MK 75	0,80 mm	3,50 mm	CPF	0,84	5,7 dB
P 5	H 126 DUOBOND PLUS, KOKA 799	1,00 mm	4,60 mm	CPE	0,82	4,5 dB
P 6	MK 15, LCD 90	1,02 mm	4,40 mm	CPE	0,85	4,3 dB
P 7	75100 AKZ 3-S (RG6)	1,00 mm	4,60 mm	CPE	0,85	4,4 dB
P 8	TELAASS B1,1/7,3	1,10 mm	7,25 mm	PE	0,66	3,8 dB
P 9	1 ikx 1,1/7,3; KOKA 741	1,10 mm	7,30 mm	PE	0,66	3,3 dB
P 10	LCD 95, DIGITAL 94	1,13 mm	4,80 mm	CPE	0,85	4,3 dB
P 11	PRG 11	1,55 mm	7,25 mm	CPE	0,81	2,7 dB
P 12	LCM 14, MK 15, KOKA 7	1,63 mm	7,20 mm	CPE	0,84	2,8 dB
P 13	COAX 6 (LG)	1,70 mm	6,95 mm	CPE	0,89	2,3 dB
P 14	COAX 4	2,20 mm	10,2 mm	CPE	0,82	1,9 dB
P 15	1nxx	2,20 mm	8,80 mm	PEH	0,88	1,8 dB
P 16	1qxx	3,30 mm	13,50 mm	PEH	0,88	1,2 dB
P 17	COAX 3	3,40 mm	14,9 mm	CPE	0,84	1,3 dB
P 18	1sxx	4,90 mm	19,40 mm	PEH	0,88	0,9 dB
P 19	75-7-12 D	2,60 mm	10,00 mm	AIR	0,85	1,6 dB
P 20	75-7-16 D	3,80 mm	13,80 mm	AIR	0,92	1,1 dB

12. Cleaning

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

13. Guarantee State July 2006

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

- 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 from SAT-Kabel®.
- 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

SAT-Kabel®

Satelliten- und Kabelfernsehanlagen/Industrievertretung GmbH

Telephone: +49 3724 6665-0

Telefax: +49 3724 6665-44

info@sat-kabel.de • www.sat-kabel.de

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