# **OM** 402PID



# OM 402PID

OMLINK

OM 402PID is a 4-digit universal panel PID regulator designed for maximum flexibility and user comfort while maintaining its favourable price. It is a multifunction instrument with the option of configuration for 8 various input options, easily configurable in the instrument menu.

In its basic configuration the OM 402PID has two regulatory relays and two relay alarm outputs. Desired value can either be constant or defined by one of 14 programmes.

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

## UNIVERSAL PID REGULATOR

- 4-DIGIT PROGRAMMABLE PROJECTION
- MULTIFUNCTION INPUT (DC, PM, RTD, T/C, DU)
- 4 OUTPUTS
- RTC WITH MEASURED VALUES RECORD
- DIGITAL FILTERS, TARE, LINEARIZATION
- SIZE OF DIN 96 x 48 MM
- POWER SUPPLY 10...30 V AC/DC; 80...250 V AC/DC
- Option
  Data output Analog output

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## OPERATION

The instrument is set and controlled by five buttons 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.

 $\mbox{USER MENU}$  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 performing 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 (settings hold even after the instrument is switched off).

## OPTION

INPUT OF DESIRED VALUE enables the regulator to be used for follow-up control. Both current and voltage inputs can be used.

**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 isolated RS232 and RS485 with the ASCII/PROFIBUS protocols.

## STANDARD FUNCTIONS

UNIVERSAL PID REGULATOR

## PROGRAMMABLE PROJECTION

Selection: of input type and measuring range Setting: manual, optional projection on the display may be set in menu for both limit values of the input signal, e.g. input 0...20 mA > 0...500,0 Projection: -999...9999

### PID REGULATOR

Execution: parallel PID, PI or proportional Relay output: double, two-state, PWM Analog output: el. isolated, modes: heating, cooling, both Required value: set, from analog output, from program Number of programs/steps: 14/64 Launching: time - one-off/weekly, by external input, by buttons

**RELAY OUTPUTS** Type: digital, adjustable in menu

Outputs: relays L1, L2 are alarm ones, relays L3, L4 are intended as regulatory but they can also be used as alarms

## ANALOG OUTPUT

Usage: where this type of signal is requested by action devices, or it can be used for processing of the measured value by external devices Type: el. isolated, programmable with a 12 bit D/A converter, functions, type and range of the output are selectable in the instrument's menu

## COMPENSATION

Of conduct (RTD, OHM): automatic (3- or 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 of terminals)

## DIGITAL FILTERS

Floating/Exp./Arithm. average: from 2...30/100/100 measurements Rounding: setting the projection step for display

## FUNCTIONS

Linearization: linear interpolation in 50 points (only via OM Link) 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 Mathemat. operations: polynom, root





