GUARANTEE
5
YEARS

OM 402UNI - B

4 DIGIT PROGRAMMABLE UNIVERSAL 4-CHANNEL INSTRUMENT

20 mm

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

SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OM 402 series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

The instruments are up to the following European standards:
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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2.1 Description

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

Type OM 402UNI is a multifunction instrument with the option of configuration for 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 OM 402 is a multifunction instrument available in following types and ranges

type UNI

DC:	±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/L
DU:	Linear potentiometer (min. 500 Ω)

type UNI, option A

DC:	±0,1 A/±0,25 A/±0,5 A/±2 A/±5 A/±100 V/±250 V/±500 V

type UNI, option B (expansion by 3 more inputs)

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

PROGRAMMABLE PROJECTION

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

COMPENSATION

of conduct:	in the menu it is possible to perform compensation for 2-wire connection
of conduct in probe:	internal connection (conduct resistance in measuring head)
of CJC (T/C):	manual or automatic, in the menu it is possible to perform selection of the type of thermocouple and compensation of cold junctions, which is adjustable or automatic (temperature at the brackets)

LINEARIZATION

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

DIGITAL FILTERS

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 130 000 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

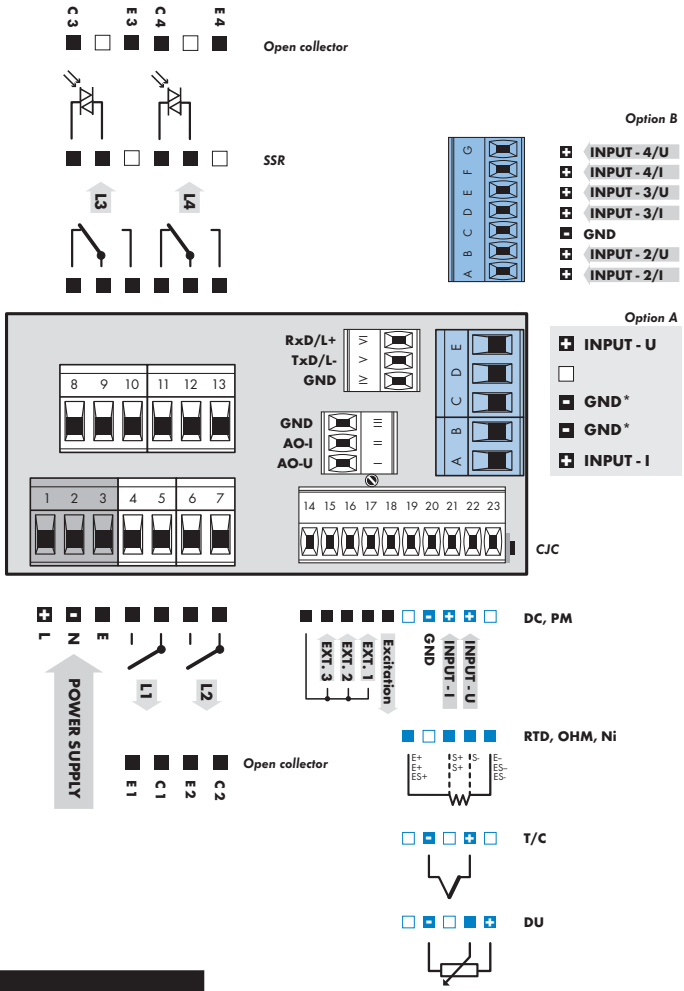
Type	Input I	Input U
DC	±60/±150/±300/±1 200 mV	
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V
OHM	0...0,1/1/10/100 kΩ	
RTD-Pt	Pt 50/100/Pt 500/ Pt 1 000	
RTD-Cu	Cu 50/100	
RTD-Ni	Ni 1 000/10 000	
T/C	J/K/T/E/B/S/R/N/L	
DU	Linear potentiometer (min. 500 Ω)	

OPTION "A"

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

OPTION "B"

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



!

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

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

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

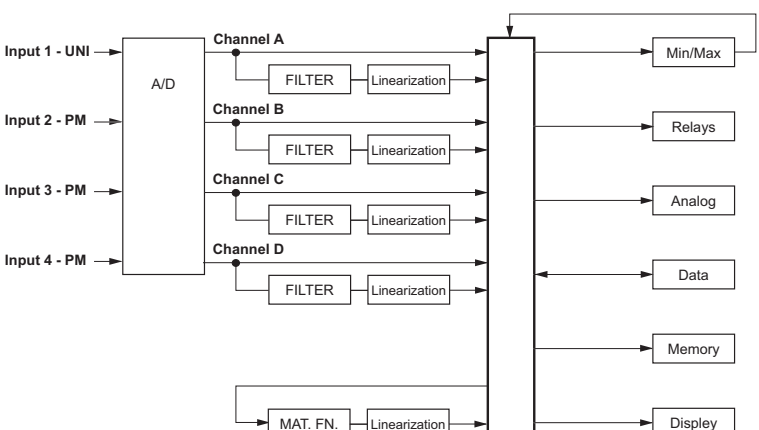
All programmable parameters are stored in the EEPROM memory (they hold even after the instrument is switched off).

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

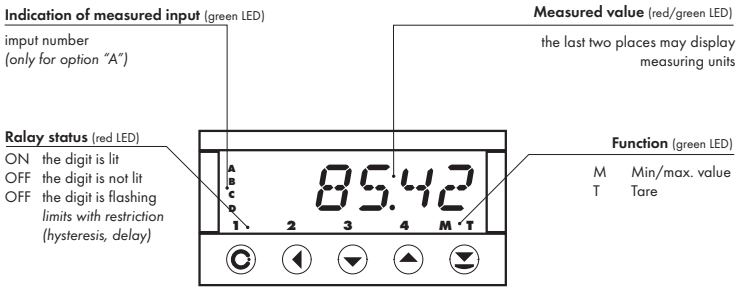
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.

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

Scheme of processing the measured signal



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



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

 **30** — continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT

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

THE MINUS SIGN

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

Control keys functions

Key	Measurement	Menu	Setting numbers/selection
	access into USER menu	exit menu	quit editing
	programmable key function	back to previous level	move to higher decade
	programmable key function	move to previous item	move down
	programmable key function	move to next item	move up
	programmable key function	confirm selection	confirm setting/selection
+			numeric value is set to zero
+	access into LIGHT/PROFI menu		
+	direct access into PROFI menu		
+		configuration of an item for "USER" menu	
+		determine the sequence of items in "USER - LIGHT" menu	

Setting items into „USER" menu

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

nO	item will not be displayed in USER menu
YES	item will be displayed in USER menu with the option of setting
SHOu	item will be solely displayed in USER menu

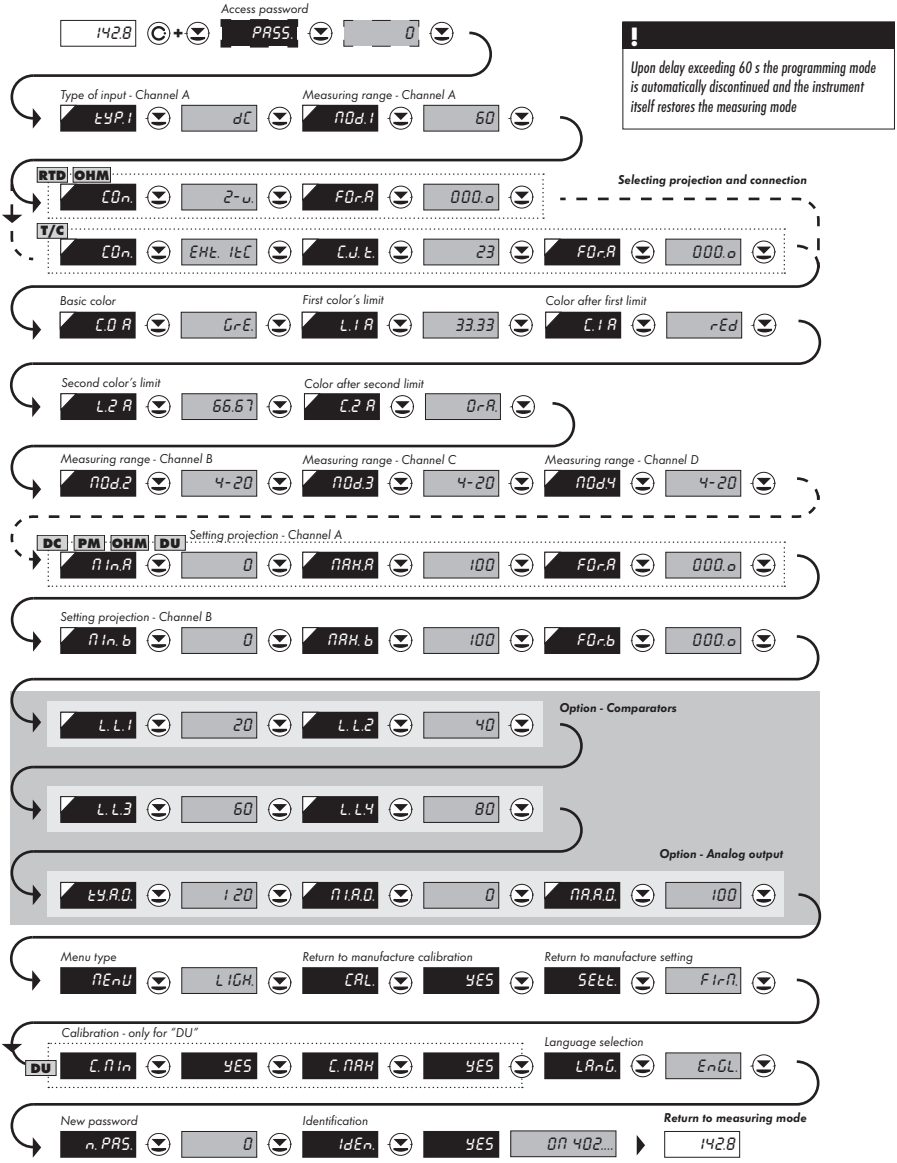
5.0 Setting "LIGHT"

