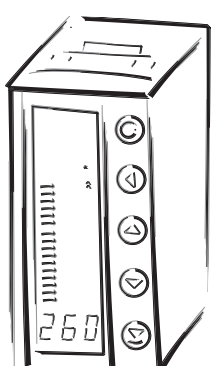
GUARANTEE
5
YEARS

# 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.

CE

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www.orbit.merret.cz

## 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 100/Pt 500/Pt 1000 |
| ***RTD-Ni:*** | Ni 1 000/Ni 10 000 |
| ***T/C:*** | J/K/T/E/B/S/R/N |
| ***DU:*** | Linear potentiometer (min. 500 Ω) |

***type UNI, option A***

| | |
|---|---|
| ***DC:*** | 0...1 A/0...5 A/±30 V/±120 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**

| | |
|---|---|
| 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

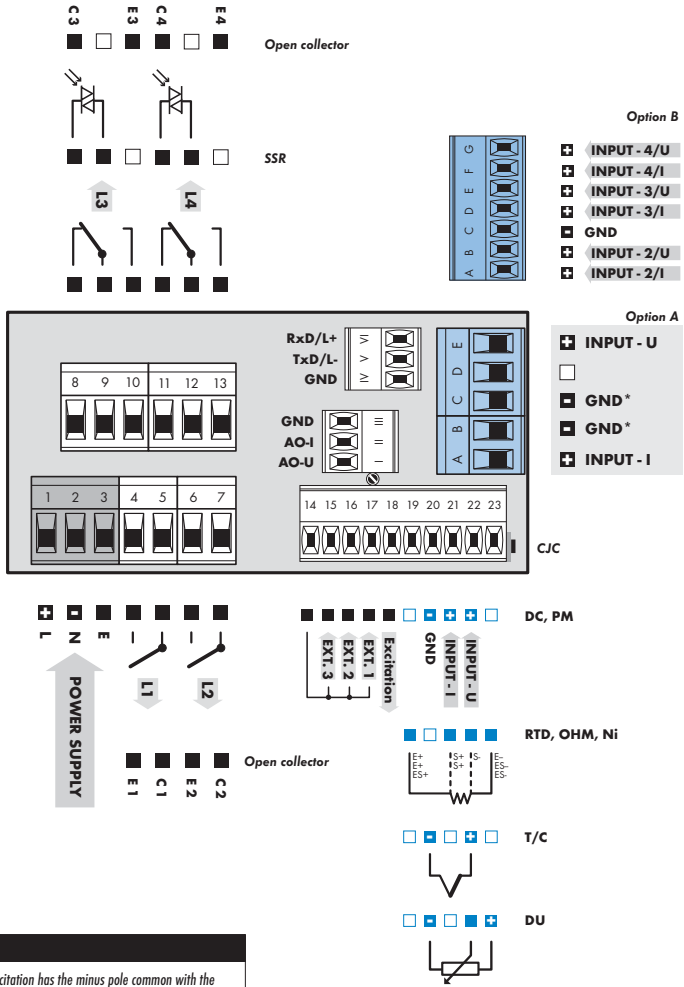
| Type | Input I | Input U |
|---|---|---|
| **DC** | 0...60/150/300/1 200 mV | |
| **PM** | 0...5/20 mA/4...20 mA | ±2/±5/±10/±40 V |
| **OHM** | 0...0,1/1/10/100 kΩ/Auto | |
| **RTD-Pt** | Pt 50/100/Pt 500/ Pt 1 000 | |
| **RTD-Cu** | Cu 50/100 | |
| **RTD-Ni** | Ni 1 000/10 000 | |
| **T/C** | J/K/T/E/B/S/R/N | |
| **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)<br>±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 |




**!**

*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*

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**
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- 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

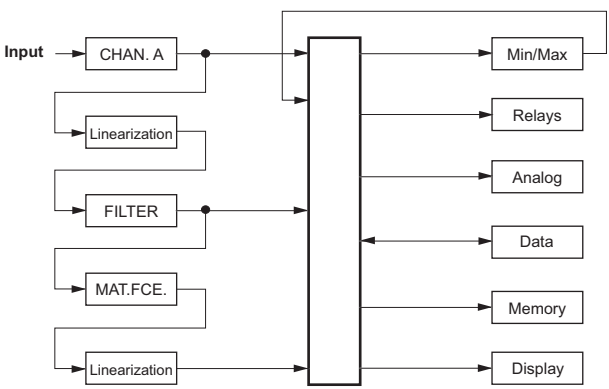
All programmable parameters are stored in the EEPROM memory (they hold even after the instrument is switched off).

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

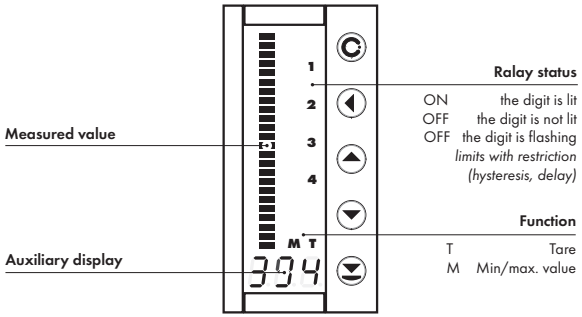
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.

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.




## 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

symbol indicates a flashing light (symbol)

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

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

continues on page 30

## Setting the decimal point and the minus sign

### DECIMAL POINT

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

### THE MINUS SIGN

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

## Control keys functions

| Key | Measurement | Menu | Setting numbers/selection |
|---|---|---|---|
| C | 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 |
| C + ▼▼ | access into LIGHT/PROFI menu | | |
| C + ▼ | 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



| | |
|---|---|
| nO | 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"

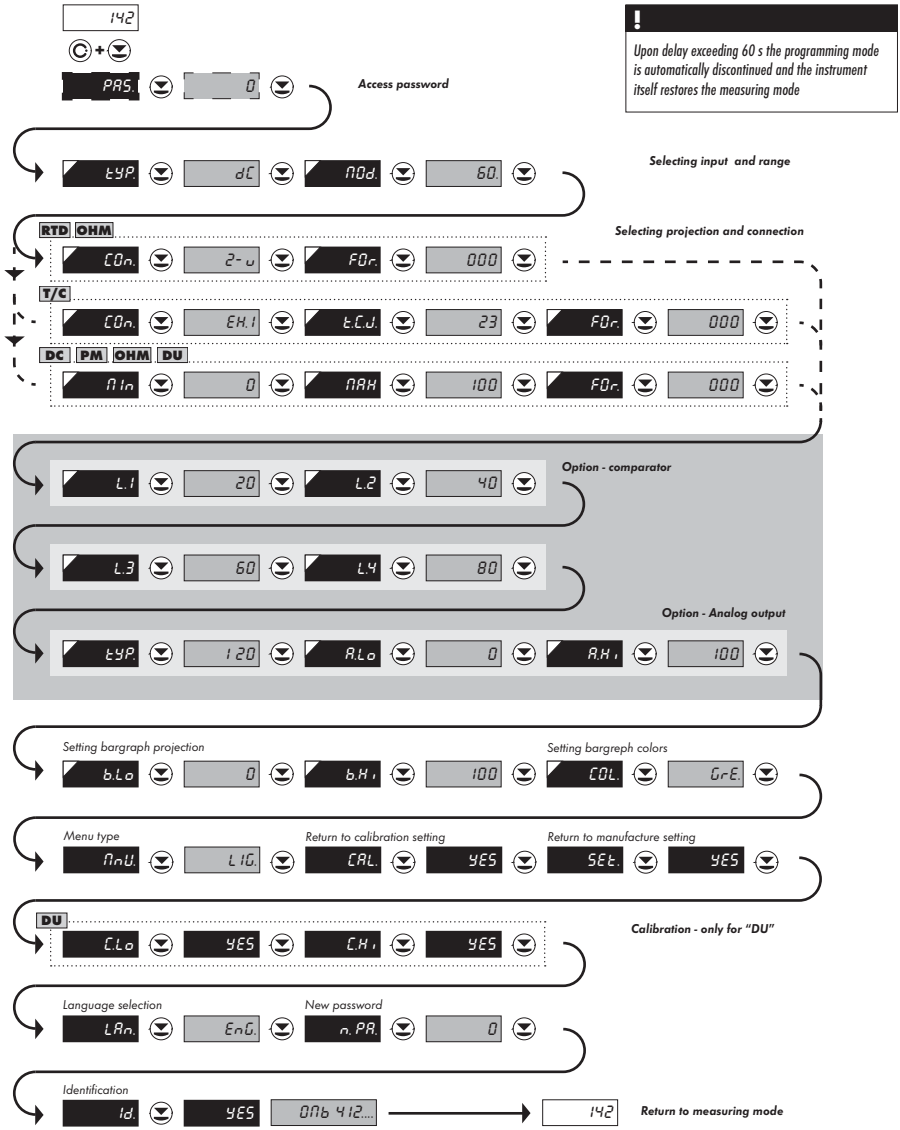
**LIGHT** **Simple programming menu**

- contains only items necessary for instrument setting and is protected by optional number code



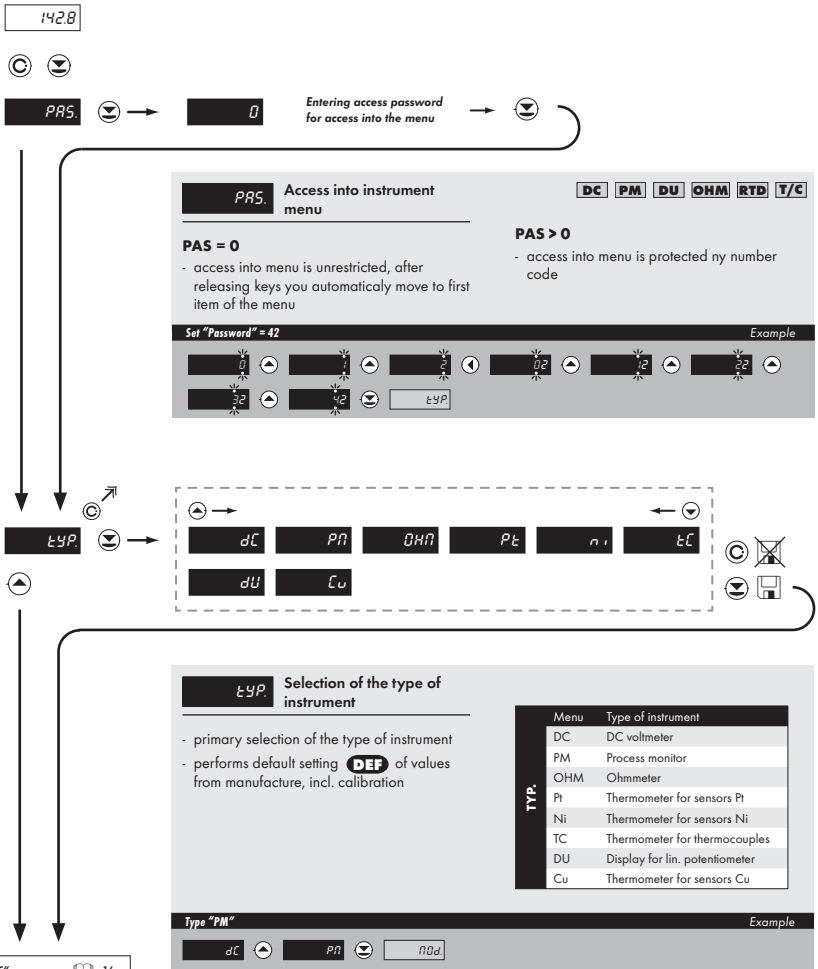

- **For capable users**
- **Only items necessary for instrument setting**
- **Access is password protected**
- **Possibility to arrange items of the „User" menu**
- **Linear menu structure**

