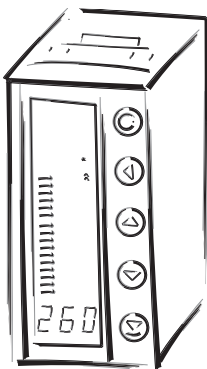# OMB 412UNI

4 DIGIT PROGRAMMABLE
UNIVERSAL BARGRAPH

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 OMB 412 series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

The instruments are up to the following European tandards:
EN 55 022, class B
EN 61000-4-2, -4, -5, -6, -8, -9, -10, -11

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.

2.1 Description

The OMB 412 model series are 24 LED, 3-colour panel programmable vertical bargraph designed for maximum efficiency and user comfort while maintaining their favourable price.

Type OMB 412UNI is a multifunction bargraph with the option of configuration for 7 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.

The OMB 412 is a multifunction instrument available in following types and ranges

type 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
RTD-Pt: Pt 50/100/Pt 500/Pt 1 000
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)

type UNI, option A
DC: 0...1 A/0...5 A/120 V/±250 V/±500 V

type UNI, option B (expansion by 3 more inputs)
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: 24-segment LED 3-color bargraph + 3-digit display -99...999

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
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.cz) 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.

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...0,1/1/10/100 kΩ/Auto	
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	
DU	Linear potentiometer (min. 500 Ω)	

OPTION "A"

Type	Input I	Input U
DC	±0,1 A/±0,25 A/±0,5 A 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

C 3   **E 3**   **C 4**   **E 4**

Open collectors

SSR

L3   **L4**

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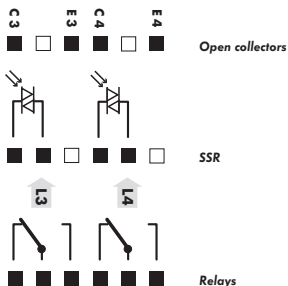
!
Excitation has the minus pole common with the input - the bracket no. 20 - GND and you may set its value by trimmer above the bracket no. 17

RxD/L+   IV
TxD/L-   V
GND   VI

| 8 | 9 | 10 | 11 | 12 | 13 |

GND   III
AO-I II
AO-U I

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

C D E
A B

| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

Option A

INPUT - U

GND - U/I0,5
GND - I5
INPUT - I

CJC

L   **N**   **E**

POWER SUPPLY

L1   **L2**

Open collectors

E1   **C1**   **E2**   **C2**

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

DC, PM

RTD, OHM, Ni

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

T/C

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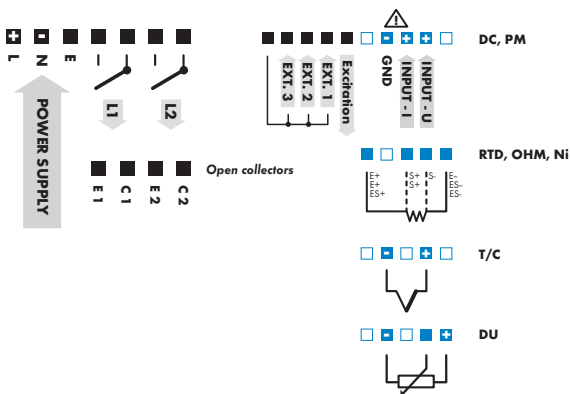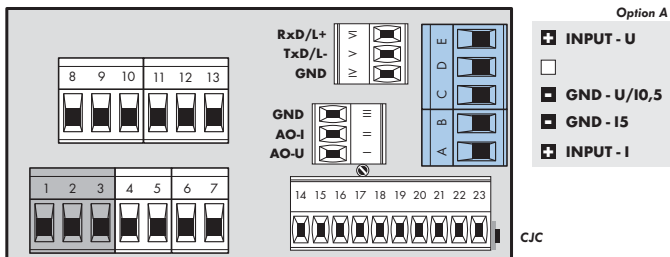
⚠ **Maximum of 250 mA may be connected to "INPUT - I" (bracket no. 21) , i.e. 10-times range overload.**
Mind the correct connection/mistaking of current - voltage input.
Destruction of measuring resistance in current input (15R) may occur.

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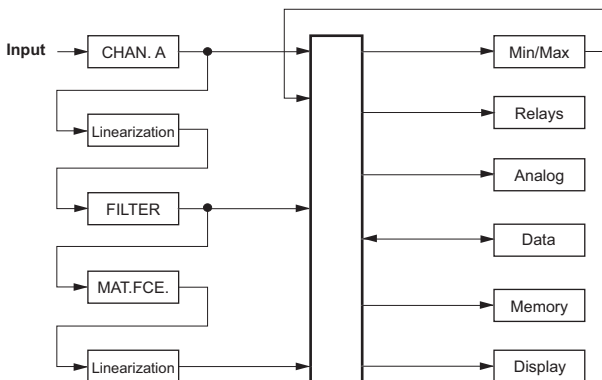
Setting and controlling the instrument is performed by means of 5 control keys located on the front panel. With the aid of these keys it is possble to browse through the operation menu and to select and set required values.

Measured value

Auxiliary display

Ralay status

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

Function

| T | Tare |
| M | Min/max. value |
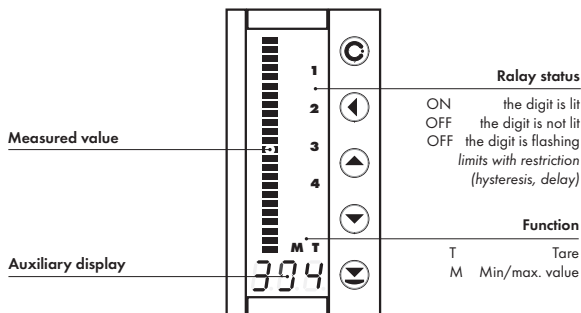
Symbols used in the instructions

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)

A In   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

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

legend is flashing - current setting is displayed

▲ →   ← ▼   ⟳   *return to item*

--- · · · · ⟳ + ▲ · · · n0 · · · YES · · · SHO. · · · ⟳ · · · 🖫 → · · · ---

n0	item will not be displayed in USER menu
YES	item will be displayed in USER menu with the option of setting
SHO.	item will be solely displayed in USER menu

5.0	Setting "LIGHT"

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

▶

- **For capable users**

- **Only items necessary for instrument setting**

- **Access is password protected**

- **Possibility to arrange items of the „User" menu**

- **Linear menu structure**

Preset from manufacture

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

`142`

C + ⌄

`PAS.` ⌄ `0` ⌄ *Access password*

`tYP.` ⌄ `Pn` ⌄ `nOd.` ⌄ `14` ⌄ *Selecting input and range*

RTD OHM *Selecting projection and connection*
`COn.` ⌄ `2-u` ⌄ `FOr.` ⌄ `000` ⌄

T/C
`COn.` ⌄ `EH.1` ⌄ `t.C.J.` ⌄ `23` ⌄ `FOr.` ⌄ `000` ⌄

DC PM OHM DU
`nIn` ⌄ `0` ⌄ `nAH` ⌄ `100` ⌄ `FOr.` ⌄ `000` ⌄

Option - comparator
`L.1` ⌄ `20` ⌄ `L.2` ⌄ `40` ⌄

`L.3` ⌄ `60` ⌄ `L.4` ⌄ `80` ⌄

Option - Analog output
`tYP.` ⌄ `120` ⌄ `A.Lo` ⌄ `0` ⌄ `A.H1` ⌄ `100` ⌄

Setting bargraph projection   *Setting bargreph colors*
`b.Lo` ⌄ `0` ⌄ `b.H1` ⌄ `100` ⌄ `COL.` ⌄ `Grε.` ⌄

Menu type   *Return to calibration setting*   *Return to manufacture setting*
`MnU.` ⌄ `L1G.` ⌄ `CAL.` ⌄ `YES` ⌄ `SEt.` ⌄ `YES` ⌄

DU   *Calibration - only for "DU"*
`C.Lo` ⌄ `YES` ⌄ `C.H1` ⌄ `YES` ⌄

Language selection   *New password*
`LAn.` ⌄ `EnG.` ⌄ `P.L1.` ⌄ `0` ⌄

Identification
`Id.` ⌄ `YES` `OMb 412....` → `142` *Return to measuring mode*

`142.8`

`PAS.` → `0` — **Entering access password for access into the menu** →

PAS. Access into instrument menu

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

PAS > 0
- access into menu is protected ny number code

Set "Password" = 42   Example

`0` `1` `3` `02` `12` `22`
`32` `42` `tYP.`

`tYP.` →   `dC`   `PN`   `OHN`   `Pt`   `ni`   `tC`
           `dU`   `Cu`

tYP. Selection of the type of instrument

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

TYP.	Menu	Type of instrument
	DC	DC voltmeter
	PM	Process monitor
	OHM	Ohmmeter
	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

`dC`   `PN`   `nOd.`

DC DC DC DC DC DC DC DC DC DC DC DC DC DC DC

Type "DC"

nOd. → 60. 150. 300. 1.20

Selection of the instrument measuring range

nOd.

DEF = 60 mV

DEF = 500 V*

* only for option "A"

Menu	Measuring range
MOD.	
60.	±60 mV
150.	±150 mV
300.	±300 mV
1.20	±1,2 V
100	±100 V
250	±250 V
500	±500 V
MOD. - A	
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. A in

A in → 0 **Setting for minimum input signal**

Setting display projection for minimum value of input signal

A in

- range of the setting is -99...999

- 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 = 0 — *Example*

0 ArH

MAX   Setting for maximum input signal

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

- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

- range of the setting is   -99...999

Projection for 150 mV > MAX = 350   Example

100	100	110	120	130	140
150	150	250	350	FOr.	

FOr.

| 000 | 00.o | 0.oo | FL.P. |

FOr.   **Setting projection of the decimal point**   **DEF** = 000

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

Projection of DP on display > 00.o   Example

| 000 | 00.o | b.LO. |

*subsequent item on the menu depends on instrument equipment

📖 **32**

light

Type "PM"

Menu	Range
i 5	0...5 mA
i 0	0...20 mA
i 4	4...20 mA
u 2	±2 V
u 5	±5 V
u 10	±10 V
u 40	±40 V

Selection of the instrument measuring range

nOd.

DEF = 4 - 20 mA

MOD.

