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Description

The demonstration multimeter is a versatile instrument, which can measure current, voltage resistance, frequency, temperature, pH and pressure. This versatility is combined with a large LED display, which makes the instrument perfect for teaching and demonstration purposes. Furthermore the DMI4 has an instructors display on top of the instrument, for instructor readout from behind.

Great emphasis has been put on ease of operation. Every measurement option can be achieved with the central knob, and extra functions can be reached with the three buttons.

There are four galvanically separated parts in the DMI4. This feature makes it possible to leave measurement probes connected while measuring something else. The 4 sections are as follows:

- Temperature
- pH and pressure
- Volt, current, resistance and frequency
- Serial communication

This feature ensures that the operator cannot be exposed to dangerous unforeseen voltages or currents while operating the DMI4.

2 OPERATING & FUNCTIONS

The demonstration multimeter is operated with the central placed knob. By turning the knob each function is selected. A ring of LED's indicates the selection. The three buttons are only used for special functions and not used during normal operation.

2.1 Voltage

The knob is turned until V= or V- is lit up. The test leads are connected to V/Ω/Hz (red) and common (black) and the measuring can begin.

2.2 Current

Before measuring current it is wise to consider whether the measured current will be higher than 2A, if in doubt or the current is higher than 2A the ampere connection should be used.

If measuring below 2A the test leads should be connected to mA (blue) and common (black). If measuring ampere the A connection (green) should be used instead.

2.3 Resistance

For measuring resistance the test leads should be connected to V/Ω/Hz (red) and Common (black).

Attention: Voltage applied to the inputs, while the DMI4 is in resistance mode, may harm the instrument.

2.4 Frequency

The V/Ω/Hz (red) and common (black) connections are used for measuring frequency. If no result is shown in the display or the display flicker the amplitude of the signal should be increased.

2.5 Temperature

A NiCr-Ni type K probe must be used for measuring temperature. Please take note that the temperature connector is galvanic separated from the rest of the instrument.

2.6 pH

A pH probe can be connected to the BNC-connector. Please take note that the pH connector is galvanic separated from the rest of the instrument, with exception of pressure.

2.6.1 pH probe settings

By pressing select it is possible to enter the pH probe calibration or adjustment mode. The values or functions are always changed by using the arrow buttons and confirmed by pressing <Select>; by turning the knob the actual function is escaped (without saving new values). In calibration mode a one or two buffer calibration can be performed. In one buffer mode the desired buffer is selected and then an automatic calculation is performed, if a two buffer calibration is selected, the above step is done again but with another buffer value. After the calibration the calculated Buffer and Slope values are saved. If the values are out of limit, Cal Err is shortly shown in the display, and the old values are re-used.

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2.7 Pressure

A pressure sensor is connected to the DIN-5 plug. Please take note that the pressure connector is galvanic separated from the rest of the instrument, with exception of pH.

2.7.1 Pressure probe settings

Pressing <select> makes it possible to enter the scale and offset for the sensor. First scale should be set. CF will be shown in the matrix and using the arrow buttons can change the 1,000. The input is confirmed by pressing <select>. Next the Offset can be set, and confirmed by pressing <select>.

3 EXTERNAL CONNECTION

3.1 Connecting remote display

The DMI4 can be connected to a large digital display using an RS-232 data cable. You can connect up to three remote displays. The first display will always show temperature, the second pH and the third pressure. The remote display has 56 mm high digits making it very suitable for teaching and lecturing applications.

3.2 Connecting PC

Using a RS-232 data cable the DMI4 can be connected to a PC COM-port.

A simple way to read out the results is by means of a terminal program:

Using the Windows program HyperTerminal, available under the program group heading "Accessories", data can be transferred from the DMI4 to the computer. The set up parameters are:

Data transfer: 9600 baud, 8 data bits, parity "none", 1 stop bit, Xon/Xoff protocol, connection via a COM-port.

Terminal set up: CR/LF for sender and receiver.

The setup options should be saved as a .TRM file so that the terminal program is easy to start up later on.

3.3 Interface

<V> Identification string from the instrument.
<D> Returns all measured values as pressure, pH, temperature and Hz/°V/mA/V.

<F><number> Changes the function to the corresponding.

1 Menu, 2 pressure, 3 pH, 4 temperature, 5 frequency, 6 resistance
7 Volt DC, 8 Volt AC, 9 mA dc, 10 mA ac, 11 A dc, 12 A ac.

4 TECHNICAL DATA

General

Supply: 230VAC ±10%
Watt: 20W
Display: 4 digit 45mm LED
Unit Display: 7x15 LED Matrix
Extra display: 4 digit 13mm LED

Volt DC

Input resistance: 10 M Ω
Input range: 0mV - 500V
Accuracy: 0,5% + 1 digit

Volt AC

Input resistance: 10 M Ω
Input range: 20mV - 500V
Accuracy: 10Hz-1KHz 1% + 1d
To 2KHz 2% + 2d
To 5KHz 5% + 2d
To 10KHz 10%+ 2d

Ampere DC

Input resistance: 10 Ω , 0,1 Ω , 0,01 Ω
Input range: 0A - 10A
Accuracy: 0,5% + 1 digit
Protection: mA: 2A fuse
A: Warning

Ampere AC

Input resistance: 10 Ω , 0,1 Ω , 0,01 Ω
Input range: 20 μ A - 10A
Accuracy: 10Hz -10KHz 1%+2d
Protection: mA: 2A fuse
A: Warning

Resistance

Input range: 0 Ω - 10M Ω
Output current: 10mA to 3 μ A
Voltage: max. 2V
Accuracy: 1% + 1 digit

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Frequency

Input resistance: 10 M Ω
Input range: 1V+ / 5V+
Accuracy: 0,5% + 1 digit

Temperature

Type: NiCr-Ni type K
Connector: type K compensation
Input range: -200°C - 1370°C
Accuracy: 0,1% + 1 digit

Pressure

Connector: DIN5-Connector
Input range: 0 hPa - 7000 hPa
Accuracy: 0,1% + 1 digit

pH

Connector: BNC
Input range: 0,00 pH - 14,00 pH
Input range: -1800 mV - 1800 mV
Accuracy: 0,1% + 1 digit

5 ACCESSORIES

PH combination electrode
Pressure sensor 0-1300hPa
Pressure sensor 500-7000hPa
Temperature sensor - liquid
Temperature sensor - needle
Temperature sensor - surface
Temperature sensor - air
Temperature sensor - wire
Remote display