20 mm

OM 402UNI

4 DIGIT PROGRAMMABLE
UNIVERSAL INSTRUMENT
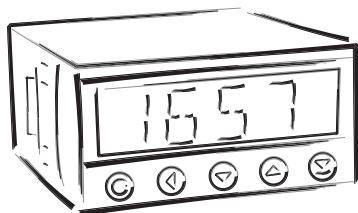
DC VOLTMETER/AMMETER
PROCESS MONITOR
OHMMETER
THERMOMETER FOR PT 100/500/1 000
THERMOMETER FOR NI 1 000
THERMOMETER FOR THERMOCOUPLES
DISPLAYS FOR LIN. POTENTIOMETERS

SAFETY INSTRUCTIONS

Please, read the enclosed safety instructions carefully and observe them!
These instruments should be safeguarded by isolated or common fuses (breakers)!
For safety information the EN 61 010-1 + A2 standard must be observed.
This instrument is not explosion-safe!

TECHNICAL DATA

Measuring instruments of the OM 402 series conform to the European regulation 89/336/EWG.

The instruments are up to the following European standards:
EN 61010-1   Electrical safety
EN 61326-1   Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"

Seismic capacity:
IEC 980: 1993, čl. 6

The instruments are applicable for unlimited use in agricultural and industrial areas.

CONNECTION

Supply of energy from the main line has to be isolated from the measuring leads.

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2. INSTRUMENT DESCRIPTION

2.1 DESCRIPTION

The OM 402 model series are 4 digit panel programmable instruments designed for maximum efficiency and user comfort while maintaining their favourable price. Two models are available: UNI 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 with a multichannel 24-bit sigma-delta converter, which secures high accuracy, stability and easy operation of the instrument.

TYPES AND RANGES

UNI	DC:	0…60/150/300/1200 mV
	PM:	0…5 mA/0…20 mA/4…20 mA/±2 V/±5 V/±10 V/±40 V
	OHM:	0…100 Ω/0…1 kΩ/0…10 kΩ/0…100 kΩ/Autorange
	RTD-Pt:	Pt 50/100/Pt 500/Pt 1000
	RTD-Cu:	Cu 50/Cu 100
	RTD-Ni:	Ni 1 000/Ni 10 000
	T/C:	J/K/T/E/B/S/R/N/L
	DU:	Linear potentiometer (min. 500 Ω)
UNI - A	DC:	±0,1 A/±0,25 A/±0,5 A/±2 A/±5 A/±100 V/±250 V/±500 V
UNI - B	PM:	3x 0…5 mA/0…20 mA/4…20 mA/±2 V/±5 V/±10 V/±40 V

PROGRAMMABLE PROJECTION

Selection:	of type of input and measuring range
Measuring range:	adjustable as fixed or with automatic change
Setting:	manual, optional projection on the display may be set in the menu for both limit values of the input signal, e.g. input 0…20 mA > 0…850,0
Projection:	-999…9999

COMPENSATION

of conduct:	in the menu it is possible to perform compensation for 2-wire connection
of conduct in probe:	internal connection (conduct resistance in measuring head)
of CJC (T/C):	manual or automatic, in the 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 brackets)

LINEARIZATION

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

DIGITAL FILTERS

Floating average:	from 2…30 measurements
Exponen. average:	from 2…100 measurements
Arithmetic average:	from 2…100 measurements
Rounding:	setting the projection step for display

MATHEMATIC FUCTIONS

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

* only for types DC, PM, DU

EXTERNAL CONTROL

Lock:	control keys blocking
Hold:	display/instrument blocking
Tare:	tare activation/resetting tare to zero
Resetting MM:	resetting min/max value
Memory:	data storage into instrument memory

2.2	OPERATION

The instrument is set and controlled by five control keys located on the front panel. All programmable settings of the instrument are performed in three adjusting modes:

LIGHT **Simple programming menu**
- contains solely items necessary for instrument setting and is protected by optional number code

PROFI **Complete programming menu**
- contains complete instrument menu and is protected by optional number code

USER **User programming menu**
- may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
- acces without password

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

OMLINK

Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.

The operation program is freely accessible (www.orbit.merret.eu) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments. Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

The program OM LINK in „Basic" version will enable you to connect one instrument with the option of visualization and archiving in PC. The OM Link „Standard" version has no limitation of the number of instruments connected.

2.3	OPTIONS

Excitation is suitable for supplying power to sensors and transmitters. It has a galvanic separation.

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 or DIN MessBus 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 250 000 values may be stored in the instrument memory. Data transmis sion into PC via serial interface RS232/485 and OM Link.

3. INSTRUMENT CONECTION

The instrument supply leads should not be in proximity of the incoming low-potential signals.

Contactors, motors with larger input power should not be in proximity of the instrument.

The leads into the instrument input (measured quantity) should be in sufficient distance from all power leads and appliances. Provided this cannot be secured it is necessary to use shielded leads with connection to ground (bracket E).

The instruments are tested in compliance with standards for use in industrial area, yet we recommend to abide by the above mentioned principles.

MEASURING RANGES

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

OPTION "A"

TYPE	INPUT I	INPUT U
DC	±0,1 A/±0,25 A/±0,5 to GND (C) ±2 A/±5 A to GND (B)	±100 V/±250 V/±500 V to GND (C)

OPTION "B"

TYPE	INPUT 2, 3, 4/I	INPUT 2, 3, 4/U
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V

Termination of RS 485 communication line

X3 - Termination of commuication line RS 485

Full	Significance	Default	Recomendation
1-2	connect L+ to (+) source	terminalconnected	
3-4	termination of line 120 Ohm	disconnected	connect at the end of line
5-6	connect L- to (-) source	terminalconnected	do not disconnect

RS 485 line should have a linear structure - wires (ideally shielded and twisted) should lead from one device to another.

C 3   E 3   C 4   E 4

Open collectors

SSR

L3   L4

Relays
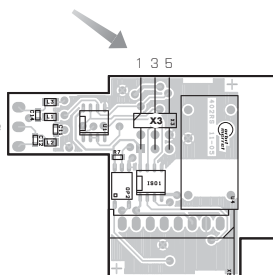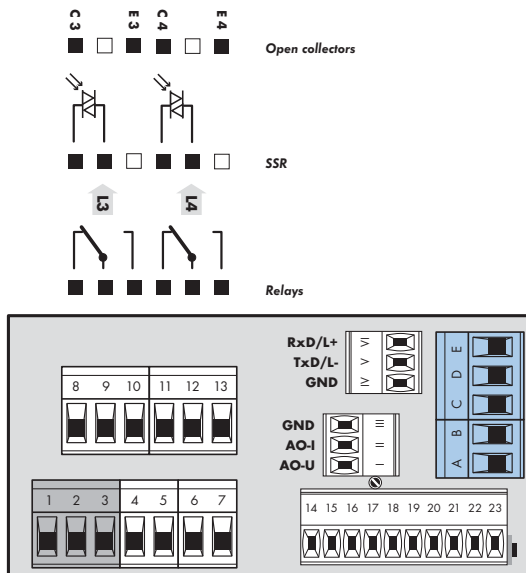
!
Excitation has the minus pole common with the input - the bracket no. 20 - GND and you may set its value by trimmer above the bracket no. 17

Option A

RxD/L+ ⊻
TxD/L- ⊽
GND ⊾

8   9   10   11   12   13

GND ≡
AO-I ≡
AO-U ‒

A   B   C   D   E

1   2   3   4   5   6   7

14 15 16 17 18 19 20 21 22 23

⊞ **INPUT - U**
☐
⊟ **GND - U/I0,5**
⊟ **GND - I5**
⊞ **INPUT - I**

CJC

POWER SUPPLY

⊞   ⊟
L   N   E   ‒   ‒
L1   L2

EXT.3 EXT.2 EXT.1 Excitation GND INPUT - I INPUT - U

DC, PM

E 1   C 1   E 2   C 2

Open collectors

E+   S+ S-   E-
E+   S+ S-   ES-
ES+   ES-

RTD, OHM, Ni

T/C

DU
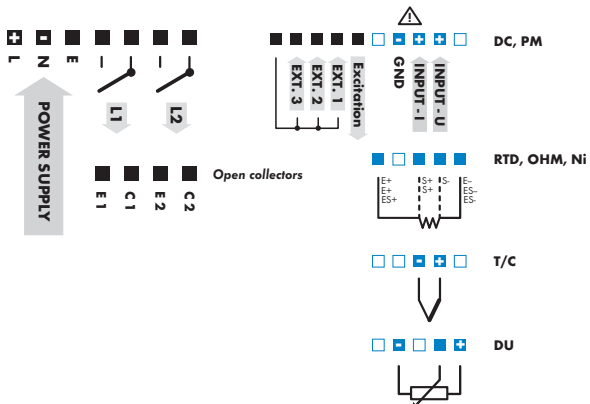
⚠ Maximum of 250 mA may be connected to "INPUT - I" (bracket no. 21) , i.e. 10-times range overload.
Mind the correct connection/mistaking of current - voltage input.
Destruction of measuring resistance in current input (15R) may occur.

3. INSTRUMENT CONECTION

Example connection of a 2-wire sensor with current signal output powered by instrument's excitation

(+)
(-)

1 2 3

L N E

Excitation
Sensor (+)

INPUT - I
Sensor (-)

14 15 16 17 18 19 20 21 22 23
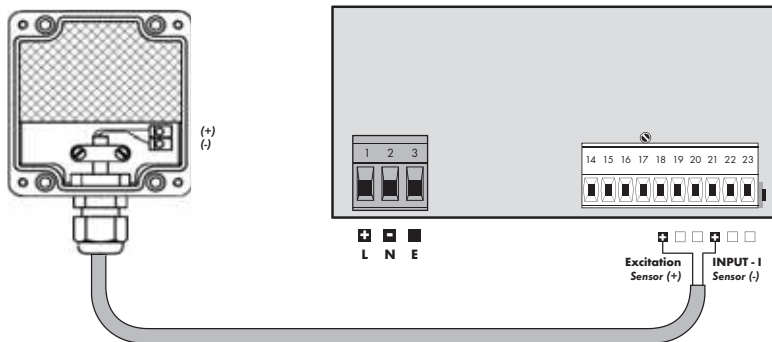
Example connection of a 3-wire sensor with current signal output powered by instrument's excitation

Supply (+)
Output (+)
GND (-)

1 2 3

L N E

Excitation
Supply (+)

INPUT - I
Output (+)

14 15 16 17 18 19 20 21 22 23
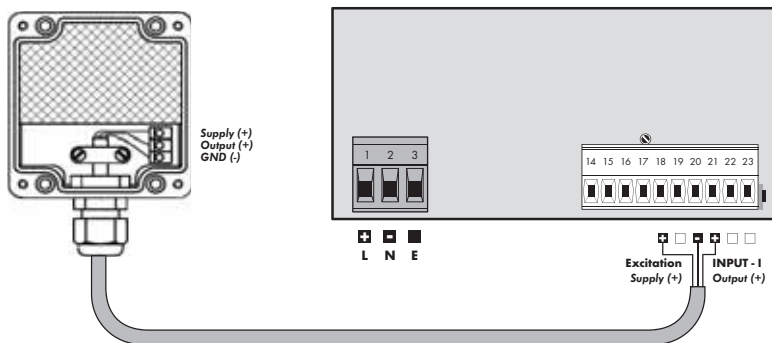
Example connection of 3-wire sensor with voltage signal output powered by instrument's excitation

Supply (+)
Output (+)
GND (-)

1 2 3

14 15 16 17 18 19 20 21 22 23

L N E

Excitation
Supply (+)
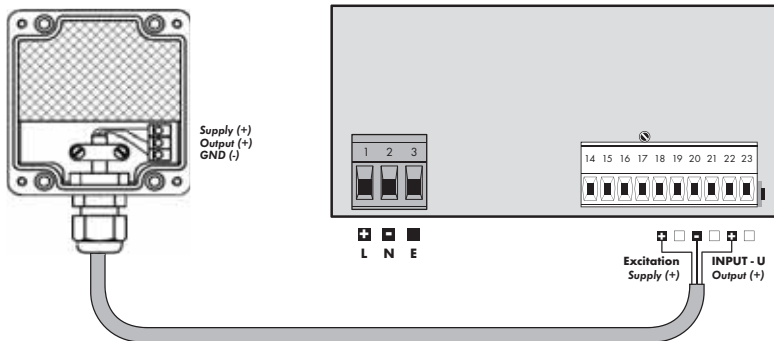
INPUT - U
Output (+)

Example connection of resistance measurement using 4 wires

By connecting resistor R* we elimintate error message **E. I.Ov.** (input overflow) when the measured resistance is disconnected
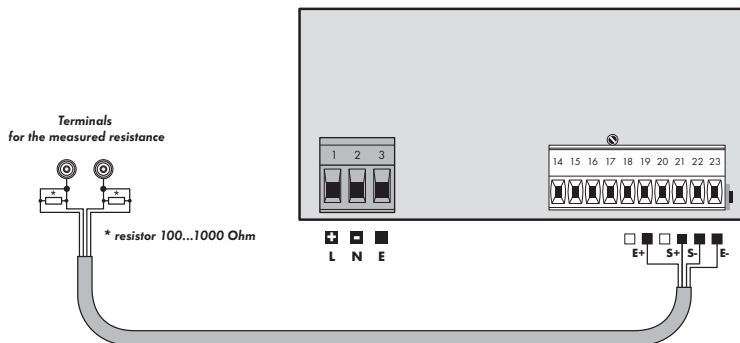
Terminals
for the measured resistance

* resistor 100...1000 Ohm

1 2 3

14 15 16 17 18 19 20 21 22 23

L N E

E+   S+ S-   E-

SETTING
PROFI

For expert users
Complete instrument menu
Access is password protected
Possibility to arrange items of the **USER MENU**
Tree menu structure

SETTING
LIGHT

For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

SETTING
USER

For user operation
Menu items are set by the user (Profi/Light) as per request
Access is not password protected
Optional menu structure either tree (PROFI) or linear (LIGHT)

4.1	SETTING

The instrument is set and controlled by five control keys located on the front panel. All programmable settings of the instrument are performed in three adjusting modes:

LIGHT   **Simple programming menu**
             - contains solely items necessary for instrument setting and is protected by optional number code

PROFI   **Complete programming menu**
             - contains complete instrument menu and is protected by optional number code

USER   **User programming menu**
             - may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
             - acces without password

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

Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.

The operation program is freely accessible (www.orbit.merret.eu) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.

Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

Scheme of processing the measured signal
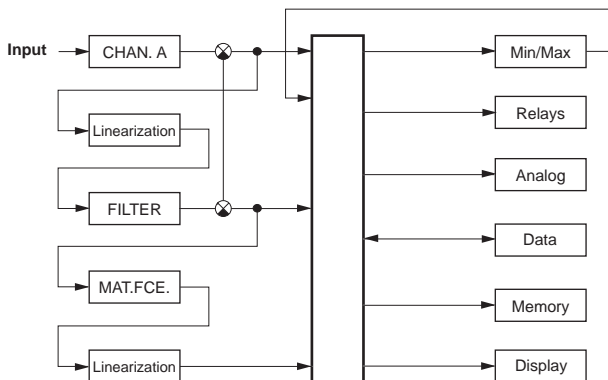
4. INSTRUMENT SETTING

Setting and controlling the instrument is performed by means of 5 control keys located on the front panel. With the aid of these keys it is possble to browse through the operation menu and to select and set required values.

Measured value
(red/green/orange LED)

Indication of measured input
(orange LED)
input number
(only for option "A")

Ralay status (red LED)
ON   the digit is lit
OFF   the digit is not lit
OFF   the digit is flashing
        limits with restriction
        (hysteresis, delay)

Function (green LED)
M   Min/max. value
T   Tare
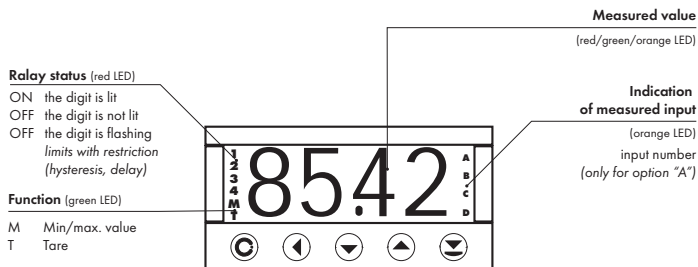
Symbols used in the instructions

| DC | PM |
| DU | OHM | RTD | T/C | Indicates the setting for given type of instrument

DEF   values preset from manufacture

42   symbol indicates a flashing light (symbol)

MIN   inverted triangle indicates the item that can be placed in USER menu

CON   broken line indicates a dynamic item, i.e. it is displayed only in particular selection/version

⊠   after pressing the key the set value will not be stored

💾   after pressing the key the set value will be stored

📖 30   continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT
Its selection in the menu, upon modification of the number to be adjusted it is performed by the control key ◀ with transition beyond the highest decade, when the decimal point starts flashing . Positioning is performed by ▲/▼.

