



Data Sheet  
**OMB 451**

*Distributed by*



[www. BristolInstruments.com](http://www.BristolInstruments.com)

Bristol Instruments  
90 Canal Street - 4th Floor  
Boston, MA 02114

Toll free  
877-866-8500



- BARGRAPH - 50 LED WITH DISPLAY AND LCD SCALE
- MULTIFUNCTION INPUT (DC, PM, RTD, T/C, DU)
- DIGITAL FILTERS, TARE, LINEARIZATION
- SIZE OF DIN 160 x 60 MM
- POWER SUPPLY 80...250 V AC/DC
- Option
  - Comparators • Data output • Analog output • Data record
  - Power supply 10...30 V AC/DC

## OPERATION

The instrument is set and controlled by two control keys and a turn knob located on the front panel. All programmable settings of the instrument are implemented in three setting modes.

**LIGHT MENU** is protected by optional number code and contains solely items necessary for instrument setting

**PROFI MENU** is protected by optional number code and contains complete instrument setting

**USER MENU** may contain arbitrary items from the programming menu (LIGHT/PROFI), which determine the right (see, change). Access w/o password.

Standard equipment is the OM Link interface, which together with operation program enables modification and filing of all instrument settings as well as perform firmware updates (with OML cable). The program is also designed for visualization and filing of measured values from more instruments.

All settings are stored in the EEPROM memory (they hold even after the instrument is switched off).

## OPTION

**COMPARATORS** are assigned to monitor one, two, three or four limit values with relay output. The user may select limits regime: LIMIT/DOSING/FROM-TO. The limits have adjustable hysteresis within the full range of the display as well as selectable delay of the switch-on in the range of 0...99,9 s. Reaching the preset limits is signalled by LED and simultaneously by the switch-on of the relevant relay.

**DATA OUTPUTS** are for their rate and accuracy suitable for transmission of the measured data for further projection or directly into the control systems. We offer an isolated RS232 and RS485 with the ASCII/MESSBUS/MODBUS/PROFIBUS protocol.

**ANALOG OUTPUTS** will find their place in applications where further evaluating or processing of measured data is required in external devices. We offer universal analog output with the option of selection of the type of output - voltage/current. The value of analog output corresponds with the displayed data and its type and range are selectable in menu.

**MEASURED DATA RECORD** is an internal time control of data collection. It is suitable where it is necessary to register measured values. Two modes may be used. FAST is designed for fast storage (40 records/s) of all measured values up to 8 000 records. Second mode is RTC, where data record is governed by Real Time with data storage in a selected time segment and cycle. Up to 266 000 values may be stored in the instrument memory. Data transmission into PC via serial interface RS232/485 and OM Link.

## OMB 451

The OMB 451 model series are programmable, three-color panel bargraphs with auxiliary display and adjustable LCD scale. The instruments are designed as dimensional replacement of the ZEPAKOMP instruments. Available are types UNI, PWR and UQC.

Type OMB 451UNI is a multifunction instrument with the option of configuration for 8 different types of input, easily configurable in the instrument menu.

The instrument is based on an 8-bit microcontroller with multi-channel 24-bit sigma-delta converter, which secures high accuracy, stability and easy operation of the instrument.

### OMB 451UNI

DC VOLTMETER AND AMMETER  
 PROCESS MONITOR  
 OHMMETER  
 THERMOMETER FOR PT/CU/Ni/THERMOCOUPLES  
 DISPLAY UNIT FOR LINEAR POTENTIOMETERS

### OMB 451PWR

AC VOLTMETER AND AMMETER  
 AC NETWORK ANALYSER

### OMB 451UQC

UNIVERSAL COUNTER

## STANDARD FUNCTIONS

### PROGRAMMABLE PROJECTION

**Selection:** of input type and measuring range

**Measuring range:** adjustable as fixed or with automatic change (OHM)

**Scale:** LCD, freely programmable

**Measuring modes (PWR):** voltage ( $V_{RMS}$ ), current ( $A_{RMS}$ ), real power (W), frequency (Hz) and with calculation of Q, S, cos φ

