USER MANUAL

FIELD STRENGTH METER

TC-402 A/D

SUMMARY

1. GENERAL DESCRIPTION

This field strength meter is intended for measuring in conmunity aerial T.V. installations in all bands (FM,VHF and UHF) as well as in cable television.

It is a portable instrument due to its reduced dimensions and weight. It is fed by an internal battery but can also be fed externally.

The measurement level range goes from 20μV (26 dB μV) to 100mV (100dBμV) in all bands.

The frequency is displayed on a 4 digits LCD.

The signal detection is made by a peak detector. Therefore the signal level shown in the indicating meter corresponds to the peak of the measured signal. When using the peak detector in television video signals, the pointer of the indicating meter will remain stable without being affected by the synchronisme impulses transmited together with the video signal, and it is fix and independent of the video information. This is the reason why the readout sometimes shows differences to other field strength meter, which use conventional detectors.

2. TECHNICAL SPECIFICATIONS

FREQUENCY RANGE:	LOW VHF: 45- 170 MHz HIGH VHF: 170- 450 MHz UHF: 450- 862 MHz
FREQUENCY DISPLAY:	4 Digits , LCD.
FREQUENCY ACCURACY:	± 0,1% ±1 digit
FREQUENCY RESOLUTION :	100 KHz
TUNING:	Ten-turn potentiometer
INPUT IMPEDANCE:	75 Ohms (0V DC)
INPUT CONNECTOR :	BNC
MEASUREMENT LEVEL:	Seven ranges from 20µV/26dBµV/-34dBmV to 100mV/100 dBµV/40 dBmV
MEASUREMENT ACCURACY:	± 2 dB (using the correction diagram provided, at 20°C)
SCALES:	µV, dBµV and dBmV
SCALE RANGE:	10 dB
IF BANDWIDTH:	800 KHz
SIGNAL LEVEL DETECTION :	Peak detector
AUDIO DETECTION:	AM and FM
AUDIO POWER:	200 mW. Built-in loudspeaker
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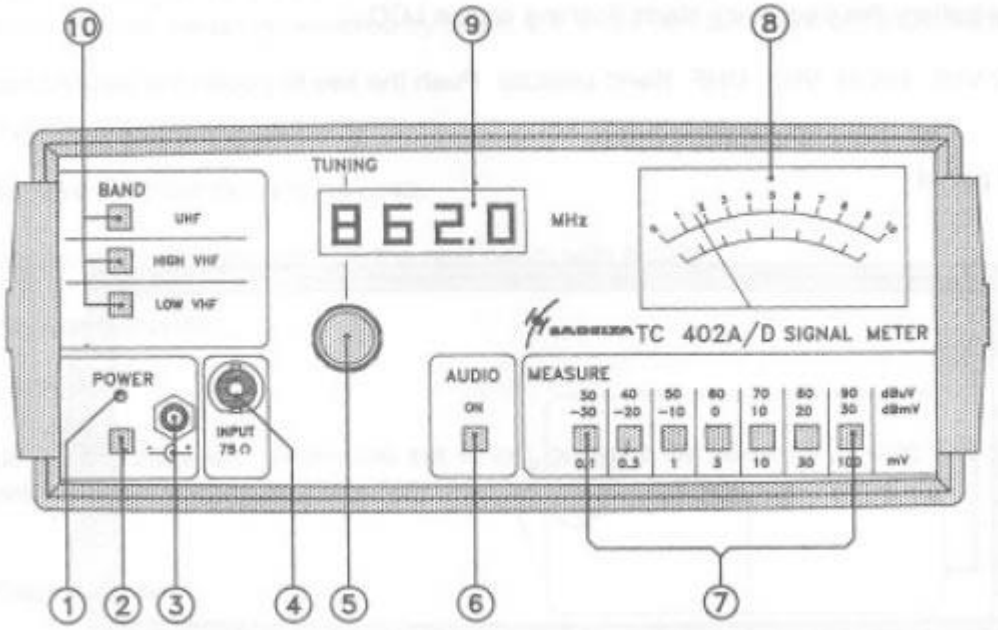
POWER SUPPLY:	8 elements, AA size. 1,5 V Alkalines batteries or Ni-Cd rechargable batteries.
LOW BATTERY INDICATION:	Automatic. Frequency flashing on the LCD.
CURRENT DRAIN:	150 mA at 12V (without audio)

