



Data Sheet  
**OMB 402UNI**

*Distributed by*



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

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

Toll free  
877-866-8500



- 4-DIGIT PROGRAMMABLE PROJECTION
- MULTIFUNCTION INPUT (DC, PM, RTD, T/C, DU)
- DIGITAL FILTERS, TARE, LINEARIZATION
- SIZE OF DIN 96 x 48 mm
- POWER SUPPLY 80...250 V AC/DC
- Option
  - Comparators • Data output • Analog output
  - Data record • Power supply 10...30 V AC/DC
  - Three-color display - 20 mm

#### OPERATION

The instrument is set and controlled by five control keys located on the front panel. All programmable settings of the instrument may be performed in three adjusting 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). The measured units may be projected on the display.

#### 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.

## OM 402

The OM 402 model series are 4-digit panel programmable instruments designed for maximum efficiency and user comfort while maintaining their favourable price. Three models are available: UNI, LC and PWR.

Type OM 402UNI is a multifunction instrument with the option of configuration for 8 various input options, easily configurable in the instrument menu. By further options of input modules it is feasible to measure larger ranges of DC voltage and current or increase the number of inputs up to 4 (applies for PM).

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

#### OM 402UNI

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

#### OM 402LC

WEIGHING INDICATOR

#### OM 402PWR

AC VOLTMETER AND AMMETER  
 AC NETWORK ANALYSER

#### STANDARD FUNCTIONS

##### PROGRAMMABLE PROJECTION

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

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

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

**Setting:** manual, in menu optional projection on the display may be set for both limit values of the input signal, e.g. input 0...39,99 V > 0...850.0

**Projection:** -99999...999999

##### EXCITATION

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

##### 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 (temperature at the input brackets)

##### LINEARIZATION

**Linearization:** through linear interpolation in 50 points (solely via OM Link)

##### DIGITAL FILTERS

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

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

##### 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 mathematic operations between inputs

##### EXTERNAL CONTROL

**Lock:** control keys blocking

**Hold:** display/instrument blocking

**Tare:** tare activation

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

## TECHNICAL DATA

### PROJECTION

**Display:** -9999...999999, red or green 14-segment LED, digit height 14 mm,  
-999...9999, red/green/orange 7-segment LED, height 20 mm  
**Description:** last two characters on the display may be used for description of measured quantities (adjustable in the menu)  
**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**  
±0,3% (0,6/0,9%) of range + 1 digit **PWR**  
**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  
**Digital filters:** Exp./Floating/Arithmetic average, Rounding  
**Functions:** offset, Min/max value, Tare, Peak value, Mat. operations  
**Ext. control:** HOLD, LOCK, Tare, Min/Max  
**Data record:** measured data record into instrument memory  
**RTC** - 15 ppm/°C, time-date-display value, < 256k data  
**FAST [UNI]** - display value, < 8k data  
**Resolution [RTD, T/C]:** 1/0,1/0,01°C  
**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:** 2x relays Form A [250 VAC/30 VDC, 3 A] and 2x Form C relays [250 VAC/50 VDC, 3 A], 2x/4x open collectors, 2x SSR, 2x bistable relays

### 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, 0,0096...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  
**Fixed:** 10 VDC, max. load 80 Ω

### POWER SUPPLY

10...30 V AC/DC, ±10%, max. 13,5 VA, PF≥0,4, I<sub>50%</sub>< 40 A/1 ms  
80...250 V AC/DC, ±10%, max. 13,5 VA, PF≥0,4, I<sub>50%</sub>< 40 A/1 ms  
Power supply is protected by a fuse inside the instrument

### MECHANICAL PROPERTIES

**Material:** Noryl GFN2 9E1, incombustible UL 94 V-1  
**Dimensions:** 96 x 48 x 120 mm  
**Panel cutout:** 90,5 x 45 mm

### OPERATING CONDITIONS

**Connection:** connector terminal board, section < 1,5/2,5 mm<sup>2</sup>  
**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 [Z], 300 V [DI], 300 V [DI] input, output, Exc. > 300 V [Z], 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