**Setting (UQC):** measuring mode 2x counter (UP/DW, IRC)/2x frequency/timer/clock with adjustable calibration coefficient, time base and projection

**Setting:** manual, in menu optional projection on the display may be set for both limit values of the input signal

**Projection:** 50 LED + 6-digit auxiliary display

### COMPENSATION

**Of conduct (RTD, OHM):** automatic (3- and 4-wire) or manual in menu (2-wire)

**of conduct in probe (RTD):** internal connection (conduct resistance in measuring head)

**of CJC (T/C):** manual or automatic, in menu it is possible to perform selection of the type of thermocouple and compensation of cold junctions, which is adjustable or automatic

### LINEARIZATION

**Linearization (DC, PM, DU):** through linear interpolation in 50 points (solely via OM Link)

### DIGITAL FILTERS

**Filtration constant (UQC):** transmits input signal up to 10...2 000 Hz

**Floating/Exp./Arithmetic average:** from 2...30/100/100 measurements

**Rounding:** setting the projection step for display

### EXCITATION

**Range:** 5...24 VDC, for feeding of sensors and transmitters

### MATHEMATIC FUNCTIONS

**Min/max. value:** registration of min/max. value reached during measurement

**Tare:** designed to reset display upon non-zero input signal

**Peak value:** the display shows only max. or min. value

**Mat. operations:** polynome, 1/x, logarithm, exponential, power, root, sin x and at the same time between inputs - sum, difference, product, quotient

### EXTERNAL CONTROL

**Lock:** control keys blocking

**Hold:** display/instrument blocking

**Tare:** tare activation

**Resetting MM:** resetting min/max value

## TECHNICAL DATA

### PROJECTION

**Display:** 60 three-color LED + three-color LED for indication of the limits, 6-digit auxiliary display (-99999...99999), digit height 9,1mm illuminated and freely programmable LCD scale  
**Decimal point:** setting - in menu  
**Brightness:** setting - in menu

### INSTRUMENT ACCURACY

**TK:** 50 ppm/°C  
**Accuracy:** ±0,1% of range + 1 digit [for projection 9999 and 5 meas./s] ±0,15% of range + 1 digit **RTD, T/C PWR**  
 ±0,3% (0,6/0,9%) of range + 1 digit  
**Accuracy of cold junction measurement:** ±1,5°C  
**Rate:** 0,1...40 meas./s, 0,5...5 meas./s (PWR)  
**Overload capacity:** 2x; 10x (t < 30 ms) - not for > 250 V and 5 A  
**Measuring modes (PWR):** voltage (V<sub>RMS</sub>), current (A<sub>RMS</sub>), real power (W), frequency (Hz) and with calculation of Q, S, cos φ  
**Linearization:** by linear interpolation in 50 points  
**Time base (UQC):** 0,2...50 s  
**Calibration constant (UQC):** 0,00001...999999  
**Filtration constant (UQC):** 0/10/20/45/55/.../1000/2000 Hz  
**PRESET (UQC):** 0...999999  
**Digital filters:** Exp/Floating/Arithmetic average, Rounding  
**Functions:** Offset, Min/max. value, Tare, Peak value, Mat. operations  
**Ext. control:** HOLD, LOCK, Tare, Reset  
**Data record:** measured data record into instrument memory  
**RTC:** 15 ppm/°C, time-date-display value, < 266k data  
**FAST (UNI)** - display value, < 8k data  
**Watch-dog:** reset after 0,4 s  
**OM Link:** Company communication interface for operation, setting and update of instruments

**Calibration:** at 25°C and 40% r.h.

### COMPARATOR

**Type:** digital, setting in menu, contact switch < 30 ms  
**Limits:** -99999...999999  
**Hysteresis:** 0...999999  
**Delay:** 0...99,9 s  
**Output:** 1...4x relays Form A [250 VAC/50 VDC, 3 A], 2x/4x open collector