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



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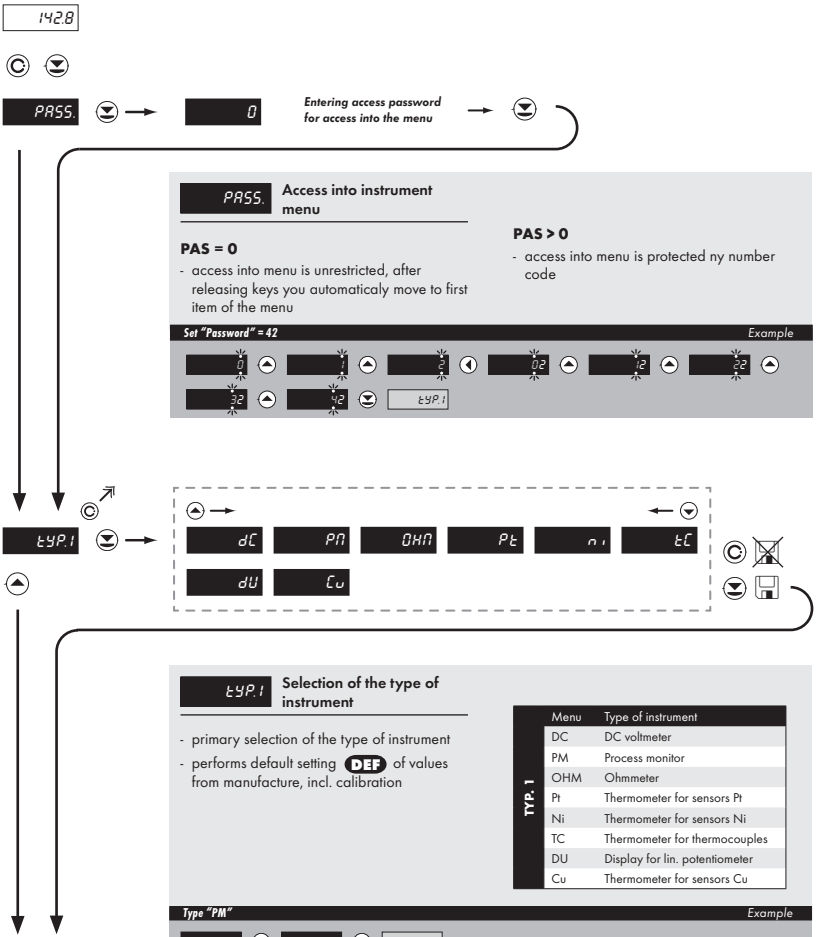
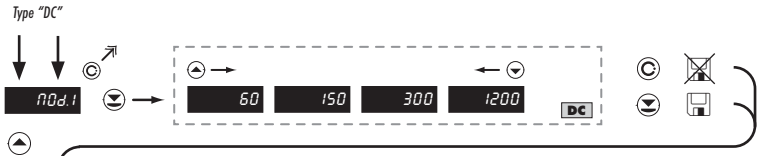
Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode





MOd.1 **Selection of the instrument measuring range**

DEF = 60 mV

MOD.1	Menu	Measuring range
	60	±60 mV
	150	±150 mV
	300	±300 mV
	1200	±1,2 V

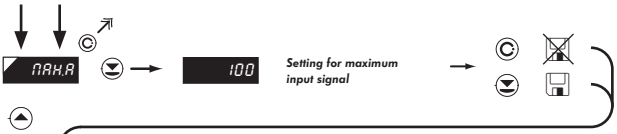
Range ±150 mV ***Example***

MIn.A **Setting display projection for minimum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mV > MIN.A = 0 *Example*

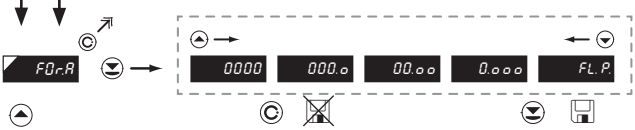


MAX.A **Setting display projection for maximum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 150 mV > MAX.A = 3500 *Example*



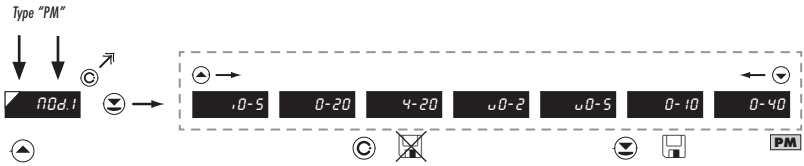
FOr.A **Setting projection of the decimal point**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*

32

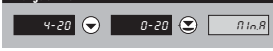


MOd.1 **Selection of the instrument measuring range**

DEF = 4 - 20 mA

MOD. 1	Menu	Range
	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V

Range 0...20 mA *Example*

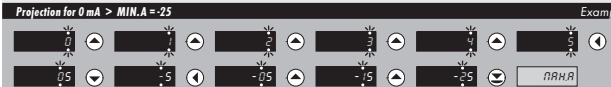


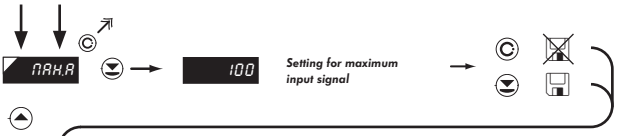
MIn.A **Setting display projection for minimum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

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



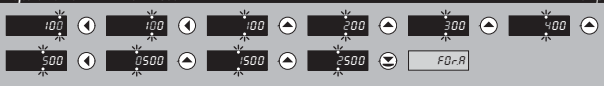


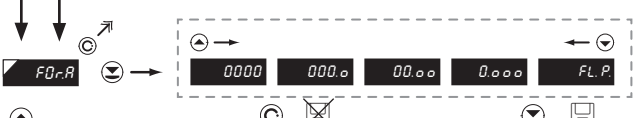
MAX.A **Setting display projection for maximum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 20 mA > MAX. A = 2500 *Example*



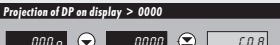


FO.A **Setting projection of the decimal point**

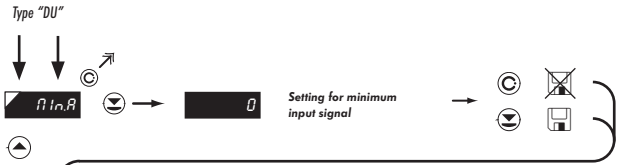
DEF = 000.o

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

Projection of DP on display > 0000 *Example*



32



MIn.A **Setting display projection for minimum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

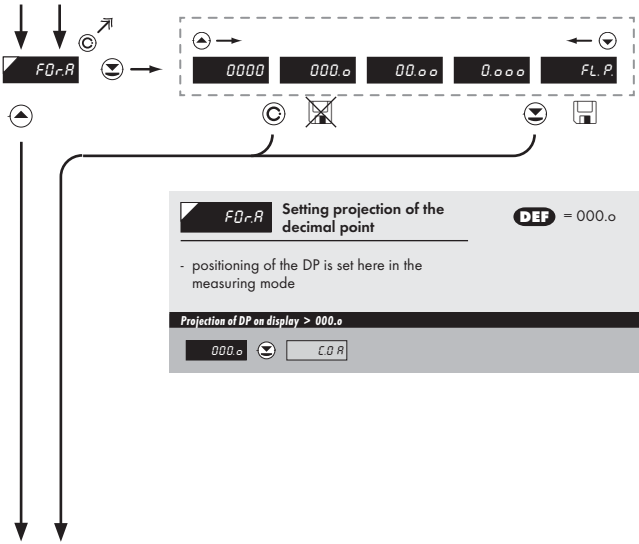
Projection for the beginning > MIN.A = 0 *Example*

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

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for the end > MAX.A = 5000 *Example*



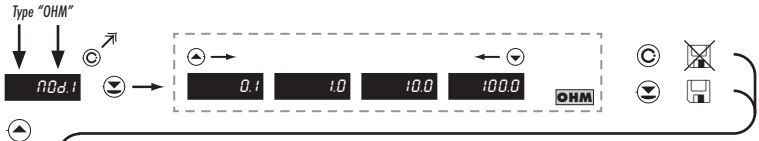
FOr.A **Setting projection of the decimal point**

DEF = 000.o

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

Projection of DP on display > 000.o *Example*

32 ***Calibration of the beginning and the end of range of linear potentiometer is on page 53***



MOd.1 **Selection of instrument measuring range**

DEF = 100 Ω

MOD. 1	Menu	Measuring range
	0.1	0...100 Ω
	1.0	0...1 kΩ
	10.0	0...10 kΩ
	100.0	0...100 kΩ

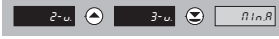
Range 0...10 kΩ — *Example*

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*

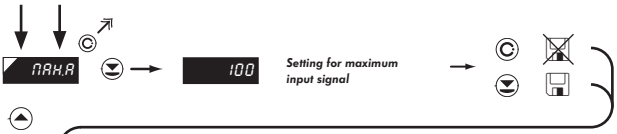


MIn.A **Setting display projection for minimum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 Ohm > MIN.A = 0 — *Example*

