LUMEL
EVERYTHING COUNTS

NEW

NT10
INSULATION METER

Functions and features of the meter:

- Insulation resistance measurement up to 3 GΩ.
- Measurement of DC and AC voltage in the range of 30 mV...1000 V.
- Measurement of DC and AC current in the range of 300 µA...300 mA.
- Resistance measurement 30 Ω...30 MΩ.
- Capacity measurement 30nF...30µF.
- Frequency measurement 300 Hz...100 kHz.
- Measuring the fill factor (%).
- HOLD function.
- Temperature measurement in the range of -200...800ºC / Pt100/ Pt1000.
- Interface RS-232.
- Analog scale.

Electrical Safety 1000 V CAT III

Electrical Safety 600 V CAT IV

Product Features:

Insulation resistance measurement up to 3GΩ.
Insulation resistance measurement up to 3GΩ with Testvoltages selection: 50 V, 100V, 250V, 500V and 1000V.

Route mean square value with distorted wave form.
Measuring principal employed permits the measurement of rout mean square value (TRMS) OF AC quantities and mixed quantities (AC and DC) regardless of wave form.

AC current measurement with clip-on sensor
Current measurement up to 300A with clip-on sensor having ratio1mv/10mA.

Min/Max Function
By pressing min/max button instrument will start recording minimum and maximum readings.

Temperature measurement
Temperatures from -200 to 800ºC using Pt100 and Pt 1000 sensors.

Auto Power Off
In order to save the power of the Batteries, the meter will automatically shut OFF if it detects no activity for 10 minutes.

Continuity test
This permits resting for short circuit and open circuit. In addition to the display, a facility of sound signal is available.

AUTO and MANUAL ranging modes.
In AUTO ranging mode the instrument automatically selects the range with best resolution depending on the applied input. In MANUAL ranging mode range is user selectable using **MAN** key.

Indication of negative values on the analog scale.
When measuring DC quantities, also negative values are shown on the analog scale so that variations of the measured value can be observed at the Zero point.

Protection from dust and water:
Instrument: IP50 For terminals : IP20 as per EN 60529

Applicable international safety standards
1000 V CAT II/600V CAT III as per International Safety standard EN 61010-1 and 61557.

Signaling in the case of a blown fuse.
The display shows “FUSE” in case of blown fuse.

Application :

NT10 is Analog Digital Multimeter with insulation resistance measurement , which measures VAC, VDC, VAC+DC,Frequency, mA DC, mA AC+DC,Resistance, continuity, Diode, Farad, AC current measurement with clip-on sensor and insulation resistance measurement.

Automatic blocking socket (ABS)
The automatic terminal blocking system prevents incorrect connection of test lead and incorrect selection of measurement quantity, which provide safety to the user.

Interface and software RISH com 100.
The multimeters are fitted with a serial RS-232 C interface via which the measured values can be transmitted to a PC. These values, electrically isolated, are transmitted to the attachable interface adaptor with infrared light through the case.

Analog scale
Analog scale that updates at the rate 20 times/sec to observe fluctuations in input.

Continuous On mode
In this mode, AUTO POWER OFF is disabled.

DATA HOLD function
By pressing DATA HOLD button, reading on the display can be latched for Hands free operation.

NULL ZERO correction for resistance
For Low ohm measurement, the lead resistance can be compensated by pressing the shift key (Yellow Key)

NULL ZERO correction for capacitance
Null zero connection for capacitance. For nF range, stray capacitance can be compensated by shift key (Yellow Key)

Diode measurement
For testing diode and transistors, diode measurement function is available.

Display with backlit.
For clear visibility in dark conditions, NT10 is featured with backlit.

Specifications:

Measuring function	Measuring range	Resolution	Input impedance	Intrinsic error of digital display ± (…% of rdg + …digit) at reference condition	Over load capacity [1]	
					Over load value	Overload duration
V dc	30.00 mV	10 µV	>10 GΩ // <40pF	0.5 + 3 [2]	1000 V DC AC eff / rms Sine wave	Continuously
	300.0 mV	100 µV	>10 GΩ // <40pF	0.5 + 3		
	3.000 V	1 mV	11 MΩ // <40pF	0.25 + 1		
	30.00 V	10 mV	10 MΩ // <40pF	0.25 + 1		
	300.0 V	100 mV	10 MΩ // <40pF	0.25 + 1		
	1000 V	1 V	10 MΩ // <40pF	0.35 + 1		
V ~	3.000 V	1 mV	11 MΩ // <40pF	1.0 + 3 (>10 Digits)		
	30.00 V	10 mV	10 MΩ // <40pF			
	300.0 V	100 mV	10 MΩ // <40pF			
	1000 V	1V	10 MΩ // <40pF			
V AC+DC	3.000 V	1 mV	11 MΩ // <40pF	1.0 + 3 (>10 Digits)		
	30.00 V	10 mV	10 MΩ // <40pF			
	300.0 V	100 mV	10 MΩ // <40pF			
	1000 V	1V	10 MΩ // <40pF			
A AC with clamp 6)	30/300 A	10/100mA	–	0.5 +5	–	--
A DC			**Voltage Drop**		0.36 A	Continuously
	300.0 µA	100 nA	15 mV	0.5+5 (>10 Digit)		
	3.000 mA	1 µA	150 mV	0.5+2		
	30.00 mA	10 µA	650 mV	0.5+5 (>10 Digit)		
	300.0 mA	100 µA	1V	0.5+5		
A AC+DC	3.000 mA	1 µA	150 mV	1.5+4 (>10 Digit)	0.36 A	Continuously
	300.0 mA	100 µA	1 V	1.5+4 (>10 Digit)		
Ω			**No load voltage**			
	30.00 Ω	10 mΩ	Max. 3.2 V	0.5 + 3 [2]	1000 V DC AC eff / rms Sine wave	10 sec
	300.0 Ω	100 mΩ	Max. 3.2 V	0.5 + 3		
	3.000 KΩ	1Ω	Max. 1.25 V	0.4 + 1		
	30.00 KΩ	10 Ω	Max. 1.25 V	0.4 + 1		
	300.0 KΩ	100 Ω	Max. 1.25 V	0.4 + 1		
	3.000 MΩ	1 KΩ	Max. 1.25 V	0.6 + 1		
	30.00 MΩ	10 KΩ	Max. 1.25 V	2.0 + 1		
→|	2.000 V	1 mV	Max. 3.2 V	0.25 + 1		

Measuring function	Measuring range	Resolution	Discharge resistance	U0 max.	Intrinsic error of digital display ± (…% of rdg + …digit) at reference condition	Over load capacity [1]	
						Over load value	Overload duration
Farad ⊣⊢	30.00 nF	10 pF	250 KΩ	2.5 V	1.0 + 3 [2]	1000 V DC AC eff / rms Sine	10 sec
	300.0 nF	100 pF	250 KΩ	2.5 V	1.0 + 3		
	3.000 µF	1 nF	25 KΩ	2.5 V	1.0 + 3		
	30.00 µF	10 nF	25 KΩ	2.5 V	3.0 + 3		

Measuring function	Measuring range		Resolution	Discharge resistance	U0 max.	Intrinsic error of digital display ± (…% of rdg + …digit) at reference condition	Over load capacity [1]	
							Over load value	Overload duration
Hz				**f min V dc**	**f min V ~**	0.5 + 1 [3]	≤ 3 kHz 1000 v ≤ 30 kHz; 300 V ≤100 kHz 30 V	Continu-ously
	300.0 Hz		0.1 Hz	1 Hz	45 Hz			
	3.000 KHz		1 Hz	1 Hz	45 Hz			
	30.00 KHz		10 Hz	10 Hz	45 Hz			
	100.0 KHz		100 Hz	100 Hz	100 Hz			
%	2.0....98.0%		0.1 %	2 Hz	--	2 Hz… 1kHz ± 5 Digit [4] 1 kHz … 10 kHz; ± 5 Digit / kHz [4]		
°C	Pt 100	-200.0... +200.0 °C	0.1 °C	–	--	2 Kelvin + 5 Digit [5]	1000 V DC AC eff / rms Sine	10 sec
		+200.0... +850.0 °C	0.1 °C			1.0 + 5 [5]		
	Pt 1000	-100.0... +200.0 °C	0.1 °C	–	--	2 Kelvin + 2 Digit [5]		
		+200.0... +850.0 °C	0.1 °C			1.0 + 2 [5]		

Reference conditions for Accuracy:

Reference temperature	23°C ± 2
Relative Humidity	45%...55% RH
Waveform of measured quantity	Sinusoidal
Input frequency	50 or 60 Hz ±2%
Battery Voltage	8 V ± 0.1 V

Response time (After manual range selection):

Measured Quantity/ Measured Response time	Response Time		Transient response for step function of the measured quantity
	Of Analog indication	Of digital indication	
VDC,VAC,A AC+DC,A AC	0.7 s	1.5 s	From 0 to 80 % of upper range limit.
30Ω…3 MΩ	1.5 s	2 s	From ∞ to 50 % of upper range limit.
30 MΩ	4 s	5 s	
	0.7s	1.5s	
nF,µF,ºC,		Max. 1… 3 s	
300 Hz,3KHz		Max 2 s	From 0 to 80 % of upper range limit.
30 KHz,300 KHz		Max 0.7 s	
% (1 Hz)		Max 9 s	
% (≥10 Hz)		Max 2.5 s	

Environmental

Operating temperature	-20 to +50°C
Storage temperature	-25 to +70°C
Relative humidity	<75% non condensing.
Terminal Protection	IP20 for terminals
Altitude	Up to 2000 m

Battery

Battery Voltage	6 x 1.5 V Cells
Battery type	Alkaline manganese Dioxide cell as per LR 03 , ANSI 24A (Size AAA)
Battery Life	Minimum 600 hours on Vdc, Adc ,240 hours on Vac, Aac, For MΩISO @1000 V, 800 Measurements possible with nominal current MΩISO @500,250V, 100V, 50 V, 2400 Measurements possible with nominal current.

Interface

Type	RS232C, serial, as per DIN 19241.
Data transmission	Optically with infrared light through the case.
Baud rate	8192 bits/s.

Influence Quantities and Variations:

Influence Quantity	Measuring Range	Resolution	Intrinsic error of digital display ± (…% of rdg + …digit) at reference condition
V1MΩ[7)]	0...1000 V AC+DC	1V	1+10 D
MΩIT@1000V 8)	0...1000 V AC+DC	1V	1+10 D
MΩIT Un=50 V	0.100…1.600 MΩ	1kΩ	--
	01.40…16.00 MΩ	10 kΩ	5 + 15 D
	014.0…155.0 MΩ	100 kΩ	--
MΩIT Un=100 V	0.100…3.100 MΩ	1kΩ	--
	02.80…31.00 MΩ	10 kΩ	5 + 15 D
	028.0…310.0 MΩ	100 kΩ	--
MΩIT Un=250 V	0.100…0.800 MΩ	1 kΩ	--
	00.70…08.00 MΩ	10 kΩ	3 + 10 D
	007.0…080.0 MΩ	100 kΩ	--
	0070…0775 MΩ	1MΩ	--
MΩIT Un=500 V	0.100…1.600 MΩ	1kΩ	--
	01.40…16.00 MΩ	10 kΩ	3 + 10 D
	014.0…160.0 MΩ	100 Ω	--
	0140…1600 MΩ	1MΩ	--
MΩIT Un=1000 V	0.100…3.100 MΩ	1kΩ	--
	02.80…31.00 MΩ	10 kΩ	3 + 10 D
	028.0…310.0 MΩ	100 kΩ	--
	0280…3100 MΩ	1MΩ	–

1) At 0º …. + 40 ºC
2) With zero adjustment, without zero adjustment + 50 digits
3) Range
3 V ac/dc: Ue = 1.5 V eff/rms … 100 V eff/rms
30 V ac/dc: Ue = 15 V eff/rms … 300 V eff/rms
300 V ac/dc: Ue = 150 V eff/rms … 1000 V eff/rms
4) On the range 3 V dc, square – wave signal positive on one side 5 … 15 V,
f = const., not 163.84 Hz or integral multiple.
5) Without sensor.
6) Measurement with clip-on current sensor with ratio 1mV/10mA.
7) Discharge the DUT through 1MΩ resistance, before insulation resistance measurement. LCD displays value of voltage present on DUT.
8) In this switch position live circuit detection (V AD+DC) is done before insulation measurement. If voltage present is greater than 50V (AC+DC), insulation resistance measurement function is disabled and LCD displays value of voltage present on DUT.