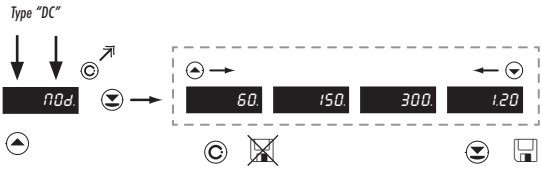
| Preset from manufacture | |
|---|---|
| *Password* | *"0"* |
| *Menu* | *LIGHT* |
| *USER menu* | *off* |
| *Setting the items* | DEF |




**!**

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






**n0d. Selection of the instrument measuring range**

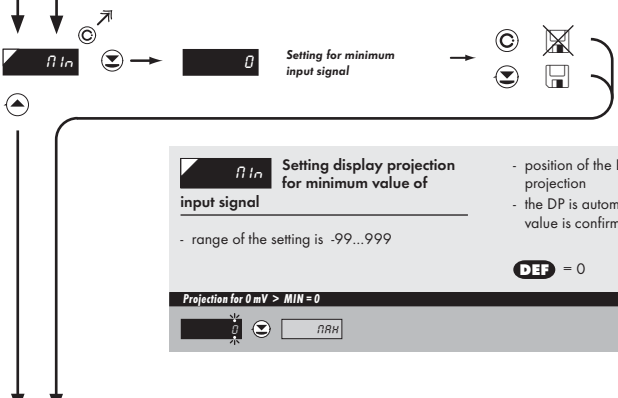
DEF = 60 mV

DEF = 500 V*

* only for option "A"

| | Menu | Measuring range |
|---|---|---|
| MODE | 60. | ±60 mV |
| | 150. | ±150 mV |
| | 300. | ±300 mV |
| | 1.20 | ±1,2 V |
| MODE - A | 100 | ±100 V |
| | 250 | ±250 V |
| | 500 | ±500 V |
| | 0.10 | ±0,1 A |
| | 0.25 | ±0,25 A |
| | 0.50 | ±0,5 A |
| | 1.00 | ±1 A |
| | 5.00 | ±5 A |

*Range ±150 mV* *Example*

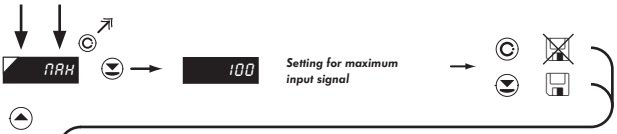




**n in Setting display projection for minimum value of input signal**

- 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 mV > MIN = 0* *Example*




**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 150 mV > MAX = 350*** *Example*

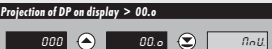


**FOr.** **Setting projection of the decimal point**

DEF = 000

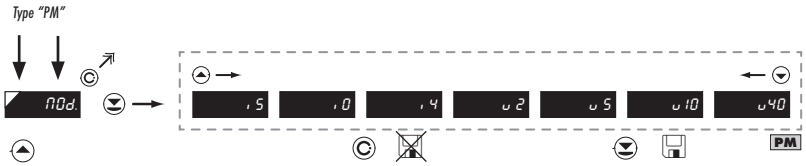
- positioning of the DP is set here in the measuring mode

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




**subsequent item on the menu depends on instrument equipment*

32




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

DEF = 4 - 20 mA

| MOD. | 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 |

*Range 0...20 mA* *Example*

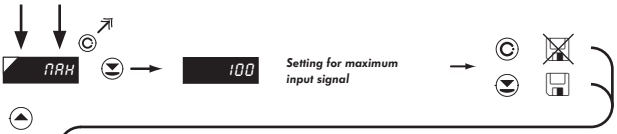


**nIn** **Setting display projection for minimum value of input signal**

- 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*




**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 20 mA > MAX = 250** *Example*

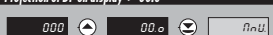


**FOr** **Setting projection of the decimal point**

DEF = 000

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

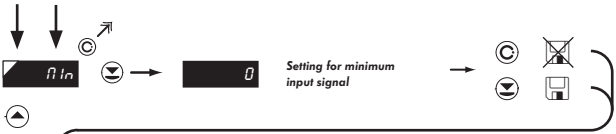
**Projection of DP on display > 00.0** *Example*




** subsequent item on the menu depends on instrument equipment*

32

*Type "DU"*



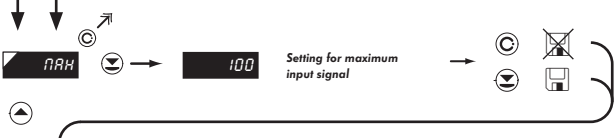

**Min** **Setting display projection for minimum value of input signal**

- 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*

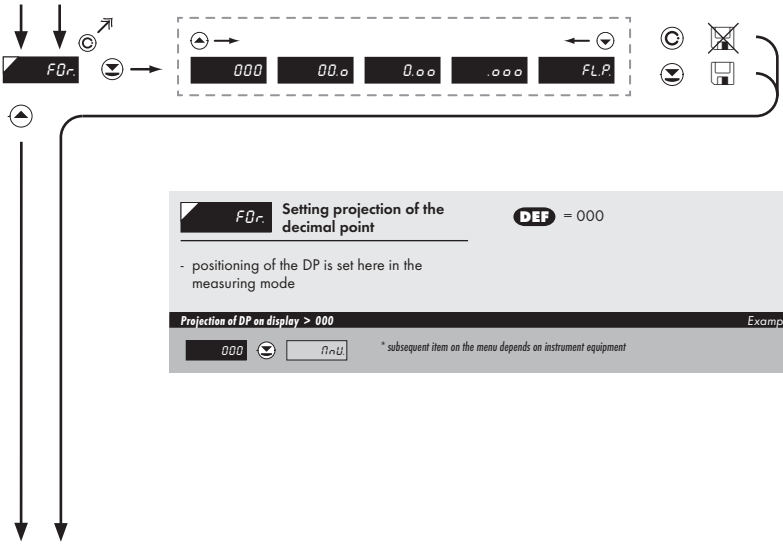

**MAX** **Setting display projection for maximum value of input signal**

- 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*




**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 ▼ AnU

** 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***


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

DEF = 100 Ω

| MODE | Menu | Measuring range |
|---|---|---|
| | 100 R | 0...100 Ω |
| | 1 k | 0...1 kΩ |
| | 10 k | 0...10 kΩ |
| | 100 k | 0...100 kΩ |
| | AUTO | Autorange |

*Range 0...10 kΩ* *Example*

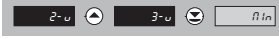


**COn.** **Selection of the type of sensor connection**

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*



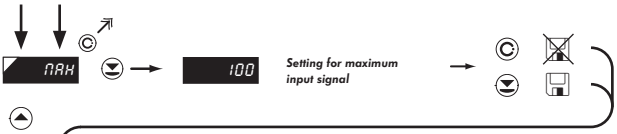


**nIn** **Setting display projection for minimum value of input signal**

- 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*

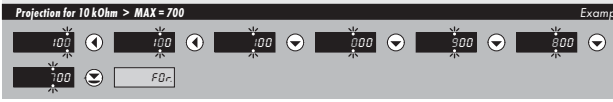



**nAH Setting display projection for maximum value of input signal**

- 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*



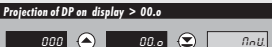


**FOr Setting projection of the decimal point**

DEF = 000

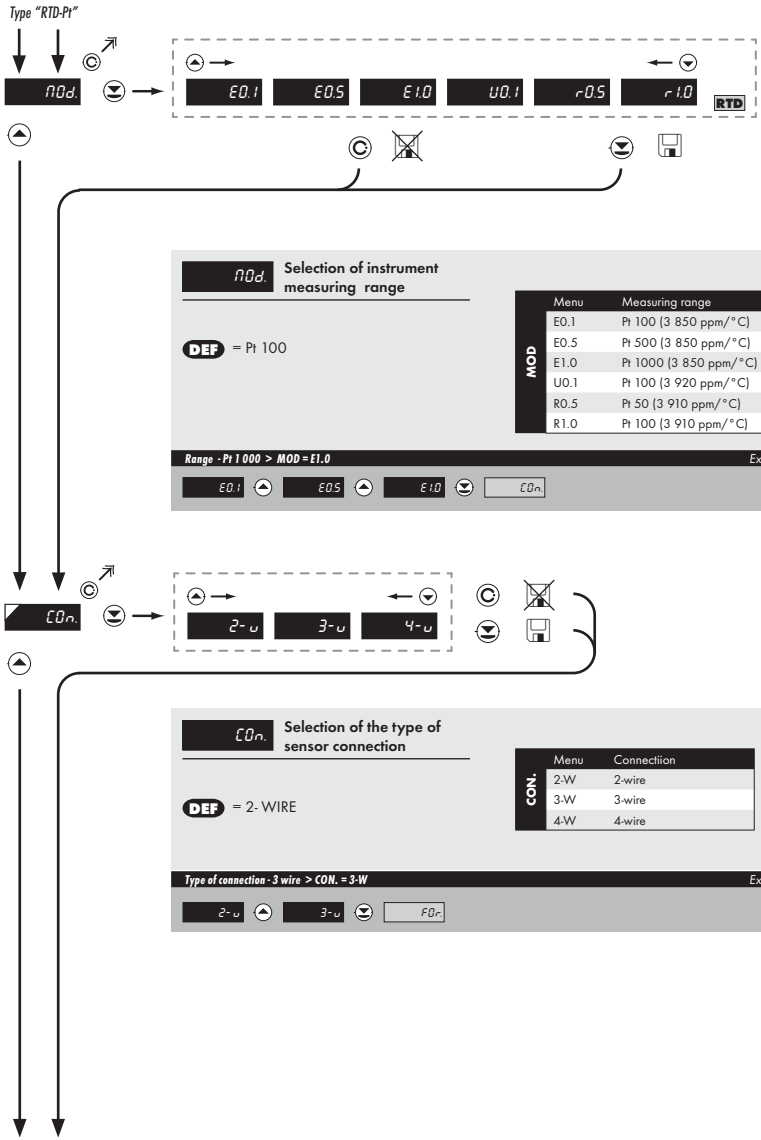
- positioning of the DP is set here in the measuring mode