Range 0...20 mA — *Example*

Setting for minimum input signal

AIn

Setting display projection for minimum value of input signal

- range of the setting is -99...999

- 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 = -25 — *Example*

PM PM PM PM PM PM PM PM PM PM PM PM PM PM

| ПAX | ⊙→ | 100 | *Setting for maximum input signal* | → | ⊙ 🖫 |

ПAX Setting display projection for maximum value of input signal

- range of the setting is -99...999

- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 20 mA > MAX = 250   *Example*

| 100 ◁ | 100 ⊙ | 110 ⊙ | 120 ⊙ | 130 ⊙ | 140 ⊙ |
| 150 ◁ | 150 ⊙ | 250 ⊙ | F0r. |

| F0r. | ⊙→ | ⊙→ 000 00.o 0.oo FL.P. ←⊙ | ⊙ 🖫 |

F0r. Setting projection of the decimal point

DEF = 000

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

Projection of DP on display > 00.o   *Example*

| 000 ⊙ | 00.o ⊙ | b.L0. | ** subsequent item on the menu depends on instrument equipment* |

📖 **32**

light

OHM OHM OHM OHM OHM OHM OHM OHM OHM OHM

Type "OHM"

nOd. → 0.1   1.0   10.0   100.   AUt.

nOd. Selection of instrument measuring range

DEF = 100 Ω

MOD.	Menu	Measuring range
	0.1	0...100 Ω
	1.	0...1 kΩ
	10.	0...10 kΩ
	100.	0...100 kΩ
	AUTO	Autorange

Range 0...10 kΩ   *Example*

0.1 ▲ 1.0 ▲ 10.0 ▼ COn.

COn. → 2-u   3-u   4-u

COn. Selection of the type of sensor connection

DEF = 2- WIRE

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

Type of connection - 3 wire > CON. = 3-W   *Example*

2-u ▲ 3-u ▼ A In

A In → 0   Setting for minimum input signal

A In Setting display projection for minimum value of input signal

- range of the setting is -99...999

- 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 = 0   *Example*

0 ▼ nAx

OHM OHM OHM OHM OHM OHM OHM OHM OHM OHM

| nAH | ⊝ → | 100 | Setting for maximum input signal | → |

nAH Setting display projection for maximum value of **input signal**

- range of the setting is -99...999

- 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 = 700   *Example*

| 100 ◀ | 100 ◀ | 100 ▼ | 000 ▼ | 900 ▼ | 800 ▼ |
| 700 ⊝ | FOr. |

| FOr. | ⊝ → | 000 | 00.o | 0.oo | FL.P. |

FOr. Setting projection of the decimal point   **DEF** = 000

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

Projection of DP on display > 00.o   *Example*

| 000 ▲ | 00.o ⊝ | b.L0. | * subsequent item on the menu depends on instrument equipment

📖 **32**

RTD-Pt RTD-Pt RTD-Pt RTD-Pt RTD-Pt RTD-Pt RTD-Pt

Type "RTD-Pt"

| nod. | → | E0.1 | E0.5 | E1.0 | U0.1 | r.05 | r1.0 | **RTD** |

nod. Selection of instrument measuring range

DEF = Pt 100

MOD.	Menu	Measuring range
	E0.1	Pt 100 (3 850 ppm/°C)
	E0.5	Pt 500 (3 850 ppm/°C)
	E1.0	Pt 1000 (3 850 ppm/°C)
	U0.1	Pt 100 (3 920 ppm/°C)
	R.05	Pt 50 (3 910 ppm/°C)
	R1.0	Pt 100 (3 910 ppm/°C)

Range - Pt 1 000 > MOD = E1.0   *Example*

| E0.1 | ▲ | E0.5 | ▲ | E1.0 | ▼ | COn. |

| COn. | → | 2-u | 3-u | 4-u | ← |

COn. Selection of the type of sensor connection

DEF = 2- WIRE

CON.	Menu	Connectiion
	2-W	2-wire
	3-W	3-wire
	4-W	4-wire

Type of connection - 3 wire > CON. = 3-W   *Example*

| 2-u | ▲ | 3-u | ▼ | FOr. |

RTD - Pt   RTD - Pt   RTD - Pt   RTD - Pt   RTD - Pt   RTD - Pt   RTD - Pt

| | FOr | **Setting projection of the decimal point** | **DEF** = 000 |

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

Projection of DP on display > 00.o   *Example*

| 000 | ▲ | 00.o | ▼ | bLo | * subsequent item on the menu depends on instrument equipment |

📖 **32**

RTD-Ni RTD-Ni RTD-Ni RTD-Ni RTD-Ni RTD-Ni RTD-Ni RTD-Ni

Type "RTD-Ni"

nOd.   5-1   6-1   510   610   **RTD**

nOd.   Selection of instrument measuring range

DEF = Ni 1 000 - 5 000 ppm/°C

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

Range - Ni 10 000, 5 000ppm > MOD = 510   *Example*

5-1   6-1   510   COn.

COn.   2-u   3-u   4-u

COn.   Selection of the type of sensor connection

DEF = 2- WIRE

Menu	Connection
2-W	2-wire
3-W	3-wire
4-W	4-wire

Type of connection - 3 wire > CON. = 3-W   *Example*
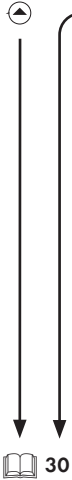
2-u   3-u   FOr.

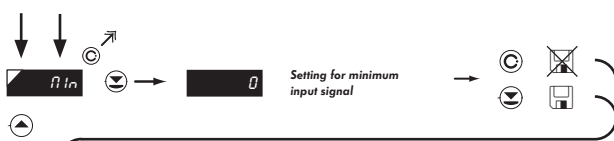**FOr** Setting projection of the decimal point

DEF = 000

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

Projection of DP on display > 00.o *Example*

000 ▲ 00.o ☻ nnU *subsequent item on the menu depends on instrument equipment*

📖 30

T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C

Type "T/C"

NOd.

| | b | E | J | H | > |
| > | n | r | S | t | **T/C** |

NOd. **Selection of the type of thermocouple**

- setting the input range depends on the measuring range ordered

DEF = Type "J"

Menu	Type of thermocouple
B	T/C B
E	T/C E
J	T/C J
K	T/C K
N	T/C N
R	T/C R
S	T/C S
T	T/C T

MOD.

Type of thermocouple "K"   *Example*

| J | | H | | COn. |

COn.

| | In.1 | In.2 | EH.1 | EH.2 |

COn. **Selection of the type of sensor connection**

DEF = EX. 1

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

CON.

Type of connection > CON. = EX. 2   *Example*

| EH.1 | | EH.2 | | t.C.J. |

T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C T/C

t.C.J. → 23   *Setting temperature of cold junction*

t.C.J.   Setting temperature of cold junction   **DEF** = 23

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

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

23 → 24 → 25 → 25 → 35 → **F0r.**

F0r. → 000   00.o   0.oo

F0r.   Setting projection of the decimal point   **DEF** = 000

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

Projection of DP on display > 00.o   *Example*

000 → 00.o → **AnU.**   * subsequent item on the menu depends on instrument equipment

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

! Method and procedure of setting the cold junctions is described in separate chapter on page 82

30

Type "DU"

⊓ In	**0** → Setting for minimum input signal

⊓ In Setting display projection for minimum value of **input signal**

- range of the setting is -99...999

- 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 = 0   *Example*

0 → **⊓⊓H**

⊓⊓H	**100** → Setting for maximum input signal

⊓⊓H Setting display projection for maximum value of **input signal**

- range of the setting is -99...999

- 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 = 500   *Example*

100 ← **100** ↑ **100** ↑ **200** ↑ **300** ↑ **400** ↑

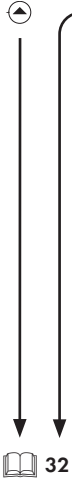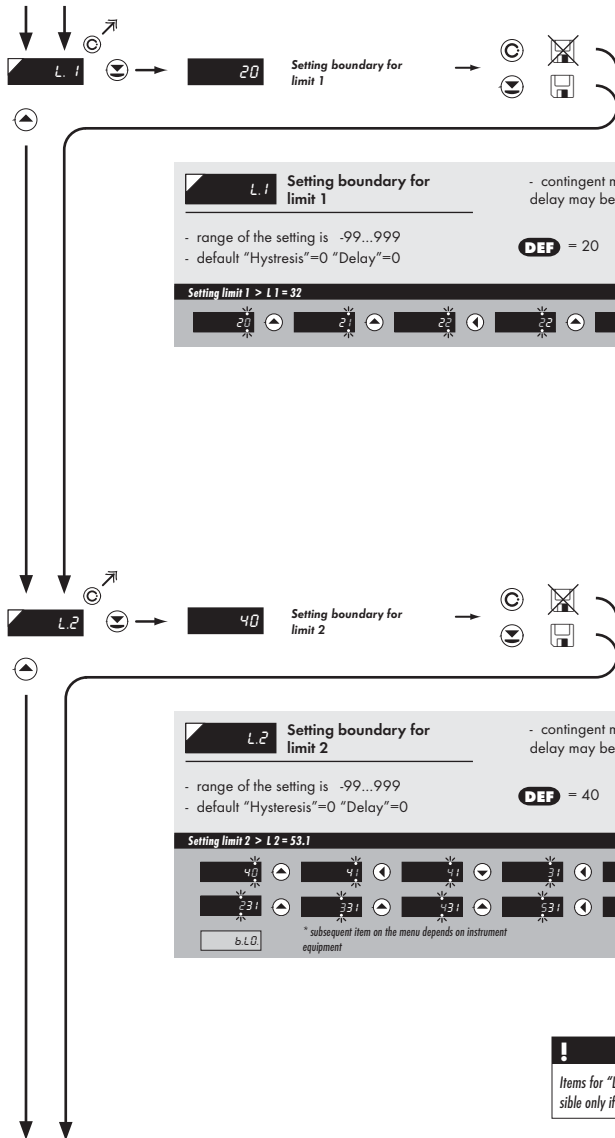**500** → **F0r**

FOr.

000   00.o   0.o o   FL.P.

FOr.   **Setting projection of the decimal point**   **DEF** = 000

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

Projection of DP on display > 000   *Example*

000   bL0.   * subsequent item on the menu depends on instrument equipment

32   *Calibration of the beginning and the end of range of linear potentiometer is on page 39*

RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu

Type "RTD-Cu"

nOd. → Cu.1 Cu.2 Cu.3 Cu.4 RTD

---
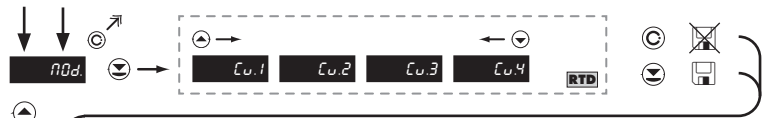
nOd. **Selection of instrument measuring range**

DEF = Cu 50/4 280 ppm

	Menu	Measuring range
MOD.	Cu.1	Cu 50 (4 280 ppm/°C)
	Cu.2	Cu 100 (4 280 ppm/°C)
	Cu.3	Cu 50 (4 260 ppm/°C)
	Cu.4	Cu 100 (4 260 ppm/°C)

Range - Cu-50/4 260 ppm > MOD. = Cu.3   *Example*

Cu.1 Cu.2 Cu.3 COn.

COn. → 2-u 3-u 4-u

COn. **Selection of the type of sensor connection**

DEF = 2- WIRE

	Menu	Connectiion
CON.	2-W	2-wire
	3-W	3-wire
	4-W	4-wire

Type of connection - 3 wire > CON. = 3-W   *Example*

2-u 3-u FOr.

RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu RTD-Cu

Setting projection of the decimal point

DEF = 000

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

Projection of DP on display > 00.o — *Example*

000 ⊙ 00.o ⊙ AnU — * subsequent item on the menu depends on instrument equipment

📖 **32**

Displayed only with options > **Comparators**

L. 1 — 20   *Setting boundary for limit 1*

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

- range of the setting is -99...999
- default "Hystresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 20

Setting limit 1 > L 1 = 32   *Example*

20 → 21 → 22 → 22 → 32 → b L.0.

L.2 — 40   *Setting boundary for limit 2*

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

- range of the setting is -99...999
- default "Hysteresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 40

Setting limit 2 > L 2 = 53.1   *Example*

40 → 41 → 41 → 31 → 031 → 131

231 → 331 → 431 → 531 → 531 → 531

b L.0.

* subsequent item on the menu depends on instrument equipment

!

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

L.3 → **60** Setting boundary for limit 3

L.3 Setting boundary for limit 3

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

- range of the setting is -99...999
- default "Hysteresis"=0 "Delay"=0

DEF = 60

Setting limit 3 > L 3 = 85   Example

60 → 61 → 62 → 63 → 64 → 65

65 → 75 → 85 → *b.LD*

* subsequent item on the menu depends on instrument equipment

L.4 → **80** Setting boundary for limit 4

L.4 Setting boundary for limit 4

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

- range of the setting is -99...999
- default "Hysteresis"=0 "Delay"=0

DEF = 80

Setting limit 4 > L 4 = 103   Example

80 → 81 → 82 → 83 → 93 → 93

93 → 003 → 103 → *b.LD*

* subsequent item on the menu depends on instrument equipment

Displayed only with options > **Comparators**

Displayed only with options > **Analog output**

tYP. Setting the type of analog output

Menu	Range	Description
i 20	0...20 mA	
E. 4	4...20 mA	with indication of error statement (<3,6 mA)
i 4	4...20 mA	
i 5	0...5 mA	
u 2	0...2 V	
u 5	0...5 V	
u 10	0...10 V	

DEF = 4...20 mA

Type of analog output - 0...10 V > TYP = U 10   *Example*

A.Lo Assigning the display value to the beginning of the AO range

A.Lo Assigning the display value to the beginning of the AO range   **DEF** = 0

- range of the setting is -99...999

Display value for the beginning of the AO range > A.Lo. = 0   *Example*

!

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

A.Hi → 100   *Assigning the display value to the end of the AO range* →

A.Hi   **Assigning the display value to the end of the AO range**   **DEF** = 100

- range of the setting is -99...999

Display value for the end of the AO range > A.Hi. = 120   *Example*

100 ◄ 100 ▲ 110 ▲ 120 ▼ b.Lo.

b.Lo → 0   Setting for minimum input signal

---

b.Lo **Setting bargraph projection for minimum input signal value**

- range of the setting is -99...999   **DEF** = 0

Projection for the beginning > b.Lo = 0   *Example*

0   b.H i

---

b.H i → 100   Nastavení pro maximální vstupní signál

---

b.H i **Setting bargraph projection for maximum input signal value**

- range of the setting is -99...999   **DEF** = 100

Projection for the end > b.Hi = 500   *Example*

100 ◁ 100 ◁ 100 ▲ 200 ▲ 300 ▲ 400 ▲

500   COL

COL.	**Select bargraph color**

- the color for bargraph in basic mode "Column" is set here

- for other bargraph working modes it is necessary to sswitch to the "PROFI" menu

DEF = Green

Selection of bargraph color > Orange *Example*
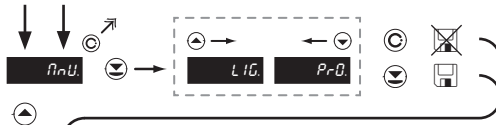
AnU. — Setting the menu type **LIGHT/PROFI**

LIG > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting
> linear tree structure

PRO > menu PROFI, a complete menu for complete instrument setting
> tree menu structure

DEF = LIGHT

Menu LIGHT > MNU = LIG. — *Example*

LIG. ⌄ CAL.

CAL. — 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 setting > CAL. — *Example*

CAL. ⌃ YES ⌄ SEt.

SEt. — 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 "TYP.")

- provided you stored your user setting in the "PROFI" menu, it may also be restored (select "USE.")
- loading manufacture calibration and primary setting of items on the menu (DEF)

Restoration of manufacture setting > SETTIN. — *Example*

SEt. ⌃ tYP. ⌄ LAn. | *subsequent item on the menu depends on instrument type, for "DU" > "K. LO."*

Type „DC"   📖 40
Type "PM"   📖 40
Type "OHM"   📖 40
Type "RTD-Pt" 📖 40
Type "RTD-Ni" 📖 40
Type "T/C"   📖 40
Type "DU"   📖 39
Type "RTD-Cu" 📖 40

Type "DU"

flashing legend

`E.Lo` → `YES`
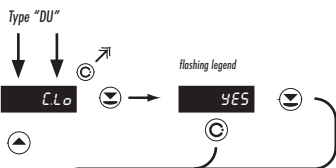
`E.Lo`	**Calibration of input range -**	*Only for type "DU"*
	the potentiometer traveller	

in initial position

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

Calibration of the beginning of the range > C. Lo   *Example*

`YES` `C.H.`

flashing legend

`C.H.` → `YES`
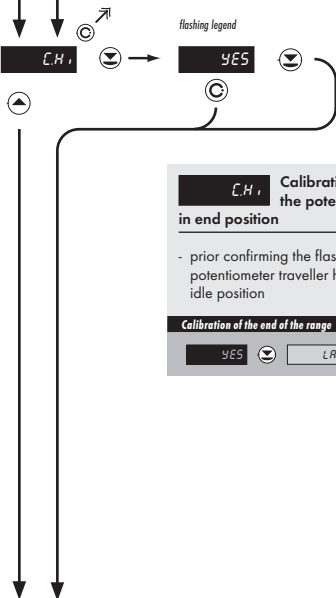
`C.H.`	**Calibration of input range -**	*Only for type "DU"*
	the potentiometer traveller	

in end position

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

Calibration of the end of the range > C. Hi   *Example*

`YES` `LAn.`

`LAn.` → `C2E` `EnG.`

LAn. Selection of language in instrument menu

- selection of language version of the instrument menu

DEF = ENG.

Language selection - ENGLISH > LAN. = ENG. *Example*

`EnG.` → `P.LO.`

`P.LO.` → `0` *Setting new access password*

P.LO. Setting new access password

- access password for menu LIGHT/PROFI
- range of the number code 0...9999

- upon setting the password to "000" the access to menu LIGHT/PROFI is free without prompt to enter it
- in the event of loss universal password "8177" may be used

DEF = 0

New password - 341 > P.LO. = 341 *Example*

`0` `1` `01` `11` `21` `31`

`41` `041` `141` `241` `341` `Id`

instrument type   SW number - version   setting the input type

| Id. | YES | 0Mb412Uni | 64-001 | Pn |

Instrument SW version

Id.

- 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

142   *Return to measuring mode*

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**

- **For expert users**
- **Complete instrument menu**
- **Access is password protected**
- **Possibility to arrange items of the „User" menu**
- **Tree menu structure**

Switching over to "PROFI" menu

☉ + ▼
- access to **PROFI** menu
- authorization for access to **PROFI** menu does not depend on setting under item SER. > MNU.
- password protected access (unless set as follows under the item SERV. > N.PA. > PROFI =0)

☉ + ☺
- access to menu selected under item SER. > MNU. > **LIG./PRO.**
- password protected access (unless set as follows under the item SER. > N.PA. > LIGHT =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used

6.1 Setting "PROFI" - INPUT
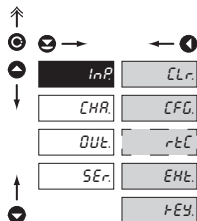
InP	CLr.
CHA.	CFG.
OUE.	rtC
SEr.	EHE.
	rEY.

The primary instrument parameters are set in this menu

CLr.	Resetting internal values
CFG.	Selection of measuring range and parameters
rtC	Setting date and time for option with RTC
EHE.	Setting external inputs functions
rEY.	Assigning further functions to keys on the instrument

6.1.1 Resetting internal values

InP	CLr.	CEA	YES
CHA.	CFG.	C.AA.	
OUE.	rtC	C. A.	
SEr.	EHE.		
	rEY.		
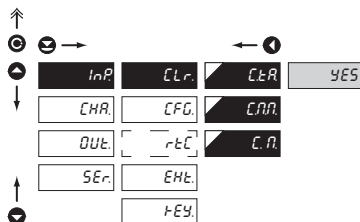
CLr.	**Resetting internal values**

C.EA.	Tare resetting
C.A.A.	Resetting min/max value

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

C. A.	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

	Selection of measuring rate
`N.P.S.`	
`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 measurement/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

	Selection of „instrument" type
`EYP.`	

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

`dC`	DC voltmeter
`P.N.`	Process monitor
`OHN`	Ohmmeter
`PE`	Thermometer for Pt xxx
`n i`	Thermometer for Ni xxxx
`EC`	Thermometer pro thermocouples
`dU`	Display for linear potentiometers
`Cu`	Thermometer for Cu xxx

`142` ⊙ + ⊙ `PAS.` ⊙ `0` ⊙ Access password

`InP.`
`CLr.` — `CtA • C.nn • C.n.`
`CFG`
  `n.PS.` — `0.1 • 02 • • • 200 • 400`
  `tYP.` — `dC • Pn • • • trC • dU`
  `nOd.`

  Setting input, range and projection

  DC — `60 • 150 • • • 050 • 100 • 500`
  PM — `.5 • .20 • • • u5 • u10 • u40`
  OHM — `0.1 • 1 • 10. • 100. • AUtO`
  RTD — `E0.1 • E0.5 • E 10 • U0.1 • r0S • r0.1`
  RTD — `S- 1 • 6- 1 • S 10 • 6 10`
  T/C — `b • E • • • t • L`
  DU — `LPO.`
  RTD — `Cu1 • Cu2 • Cu3 • Cu4`

  `COn.` — `2-u • 3-u • 4-u`
  `r.Ad.` — `0`
  `LEA.` — `0`
  `COn.` — `In1 • In2 • EH.1 • EH2`
  `t.C.J.` — `0`

`rtC.`
  `t.In.` — `0`
  `dAt.` — `0`

`EHt.`
  `EH. 1` — `OFF • HLd • • • C.nn. • SAu`
  `n. H.` — `d 15. • d-1R • dAL. • ALL`

`KEY.`
  `LEF.`
    `F.LE.` — `n0 • C.nn • C.tA • nnU • EnP • tAr`
    `t.LE.` — `n0 • C.A • F.A • n.Fn • n.In • nAH • L. 1 • • • PtA • C.Jt`
  `Ent.`
    `n.LE.` — `L. 1 • L. 2 • L. 3 • L. 4`

`CHA.`
`C. A.`
  `SEt.`
    `n.In` — `0`
    `nAH.` — `100`
    `Pt. A.` — `0`
  `FIL.`
    `nOd.` — `n0 • AuE • • • r.OU`
    `COn.` — `0`
  `FOr.` — `000 • 00o • 0oo • FL. P.`
  `SAu.` — `YES • n0`

`n.Fn.`
  `n.Fn.` — `OFF • nUL. • 1rn. • • • 5 In`
  `C. A.` — `0`
  `C. F.` — `0`
  `FOr.` — `000 • 00o • 0oo • FL. P.`
  `SAu.` — `YES • n0`

`n. n.`
  `InP.` — `n0 • C. A • F.A • n.Fn`

OUt.

