

## TRUE RMS Digital Multimeter BENNING MM 7-2

### Application Report

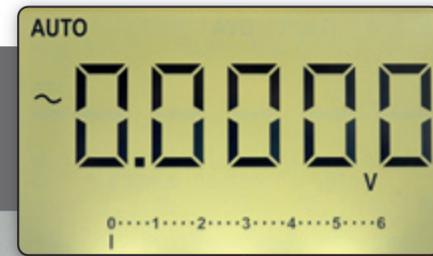
BENNING has developed the new TRUE RMS MM 7-2 Digital Multimeter for demanding requirements in terms of the scope of functions and measurement accuracy.



What's included

You immediately notice two things the first time you take the BENNING MM 7-2 out of its box: The black surround around the instrument casing is not made from some cheap and nasty plastic, but a rubber-feel synthetic material. And it's a welcome discovery to find that it doesn't give that overtacky feel that characterises so many other silicon type materials, also making them difficult to clean. The other point you notice is the form of the case, and how it's made. They have kept the MM 7-2 relatively compact, so it's very easy to hold. This casing gives the impression of being tremendously robust: there are absolutely no squeaks or rattles when you grasp the instrument with both hands for a closer look.

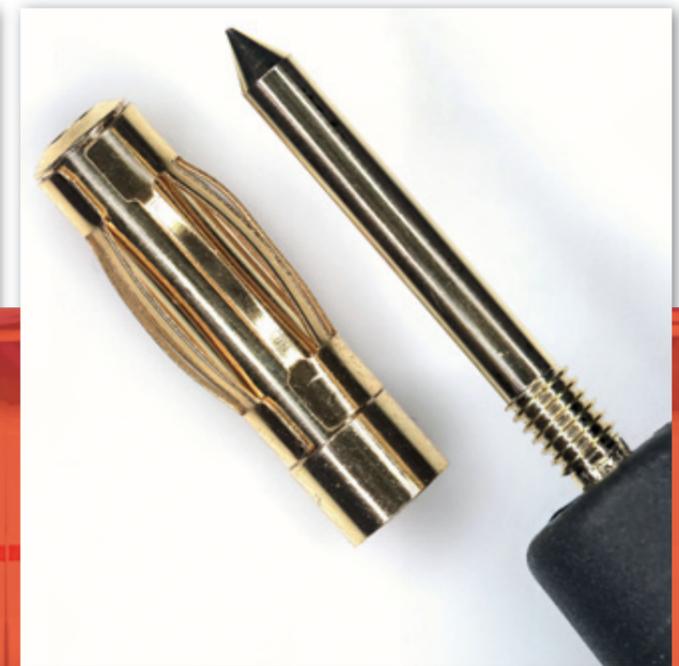
And, as we've come to expect with many BENNING instruments, the MM 7-2 ships with some accessories. Out of the box, you get the multimeter itself plus high-quality silicon measurement cables with gold-plated contact probes and protective caps, a temperature sensor, batteries and a cushioned transport case for the instrument and its accessories. What a joy to find that BENNING include a printed and – even better – complete set of operating instructions. They don't inflict you with those infamous and hard-to-read “Brief Instructions” consisting of one piece of paper which has been folded a dozen times (and which never folds back again in the correct way). Rather, they've invested in easy to read, useable instructions.



High-contrast display with characters 15 mm high, and a 30-segment bar graph



10-position rotary switch plus 8 function keys



High-quality, gold-plated test probes, ensuring permanently low transfer resistance levels. 4-mm bunch plugs

And because the booklet fits neatly into its own compartment in the carry-case, you've got the instructions to hand whenever you need them.

#### Generously sized display and a range of different measurement functions

And it's easy – even at awkward viewing angles – to read the large LCD display, which can be backlit if desired. Its five-cell main display (with four settings for 5 to 6 decimal places, or 60,000 digits) also includes – in its lower area – a quasi-analog bar graph display. This is always useful if there are major fluctuations in readings, and it makes it easier to detect any short-term changes in readings.

The BENNING MM 7-2's wide range of measurement functions far exceeds the basic facilities of a conventional digital multimeter. These days, any multimeter required for

professional use has to be equipped with TRUE RMS (RMS metrology). And, because BENNING expressly recommends the MM 7-2 for demanding measurement duties, including industrial applications, this TRMS technology is on board, as you would expect. Accordingly, the instrument has high basic accuracy extending to an impressive 0.03% in the DC range.

