PANTEC
DIVISION OF CARLO GAVAZZI

Operating instructions

DOLOMITI

The Dolomiti multimeter is available in three versions:

— Dolomiti which is the basic unit,
— Dolomit S, which incorporates electronic overload protection,
— Dolomiti USI, which incorporates both the overload protection and a universal signal injector.

Ranges

V d.c.	150 mV	0,5 V	1,5 V	5 V	15 V	50 V	150 V	500 V	1,5 kV
a.c.				5 V	15 V	50 V	150 V	500 V	1,5 kV
K	10	0,01	0,1	0,1	1	1	10	10	100
A d.c.	50 µA	0,5 mA		5 mA	50 mA		0,5 A	5 A	
a.c.				5 mA	50 mA		0,5 A	5 A	
K	1	0,01		0,1	1		0,01	0,1	
Output dB	—10+16	0+26		+10+36	+20+46		+30+56	+40+66	
K (add.)	0	+10		+20	+30		+40	+50	
Output V LF	5 V	15 V		50 V	150 V		500 V	1,5 kV	
K	0,1	1		1	10		10	100	
Ω d.c.	0,5 kΩ	5 kΩ		50 kΩ	500 kΩ		5 MΩ	50 MΩ	
a.c.							5 MΩ	50 MΩ	
K	0,1	1		10	100		1 k	10 k	
Reactive cap.	50.000 pF		500.000 pF						
K	1		10						
Balistic cap.	10	100	1000	10.000	100.000 µF		1 F		

General specifications

The basic movement is a Class 1 moving coil unit with centre magnet and shock-proof jewel mounts. Protection diodes are included to cope with polarity reversals.

— Accuracy: ± 2-0% d.c., ± 2-5% a.c., and ohms.
— Sensitivity: 20 kΩ/V, a.c. and d.c.
— Frequency: on a.c. ranges, 20 Hz to 20 kHz
— Power requirements: 2 x 1-5 V (Ever Ready HP 7 suits) and 1 x 22-5 V (Ever Ready B 122 suits). 240 V a.c. mains for reactive capacitance ranges.

Accessories

— Test leads, carrying case and instructions.
— Optional extra is 30 kV probe which extends upper d.c. voltage range to 30 kV f.s.d.
— USI: Output of 20 V peak-to-peak signal, 500 kHz modulated at 1 kHz. Rich in harmonics detectable up to 500 MHz.

Overload protection

The overload protection system used is electronic and electromechanical in nature, incorporating an amplifier, which detects the voltage applied across the meter movement and, if this exceeds the rated value by a factor of 8, then trips an electromechanical latch which switches the movement out of circuit.

Of course the system is applicable to beth a.c. and d.c. measurements since the movement only handles d.c. anyway. There is a lag in operation which is 7 ms for d.c. measurements and between 7 and 15 ms for a.c.

The protection circuit gains its supply from the 22-5 V battery which also powers the highest resistance, the X 10 kΩ range.

The overload protection only works with the inserted 22,5 V battery, with a minimal tension of 19 V. The protection operates a relay with a response time of 7 to 15 msec. For that reason there is no complete protection and in case of heavy overload a damage may nevertheless be caused on the printed circuit board.

Fusing

In addition, all Dolomiti instruments are supplied with test prods and the positive lead prod carries a rapid fusion 5 A fuse measuring 5 x 20 mm. To replace this fuse simply unscrew the pointer end of the prod from the insulating holder to expose the fuse.

Internal Power supply

The Dolomiti carries two 1-5 V batteries and one 22-5 V battery.

All three are used in the 6 resistance ranges and in addition the 22-5 V unit supplies power for the overload protection circuit. The USI also drains some 25 mA from the internal batteries when in use.

As all are used on the resistance ranges it is simple to check their state. Just ascertain that the OHM set zero knob can take the pointer beyond the zero calibration for resistance x 1 and x 10 k. This verifies the states of the 1-5 V and the 22-5 V batteries respectively.