Influence Quantity	Range of Influence		Measured Quantity / measuring Range	Variation [1] ± (….% of rdg. + ….digits)
Temperature	0 ºC +21 ºC and +25 ºC…+40ºC MΩIT 0.25 + 2		30/300 mV dc	1.0 + 3
			3...300 V dc	0.15 + 1
			1000 V dc	0.2 + 1
			V ~	0.4 + 1
			300µA … 300mA DC	0.5+1
			A AC+DC	0.75+3
			30 Ω 2)	0.15 + 2
				300 Ω 0.25 + 2
			3 KΩ – 3 MΩ	0.15 + 1
			30 MΩ	1.0 + 1
			30 nF [2] – 3 µF	0.5 + 2
			30 µF	2.0 + 2
			Hz	0.5 + 1
			%	± 5 digits
			-200…+200 ºC	0.5 K + 2
			+200…+850ºC	0.5 + 2
Frequency of the measured quantity	15 Hz....< 30 Hz		3…1000 V ~	1.0 + 3
	30 Hz....< 45 Hz			0.5 + 3
	> 65 Hz... 400 Hz			2.0 + 3
	>400 Hz…1 kHz		3….300 V ~	3.0 + 3
			1000 V ~	3.0 + 7
	20Hz …< 45 Hz		A~	2.0 + 3
	>66 Hz… 1 kHz			3.0 + 3
Wave form of the measured quantity [3]	Crest factor CF	1….3	V ~ 4) , A~ 4)	± 1 % of rdg
		3….5		± 3 % of rdg
Battery Voltage	⊣⊢ [5] …< 7.9 V > 8.1 V …10.0 V		V DC	2 Digit
			V~, ADC	4 Digit
			A AC+DC	6 Digit
			30Ω / 300 Ω/˚C	4 Digit
			3 kΩ – 30MΩ, MΩIT	3 Digit
			nF, µF, Hz %	1 Digit 1 Digit 1 Digit
Relative humidity	75% 3 Days Meter off		V~,V DC A AC+DC,A DC Ω Hz ˚C %	3 Days 1 x intrinsic error
DATA	-			± 1 digits
MIN/MAX	-		V ac/dc , A ac/dc, clamp	± 2 digits

1) With temperature: Error data apply per 10 K change in temperature.
With frequency: Error data apply to a display from 300 digits onwards.
2) With zero adjustment.
3) With unknown waveform (crest factor CF > 2), measure with manual range selection
4) With the exception of sinusoidal waveform.
5) After the " ⊣⊢ " symbol is displayed.

Influence Quantity	Range of Influence	measuring Range	Attenuation
Common Mode interference voltage	Noise quantity max. 1000 V	V dc 3V~ , 30V~ 300 V~	> 120 dB > 70 dB
		1000 V~	> 60 dB
Normal Mode Interference Voltage	Noise quantity max. 1000 V ~ Value of the measuring range at a time Max. 1000V~ ,50Hz, 60Hz sinusoidal	V dc	50dB
	Noise quantity max. 1000 V-	V~	>110dB

Applicable Standards:

For Use as a Insulation Measuring Instrument.	EN 61557: Devices for testing, measuring and monitoring protective safety measures in system with voltages of up to 1000 V A.C. and 1500 V D.C. EN 61557- 1: For general requirements EN 61557- 2: For Insulation resistance measuring instruments
EMC	EN 61326: Class B
Immunity	EN 61000-4-2 8 kV atmosphere discharge, 4 kV contact discharge EN 61000-4-3 : 3 V/m

Safety

EN 61010-1

IP for water & dust	EN 60529
Pollution degree:	2
Installation category:	III
High Voltage Test	3.5 kV (EN 61010-1)

ORDERING CODE

Isolation meter NT10 -	XX	X	X
Version:			
standard	00		
custom-made*	XX		
Language:			
Polish		P	
English		E	
other*		X	
Acceptance tests:			
with an extra quality inspection certificate			1
with test certificate			2
acc. to custromer's request			X

ITEMS AVAILABLE FROM OUR STOCK:
NT10 - 00E1

* after agreeing with the manufacturer

LUMEL S.A.
ul. Sulechowska 1, 65-022 Zielona Góra, POLAND
tel.: +48 68 45 75 100, fax +48 68 45 75 508
www.lumel.com.pl

Export department:
tel.: (+48 68) 45 75 139, 45 75 233, 45 75 321, 45 75 386
fax.: (+48 68) 32 54 091
e-mail: export@lumel.com.pl