THE MINUS SIGN
Setting the minus sign is performed by the key ▼ on higher decade. When editing the item substraction must be made from the current number (e.g..: 013 > ▼ , on class 100 > -87)

Control keys functions

KEY	MEASUREMENT	MENU	SETTING NUMBERS/SELECTION
⟳	access into USER menu	exit menu	quit editing
◀	programmable key function	back to previous level	move to higher decade
▼	programmable key function	move to previous item	move down
▲	programmable key function	move to next item	move up
▼	programmable key function	confirm selection	confirm setting/selection
▲ + ▼			numeric value is set to zero
⟳ + ▼	access into LIGHT/PROFI menu		
⟳ + ▼	direct access into PROFI menu		
▼ + ▲		configuration of an item for "USER" menu	
▼ + ▼		determine the sequence of items in "USER - LIGHT" menu	

Setting items into „USER" menu

- in **LIGHT** or **PROFI** menu
- no items permitted in **USER** menu from manufacture
- on items marked by inverted triangle

USER

legend is flashing - current setting is displayed

return to item

NO | YES | SHOW

NO	item will not be displayed in USER menu
YES	item will be displayed in USER menu with the option of setting
SHOW	item will be solely displayed in USER menu

SETTING
LIGHT

For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

Access password

| 1428 | ⓒ + ⊜ | PASS. ⊜ | 0 ⊜ |

Type of instruments | Measuring range

| TYPE ⊜ | PM ⊜ | MODE ⊜ | 4-20mA ⊜ |

Selecting projection and connection

RTD OHM
| CON. ⊜ | 2-W. ⊜ | FORA | 000.o ⊜ |

T/C
| CON. ⊜ | EXT1 ⊜ | C.J.T. ⊜ | 23 ⊜ | FORA | 0000 ⊜ |

DC PM OHM DU
| MINA ⊜ | 0 ⊜ | MAXA ⊜ | 100 ⊜ | FORA | 000.o ⊜ |

| L.L1 ⊜ | 20 ⊜ | L.L2 ⊜ | 40 ⊜ | L.L3 ⊜ | 60 ⊜ | L.L4 ⊜ | 80 ⊜ |

Option - comparator

| TYA.O. ⊜ | 4-20mA ⊜ | MIA.O. ⊜ | 0 ⊜ | MAA.O. ⊜ | 100 ⊜ |

Option - Analog output

Basic color | First color's limit | Color after first limit | Second color's limit

| Co.0 ⊜ | GRE. ⊜ | D.L1 ⊜ | 3333 ⊜ | Co.1 ⊜ | RED ⊜ | D.L2 ⊜ | 6667 ⊜ |

Color after second limit | Menu type | Return to manufacture calibration | Return to manufacture setting

| Co.2 ⊜ | ORA. ⊜ | MENU ⊜ | LIGH. ⊜ | RE.CA. ⊜ | YES ⊜ | RE.SE. ⊜ | TYPE ⊜ |

Calibration - only for "DU"

DU
| C.MI. ⊜ | YES ⊜ | C.MA. ⊜ | YES ⊜ |

Language selection | New password

| LANG. ⊜ | ENGL. ⊜ | PA.LI. ⊜ | 0 ⊜ |

Identification | Type of instruments | SW: version | Input

| IDEN. ⊜ | YES ⊜ | OM 402UNI 20 | 78-001 | PM ▸ | 1428 |

Return to measuring mode

Preset from manufacture

Password	"0"
Menu	LIGHT
USER menu	off
Setting the items	**DEF**

!
Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode

1428

©+☺

PASS. ☺ → 0 Entering access password for access into the menu → ☺

PASS. **Access into instrument menu**

PASS. = 0
- access into menu is unrestricted, after releasing keys you automaticaly move to first item of the menu

PASS. > 0
- access into menu is protected ny number code

Ser „PASS."=42   Example

0 ⬆ 1 ⬆ 2 ◀ 02 ⬆ 12 ◀ 22 ⬆

32 ⬆ 42 ☺ TYPE

TYPE ☺ → DC PM OHM Pt Ni TC   © ✉

DU Cu   ☺ 💾

⬆

TYPE **Selection of the type of instrument**

- primary selection of the type of instrument
- performs default setting **DEF** of values from manufacture, incl. calibration
- **DEF** = „PM"

	Menu	Type of instrument
	DC	DC voltmeter
	PM	Process monitor
	OHM	Ohmmeter
TYPE	Pt	Thermometer for sensors Pt
	Ni	Thermometer for sensors Ni
	TC	Thermometer for thermocouples
	DU	Display for lin. potentiometer
	Cu	Thermometer for sensors Cu

Type "PM"   Example

PM ☺ MODE

Type DC	📖 18
Type PM	📖 20
Type OHM	📖 22
Type RTD-Pt	📖 24
Type RTD-Ni	📖 26
Type T/C	📖 28
Type DU	📖 30
Type RTD-Cu	📖 32

MEASURING MODE > **DC**

MODE	Selection of the instrument measuring range

DEF = 60 mV

DEF = 500 V*

* only for option "A"

	Menu	Measuring range
MODE	60	±60 mV
	150	±150 mV
	300	±300 mV
	1200	±1,2 V
MODE - A	100	±100 V
	250	±250 V
	500	±500 V
	0.10	±0,1 A
	0.25	±0,25 A
	0.50	±0,5 A
	1.00	±1 A
	5.00	±5 A

Range ±150 mV   Example

60   150   MI N A
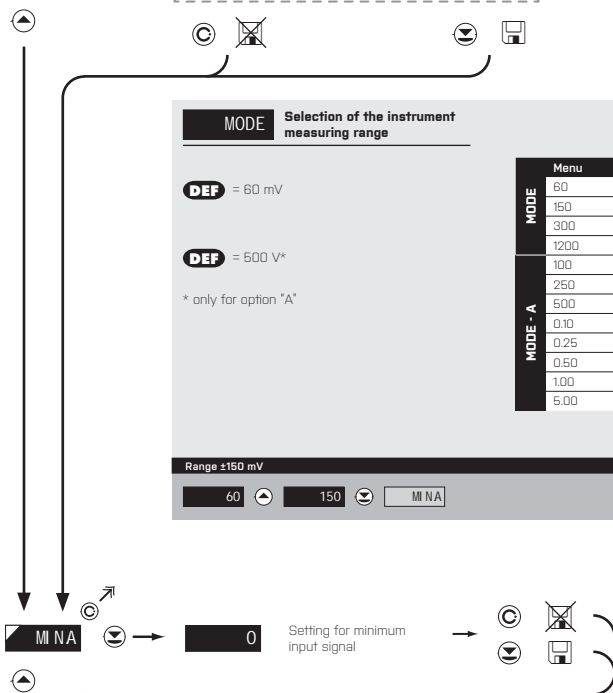
MI N A	Setting display projection for minimum value of input signal

Setting for minimum input signal

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mV > MIN.A = 0   Example

0   MAX A

| MAX A | 🔽 → | 100 | Setting for maximum input signal | → | Ⓒ ❌ 🔽 💾 |

MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 150 mV > MAX.A = 3500   Example

| 100 ◀ | 100 ◀ | 100 🔼 | 200 🔼 | 300 🔼 | 400 🔼 |
| 500 ◀ | 0500 🔼 | 1500 🔼 | 2500 🔼 | 3500 🔽 | FORA |

| FORA | 🔽 → | 0000 | 000.o | 00.oo | 0.ooo | FL.P. |
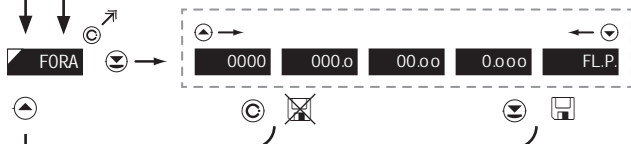
FORA **Setting projection of the decimal point**

- positioning of the DP is set here in the measuring mode

DEF = 000.o

Projection of DP on display > 0000   Example

| 000.o 🔽 | 0000 🔽 | BARO | *subsequent item on the menu depends on instrument equipment |

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MEASURING MODE > **PM**

MODE

| i 0-5 | 0-20 | 4-20 | • • • | 0-10 | 0-40 | Er.4 |

MODE Selection of the instrument measuring range

DEF = 4 - 20 mA

	Menu	Measuring range
MODE	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V
	Er. 4	4...20 mA, with error statement of „underflow" upon signal smaller than 3,36 mA

Range 0...20 mA   Example

4-20   u0-2   MI NA

MI NA

0   Setting for minimum input signal

MI NA Setting display projection for minimum value of input signal

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mA > MIN.A = -25   Example

| 0 | 1 | 2 | 3 | 4 | 5 |
| 05 | -5 | -05 | -15 | -25 | MAX A |

MAX A ⊝ → 100   Setting for maximum input signal →

MAX A — **Setting display projection for maximum value of input signal**

- the DP is automatically shifted after the value is confirmed

- range of the setting: -999...9999
- position of the DP does not affect display projection

DEF = 100

Projection for 20 mA > MAX.A = 2500   Example

100 100 100 200 300 400
500 0500 1500 2500 FORA
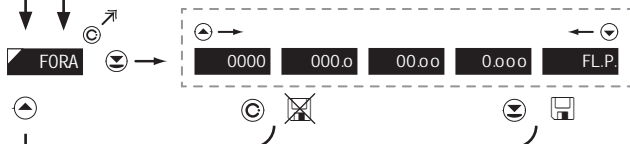
FORA ⊝ → 0000 000.o 00.oo 0.ooo FL.P.

FORA — **Setting projection of the decimal point**

- positioning of the DP is set here in the measuring mode

DEF = 000.o

Projection of DP on display > 0000   Example

000.o 0000 BARO   *subsequent item on the menu depends on instrument equipment

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MEASURING MODE > **OHM**

MODE

| 0.1 | 1.0 | 10.0 | 100.0 | AUTO |

MODE	Selection of the instrument measuring range

DEF = 100 Ω

	Menu	Measuring range
MODE	0.1	0...100 Ω
	1.0	0...1 kΩ
	10.0	0...10 kΩ
	100.0	0...100 kΩ
	AUTO	Autorange

Range 0...10 kΩ   Example

| 0.1 | | 1.0 | | 10.0 | | CON. |

CON.

| 2-W. | 3-W. | 4-W. |

CON.	Selection of the type of sensor connection

DEF = 2-wire

	Menu	Connection
CON.	2-u.	2-wire
	3-u.	3-wire
	4-u.	4-wire

Type of connection - 3 wire > CON. = 3-u.   Example

| 2-W. | | 3-W. | | MIN.A |

MIN.A

0

Setting for minimum input signal

MIN.A	Setting display projection for minimum value of input signal

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 Ohm > MIN.A = 0   Example

| 0 | | MAX.A |

MEASURING MODE > **OHM**

| MAX A | ⊻ | → | 100 | Setting for maximum input signal | → |

MAX A Setting display projection for maximum value of input signal

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 10 kOhm > MAX A = 1000   Example

| 100 | ◄ | 100 | ◄ | 100 | ⊻ | 000 | ◄ | 0000 | ▲ | 1000 | ⊻ |

FORA

| FORA | ⊻ | → | 0000 | 000.o | 00.oo | 0.ooo | FL.P. |

FORA Setting projection of the decimal point

- positioning of the DP is set here in the measuring mode

DEF = 000.o

Projection of DP on display > 0000   Example

| 000.o | ⊻ | 0000 | ⊻ | BARO | *subsequent item on the menu depends on instrument equipment |

📖 34

MEASURING MODE > **RTD-Pt**

MODE

EU01　EU05　EU1.0　US01　R.50　R100

MODE	Selection of the instrument measuring range

DEF = Pt 100

	Menu	Measuring range
MODE	EU0.1	Pt 100 (3 850 ppm/°C)
	EU0.5	Pt 500 (3 850 ppm/°C)
	EU1.0	Pt 1000 (3 850 ppm/°C)
	US0.1	Pt 100 (3 920 ppm/°C)
	R. 50	Pt 50 (3 910 ppm/°C)
	R.100	Pt 100 (3 910 ppm/°C)

Range - Pt 1 000 > MODE = EU1.0　　　　　　　　　　　　　　Example

EU01　EU05　EU1.0　CON.

CON.

2-W.　3-W.　4-W.

CON.	Selection of the type of sensor connection

DEF = 2-wire

	Menu	Connection
CON.	2-u.	2-wire
	3-u.	3-wire
	4-u.	4-wire

Type of connection - 3 wire > CON. = 3-u.　　　　　　　　　　　　Example

2-W.　3-W.　FORA

MEASURING MODE > **RTD-Pt**

FORA

0000   000.o   00.oo

| FORA | **Setting projection of the decimal point** |

- positioning of the DP is set here in the measuring mode
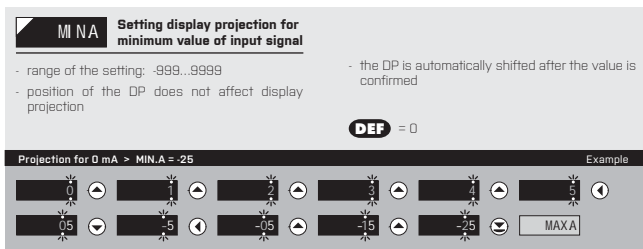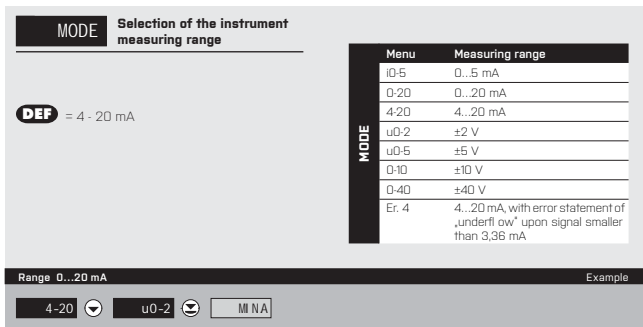
DEF = 000.o

Projection of DP on display > 0000   Example

000.o   0000   BARO   *subsequent item on the menu depends on instrument equipment

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MEASURING MODE > **RTD-Ni**

MODE | 5-1 | 6-1 | 5-10 | 6-10

MODE	Selection of the instrument measuring range

DEF = Ni 1 000 - 5 000 ppm/°C

	Menu	Measuring range
MODE	5-1	Ni 1 000 (5 000 ppm/°C)
	6-1	Ni 1 000 (6 180 ppm/°C)
	5-10	Ni 10 000 (5 000 ppm/°C)
	6-10	Ni 10 000 (6 180 ppm/°C)

Range - Ni 10 000, 5 000 ppm > MODE = 5-10   Example

5-1 | 6-1 | 5-10 | CON.

CON. | 2-W. | 3-W. | 4-W.

CON.	Selection of the type of sensor connection

DEF = 2-wire

	Menu	Connection
CON.	2-u.	2-wire
	3-u.	3-wire
	4-u.	4-wire

Type of connection - 3 wire > CON. = 3-u.   Example

2-W. | 3-W. | FORA

FORA → 0000 000.o 00.oo

FORA	**Setting projection of the decimal point**

- positioning of the DP is set here in the measuring mode

DEF = 000.o

Projection of DP on display > 0000	Example

000.o ⊙ 0000 ⊙ BARO *subsequent item on the menu depends on instrument equipment

34

MEASURING MODE > **T/C**

MODE

▲ →			← ▼	
TC B	TC E	TC J	TC K	>
> TC N	TC R	TC S	TC T	TC L

MODE	Selection of the type of thermocouple

DEF = Type "J"

Menu	Type of thermocouple
tC B	B
tC E	E
tC J	J
tC K	K
tC N	N
tC R	R
tC S	S
tC T	T
tC L	L

MODE

Type of thermocouple "K"   Example

| tC J | ▲ | tC K | ▼ | CON. |

CON.

▲ →			← ▼
Int1	Int2	EXT1	EXT2

CON.	Selection of the type of sensor connection

DEF = EXT. 1

Menu	Connection	Ref. T/C
Int.1	measuring C.J. at instrument brackets	✗
Int.2	measuring C. J. at instrument brackets with anti-series connected ref. TC	✓
EXT.1	the entire measuring set is working under invaried and constant temperature	✗
EXT.2	when using compensation box	✓

CON.

Selection of the type of sensor connection > COn. = EXT.2   Example

| EXT1 | ▲ | EXT2 | ▼ | C.J.T. |

!
For thermocoule type "B" the items **CON.** and **C. J.t.** are not available

!
Method and procedure of setting the cold junctions is described in separate chapter on page 80

C.J.T.	23	Setting temperature of cold junction	

C.J.T. **Setting temperature of cold junction**

- range 0...99°C with compensation box

DEF = 23

Setting temperature of cold junction > C. J.t. = 35 Example

23	24	25	25	35	FORA

FORA	0000	000.o	00.oo	

FORA **Setting projection of the decimal point**

- positioning of the DP is set here in the measuring mode

DEF = 0000

Projection of DP on display > 000.o Example

0000	000.o	BARO	*subsequent item on the menu depends on instrument equipment

34

MEASURING MODE > **DU**

MIN A → 0   Setting for minimum input signal

MIN A   **Setting display projection for minimum value of input signal**

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for the beginning > MIN.A = 0   Example

0 → MAX A

MAX A → 100   Setting for maximum input signal

MAX A   **Setting display projection for maximum value of input signal**

- range of the setting: -999...9999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for the end > MAX.A = 5000   Example

100 → 100 → 100 → 000 → 0000 → 1000

2000 → 3000 → 4000 → 5000 → FORA

FORA

0000   000.0   00.oo   0.000   FL.P.

| FORA | **Setting projection of the decimal point** |

- positioning of the DP is set here in the measuring mode   **DEF** = 000.o
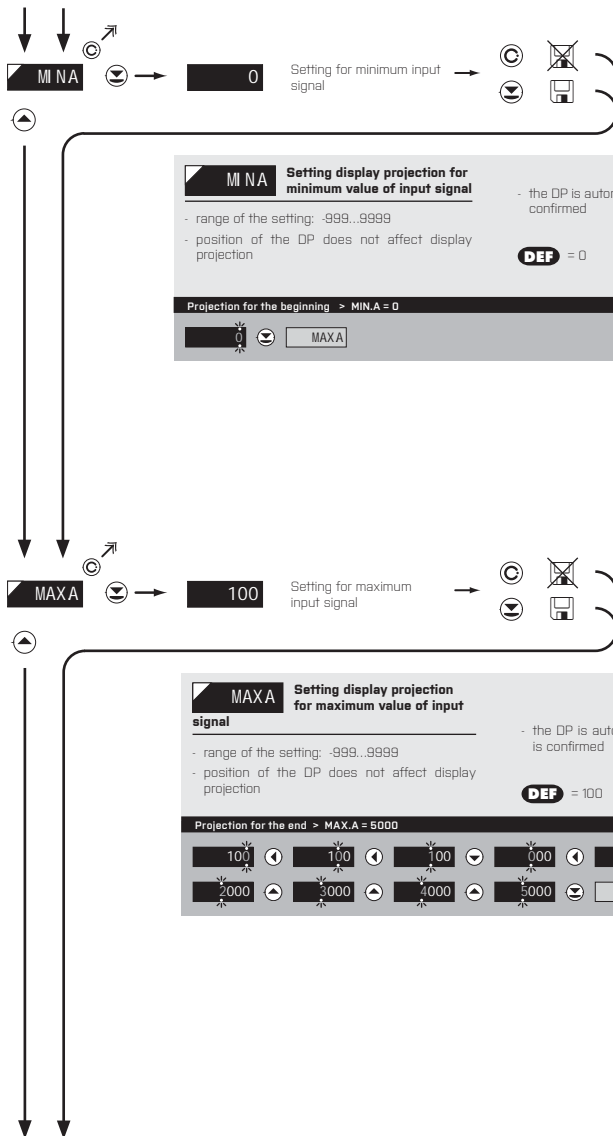
Projection of DP on display > 000.o   Example

000.o   BARO   *subsequent item on the menu depends on instrument equipment

34   Calibration of the beginning and the end of range of linear potentiometer is on page 41

MEASURING MODE > **RTD-CU**

MODE

MODE	Selection of the instrument measuring range

DEF = Cu 50 [4 285 ppm/°C]

	Menu	Measuring range
MODE	8-50	Cu 50 [4 285 ppm/°C]
	8-0.1	Cu 100 [4 285 ppm/°C]
	6-50	Cu 50 [4 260 ppm/°C]
	6-0.1	Cu 100 [4 260 ppm/°C]

Range - Cu 50/4260 ppm > MODE = 6-50   Example

8-50 8-01 6-50 CON.

