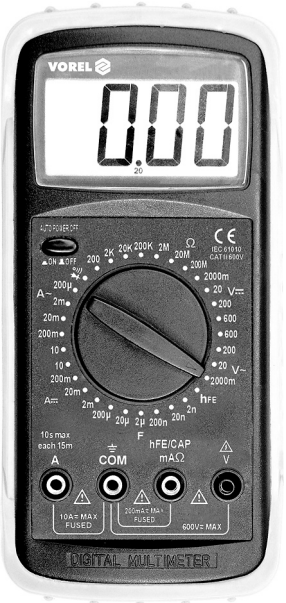
VOREL
BY TOYA

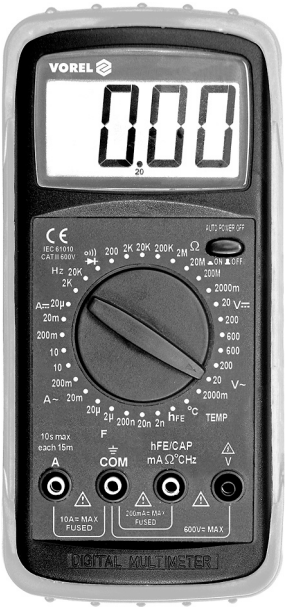
>>> 81783
>>> 81784

GB ***DIGITAL MULTIMETER***

CE



81783



81784

U **D.C.** **0-600V**	Direct voltage	**f** **20kHz** **max**	Frequency
U **A.C.** **0-600V**	Alternative voltage	**T** **-40°÷** **+400°C**	Temperature
I **D.C.** **0-10A**	Direct current	**h_{FE}** **PNP** **NPN**	Ttansistor test
I **A.C.** **0-10A**	Alternative current		Diode test
R **0-200** **MΩ**	Resistance		Buzzer
C **0-20µF**	Capacitance		

ENVIRONMENTAL PROTECTION
Correct disposal of this product: This marking shown on the product and its literature indicates this kind of product mustn't be disposed with household wastes at the end of its working life in order to prevent possible harm to the environment or human health. Therefore the customers is invited to supply to the correct disposal, differentiating this product from other types of refusals and recycle it in responsible way, in order to re - use this components. The customer therefore is invited to contact the local supplier office for the relative information to the differentiated collection and the recycling of this type of product.

2012 Production year:

TOYA S.A. ul. Sołtysowicka 13-15, 51-168 Wrocław, Polska

PROPERTIES OF THE DEVICE

The all-purpose meter is a digital measurement device designed to measure various electrical quantities. The meter has been designed for amateur, non-professional purposes and must not be used for paid jobs or craft.

Before using the meter, read the whole manual and keep it.

The meter has a plastic housing, a liquid crystal display and a measurement range selector. The housing is equipped with three measurement sockets and a transistor test socket.
The meter is equipped with measurement cables with plugs.
The meter is sold without a battery.

ATTENTION! The meter is not a measurement device as it is construed within the „Measurement Law"

TECHNICAL PROPERTIES

ATTENTION! It is prohibited to measure electrical quantities exceeding the maximum measurement range of the meter.

Parameter	Direct voltage (R_{IN} = 10MΩ)		Alternating voltage (R_{IN} = 10MΩ)		Direct current (U_{AR} = 0,2V, f_{IN} = 40 ÷ 400Hz)		Alternating current (U_{AR} = 0,2V, f_{IN} = 40 ÷ 400Hz)		Resistance	
Catalogue number	Range	Precision	Range	Precision	Range	Precision	Range	Precision	Range	Precision
81783	200 mV	±0,5%	200 mV	±1,2%	20 µA	-	20 µA	-	200 Ω	±0,8%
	2 V		2000 mV	±0,8%	200 µA		200 µA		2 kΩ	
	20 V		20 V		2 mA	±0,8%	2 mA	±1%	20 kΩ	
	200 V		200 V		20 mA		20 mA		200 kΩ	
	1000 V	±0,8%	750 V	±1,2%	200 mA	±1,2%	200 mA	±1,8%	2 MΩ	
					2 A	-	2 A	-	20 MΩ	±1%
					20 A	±2%	20 A	±2%	200 MΩ	±5%
81784	200 mV	±0,5%	200 mV	-	20 µA	±2%	200 µA	-	200 Ω	±0,8%
	2 V		2000 mV		200 µA	-	200 µA		2 kΩ	
	20 V		20 V	±0,8%	2 mA		2 mA		20 kΩ	
	200 V		200 V		20 mA	±0,8%	20 mA	±1%	200 kΩ	
	1000 V	±0,8%	750 V	±1,2%	200 mA	±1,2%	200 mA	±1,8%	2 MΩ	
					2 A	-	2 A	-	20 MΩ	±1%
					20 A	±2%	20 A	±2%	200 MΩ	±5%