## TECHNICAL DATA

| DC              | Range                                | optional in configuration<br>±60 mV  | menu<br>> 100 MΩ  | Input U   |  |
|-----------------|--------------------------------------|--|---|---|--|
|                 |                                      | ±150 mV  | > 100 MΩ  | Input U   |  |
|                 |                                      | ±300 mV  | > 100 MQ  | Input U   |  |
|                 |                                      | ±1 200 mV  | > 100 MQ  | Input U   |  |
| PM              | Range                                | optional in configuration menu<br>020 mA < 400 mV Input  |   |   |  |
|                 |                                      | u20 mA<br>420 mA   | < 400 mV<br>< 400 mV  | Input I<br>Input I  |  |
|                 |                                      | 420 MA<br>±2 V   | < 400 mv<br>1 MΩ  | Input U   |  |
|                 |                                      | ±5 V   | 1 MO  | Input U   |  |
|                 |                                      | ±10 V  | 1 MΩ  | Input U   |  |
|                 |                                      | ±40 V  | 1 MΩ  | Input U   |  |
|                 | Required value                       | optional extensions - by order<br>range and setting is the same as option "PM"<br>connection to inputs - Required value U/)"   |   |   |  |
| онм             | Range                                | optional in configuration menu with aut. range change<br>0100 Ω<br>01 kΩ<br>010 kΩ<br>010 kΩ   |   |   |  |
|                 | Connect.                             | 2, 3 or 4 wire   |   |   |  |
| RTD             | Туре                                 | optional in configuration menu<br>EU > 100/500/1 000 0, with 3 850 ppm/°C-50°460°C<br>US > 100 0, with 3 920 ppm/°C -50°460°C<br>RU > 500 0 with 3 910 ppm/°C -200°1 100°C<br>RU > 100 0 with 3 910 ppm/°C -200°460°C  |   |   |  |
|                 |                                      |  |   |   |  |
|                 | Connect.                             |  |   |   |  |
| Ni              | Connect.<br>Type                     | RU > 100 Ω with 3 910 p  | menu<br>DOO ppm/°C  |   |  |
| Ni              |                                      | RU > 100 Ω with 3 910 p<br>2, 3 or 4 wire<br>optional in configuration<br>Ni 1 000/10 000 with 5 0<br>Ni 1 000/10 000 with 6 0   | menu<br>DOO ppm/°C  | -200°450°C  |  |
|                 | Туре                                 | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 1000/10 000 with 6        N1 1000/10 000 with 6        -50°250°C        2, 3 or 4 wire        optional in configuration   | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>                                     | -200°450°C<br>-50°250°C   |  |
|                 | Type<br>Connect.                     | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        Ni 1 000/10 000 with 5 i        Ni 1 000/10 000 with 6 i        -50°250°C        2, 3 or 4 wire  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>                                     | -200°450°C<br>-50°250°C<br>-50°250°C  |  |
|                 | Type<br>Connect.                     | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 1000/10 000 with 5        .50°250°C        2, 3 or 4 wire        optional in configuration        cut wire        optional in configuration        Cut 50/100 with 4 260 p  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>                                     | -200°450°C<br>-50°250°C   |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        Ni 1 000/10 000 with 5 in        Ni 1 000/10 000 with 6 in        50°250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 280 p        Cu 50/100 with 4 280 p        2, 3 or 4 wire  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C<br>-50°250°C<br>-50°250°C  |  |
| Cu              | Type<br>Connect.<br>Type             | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 1000/10 000 with 6 1        -50°250°C        2, 3 or 4 wire        optional in configuration        cu 50/100 with 4 260 p        Cu 50/100 with 4 280 p  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 000/10 000 with 5 in        N1 000/10 000 with 6 in        -50°250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 260 p        Cu 50/100 with 4 280 p        2, 3 or 4 wire        optional in configuration  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 000/10 000 with 5 in        N1 000/10 000 with 6 in        50°250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 260 p        Cu 50/100 with 4 280 p        2, 3 or 4 wire        optional in configuration        J [Fe-CuN]        K [NIC:NI]        T [Cu-CUN]   | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 000/10 000 with 5        N1 1000/10 000 with 6        .50°250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 280 p        Cu 50/100 with 4 280 p        2, 3 or 4 wire        optional in configuration        J [Fe-CuNi]        K [NiC+Ni]        T [Cu-CuNi]   | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        Ni 1 000/10 000 with 6 in        Ni 1 000/10 000 with 6 in        0x 3 or 4 wire        optional in configuration        Cu 50/100 with 4 280 p        Cu 50/100 with 4 280 p        Cu 50/100 with 4 280 p        J (Fe-CuN)        J (Fe-CuN)        E (NICr-CuNi)        B (PRR.30-PRh6)  | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        Ni 1 000/10 000 with 5 1        Ni 1 000/10 000 with 5 6        Ni 1 000/10 000 with 6 1        Soft-250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        Z, 3 or 4 wire        optional in configuration        J [Fe-CuNi]        K [NIC-Fwi]        T [Cu-CuNi]        B [PrRh30-PrRh6]        S [PtRh10-Pt]     | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C<br>-50°250°C<br>-50°250°C<br>-200°200°C<br>-200°200°C<br>-200°300°C<br>-200°400°C<br>-200°480°C<br>-200°1820°C<br>-50°1760°C |  |
| Cu              | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        N1 1000/10 000 with 5 1        N1 1000/10 000 with 6 6        -50°250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        2, 3 or 4 wire        optional in configuration        J [Fe-CuN]        K [NICr-Ni]        T [Cu-CuN]        E [NICr-CuNi]        B [PIRh30-PIRh6]        S [PIRh10-Pi]        R [P13Rh-P1] | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |
| Ni<br>Cu<br>T/C | Type<br>Connect.<br>Type<br>Connect. | RU > 100 0 with 3 910 p        2, 3 or 4 wire        optional in configuration        Ni 1 000/10 000 with 5 1        Ni 1 000/10 000 with 5 6        Ni 1 000/10 000 with 6 1        Soft-250°C        2, 3 or 4 wire        optional in configuration        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        Cu 50/100 with 4 260 p        Z, 3 or 4 wire        optional in configuration        J [Fe-CuNi]        K [NIC-Fwi]        T [Cu-CuNi]        B [PrRh30-PrRh6]        S [PtRh10-Pt]     | pm/°C<br>menu<br>200 ppm/°C<br>180 ppm/°C<br>180 ppm/°C<br>menu<br>pm/°C<br>pm/°C | -200°450°C  |  |

| its | 3 inputs, on contact<br>The following functions can be assigned: |  |  |  |
|-----|--|--|--|--|
|     |  |  |  |  |
|     | OFF  | input off                              |  |  |
|     | HOLD   | display stop                           |  |  |
|     | LOCK   | control keys blocking                  |  |  |
|     | PASS.  | menu access blocking                   |  |  |
|     | TARE   | tare activation                        |  |  |
|     | CL. TA.  | tare resetting                         |  |  |
|     | CL. M.M.   | resetting min/max value                |  |  |
|     | SAVE   | data recording start [FAST/RTC]        |  |  |
|     | CL. ME.  | data recording reset (FAST/RTC)        |  |  |
|     | STOP R.  | regulation stop                        |  |  |
|     | STAR. P.   | running regulation to the spec. value  |  |  |
|     | STAR. A  | running regulation to "Required value" |  |  |