AUTONOMY:	9 hours aproximately with alkalines batteries. 2,5 hours aproximately with Ni-Cd batteries.
CHARGING TIME:	14 hours aproximately (Ni-Cd batteries)
SIZE:	220 (W)X 91(H) X 235(D) (in mm)
WEIGHT:	1,7Kg. (batteries included)
ACCESSORIES:	Carrying case Correction diagram (individualized)

3. CONTROLS AND KEYS DESCRIPTION

3.1 Front panel



(1) POWER LED: Indication of power supply.

(2) POWER: ON/OFF switch.

(3) EXTERNAL POWER SUPPLY INPUT. 3,5 mm jack socket (central pin to positive): The DC power supply has to give supply 12 VDC with a minimun current of 250 mA. NEVER connect the external power supply when the dry batteries are in the compartment. The batteries would be damaged.

(4) INPUT: BNC connector.

(5) TUNING BUTTON: To tune the desired frequency.

(6) AUDIO: When pushing this key the sound of the signal received is heard, (both in AM and FM).

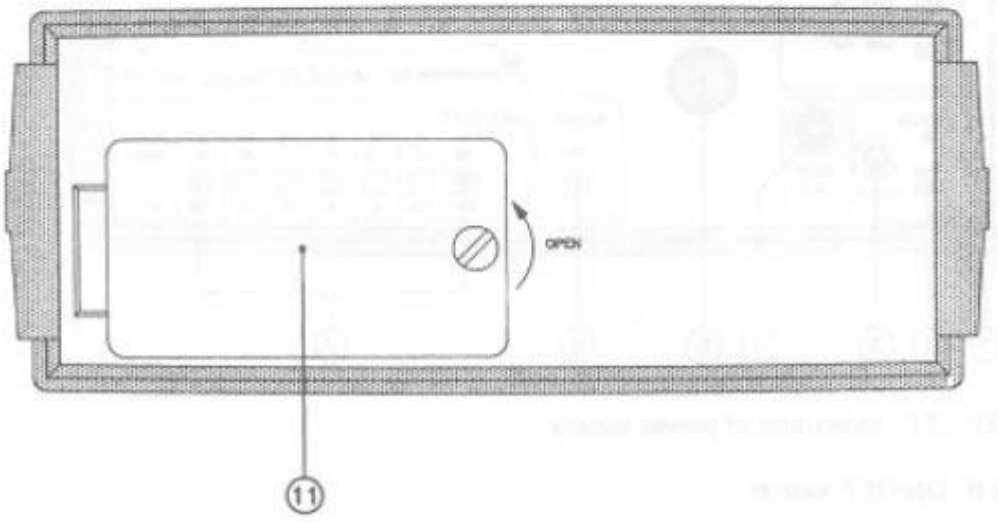
(7) 0.1mV/30dBµV/-30dBmV to 100mV/90dBµV/30dBmV: Measurement range selector. One of the mentioned keys has to be always pushed to avoid errors when measuring.

(8) MOVING COIL INSTRUMENT: This indicates the signal level received. The signal level shown in multiples of V is read in the two upper scales. The signal level shown in dBµV or dBmV is read in the lower scale.

(9) FREQUENCY DISPLAY/LOW BATTERY INDICATOR: Frequency readout on the LCD. When low battery the frequency starts flashing on the LCD.

(10) LOW VHF, HIGH, VHF, UHF: Band selector. Push the key to obtain the desired band.

3.2. **Rear panel**



(11) BATTERY COMPARTMENT: Open to put the batteries in.

4. OPERATING INSTRUCTIONS

4.1. Power supply and battery replacement

The field strength meter is powered by eight 1,5 V dry cell batteries or Ni-Cd batteries, AA type.

For replacement, proceed as follows:

- Remove set from its carrying case.
- Open battery compartment on the rear panel with a coin.
- Replace batteries.

ATTENTION:

Use leakproof batteries. When the set is not going to be used for a long period of time remove the batteries to avoid any damage from battery leakage

4.2. Switching on

To switch on the field strength meter, push the "POWER" button (2). The led (1) will ligth.