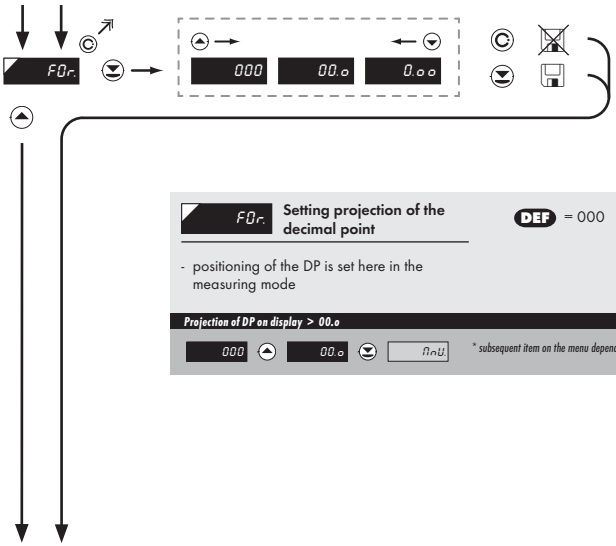
*Projection of DP on display > 00.0* — *Example*




* subsequent item on the menu depends on instrument equipment

32


Type "RTD-Pt"
nOd.
E0.1
E0.5
E1.0
U0.1
r0.5
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)
R0.5
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.
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




32

**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 > 00.0*** *Example*




** subsequent item on the menu depends on instrument equipment*


### nOd. Selection of instrument measuring range

DEF = Cu 50/4 280 ppm

| MOD. | Menu | Measuring range |
|---|---|---|
| | 8-5 | Cu 50 (4 280 ppm/°C) |
| | 8-1 | Cu 100 (4 280 ppm/°C) |
| | 6-5 | Cu 50 (4 260 ppm/°C) |
| | 6-1 | Cu 100 (4 260 ppm/°C) |

***Range - Cu-50/4 260 ppm > MOD. = 6-5*** *Example*

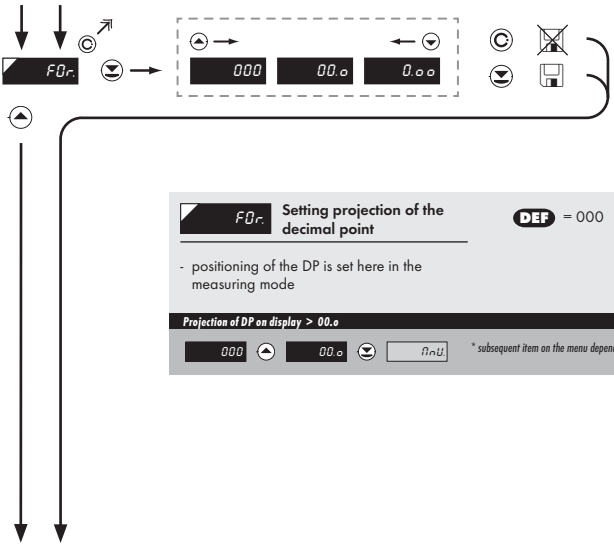


### COn. Selection of the type of sensor connection

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*




**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 > 00.0*** *Example*

000 00.0 nnU

** subsequent item on the menu depends on instrument equipment*


**MOd.** **Selection of instrument measuring range**

DEF = Ni 1 000 - 5 000 ppm/°C

| MOD. | 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*

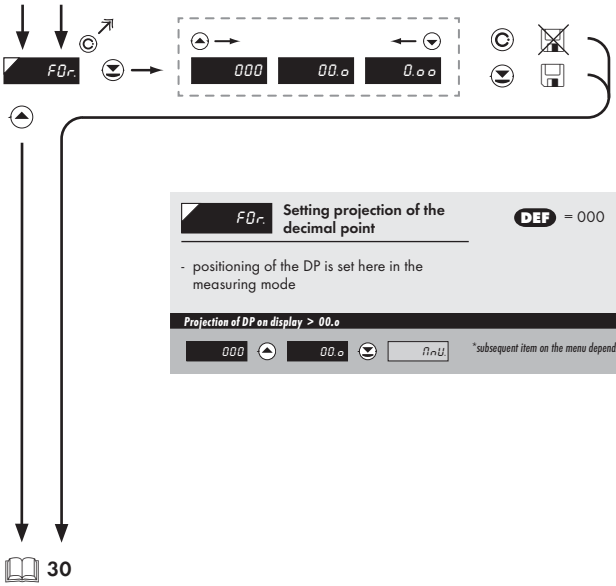


**CON.** **Selection of the type of sensor connection**

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*




**FOr.** **Setting projection of the decimal point**

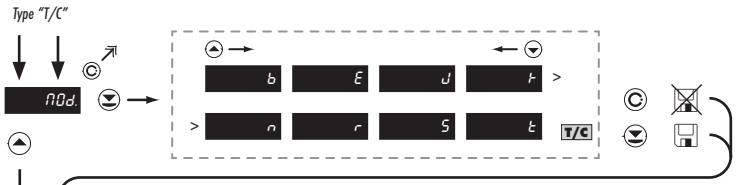
DEF = 000

- 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*



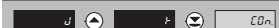

**MOd.** **Selection of the type of thermocouple**

- setting the input range depends on the measuring range ordered

DEF = Type "J"

| MOD. | 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 |

*Type of thermocouple "K"* *Example*



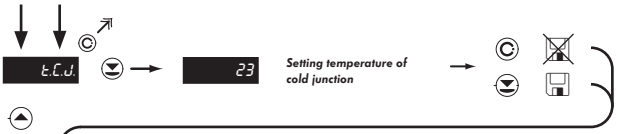


**CON.** **Selection of the type of sensor connection**

DEF = EX. 1

| CON. | 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 | ✓ |

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




**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*

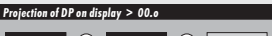


**FOr.** **Setting projection of the decimal point**

DEF = 000

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

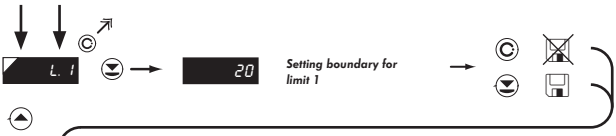
*Projection of DP on display > 00.0* *Example*




** subsequent item on the menu depends on instrument equipment*

> **!**
>
> *For thermocouple 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*



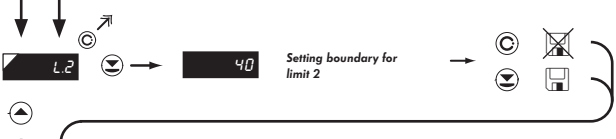

**L.1** **Setting boundary for limit 1**

- 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*

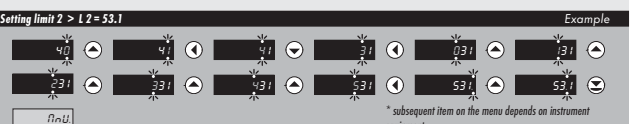

**L.2** **Setting boundary for limit 2**

- 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

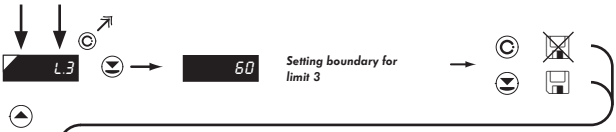
*Setting limit 2 > L 2 = 53.1* *Example*




** subsequent item on the menu depends on instrument equipment*

**!**

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



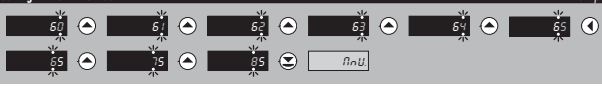

**L.3** **Setting boundary for limit 3**

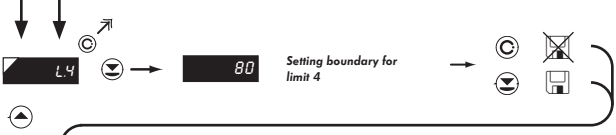
- range of the setting is -99...999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 60

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




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

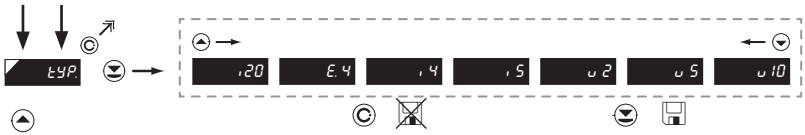
- range of the setting is -99...999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 80

*Setting limit 4 > L4 = 103* *Example*


** subsequent item on the menu depends on instrument equipment*

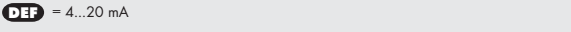


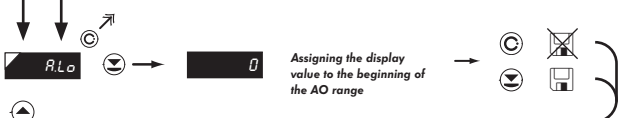

### tYP. Setting the type of analog output

| 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*




***Assigning the display value to the beginning of the AO range***

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

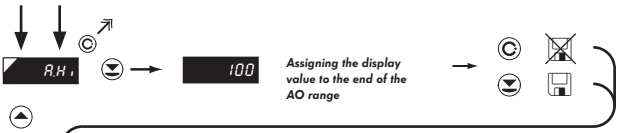
**DEF** = 0

- 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 **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*


**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*



**b.Hi** **Setting bargraph projection for maximum input signal value**

DEF = 100

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

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



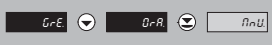
**Select bargraph color**

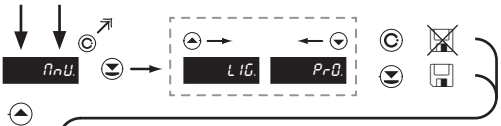
- the color for bargraph in basic mode "Column" is set here

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

DEF = Green

***Selection of bargraph color > Orange*** *Example*






**MNU.** **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*

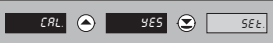


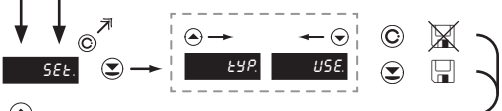
**CAL.** **Restoration of manufacture calibration**

- 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*



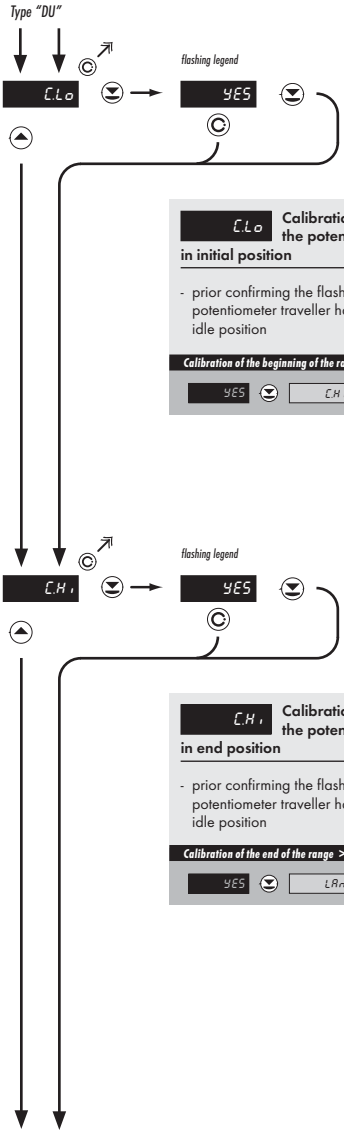

**SET.** **Restoration of manufacture instrument setting**

- 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*


** subsequent item on the menu depends on instrument type, for "DU" > "K. MIN"*

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




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

*Only for type "DU"*

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

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

YES → C.Hi

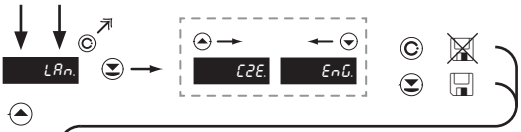
**C.Hi** **Calibration of input range - the potentiometer traveller in end position**

*Only for type "DU"*

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

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

YES → LAn




### LAn. Selection of language in instrument menu

- selection of language version of the instrument menu

DEF = ENG.