## PROJECTION

Ext. inpu

Display: -999...9999, single color 14-segment LED Digit height: 14 mm

Display color: red or green Auxiliary display: 2x -999...9999, green 7seg. LED, height 9 mm The upper display shows the number of the program/step, the lower display shows the desired value uispiay snows the desired value Signaling LED: yellow (regulation) - ,+\*, ,\*, ,3\*, ,4\* red (alarm) - ,1\*, ,2\*, ,3\*, ,4\*, green (tare) - ,T\*, ,t\* Decimal point: adjustable - in menu Brightness: adjustable - in menu

INSTRUMENT ACCURACY

## TK: 50 ppm/°C Accuracy: ±0,1% of range + 1 digit (for proj. 9999 and 5 measur./s) ±0,15% of range + 1 digit RTD, T/C Accuracy of cold junction measur.: ±1,5°C Rate: 0,1...40 measur./s Overload capacity: 2x; 10x (t < 30 ms) Resolution (RTD, T/C): 1°/0,1°/0,01°C Line compensation: max. 30 Ω (RTD) Cold junction compens.: adjustable -20°...99°C or automatic Linearization: linear interpolation in 50 points (only via OM Link) Endotronomic metropolation in 30 point via on carry Digital filters: Exp./Floating/Arithm. average, Rounding Functions: Ofset, Min/max value, Tare, Peak value, Mat. operations Ext. operation: HOLD, LOCK, tare, Min/Max a functions PID Data record: measured data record into instrument memory RTC - 15 ppm/°C, time-date-display value < 266k data OM Link: Company communication interface for operation, setting and update of instruments. Watch-dog: reset after 400 ms Calibration: at 25°C and 40 % r.h.

## COMPARATOR

Type: digital, menu adjustable, contact switch-on < 30 ms Hysteresis mode: switching limit, hysteresis band "Lim ±1/2 Hys." and time (0...99,9 s) determining the switching delay Mode From-To: switching on and switching off interval Mode double-state - L3 switches at negative deviation (INCREASE), L4 switches at positive deviation (DECREASE) Mode PWM - L3 switches at negative deviation (INCREASE), L4

switches at positive deviation (DECREASE)

Mode Program - the relay is active after the program has ended, if the time "D" is set - permanently, otherwise for a period of time "TIM. L.2" relay is activated when the setpoint is reached; if the time  $_*0^*$  is set permanently, otherwise for the period of time  $_*CAS,$  L.1 , Output: 2x relays Form A (250 VAC/30 VDC, 3 A) 2x relays FORM C (250 VAC/50 VDC, 3 A); 4x open collector (30 VDC/100 mA) or 2x SSR (250 VAC/1 A)

## DATA OUTPUTS

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)

### ANALOGOVÝ OUTPUT

 $\ensuremath{\mathsf{Type:}}$  el.isolated, programmable with a 16 bit D/A converter, functions, type and output range are selectable in the menu 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  $\Omega/12$  V or 1 000  $\Omega/24$  V]

EXCITATION

## Adjustable: 5...24 VDC/max. 1.2 W

POWER SUPPLY

Range: 10...30 V AC/DC, ±10 %, PF≥0,4, I<sub>STP</sub>< 40 A/1 ms, isolated 80...260 V AC/DC, ±10 %, PF  $\ge$  0,4, I<sub>STP</sub> < 40 A/1 ms, isolated Consumption: < 9,4 W/9,2 VA

Power supply is protected by a fuse inside the instrument

## MECHANIC PROPERTIES

Material: NorvI GFN2 SE1, incombustible UL 94 V-I Dimensions: 96 x 48 x 120 mm (w x h x d) Panel cutout: 90,5 x 45 mm (w x h)

## OPERATING CONDITIONS

Connection: connector terminal blocks, section < 1,5/2,5 mm<sup>2</sup> Stabilization period: within 15 minutes after switch-on Temperature working/storing: -20°...60°C/-20°...80°C Protection: IP64 (front panel only) El. safety: EN 61010-1, A2

Dielectric strength: 4 kVAC per 1 min test between supply and input 4 kVAC per 1 min test between supply and data/analog output 4 kVAC per 1 min test between input and relay output 2,5 kVAC per 1 min test between input and data/analog output Insulation resistance: for pollution degree II, measuring cat. III power supply > 670 V (PI), 300 V (DI)

input, output, PN > 300 V (PI), 150 V (DI)

EMC: EN 61326-1

PI - Primary insulation, DI - Double insulation

## CONNECTION



ORDER CODE **OM 402PID** 1 10...30 V AC/DC Power supply 0 80...250 V AC/DC 1 Input for the requested value 0 no yes Α Alarm relays (outputs L3, L4) 0 relay SSR 1 Analog output 0 no yes (compensation < 600  $\Omega/12$  V) 1 yes (compensation < 1 000  $\Omega/24$  V) 2 Data output none RS 232 0 1 RS 485 2 MODBUS 3 PROFIBUS 4 Excitation 1 yes

customized version, do not fill in Specification

Basic configuration of the instrument is indicated in bold.