### DATA OUTPUT

**Protocol:** ASCII, MESSBUS, MODBUS - RTU, PROFIBUS DP  
**Data format:** 8 bit + no parity + 1 stop bit (ASCII)  
 7 bit + even parity + 1 stop bit (Messbus)  
**Rate:** 600...230 400 Baud  
 9 600 Baud...12 Mbaud (PROFIBUS)  
**RS 232:** isolated  
**RS 485:** isolated, addressing (max. 31 instruments)

### ANALOG OUTPUT

**Type:** isolated, programmable with 16-bit D/A converter, type and range are selectable in programming mode  
**Non-linearity:** 0,1% of range  
**TK:** 15 ppm/°C  
**Rate:** response to change of value < 1 ms  
**Ranges:** 0...2/5/10 V, ±10 V, 0...5 mA, 0/4...20 mA [comp. < 600 Ω/12 V or 1 000 Ω/24 V]

### EXCITATION

**Adjustable:** 5...24 VDC/max. 1,2 W

### POWER SUPPLY

10...30 V AC/DC, ±10%, max. 13,5 VA, PF≥0,4, I<sub>STB</sub>< 40 A/1 ms  
 80...250 V AC/DC, ±10%, max. 13,5 VA, PF≥0,4, I<sub>STB</sub>< 40 A/1 ms  
 Power supply is protected by a fuse inside the instrument

### MECHANICAL PROPERTIES

**Material:** Noryl GFN2 SE1, incombustible UL 94 V-1  
**Dimensions:** 160 x 60 x 80 mm  
**Panel cutout:** 150 x 50 mm

### OPERATING CONDITIONS

**Connection:** connector terminal board, section < 1,5/2,5 mm<sup>2</sup>  
**Stabilization period:** within 15 minutes after switch-on  
**Working temperature:** -20°...60°C  
**Storage temperature:** -20°...80°C  
**Cover:** IP64 (front panel only)  
**El. safety:** EN 61010-1, A2  
**Dielectric strength:** 4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and data/analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between input and data/analog output  
**Insulation resistance:** for pollution degree II, measuring cat. III. Power supply > 670 V (ZI), 300 V (DI) input, output, Exc. > 300 V (ZI), 150 V (DI)  
**EMC:** EN 61326-1  
**Seismic capacity:** IEC 980: 1993, par. 6  
**SW validation (UNI):** Class B, C in compliance with IEC 62138, 61226

PI - Primary insulation, DI - Double insulation

## MEASURING RANGES

OMB 451 is a multifunction instrument available in following types and ranges

### type UNI, standard [code „0“]

**DC:** ±60/±150/±300/±1 200 mV  
**PM:** 0...5/20 mA/4...20 mA; ±2/±5/±10/±40 V  
**OHM:** 0...100 Ω/0...1/10/100 kΩ/Auto  
**RTD:** Pt 50/100/500/1 000  
**Cu:** Cu 50/100  
**Ni:** Ni 1 000/10 000  
**T/C:** J/K/T/E/B/S/R/N/L  
**DU:** Linear potentiometer (min. 500 Ω)

### type UNI, Option A

**DC:** ±0,1/±0,25/±0,5/±2/±5 A; ±100/±250/±500 V

### type PWR

**input U:** 0...10/120/250/450 V  
**input I:** 0...60/150/300 mV; 0...1/2,5/5 A

### type UQC

**Measuring mode (UQC):** input frequency 0,002 Hz...1 MHz (500 kHz for QUADR and UP/DW)  
 2x UP or DW counter, UP or DW counter + frequency, UP/DW counter, UP/DW counter for IRC + frequency, timer/clock/phase