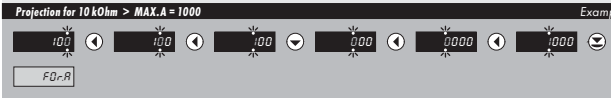


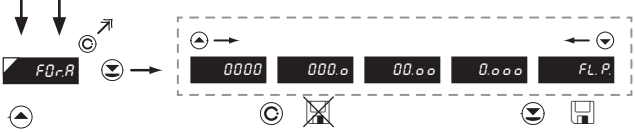
MAX.A **Setting display projection for maximum value of input signal**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 10 kOhm > MAX.A = 1000 *Example*





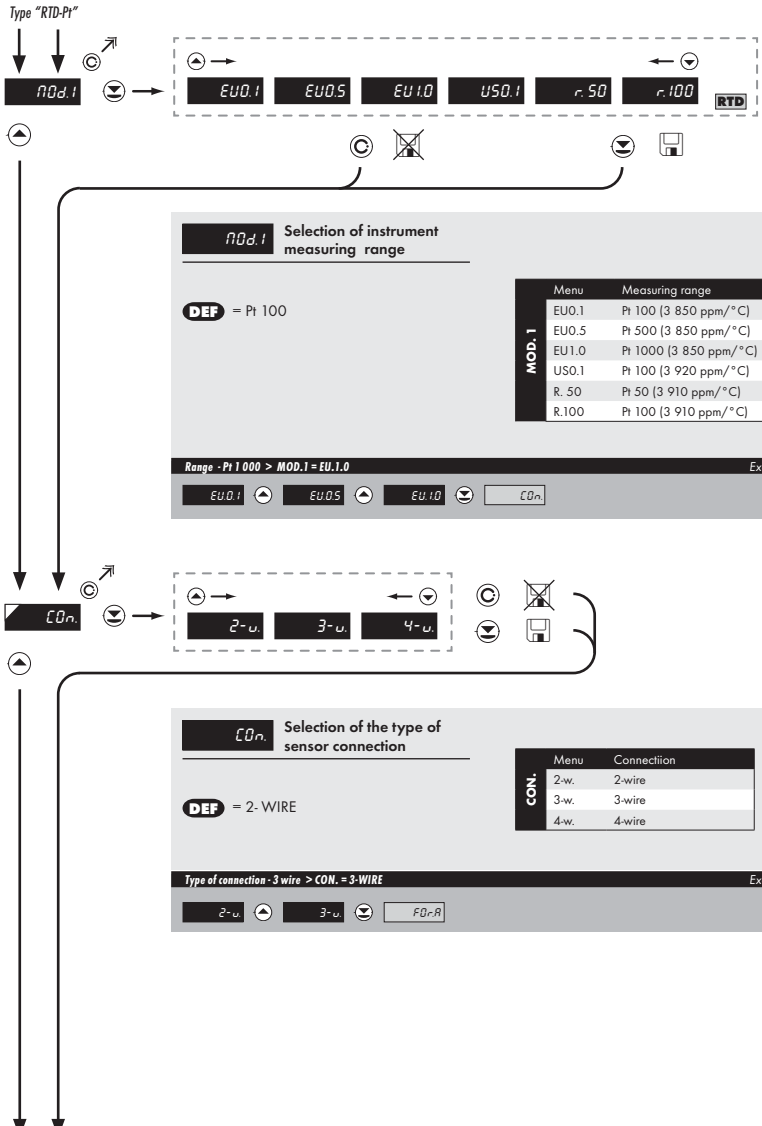
FO.A **Setting projection of the decimal point**

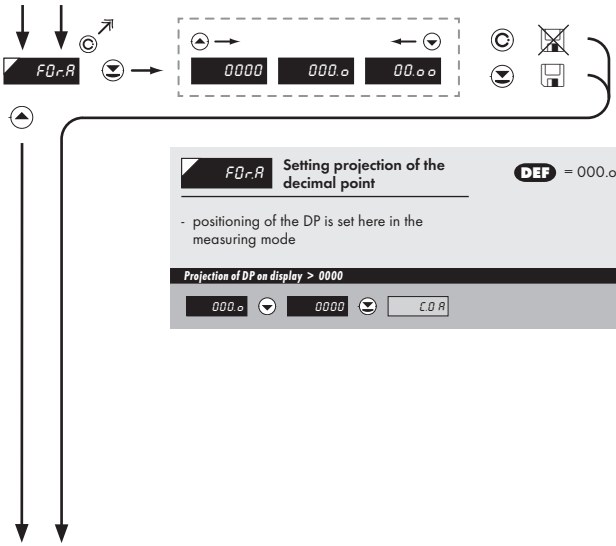
DEF = 000.o

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

Projection of DP on display > 0000 *Example*

32


Type "RTD-Pt"
nOd.1
EU0.1
EU0.5
EU1.0
US0.1
r. 50
r.100
RTD
nOd.1
Selection of instrument measuring range
DEF = Pt 100
MOD. 1
Menu
Measuring range
EU0.1
Pt 100 (3 850 ppm/°C)
EU0.5
Pt 500 (3 850 ppm/°C)
EU1.0
Pt 1000 (3 850 ppm/°C)
US0.1
Pt 100 (3 920 ppm/°C)
R. 50
Pt 50 (3 910 ppm/°C)
R.100
Pt 100 (3 910 ppm/°C)
Range - Pt 1 000 > MOD.1 = EU.1.0
Example
EU0.1
EU0.5
EU1.0
COn.
COn.
2-u.
3-u.
4-u.
COn.
Selection of the type of sensor connection
DEF = 2- WIRE
CON.
Menu
Connectiion
2-w.
2-wire
3-w.
3-wire
4-w.
4-wire
Type of connection - 3 wire > CON. = 3-WIRE
Example
2-u.
3-u.
FOrA



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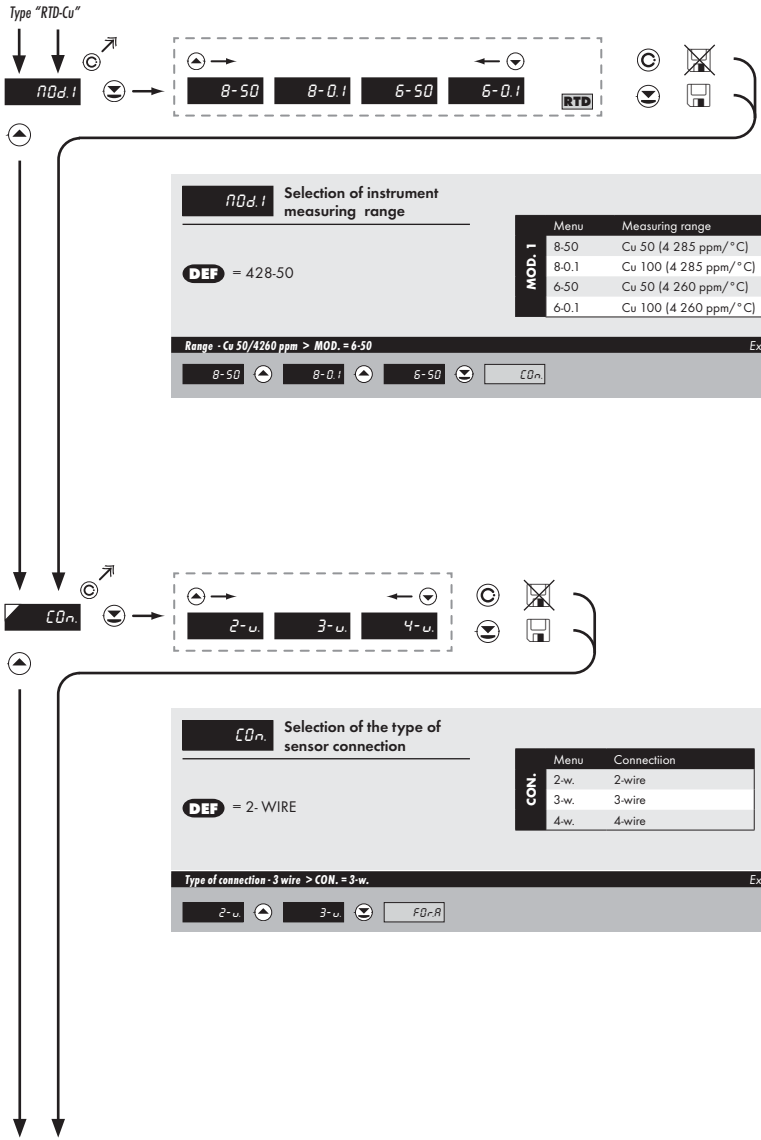
FOr.A **Setting projection of the decimal point**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*



MOd.1 **Selection of instrument measuring range**

DEF = 428-50

MOD. 1	Menu	Measuring range
	8-50	Cu 50 (4 285 ppm/°C)
	8-0.1	Cu 100 (4 285 ppm/°C)
	6-50	Cu 50 (4 260 ppm/°C)
	6-0.1	Cu 100 (4 260 ppm/°C)

Range - Cu 50/4260 ppm > MOD. = 6-50 *Example*

8-50 ▲ 8-0.1 ▲ 6-50 ▼ CON

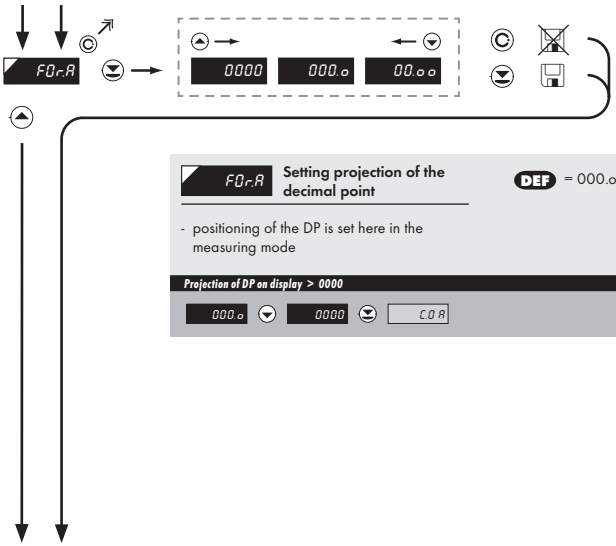
CON. **Selection of the type of sensor connection**