CON.

CON.	Selection of the type of sensor connection

DEF = 2-wire

	Menu	Connection
CON.	2-u.	2-wire
	3-u.	3-wire
	4-u.	4-wire

Type of connection - 3 wire > CON. = 3-u.   Example

2-W. 3-W. FORA

FORA

0000   000.o   00.oo

FORA	Setting projection of the decimal point

- positioning of the DP is set here in the measuring mode

DEF = 000.o

Projection of DP on display > 0000   Example

000.o   0000   BARO   *subsequent item on the menu depends on instrument equipment
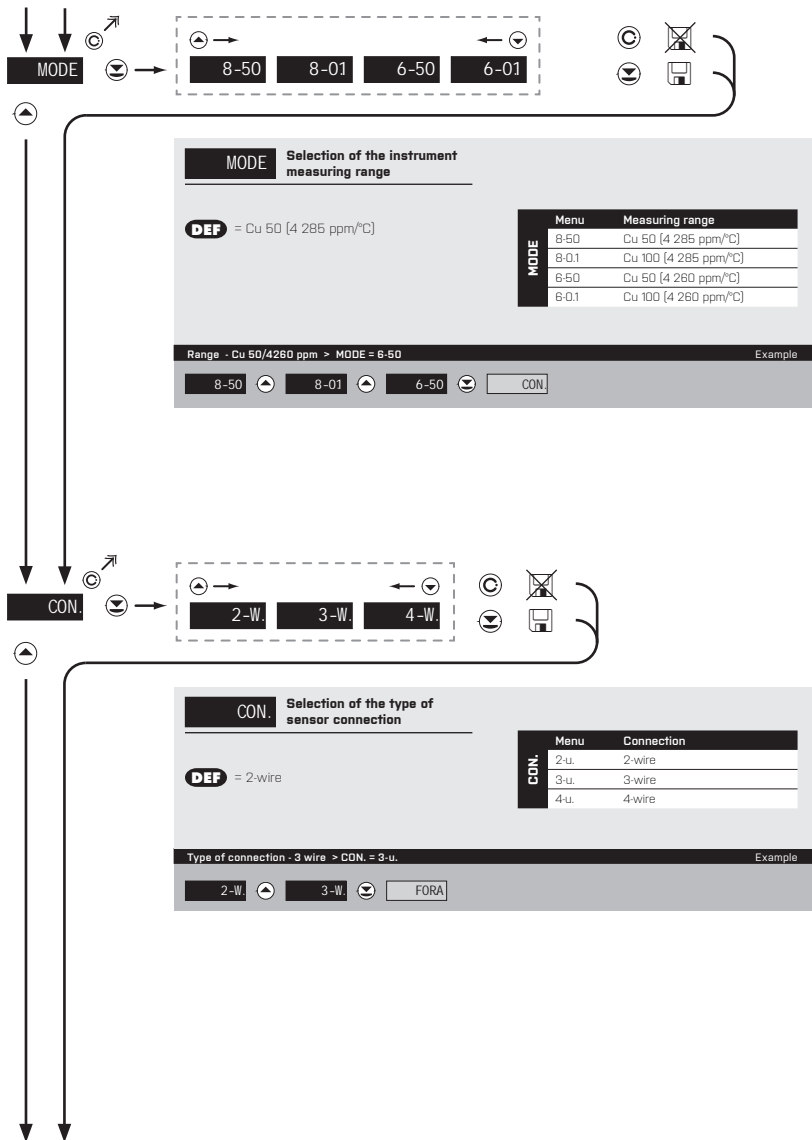
34

DISPLAYED ONLY WITH OPTIONS **> COMPARATORS**

L.L1 ⊕ → 20   Setting boundary for limit 1

L.L1   **Setting boundary for limit 1**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 20
DEF „Hystresis"=0, „Delay"=0

Setting limit 1 > L. L.1 = 32   Example

20 ▲ 21 ▲ 22 ◀ 22 ▲ 32 ⊕ BARO

L.L2 ⊕ → 40   Setting boundary for limit 2

L.L2   **Setting boundary for limit 2**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 40
DEF „Hystresis"=0, „Delay"=0

Setting limit 2 > L. L.2 = 53.1   Example

40 ▲ 41 ◀ 41 ▼ 31 ◀ 031 ▲ 131 ▲
231 ▲ 331 ▲ 431 ▲ 531 ◀ 0531 ◀ 0531 ▲
0531 ⊕ BARO   *subsequent item on the menu depends on instrument equipment

!

Items for "Limits" and "Analog output" are accessible only if incorporated in the instrument.

L.L3 60 Setting boundary for limit 3

L.L3 **Setting boundary for limit 3**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 60
DEF „Hystresis"=0, „Delay"=0

Setting limit 3 > L. L.3 = 85   Example

60 → 61 → 62 → 63 → 64 → 65
65 → 75 → 85 → BARO

* následující položka menu je závislá dle vybavení přístroje

L.L4 80 Setting boundary for limit 4

L.L4 **Setting boundary for limit 4**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 80
DEF „Hystresis"=0, „Delay"=0

Setting limit 4 > L. L.4 = 103   Example

80 → 81 → 82 → 83 → 83 → 93
03 → 003 → 103 → BARO

* následující položka menu je závislá dle vybavení přístroje

DISPLAYED ONLY WITH OPTIONS **> ANALOG OUTPUT**

TYA0.

| 0-20 | Er4T | 4-2T | Er.4 | ••• | 0-10 | +-10 |

TYA0. **Setting the type of analog output**

	Menu	Range	Description
TY.A.0.	0-20	0...20 mA	
	Er.4t	4...20 mA	with error message indication and broken loop indication [<3,6 mA]
	4-2t	4...20 mA	with broken loop indication [<3,6 mA]
	Er. 4	4...20 mA	with indication of error statement [<3,6 mA]
	4-20	4...20 mA	
	i0-5	0...5 mA	
	u0-2	0...2 V	
	u0-5	0...5 V	
	0-10	0...10 V	
	+-10	±10 V	

DEF = 4...20 mA

Type of analog output - 0...10 V > TY.A.0. = 0-10   Example

| 4-20 | ▲ | i 0-5 | ▲ | u0-2 | ▲ | u0-5 | ▲ | 0-10 V | ⊙ | MI A0. |

MI A0.   0   Assigning the display value to the beginning of the A0 range

MI A0. **Assigning the display value to the beginning of the A0 range**

- range of the setting: -999...9999   **DEF** = 0
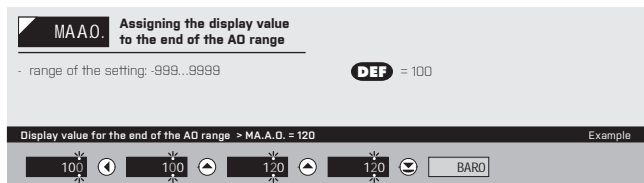
Display value for the beginning of the A0 range > MI.A.0. = 0   Example
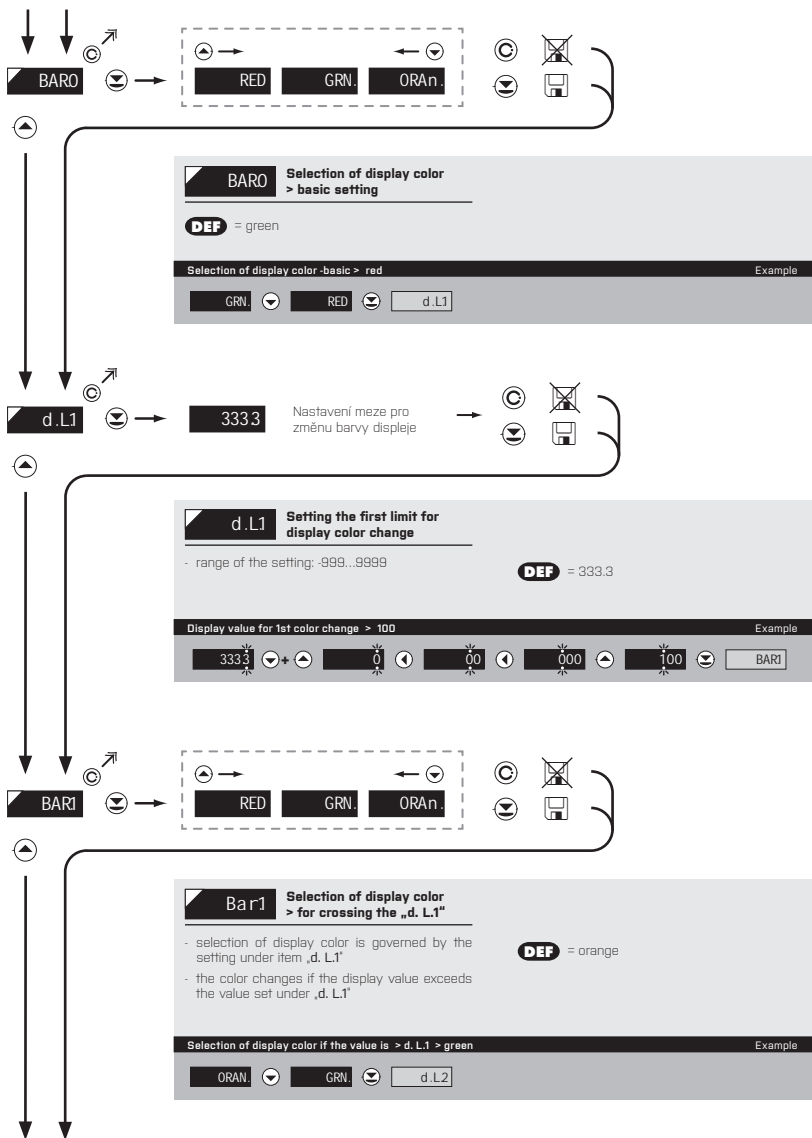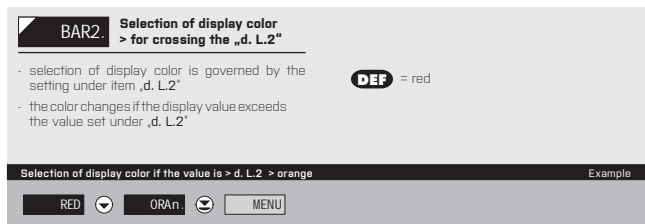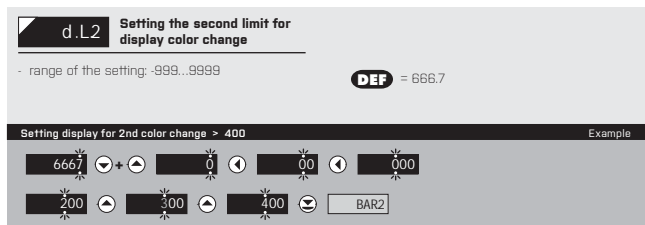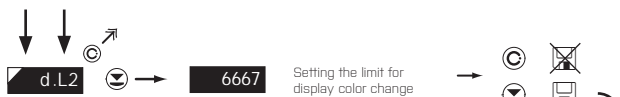
| 0 | ⊙ | MA A0. |

!

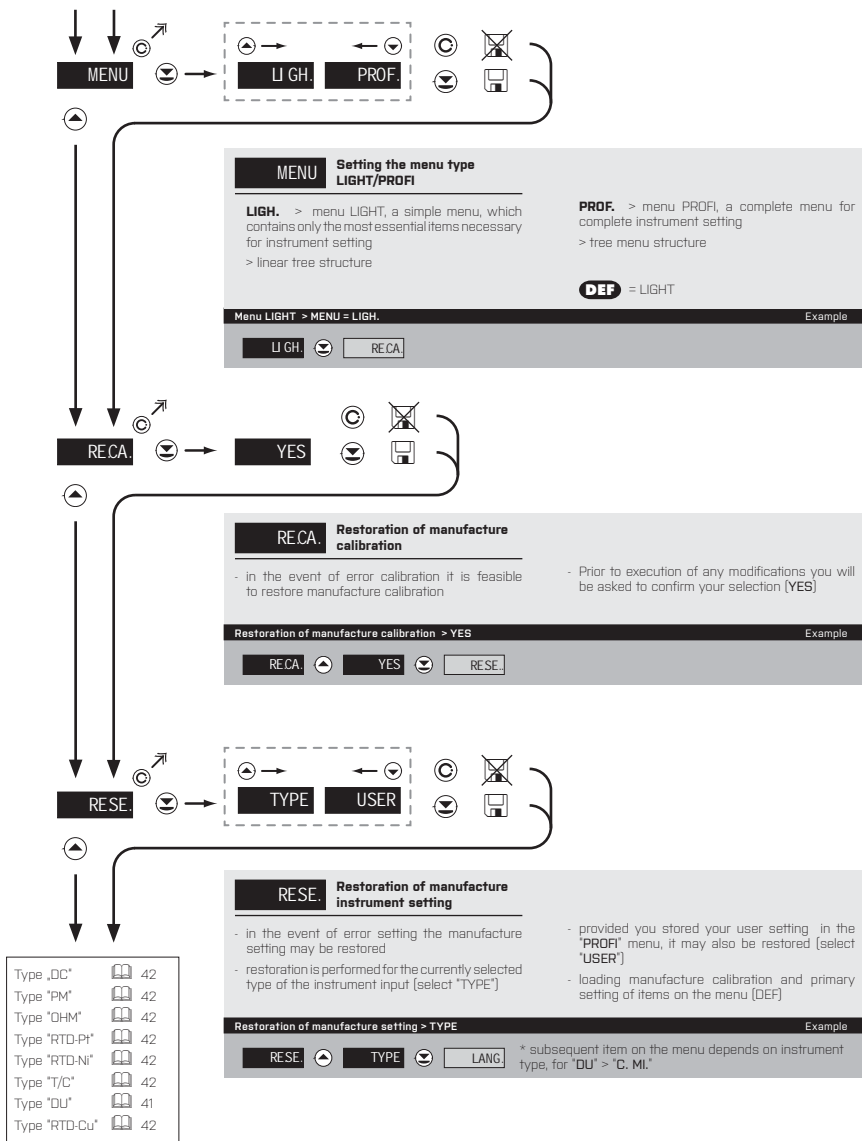Items for "Limits" and "Analog output" are accessible only if incorporated in the instrument.

ANALOG OUTPUT

> **MA.A.O.**

100

Assigning the display value to the end of the AO range

| MA.A.O. | **Assigning the display value to the end of the AO range** |

- range of the setting: -999...9999   **DEF** = 100

Display value for the end of the AO range > MA.A.O. = 120   Example

100   100   120   120   BAR0

DISPLAYED ONLY WITH OPTIONS **>** **ANALOG OUTPUT**

BAR0

RED   GRN.   ORAn.

| BAR0 | **Selection of display color > basic setting** |

DEF = green

Selection of display color -basic > red   Example

GRN.   RED   d.L1

d.L1

3333   Nastavení meze pro změnu barvy displeje

| d.L1 | **Setting the first limit for display color change** |

- range of the setting: -999...9999   **DEF** = 333.3

Display value for 1st color change > 100   Example

3333 + 0   00   000   100   BAR1

BAR1

RED   GRN.   ORAn.

| Bar1 | **Selection of display color > for crossing the „d. L.1"** |

- selection of display color is governed by the setting under item „**d. L.1**"   **DEF** = orange
- the color changes if the display value exceeds the value set under „**d. L.1**"

Selection of display color if the value is > d. L.1 > green   Example

ORAN.   GRN.   d.L2

d.L2 → 6667 Setting the limit for display color change

d.L2 **Setting the second limit for display color change**

- range of the setting: -999...9999 **DEF** = 666.7

Setting display for 2nd color change > 400 Example

6667 ⊖+⊕ 0 ◁ 00 ◁ 000
200 ⊕ 300 ⊕ 400 ☺ BAR2

BAR2 → RED GRN. ORAN.