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

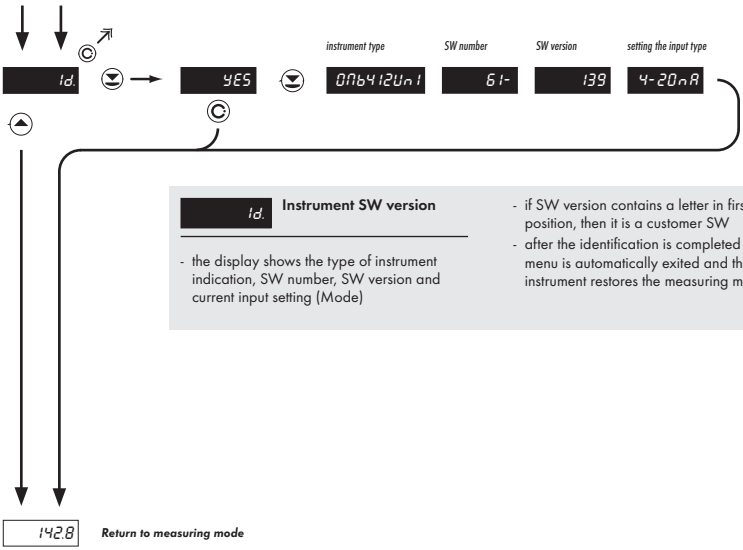


### n.PA. Setting new access password

- 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 > N.PA. = 341* — *Example*




**Id. Instrument SW version**

- the display shows the type of instrument indication, SW number, SW version and current input setting (Mode)
- if SW version contains a letter in first position, then it is a customer SW
- after the identification is completed the menu is automatically exited and the instrument restores the measuring mode

## 6.0 Setting "PROFI"

**PROFI** **Complete programming menu**

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




- **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

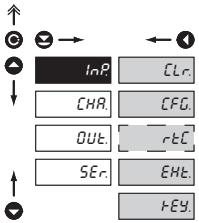
C + ▼

- temporary switch-over to **PROFI** menu, which is suitable to edit a few items
- after quitting **PROFI** menu the instrument automatically switches to **LIGHT** menu
- access is password protected (if it was not set under item N. PA. =0)

C + ▲

- access into **LIGHT** menu and transition to item „MNU" with subsequent selection of „PROFI" and confirmation
- after re-entering the menu the **PROFI** type is active
- access is password protected (if it was not set under item N. PA. =0)

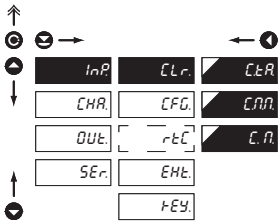
## 6.1 Setting "PROFI" - INPUT




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
- EHt. Setting external inputs functions
- FEY. Assigning further functions to keys on the instrument

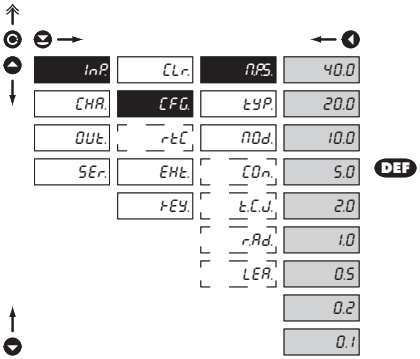
### 6.1.1 Resetting internal values




**CLr. Resetting internal values**

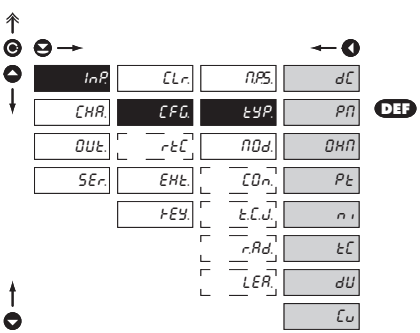
- CtA. Tare resetting
- CMM. Resetting min/max value
  - resetting memory for the storage of minimum and maximum value achieved during measurement
- C.M. Resetting the instrument memory
  - resetting memory with data measured in the "FAST" or "RTC" modes
  - not in standard equipment

