



IRM 20



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

Determining the length of a short and accessible cable is not a problem with a tape measure.

But measuring a cable reel with several 10 or 100 meters is expensive and time consuming.

Particular difficult is the determination of cables which are not easy accessible because of the local conditions. For example, it is concealed in the wall.

For this purpose the *IRM 20* offers an easy fully electronically measurement.

The length of the cable is displayed immediately after connecting. Only the cable type have to be selected from a predefined list. Additional to the length an open end or short circuit is identified. The length of an installed antenna cable can fast and easily determined, e.g. for the invoice to a customer by a monteur. It also can be very helpful in networking to check the segment length of a network. In addition it helps in localization of damages on cables.

The distance to the defective point is displayed immediately and whether it is a short circuit or a cut. The *IRM 20* can measure all usual 2-core wires, no matter if it are coaxial cables or "normal" installation cables.

Excepted from this are only some special cable types, e.g. high capacitive cables which "swallow" the measurement impulses.

2. Delivery volume

1× IRM 20

1× Measuring cable

1× 9-V-accumulator

Operating instruction

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 strains from impacts or drop downs
- the surface of the housing can be cleaned with a dry, soft and lintfree cloth. Do not use any aggressive solvents!

3. Functional principle

The *IRM 20* operates based on the reflections of electric pulses on open or closed cable ends. These electric pulses are sent out in time constant intervals.

The device calculates the length of the cable by measuring the time between the sending of the impulse and his return.

This depends on the velocity factor of the cable which is considered in the calculation.

The velocity factor (v/c or pulse velocity) declares the propagation of electrical signals in the cable in relation to the speed of light. It depends on the used type of coaxial cable and can be found, for example, in the manufacturer's data sheet for the cable in question. Alternatively it has to be determined "at the place" (locally).

To make work easier the *IRM 20* has a persistent memory with 20 predefined cable types and their corresponding velocity factors. These can be modified.

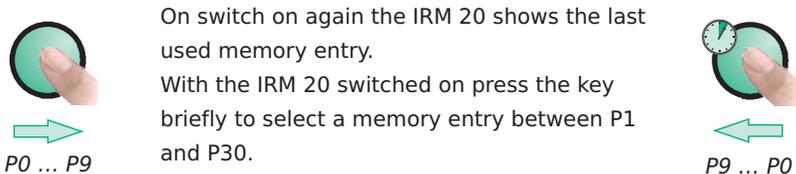
3. Operation

3.1 Switch on/ off



Without any key pressed the *IRM 20* turns off automatically after 2 minutes to save battery. If the battery voltage becomes lower than 5,8 V a battery icon appears in the display. At a battery voltage of 5,5 V the *IRM 20* switches off.

3.2 Measuring



The cable to be measured must be connected only after selecting the required shortening factor. Then read the length of the cable in the display. If there is a short circuit in the cable, the cable length appears >>K<< in the display.

Notes

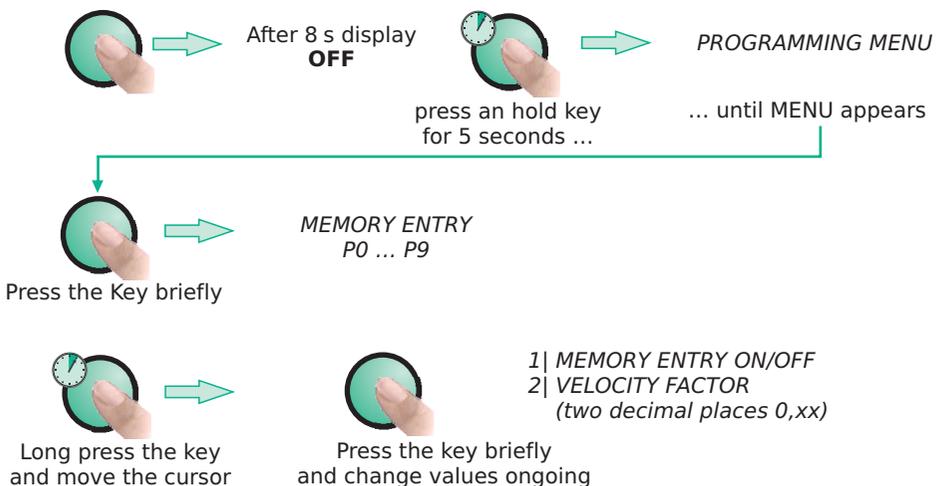
- the velocity factor of the cable has always to be selected before the measurement of the length
- if the velocity factor is unknown, choose an approximate value and determine the fault from both ends of the cable
- if a terminating resistor is installed which corresponds to the wave impedance of the cable a length measurement is not possible (the send pulse will not be reflected at the cable end)
- to minimize measuring errors determine the cable from both ends

3.3 Velocity factor

The velocity factor declares the propagation of electrical signals in the cable in relation to the speed of light. It affects the accuracy of the measurement significant. The velocity factor is in general:

Electric cable	0,49-0,57	(ca. 0,53)
Telephone cable	0,58-0,65	(ca. 0,62)
Coaxial cable with PE dielectric	0,66	
Coaxial cable with foam PE	0,77-0,85	(ca. 0,83)
Air insulation	0,88-0,92	

3.3.1 Set a velocity factor





SAVE when the IRM 20 is switched off!

Press the key for
2 seconds

3.3.2 Determining the velocity factor

If the velocity factor of a cable is unknown it can be determined easily.

Therefore connect a cable with a known length (50 to 100 meter) at the IRM 20.

After that, modify the velocity factor until the displayed length matches the length of the cable

4. Technical data

Maximal cable length	1000 m (low loss cable)
Resolution	1 m
Accuracy	$\pm 1 \% \pm 2 \text{ m}$
Measuring connection	4 mm banana jack, 75 ohms
Output pulse	4 V Rechteck, 30 kHz
Display	LCD, 2 × 8 Zeichen, illuminated
Casing dimensions	120 mm × 60 mm × 25 mm
Weight	110 g

14. 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

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Irrtümer sowie Änderungen im Zuge technischer Weiterentwicklung vorbehalten!