BAR2. **Selection of display color > for crossing the „d. L.2"**

- selection of display color is governed by the setting under item „d. L.2" **DEF** = red
- the color changes if the display value exceeds the value set under „d. L.2"

Selection of display color if the value is > d. L.2 > orange Example

RED ⊖ ORAn. ⊖ MENU

MENU ◉ → ← ◉ LI GH. PROF. Ⓒ ✗

MENU Setting the menu type LIGHT/PROFI

LIGH. > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting

> linear tree structure

PROF. > menu PROFI, a complete menu for complete instrument setting

> tree menu structure

DEF = LIGHT

Menu LIGHT > MENU = LIGH. Example

LI GH. ◉ RE.CA.

RE.CA. ◉ → YES Ⓒ ✗

RE.CA. Restoration of manufacture calibration

- in the event of error calibration it is feasible to restore manufacture calibration

- Prior to execution of any modifications you will be asked to confirm your selection (**YES**)

Restoration of manufacture calibration > YES Example

RE.CA. ◉ YES ◉ RE.SE.

RE.SE. ◉ → ← ◉ TYPE USER Ⓒ ✗

RE.SE. Restoration of manufacture instrument setting

- in the event of error setting the manufacture setting may be restored

- restoration is performed for the currently selected type of the instrument input (select "TYPE")

- provided you stored your user setting in the "**PROFI**" menu, it may also be restored (select "**USER**")

- loading manufacture calibration and primary setting of items on the menu (**DEF**)

Restoration of manufacture setting > TYPE Example

RE.SE. ◉ TYPE ◉ LANG.

* subsequent item on the menu depends on instrument type, for "**DU**" > "**C. MI.**"

C.MI .

flashing legend

YES

C.MI . **Calibration of input range - the potentiometer traveller in** initial position

Only for type "DU"

- prior confirming the flashing "YES" sign the potentiometer traveller has to be in given idle position

Calibration of the beginning of the range > C. MI.   Example
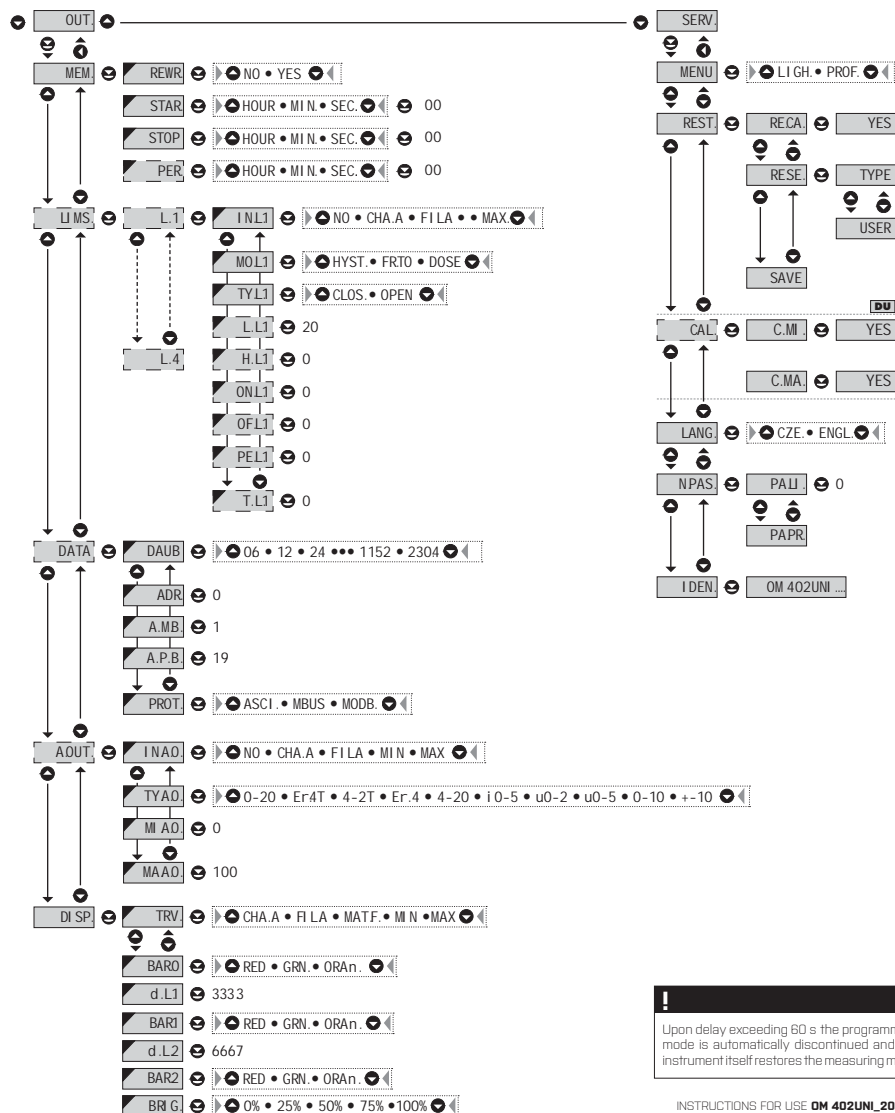
YES   C.MA.

C.MA.

flashing legend

YES
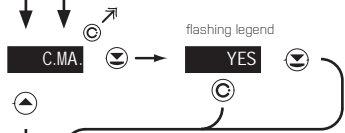
C.MA. **Calibration of input range - the potentiometer traveller** in end position

Only for type "DU"

- prior confirming the flashing "YES" sign the potentiometer traveller has to be in given idle position

Calibration of the end of the range > C. MA.   Example

YES   LANG.

5. SETTING **LIGHT**

LANG. → CZE. ENGL.

LANG. Selection of language in instrument menu

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL.   Example

ENGL. PA.LI

PA.LI . → 0   Setting new access password

PA.LI . Setting new access password

- access password for menu **LIGHT**
- range of the number code 0...9999
- upon setting the password to "0000" the access to menu **LIGHT** is free without prompt to enter it

- in case the password is lost, please contact the adminstrator of this device

DEF = 0

New password - 341 > PA.LI. = 341   Example

0 1 01 11 21 31
41 041 141 241 341 IDEN.

				instrument type	SW: version	setting the input type

I DEN.   →   YES   OM 402UNI 20   78-001   PM

I DEN.   Instrument SW version

- the display shows the type of instrument indication, SW number, SW version and current input setting (Mode)
- if SW version contains a letter in first position, then it is a customer SW

- after the identification is completed the menu is automatically exited and the instrument restores the measuring mode

1428   Return to measuring mode

Programming sch

1428 ⊙ + ⊝ PASS ⊝ 0 ⊝ Access password
⊙ + ⊝ - after setting in item "MENU"

I NP.

CLR ⊝ ▶⊝ C.TA.• C.MM.• C.ME. ⊝◀

CONF ⊝ R/S ⊝ ▶⊝ 01 • 02 ••• 200 • 400 ⊝◀

TYPE ⊝ ▶⊝ DC • PM ••• T/C • DU ⊝◀

MODE ⊝

Setting input, range and projection

DC ~ ⊝ 60 • 150 • 300 • 1200 ⊝◀
PM ~ ⊝ i 0-5 • 0-20 ••• 0-40 • Er.4 ◀
OHM ~ ⊝ 01 • 10 • 100 • 1000 • AUT0 ⊝◀
RTD ~ ⊝ EU01 • EU05 • EU10 ••• R100 ⊝◀
RTD ~ ⊝ 5-1 • 6-1 • 5-10 • 6-10 ⊝◀
T/C ~ ▶⊝ TC B • TC E ••• TC T • TC L ⊝◀
DU ~ ▶ LP0T
RTD ~ ⊝ 8-50 • 8-01 • 6-50 • 6-01 ⊝◀

CON. ⊝ ⊝ 2-W.• 3-W.• 4-W.⊝◀
AD.R. ⊝ 0
LEAD. ⊝ 0
CON. ⊝ ⊝ I nt1 •I nt2 ••• EXT2 ⊝◀
C.J.T. ⊝ 0

RTC TIME ⊝ ▶⊝ HOUR • MI N.• SEC.⊝◀ ⊝ 00
DATE ⊝ ▶⊝ DAY • MON.• YEAR ⊝◀ ⊝ 00

E.I N. ⊝ EX.1 ⊝ ▶⊝ OFF • HOLD ••• MATF. ⊝◀
M.HO ⊝ ⊝ DI SP.• DA0.• DA0L.• ALL ⊝◀

Keys ⊝ LEFT ⊝ FN.L ▶⊝ NO • C.MM.• C.TA.• MENU • TMPV.• TARE • SAVE • C.ME. ⊝◀
DO.L ⊝ ▶⊝ NO • CHA.A.• FI LA • MATF.• MI N • MAX.• L1 ••• P.TA.• C.J. ⊝◀
ENTR MN.L ⊝ ▶⊝ M.1 • M.2 • M.3 • M.4 ••• ON4 • OF.1 • OF.2.• OF.3 • OF.4 ⊝◀

CHAN.

CHA.A ⊝ SETA ⊝ MI NA ⊝ 0
MAXA ⊝ 100
P.TA ⊝ 0

FI L ⊝ M.FA ⊝ ⊝ NO ••• ROUN.⊝◀
C.FA ⊝ 0

FORA ⊝ ⊝ 0000 • 000o ••• PL.T. ⊝◀

LOG A ⊝ ⊝ NO • ALL • I N • OUT ⊝◀

MATF. ⊝ MATF. ⊝ ⊝ NO • POL.••• ODM. ⊝◀
CO.A ⊝ 0
CO.F ⊝ 0
FORM ⊝ ⊝ 0000 • 000o ••• FL.P. ⊝◀
LOGM ⊝ ⊝ NO • ALL • I N • OUT ⊝◀

MI MA. ⊝ I NMM. ⊝ ⊝ NO • CHA.A • FI LA • M.FN. ⊝◀

...eme PROFI MENU

> **!**
> Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode

SETTING
PROFI

For expert users
Complete instrument menu
Access is password protected
Possibility to arrange items of the **USER MENU**
Tree menu structure

6.0	SETTING "PROFI"

PROFI   **Complete programming menu**
- contains complete instrument menu and is protected by optional number code
- designed for expert users
- preset from manufacture is menu **LIGHT**

Switching over to "PROFI" menu

⊙ + ⊙
- access to **PROFI** menu
- authorization for access to **PROFI** menu does not depend on setting under item SERV. > MENU
- password protected access (unless set as follows under the item SERV. > N. PASS. > PROF. =0)

⊙ + ⊙
- access to menu selected under item SERV. > MENU > **LIGH.**/**PROF.**
- password protected access (unless set as follows under the item SERV. > N. PAS. > LIGH. =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used

6. SETTING **PROFI**

6.1 SETTING "PROFI" - INPUT

INP.	CLR.
CHAN.	CONF.
OUT.	RTC
SERV.	E.IN.
	Keys
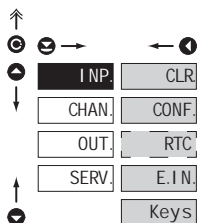
The primary instrument parameters are set in this menu

CLR.	Resetting internal values
CONF.	Selection of measuring range and parameters
RTC	Setting date and time for option with RTC
E.IN.	Setting external inputs functions
Keys	Assigning further functions to keys on the instrument

6.1.1 RESETTING INTERNAL VALUES

INP.	CLR.	C.TA.
CHAN.	CONF.	C.MM.
OUT.	RTC	C.ME.
SERV.	E.IN.	
	Keys	
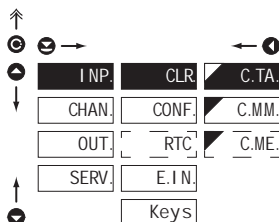
CLR.	**Resetting internal values**
C.TA.	Tare resetting
C.MM.	Resetting min/max value

- resetting memory for the storage of minimum and maximum value achieved during measurement

C.ME.	**Resetting the instrument memory**

- resetting memory with data measured in the "**FAST**" or "**RTC**" modes
- not in standard equipment

6.1.2a | SELECTION OF MEASURING RATE

I NP.	CLR.	R/S	40.0
CHAN.	CONF.	TYPE	20.0
OUT.	RTC	MODE	10.0
SERV.	E.I N.	CON.	5.0	**DEF**
	Keys	C.J.T.	2.0
		AD.R.	1.0
		LEAD	0.5
			0.2
			0.1

R/S	Selection of measuring rate
40.0	40,0 measurements/s
20.0	20,0 measurements/s
10.0	10,0 measurements/s
5.0	5,0 measurements/s
2.0	2,0 measurements/s
1.0	1,0 measurements/s
0.5	0,5 measurements/s
0.2	0,2 measurements/s
0.1	0,1 measurements/s

6.1.2b | SELECTION OF „INSTRUMENT" TYPE

I NP.	CLR.	R/S	DC
CHAN.	CONF.	TYPE	PM	**DEF**
OUT.	RTC	MODE	OHM
SERV.	E.I N.	CON.	Pt
	Keys	C.J.T.	Ni
		AD.R.	TC
		LEAD	DU
			Cu

TYPE	Selection of „instrument" type

- selection of particular type of "instrument" is bound to relevant dynamic items

DC	DC voltmeter
PM	Process monitor
OHM	Ohmmeter
Pt	Thermometer for Pt xxx
Ni	Thermometer for Ni xxxx
TC	Thermometer pro thermocouples
DU	Display for linear potentiometers
Cu	Thermometer for Cu xxx

6.1.2c SELECTION OF MEASURING RANGE

			DC	OHM
INP.	CLR.	R/S	60	01 **DEF**
CHAN.	CONF.	TYPE	150	1.0
OUT.	RTC	MODE	300	10.0
SERV.	E.IN.	CON.	1200	100.0
	Keys	C.J.T.		AUT0
		AD.R.	**DC - A**	**PM**
		LEAD.	100	i 0-5
			250	0-20
		DEF	500	4-20 **DEF**
			010	u0-2
			025	u0-5
			050	0-10
			100	0-40
			500	Er4

!

Switching in the mode
AUTO - "OHM"

0.1 Ω > 1 kΩ	0.101 k
1 kΩ > 10 kΩ	1.010 k
10 kΩ > 100 kΩ	10.10 k
100 Ω > 10 kΩ	9.900 k
10 kΩ > 1 kΩ	0.990 k
1 kΩ > 0.1 kΩ	0.099 k

When selecting the "AUTO" range, the items "MIN", "MAX", "P. T. A" will not be displayed in the "CH. A" setting

RTD-Pt	RTD-Cu
DEF EU01	8-50 **DEF**
EU05	8-01
EU1.0	6-50
US01	6-01
R.50	
R100	**T/C**
	TC B
RTD-Ni	TC E
DEF 50-1k	TC J
62-1k	TC K **DEF**
50-10k	TC N
62-10k	TC R
	TC S
	TC T
DU	TC T
DEF L.POT.	TC L

MODE	Selection of the instrument measuring range

	Menu	Measuring range
DC	60	±60 mV
	150	±150 mV
	300	±300 mV
	1200	±1,2 V
DC - A	100	±100 V
	250	±250 V
	500	±500 V
	0.10	±0,1 A
	0.25	±0,25 A
	0.50	±0,5 A
	1.00	±1 A
	5.00	±5 A
	Menu	**Measuring range**
PM	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V
	Er. 4	4...20 mA, with error statement of "underfl ow" upon signal smaller than 3,36 mA
	Menu	**Measuring range**
OHM	0.1	0...100 Ω
	1.0	0...1 kΩ
	10.0	0...10 kΩ
	100.0	0...100 kΩ
	AUT0	Autorange
	Menu	**Measuring range**
RTD-PT	EU0.1	Pt 100 (3 850 ppm/°C)
	EU0.5	Pt 500 (3 850 ppm/°C)
	EU1.0	Pt 1000 (3 850 ppm/°C)
	US0.1	Pt 100 (3 920 ppm/°C)
	r. 50	Pt 50 (3 910 ppm/°C)
	r.100	Pt 100 (3 910 ppm/°C)
	Menu	**Measuring range**
RTD-NI	5.0-1	Ni 1 000 (5 000 ppm/°C)
	6.2-1	Ni 1 000 (6 180 ppm/°C)
	5-10	Ni 10 000 (5 000 ppm/°C)
	6-10	Ni 10 000 (6 180 ppm/°C)
	Menu	**Measuring range**
RTD-CU	8-50	Cu 50 (4 280 ppm/°C)
	8-0.1	Cu 100 (4 280 ppm/°C)
	6-50	Cu 50 (4 260 ppm/°C)
	6-0.1	Cu 100 (4 260 ppm/°C)
	Menu	**Type of thermocouple**
T/C	tC B	B
	tC E	E
	tC J	J
	tC K	K
	tC N	N
	tC R	R
	tC S	S
	tC T	T
	tC L	L

6.1.2d SELECTION OF THE TYPE OF SENSOR CONNECTION | RTD | OHM | T/C |

INP.	CLR.	R/S	2-W.	DEF
CHAN.	CONF.	TYPE	3-W.
OUT.	RTC	MODE	4-W.
SERV.	E.IN.	CON.
	Keys	AD.R
		LEAD.

INP.	CLR.	R/S	Int1
CHAN.	CONF.	TYPE	Int2
OUT.	RTC	MODE	EXT1	DEF
SERV.	E.IN.	CON.	EXT2
	Keys	C.J.T.
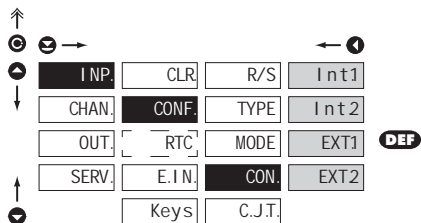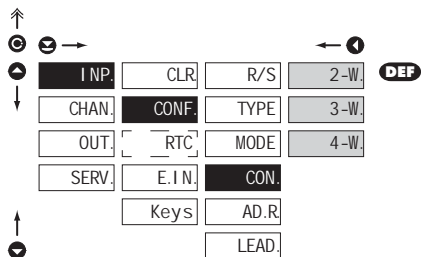
| CON. | **Selection of type of sensor connection** |

RTD OHM

2-W.	2-wire connection
3-W.	3-wire connection
4-W.	4-wire connection

T/C

| INT1 | Measurement without reference thermocouple |

- measuring cold junction at instrument brackets

| Int2 | Measurement with reference thermocouple |

- measuring cold junction at instrument brackets with anti-series connected reference thermocouple

| EXT1 | Measurement without reference thermocouple |

- the entire measuring set is working under invaried and constant temperature

| EXT2 | Measurement with reference thermocouple |

- when using compensation box

!