OM 402 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 UNI, Option B [expansion aby three inputs]

**PM:** 3x 0...5/20 mA/4...20 mA; ±2/±5/±10/±40 V

### type LC

**LC:** 1...4/2...8/4...16 mV/V

### type PWR

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

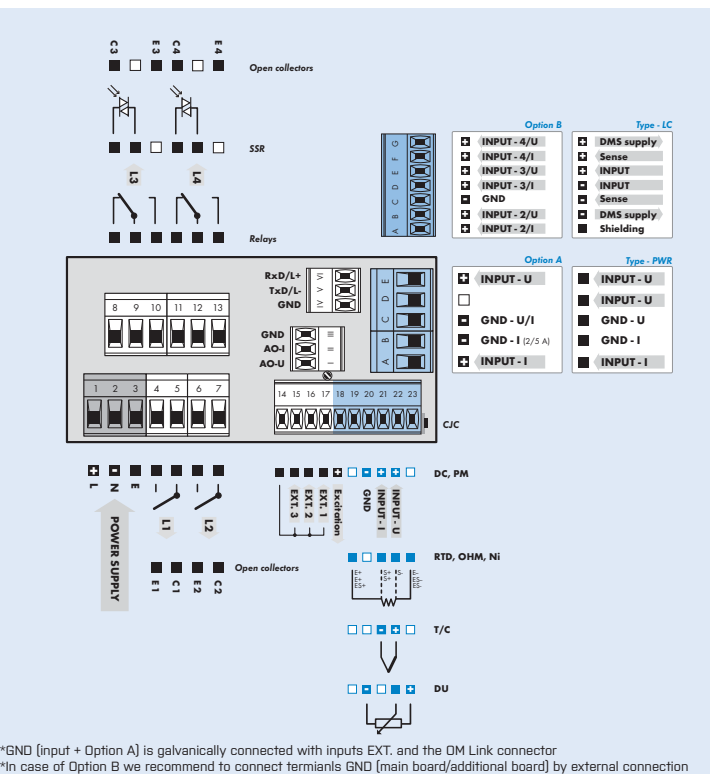
### CONNECTING INDIVIDUAL INPUTS

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

### ORDER CODE SPECIFICATION

	UNI	LC	PWR - U	PWR - I
<b>W/O</b>	standard	1...4/2...8/4...16 mV/V		
<b>A</b>	+0,1/±0,25/±0,5/±2/±5 A ±100/±250/±500 V			
<b>B</b>	Expansion about three inputs [PM]			
<b>K</b>				0...60/150/300 mV
<b>P</b>				0...1/2,5/5 A
<b>S</b>			0...10/120 V	
<b>U</b>			0...250/450 V	
<b>Z</b>	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

OM 402	1									
Type	U	N	I							
	L	C								
	P	W	R							
Power supply	10...30 V AC/DC									
	80...250 V AC/DC									
Option, see table „Order code specification”										
Comparators	no									
	1x relay [Form A]									
	2x relays [Form A]									
	3x relays [2x Form A + 1x Form C]									
	4x relays [2x Form A + 2x Form C]									
	2x open collectors									
	4x open collectors									
	2x open collectors + 2x relays [Form C]									
	2x relays [Form C]									
	2x SSR									
	2x relays, bistable									
	1x relay [Form C]									
Analog output	no									
	yes [Compensation < 600 Ω/12 V]									
	yes [Compensation < 1000 Ω/24 V]									
Data output	no									
	RS 232									
	RS 485									
	MODBUS*									
	PROFIBUS									
Excitation	yes									
Data record	no									
	RTC									
	FAST [only for UNI]									
Display color	red [14 mm]									
	green [14 mm]									
	red/green [20 mm]									
Other	customer version, do not fill in									
	SW validation - IEC 62138, IEC 61226									

Default execution is shown in bold

\* not compatible with RTC