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. ▼ FOrA



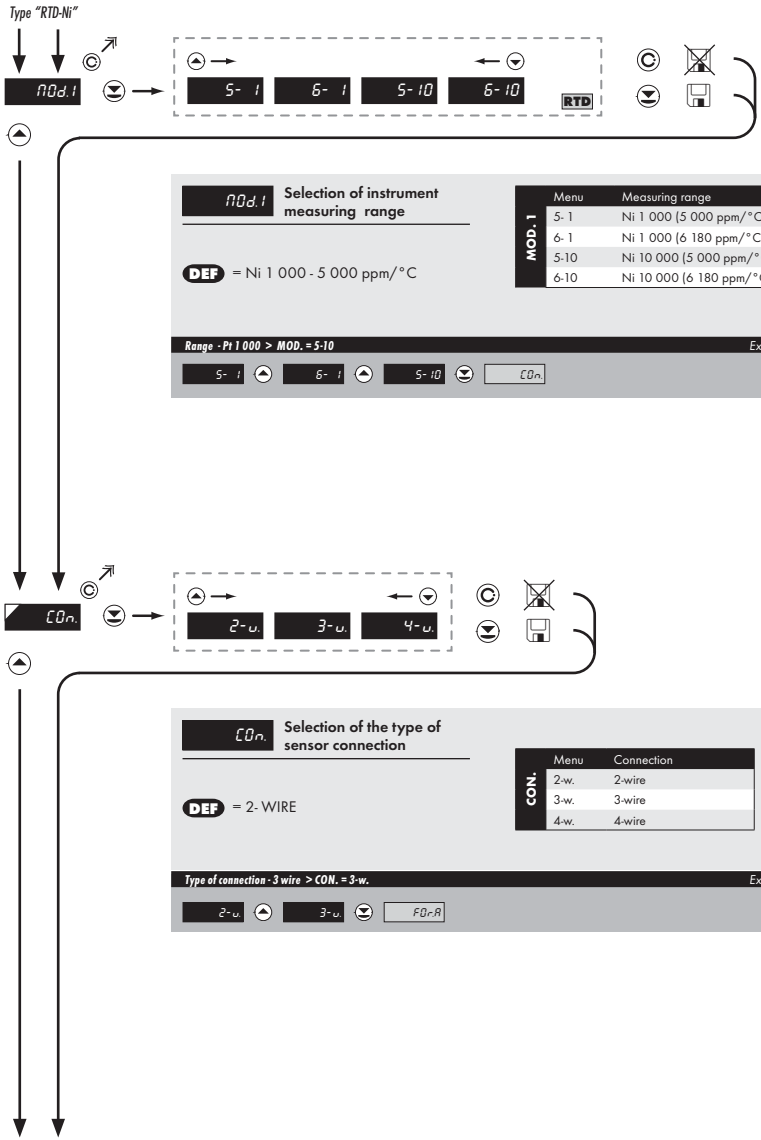
32

FOrA **Setting projection of the decimal point**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*



MOd.1 **Selection of instrument measuring range**

DEF = Ni 1 000 - 5 000 ppm/°C

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

Range - Pt 1 000 > MOD. = 5-10 *Example*

5- 1 ▲ 6- 1 ▲ 5-10 ▼ CON

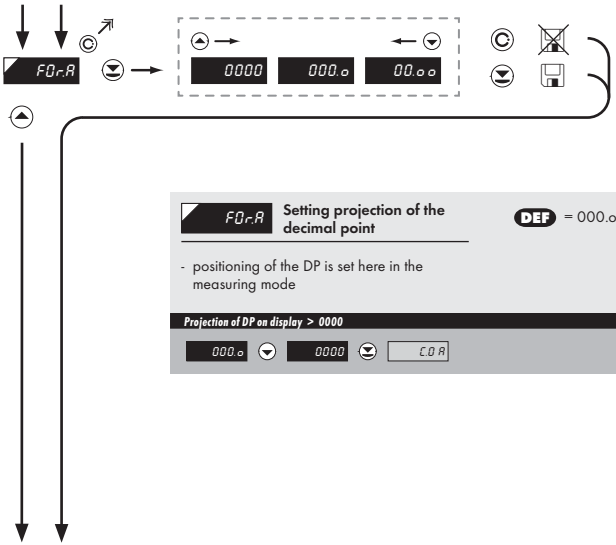
CON. **Selection of the type of sensor connection**

DEF = 2- WIRE

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

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

2-w. ▲ 3-w. ▼ FOrA



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

DEF = 000.o

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

Projection of DP on display > 0000 *Example*

Mod.1 **Selection of the type of thermocouple**

- setting the input range depends on the measuring range ordered

DEF = Type "J"

MOD. 1	Menu	Type of thermocouple
	TC B	B
	TC E	E
	TC J	J
	TC K	K
	TC N	N
	TC R	R
	TC S	S
	TC T	T
	TC L	L

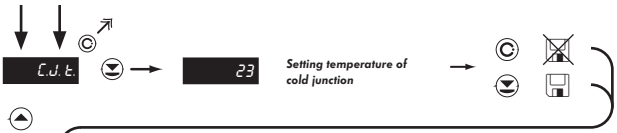
Type of thermocouple "K" *Example*

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

DEF = EXT. 1

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

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

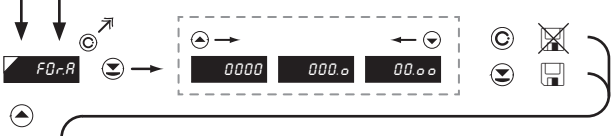


C.J. t. **Setting temperature of cold junction**

DEF = 23

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

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



FOrA **Setting projection of the decimal point**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*

!

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

!

Method and procedure of setting the cold junctions is described in separate chapter on page 100

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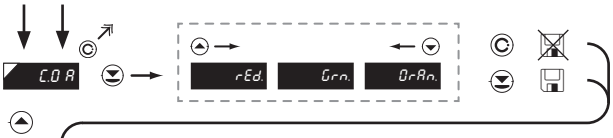
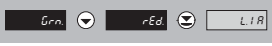


C.0 A **Selection of display color > primary setting**

DEF = green

Selection of display color - primary > C.0 A = red — *Example*



L.1 A Setting first value for change of display color

- range of setting is -999...9999 (+ time formats)

DEF = 33.33

Display value for 1st color change > L.1 B = 100 — *Example*

C.1 A **Selection of display color > after crossing L. 1 A**

DEF = orange

- selection of display color is controlled through setting under L.1 A
- color changes if the value on display exceeds the value set in L.1 A

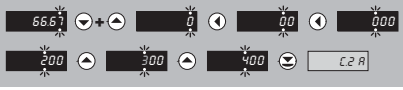
Selection of display color if the value is > C.1 A = green — *Example*

L.2 A Setting second value for change of display color

DEF = 66.67

- range of setting is -999...9999 (+ time formats)

Display value is for 1st color change > L.2 A = 400 — *Example*

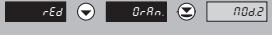


C.2 A **Selection of display color > after crossing L.2 A**

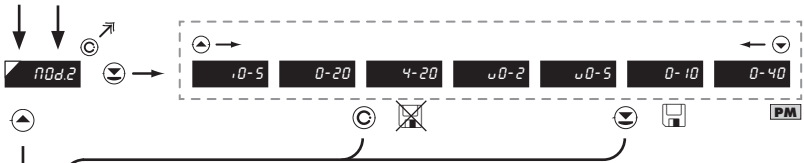
DEF = red

- selection of display color is controlled through setting under item L.2 A
- color changes if the value on display exceeds the value set in L.2 A

Selection of display color if the value is > C.2 A = orange — *Example*



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



n0d.2 **Selection of the instrument measuring range -**

Channel B

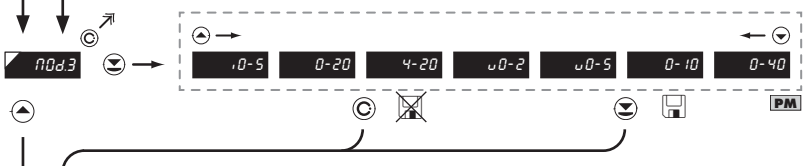
DEF = 4 - 20 mA

MOD. 2	Menu	Range
	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V

Range 0...20 mA *Example*

4-20 ▼ 0-20 ▼⏬ n0d.3

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



n0d.3 **Selection of the instrument measuring range -**

Channel C

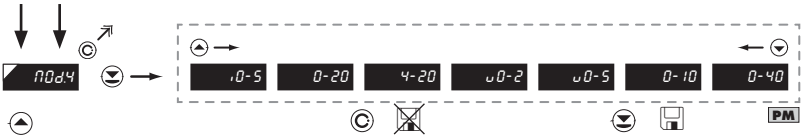
DEF = 4 - 20 mA

MOD. 3	Menu	Range
	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V

Range 0...20 mA *Example*

4-20 ▼ 0-20 ▼⏬ n0d4

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



mOd4 **Selection of the instrument measuring range - Channel D**

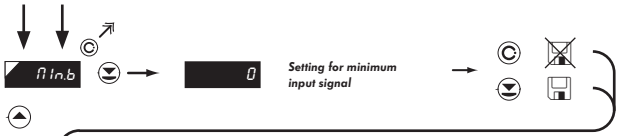
DEF = 4 - 20 mA

MOD. 4	Menu	Range
	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V

Range 0...20 mA *Example*

4-20 → 0-20 → Alnb

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

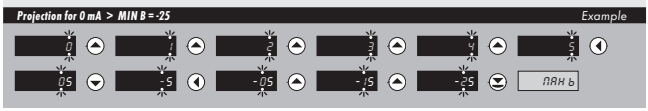


Min.b Setting display projection for minimum value of input signal - Channel B

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

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

DEF = 0

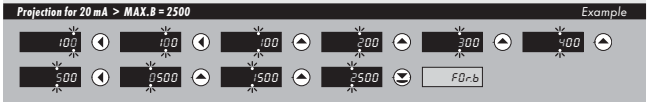


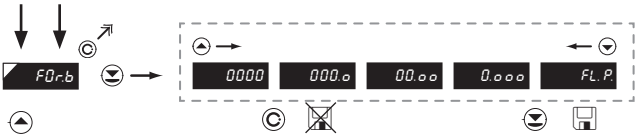
MAX.b Setting display projection for maximum value of input signal - Channel B