Method and procedure of setting the cold junctions is described in separate chapter on page 80

!

For thermocoule type "**B**" the items **CON.** and **C. J.T.** are not available

6.1.2e SETTING TEMPERATURE OF COLD JUNCTION — T/C

⤒			
⊕ ⊗ →			← ◐
⬆ VST.	CLR.	R/S	230
↓ CHAN.	CONF.	TYPE	
OUT.	RTC	MODE	
SERV.	E.IN.	CON.	
⬆	Keys	C.J.T.	
⬇			
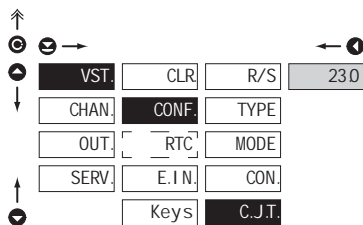
C.J.T. — Setting temperature of cold junction

- range 0...99°C with compensation box
- **DEF** = 23°C

6.1.2f ZERO OFFSET OF THE MEASUREMENT RANGE — RTD OHM

⤒			
⊕ ⊗ →			← ◐
⬆ VST.	CLR.	R/S	00
↓ CHAN.	CONF.	TYPE	
OUT.	RTC	MODE	
SERV.	E.IN.	CON.	
Keys	AD.R.		
⬆		LEAD.	
⬇			
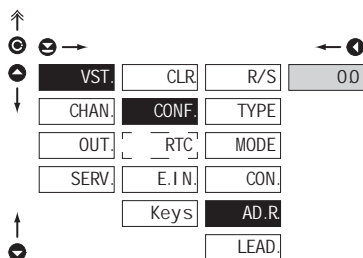
AD.R. — Offset of the beginning of the measuring range

- in cases when it is necessary to offset the beginning of the range by certain value, e.g. while using sensor in measuring head
- entered directly in Ohm (0...9999)
- **DEF** = 0

6.1.2g COMPENSATION OF 2-WIRE CONDUCT — RTD OHM

⤒			
⊕ ⊗ →			← ◐
⬆ INP.	CLR.	R/S	YES
↓ CHAN.	CONF.	TYPE	
OUT.	RTC	MODE	
SERV.	E.IN.	CON.	
Keys	AD.R.		
⬆		LEAD.	
⬇			
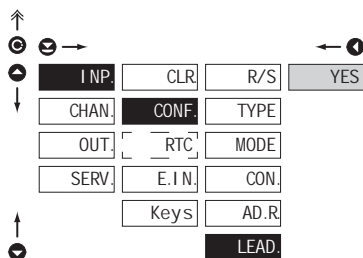
LEAD. — Compensation of 2-wire conduct

- for measurement accuracy it is necessary to perform compensation of conduct always in case of 2-wire connection
- prior confirmation of the displayed prompt "YES" it is necessary to substitute the sensor at the end of the conduct by a short-circuit
- **DEF** = 0

6.1.3 SETTING THE REAL TIME CLOCK

I NP.	CLR.	TI ME	HOUR	00
CHAN.	CONF.	DATE	MI N.
OUT.	RTC		SEC.
SERV.	E. I N.
	KEYS
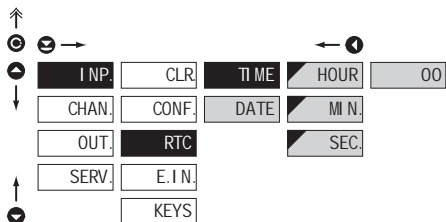
| RTC | Setting the real time clock (RTC) |

| TI ME | Time setting |
- format 23.59.59

| DATE | Date setting |
- format DD.MM.YY

6.1.4a EXTERNAL INPUT FUNCTION SELECTION

I NP.	CLR.	EXT1	OFF
CHAN.	CONF.	EXT2	HOLD
OUT.	RTC	EXT3	LO.K.
SERV.	E. I N.	M.HO.	BPAS.
	Keys		TARE
			C.TA.
			C.MM.
			SAVE
			C.ME.
			CHA.A
			FI LA
			M.FN.
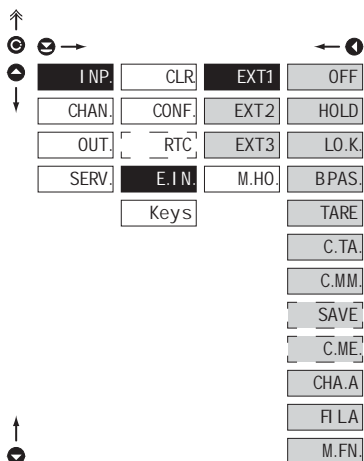
| E. I N. | External input function selection |

| OFF | Input is off |

| HOLD | Activation of HOLD |

| LO.K. | Locking keys on the instrument |

| BPAS. | Activation of locking access into programming menu |
LIGHT/PROFI

| TARE | Tare activation |

| C.TA. | Tare resetting |

| C.MM. | Resetting min/max value |

| SAVE | Activation of measured data record in instrument |
memory

| C.ME. | Clearing memory for option FAST/RTC |

| CHA.A | Displaying value of "Channel A" |

| FI LA | Displaying value of "Channel A" after being processed by |
digital filters

| M.FN. | Displaying value of "Mathematical function" |

- **DEF** EXT. 1 > HOLD
- **DEF** EXT. 2 > LO. K.
- **DEF** EXT. 3 > TARE

*

Uvedený postup nastavení je shodný i pro **EXT. 2** a **EXT. 3**

6.1.4b SELECTION OF FUNCTION "HOLD"
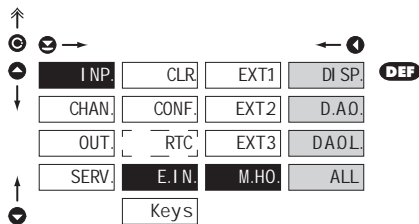
M.HO.	**Selection of function "HOLD"**
DI SP.	"HOLD" locks only the value displayed
D.AO.	"HOLD" locks the value displayed and on AO
DAOL.	"HOLD" locks the value displayed, on AO and limit evaluation
ALL	"HOLD" locks the entire instrument

I NP. — CLR. — EXT1 — DI SP. — DEF
CHAN. — CONF. — EXT2 — D.AO.
OUT. — RTC — EXT3 — DAOL.
SERV. — E.IN. — M.HO. — ALL
Keys

6.1.5a OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS

I NP. — CLR. — LEFT — FN.L. — NO
CHAN. — CONF. — DOWN — TM.L. — C.MM.
OUT. — RTC — UP — MN.L. — C.TA.
SERV. — E.IN. — ENTR — MENU
Keys — TMP.V.
— TARE
— SAVE
— C.ME.
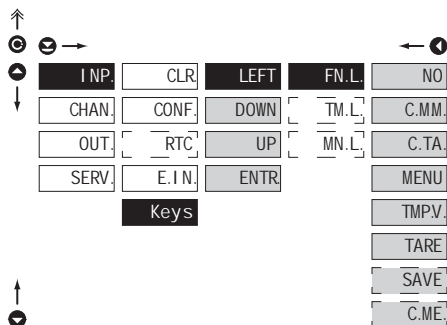
FN.L.	**Assigning further functions to instrument keys**

- „Fn. L." > executive functions

NO	Key has no further function
C.MM.	Resetting min/max value
C.TA.	Tare resetting
MENU	Direct access into menu on selected item

- after confirmation of this selection the "MN. L." item is displayed on superior menu level, where required selection is performed

TMP.V.	Temporary projection of selected values

- after confirmation of this selection the item "TM. L." is displayed on superior menu level, where required selection is performed

TARE	Tare function activation
SAVE	Activation of measured data record in instrument memory
C.ME.	Clearing memory

- clearing memory with data measured in modes "FAST" or "RTC"

!

Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

!

Preset values of the control keys DEF:
LEFT   Show Tare
UP   Show Max. value
DOWN   Show Min. value
ENTER   w/o functione

6.1.5b   OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION

I NP.	CLR.	LEFT	FN.L.	NO
CHAN.	CONF.	DOWN	TM.L.	CHA.A
OUT.	RTC	UP		FI LA
SERV.	E.I N.	ENTR.		M.FN.

Keys

MI N.
MAX.
L.1
L.2
L.3
L.4
TI ME
DATE
TARE
P.TAR.
C.J.
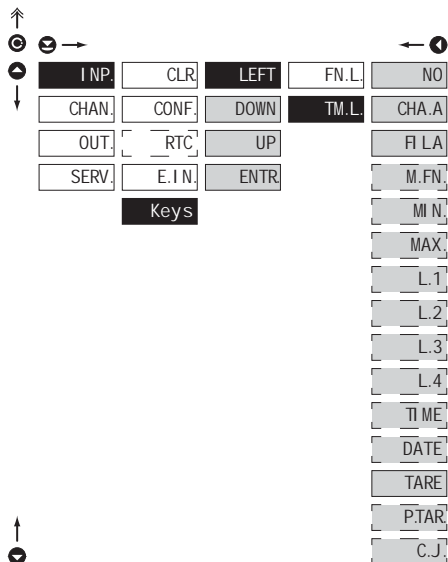
| DO.L. | **Temporary projection of selected item** |

- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing ⊙ + "Selected key", this holds until the stroke of any key

NO	Temporary projection is off
CHA.A	Temporary projection of "Channel A" value
FI LA	Temporary projection of "Channel A" value after processing digital filters
M.FN.	Temporary projection of "Mathematic functions" value
MI N.	Temporary projection of "Min. value"
MAX.	Temporary projection of "Max. value"
L.1	Temporary projection of "Limit 1" value
L.2	Temporary projection of "Limit 2" value
L.3	Temporary projection of "Limit 3" value
L.4	Temporary projection of "Limit 4" value
TI ME	Temporary projection of "TIME" value
DATE	Temporary projection of "DATE" value
TARE	Temporary projection of "TARE" value
P.TAR.	Temporary projection of "P.TAR." value
C.J.	Temporary projection of "CJC" value

!

Setting is identical for LEFT, DOWN, UP and ENTER

6. SETTING **PROFI**

6.1.5c OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - DIRECT ACCESS TO ITEM

I NP.	CLR.	LEFT	FN.L.	L.1
CHAN.	CONF.	DOWN	MN.L.	L.2
OUT.	RTC	UP		L.3
SERV.	E.I N.	ENTR.		L.4
	Keys			H.1

H.2
H.3
H.4
ON1
ON2
ON3
ON4
OF.1
OF.2
OF.3
OF.4
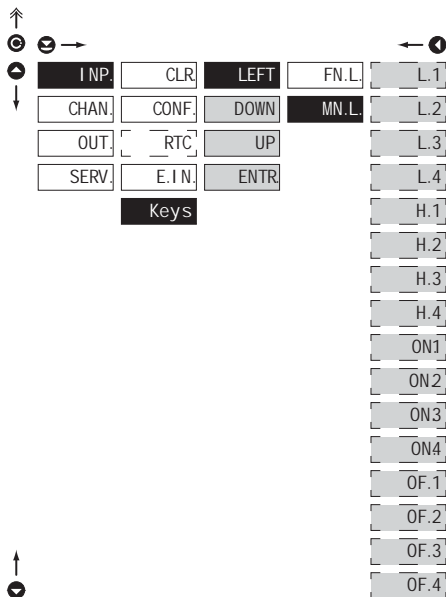
MN.L.	**Assigning access to selected menu item**
L.1	Direct access to item "L. L.1"
L.2	Direct access to item "L. L.2"
L.3	Direct access to item "L. L.3"
L.4	Direct access to item "L. L.4"
H.1	Direct access to item "H. L.1"
H.2	Direct access to item "H. L.2"
H.3	Direct access to item "H. L.3"
H.4	Direct access to item "H. L.4"
ON1	Direct access to item "ON.L.1"
ON2	Direct access to item "ON.L.2"
ON3	Direct access to item "ON.L.3"
ON4	Direct access to item "ON.L.4"
OF.1	Direct access to item "OF.L.1"
OF.2	Direct access to item "OF.L.2"
OF.3	Direct access to item "OF.L.3"
OF.4	Direct access to item "OF.L.4"

!

Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

6. SETTING **PROFI**

6.2 SETTING "PROFI" - CHANNELS

I NP.	CHA.A
CHAN.	MATF.
OUT.	MI MA.
SERV.	
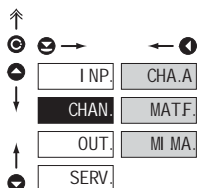
The primary instrument parameters are set in this menu

CHA.A	Setting parameters of measuring "Channel A"
MATF.	Setting parameters of mathematic functions
MI MA.	Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION

DC PM DU OHM

I NP.	CHA.A	SETA	MI NA	0.00
CHAN.	MATF.	FI L.	MAXA	
OUT.	MI MA.	FORA	P.TA	
SERV.		LOGA		
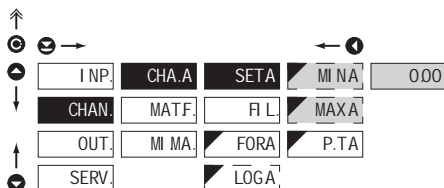
SETA **Setting display projection**

MI NA Setting display projection for minimum value of input signal
- range of the setting: -999...9999
- **DEF** = 0.0

MAXA Setting display projection for maximum value of input signal
- range of the setting: -999...9999
- **DEF** = 100.0

6.2.1b SETTING FIXED TARE

I NP.	CHA.A	SETA	MI NA	0.00
CHAN.	MATF.	FI L.	MAXA	
OUT.	MI MA.	FORA	P.t A	
SERV.		LOGA		
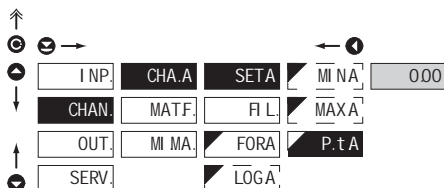
P.TA **Setting "Fixed tare" value**

- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting [**P. TAR. A**≠ 0] is in effect, display does not show the "T" symbol
- range of the setting: -999...9999
- **DEF** = 0.00

6.2.1d | DIGITAL FILTERS

I NP.	CHA.A	SET A	M.FA	NO	DEF
CHAN.	MAT F.	FI L.	C.FA	AVER.
OUT.	MI MA.	FORA		FLOA.
SERV.		LOG A		EXP.
				ROUN.

Input value

Arithmetic average
Constant F.A = 5.0

Floating filter
Constant F.A = 5.0

36 57 68 84 84 68 52 36

Exponential filter
Constant F.A = 5.0

36 49 59 67 74 79 83 86 89 75 64 55 42 38 34 31 29 27
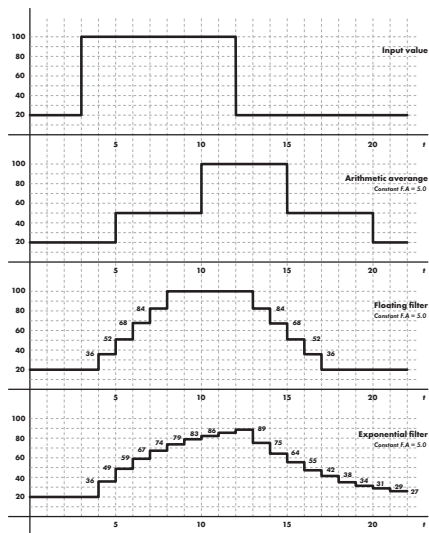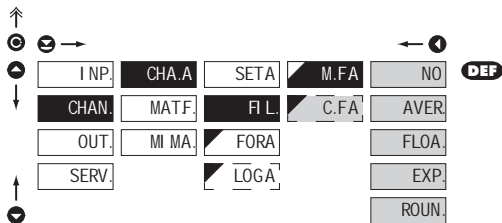
M.FA — Selection of digital filters

- at times it is useful for better user projection of data on display to modify it mathematically and properly , wherefore the following filters may be used

NO — Filters are off

AVER. — Measured data average

- arithmetic average from given number („**C. F.A**") of measured values
- range 2...100

FLOA. — Selection of floating filter

- floating arithmetic average from given number („**C. F.A**") of measured data and updates with each measured value
- range 2...30

EXP. — Selection of exponential filter

- integration filter of first prvniho grade with time constant („**C. F.A**") measurement
- range 2...100

ROUN. — Measured value rounding

- is entered by any number, which determines the projection step (e.g: „**C. F.A**" = 2,5 > display 0, 2.5, 5,...)