#### Good readings are dependent on good contacts

You can pretty much bet that measurement probes with poor-quality surface treatment will result in loose contacts and corresponding measurement errors. Measurement technicians are not impressed by test cables which lack flexibility and which become even more stiff in a cold environment. We are glad to see that BENNING has provided the MM 7-2 with test cables whose quality matches the unit it-

self. Accordingly, the cable insulation is made of silicon, which means that the measurement cables themselves retain great flexibility even at low temperatures, and can also withstand contact with hot objects (such as soldering irons) with no problems.

Special measurement functions for HVAC technicians make it possible to conduct inspection measurements for ionisation currents in flame sensors, and they can also measure the sacrificial anode current in boilers. Within the 600  $\mu\text{A}$  measurement range, the BENNING MM 7-2 gives 0.01  $\mu\text{A}$  resolution, thus enabling precise assessment of low DC values.

In the temperature measurement range, for example, it's possible to measure flue gas temperatures together with water and air temperatures in heating and air-conditioning systems. This will often do away with the need to bring further special measurement instruments on-site. →



Temperature measurement with the K type thermocouple wire (included as standard) with 0.1 °C resolution, with the support unfolded

(at right) Contactless voltage detection. This also means that line breaks – such as in extension cables, for example – can be readily traced

Practical solution: the removable battery case means that batteries can be swapped over conveniently

0.01 nF to 10 mF capacity measurement range

0.03% basic volts DC accuracy for precise readings and demanding metrology tasks (comparative measurement in laboratory with a calibrated precision laboratory multimeter)

### User-friendly functions

You can use the VoltSensor function for contactless voltage detection. A voltage detector for detecting alternating fields is integrated into the front section of the casing. This is operated by means of the “VoltSense” key. Sensitivity can be selected by pressing the key repeatedly. More than this, the MM 7-2 gives an audio indication of the potential field strength, together with a 4-level, horizontal bar chart display. It's of practical value that they provide the automatic AC/DC switchover function in the voltage measurement range, which is termed “AutoV”, supplementary to the automatic measurement range selection which is (of course) provided. The multimeter provides fully automated selection not only of the appropriate measurement range but also the measurement function (AC or DC) which means that the operator can fully concentrate on his measurement task.

### Universal diagnostics tool

For troubleshooting, there's a continuity test function – with audio-visual operation – and this is extraordinarily responsive, with a reaction time of less than 100 μs.

This is most welcome, because so many multimeters prove to be sluggish in this respect: making it difficult or impossible to detect “loose connections”.

The BENNING MM 7-2 is equally impressive when it comes to diode testing. This is another important feature, one which saves a whole lot of time for service engineers trying to trace defective semiconductors, especially as the instrument also gives audio warning of any defective diodes.

Overall, the new BENNING MM 7-2 qualifies admirably as a universal diagnostic tool,

thanks to the wide measurement ranges which it provides in addition to its extensive range of functions.

### Diverse measurement functions – does that mean it's complicated to operate?

Although the MM 7-2 is very extensively equipped, the clear layout and the clear labelling provided in the control area make it easy and straightforward for you to find your way around. The functions identified in blue on the second level of the measurement range selector are easy to select by just pressing the (also) blue key, and can then be deactivated in precisely the same way. The operating concept has been well thought through, with a simple structure: no need to spend hours reading through the operating instructions. Even when you first use this instrument – or if you only use it from time to time – you shouldn't experience any problems.

### Conclusion

The BENNING MM 7-2 offers impressively high accuracy, extensive measurement functions and a tough, two-component casing. With a view to preventing accidental errors of operation, it possesses integrated socket monitoring and gives audio-visual warnings if the measurement cables have been plugged into the unit incorrectly. Thanks to covering the CAT IV to 600 V and the CAT III to 1000 V overvoltage categories, too, the BENNING MM 7-2 is as suitable for industrial applications as it is in conventional electrical installations. Service engineers in industrial systems will benefit in particular from the measurement functions provided for 4 – 20 mA current loop signals, duty cycles (in %) and a switchable HFR lowpass filter, and the LoZ (low input impedance) voltage measurement function for suppressing ghost voltages.

Installation engineers and service staff for “wall boxes” (EV charging stations) will be impressed by the integrated measurement function for the CP control signal which the BENNING MM 7-2 fulfils with two measurement adapters that can be obtained as accessories. Because the product ships as standard with a thoroughly adequate transport case, high-quality measurement cables and a temperature sensor for measuring the temperatures of wires, you don't need to buy these additional fittings – which is most welcome as in most cases they will be essential anyway. Considering the scope of functions, the items included as standard and the level of measurement accuracy provided, the current selling price of less than 300 euros is extremely reasonable. ■

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For further information about the BENNING MM 7-2, visit:  
[www.benning.de](http://www.benning.de)

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