## 6.1.2a Selection of measuring rate

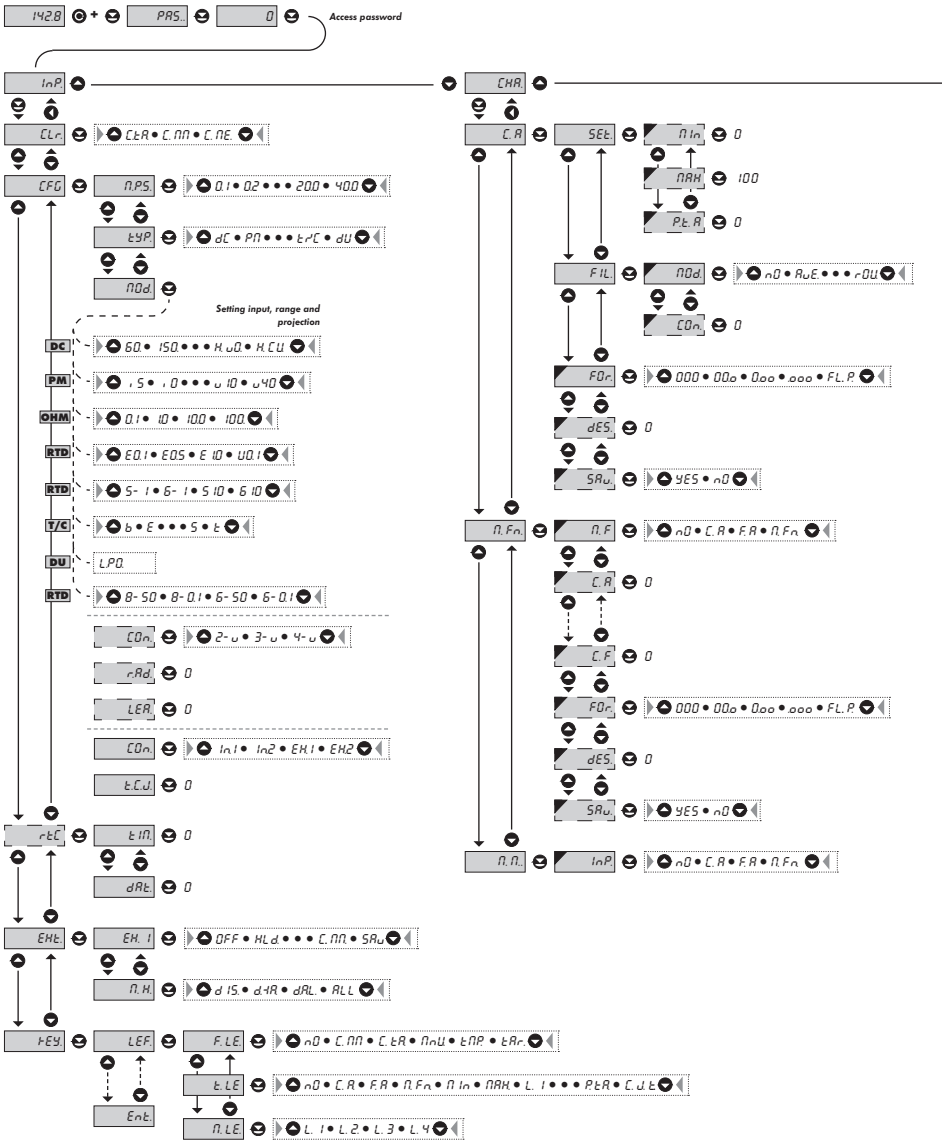


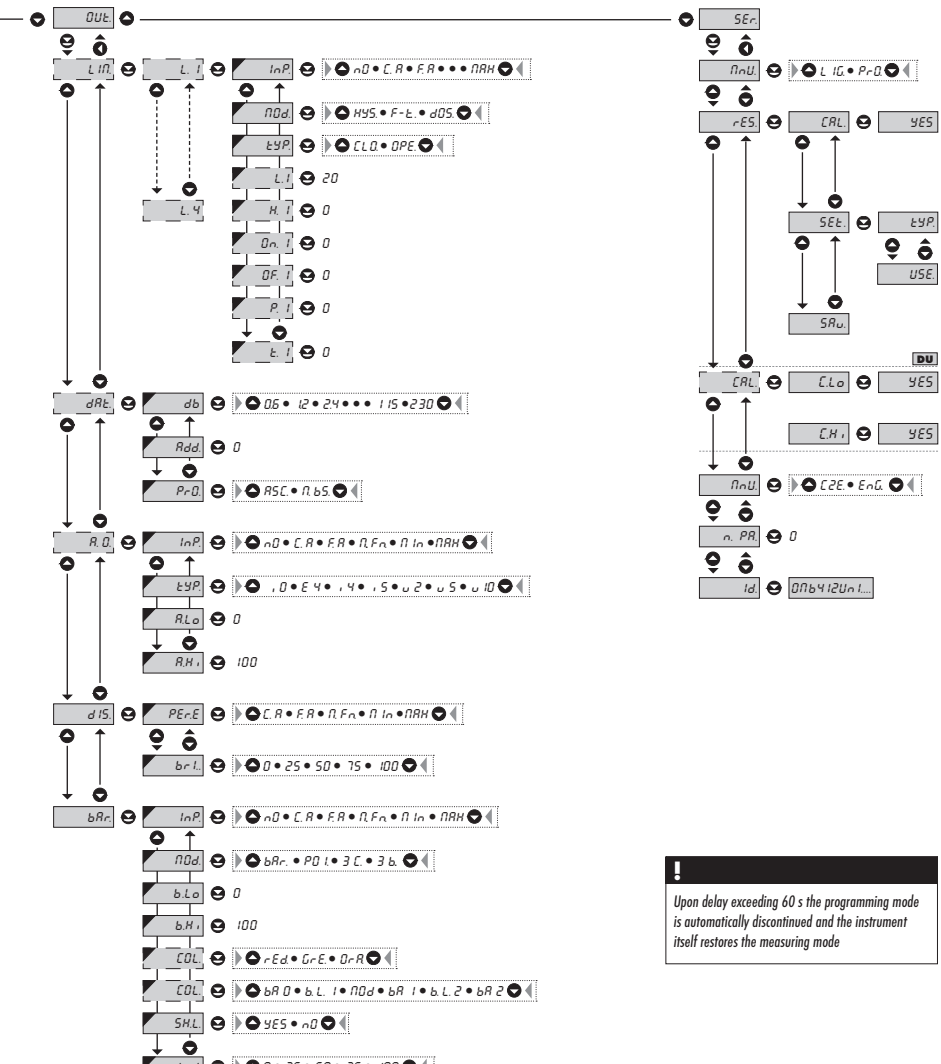

| nPS. | Selection of measuring rate |
|---|---|
| 40.0 | 40,0 measurements/s |
| 20.0 | 20,0 measurements/s |
| 10.0 | 10,0 measurements/s |
| 5.0 | 5,0 measurements/s |
| 2.0 | 2,0 measurements/s |
| 1.0 | 1,0 measurement/s |
| 0.5 | 0,5 measurements/s |
| 0.2 | 0,2 measurements/s |
| 0.1 | 0,1 measurements/s |

## 6.1.2b Selection of „instrument" type




| tYP. | Selection of „instrument" type |
|---|---|
| | - selection of particular type of "instrument" is bound to relevant dynamic items |
| dC | DC voltmeter |
| PM | Process monitor |
| OHM | Ohmmeter |
| Pt | Thermometer for Pt xxx |
| n i | Thermometer for Ni xxxx |
| tC | Thermometer pro thermocouples |
| dU | Display for linear potentiometers |
| Cu | Thermometer for Cu xxx |

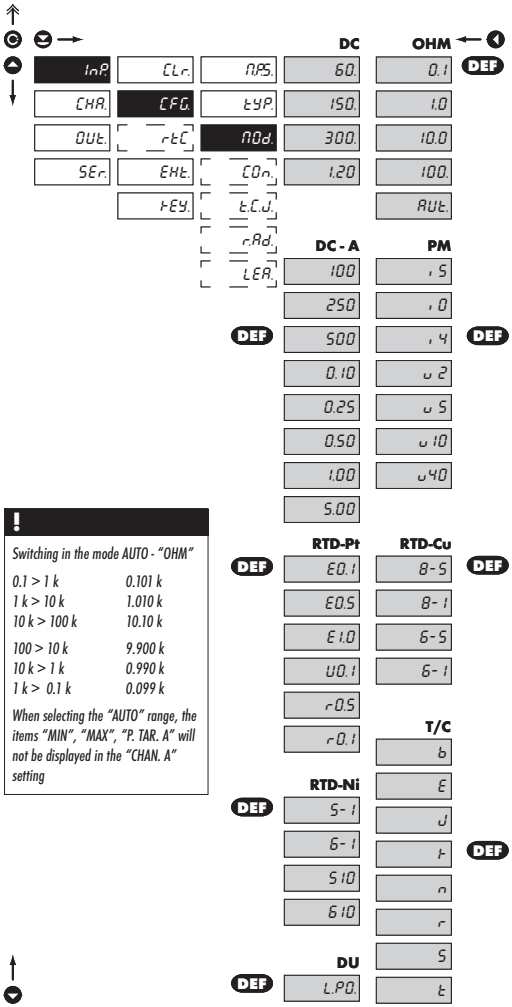

1428
PAS..
0
Access password
InP
CLr
CLEA • C.ANN • C.NE
CFG
n.PS.
0.1 • 0.2 • • • 200 • 400
tYP
dC • PA • • • trC • dU
nOd
Setting input, range and projection
DC
60 • 150 • • • H.U0 • H.CU
PM
, 5 • , 0 • • • U.10 • U.40
OHM
0.1 • 10 • 100 • 100
RTD
E0.1 • E0.5 • E 10 • U0.1
RTD
5- 1 • 6- 1 • 5.10 • 6.10
T/C
b • E • • • S • t
DU
L.P0.
RTD
8-50 • 8-0.1 • 6-50 • 6-0.1
COn
2-U • 3-U • 4-U
rAd
0
LER
0
COn
In.1 • In.2 • EH.1 • EH.2
t.C.d
0
rtC
t.in.
0
dAt
0
EHt
EH. 1
OFF • HEd • • • C.AN • SAU
n.H.
d 15 • d.tR • dAL • ALL
tEY
LEF
F.LE.
n0 • C.AN • C.tA • AnU • tAP • tAr
t.LE
n0 • C.A • F.A • n.Fn • n.in • nAH • L. 1 • • • P.tA • C.d.t
Ent.
n.LE.
L. 1 • L.2 • L.3 • L.4
CHA
C.A
SEt.
n.in
0
nAH
100
P.t.A
0
FIL.
nOd
n0 • A.uE • • • rOU
COn
0
FOr
000 • 00.0 • 0.00 • 000 • FL.P
dES
0
SAU
YES • n0
n.Fn
n.F
n0 • C.A • F.A • n.Fn
C.A
0
C.F
0
FOr
000 • 00.0 • 0.00 • 000 • FL.P
dES
0
SAU
YES • n0
n.n.
InP
n0 • C.A • F.A • n.Fn




**!**

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

## 6.1.2c Selection of measuring range




**!**

*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* |

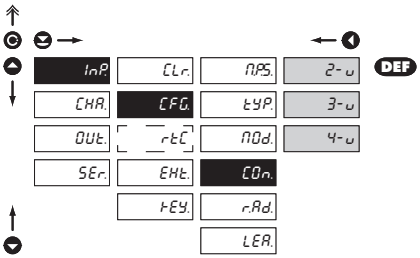
*When selecting the "AUTO" range, the items "MIN", "MAX", "P. TAR. A" will not be displayed in the "CHAN. A" setting*

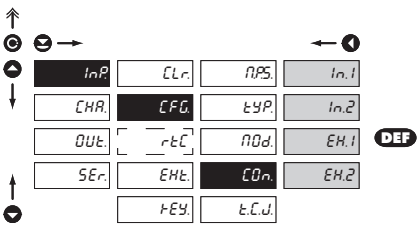
**nOd Selection of instrument measuring range**

| | Menu | Measuring range |
|---|---|---|
| DC | 60. | ±60 mV |
| | 150. | ±150 mV |
| | 300. | ±300 mV |
| | 1.20 | ±1,2 V |
| DC-A | 100 | ±100 V |
| | 250 | ±250 V |
| | 500 | ±500 V |
| | 0.10 | ±0,1 A |
| | 0.25 | ±0,25 A |
| | 0.50 | ±0,5 A |
| | 1.00 | ±1 A |
| | 5.00 | ±5 A |
| PM | Menu | Measuring range |
| | 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 |
| OHM | Menu | Measuring range |
| | 0.1 | 0...100 Ω |
| | 1.0k | 0...1 kΩ |
| | 10.0 | 0...10 kΩ |
| | 100. | 0...100 kΩ |
| | AUT. | Automatická změna rozsahu |
| RTD-Pt | 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) |
| | R0.5 | Pt 50 (3 910 ppm/°C) |
| | R0.1 | Pt 100 (3 910 ppm/°C) |
| RTD-Ni | 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) |
| RTD-Cu | Menu | Measuring range |
| | 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) |
| T/C | 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 |

## 6.1.2d Selection of type of sensor connection

RTD OHM T/C




**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

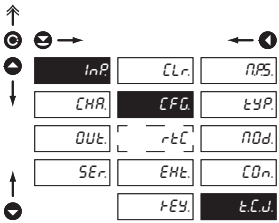
**!**

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

**!**

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

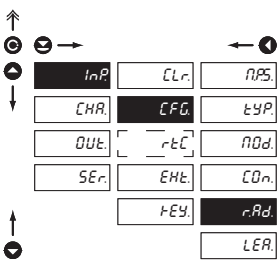
## 6.1.2e Setting temperature of cold junction T/C




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

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

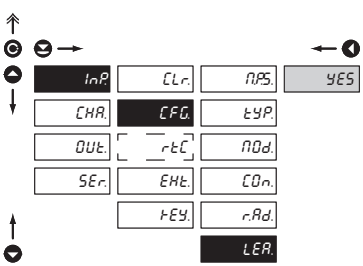
## 6.1.2f Compensation of 2-wire conduct RTD OHM




**rAd. 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

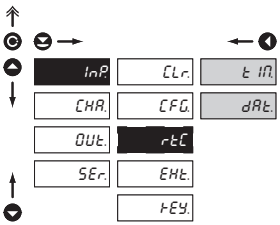
## 6.1.2g Compensation of 2-wire conduct RTD OHM




**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




**rtC Setting the real time clock (RTC)**

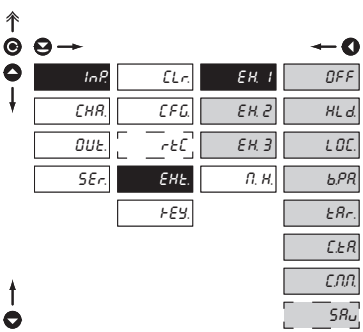
tIM. Time setting

- format 23.59.59

dAt. Date setting

- format DD.MM.YY

## 6.1.4a External input function selection




**EHt. External input function selection**

OFF Input is off

HLd. Activation of HOLD

LOC. Locking keys on the instrument

bPR. Activation of locking access into programming menu LIGHT/PROFI

tAr. Tare activation

CtR. Tare resetting

CnN. Resetting min/max value

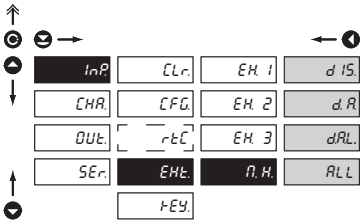
SAv. Activation of measured data record in instrument memory (not in standard equipment)

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

*****

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

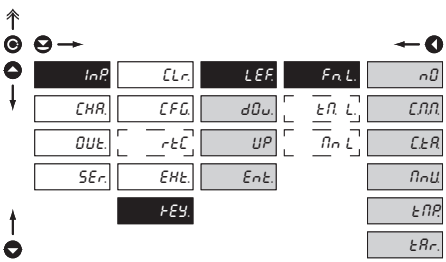
## 6.1.4b Selection of function "HOLD"