Parameter	Capacitance		Frequency		Temperature		Transistor test		Diode test	
Catalogue number	Range	Precision	Range	Precision	Range	Precision	I_B	U_{CE}	I_F	U_R
81783	2 nF 20 nF 200 nF 2 µF 20 µF	±2,5%	-	-	-	-	10 µA	2,8 V	1 mA	2,8 V
81784	2 nF 20 nF 200 nF 2 µF 20 µF	±2,5%	2 kHz 20 kHz	±1,5%	-40 ÷ 400°C 400 ÷ 1000°C	±0,75% ±1,5%	10 µA	2,8 V	1 mA	2,8 V

OPERATION OF THE MULTIMETER

ATTENTION! In order to protect from electric shock before the housing of the device is opened, disconnect the measurement cables and turn the meter off.

Replacement of the battery
The multimeter is powered with a **9V 6F22 battery**. It is recommended to use alkaline batteries. In order to install a battery, open the housing of the device removing the two screws at the bottom of the meter. Connect the battery in accordance with the marking of the terminals, close the housing and replace the screws.

Replacement of the fuse
The device is equipped with a 0,5A/250V quick-break equipment fuse. If the fuse is damaged, it must be replaced with a new one of the same electrical parameters.
To do so, open the housing of the meter and proceed as in the case of replacement of the battery, observing the safety principles, to replace the fuse.

MEASUREMENTS

Depending on the actual position of the range switch in the display three significant digits will be displayed as well as the measurement range below the coma. In case of measurements in the highest voltage ranges a lightning symbol will be displayed. If it is necessary to replace the battery the multimeter indicates this displaying the battery symbol. If before the measured value the "-" symbol is displayed then the measured value has an opposite polarization in relation to the connection of the meter. If only "1" is displayed, then the measurement range is exceeded, and it is necessary to increase the measurement range. In case of measurements of quantities of unknown values, set the highest measurement range and only after the initial measurement change the measurement range to the adequate one.

ATTENTION! The measurement range of the meter must not be lower than the measured value. It might damage the meter and cause an electric shock.

The correct connection of the leads:
The red lead must be connected to the socket marked as „VΩ", „mA" or „A"
The black lead must be connected to the socket marked as „COM"

Measurements of voltage
Connect the measurement cables. Switch the range selector to the position of the measurement of the direct voltage or alternating voltage. Select the maximum measurement range, connect the measurement cables in parallel to the electric circuit and read the result of the measurements of the voltage. In order to ensure more precise results of the measurement you may change the measurement range. Do not ever measure a voltage exceeding 1000V, since it might damage the meter and cause an electric shock.

Measurement of intensity of the current
Depending on the expected value of the measured intensity of the current connect the measurement cables to the socket marked as „mA" and „COM" or „A" and „COM". Maximum intensity of the current measured through the „A" socket may be 20A and it is not protected with any fuse. Maximum intensity of the current measured through the socket is 10A. The duration of measurement of a current exceeding 10A must not be longer than 15 seconds. The maximum power-carrying capacity of the „mA" socket is 200mA. **The maximum current and voltage values of the sockets must not be exceeded.**
Connect the measurement cables in series to the tested electric circuit, select the range and kind of the current and read the result of the measurement. The first stage of the measurements is to select the maximum measurement range. In order to ensure more precise results of the measurement you may change the measurement range.