ATTENTION:

For long battery life, turn off the set after measuring, by pressing the power swich again.

4.3. Battery check

"Low battery" is automatically shown by flashing the frequency on the display (9). In this case replace the batteries

4.4. Band selector

Choose the desired band by pressing the corresponding button (10).

4.5. Tuning

Accurate tuning by a ten-turn potentiometer (5).

4.6. **Frequency indicator**

The frequency is indicated in MHz with 4 digits on a LC display (9).

4.7. **Measurement ranges**

The instrument has seven measurement ranges, from 100µV/40dBµV/-20dBmV full scale, to 100mV/100dBµV/40dBmV full scale (7).

The lowest measurable level is 20µV/26dBµV/-34dBmV.

4.8. **Level indicator**

The received level, on voltage at 75 ohms termination, is indicated on the moving coil instrument placed on the right side of the front panel (8).

The readouts of the ranges of 100µV, 1mV, 10mV and 100mV are obtained on the upper black "V" scale.

The ranges of 300µV, 3mV and 30mV are read on the lower black "V" scale.

In order to obtain the measured level directly in dBµV or dBmV, add to the readout obtained on the "dBµV" or "dBmV" red scale the value indicated below the pressed range selector key.

Example: Measurement in 60dBµV range (3 mV full scale).
The pointer indicates 4 on the dBµV scale.
The measured level is 64 dBµV (1.6 mV).

The maximum and minimum recommended levels for TV and FM reception are the following:

MAX TV..... 50mV
MIN TV..... 1mV
MIN FM..... 100µV

4.9. **Digital signal power measurement**

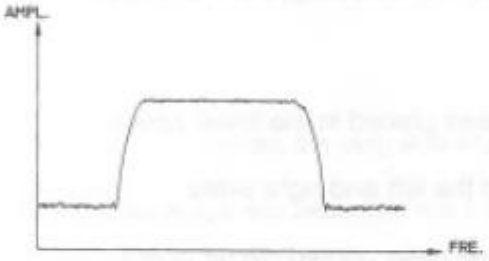
With this meter it is possible to know the average power of a digital channel by applying to the value read by the meter a correction factor depending on the digital signal bandwith.

To achieve it, tune the meter to the digital channel central frequency, read the value stated at the galvanometer and add it suitable correction factor according to the table.

Bw	8 MHz	7 MHz	6 MHz
Correction factor	5 dB	4.5 dB	3.8 dB

wherein Bw is the digital signal bandwidth

Note: Above correction factor must be applied because of digital channel spectrum characteristics, it is of wide band and with a sufficiently even amplitude along the whole band.



The correction factor is calculated on the basis of the meter detector type and the difference between metering filter bandwidth and digital signal bandwidth.

4.10. **Measurement corrections**

When more accurate measurements are required, frequency function errors due to the tuner response can be compensated adding to the value shown by the meter, the value indicated in the correction diagram, corresponding to the working frequency.

4.11. **Audio monitoring**

Pressing of the key AUDIO (6) allows the audio monitoring of the received station, in both AM or FM modes without further switching. The audio output power is 200mW..

4.12. **Incorrect performace**

- Ensure the set is correctly turned on with the POWER button (the LED lights).

- Check that the coaxial antenna cable is correctly plugged into the input socket.

- Ensure you have selected the corrent operating frequency and the necessary level range.

- Should the fault persist after having checked the above points while following the operating instructions, please return the instrument for replacement/repair to your apointed distributor enclosing a precise and detailed description of the faults observed.

The meter is protected by means of an internal fuse. To replace this fuse you have to use another one of the same type and 0.5 A. It is not allowed to use a fuse of higher amperage. In case of a failure this may cause important damages in the circuit.

To replace the fuse:

- Remove the four fixation screws placed in the lower cover.
- Remove the upper cover and the left and right sides.
- Replace the fuse located in the main printed circuit board.
- Put the upper cover and the left and right sides.
- Fix the covers with the help of the four screws.

5. MEASUREMENT PROCEDURE

- Connect the coaxial antenna cable to the input socket (4)
- Turn on the field strength meter (2)
- Choose the desired operating band (10)
- Push the range button according to the signal strength to be measured (7)
- Tune to the desired frequency by rotating the tuning knob (5)
- Measure the received level and switch off the instrument.