LIn. — L.1 — InP. → no • C.A • F.A ••• MAX
- MOd. → HYS. • F-t. • dOS.
- tYP. → CLO • OPE.
- L.1 → 20
- H.1 → 0
- On.1 → 0
- OF.1 → 0
- P.1 → 0
- t.1 → 0
- L.4

dAt. — db → 06 • 12 • 24 ••• 115 • 230
- Add. → 0
- Pr-O. → ASC. • N.b5. • N.b5.

A.O. — InP. → no • C.A • F.A • N.Fn • N.In • MAX
- tYP. → ,0 • E.4 • ,4 • ,5 • u2 • u5 • u10
- A.Lo → 0
- A.H.i → 100

dIS. — PErE → C.A • F.A • N.Fn • N.In • MAX
- br.i. → 0 • 25 • 50 • 75 • 100

bAr. — InP. → no • C.A • F.A • N.Fn • N.In • MAX
- MOd. → bAr. • PO1 • 3C • 3b.
- b.Lo → 0
- b.H.i → 100
- COL. → rEd • GrE • OrA
- COL. → bA0 • b.L.1 • MOd • bA1 • b.L.2 • bA2
- SH.L → YES • no
- br.i. → 0 • 25 • 50 • 75 • 100

SEr

MoU. → LIG • Pr-O

rES. — CAL → YES
- SEt. → tYP. / USE.
- SAu.
- CAL → C.Lo → YES
- C.H.i → YES

MoU. → C2E • EnG.

n.PA. — PL.i → 0
- P.Pr.

Id. → OM 402Uni...

DU

!

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

profi

6.1.2c   Selection of measuring range

	Menu	Measuring range
	∩Od	**Selection of instrument measuring range**
DC	60.	±60 mV
	150.	±150 mV
	300.	±300 mV
	1.20	±1,2 V
	100	±100 V
	250	±250 V
	500	±500 V
DC - A	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	i 5	0...5 mA
	i 0	0...20 mA
	i 4	4...20 mA
	u 2	±2 V
	u 5	±5 V
	u10	±10 V
	u-40	±40 V
	Menu	**Measuring range**
OHM	0.1	0...100 Ω
	1.0k	0...1 kΩ
	10.0	0...10 kΩ
	100.	0...100 kΩ
	AUT.	Automatická změna rozsahu
	Menu	**Measuring range**
RTD-Pt	E0.1	Pt 100 (3 850 ppm/°C)
	E0.5	Pt 500 (3 850 ppm/°C)
	E1.0	Pt 1000 (3 850 ppm/°C)
	U0.1	Pt 100 (3 920 ppm/°C)
	R0.5	Pt 50 (3 910 ppm/°C)
	R0.1	Pt 100 (3 910 ppm/°C)
	Menu	**Measuring range**
RTD-Ni	5-1	Ni 1 000 (5 000 ppm/°C)
	6-1	Ni 1 000 (6 180 ppm/°C)
	510	Ni 10 000 (5 000 ppm/°C)
	610	Ni 10 000 (6 180 ppm/°C)
	Menu	**Measuring range**
RTD-Cu	8-5	Cu 50 (4 280 ppm/°C)
	8-1	Cu 1 00 (4 280 ppm/°C)
	6-5	Cu 50 (4 260 ppm/°C)
	6-1	Cu 100 (4 260 ppm/°C)
	Menu	**Type of thermocouple**
T/C	B	T/C B
	E	T/C E
	J	T/C J
	K	T/C K
	N	T/C N
	R	T/C R
	S	T/C S
	T	T/C T

!

Switching in the mode AUTO - "OHM"

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

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

6.1.2d   **Selection of type of sensor connection**   `RTD` `OHM` `T/C`

InP.	CLr.	N.PS.	2-u	DEF
CHA.	CFG.	tYP.	3-u	
OUt.	rtC	NOd.	4-u	
SEr.	EHt.	COn.		
	HEY.	r.Ad.		
		LEA.		

InP.	CLr.	N.PS.	In.1	
CHA.	CFG.	tYP.	In.2	
OUt.	rtC	NOd.	EH.1	DEF
SEr.	EHt.	COn.	EH.2	
	HEY.	t.C.J.		

`COn.`   **Selection of type of sensor connection**

`RTD` `OHM`

`2-u`   2-wire connection

`3-u`   3-wire connection

`4-u`   4-wire connection

`T/C`

`In. 1`   Measurement without reference thermocouple
- measuring cold junction at instrument brackets

`In.2`   Measurement with reference thermocouple
- measuring cold junction at instrument brackets with anti-series connected reference thermocouple

`EH.1`   Measurement without reference thermocouple
- the entire measuring set is working under invaried and constant temperature

`EH.2`   Measurement with reference thermocouple
- when using compensation box

!

Method and procedure of setting the cold junctions is described in separate chapter on page 82

!

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

6.1.2e Setting temperature of cold junction `T/C`

InP.	CLr.	NPS.	23
CHA.	CFG.	tYP.	
OUt.	rtC	NOd.	
SEr.	EHt.	COn.	
	rEY.	t.C.J.	
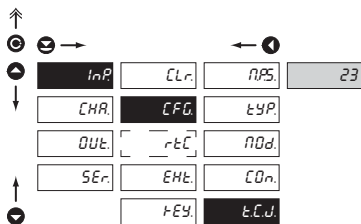
t.C.J. Setting temperature of cold junction

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

6.1.2f Compensation of 2-wire conduct `RTD` `OHM`

InP.	CLr.	NPS.	0
CHA.	CFG.	tYP.	
OUt.	rtC	NOd.	
SEr.	EHt.	COn.	
	rEY.	r.Ad.	
		LEA.	
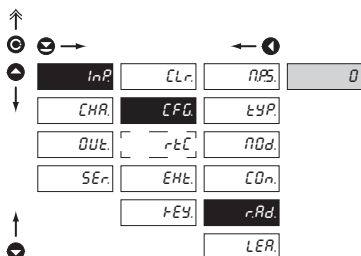
r.Ad. Offset of the beginning of the measuring range

- 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...999)
- **DEF** = 0

6.1.2g Compensation of 2-wire conduct `RTD` `OHM`

InP.	CLr.	NPS.	YES
CHA.	CFG.	tYP.	
OUt.	rtC	NOd.	
SEr.	EHt.	COn.	
	rEY.	r.Ad.	
		LEA.	
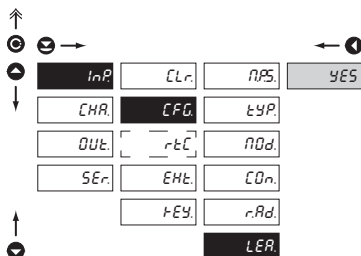
LEA. Compensation of 2-wire conduct

- 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

InP.	CLr.	tIП.	Hr.
CHA.	CFG.	dAt.	П.In
OUt.	rtC		SEC.
SEr.	EHt.		
	rEY.		
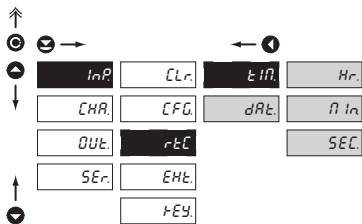
| rtC | **Setting the real time clock (RTC)** |
| tIП. | Time setting |
- format 23.59.59

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

6.1.4a External input function selection

InP.	CLr.	EH. 1	OFF
CHA.	CFG.	EH. 2	HLd.
OUt.	rtC	EH. 3	LOC.
SEr.	EHt.	П. H.	b.PA
	rEY.		tAr.
			C.tA.
			C.П.П.
			SAu
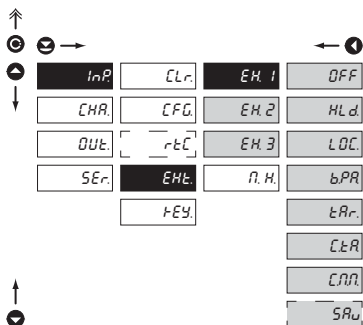
EHt.	**External input function selection**
OFF	Input is off
HLd.	Activation of HOLD
LOC.	Locking keys on the instrument
b.PA.	Activation of locking access into programming menu LIGHT/PROFI
tAr.	Tare activation
C.tA.	Tare resetting
C.П.П.	Resetting min/max value
SAu.	Activation of measured data record in instrument memory (not in standard equipment)

- **DEF** EX. 1 > HLD.
- **DEF** EX. 2 > LOC.
- **DEF** EX. 3 > TAR.

*

Setting procedure is identical for EX. 2 and EX. 3

6.1.4b | **Selection of function "HOLD"**

InP.	CLr.	EH. 1	d 15.
CHA.	CFG.	EH. 2	d. A
OUt.	rtC	EH. 3	dAL.
SEr.	EHt.	N. H.	ALL
	rEY.		
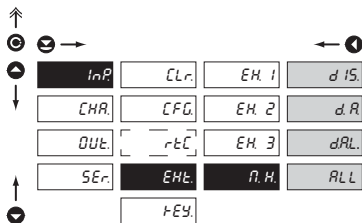
N. H.	Selection of function "HOLD"
d 15.	"HOLD" locks only the value displayed
d. A.	"HOLD" locks the value displayed and on AO
d.A.L.	"HOLD" locks the value displayed, on AO and limit evaluation
ALL	"HOLD" locks the entire instrument

6.1.5a | **Optional accessory functions of the keys**

InP.	CLr.	LEF.	Fn. L.	nO
CHA.	CFG.	dOu.	tN. L.	C.NN.
OUt.	rtC	UP	Nn L	C.tA.
SEr.	EHt.	Ent.		NnU.
	rEY.			tNP.
				tAr.
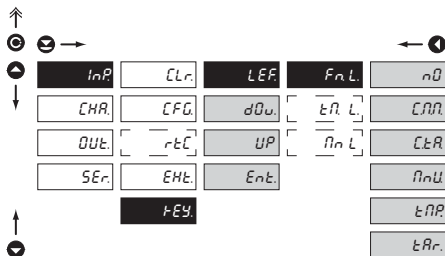
| Fn. L. | Assigning further functions to instrument keys |

- „FN. L." > executive functions
- „TM. L." > temporary projection of selected values
- „MN. L." > direct access into menu on selected item

nO	Key has no further function
C.NN.	Resetting min/max value
C.tA.	Tare resetting
NnU.	Direct access into menu on selected item

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

| tNP. | Temporary projection of selected values |

- after confirmation of this selection the item "TEMPOR." is displayed on superior menu level, whererequired selection is performed

| tAr. | Tare function activation |

!