Measurements of resistance
Connect the measurement cables to the sockets marked as „VΩ" and „COM"; switch the range selector to the position of the measurement of resistance. Place the measurements leads at the terminals of the measured element and read the result. In order to ensure more precise results of the measurement the measurement range may be changed if required. **It is strictly prohibited to measure the resistance of live elements.** The measurement range 200MΩ has a constant amounting to 1MΩ, which must be deducted from the result of the measurement. The constant may be

seen if the measurement leads of the meter are short-circuited.

Measurement of capacitance
Switch the range selector to the position of the measurement of capacitance. Make sure the capacitor was discharged before the measurement. **Do not ever measure the capacitance of a charged capacitor, since it might damage the meter and cause an electric shock.**

Measurements of frequency
Connect the measurement cables to the sockets marked as „VΩ" and „COM"; switch the range selector to the position of measurement of frequency. Put the measurements leads to the terminals of the tested element and read the result of the measurement in the display. Do not ever measure the frequency of a signal whose frequency exceeds 250V RMS (average value). The measured signal should not exceed 100V RMS, since otherwise the result cannot be read.

Measurement of temperature
Connect the special cable to the TEMP socket and observe the polarization of the terminals. Switch the range selector to the position of measurements of temperature. Measure the temperature with the other end of the thermoelement. The meter will indicate the temperature in degrees centigrade. The thermoelement supplied with the device permits to realise measurements only up to 250^{O}C. Measurements up to 300^{O}C are permitted provided the duration of measurements is short.

Diode and conductivity test
Connect the measurement cables to the sockets marked as „VΩ" and „COM", and switch the selector to the diode symbol. Place the measurement leads at the diode terminals in the conduction direction and the reverse direction. If the diode is functioning correctly, then at the diode connected in the forward direction we will read the voltage drop for this diode expressed in mV. In case the diode is connected in the reverse direction the display will read „1". If the diode terminal is damaged the display will read „0" independently of the direction in which the diode is connected. Correctly functioning diodes show a low resistance in the forward direction and a high resistance in the reverse direction. **It is strictly prohibited to test live diodes.**
In case the meter is used for conduction measurements, the internal buzzer will emit sound each time the measured resistance drops below 30±10Ω.

Transistor test
Switch the measurement range selector to the position marked with the h_{FE} symbol (measurement of the gain coefficient of the transistor). Depending on the type of transistor it must be connected to the socket of the base marked as PNP or NPN, making sure the terminals of the transistor are placed in accordance with the letter indications: E - emitter, B - base, C - collector. If the transistor is functioning properly and the connection is correct, the result of the measurement of the gain coefficient is read in the display. **It is strictly prohibited to test live transistors.**

TOYA S.A.
ul. Sołtysowicka 13 - 15
51 - 168 Wrocław
tel.: 071 32 46 200
fax: 071 32 46 373
e-mail: biuro@yato.pl

ODDZIAŁ WARSZAWSKI
Teren ProLogis Park Nadarzyn
al. Kasztanowa 160
05 - 831 Młochów k. Nadarzyna
tel.: 022 73 82 800
fax: 022 73 82 828

DECLARATION OF CONFORMITY

0112/81783/EC/2012

We declare and guarantee with full responsibility that the following products:

Digital universal multimeter; item no. 81783
Digital universal multimeter; item no. 81784

meet requirements of the following European Standards / Technical Specifications:

EN 61010-1:2001
EN 61010-031:2002 + A1:2008
EN 61326-1:2006
EN 61326-2:2006

and fulfill requirements of the following European Directives:

2006/95/EC Low voltage equipment
2004/108/EC Electromagnetic compatibility (EMC) Directive

The last two digits of the year in which the CE marking was affixed: 07
Year of production: 2012

Wrocław, 2012.01.02
(Place and date of issue)

(Name and signature of authorized person)