PRECISION DIGITAL MULTIMETERS

MODEL 1281

Selfcal Digital Multimeter

- **The World's Finest 8½ Digit DMM**
- **1 Year DCV Specifications to ±3.1 ppm**
- **1 Year ACV Specifications to ±65 ppm**
- **Selfcal Internal Calibration**
- **Simultaneous Display of Frequency and RMS ACV**

State of the Art Accuracy

A glance at the specifications opposite will confirm that the 8½ digit 1281 Selfcal Digital Multimeter is, without exception, the best DMM in the world. Designed with Standards and Calibration laboratories in mind, the 1281 provides the ultimate in electrical measurement, outperforming all rivals in accuracy, functional capability, and ease of use.

Selfcal

The impressive specifications of the 1281, achieved through a blend of innovation, experience and new component technology, are further enhanced by "Selfcal"—Datron's unique method of accurate internal calibration.

Embedded within the 1281's normal measurement circuits is a compact and accurate internal calibrator based on an inherently stable precision transformer multiplier. This is used to derive different levels of very high accuracy calibration signals from the 1281's zener references, which are then routed to the various measurement circuits in order to calibrate them. Over 150 calibration measurements are used by the microprocessor to compute and store corrections for the effects of time and temperature drift in the 1281's circuits, significantly enhancing its long term performance and temperature coefficient specifications.

Applications

Long term accuracy and wide functional capability make the 1281 an obvious choice as a lab standard for the smaller calibration facility, while its short term stability and ease of calibration without removal of covers also makes it ideal for the short term transfer work appropriate to a Standards environment. In addition to its stability, the 1281's rugged construction and extensive selftesting capability (which can be carried out to very high precision due to the 1281's internal calibrator) are characteristics that lend it to audit applications, where laboratories can compare measurements knowing that the transfer instrument can check itself to a high degree of accuracy after transportation, and is highly stable over the period the measurements are taken.

Calibration Systems

Apart from enhancing accuracies, the 1281's ability to internally calibrate itself gives it a low effective temperature coefficient, which when combined with comprehensive control over the IEEE-488 interface makes the instrument an ideal component either for a mobile calibration system, or for integration in a high accuracy A.T.E. The low temperature coefficient means that the 1281 can deliver highly accurate measurements outside of a controlled calibration environment.

Versatile

In addition to its basic measurement capability, the 1281 incorporates many features to enhance the usefulness of its fundamental performance. These include frequency measurements which can be displayed simultaneously with the signal's True RMS value, low-current

resistance modes which are of particular interest to users of resistance thermometers, comprehensive autoranging ratio (including difference and deviation measurements), rolling and block averaging, linear math computations, dB's and automatic readout of the uncertainty of measurements.

SPECIFICATIONS

DC Voltage

Ranges: 100 mV to 1000V in decades.
FS: 2 x Full Range. 100% Overrange. (Except 1kV range).
Resolution: 10 nV, 8½ digits.
Total Uncertainty: (1 Year, 23° ±5°C, ±(ppmR+ppmFS)).

100mV Range:	6 + 0.5
1V Range:	3 + 0.2
10V Range:	3 + 0.1
100V Range:	6 + 0.2
1000V Range:	6 + 0.2

CMRR: (1kΩ unbalance) >140dB at DC, >(80dB+NMRR) at 1Hz-60Hz.
NMRR: 60 dB at 50/60 Hz ±0.09% (Filter out), 110 dB at 50/60 Hz (Filter in).
Input Impedance: >10,000MΩ from 100 mV to 10V ranges, 10MΩ ±0.1% on 100V and 1000V ranges.
Input Protection: Withstands 1kV RMS on any range.
Input Current: <50pA.
Settling Time: (To 10ppm step size) <50 ms (Filter out), <1s (Filter in).
Read Rate: 1/6s at 8½ digits, 150/s at 4½ digits.

True RMS AC Voltage

Ranges: 100 mV to 1000V in decades.
FS: 2 x Full Range. 100% Overrange. (Except 1kV range).
Resolution: 100 nV, 6½ digits.
Total Uncertainty: (1 Year, 23° ±5°C, Signal >1%FS, ±(ppmR+ppmFS)).

100 mV Range:

40 Hz-10 kHz	100+20
10-30 kHz	300+40
30-100 kHz	700+100

1V to 100V Ranges:

40-100 Hz	80+10
100 Hz-2 kHz	60+10
2-10 kHz	80+10
10-30 kHz	200+20
30-100 kHz	500+100
100-300 kHz	0.3%+0.1%
300 kHz-1 MHz	1%+1%

1000V Range:

40 Hz-10 kHz	80+10
10-30 kHz	200+20
30-100 kHz	500+100

Lf Accuracy: (DC coupled. Add to main accuracy specs).