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

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

DEF = 100



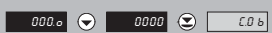


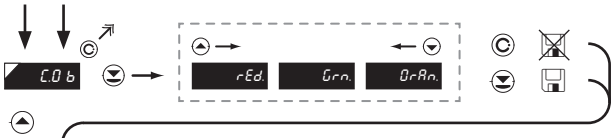
FOrb **Setting projection of the decimal point - Channel B**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*

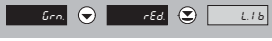




C.0 b **Selection of display color > primary setting**

DEF = green

Selection of display color - primary > C.0 B = red *Example*



L.1 b Setting first value for change of display color

- range of setting is -999...9999 (+ time formats)

DEF = 33.33

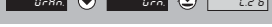
Display value for 1st color change > L.1 B = 100 *Example*

C.1 b **Selection of display color > after crossing L. 1 B**

DEF = orange

- selection of display color is controlled through setting under L.1 B
- color changes if the value on display exceeds the value set in L.1 B

Selection of display color if the value is > L.1 B = green *Example*

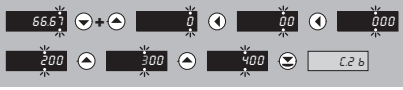


L.2 b Setting second value for change of display color

DEF = 66.67

- range of setting is -999...9999 (+ time formats)

Display value is for 1st color change > L.2 B = 400 — *Example*

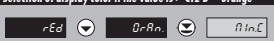


C.2 b **Selection of display color > after crossing L.2 B**

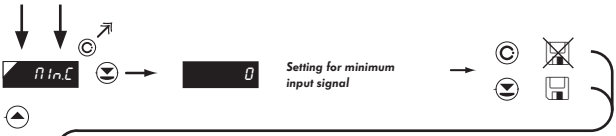
DEF = red

- selection of display color is controlled through setting under item L.2 B
- color changes if the value on display exceeds the value set in L.2 B

Selection of display color if the value is > C.2 B = orange — *Example*



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

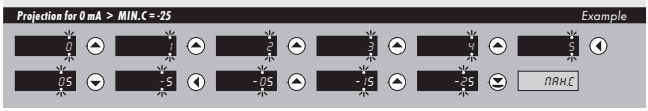


MIn.C Setting display projection for minimum value of input signal - Channel C

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

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

DEF = 0

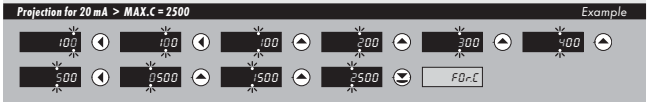


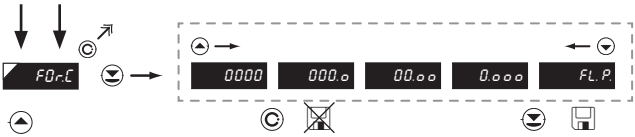
MAX.C Setting display projection for maximum value of input signal - Channel C

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

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

DEF = 100



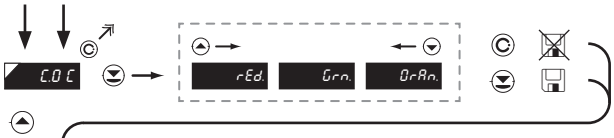


FOr.C **Setting projection of the decimal point - Channel C**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*



C.0 Cb **Selection of display color > primary setting**

DEF = green

Selection of display color - primary > C.0 C = red *Example*

Setting limit for change of display color

L.1 C Setting first value for change of display color

- range of setting is -999...9999 (+ time formats)

DEF = 33.33

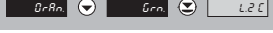
Display value for 1st color change > L.1 C = 100 *Example*

C.1 C **Selection of display color > after crossing L. 1 C**

DEF = orange

- selection of display color is controlled through setting under L.1 C
- color changes if the value on display exceeds the value set in L.1 C

Selection of display color if the value is > C.1 C = green *Example*

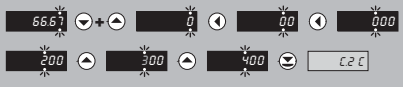


L.2 C Setting second value for change of display color

DEF = 66.67

- range of setting is -999...9999 (+ time formats)

Display value is for 1st color change > L.2 C = 400 — *Example*



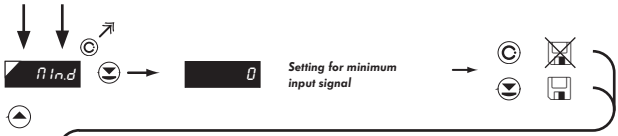
C.2 C **Selection of display color > after crossing L.2 C**

DEF = red

- selection of display color is controlled through setting under item L.2 C
- color changes if the value on display exceeds the value set in L.2 C

Selection of display color if the value is > C.2 C = orange — *Example*

*subsequent item on the menu depends on instrument equipment

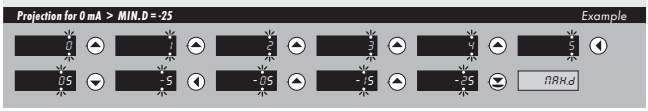


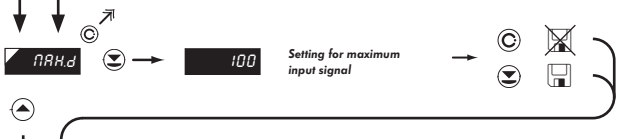
Min.d **Setting display projection for minimum value of input signal - Channel D**

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

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

DEF = 0



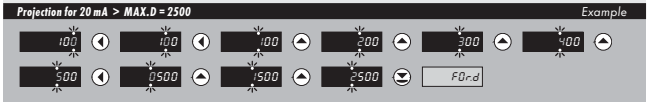


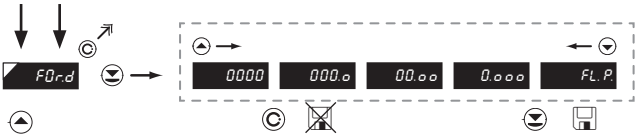
MAX.d **Setting display projection for maximum value of input signal - Channel D**

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

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

DEF = 100



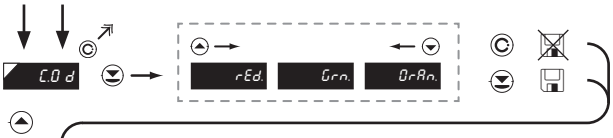


FOrd **Setting projection of the decimal point - Channel D**

DEF = 000.o

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

Projection of DP on display > 0000 *Example*



C.0 d **Selection of display color > primary setting**

DEF = green

Selection of display color - primary > C.0 D = red *Example*

Setting limit for change of display color

L.1 d Setting first value for change of display color

- range of setting is -999...9999 (+ time formats)

DEF = 33.33

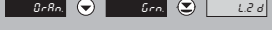
Display value for 1st color change > L.1 D = 100 *Example*

C.1 d **Selection of display color > after crossing L. 1 D**

DEF = orange

- selection of display color is controlled through setting under L.1 D
- color changes if the value on display exceeds the value set in L.1 D

Selection of display color if the value is > L.1 D = green *Example*



L.2 d Setting second value for change of display color

DEF = 66.67

- range of setting is -999...9999 (+ time formats)

Display value is for 1st color change > L.2 D = 400 — *Example*

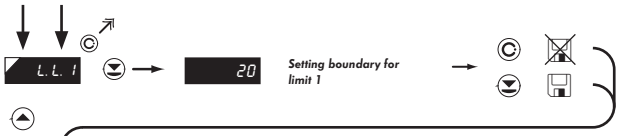
C.2 d **Selection of display color > after crossing L.2 D**

DEF = red

- selection of display color is controlled through setting under item L.2 D
- color changes if the value on display exceeds the value set in L.2 D

Selection of display color if the value is > C.2 D = orange — *Example*

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



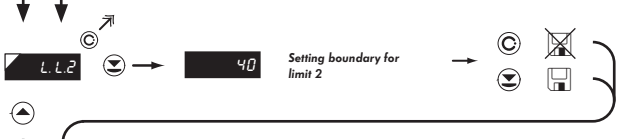
L.L.1 **Setting boundary for limit 1**

- range of the setting is -999...9999
- default "Hystresis"=0 "Delay"=0

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

DEF = 20

Setting limit 1 > L1 = 32 *Example*



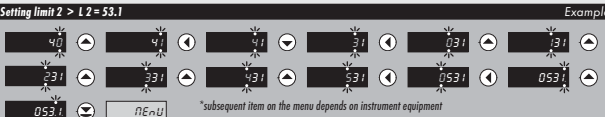
L.L.2 **Setting boundary for limit 2**

- range of the setting is -999...9999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 40

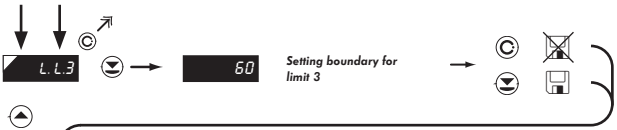
Setting limit 2 > L2 = 53.1 *Example*



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

!