C.FA — Setting constants

- this menu item is always displayed after selection of particular type of filter
- **DEF** = 2

6.2.1e PROJECTION FORMAT - POSITIONING OF DECIMAL POINT

I NP.	CHA.A	SET A	0000
CHAN.	MAT.F.	FI L.	000.o
OUT.	MI MA.	FORA	00.oo
SERV.		LOG A	0.ooo
			FL.P.
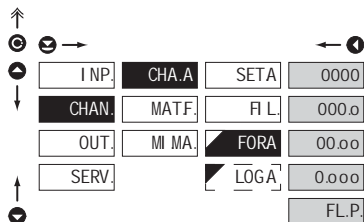
FORA — Selection of decimal point

- the instrument allows for classic projection of a number with positioning of the DP as well as projection with floating DP, allowing to display a number in its most exact form „**FL. P.**"

0000	Setting DP - XXXX

- **DEF** > **T/C**

000.o	Setting DP - XXX.x

- **DEF**

00.oo	Setting DP - XX.xx

0.ooo	Setting DP - X.xxx

FL.P.	Floating DP

6.2.1f SELECTION OF STORING DATA INTO INSTRUMENT MEMORY

I NP.	CHA.A	SET A	SAV A	NO	**DEF**
CHAN.	MAT.F.	FI L.	FR.A	ALL	
OUT.	MI MA.	FORA	TO A	I N	
SERV.		LOG A		OUT	
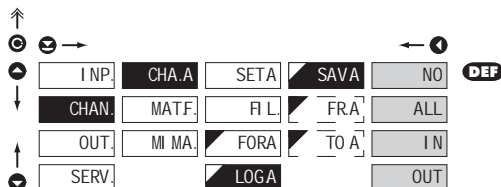
LOG A — Selection of storing data into instrument memory

- by selection in this item you allow to register values into instrument memory
- another setting in item "**OUT. > MEM.**" (not in standard experiment)

NO	Measured data is not stored

ALL	Measured data is stored in memory

I N	Only data measured within the set interval is stored

in memory

OUT	Only data measured outside the set interval is stored

in memory

FR.A	Setting the initial interval value

- range of the setting: -999...9999

TO A	Setting the final interval value

- range of the setting: -999...9999

6.2.2a MATHEMATIC FUNCTIONS

I NP.	CHA.A	MATF.	OFF	DEF
CHAN.	MATF.	CO.A	MUL.	
OUT.	MI MA.	CO.B	1/MU.	
SERV.		CO.C	LOG.	
		CO.D	EXP.	
		CO.E	POV.	
		CO.F	ROOT	
		FORM	SI N	
		LOGM		
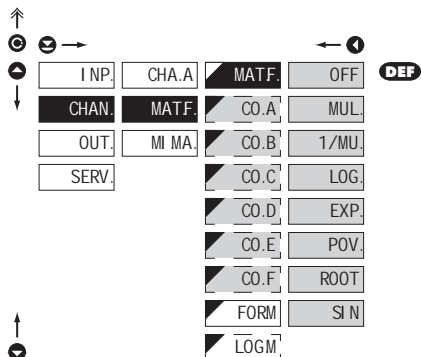
MATF.	**Selection of mathematic functions**

OFF	Mathematic functions are off

MUL.	Multinominal

$$Ax^5 + Bx^4 + Cx^3 + Dx^2 + Ex + F$$

1/MU.	1/x

$$\frac{A}{x^5} + \frac{B}{x^4} + \frac{C}{x^3} + \frac{D}{x^2} + \frac{E}{x} + F$$

LOG.	Logarithm

$$A \times \ln\left(\frac{Bx + C}{Dx + E}\right) + F$$

EXP.	Exponential

$$A \times e^{\left(\frac{Bx+C}{Dx+E}\right)} + F$$

MOC.	Power

$$A \times (Bx + C)^{(Dx+E)} + F$$

ODM.	Root

$$A \times \sqrt{\frac{Bx + C}{Dx + E}} + F$$

SI N	Sin x

$$A\sin^5 x + B\sin^4 x + C\sin^3 x + D\sin^2 x + E\sin x + F$$

CO. -	**Setting constants for calculation of mat. functions**

- this menu is displayed only after selection of given mathematic function

6.2.2b MATHEMATIC FUNCTIONS - DECIMAL POINT

I NP.	CHA.A	MAT.F.	0000
CHAN.	MAT.F.	CO.A	000.o
OUT.	MI MA.	CO.B	00.oo
SERV.		CO.C	0.ooo
		CO.D	FL.P.
		CO.E	
		CO.F	
		FORM	
		LOGM	
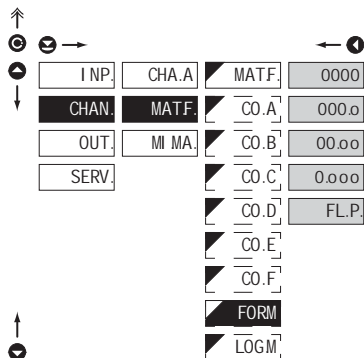
FORM — **Selection of decimal point**

- the instrument allows for classic projection of a number with positioning of the DP as well as projection with floating DP, allowing to display a number in its most exact form „**FL. P.**"

0000	Setting DP - XXXX
000.o	Setting DP - XXX.x
00.oo	Setting DP - XX.xx
0.ooo	Setting DP - X.xxx
FL.P.	Floating DP

- **DEF**

6.2.2c MATHEMATIC FUNCTIONS - SELECTION OF STORING DATA INTO INSTRUMENT MEMORY

I NP.	CHA.A	MAT.F.	SAVM	NO	**DEF**
CHAN.	MAT.F.	CO.A	FR.M	ALL	
OUT.	MI MA.	CO.B	TO M	I N	
SERV.		CO.C		OUT	
		CO.D			
		CO.E			
		CO.F			
		FORM			
		LOGM			
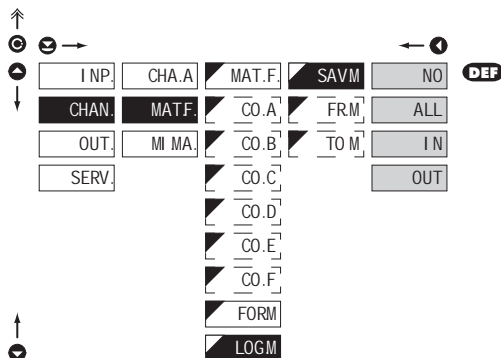
LOGM — **Selection of storing data into instrument memory**

- by selection in this item you allow to register values into instrument memory
- another setting in item "**OUT. > MEM.**" (not in standard experiment)

NO	Measured data is not stored
ALL	Measured data is stored in memory
I N	Only data measured within the set interval is stored in memory
OUT	Only data measured outside the set interval is stored in memory

FR.M	Setting the initial interval value

- range of the setting: -999...9999

TO M	Setting the final interval value

- range of the setting: -999...9999

6.2.3 | SELECTION OF EVALUATION OF MIN/MAX VALUE
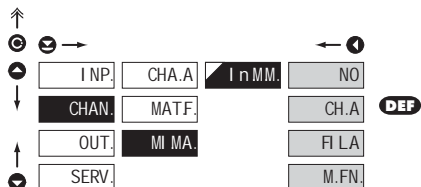
I n MM. | **Selection of evaluation of min/max value**

- selection of value from which the min/max value will be calculated

NO | Evaluation of min/max value is off

CH.A | From "Channel A"

FI LA | From "Channel A" after digital filters processing

M.FN. | From "Mathematic functions"

6.3   SETTING „PROFI" - OUTPUTS
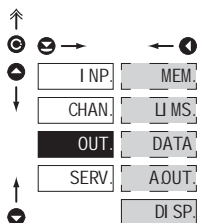
In this menu it is possible to set parameters of the instrument output signals

MEM.	Setting data logging into memory
LI MS.	Setting type and parameters of limits
DATA	Setting type and parameters of data output
A OUT.	Setting type and parameters of analog output
DI SP.	Setting display projection and brightness

6.3.1a   SELECTION OF MODE OF DATA LOGGING INTO INSTRUMENT MEMORY
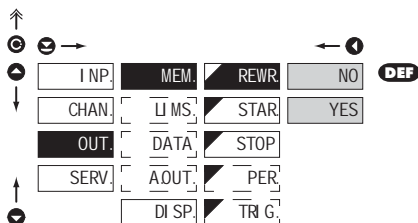
REWR.	**Selection of the mode of data logging**

- selection of the mode in the event of full instrument memory

NO	Rewriting values prohibited
YES	Rewriting values permitted, the oldest get rewritten by the latest

6.3.1b SETTING DATA LOGGING INTO INSTRUMENT MEMORY - RTC

INP.	MEM.	REWR.	HOUR	00
CHAN.	LIMS.	STAR.	MIN.	
OUT.	DATA	STOP	SEC.	
SERV.	AOUT.	PER.		
	DISP.			
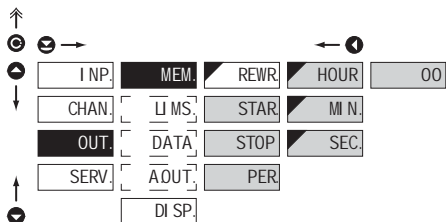
STAR. Start of data logging into instrument memory
- time format HH.MM.SS

STOP Stop data logging into instrument memory
- time format HH.MM.SS

PER. Period of data logging into instrument memory
- determines the period in which values will be logged in an interval delimited by the time set under items **STAR.** and **STOP**
- time format HH.MM.SS
- records are made on a daily basis in selected interval and period
- item not displayed if "**SAVE**" is selected in menu (**INP. > E. IN.**)

RTC

The lowest recording rate possible is once a day, the highest is every second. Under exceptional circumstances it is possible to set the rate to 8 times per second by entering the recording period as 00:00:00. However, this mode is not recommended due to the memory overload. Recordings are realised in a timeframe of one day and are repeated periodically every following day. Recordings can take place either inside or outside of selected time intervals. The duration of re-writing can be determined by the number of channels recorded as well as by the recording rate.

6.3.1c SETTING DATA LOGGING INTO INSTRUMENT MEMORY - FAST

INP.	MEM.	REWR.	3%	DEF
CHAN.	LIMS.	TRIG.		
OUT.	DATA			
SERV.	AOUT.			
	DISP.			
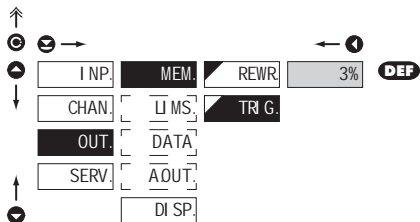
TRIG. Setting logging data into inst. memory
- logging data into inst. memory is governed by the following selection, which determines how many percent of the memory is reserved for data logging prior to initiation of trigger imputse
- initialization is on ext. input or button
- setting in range 1...100 %
- when setting 100 %, datalogging works in the mode **ROLL** > data keep getting rewritten in cycles

1. Memory initialization
- clear memory (ext.input, button)
- LED "M" flashes, after reading TRIGGER (%) memory is permanently shining. In ROLL flashes constantly.

2. Triggering
- external input, button
- after the memory LED is full "M" turns off
- in the ROLL mode the trigger ends datalogging and LED turns off

3 . Termination
- ext. input, button or reading data via RS

FAST

The memory operates on the basis of memory oscilloscope. Select an area of 0...100% of the memory capacity (100% represents 8 192 individual recordings for a single channel measurement). This area is filled cyclically up to the point when the recording starts (activated by the front panel button or by an external input). When the remaining memory capacity fills up the recording stops. A new recording is possible after the deletion of the latest recording. It is possible to abort a recording before its completion by reading out the data.

MODE > HYSTER • FROM - TO - DOSING

DESCRIPTION OF RELAY FUNCTION

OFF • +H/2 • 3 P

LIM • 2,5 P

ON • -H/2 • 2 P

1,5 P

1 P

0,5 P

z - delay "TIM. L."

Dose limit: MODE L. > "DOSE"

axis x > "P" Period

Switch-on relay
TYPE > SWITCH-ON
LED signalization

Switch-off relay
TYPE > SWITCH-OFF
LED signalization

Window limit: MODE L. > "FROM . ."

axis x > "ON L." switch on, "OFF L." switch

Switch-on relay
TYPE > SWITCH-ON
LED signalization

Switch-off relay
TYPE > SWITCH-OFF
LED signalization

Limit - Limit/hysteresis/delay: MODE L. > "HYSTER"

axis x > "LIM. L." limit, "H/2" hysteresi

Z > 0 - Switch-on relay
TYPE > SWITCH-ON
LED signalization

Z < 0 - Switch-on relay
TYPE > SWITCH-OFF
LED signalization

Z > 0 - Switch-off relay
TYPE > SWITCH-ON
LED signalization

Z < 0 - Switch-off relay
TYPE > SWITCH-OFF
LED signalization

6.3.2a SELECTION OF INPUT FOR LIMITS EVALUATION
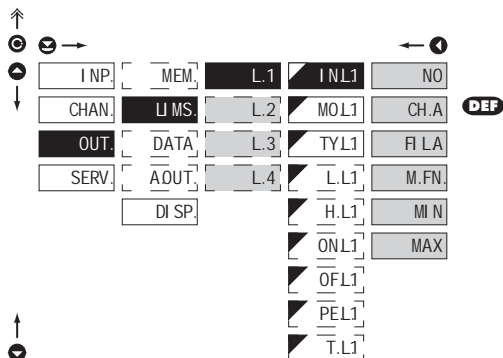
I NL1	**Selection evaluation of limits**

- selection of value from which the limit will be evaluated

NO	Limit evaluation is off

CH.A	Limit evaluation from "Channel A"

FI LA	Limit evaluation from "Channel A" after digital filters processing

M.FN.	Limit evaluation from "Mathematic functions"

MI N.	Limit evaluation from "Min. value"

MAX	Limit evaluation from "Max. value"

!

Setting is identical for L. 1, L. 2, L. 3 and L. 4

6.3.2b SELECTION OF TYPE OF LIMIT
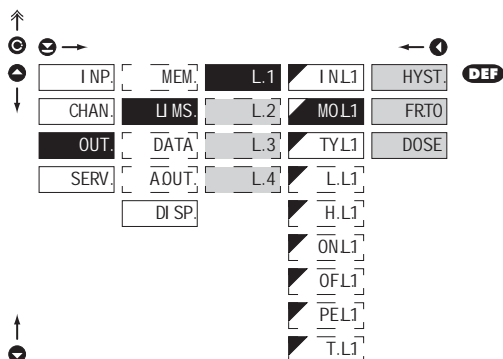
MO L1	**Selection the type of limit**

HYST.	Limit is in mode "Limit, hysteresis, delay"

- for this mode the parameters of "L. L.1" are set, at which the limit will shall react, "H. L.1" the hysteresis range around the limit [LIM ±1/2 HYS] and time "T. L.1" determining the delay of relay switch-on

FRTO	Frame limit

- for this mode the parameters are set for interval "ON.L.1" the relay switch-on and "OF.L.1" the relay switch-off

DOSE	Dose limit (periodic)

- for this mode the parameters are set for "PE.L.1" determining the limit value as well as its multiples at which the output is active and "T. L.2" indicating the time during which is the output active

!

Setting is identical for L. 1, L. 2, L. 3 and L. 4

6.3.2c SELECTION OF TYPE OF OUTPUT
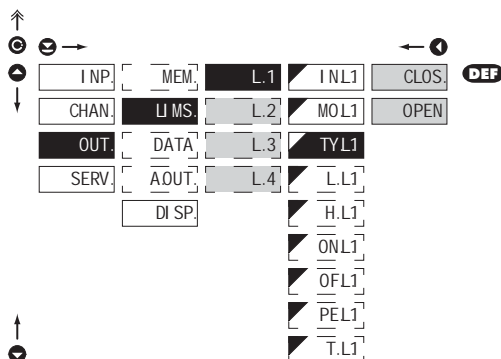
TYL1	**Selection of type of output**

CLOS.	Output switches on when condition is met
OPEN	Output switches off when condition is met

!

Setting is identical for **L. 1**, **L. 2**, **L. 3** and **L. 4**

6.3.2d SETTING VALUES FOR LIMITS EVALUATION
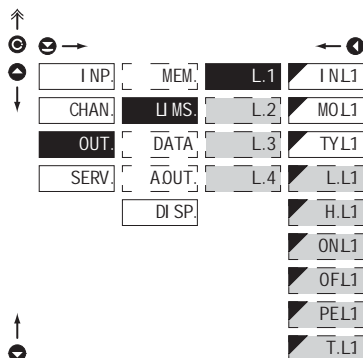
L.L1	Setting limit for switch-on

- for type **"HYST."**

H.L1	Setting hysteresis

- for type **"HYST."**
- indicates the range around the limit (in both directions, LIM. ±1/2 HYS.)

ONL1	Setting the outset of the interval of limit switch-on

- for type **"FR.TO"**

OFL1	Setting the end of the interval of limit switch-on

- for type **"FR.TO"**

PEL1	Setting the period of limit switch-on

- for type **"DOSE"**

T.L1	Setting the time switch-on of the limit

- for types **"HYST."** and **"DOSE"**
- setting within the range: ±0...99,9 s
- positive time > relay switches on after crossing the limit (**L. L1**) and the set time (**T. L1**)
- negative time > relay switches off after crossing the limit (**L. L1**) and the set negative time (**T. L1**)

!

Setting is identical for **L. 1**, **L. 2**, **L. 3** and **L. 4**

6.3.3a SELECTION OF DATA OUTPUT BAUD RATE

I NP.	MEM.	BAUD	06
CHAN.	LI MS.	ADR.	12
OUT.	DATA	A.MB.	24
SERV.	AOUT.	A.PB.	48
	DI SP.	PROT.	96 **DEF**
			192
			384
			576
			1152
			2304
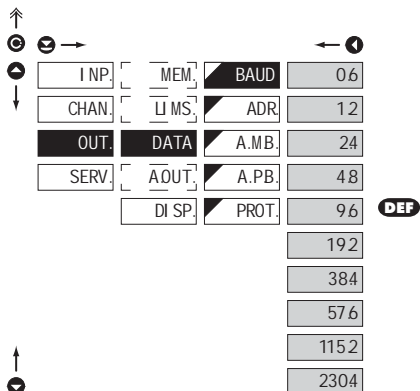
BAUD	Selection of data output baud rate
06	Rate - 600 Baud
12	Rate - 1 200 Baud
24	Rate - 2 400 Baud
48	Rate - 4 800 Baud
96	Rate - 9 600 Baud
192	Rate - 19 200 Baud
384	Rate - 38 400 Baud
576	Rate - 57 600 Baud
1152	Rate - 115 200 Baud
2304	Rate - 230 400 Baud

6.3.3b SETTING INSTRUMENT ADDRESS

I NP.	MEM.	BAUD	0
CHAN.	LI MS.	ADR.	
OUT.	DATA	A.MB.	
SERV.	AOUT.	A.PB.	
	DI SP.	PROT.	
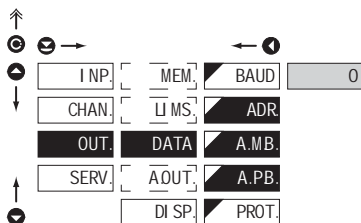
ADR.	Setting instrument address
	- setting in range: 0…31
	- **DEF** = 00

A.MB.	Setting instrument address - MODBUS
	- setting in range: 1…247
	- **DEF** = 01

A.PB.	Setting instrument address - PROFIBUS
	- setting in range: 1…127
	- **DEF** = 19

6.3.3c SELECTION OF DATA OUTPUT PROTOCOL

I NP.	MEM.	BAUD	ASCI .	**DEF**
CHAN.	LI MS.	ADR.	MBUS	
OUT.	DATA	A.M.B.	MODB.	
SERV.	A.OUT.	A.P.B.		
	DI SP.	PROT.		