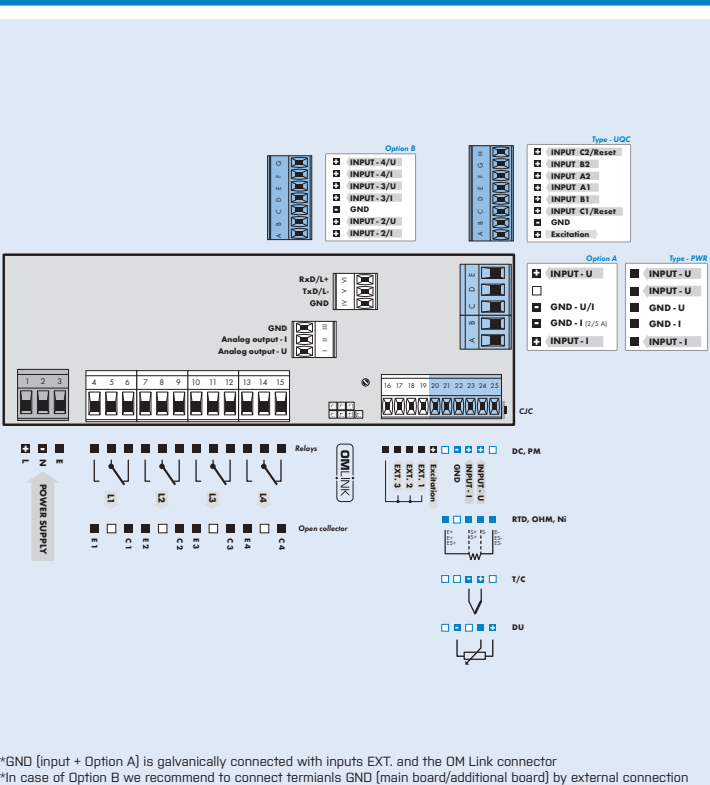
## CONNECTING INDIVIDUAL INPUTS

	INPUT „I“	INPUT „U“
DC		±60/±150/±300/±1200 mV
PM	0...5/0...20 mA/4...20 mA	±2/±5/±10/40 V

## ORDER CODE SPECIFICATION

	UNI	PWR - U	PWR - I	UQC
W/D	standard			
A	±0,1/±0,25/±0,5/±2/±5 A ±100/±250/±500 V			standard contact, TTL, NPN/PNP
B	Expansion about three inputs (PM)			SSI input
C				line input
K			0...60/150/300 mV	
P			0...1/2,5/5 A	
S		0...10/120 V		
U		0...250/450 V		
Z	on request	on request	on request	

## CONNECTION



\*GND (input + Option A) is galvanically connected with inputs EXT. and the OM Link connector  
 \*In case of Option B we recommend to connect terminals GND (main board/additional board) by external connection

## ORDER CODE

### OMB 451

Type	U N I	• • • • • • • •
	P W R*	• • • • • • • •
	U Q C*	• • • • • • • •

Power supply	10...30 V AC/DC 80...250 V AC/DC	0 1						
Option, see table „Order code specification“		?						
Comparators	none 1x relay [Form C] 2x relays [Form C] 3x relays [Form C] 4x relays [Form C] 2x open collectors 4x open collectors 2x open collectors + 2x relays [Form C]	0 1 2 3 4 5 6 7						
Analog output	no yes [Compensation < 600 Ω/12 V] yes [Compensation < 1 000 Ω/24 V]	0 1 2						
Data output	none RS 232 RS 485 MODBUS** PROFIBUS	0 1 2 3 4						
Excitation	yes		1					
Data record	no RTC FAST [only for UNI]	0 1 2						
Colour of digital display	red green				1 2			
Other	customer version, do not fill in SW validation - IEC 62138, IEC 61226							00 VS

For complete technical parameters of OMB 451UQC see the universal counter OM 602UQC

Default execution is shown in bold

\* Launch for sale has not been set  
 \*\* not compatible with RTC