**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




**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
- **CMM.** Resetting min/max value
- **CLtR.** Tare resetting
- **MnU.** 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
- **tMP.** 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

**!**

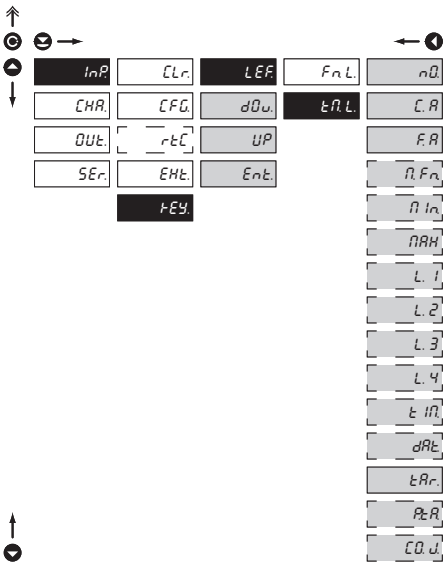
*Preset values of the control keys* **DEF**:

| | |
|---|---|
| *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




**tM. L. Temporary projection of selected item**

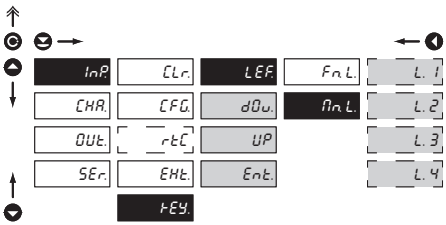
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing ⊙ + "Selected key", this holds until the stroke of any key

| | |
|---|---|
| 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 |
| M. Fn. | Temporary projection of "Mathematic functions" value |
| M in. | Temporary projection of "Min. value" |
| MAX. | Temporary projection of "Max. value" |
| L. 1 | Temporary projection of "Limit 1" value |
| L. 2 | Temporary projection of "Limit 2" value |
| L. 3 | Temporary projection of "Limit 3" value |
| L. 4 | Temporary projection of "Limit 4" value |
| t iM. | 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*

## 6.1.5c Optional accessory functions of the keys - Direct access to item



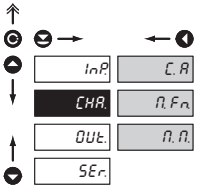

**An. L.** **Assigning access to selected menu item**

- **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

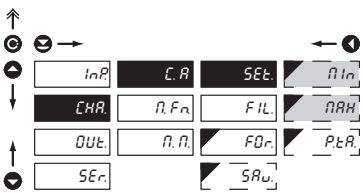
C.A — Setting parameters of measuring "Channel"

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



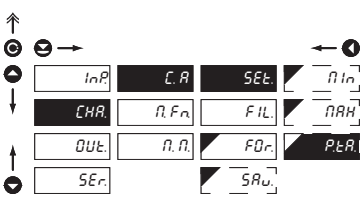

**SEt. Setting display projection**

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

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

### 6.2.1b Setting fixed tare

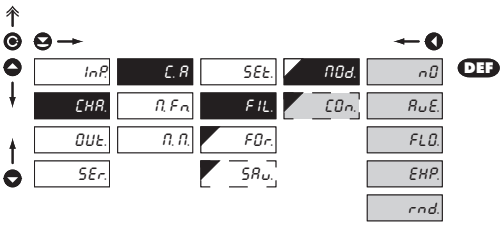
DC PM DU OHM




**PtA. 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




**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

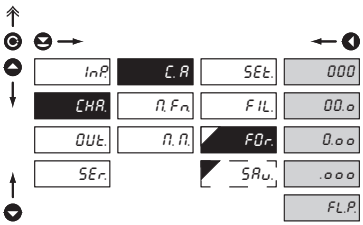
rnd. Measured value rounding

- 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




**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

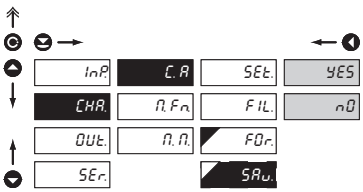
00.0 Setting DP - XX.x

0.00 Setting DP - X.xx

.000 Setting DP - .xxx

FL.P. Floating DP

## 6.2.1e Selection of storing data into instrument memory



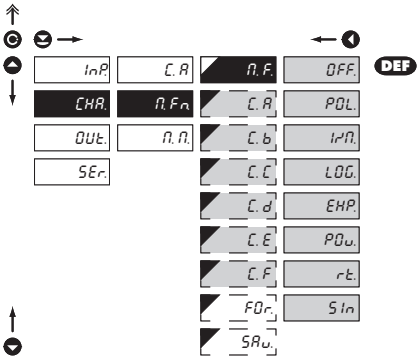

**SAv. Selection of storing data into instrument memory**

- 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

## 6.2.2a Mathematic functions




**n.F. Selection of mathematic functions**

**OFF.** Mathematic functions are off

**POL.** Polynome

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

**IrA.** 1/x

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

**LOG.** Logarithm

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

**EHP.** Exponential

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

**POu.** Power

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

**rt.** Root

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

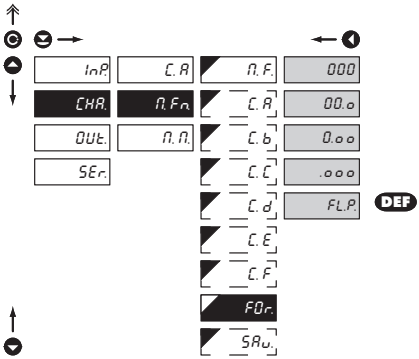
**SIn** Sin x

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

**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



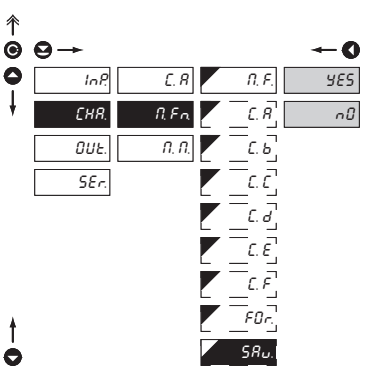

**FOr. Selection of decimal point**

- 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. |
| 00.0 | Setting DP - XXXXX.x |
| 0.00 | Setting DP - XXXX.xx |
| .000 | Setting DP - XXX.xxx |
| FL.P. | Floating DP |

- DEF

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

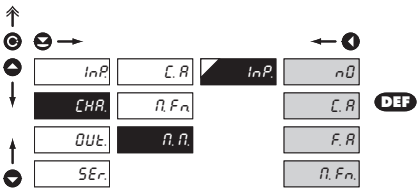



**SAv. Selection of storing data into instrument memory**

- 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 |
| n0 | Measured data are not stored |

## 6.2.3 Selection of evaluation of min/max value

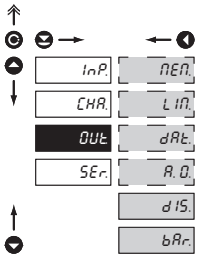



**InP. Selection of evaluation of min/max value**

- 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" |

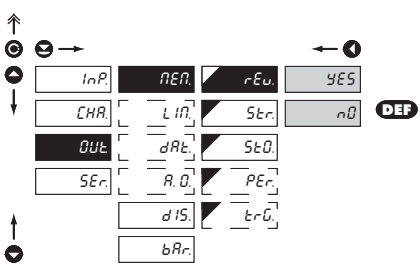
## 6.3 Setting „PROFI“ - OUTPUTS




In this menu it is possible to set parame ters of the instrument output signals

- MEM. Setting data logging into memory
- LIM. Setting type and parameters of limits
- dAt. Setting type and parameters of data output
- A.O. Setting type and parameters of analog output
- dIS. Setting display projection and brightness
- bAr. Setting bargraph projection and brightness

### 6.3.1a Selection of mode of data logging into instrument memory

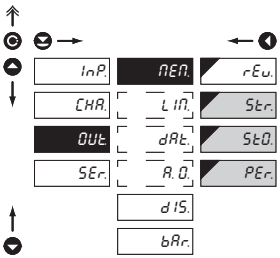



**rEu. Selection of the mode of data logging**

- 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

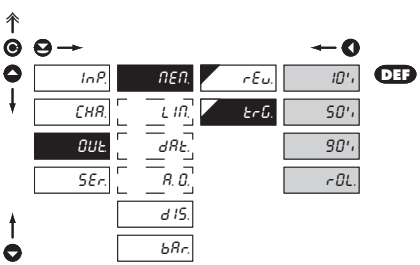



**Str.** Start of data logging into instrument memory
- time format HH.MM.SS

**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




**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

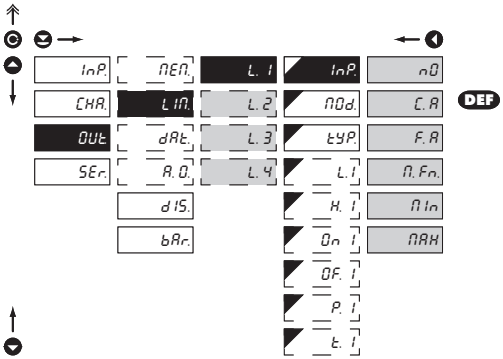
**10'** Reser. of 10 % memory prior init. of data logging

**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

## 6.3.2a Selection of input for limits evaluation




**inP. Selection evaluation of limits**

- selection of value from which the limit will be evaluated

nO Limit evaluation is off

C. A Limit evaluation from "Channel A"

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

M. Fn. Limit evaluation from "Mathematic functions"

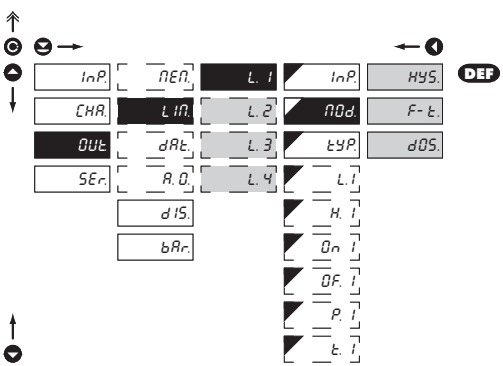
MIn Limit evaluation from "Min.value"

MAX Limit evaluation from "Max.value"

**!**

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

## 6.3.2b Selection of type of limit




**MOd. 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 *"TIM. 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 *"OFF. L."* the relay switch-off

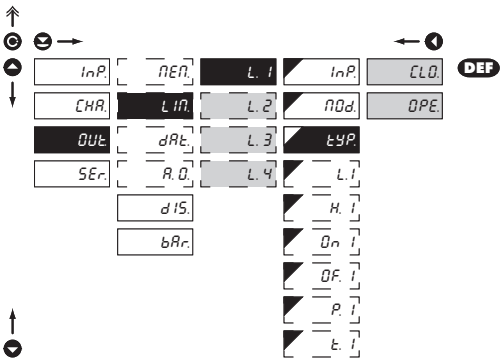
dOS. Dosing limit (periodic)