PROT.	**Selection of data output protocol**
ASCI .	Data protocol ASCII
MBUS	Data protocol DIN MessBus
MODB.	Data protocol MODBUS - RTU

- option is available only for RS 485

6.3.4a SELECTION OF INPUT FOR ANALOG OUTPUT

I NP.	MEM.	I NA.O.	NO	
CHAN.	LI MS.	TY A.O.	CH.A	**DEF**
OUT.	DATA	MI A.O.	FI LA	
SERV.	A.OUT.	MA A.O.	MAT.F.	
	DI SP.		MI N	
			MAX	

I NA.O.	**Selection evaluation analog output**

- selection of value from which the analog output will be evaluated

NO	AO evaluation is off
CH.A	AO evaluation from "Channel A"
FI LA	AO evaluation from "Channel A" after digital filters processing
MAT.F.	AO evaluation from "Math. functions"
MI N	AO evaluation from "Min. value"
MAX	AO evaluation from "Max. value"

6.3.4b SELECTION OF THE TYPE OF ANALOG OUTPUT

I NP.	MEM.	I N A.O.	0-20
CHAN.	LI MS.	TYA.O.	Er4T
OUT.	DATA	MI A.O.	4-2T
SERV.	A.OUT.	MA A.O.	Er.4
	DI SP.		4-20 **DEF**
			i 0-5
			u0-2
			u0-5
			0-10
			+-10
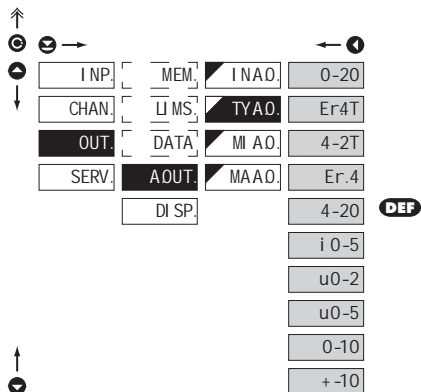
TYA.O. Selection of the type of analog output

0-20 Type: 0…20 mA

Er4T Type: 4…20 mA with indication

- with broken loop detection and indication of error statement [< 3,6 mA]

4-2T Type: 4…20 mA with indication

- with broken loop detection [< 3,6 mA]

Er.4 Type: 4…20 mA with indication

- with indic. of error statement [< 3,6 mA]

4-20 Type: 4…20 mA

i 0-5 Type: 0…5 mA

u0-2 Type: 0…2 V

u0-5 Type: 0…5 V

0-10 Type: 0…10 V

+-10 Type: ±10 V

6.3.4c SETTING THE ANALOG OUTPUT RANGE

I NP.	MEM.	I N A.O.	0.0
CHAN.	LI MS.	TYA.O.	
OUT.	DATA	MI A.O.	
SERV.	A.OUT.	MA A.O.	
	DI SP.		
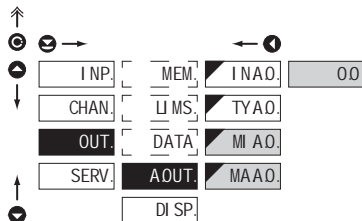
A.OUT. Setting the analog output range

- analog output is isolated and its value corresponds with displayed data. It is fully programmable, i.e. it allows to assign the AO limit points to two arbitrary points of the entire measuring range

MI A.O. Assigning the display value to the beginning of the AO range

- range of the setting: -999…9999
- **DEF** = 0

MA A.O. Assigning the display value to the end of the AO range

- range of the setting: -999…9999
- **DEF** = 100

6. SETTING **PROFI**

I NP.	MEM.	**TRV.**	CH.A	**DEF**
CHAN.	LI MS.	BARO	FI LA	
OUT.	DATA	D.L1	MAT.F.	
SERV.	A.OUT.	BAR1	MI N	
	DI SP.	D.L2	MAX	
		BAR2		
		BRI G.		
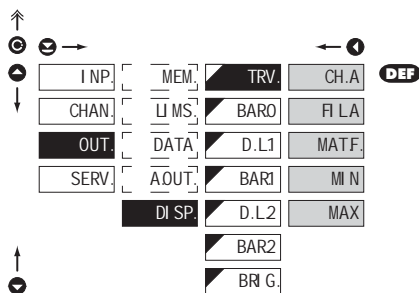
TRV. — **Selection display projection**

- selection of value which will be shown on the instrument display

CH.A — Projection of values from "Channel A"

FI LA — Projection of values from "Channel A" after digital filters processing

MAT.F. — Projection of values from "Math. functions"

MI N — Projection of values from "Min. value"

MAX — Projection of values from "Max. value"

I NP.	MEM.	**TRV.**	RED
CHAN.	LI MS.	**BARO**	GRN.
OUT.	DATA	D.L1	ORAN.
SERV.	A.OUT.	**BAR1**	
	DI SP.	D.L2	
		BAR2	
		BRI G.	
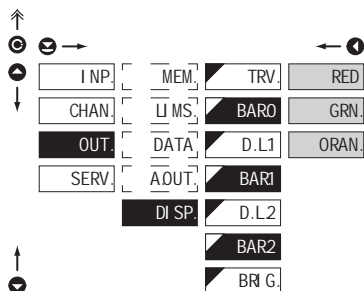
BAR.- — **Selection of display color**

- selection of color is governed by setting under items "d. L.1" and "d. L.2"

RED — Red color

GRN. — Green color

ORAn. — Orange color

- "BAr.0" **DEF** = Green
- "BAr.1" **DEF** = Orange
- "BAr.2" **DEF** = Red

6.3.5c | SELECTION OF DISPLAY COLOR CHANGE

I NP.	MEM.	TRV.	3333
CHAN.	LI MS.	BAR0	
OUT.	DATA	D.L1	
SERV.	A.OUT.	BAR1	
	DI SP.	D.L2	
		BAR2	
		BRI G.	
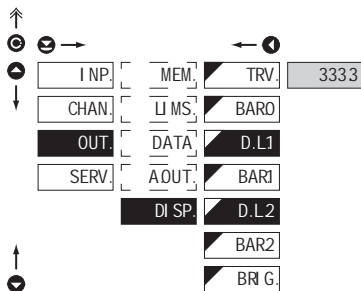
d L.- — Selection of display color change

- under items "**d. L.1**" and "**d. L.2**" the limit is set at which the display color changes

- "**d. L.1**" **DEF** = 333.3
- "**d. L.2**" **DEF** = 666.7

6.3.5d | SELECTION OF DISPLAY BRIGHTNESS

I NP.	MEM.	TRV.	100% **DEF**
CHAN.	LI MS.	BAR0	75%
OUT.	DATA	D.L1	50%
SERV.	A.OUT.	BAR1	25%
	DI SP.	D.L2	0%
		BAR2	
		BRI G.	
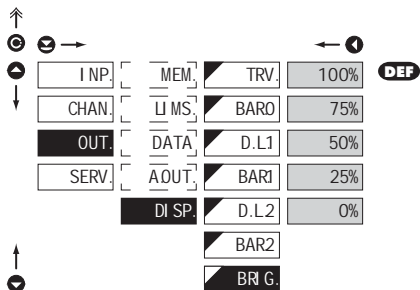
BRI G. — Selection of display brightness

- by selecting display brightness we may appropriately react to light conditions in place of instrument location

0% — Display is off

- after keystroke display turns on for 10 s

25% — Display brightness - 25 %

50% — Display brightness - 50 %

75% — Display brightness - 75 %

100% — Display brightness - 100 %

6.4   SETTING "PROFI" - SERVIS
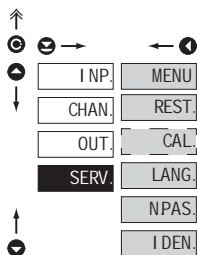
The instrument service functions are set in this menu

MENU	Selection of menu type LIGHT/PROFI
REST.	Restore instrument manufacture setting and calibration
CAL.	Input range calibration for „DU" version
LANG.	Language version of instrument menu
NPAS.	Setting new access password
IDEN.	Instrument identification

6.4.1   SELECTION OF TYPE OF PROGRAMMING MENU
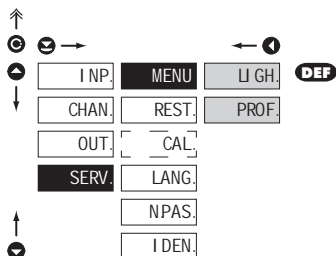
MENU   **Selection of menu type - LIGHT/PROFI**

- enables setting the menu complexity according to user needs and skills

LIGH.   Active LIGHT menu

- simple programming menu, contains only items necessary for configuration and instrument setting
- linear menu > items one after another

PROF.   Active PROFI menu

- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

| 6.4.2 | RESTORATION OF MANUFACTURE SETTING |

I NP.	MENU	RE.CA.	YES
CHAN.	REST.	RE.SE.	
OUT.	CAL.	SAVE	
SERV.	LANG.		
	N.PAS.		
	I DEN.		

I NP.	MENU	RE.CA.	TYPE
CHAN.	REST.	RE.SE.	USER
OUT.	CAL.	SAVE	
SERV.	LANG.		
	N.PAS.		
	I DEN.		
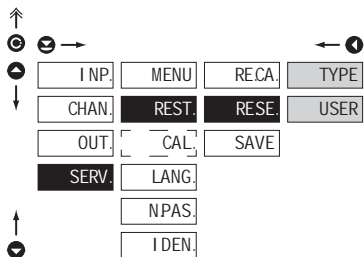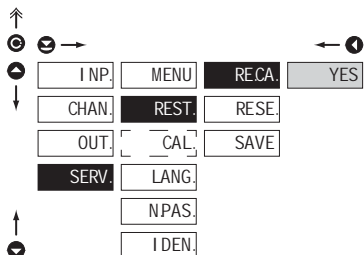
REST. Restoration of manufacture setting

- in the event of error setting or calibration, manufacture setting may be restored

RE.CA. Restoration of manufacture calibration of the instrument

- prior executing the changes you will be asked to confirm you selection „YES"

RE.SE. Restoration of instrument manufacture setting

TYPE Restoration of instrument manufacture setting

- generating the manufacture setting for currently selected type of instrument (items marked **DEF**)

USER Restoration of instrument user setting

- generating the instrument user setting, i.e. setting stored under **SERV./REST./SAVE**

SAVE Save instrument user setting

- storing the user setting allows the operator to restore it in future if needed

!

After restoration the instrument switches off for couple seconds

JOBS PERFORMED	RESTORE	
	CALIBRATION	SETTING
cancels USER menu rights	✓	✓
deletes table of items order in USER - LIGHT menu	✓	✓
adds items from manufcture to LIGHT menu	✓	✓
deletes data stored in FLASH	✓	✓
cancels or linearization tables	✓	✓
clears tare	✓	✓
restore manufacture calibration	✓	✗
restore manufacture setting	✗	✓

6.4.3 CALIBRATION - INPUT RANGE   DU

| INP. | MENU | C.MI. | YES |
CHAN.	REST.	C.MA.	
OUT.	CAL.		
SERV.	LANG.		
	NPAS.		
	IDEN.		
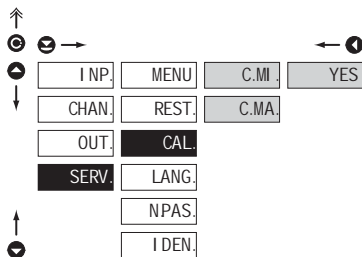
CAL. **Input range calibration**

- when "**C. MI.**" is displayed, move the potentiometer traveller to the required minimum position and confirm by „Enter", calibration is confirmed by "**YES**"
- when "**C. MA.**" is displayed, move the potentiometer traveller to required maximum position and confirm by „Enter", calibration is confirmed by "**YES**"

6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION

INP.	MENU	CZE.
CHAN.	REST.	ENGL.	DEF
OUT.	CAL.	
SERV.	LANG.	
	NPAS.	
	IDEN.	
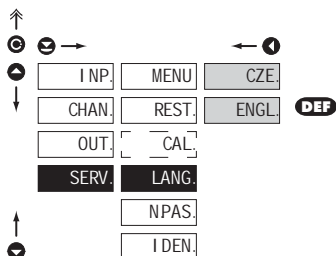
LANG. **Selection of instrument menu language version**

CZE. Instrument menu is in Czech

ENGL. Instrument menu is in English

6.4.5 SETTING NEW ACCESS PASSWORD

INP.	MENU	PA.LI.	0
CHAN.	REST.	PA.PR.	
OUT.	CAL.		
SERV.	LANG.		
	NPAS.		
	IDEN.		
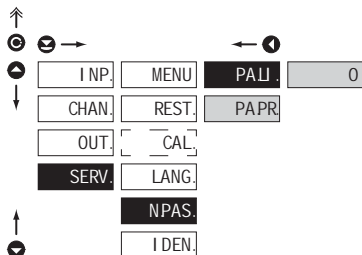
NPAS. **Setting new password for access to LIGHT and PROFI menu**

- this option allows to change the numeric code, which blocks the access into **LIGHT** and **PROFI** menu.
- numerci code range: 0...9999
- universal passwords in the event of loss:
  LIGHT Menu > „8177"
  PROFI Menu > „7915"

| 6.4.6 | INSTRUMENT IDENTIFICATION |

I NP.	MENU	OM 402UNI 20	78-001		PM
CHAN.	REST.				
OUT.	CAL.				
SERV.	LANG.				
	NPAS.				
	I DEN.				
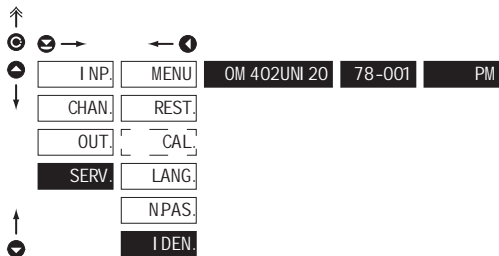
I DEN. **Projection of instrument SW version**

- display shows type identification of the instrument, SW number, SW version and current input setting (Mode)
- if the SW version reads a letter on first position, it is a customer SW

	Pos.	Description
IDEN.	1.	type of instrument
	2.	SW: number - version
	3.	the input type

SETTING
USER

For user operation
Menu items are set by the user (Profi/Light) as per request
Access is not password protected
Optional menu structure either tree (PROFI) or linear (LIGHT)

7.0	SETTING ITEMS INTO "USER" MENU

- **USER** menu is designed for users who need to change only several items of the setting without the option to change the primary instrument setting (e.g. repeated change of limit setting)
- there are no items from manufacture permitted in **USER** menu
- on items indicated by inverse triangle ▰ L.1
- setting may be performed in **LIGHT** or **PROFI** menu, with the **USER** menu then overtaking the given menu structure

Setting

flashing legend - current setting is displayed
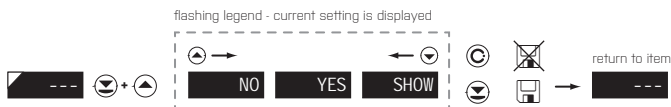
NO	item will not be displayed in USER menu
YES	item will be displayed in USER menu with editing option
SHOW	item will be solely displayed in USER menu

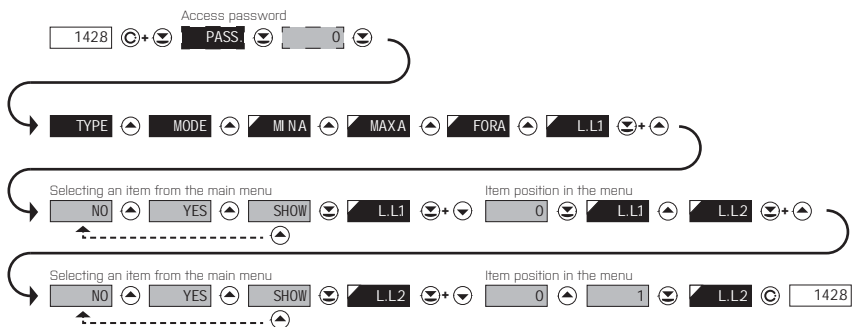**Setting sequence of items in "USER" menu**

In compiling USER menu from active LIGHT menu the items (max. 10) may be assigned a sequence, in which they will be projected in the menu

nastavení pořadí zobrazení

`---` 😑 + 😑 `0`

Example of ranking the order of menu items in the "USER" menu

In this example we want to have a direct access to menu items Limit 1 and Limit 2 (example show is for the Light menu, but can equaly be used in the Profi menu).