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



L.L3 Setting boundary for limit 3

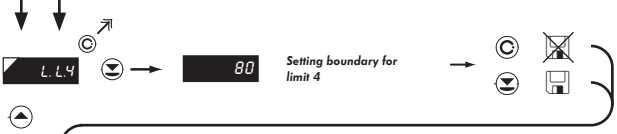
- range of the setting is -999...9999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 60

Setting limit 3 > L3 = 85 — *Example*

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



L.L4 Setting boundary for limit 4

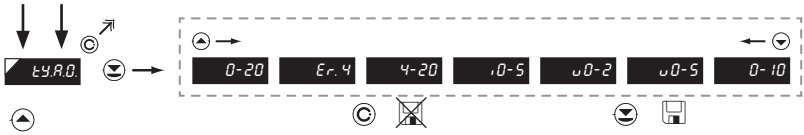
- range of the setting is -99999...999999
- default "Hysteresis"=0 "Delay"=0

- 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*

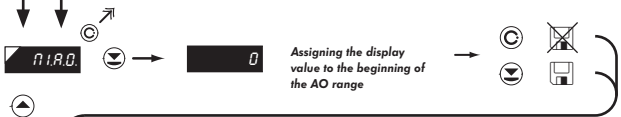


tY.A.O. Setting the type of analog output

Menu	Range	Description
0-20	0...20 mA	
Er. 4	4...20 mA	with indication of error statement (<3,6 mA)
4-20	4...20 mA	
i0-5	0...5 mA	
u0-2	0...2 V	
u0-5	0...5 V	
0-10	0...10 V	

DEF = 4...20 mA

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



Assigning the display value to the beginning of the AO range

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

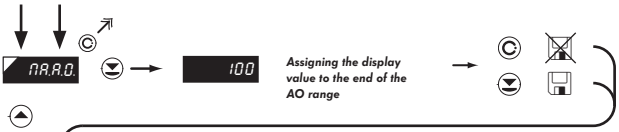
DEF = 0

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

Display value for the beginning of the AO range > MI. A.O. = 0 — *Example*

!

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

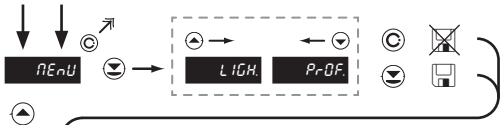


MA.A.O. **Assigning the display value to the end of the AO range**

DEF = 100

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

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



MENU Setting the menu type LIGHT/PROFI

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

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

DEF = LIGHT

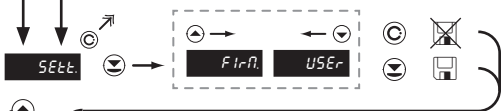
Menu LIGHT > MENU = LIGH. — *Example*

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 > CALI. — *Example*



SEtt. Restoration of manufacture instrument setting

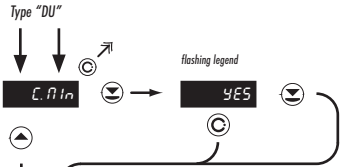
- in the event of error setting the manufacture setting may be restored
- restoration is performed for the currently selected type of the instrument input (select "FIRM.")

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

Restoration of manufacture setting > SETT. — *Example*

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

Type „DC"	54
Type "PM"	54
Type "DU"	53
Type "OHM"	54
Type "Pt"	54
Type "Cu"	54
Type "Ni"	54
Type "T/C"	54



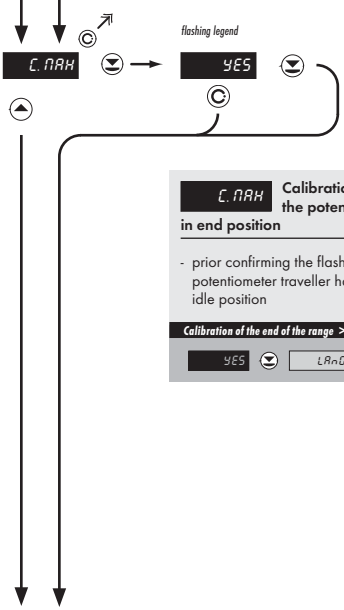
C.MIn **Calibration of input range - the potentiometer traveller in initial position**

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. MIN *Example*

YES → C.MAX



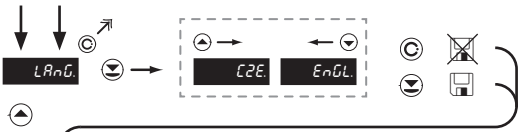
C.MAX **Calibration of input range - the potentiometer traveller in end position**

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. MAX *Example*

YES → LAnG.

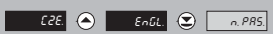


LAnG. Selection of language in instrument menu

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL. *Example*

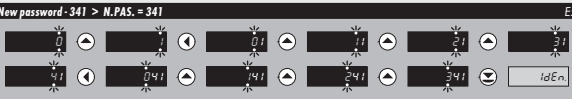


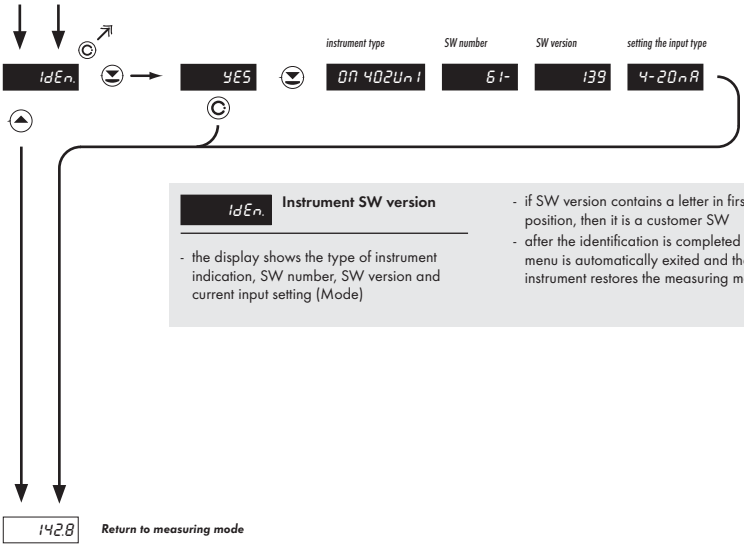
n.PAS. Setting new access password

- 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.PAS. = 341 *Example*



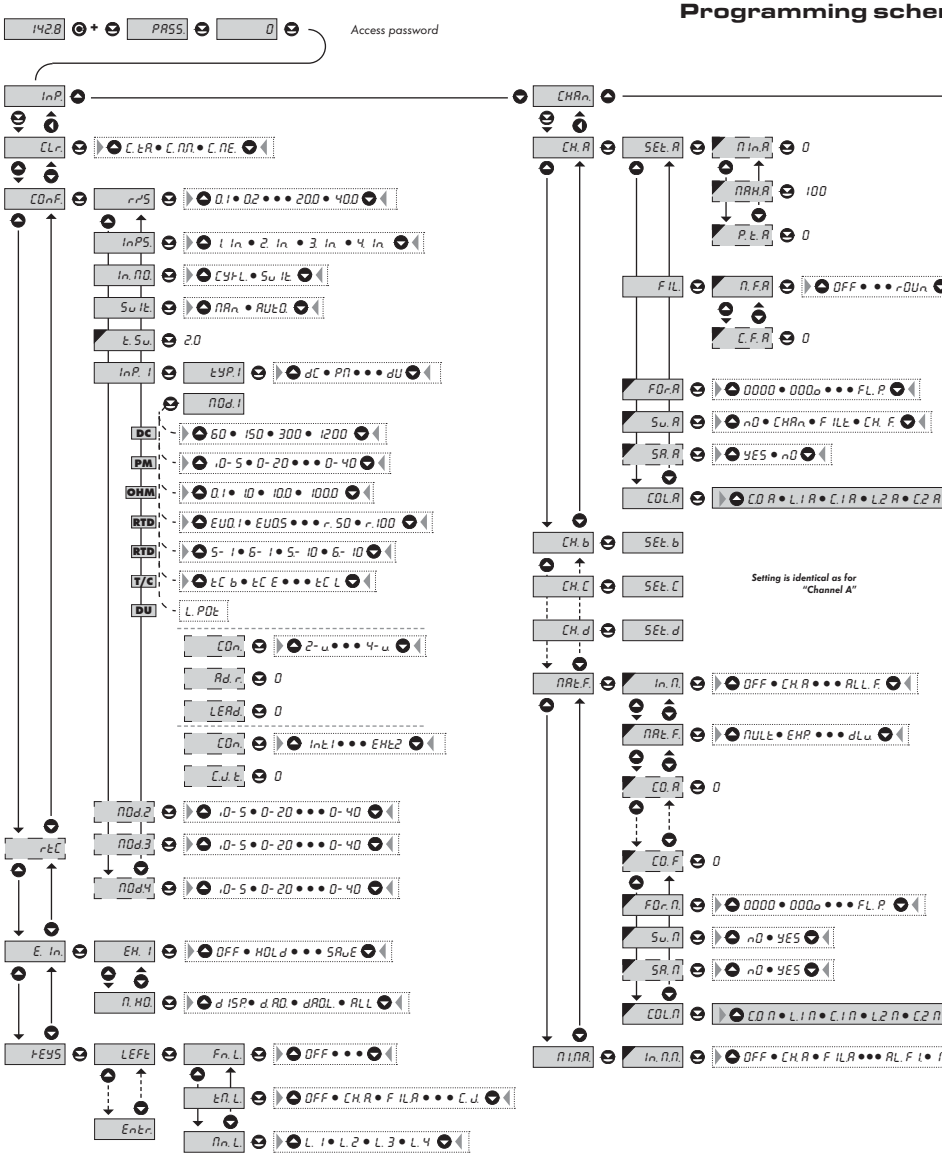


IdEn. Instrument SW version

- 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

Return to measuring mode

Programming schem



me of PROFI MENU

!