- for this mode the parameters are set for *"PER. L."* determining the limit value as well as its multiples at which the output is active and *"TIM. L."* indicating the time during which is the output active

**!**

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

## 6.3.2c Selection of type of output



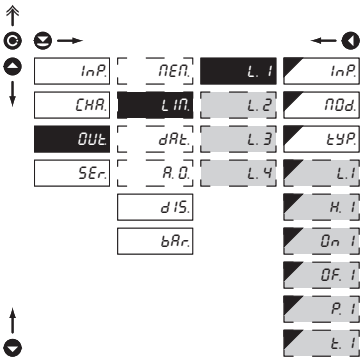

**tYP. Selection of type of output**

- 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

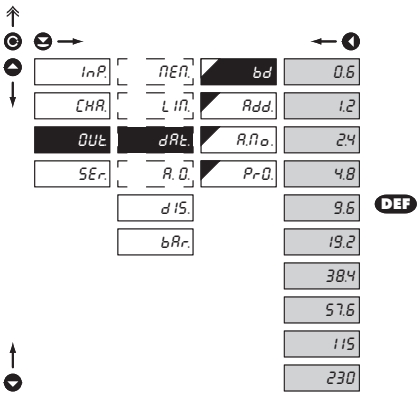



- L.1 Setting limit for switch-on
  - for type *"HYSTER"*
- H. 1 Setting hysteresis
  - for type *"HYSTER"*
  - indicates the range around the limit (in both directions, LIM. ±1/2 HYS.)
- On.1 Setting the outset of the interval of limit switch-on
  - for type *"FROM. ."*
- OF. 1 Setting the end of the 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"*

**!**

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

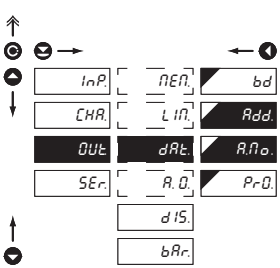
## 6.3.3a Selection of data output baud rate




**bd** — **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



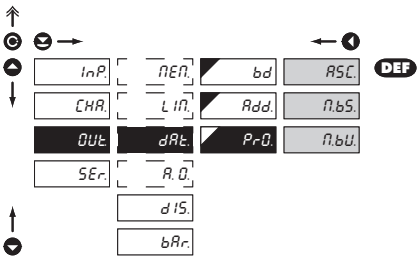

**Add.** — **Setting instrument address**

- setting in range 0...31
- DEF = 00

**A.no.** — **Setting instrument address - MODBUS**

- setting in range 1...247
- DEF = 1

## 6.3.3c Selection of data output protocol

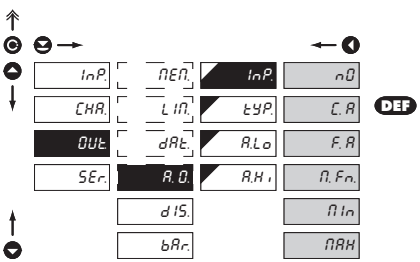



**Pr0. Selection of the type of analog output**

- ASC. Data protocol ASCII
- n.bS. Data protocol DIN MessBus
- n.bU. Data protocol MODBUS-RTU

- option is available only for RS 485

## 6.3.4a Selection of input for analog output

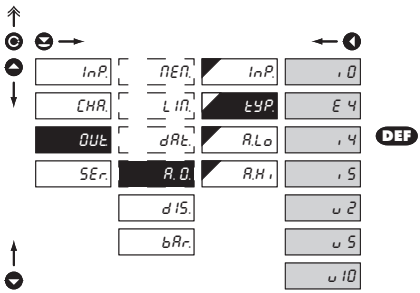



**InP. Selection evaluation analog output**

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

- n0 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"
- Min AO evaluation from "Min.value"
- MAX AO evaluation from "Max.value"

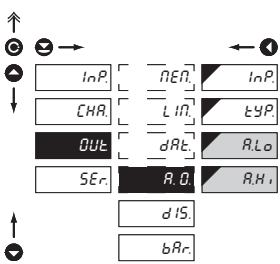
## 6.3.4b Selection of the type of analog output




**tYP. Selection of the type of analog output**

- ,0 Type - 0...20 mA
- E4 Type - 4...20 mA
- with indication of error statement (< 3,0 mA)
- ,4 Type - 4...20 mA
- ,5 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




**A.0. 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

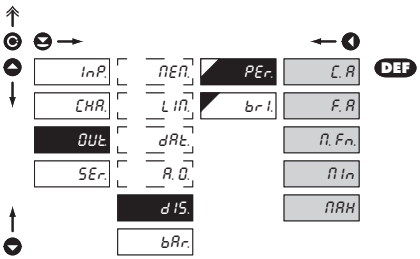
A.Lo Assigning the display value to the beginning of the AO range

- 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"

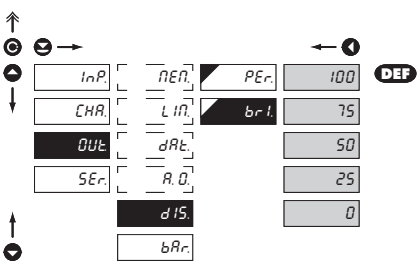
F.A Projection of values from "Channel A" after digital filters processing

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

Min Projection of values from "Min.value"

MAX 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

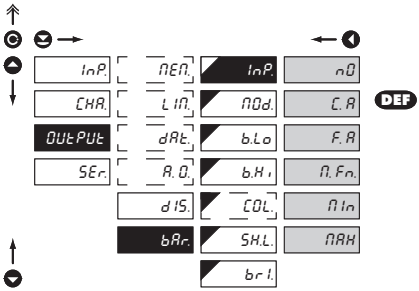
25 Display brightness - 25 %

50 Display brightness - 50 %

75 Display brightness - 75 %

100 Display brightness - 100 %

## 6.3.6a Bargraph - Selection of projection input

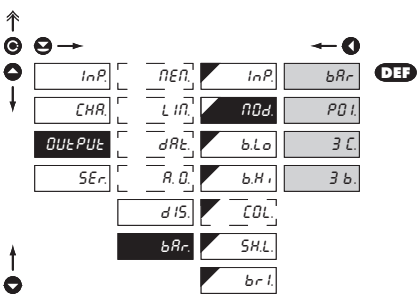



**InP. Selection of bargraph evaluation**

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

| | |
|---|---|
| nO | Analog evaluation is off |
| C.A | From "Channel A" |
| F.A | From "Channel A" after digital filter modification |
| M.Fn. | From "Mathematic function" |
| Min | From "Minimum va-lue" |
| MAX | From "Maximum value" |

## 6.3.6b Bargraph - Selection of projection mode




**Mod. Selection of bargraph projection mode**

| | |
|---|---|
| bAr | Column projection |

- the display shows only a column in one colorě

| | |
|---|---|
| Pt. | Point projection |

- the display shows one point in one color

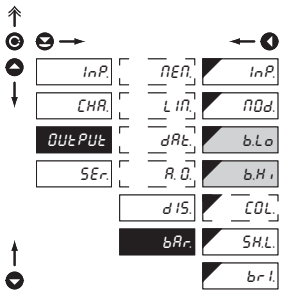
| | |
|---|---|
| 3 C. | 3-colored column projection |

- 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



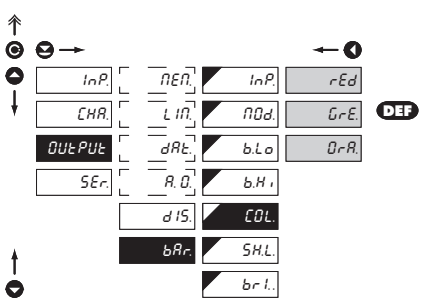

**bAr. Setting the bargraph projection range**

- 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**

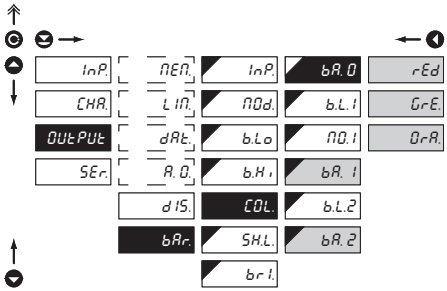
- the item *"COLOR"* is displayed only with selected mode *("BAR. > MOD.") "BAR."* or *"POI."*

**rEd** Red color

**GrE.** Green color

**OrA.** Orange color

## 6.3.6e Bargraph - Color setting




**bA.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

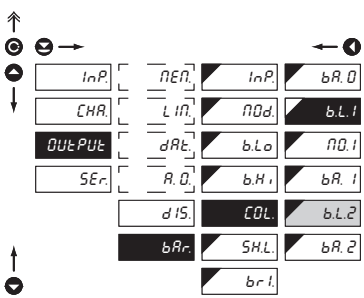
OrA. Orange color

- 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




**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

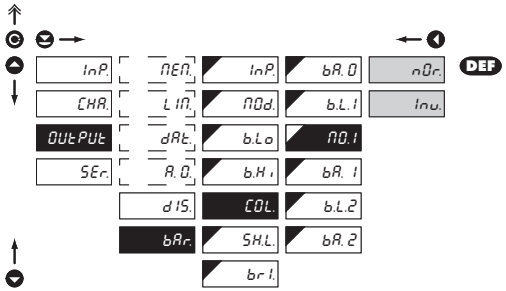
b.L.2 Boundary between bands 1 - 2

- 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



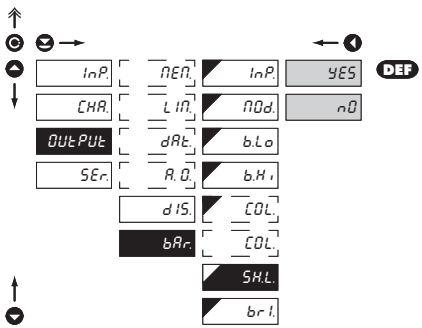

**NO.1 Selection of inverse projection of "Band 0"**

- 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

Inv. Column in "BA. 0" moves from right to left

## 6.3.6h Bargraph - Selection of limits projection



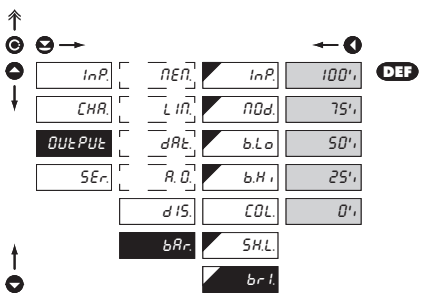

**SH.L. Selection of limit projection on the bargraph**

- 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




**br I. Selection of bargraph brightness**

0 Bargraph is off

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

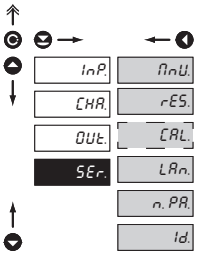
25 Brightness - 25 %

50 Brightness - 50 %

75 Brightness - 75 %

100 Brightness - 100 %

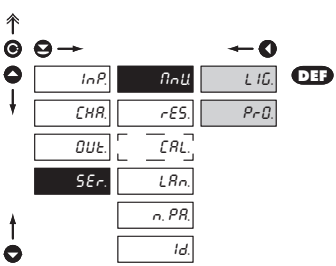
## 6.4 Setting "PROFI" - SERVIS




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




**!**

*Change of setting is valid upon next access into menu*

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

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

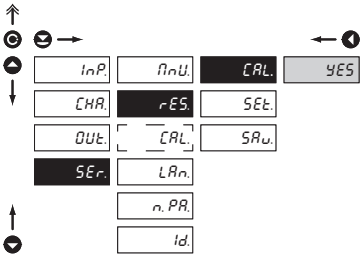
LIG. – Active LIGHT menu

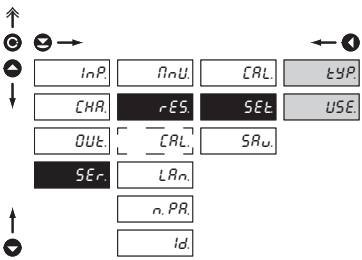
- simple programming menu, contains only items necessary for configuration and instrument setting
- linear menu > items one after another