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

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.1.5b Optional accessory functions of the keys - Temporary projection

InP.	CLr.	LEF.	Fn.L.	nO.
CHA.	CFG.	dOu.	tN.L.	C.A
OUt.	rtC	UP		F.A
SEr.	EHt.	Ent.		N.Fn.
	HEY.			N.In
				NAH
				L.1
				L.2
				L.3
				L.4
				t.IN.
				dAt.
				tAr.
				P.tA.
				CO.J.
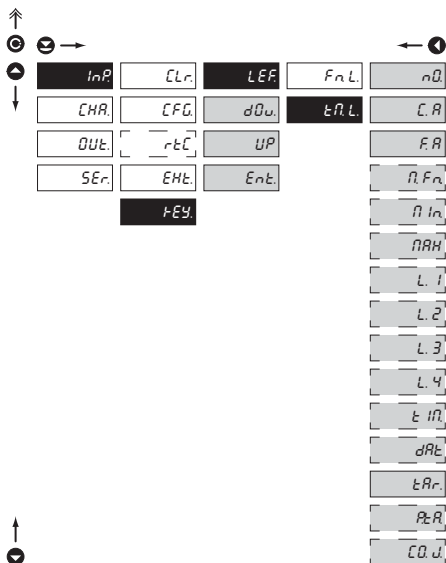
tN.L. **Temporary projection of selected item**

- "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

C.A Temporary projection of "Channel A" value

F.A Temporary projection of "Channel A" value after processing digital filters

N.Fn. Temporary projection of "Mathematic functions" value

N.In Temporary projection of "Min. value"

NAH 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

t.IN. Temporary projection of "TIME" value

dAt. Temporary projection of "DATE" value

tAr. Temporary projection of "TARE" value

P.tA. Temporary projection of "P. TARE" value

CO.J. Temporary projection of "CJC" value

!

Setting is identical for LEFT, DOWN, UP and ENTER

profi

6.1.5c   **Optional accessory functions of the keys - Direct access to item**
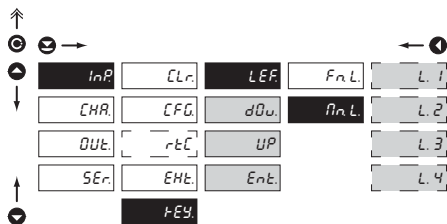
`An. L.`	**Assigning access to selected menu item**
`L. 1`	Direct access to item "LIM 1"
`L. 2`	Direct access to item "LIM 2"
`L. 3`	Direct access to item "LIM 3"
`L. 4`	Direct access to item "LIM 4"

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.2 Setting "PROFI" - CHANNELS
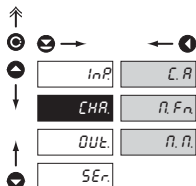
The primary instrument parameters are set in this menu

C. A	Setting parameters of measuring "Channel"
N. Fn.	Setting parameters of mathematic functions
N. N.	Selection of access and evaluation of Min/max value

6.2.1a Display projection   DC PM DU OHM
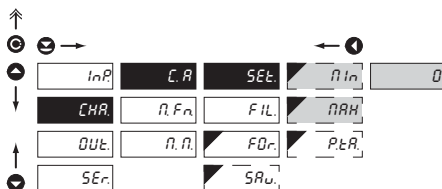
SEt.	Setting display projection

N In Setting display projection for minimum value of input signal
- range of the setting is -99...999
- **DEF** = 0

NAH Setting display projection for maximum value of input signal
- range of the setting is -99...999
- **DEF** = 100

6.2.1b Setting fixed tare   DC PM DU OHM
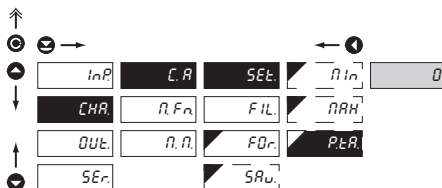
P.tA. Setting "Fixed tare" value

- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting (*P. TA.* > 0) display shows "T" symbol
- range of the setting is 0...999
- **DEF** = 0

6.2.1c Digital filters

<table>
<tr><td>InP.</td><td>C. A</td><td>SEt.</td><td>NOd.</td><td>nO</td><td>DEF</td></tr>
<tr><td>CHA.</td><td>N.Fn</td><td>FIL.</td><td>COn.</td><td>AuE.</td></tr>
<tr><td>OUt.</td><td>N. N.</td><td>FOr.</td><td></td><td>FLO.</td></tr>
<tr><td>SEr.</td><td></td><td>SAu</td><td></td><td>EHP.</td></tr>
<tr><td></td><td></td><td></td><td></td><td>rnd.</td></tr>
</table>
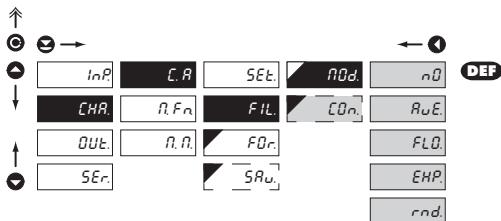
NOd. Selection of digital filters

- 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

AuE. Measured data average
- arithmetic average from given number („CON.") of measured values
- range 2...100

FLO.. Selection of floating filter

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

EHP. Selection of exponential filter
- integration filter of first prvního grade with time constant („CON.") measurement
- range 2...100

rnd. Measured value rounding
- is entered by any number, which determines the projection step (e.g: "CON."=2,5 > display 0, 2.5, 5,...)

COn. Setting constants

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

6.2.1d — Projection format - positioning of decimal point
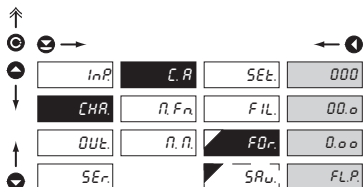
InP.	C. A	SEt.	000.
CHA.	N. Fn.	F IL.	00.o
OUt.	N. N.	FOr.	0.o o
SEr.		SAu.	FL.P.

FOr. 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."

000. Setting DP - XXX.

- **DEF**

00.o Setting DP - XX.x

0.o o Setting DP - X.xx

FL. P. Floating DP

6.2.1e — Selection of storing data into instrument memory
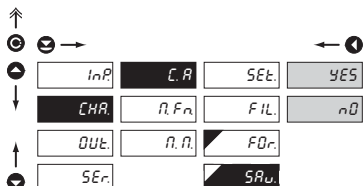
|			
InP.	C. A	SEt.	YES
CHA.	N. Fn.	F IL.	nO
OUt.	N. N.	FOr.	
SEr.		SAu.	

SAu. 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)

YES Measured data are stored in the memory

nO Measured data are not stored

6.2.2a Mathematic functions

Selection of mathematic functions

OFF. Mathematic functions are off

NUL. Polynome

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

1/N. 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

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

POu. Power

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

rt. Root

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

Sin Sin x

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

C. - 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

InP.	C. A	n. F.	000
CHA.	n. Fn.	C. A	00.o
OUt.	n. n.	C. b	0.oo
SEr.		C. C	FL.P. DEF
		C. d	
		C. E	
		C. F	
		FOr.	
		SAv.	

FOr. — 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."

000.	Setting DP - XXXXXX.
00.o	Setting DP - XXXXX.x
0.oo	Setting DP - XXXX.xx
FL. P.	Floating DP

- DEF

6.2.2c Mathematic functions - selection of storing data into instrument memory

InP.	C. A	n. F.	YES
CHA.	n. Fn.	C. A	nO
OUt.	n. n.	C. b	
SEr.		C. C	
		C. d	
		C. E	
		C. F	
		FOr.	
		SAv.	

SAv. — 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)

YES	Measured data are stored in the memory
nO	Measured data are not stored

6.2.3	Selection of evaluation of min/max value
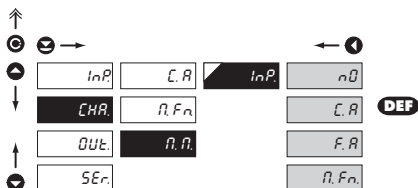
Selection of evaluation of min/max value

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

nO	Evaluation of min/max value is off
C. A	From "Channel A"
F. A	From "Channel A" after digital filters processing
N. Fn.	From "Mathematic functions"

profi

6.3 Setting „PROFI" - OUTPUTS

InP.	nEn.
CHA.	L In.
OUt	dAt.
SEr.	A. O.
	d IS.
	bAr.
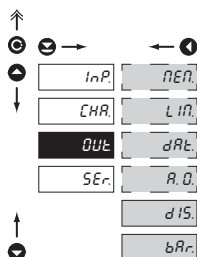
In this menu it is possible to set parameters of the instrument output signals

nEn.	Setting data logging into memory
L In.	Setting type and parameters of limits
dAt.	Setting type and parameters of data output
A. O.	Setting type and parameters of analog output
d IS.	Setting display projection and brightness
bAr.	Setting bargraph projection and brightness

6.3.1a Selection of mode of data logging into instrument memory

InP.	nEn.	rEu.	YES
CHA.	L In.	Str.	nO DEF
OUt	dAt.	StO.	
SEr.	A. O.	PEr.	
	d IS.	trG.	
	bAr.		
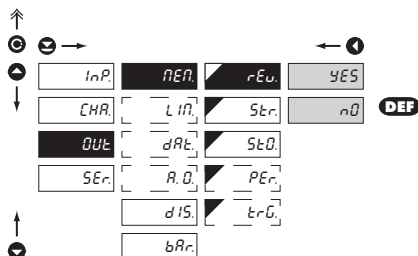
rEu. **Selection of the mode of data logging**

- 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.	NEN.	rEu.	Hr.
CHA.	LIN.	Str.	N In
OUt	dAt.	StO.	SEC.
SEr.	A. O.	PEr.	
	dIS.		
	bAr.		
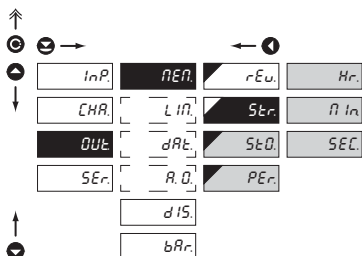
Str. Start of data logging into instrument memory
- time format HH.MM.SS

StO. 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 START and STOP
- time data hold valid for one day, where the logging is valid for every day without limitation
- time format HH.MM.SS
- item not displayed if "STORE" is selected in menu *(INP. > EXT.)*

6.3.1c **Setting data logging into instrument memory - FAST**

InP.	NEN.	rEu.	10'.
CHA.	LIN.	trG.	50'.
OUt	dAt.		90'.
SEr.	A. O.		rOL.
	dIS.		
	bAr.		
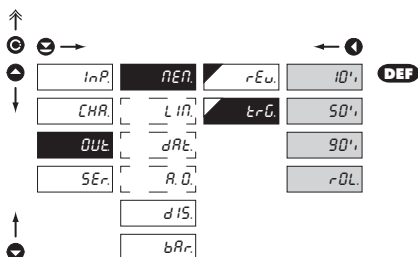
trG. **Setting logging data into inst. memory**
- logging data into inst. memory is governed by the folowing selection, which determines how many percent of the memory is reserved for data logging prior to initiation of trigger imputse
- initiation is on ext. input or control key

10'. Reser. of 10 % memory prior init. of data logging

50'. Reser. of 50 % memory prior init. of data logging

90'. Reser. of 90 % memory prior init. of data logging

rOL. After initiation of data logging the memory is cyclically transcribed

Description of relay function > HYSTER • FROM-TO • DOSING

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."

t

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**

InP.	nEn.	L. 1	InP.	n0
CHA.	LIn.	L. 2	n0d.	C. A	DEF
OUt	dAt.	L. 3	tYP.	F. A
SEr.	A. 0.	L. 4	L. 1	n. Fn.
	d IS.		H. 1	n In
	bAr.		On 1	nAH
			OF. 1	
			P. 1	
			t. 1	

!