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

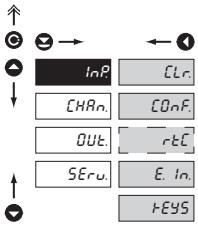
C + ▼

- 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. PAS. =0)

C + ▼

- access into **LIGHT** menu and transition to item „MENU" 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. PAS. =0)

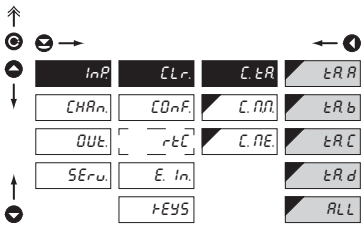
6.1 Setting "PROFI" - INPUT



The primary instrument parameters are set in this menu

- CLr. — Resetting internal values
- CONF. — Selection of measuring range and parameters
- rtC — Setting date and time for option with RTC
- E. In. — Setting external inputs functions
- KEYS — Assigning further functions to keys on the instrument

6.1.1 Resetting internal values



C.tA. Resetting TARE

- tA.A — Tare resetting - Channel A
- tA.b — Tare resetting - Channel B
- tA.C — Tare resetting - Channel C
- tA.d — Tare resetting - Channel D
- ALL — Tare resetting - Channel A, B, C and D

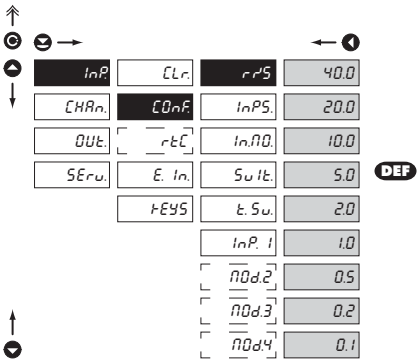
C.MM. — Resetting min/max value

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

C.nE. — 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

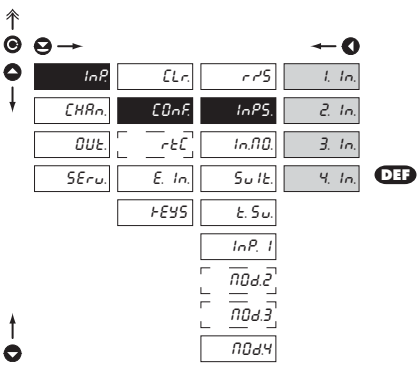


rrS Selection of measuring rate

- measuring rate very significantly affects the number of active inputs "INPS." and evaluation mode "IN.MO." (the factual measuring rates are listed in chapter Technical data)

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 the number of active inputs

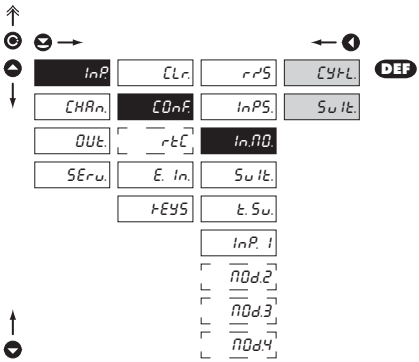


InPS. Selection of the number of active inputs

- measuring rate depends on the number of active inputs (the factual measuring rates are listed in chapter Technical data)

1. In.	Active input 1
2. In.	Active inputs 1 and 2
3. In.	Active inputs 1, 2 and 3
4. In.	Active inputs 1, 2, 3 and 4

6.1.2c Selection of measuring mode for multichannel instrument



In.nO. Selection of measuring mode in multichannel instrument

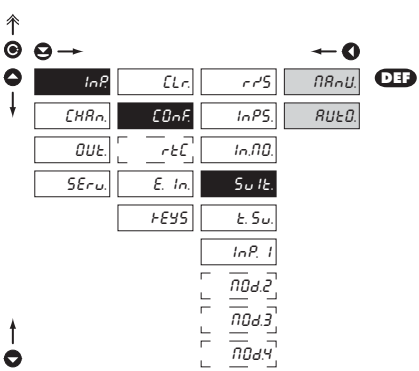
CYCL. Cyclic measuring on all channels

- instrument evaluates measured data simultaneously on all channels
- selection of cycle very significantly affects measuring rate and depends also on the number of active inputs (factual measuring rates are listed in the chapter Technical data)

Sult. Measuring on selected channel

- instrument evaluates measured data only on selected channel

6.1.2d Selection of inputs switching



Sult. Selection of inputs switching

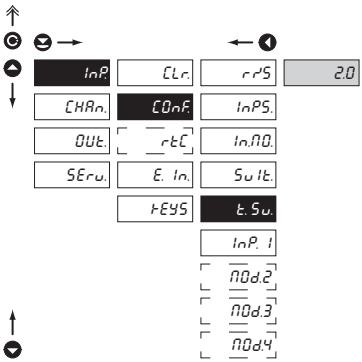
MAnU. Manual inputs switching

- inputs switching is controlled by selected key on the front panel or selected external input

AUtO. Automatic inputs switching

- inputs switching is automatic in a time period set in "T. SW."

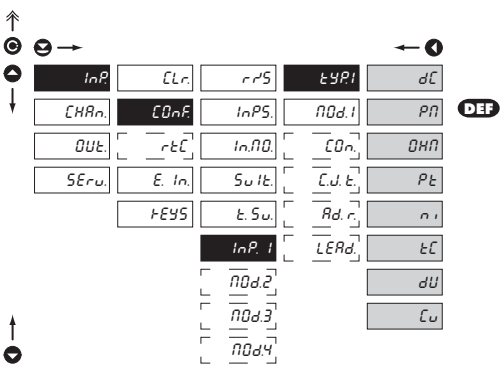
6.1.2e Setting the period for inputs switching



t. Su. Setting the period for inputs switching

- setting the time period for projection of channels in automatic mode ode of inputs switching ("AUTO.")
- range of setting 0,5...99,9 s
- DEF T. SW. = 2 s

6.1.2f Selection of „instrument" type for channel A

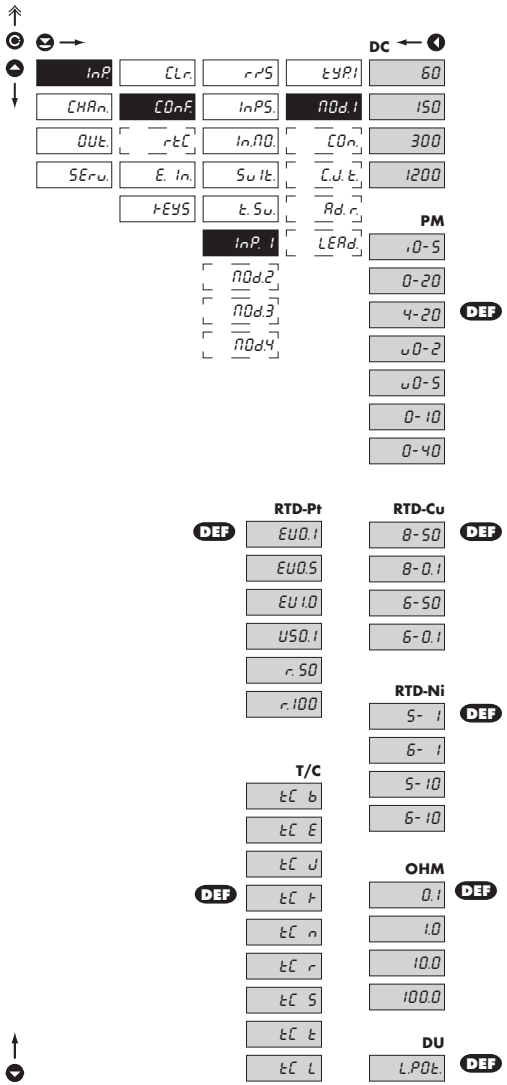


tYP.1 Selection of „instrument" type for channel A

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

dC	DC voltmeter
PA	Process monitor
OHA	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

6.1.2g Selection of measuring range for channel A

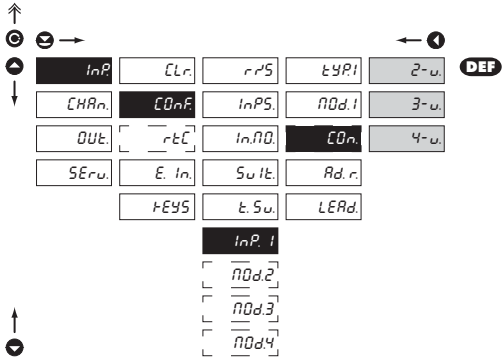


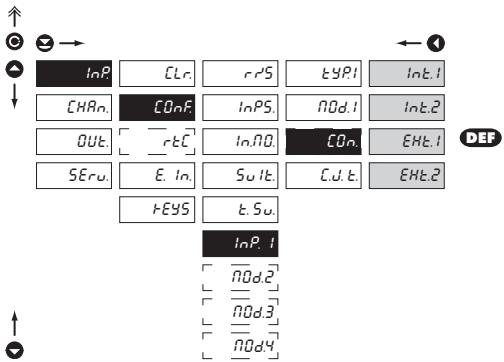
MOd.1 Selection of instrument measuring range