PrO. – Active PROFI menu

- complete programming menu for expert users
- tree menu

## 6.4.2 Restoration of manufacture setting




| 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 | ✗ | ✓ |

**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.

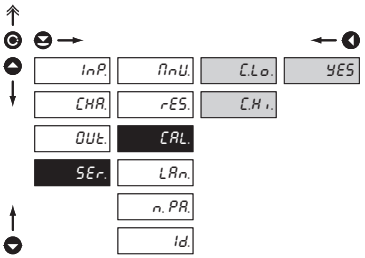
SAu. Save instrument user setting

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

**!**

*After restoration the instrument switches off for couple seconds*

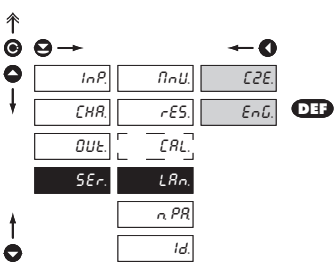
## 6.4.3 Calibration - Input range DU




**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

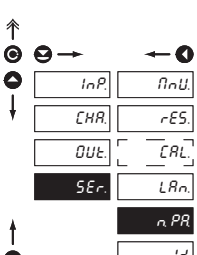



**LAn. Selection of instrument menu language version**

CZE. Instrument menu is in Czech

EnG. Instrument menu is in English

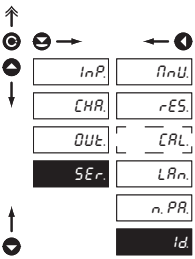
## 6.4.5 Setting new access password




**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 password in the event of loss is „177"

## 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

## 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 
- setting may be performed in **LIGHT** or **PROFI** menu, with the **USER** menu then overtaking the given menu structure




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

### Setting


 item will not be displayed in USER menu

 item will be displayed in USER menu with editing option

 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


*Example:*

Into USER menu were selected these items

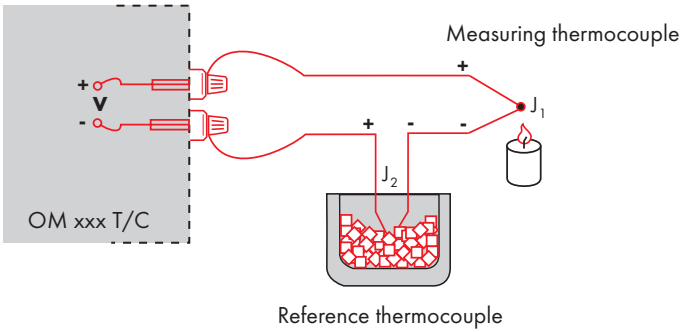
(keys + ) > C. *TA.*, *L. 1*, *L. 2*, *L. 3*, for which we have preset this sequence (keys + ):

| | |
|---|---|
| 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.




**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 CJn 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 tCJ its temperature (applies for setting CJn to EH2)
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CJn 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 CJn in the instrument menu to In.1 or EH.1
- when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CJn to EH.1)

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> | | | | | | | | | |
| | | | Bad | ? | A | A | <CR> | | | | | | | | | |
| | | Messbus | | No - data is transmitted permanently | | | | | | | | | | | | |
| | 485 | ASCII | OK | ! | A | A | <CR> | | | | | | | | | |
| | | | Bad | ? | A | A | <CR> | | | | | | | | | |
| | | MessBus | OK | <DLE> | 1 | | | | | | | | | | | |
| | | | 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<br>49 | $10_H$<br>$31_H$ | 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. Hw. | A part of the instrument does not work properly | send the instrument for repair |
| E. EE | Data in EEPROM corrupted | perform restoration of manufacture setting, upon repeated error statement send instrument for repair |
| E. dR. | Data in EEPROM outside the range | perform restoration of manufacture setting, upon repeated error statement send instrument for repair |
| E. CL. | Memory was empty (presetting carried out) | upon repeated error statement send instrument for repair, possible failure in calibration |

## 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<br>US > 100 Ohm, with 3 920 ppm/°C<br>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 |

***DU***

| | |
|---|---|
| Voltage of lin. pot. | 2,5 VDC/6 mA<br>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: | adjustable - in menu |
| Brightness: | adjustbale - in menu |

## INSTRUMENT ACCURACY

| | | |
|---|---|---|
| TC: | 100 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*** |
| | ***Above accuracies apply for projection 9999*** | |
| Resolution: | 0,01°/0,1°/1° | ***RTD*** |
| Rate: | 0,1...40 measurements/s** | |
| Overload capacity: | 10x (t < 100 ms) not for 400 V and 5 A,<br>2x (long-term) | |
| Linearisation: | by linear interpolation in 50 points<br>- 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<br>Hold - stop measuring (at contact)<br>Lock - control key locking<br>MM - min/max value<br>Mathematic functions | |
| OM Link: | company communication interface for setting, operation and update of instrument SW | |
| Watch-dog: | reset after 400 ms | |
| Calibration: | at 25°C and 40 % of r.h. | |

## COMPARATOR

| | |
|---|---|
| Type: | digital, adjustable in menu |
| Mode: | Hysteresis, From, Dosing |
| Limita: | -99999...999999 |
| Hysteresis: | 0...999999 |
| Delay: | 0...99,9 s |
| Outputs: | 2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)*<br>2x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)*<br>2x SSR (250 VAC/ 1 A)*<br>2x/4x open collector (30 VDC/100 mA)<br>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)<br>7 bit + even parity + 1 stop bit (MessBus) |
| Rate: | 600...230 400 Baud |
| 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: | 100 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<br>- 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,<br>- fuse inside (T 4000 mA)<br>80...250 V AC/DC, 10 VA, isolated<br>- 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 |

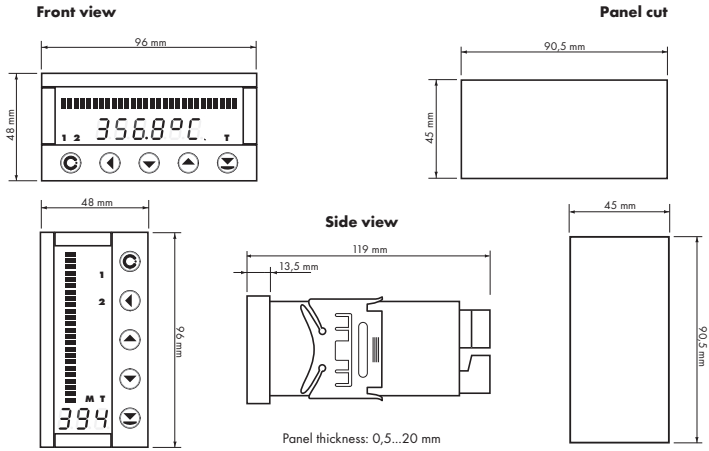
**OPERATING CONDITIONS**

| | |
|---|---|
| Connection: | connector terminal board, conductor cross-section <1,5 $mm^2$ /<2,5 $mm^2$ |
| 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 |
| Overvoltage category: | EN 61010-1, A2 |
| Insulation resistance: | for pollution degree II, measurement category III<br>instrum.power supply > 670 V (PI), 300 V (DI)<br>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*

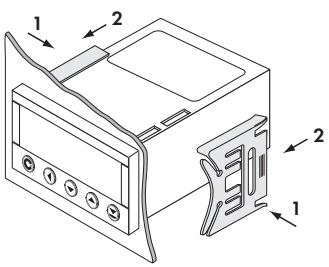
| *Channels/Rate* | *40* | *20* | *10* | *5* | *2* | *1* | *0,5* | *0,2* | *0,1* |
|---|---|---|---|---|---|---|---|---|---|
| *No.of channels: 1 (Type: DC, PM, DU)* | *40,00* | *20,00* | *10,00* | *5,00* | *2,00* | *1,00* | *0,50* | *0,20* | *0,10* |
| *No.of channels: 2* | *5,00* | *2,50* | *1,25* | *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* |

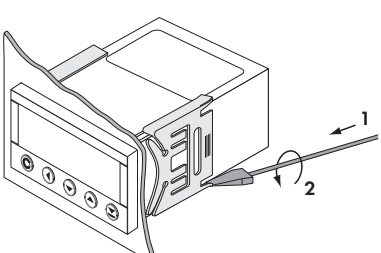
*PI - Primary insulation, DI - Double insulation*




**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 B** |
| Type | . . . . . |
| Manufacturing No. | . . . . . |
| Date of sale | . . . . . |

## GUARANTEE

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 full 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 type listed hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant statutory orders.

**Product:** 4-digit programmable panel instrument

**Type:** **OMB 412**

**Version:** UNI, PWR

Conformity is assessed pursuant to the following standards:

| | | |
|---|---|---|
| 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 50130-5, chapter 20 | |
| | prEN 50131-2-1, par. 9.3.1 | |
| | EN 61000-4-8 | |
| | EN 61000-4-9 | |
| | EN 61000-3-2 ed. 2:2001 | |
| | EN 61000-3-3: 1997, Cor. 1:1998, Z1:2002 | |
| | EN 55022, chapter 5 and chapter 6 | |

and Ordinance on:

| | |
|---|---|
| El. safety: | No. 168/1997 Coll. |
| EMC: | No. 169/1997 Coll. |

The evidence are the protocols of authorized and accredited organizations:
VTÚE Praha, experimental laboratory No. 1158, accredited by ČIA
VTÚPV Vyškov, experimental laboratory No. 1103, accredited by ČIA

Place and date of issue: Prague, 18. March 2006

Miroslav Hackl v.r.
Company representative

*Mode of asses. of conformity §12, par. 4 b, d Act No. 22/1997 Coll.*