Setting is identical for LIM 2, LIM 3 and LIM 4

InP.   **Selection evaluation of limits**

- selection of value from which the limit will be evaluated

n0   Limit evaluation is off

C. A   Limit evaluation from "Channel A"

F. A   Limit evaluation from "Channel A" after digital filters processing

n. Fn.   Limit evaluation from "Mathematic functions"

n In   Limit evaluation from "Min.value"

nAH   Limit evaluation from "Max.value"

6.3.2b   **Selection of type of limit**

InP.	nEn.	L. 1	InP.	HYS.	DEF
CHA.	LIn.	L. 2	n0d.	F- t.
OUt	dAt.	L. 3	tYP.	d0S.
SEr.	A. 0.	L. 4	L. 1	
	d IS.		H. 1	
	bAr.		On 1	
			OF. 1	
			P. 1	
			t. 1	

!

Setting is identical for LIM 2, LIM 3 and LIM 4

n0d.   **Selection the type of limit**

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

F- t   Frame limit
- for this mode the parameters are set for interval "ON. L." the relay switch-on and "OF. L." the relay switch-off

d0S.   Dosing limit (periodic)
- for this mode the parameters are set for "P. L." determining the limit value as well as its multiples at which the output is active and "T. L." indicating the time during which is the output active

6.3.2c Selection of type of output
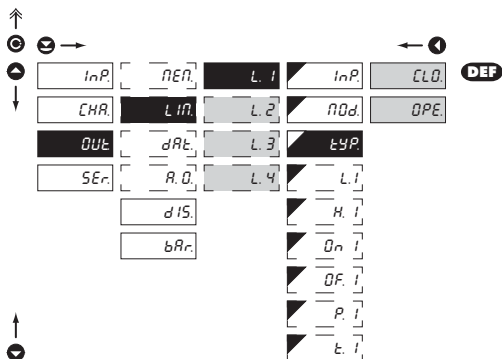
	Selection of type of output
EYP.	
CLO.	Output switches on when condition is met
OPE.	Output switches off when condition is met

!

Setting is identical for LIM 2, LIM 3 and LIM 4

6.3.2d Setting values for limits evaluation
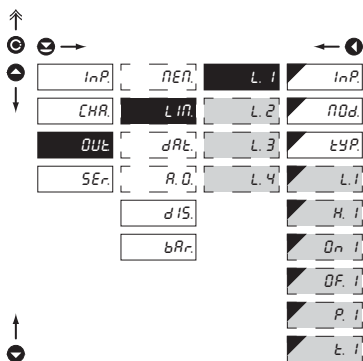
L.1	Setting limit for switch-on

- for type *"HYSTER"*

H. 1	Setting hysteresis

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

On.1	Setting the outset of the interval of limit switch-on

- for type *"FROM. ."*

OF. 1	Setting the end of the interval of limit switch-on

- for type *"FROM. ."*

P. 1	Setting the period of limit switch-on

- for type *"DOSING"*

t. 1	Setting the time switch-on of the limit

- for type *"HYSTER"* and *"DOSING"*
- positive time > relay switches on after crossing the limit (L. 1) and the set time (T. 1)
- negative time > relay switches off after crossing the limit (L.1) and the set negative time (T. 1)

!

Setting is identical for LIM 2, LIM 3 and LIM 4

6.3.3a Selection of data output baud rate

	Selection of data output baud rate
0.6	Rate - 600 Baud
1.2	Rate - 1 200 Baud
2.4	Rate - 2 400 Baud
4.8	Rate - 4 800 Baud
9.6	Rate - 9 600 Baud
19.2	Rate - 19 200 Baud
38.4	Rate - 38 400 Baud
57.6	Rate - 57 600 Baud
115	Rate - 115 200 Baud
230	Rate - 230 400 Baud

6.3.3b Setting instrument address

Add. Setting instrument address
- setting in range 0...31
- **DEF** = 00

A.No. Setting instrument address - MODBUS
- setting in range 1...247
- **DEF** = 1

A.No. Setting instrument address - PROFIBUS
- setting in range 1...127
- **DEF** = 1

profi

6.3.3c **Selection of data output protocol**

InP.	nEn.	bd	ASC.
CHA.	LIn.	Add.	n.bS.
OUt	dAt.	Ad.n	nOd.
SEr.	A. O.	A.Pb.	
	d IS.	PrO.	
	bAr.		

PrO.	**Selection of the type of analog output**
ASC.	Data protocol ASCII
n. bS.	Data protocol DIN MessBus
nOd.	Data protocol MODBUS-RTU

- option is available only for RS 485

6.3.4a **Selection of input for analog output**

InP.	nEn.	InP.	nO
CHA.	LIn.	A. t.	C. A
OUt	dAt.	A.Lo	F. A
SEr.	A. O.	A.H i	n. Fn.
	d IS.		n In
	bAr.		nAH

InP.	**Selection evaluation analog output**

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

nO	AO evaluation is off
C. A	AO evaluation from "Channel A"
F. A	AO evaluation from "Channel A" after

digital filters processing

n. Fn.	AO evaluation from "Math.functions"
n In	AO evaluation from "Min.value"
nAH	AO evaluation from "Max.value"

6.3.4b Selection of the type of analog output

InP.	nEn.	InP.	ˌ0
CHA.	LIn.	A.t.	E4
OUt	dAt.	A.Lo	ˌ4
SEr.	A.O.	A.Hi	ˌ5
	dIS.		u2
	bAr.		u5
			u10

DEF
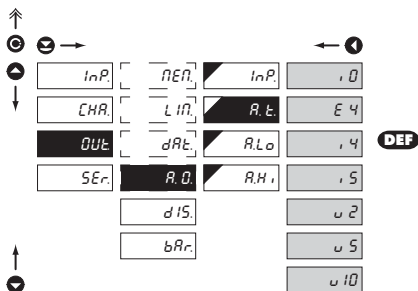
A.t.	**Selection of the type of analog output**

ˌ20	Type - 0...20 mA
E4	Type - 4...20 mA

- with indication of error statement
  (< 3,0 mA)

ˌ4	Type - 4...20 mA
ˌ5	Type - 0...5 mA
u2	Type - 0...2 V
u5	Type - 0...5 V
u10	Type - 0...10 V

6.3.4c Setting the analog output range

InP.	nEn.	InP.	0
CHA.	LIn.	A.t.	
OUt	dAt.	A.Lo	
SEr.	A.O.	A.Hi	
	dIS.		
	bAr.		
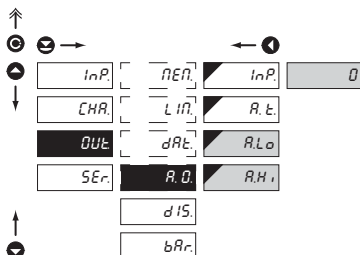
A.O.	**Setting the analog output range**

- 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

A.Lo	Assigning the display value to the beginning of

the AO range
- range of the setting is -99...999
- **DEF** = 0

A.Hi	Assigning the display value to the end of the

AO range
- range of the setting is -99...999
- **DEF** = 100

6.3.5a   Selection of input for display projection
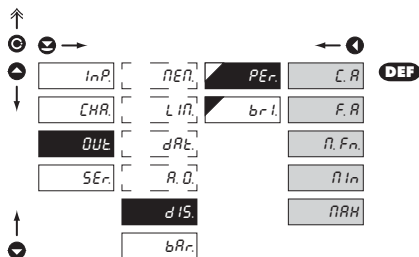
PEr.	Selection display projection

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

C. A	Projection of values from "Channel A"

F. A	Projection of values from "Channel A" after digital filters processing

N. Fn.	Projection of values from "Math.functions"

N In	Projection of values from "Min.value"

NAX	Projection of values from "Max.value"

6.3.5b   Selection of display brightness
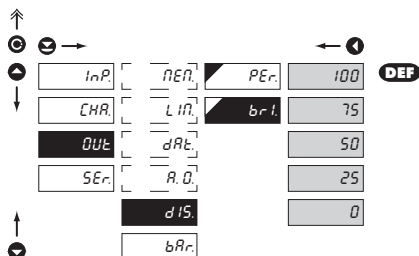
br I.	Selection of display brightness

- 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 %

6.3.6a Bargraph - Selection of projection input

InP.		InP.	n0
InP.	nEn.	InP.	n0
CHA.	LIn.	nOd.	C.A
OUt	dAt.	b.Lo	F.A
SEr.	A.O.	b.Hi	N.Fn.
	dIS.	COL.	nIn
	bAr.	SHL.	nAH
		brI.	

DEF
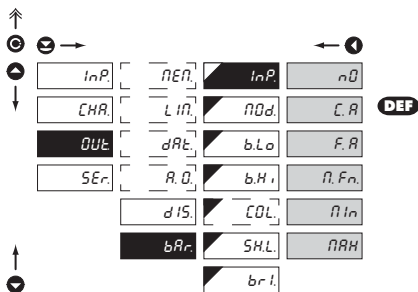
InP. Selection of bargraph evaluation

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

n0 Analog evaluation is off

C.A From "Channel A"

F.A From "Channel A" after digital filter modification

N.Fn. From "Mathematic function"

nIn From "Minimum va-lue"

nAH From "Maximum value"

6.3.6b Bargraph - Selection of projection mode

InP.	nEn.	InP.	bAr
CHA.	LIn.	nOd.	PO I.
OUt	dAt.	b.Lo	3 C.
SEr.	A.O.	b.Hi	3 b.
	dIS.	COL.	
	bAr.	SHL.	
		brI.	