Access password

`1428` © + 😑 PASS. 😑 `0` 😑

TYPE 🔼 MODE 🔼 MIN A 🔼 MAX A 🔼 FOR A 🔼 L.L1 😑 + 🔼

Selecting an item from the main menu   Item position in the menu

NO 🔼 YES 🔼 SHOW 😑 L.L1 😑 + 😑 `0` 😑 L.L1 🔼 L.L2 😑 + 🔼

Selecting an item from the main menu   Item position in the menu

NO 🔼 YES 🔼 SHOW 😑 L.L2 😑 + 😑 `0` 🔼 `1` 😑 L.L2 © `1428`

The result of this setting is that when the © button is pressed, the display will read „L. L.1". By pressing 😑 button you confirm your selection and then you can set the desired limit value, or by pressing the 🔼 button you can go to setting of „L. L.2" where you can proceed identically as with Limit one.

You can exit the setting by pressing the 😑 button by which you store the latest setting and pressing the © button will take you back to the measuring mode

Instrument with input for temperature measurement with thermocouple allows to set two types of measurement of cold junction.

Measuring thermocouple

Reference thermocouple
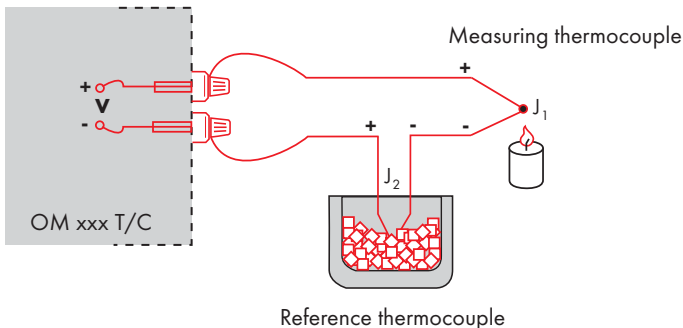
WITH REFERENCE THERMOCOUPLE

– a reference thermocouple may be located in the same place as the measuring instrument or in place with stable temperature/compensation box

– when measuring with reference thermocouple set CON.in the instrument menu to INT2 or EXT2

– when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu C.J. its temperature (applies for setting CON. to EXT2)

– if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CON. to INT2 Based on this selection the measurement of the ambient temperatureis performed by a sensor located in the instrument terminal board

WITHOUT REFERENCE THERMOCOUPLE

– inaccuracy originating from the creation of dissimilar thermocouples on the transition point terminal/conductor of the thermocouple is not compensated for in the instrument

– when measuring without reference thermocouple set CON. in the instrument menu to INT1 or EXT1

– when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CON. to EXT1)

ERROR	CAUSE	ELIMINATION
d.Un.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
d.Ow.	Number is too large to be displayed	change DP setting, channel constant setting
t.Un.	Number is outside the table range	increase table values, change input setting (channel constant setting)
t.Ow.	Number is outside the table range	increase table values, change input setting (channel constant setting)
I .Un.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
I .Ow.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.Hw.	A part of the instrument does not work properly	send the instrument for repair
E.EE	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.SE.	Data in EEPROM outside the range	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.CL.	Memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
E.OU.	Analogue output current loop disconnected	check wire connection

10. DATA PROTOCOL

The instruments communicate via serial line RS232 or RS485. For communication they use the ASCII protocol. Communication runs in the following format:

ASCII: 8 bit, no parity, one stop bit
DIN MessBus: 7 bit, even parity, one stop bit

The transfer rate is adjustable in the instrument menu. The instrument address is set in the instrument menu in the range of 0 ÷ 31. The manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232 / RS485 - is determined by an output board automatically identified by the instrument.

The commands are described in specifications you can find at www.orbit.merret.cz or SW OM link.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

EVENT	TYPE	PROTOCOL	TRANSMITTED DATA													
Data solicitation (PC)	232	ASCII	#	A	A	<CR>										
		MessBus	No - data is transmitted permanently													
	485	ASCII	#	A	A	<CR>										
		MessBus	<SADR>	<ENQ>												
Data transmission (instrument)	232	ASCII	>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus	<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
	485	ASCII	>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus	<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
Confirmation of data acceptannce (PC) - OK	485	MessBus	<DLE>	1												
Confirmation of data acceptance (PC) - Bad			<NAK>													
Sending address (PC) prior command			<EADR>	<ENQ>												
Confirmation of address (instrument)			<SADR>	<ENQ>												
Command transmission (PC)	232	ASCII	#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus	<STX>	S	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
	485	ASCII	#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus	<STX>	S	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
Command confirmation (instrument)	232	ASCII OK	!	A	A	<CR>										
		ASCII Bad	?	A	A	<CR>										
		Messbus	No - data is transmitted permanently													
	485	ASCII OK	!	A	A	<CR>										
		ASCII Bad	?	A	A	<CR>										
		Mess-Bus OK	<DLE>	1												
		Mess-Bus Bad	<NAK>													
Instrument identification			#	A	A	1	Y	<CR>								
HW identification			#	A	A	1	Z	<CR>								
One-time transmission			#	A	A	7	X	<CR>								
Repeated transmission			#	A	A	8	X	<CR>								

LEGEND

SING	RANGE		DESCRIPTION
#	35	23$_H$	Command beginning
A A	0...31		Two characters of instrument address (sent in ASCII - tens and units, e.g. "01", "99" universal
<CR>	13	0D$_H$	Carriage return
<SP>	32	20$_H$	Space
N, P			Number and command - command code
D			Data - usually characters "0"..."9", "-", "."; (D) - dp. and (-) may prolong data
R	30$_H$...3F$_H$		Relay and tare status
!	33	21$_H$	Positive confirmation of command (ok)
?	63	3F$_H$	Negative confirmation of command (point)
>	62	3E$_H$	Beginning of transmitted data
<STX>	2	02$_H$	Beginning of text
<ETX>	3	03$_H$	End of text
<SADR>	adresa +60$_H$		Prompt to send from address
<EADR>	adresa +40$_H$		Prompt to accept command at address
<ENQ>	5	05$_H$	Terminate address
<DLE>1	16 49	10$_H$ 31$_H$	Confirm correct statement
<NAK>	21	15$_H$	Confirm error statement
<BCC>			Check sum -XOR

RELAY, TARE

SIGN	RELAY 1	RELAY 2	TARE	CHANGE RELAY 3/4
P	0	0	0	0
Q	1	0	0	0
R	0	1	0	0
S	1	1	0	0
T	0	0	1	0
U	1	0	1	0
V	0	1	1	0
W	1	1	1	0
p	0	0	0	1
q	1	0	0	1
r	0	1	0	1
s	1	1	0	1
t	0	0	1	1
u	1	0	1	1
v	0	1	1	1
w	1	1	1	1

Relay status is generated by command #AA6X <CR>.

The instrument immediately returns the value in the format >HH <CR>, where HH is value in HEX format and range 00$_H$...FF$_H$. The lowest bit stands for „Relay 1", the highest for „Relay 8"

INPUT

range is adjustbale			**DC**
	±60 mV	>100 MΩ	Input U
	±150 mV	>100 MΩ	Input U
	±300 mV	>100 MΩ	Input U
	±1200 mV	>100 MΩ	Input U

range is adjustbale			**DC - option "A"**
	±0,1 A	< 300 mV	Input I
	±0,25 A	< 300 mV	Input I
	±0,5 A	< 300 mV	Input I
	±1 A	< 30 mV	Input I
	±5 A	< 150 mV	Input I
	±100 V	20 MΩ	Input U
	±250 V	20 MΩ	Input U
	±500 V	20 MΩ	Input U

range is adjustbale			**PM**
	0/4...20 mA	< 400 mV	Input I
	±2 V	1 MΩ	Input U
	±5 V	1 MΩ	Input U
	±10 V	1 MΩ	Input U
	±40 V	1 MΩ	Input U

range is adjustbale		**OHM**
	0...100 Ω	
	0...1 kΩ	
	0...10 kΩ	
	0...100 kΩ	
	Autorange	
Connection:	2, 3 or 4 wire	

		RTD
Pt xxxx	-200°...850°C	
Pt xxxx/3910 ppm	-200°...1 100°C	
Ni xxxx	-50°..250°C	
Cu/4260 ppm	-50°...200°C	
Cu/4280 ppm	-200°...200°C	
Type Pt:	EU > 100/500/1 000 Ω, with 3 850 ppm/°C	
	US > 100 Ω, with 3 920 ppm/°C	
	RU > 50/100 Ω, with 3 910 ppm/°C	
Type Ni:	Ni 1 000/ Ni 10 000 with 5 000/6 180 ppm/°C	
Type Cu:	Cu 50/Cu 100 with 4 260/4 280 ppm/°C	
Connection:	2, 3 or 4 wire	

range is adjustbale in configuration menu		**T/C**
Type:	J (Fe-CuNi)	-200°...900°C
	K (NiCr-Ni)	-200°...1 300°C
	T (Cu-CuNi)	-200°...400°C
	E (NiCr-CuNi)	-200°...690°C
	B (PtRh30-PtRh6)	300°...1 820°C
	S (PtRh10-Pt)	-50°...1 760°C
	R (Pt13Rh-Pt)	-50°...1 740°C
	N (Omegalloy)	-200°...1 300°C
	L (Fe-CuNi)	-200°...900°C

		DU
Voltage of lin. pot.	2,5 VDC/6 mA	
	min. potentiometer resistance is 500 Ω	

PROJECTION

Display:	9999, intensive red/green/orange
	7 segment LED, digit height 14 mm
Projection:	-999...9999
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

TC:	50 ppm/°C	
Accuracy:	±0,1% of range + 1 digit	
	±0,15 % of range + 1 digit	**RTD, T/C**
	Above accuracies apply for projection 9999	
Resolution:	0,01°/0,1°/1°	**RTD**
Rate:	0,1...40 measurements/s**	
Overload capacity:	10x (t < 100 ms) not for 500 V and 5 A,	
	2x (long-term)	
Linearisation:	by linear interpolation in 50 points	
	- solely via OM Link	
Digital filters:	Averaging, Floating average, Exponential filter,	
	Rounding	
Comp. of conduct:	max. 40 Ω/100 Ω	**RTD**
Comp. of cold junc.:	adjustable	**T/C**
	0°...99°C or automatic	
Functions:	Tare - display resetting	
	Hold - stop measuring (at contact)	
	Lock - control key locking	
	MM - min/max value	
	Mathematic functions	
OM Link:	company communication interface for setting,	
	operation and update of instrument SW	
Watch-dog:	reset after 400 ms	
Calibration:	at 25°C and 40 % of r.h.	

COMPARATOR

Type:	digital, adjustable in menu
Mode:	Hysteresis, From, Dosing
Limita:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A)
	(230 VAC/30 VDC, 3 A)*
	2x relays with switch-off contact (Form C)
	(230 VAC/50 VDC, 3 A)*
	2x SSR (250 VAC/ 1 A)*
	2x/4x open collector (30 VDC/100 mA)
	2x bistabil relays (250 VAC/250 VDC, 3 A/0,3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

* values apply for resistance load

DATA OUTPUTS

Protocols:	ASCII, DIN MessBus, MODBUS, PROBUS
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, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)
PROFIBUS	Data protocol SIEMENS

ANALOG OUTPUTS

Type:	isolated, programmable with 12 bits D/A convertor, analogoutput corresponds with displayed data, type and range are adjustable
Non-linearity:	0,1% of range
TC:	15 ppm/°C
Rate:	response to change of value < 1 ms
Voltage:	0…2 V/5 V/10 V/±10 V
Curernt:	0…5/20 mA/4…20 mA
	- compensation of conduct to 500 Ω/12 V or 1 000 Ω/24 V

MEASURED DATA RECORD

Type RTC:	time-controlled logging of measured data into instrument memory, allows to log up to 250 000 values
Type FAST:	fast data logging into instrument memory, allows to log up to 8 000 values at a rate of 40 records/s
Transmission:	via data output RS 232/485 or via OM Link

EXCITATION

Adjustbale:	5…24 VDC/max. 1,2 W, isolated

POWER SUPPLY

Options:	10…30 V AC/DC, max. 13,5 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 4000 mA)
	80…250 V AC/DC, max. 13,5 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 630 mA)

MECHANIC PROPERTIES

Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	96 x 48 x 120 mm
Panel cut-out:	90,5 x 45 mm

OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section < 1,5 mm² /< 2,5 mm²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°…60°C
Storage temp.:	-20°…85°C
Cover:	IP64 (front panel only)
Construction:	safety class I
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 supply and data/analog output
Overvoltage cat.:	EN 61010-1, A2
Insulation resist.:	for pollution degree II, measurement cat. III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61326-1
Seismic resistance:	IEC 980: 1993, par. 6

**Table of rate of measurement in relation to number of inputs

Channels/Rate	40	20	10	5	2	1	0,5	0,2	0,1
No.of channels: 1 [Type: DC, PM, DU]	40,00	20,00	10,00	5,00	2,00	1,00	0,50	0,20	0,10
No.of channels: 2	5,00	2,50	1,25	1,00	0,62	0,38	0,22	0,09	0,05
No.of channels: 3	3,33	1,66	0,83	0,66	0,42	0,26	0,14	0,06	0,03
No.of channels: 4	2,50	1,25	0,62	0,50	0,31	0,19	0,11	0,05	0,02
No.of channels: 1 [Type: OHM, RTD, T/C]	5,00	2,50	1,25	1,00	0,62	0,38	0,22	0,09	0,05
No.of channels: 2	3,33	1,066	0,83	0,66	0,42	0,26	0,14	0,06	0,03
No.of channels: 3	2,50	1,25	0,62	0,50	0,31	0,19	0,11	0,05	0,02
No.of channels: 4	2,00	1,00	0,50	0,40	0,25	0,15	0,08	0,04	0,02

PI - Primary insulation, DI - Double insulation

Front view

96 mm

48 mm

3 9 5.0

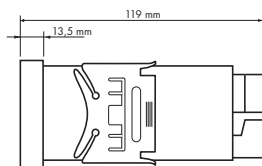1   2   T

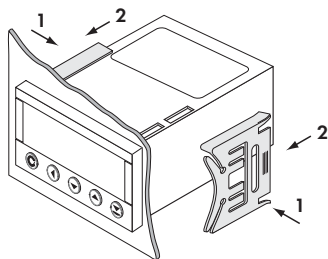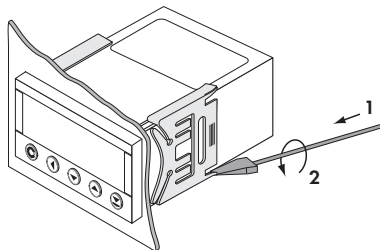**Panel cut**

90,5 mm

45 mm

Side view

119 mm

13,5 mm
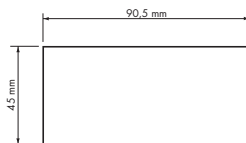
Panel thickness: 0,5...20 mm

INSTRUMENT INSTALLATION

1. insert the instrument into the panel cut-out
2. fit both travellers on the box
3. press the travellers close to the panel

INSTRUMENT DISASSEMBLY

1. slide a screw driver under the traveller wing
2. turn the screw driver and remove the traveller
3. take the instrument out of the panel

Product   **OM 402UNI**   **A**

Type   . . . .
Manufacturing No.   . . . .
Date of sale   . . . .

A guarantee period of 60 months from the date of sale to the user applies to this instrument.
Defects occuring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

For quality, function and construction of the instrument the guarantee shall apply provided that the instrument was connected and used in compliance with the instructions for use.

The guarantee shall not apply to defects caused by:

- mechanic damage
- transportation
- intervention of unqualified person incl. the user
- unavoidable event
- other unprofessional interventions

The manufacturer performs guarantee and post.guarantee repairs unless provided for otherwise.

Stamp, signature

ES DECLARATION OF CONFORMITY

Company: **ORBIT MERRET, spol. s r.o.**
Klánova 81/141, 142 00 Prague 4, Czech Republic, IDNo.: 00551309

Manufactured: **ORBIT MERRET, spol. s r.o.**
Vodňanská 675/30, 198 00 Prague 9, Czech Republic

declares at its explicit responsibility that the product presented hereunder meets all technical requirements, is safe for use when utilised under the terms and conditions determined by ORBIT MERRET, spol.s r.o. and that our company has taken all measures to ensure conformity of all products of the types referred-to hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant Czech statutory orders.

Product: Programmable panel instrument

Type   **OM 402**

Version: UNI, PWR

Thas been designed and manufactured in line with requirements of:

Statutory order no. 17/2003 Coll., on low-voltage electrical equipment (directive no. 73/23/EHS)
Statutory order no. 616/2006 Coll., on electromagnetic compatibility (directive no. 2004/108/EHS)

The product qualities are in conformity with harmonized standard:

El. safety: EN 61010-1
EMC: EN 61326-1
Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"
EN 50131-1, chap. 14 and chap. 15, EN 50130-4, chap. 7, EN 50130-4, chap. 8, (EN 61000-4-11, ed. 2),
EN 50130-4, chap. 9 (EN 61000-4-2), EN 50130-4, chap. 10, (EN 61000-4-3, ed. 2), EN 50130-4, chap. 11 (EN 61000-4-6),
EN 50130-4, chap. 12, (EN 61000-4-4, ed. 2), EN 50130-4, chap. 13 (EN 61000-4-5), EN 61000-4-8, EN 61000-4-9,
EN 61000-6-1, EN 61000-6-2, EN 55022, chap. 5 and chap. 6

Seismic resistance: IEC 980: 1993, par. 6

The product is furnished with CE label issued in 2006

As documentation serve the protocoles of authorized and accredited organizations:

EMC   MO CR, Testing institute of technical devices, protocol no. 80/6-46/2006 of 03/03/2006
MO CR, Testing institute of technical devices, protocol no. EMI.80/6-333/2006 of 15/01/2007
Seismic resistance   VOP-026 Stemberk, protocol no.: 6430-16/2007 of 07/02/2007

Place and date of issue: Prague, 19. Juli 2010   Miroslav Hackl
Company representative

Assessment of conformity pursuant to §22 of Act no. 22/1997 Coll. and changes as amended by Act no.71/2000 Coll. and 205/2002 Coll