The Dolomiti in use

Suitable batteries should be inserted in the clearly marked compartments at the rear of the instrument and the cover replaced. The batteries are spring contacted and the springs are biassed to help remove the batteries when replacement is needed. Hence some care in replacing the cover is needed. If the instrument is to be stored away for any length of time then it is recommended that batteries be removed to avoid any possibility of later problems with corrosion.

The Dolomiti is provided with a mechanical set-zero screw located at the bottom centre of the movement. Any lack of zero alignment can be taken up with this prior to use.

Controls

Operation of the Dolomiti is simple. A main range switch on the right hand side of the fascia can be rotated to select voltage, current, capacitance or resistance multipliers. A small slider switch at the bottom of the fascia selects d.c., a.c., or resistance ranges.

A single resistance set-zero control is provided and the only other items on the fascia are the overload button (Red) when that is supplied, the +, — and 1500 V input sockets and the USI output socket when the USI version is used.

Prior to use it is always a good idea to make certain that the trip is in its depressed or un-tripped state and that the correct range has been selected.

Always use the original probes supplied as these have plug dimensions to suit the sockets and, of course, incorporate the 5 A fuse.

D.C. voltage measurement

Set the switch slide to the = position. Set the rotary switch to the range required and insert the test prods in the respective sockets. The voltage measured will be read from the AV = scales which are the Black scales calibrated 0 to 15 and 0 to 50. Then multiply by K factor, according to the range used (see table).

To measure up to 30 kV the « AT 30 kV Dolomiti » probe is required. This is used in place of the normal positive probe and the rotary switch is set to the 1-5 kV marker. The voltage is read from the 0 to 15 scale and the value multiplied by 2,000.

A.C. voltage measurements

Move the slide switch to the ~ position and set up the required range on the rotary switch. Again the probes should be inserted in their correct sockets. This is a habit one should always hold to as it avoids any possibility of confusion later.

The voltage is read from the Red V ~ scales, again 0 to 15 and 0 to 50. The Red 0 to 50 is used for two scales, voltage and current so do not confuse one with the other. The current scales have a different linear relationship from the voltage scales.

Direct current measurement

Set the slide switch to the = position and select the required range with the rotary range switch. The reading is taken from the AV = scale using the necessary multiplier.

Apart from the 50 µA scale so marked, the 0-15 V scale also provides a 50 µA scale.

Alternating current measurements

Reset the slide switch to the ~ position and set the required range on the rotary switch. This time the reading is taken from the ~ scale in which the calibrations are offset somewhat from those of the other scales.

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Guarantee certificate

The Carlo Gavazzi organisation guarantees all Pantec instruments for one year from date of purchase against faulty material and workmanship.
Repair or replacement will be carried out without charge through the appropriate representative or distributor.
The guarantee does not cover damage due to mechanical shock, overload, incorrect operation and other misuse.
Any instrument requiring service under guarantee conditions should be returned through the supplier together with original invoice or other evidence of purchase date.

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Reactive capacitance measurements

Beware - When carrying out these measurements the instrument is connected to the mains with one mains line connected to one of the probes. Thus it is of utmost importance to avoid any contact with either the probes or parts of the instrument for the safety of both operator and instrument.

The instrument is connected to the mains via the cable supplied, the slide switch is set to the ~ position and the rotary switch to either the pF x 1 or x 10 position. With the test prods in position short them together and adjust the OHM adjust knob for full scale deflection.

Now the capacitor may be measured and the reading converted by multiplying if on the x 10 range.

Resistance measurement

With the slide switch in the Ω position and the probes in position select the required range on the rotaty switch, short the probes together and set the needle to the Ω zero position using the OHM set-zero control.

Now apply the prods to the resistance to be measured and read the value from the scale above the anti-parallax mirror using the scale multiplier required.