DEF
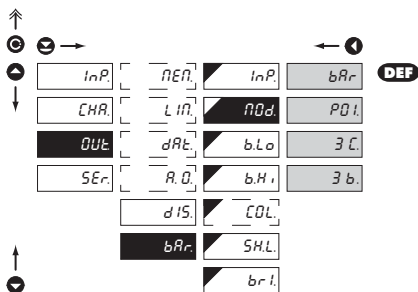
nOd. Selection of bargraph projection mode

bAr Column projection

- the display shows only a column in one colorĕ

PO I. Point projection

- the display shows one point in one color

3 C. 3-colored column projection

- change of color is determined by set limits *(COL. > BAND)*
- upon exceeding the limit the color of the entire display, i.e. there is always only one column of one color lit

3 b. 3-colored bar projection, cascade

- change of color is determined by the said limits *(COL. > BAND)*
- upon exceeding a limit color of the given display section is changing, i.e. the display may shine up to three colors at a time

6.3.6c Bargraph - Setting the projection range
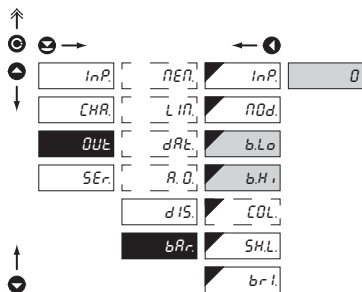
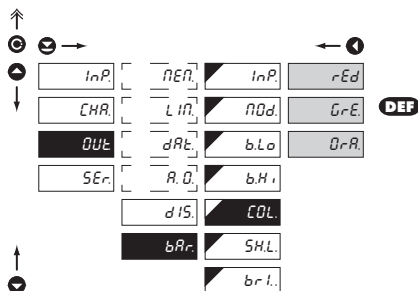| bAr. | **Setting the bargraph projection range** |

- setting is the same as the setting for main display projection

| b.Lo | Setting bargraph projection for minimum |

input signal value
- range of the setting is -99...999
- **DEF** = 0

| b.Hi | Setting bargraph projection for maximum |

input signal value
- range of the setting is -99...999
- **DEF** = 100

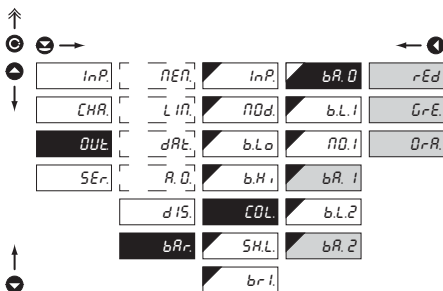**6.3.6d Bargraph - Setting color**

| COL. | **Selection of bargraph color** |

- the item "COLOR" is displayed only with selected mode ("BAR. > MOD.") "BAR." or "POI."

| rEd | Red color |

| GrE. | Green color |

| OrA. | Orange color |

6.3.6e Bargraph - Color setting

InP.	NEN.	InP.	bR. 0	rEd
CHR.	LIN.	NOd.	b.L.1	GrE.
OUt	dRt.	b.Lo	NO.1	OrR.
SEr.	R.O.	b.Hi	bR. 1	
	dIS.	COL.	b.L.2	
	bRr.	SHL.	bR. 2	
		brI.		

bR. 0 — Selection of bargraph color

- the item "COL." is displayed only with selected mode ("BAR. > MOD.") "3 C." or "3 B"

rEd — Red color

GrE. — Green color

OrR. — Orange color

- **DEF** = Green (Band 0)
- **DEF** = Orange (Band 1)
- **DEF** = Red (Band 2)

!

Setting is identical for BA. 1 and BA. 2

6.3.6f Bargraph - Setting the color changes bands

InP.	NEN.	InP.	bR. 0	33
CHR.	LIN.	NOd.	b.L.1	
OUt	dRt.	b.Lo	NO.1	
SEr.	R.O.	b.Hi	bR. 1	
	dIS.	COL.	b.L.2	
	bRr.	SHL.	bR. 2	
		brI.		
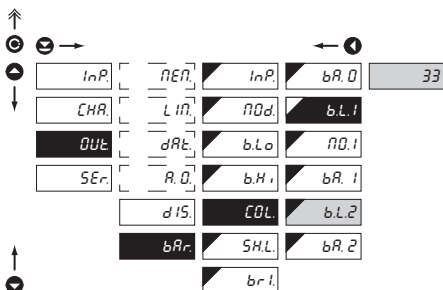
b.L. 1 — Setting color limits for color projection

- the item "COL." is displayed only with selected mode ("BAR. > MOD.") "3 C." or "3 B."
- items „b. L 1" and „b. L 2" determine the borders of the bargraph color changes

b. L. 1 — Boundary between bands 0 - 1

b. L. 2 — Boundary between bands 1 - 2
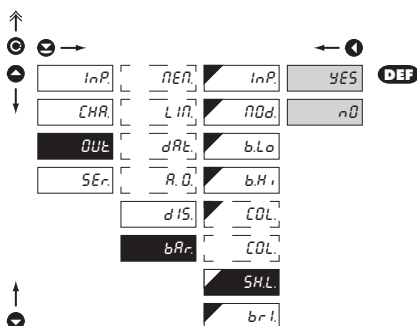
- **DEF** = 33 (b. L 1))
- **DEF** = 66 (b. L 2)

!

Setting is identical for B. L. 2

6.3.6g Bargraph - Selection of inverse projection

InP.		nEn.	InP.	bA. 0	nOr.	DEF
CHA.		L in.	nOd.	b.L. 1	Inu.	
OUt		dAt.	b.Lo	nO.1		
SEr.		A. 0.	b.H i	bA. 1		
		d iS.	COL.	b.L.2		
		bAr.	SH.L.	bA.2		
			br i.			
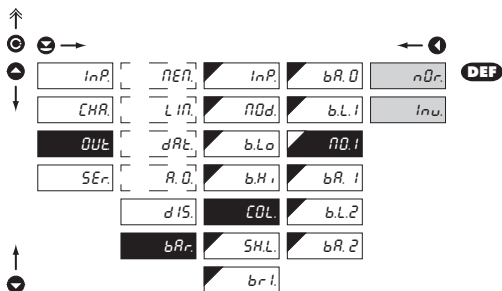
| nO.1 | **Selection of inverse projection of "Band 0"** |

- the item "COLORS" is displayed only with selected mode ("BAR. > MOD. ") "3 C." or "3 B."
- setting „b. A. 1" is designed for projection where indication of zero center is required

| nOr. | Column in "BA. 0" moves from left to right |
| Inu. | Column in "BA. 0" moves from right to left |

6.3.6h Bargraph - Selection of limits projection

InP.		nEn.	InP.	YES	DEF
CHA.		L in.	nOd.	nO	
OUt		dAt.	b.Lo		
SEr.		A. 0.	b.H i		
		d iS.	COL.		
		bAr.	COL.		
			SH.L.		
			br i.		

| SH.L. | **Selection of limit projection on the bargraph** |

- limits are always displayed orange, always by one degree lighter or darker

| YES | Limits are projected |
| nO | Limity are not projected |

6.3.6i Bargraph - Selection of display brightness

InP.		nEn.	InP.	100	DEF
CHA.		L in.	nOd.	75	
OUt		dAt.	b.Lo	50	
SEr.		A. 0.	b.H i	25	
		d iS.	COL.	0	
		bAr.	SH.L		
			br i.		
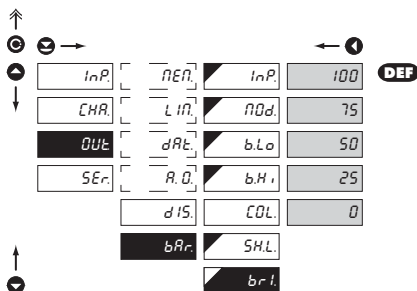
| br i. | **Selection of bargraph brightness** |

| 0 | Bargraph is off |

- after pres. the key the display lights up for 0 s

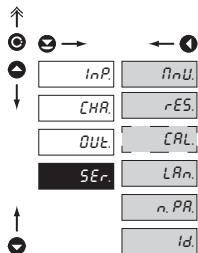| 25 | Brightness - 25 % |
50	Brightness - 50 %
75	Brightness - 75 %
100	Brightness - 100 %

> **!**
>
> *After restoration the instrument switches off for couple seconds*

6.4 Setting "PROFI" - SERVIS

The instrument service functions are set in this menu

AnU.	Selection of menu type LIGHT/PROFI
rES.	Restore instrument manufacture setting and calibration
CAL.	Input range calibration for „DU" version
LAn.	Language version of instrument menu
n. PA.	Setting new access password
Id.	Instrument identification

6.4.1 Selection of type of programming menu

AnU. **Selection of menu type - LiGHT/PROFI**

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

L IG. Active LIGHT menu

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

Pr O. Active PROFI menu

- complete programming menu for expert users
- tree menu

!
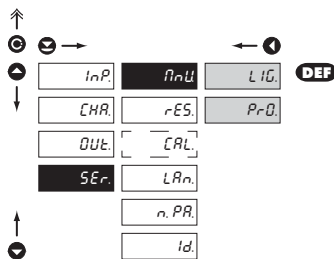
Change of setting is valid upon next access into menu

6.4.2 **Restoration of manufacture setting**

InP.	AnU.	CAL.	YES
CHA.	rES.	SEt.	
OUt.	CAL.	SAu.	
SEr.	LAn.		
	n.PA.		
	Id.		

InP.	AnU.	CAL.	tYP.
CHA.	rES.	SEt.	USE.
OUt.	CAL.	SAu.	
SEr.	LAn.		
	n.PA.		
	Id.		
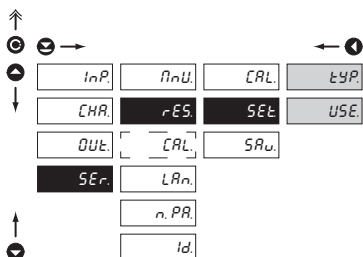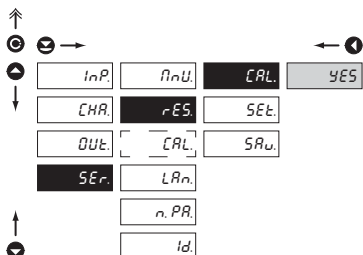
rES. **Restoration of manufacture setting**

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

CAL. Restoration of manufacture calibration of the instrument

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

SEt. **Restoration of instrument manufacture setting**

tYP. Restoration of instrument manufacture setting

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

USE. Restoration of instrument user setting

- generating the instrument user setting, i.e. setting stored under SER./RES./SAV.