DC	±(50ppmR+20ppmFS+20μV)
1Hz-10Hz	±(20ppmR+50ppmFS)
10-40 Hz	±(20ppmR)

CMRR: (1kΩ unbalance) >90 dB at DC-60 Hz.
Input Impedance: >1MΩ shunted by 150pF.
Input Protection: Withstands 1kV RMS on any range.
Crest factor: 5:1 at Full Range.
Max Volt-Hertz: 3 x 10^7.
Settling Time: (To 100 ppm step size) <500 ms (100Hz), <1.25s (40 Hz), <5s (10 Hz), <50s (1 Hz).
Read Rate: 1/s at 6½ digits.

Spot Frequency AC Voltage:

Total Uncertainty: (1 Year, 23° ±5°C, Signal >1%FS, ±(ppmR+ppmFS), Valid within ±10% of calibrated RMS value and Spot Frequency).

100 mV Range:

40 Hz-10 kHz	100+10
10-30 kHz	150+25
30-100 kHz	500+100

1V to 100V Ranges:

40 Hz-10 kHz	60+5
10-30 kHz	150+15
30-100 kHz	400+50
100-300 kHz	0.2%+0.05%
300 kHz-1 MHz	0.5%+0.3%

1000V Range:

40 Hz-10 kHz	60+5
10-30 kHz	150+15
30-100 kHz	400+50

Resistance

Ranges: 10Ω to 1GΩ in decades.
FS: 2 x Full Range, 100% Overrange.
Resolution: 1μΩ, 8½ digits (Except 100MΩ and 1GΩ ranges).
Total Uncertainty: (1 Year, 23° ±5°C, ±(ppmR+ppmFS)).

10Ω Range:	12+1
100Ω to 10kΩ Range:	8+0.3
100kΩ Range:	6+0.2
1MΩ Range:	10+0.7
10MΩ Range:	20+4
100MΩ Range:	200+45
1GΩ Range:	0.2%+450

Open Circuit Voltage: <20V.
Lead Resistance: Up to 100Ω.
Current Through Unknown:

10Ω and 100Ω	10 mA
1kΩ	1 mA
10kΩ and 100kΩ	100μA
1MΩ	10μA
10MΩ	1μA
100MΩ	100nA
1GΩ	10nA

Input Protection: Withstands 250V RMS on any range.
Settling Time: Up to 100kΩ generally the same as DCV.
Read Rate: 1/6s at 8½ digits, 150/s at 4½ digits

Low Current Resistance

Total Uncertainty: (1 Year, 23° ±5°C, ±(ppmR+ppmFS)).

10Ω to 1kΩ Ranges:	12+1
10kΩ Range:	15+1
100kΩ Range:	70+3
1MΩ Range:	400+10

Open Circuit Voltage: <0.2V.
Current Through Unknown:

10Ω	10 mA
100Ω	1 mA
1kΩ	100μA
10kΩ	10μA
100kΩ	1μΩ
1MΩ	100 nA

DC Current

Ranges: 100μA to 1A in decades.
FS: 2 x Full Range. 100% Overrange.
Resolution: 100pA, 6½ digits.
Total Uncertainty: (1 Year, 23° ±5°C, ±(ppmR+ppmFS)).

100μA to 10mA Ranges:	25+2
100 mA Range:	50+5
1A Range:	150+10

AC Current

Ranges: 100μA to 1A in decades.
FS: 2 x Full Range. 100% Overrange.
Resolution: 1 nA, 5½ digits.
Total Uncertainty: (1 Year, 23° ±5°C, ±(%R+%FS)).

100μA to 100mA Range:

40 Hz-5 kHz	200+100

1A Range:

10 Hz-1 kHz	500+200
1-5 kHz	0.15%+0.04%

Frequency

Resolution: 4½ or 6½ digits.
Total Uncertainty: (1 Year, 13°-33°C).
±10ppmR+2 digits (6½ digits, 10 Hz-1 MHz).
±2 digits (4½ digits, 200 Hz-1 MHz).
Sample Interval:

Fast Gate	50 ms (4½ digits).
Normal Gate	1s (6½ digits)

Ratio Accuracy

±(net signal accuracy+net reference accuracy).

GENERAL

Calibration: Selfcal internal calibration. Autocal external cal from front panel or via IEEE-488 interface
Remote Programming: IEEE-488.
Environmental:
Operating temp: 0° to +50°C.
Storage temp: −40° to +70°C.
Dimensions: 88 mm (3.5 in.) high, 427 mm (16.8 in.) wide, 487 mm (19.2 in.) deep.
Weight: 13.5 kg (30 lb).
Power: 100-130V or 200-260V, 47Hz-63Hz, 37VA.

OPTIONS

10: True RMS AC Converter
20: 2-Wire and 4-Wire Resistance Converter
30: Current Converter. (Only available with Option 20)
70: Isolated Analog Output
80: 115V 60Hz Line Operation
81: 115V 50Hz Line Operation
90: Rack Mounting Kit

ACCESSORIES

1501: DMM Lead Kit

FACTORY/FOB

Indianapolis, IN
Norwich, England