If the set-zero fails to produce what in fact f.s.d. then one or more of the batteries is flat. Remember that the 22·5 V unit is used on the highest range only.

An indication of resistance can be obtained even without batteries provided a mains supply is available. Plug in the mains as for reactive capacitance measurement and proceed as if to measure a capacitor. Using the upper resistance scale multiply the reading by 1 k if on the pF x 10 and by 10 k if one the pF x 1.

Again, beware the presence of mains voltage at one probe. Do not use this method on any semiconductor devices or equipment in view of the risk of damage to the subject material.

Balistic capacitance measurement

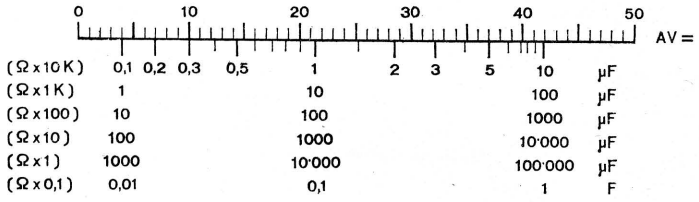
As with all multimeters, the Dolomiti can be used to obtain quite a good idea of the value of a capacitance by using one of the resistance ranges as a source of charging current and measuring the peak current obtained.

One warning, leaky capacitors will give a misleading reading.

Set up the instrument as for resistance measurement (d.c., **not** using the mains) and apply the probes to the capacitor under test. Note the maximum deviation to which the needle moves on the AV = scale.

The value of the capacitor can be obtained using the conversion scale supplied here.

It is recommended that this procedure be repeated several times, shorting out the capacitor between readings to give maximum accuracy.



Level measurements

As the instrument has a bandwidth of up to 20 kHz on a.c. it is quite suitable for working on audio voltage and level measurement problems. The voltage readings can be taken as for any a.c. voltages on the V ~ scale.

For output measurements the dB scale has been calibrated in accordance with international standards. 0 dB = 1 mW into 600 Ω, equivalent to 0-775 V. Thus, switched to the 5 V a.c. range one can read —10 to +16 dB, on the 15 V a.c. range one reads 0 to 26 dB, on the 50 V range +10 to +36 dB, on the 150 V range +20 to +46 dB, on the 500 V range +30 to +56, and the 1-5 kV range, +40 to +66 dB.

In practice it is always best to carry out any measurement of this type with a blocking capacitor of between 0-047 µF and 0-1 µF capacity in series with one of the probes. This should of course be a high voltage device if high readings are expected

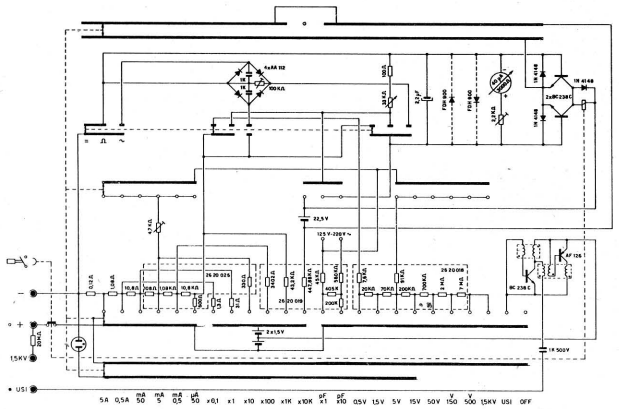
Universal signal injector

Where this is included in the instrument it takes its power from the resistance range batteries. Output is obtained from the single USI output terminal and the common + terminal. The USI terminal is the high or « hot » side of the circuit.

In practice it will be found that when working into high impedance circuits only a connection from the USI terminal will be required but when testing low impedance equipment then both connections will have to be used.

Areas of use include radio and television testing right up to 500 MHz as harmonics of the output can be detected up to this frequency. It can of course also be used as a simple audio note source such as in a morse practice oscillator.

The output terminals can withstand up to 500 V d.c.



Electric diagram