SAu. Save instrument user setting

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

| 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	✓	✓
clears conduct resistances	✓	✓
restore manufacture calibration	✓	✗
restore manufacture setting	✗	✓

6.4.3 Calibration - Input range `DU`

|			
`InP.`	`AnU.`	`C.Lo.`	`YES`
`CHR.`	`rES.`	`C.H i.`	
`OUt.`	`CAL.`		
`SEr.`	`LAn.`		
	`n.PA.`		
	`Id.`		
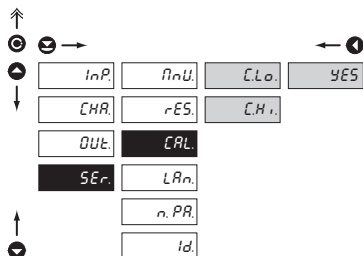
`CAL.` **Input range calibration**

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

- when "C. Hi." 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.`	`AnU.`	`C2E.`
`CHR.`	`rES.`	`EnG.` `DEF`
`OUt.`	`CAL.`	
`SEr.`	`LAn.`	
	`n.PA`	
	`Id.`	
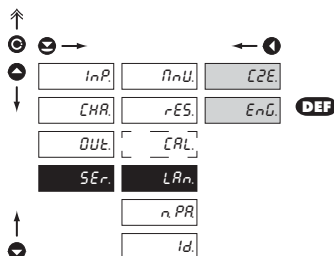
`LAn.` **Selection of instrument menu language version**

`C2E.` Instrument menu is in Czech

`EnG.` Instrument menu is in English

6.4.5 Setting new access password

`InP.`	`AnU.`	`P.L i.`	`0`
`CHR.`	`rES.`	`P.H i.`	
`OUt.`	`CAL.`		
`SEr.`	`LAn.`		
	`n.PA`		
	`Id.`		
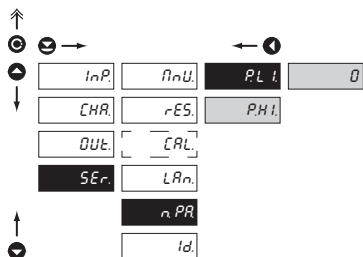
`n.PA.` **Setting new password for access to LIGHT and PROFI menu**

- this selection enables changing number code that blocks the access into LIGHT and PROFI Menu.
- range of the number code is 0...999
- universal passwords in the event of loss:
  LIGHT Menu > „177"
  PROFI Menu > „915"

6.4.6   Instrument identification
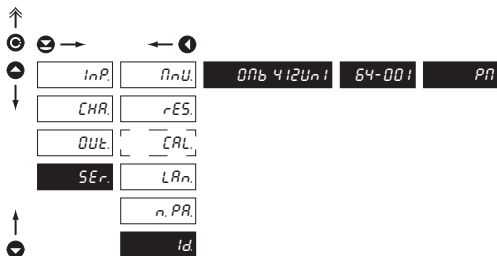
| | | Id.. | **Projection of instrument SW version** |

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

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

USER

Setting

- **For user operation**
- **Menu items are set by the user (Profi/Light) as per request**
- **Access is not password protected**

Setting

flashing legend - current setting is displayed

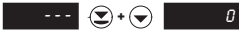`n0`   item will not be displayed in USER menu

`YES`   item will be displayed in USER menu with editing option

`SHO.`   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

setting projection sequence

- - - � + 🔽   **0**

Example:

Into USER menu were selected these items

(keys 😊 + 🔼) > C. *TA.*, *L. 1*, *L. 2*, *L. 3*, for which we have preset this sequence (keys 😊 + 🔽):

C. TA.   5
L. 1   0 (sequence not determined)
L. 2   2
L. 3   1

Upon entering USER menu

(key ⊙) items will be projected in the following sequence: L. 3 > L. 2 > C.TA. > L. 1

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

Measuring thermocouple

Reference thermocouple
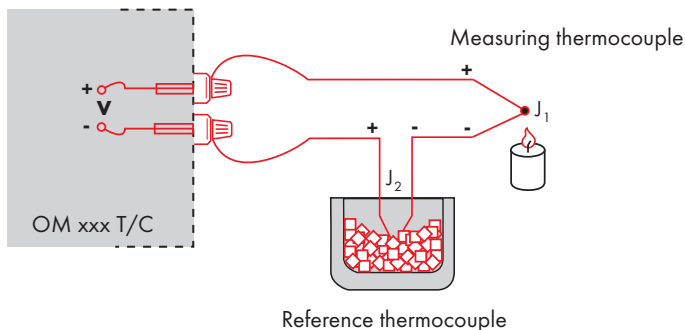
WITH REFERENCE THERMOCOUPLE

– 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 $In2$ or $EH2$

– when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu tCu its temperature (applies for setting CON to $EH2$)

– if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CON to $In2$. Based on this selection the measurement of the ambient temperature is 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 $In1$ or $EH1$

– when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CON to $EH1$)

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 na www.orbit.merret.cz/rs or in the OM Link program.

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	<SADR>	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	<SADR>	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>	$	N	P	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
	485	ASCII	#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>
		MessBus	<SADR>	$	N	P	(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>									
		MessBus OK	<DLE>	1											
		MessBus Bad	<NAK>												
Command confirmation (inst.) - OK	485	MessBus	!	A	A	<CR>									
Command confirmati (instrument) - Bad			?	A	A	<CR>									
Instrument identification			#	A	A	1Y	<CR>								
HW identification			#	A	A	1Z	<CR>								
One-time transmission			#	A	A	7X	<CR>								
Repeated transmission			#	A	A	8X	<CR>								

LEGEND

#	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>	addresa $+60_H$		Prompt to send from address
<EADR>	addresa $+40_H$		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"

ERROR	CAUSE	ELIMINATION
E. d. U	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E. d. O.	Number is too large to be displayed	change DP setting, channel constant setting
E. t. U	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. t. O.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. I. U	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E. I. O.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E. Hu	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.	Change of a linked item in the menu, Data in EEPROM outside the range	change of contiguous items, 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

INPUT

range is adjustbale **DC**

±60 mV	>100 MOhm	Input U
±150 mV	>100 MOhm	Input U
±300 mV	>100 MOhm	Input U
±1200 mV	>100 MOhm	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 MOhm	Input U
±250 V	20 MOhm	Input U
±500 V	20 MOhm	Input U

range is adjustbale **PM**

0/4...20 mA	< 400 mV	Input I
±2 V	1 MOhm	Input U
±5 V	1 MOhm	Input U
±10 V	1 MOhm	Input U
±40 V	1 MOhm	Input U

range is adjustbale **OHM**

0...100 Ohm	
0...1 kOhm	
0...10 kOhm	
0...100 kOhm	
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 Ohm, with 3 850 ppm/°C	
	US > 100 Ohm, with 3 920 ppm/°C	
	RU > 50/100 Ohm, 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 Ohm

PROJECTION

Display 1:	24-segment 3-color bargraph
Display2:	auxiliary 3-digit display, intensive red or green, 7-segment LED, letter height 9,1 mm
Projection:	24 LED/-99...999
Decimal point:	adjustbale - 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**
	±0,3 % of range + 1 digit	**PWR**
Resolution:	0,01°/0,1°/1°	**RTD**
Rate:	0,1...40 measurements/s**	
Overload capacity:	10x (t < 100 ms) not for 400 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 Ohm/100 Ohm	**RTD**
Comp. of cold junct.:	adjustable, 0°...99°C or automatic	**T/C**
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:	-99...999
Hysteresis:	0...999
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

ANALOGO OUTPUTS

Type:	isolated, programmable with resolution of max.10 000 points, analog output corresponds with displayed data, type and range are adjustable
Non-linearity:	0,2 % of range
TC:	50 ppm/°C
Rate:	response to change of value < 150 ms
Voltage:	0...2 V/5 V/10 V
Curernt:	0...5/20 mA/4...20 mA
	- compensation of conduct to 500 Ohm/12 V or 1 000 Ohm/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, 10 VA, isolated,
	- fuse inside (T 4000 mA)
	80...250 V AC/DC, 10 VA, isolated
	- fuse inside (T 630 mA)

MECHANIC PROPERTIES

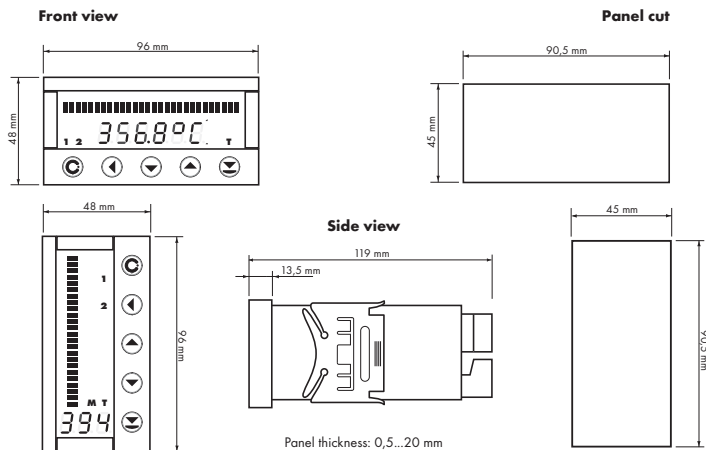|	
Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	96 x 48 x 120 mm
Panel cut-out:	90,5 x 45 mm

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.:	0°...60°C
Storage temp.:	-10°...85°C
Cover:	IP65 (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 resistance:	for pollution degree II, measurement category III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11; EN 550222, A1, A2

**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

356.8°C

Panel cut

90,5 mm

45 mm

48 mm

96 mm

Side view

119 mm

13,5 mm

45 mm

90,5 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
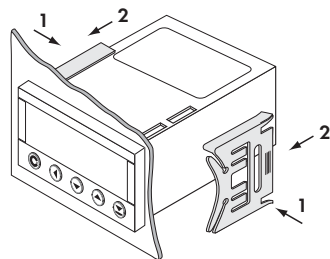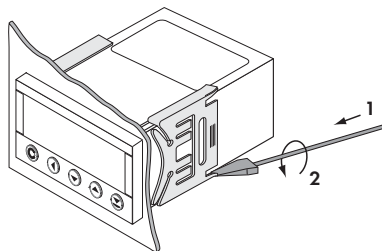
Instrument disassembly

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	**OMB 412UNI**	**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

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: 4-digit programmable panel instrument

Type: **OMB 412**

Version: UNI, PWR

It has 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. 18/2003 Coll., on electromagnetic compatibility (directive no. 89/336/EHS)

The product qualities are in conformity with harmonized standard:

El. safety: EN 61010-1
EMC: EN 50131-1, chapter 14 and chapter 15

EN 50130-4, chapter 7	EN 61000-4-11
EN 50130-4, chapter 8	EN 61000-4-11
EN 50130-4, chapter 9	EN 61000-4-2
EN 50130-4, chapter 10	EN 61000-4-3
EN 50130-4, chapter 11	EN 61000-4-6
EN 50130-4, chapter 12	EN 61000-4-4
EN 50130-4, chapter 13	EN 61000-4-5
EN 61000-4-8	
EN 61000-4-9	
EN 61000-6-1	
EN 61000-6-2	
EN 55022, chapter 5 and chapter 6	

The product is furnished with CE label issued in 2007.

As documentation serve the protocoles of authorized and accredited organizations:
MO ČR, Agency for development of informatics, testing lab no.1558, accredited ČIA, in compliance with EN ISO/EIC 17025

Place and date of issue: Prague, 15. Januar 2007   Miroslav Hackl v.r.
                                                 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