	Menu	Measuring range
DC	60	±60 mV
	150	±150 mV
	300	±300 mV
	1200	±1,2 V
	Menu	Measuring range
PM	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V
	Menu	Measuring range
OHM	0.1	0...100 Ω
	1.0	0...1 kΩ
	10.0	0...10 kΩ
	100.0	0...100 kΩ
	Menu	Measuring range
Pt	EU0.1	Pt 100 (3 850 ppm/°C)
	EU0.5	Pt 500 (3 850 ppm/°C)
	EU1.0	Pt 1000 (3 850 ppm/°C)
	US0.1	Pt 100 (3 920 ppm/°C)
	R. 50	Pt 50 (3 910 ppm/°C)
	R.100	Pt 100 (3 910 ppm/°C)
	Menu	Measuring range
Ni	5- 1	Ni 1 000 (5 000 ppm/°C)
	6- 1	Ni 1 000 (6 180 ppm/°C)
	5-10	Ni 10 000 (5 000 ppm/°C)
	6-10	Ni 10 000 (6 180 ppm/°C)
	Menu	Measuring range
Cu	8-50	Cu 50 (4 280 ppm/°C)
	8-0.1	Cu 1 00 (4 280 ppm/°C)
	6-50	Cu 50 (4 260 ppm/°C)
	6-0.1	Cu 100 (4 260 ppm/°C)
	Menu	Type of thermocouple
T/C	TC B	B
	TC E	E
	TC J	J
	TC K	K
	TC N	N
	TC R	R
	TC S	S
	TC T	T
	TC L	L

6.1.2h Selection of type of sensor connection for channel A

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

- Int. 1 Measurement without reference thermocouple
  - measuring cold junction at instrument brackets
- Int.2 Measurement with reference thermocouple
  - measuring cold junction at instrument brackets with anti-series connected reference thermocouple
- EHt.1 Measurement without reference thermocouple
  - the entire measuring set is working under invaried and constant temperature
- EHt.2 Measurement with reference thermocouple
  - when using compensation box

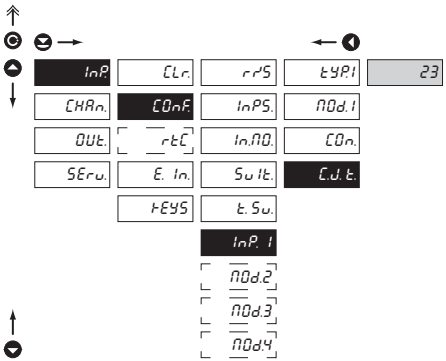
!

Method and procedure of setting the cold junctions is described in separate chapter on page 100

!

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

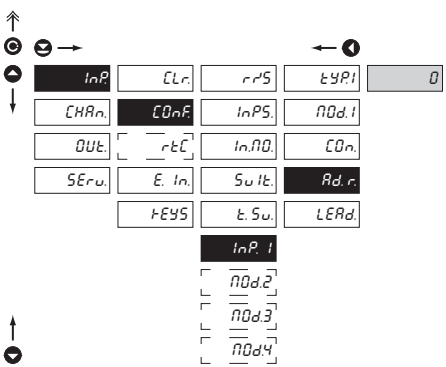
6.1.2i Setting temperature of cold junction T/C



C.J.t. Setting temperature of cold junction

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

6.1.2j Compensation of 2-wire conduct RTD OHM

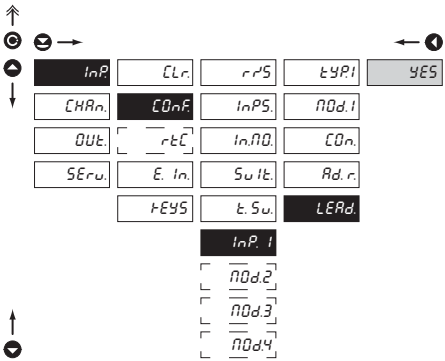


Rd. r. Offset of the beginning of the measuring range

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

6.1.2k Compensation of 2-wire conduct

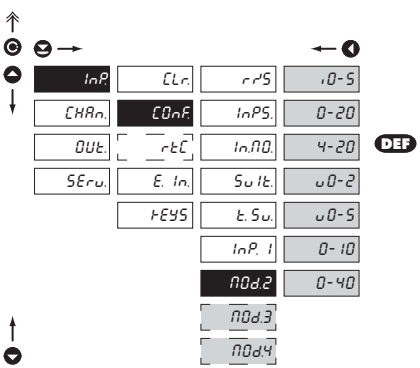
RTD OHM



LEAd. Compensation of 2-wire conduct

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

6.1.2l Selection of measuring range for channel B



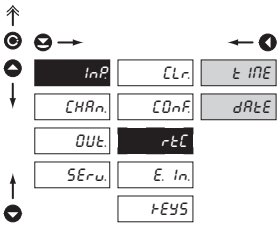
MOd.2 Selection of instrument measuring range for channel B

PM	Menu	Range
	i0-5	0...5 mA
	0-20	0...20 mA
	4-20	4...20 mA
	u0-2	±2 V
	u0-5	±5 V
	0-10	±10 V
	0-40	±40 V

*****

Setting procedure is identical for MOD. 3 and MOD. 4

6.1.3 Setting the real time clock



rtC Setting the real time clock (RTC)

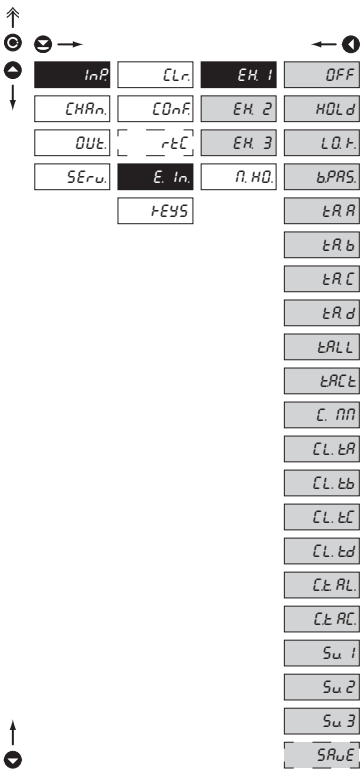
tIME Time setting

- format Hour/Min/Sec.

dAtE Date setting

- format YY/MM/DD

6.1.4a External input function selection



E. In. External input function selection

OFF Input is off

HOLd Activation of HOLD

LO.K. Locking keys on the instrument

b.PAS. Activation of locking access into programming menu LIGHT/PROFI

tA.- Tare activation

- TARE A, B, C, D, All, Active

C.nn. Resetting min/max value

CL.- Tare resetting

- TARE A, B, C, D, All, Active

Su. 1 Successive switching of channel projection

Su.2 BCD switching of channel projection - EXT. 1,2

- for operation see the table
- following this choice the setting for "EXT. 2" is automatically restricted

Su. 3 BCD switching of channel projection - EXT. 1,2, 3

- for operation see the table
- following this choice the setting for EXT.2" and "EXT. 3" is automatically restricted

Table with operation of external inputs

Channel	EXT. 1	EXT. 2	EXT. 3
FIL. A	0	0	
FIL. B	0	1	
FIL. C	1	0	
FIL. D	1	1	
MF	0	0	1
Min	0	1	1
Max	1	0	1
Max	1	1	1

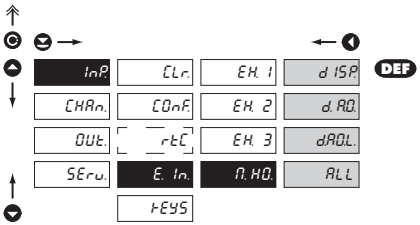
SAvE Activation of measured data record in instrument memory (not in standard equipment)

- DEF EXT. 1 > HOLD
- DEF EXT. 2 > LOCK K.
- DEF EXT. 3 > SWITCH. 1

*****

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

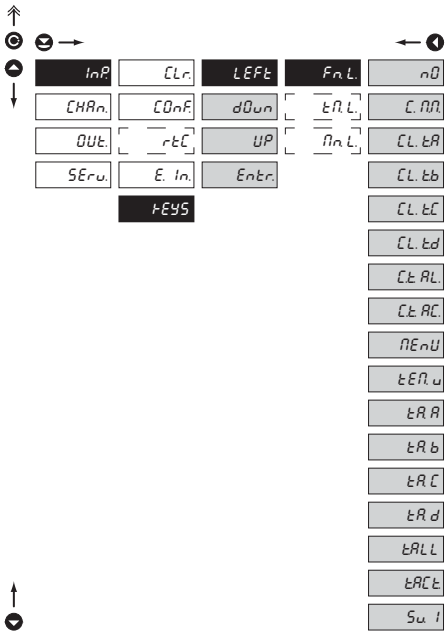
6.1.4b Selection of function "HOLD"



n. HOLd Selection of function "HOLD"

- d ISP. "HOLD" locks only the value displayed
- d. AO. "HOLD" locks the value displayed and on AO
- d.AO.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

C.MM. Resetting min/max value

CL.t- Tare resetting

- TARE A, B, C, D, All, Active

MEnU 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

tEM.u. Temporary projection of selected values

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

tA.- Tare function activation

- TARE A, B, C, D, All, Active

Su. I Successive switching of channel projection

!

Presett values of the keybuttons DEF:

LEFT	*Channel B, after filtration*
UP	*Channel C, after filtration*
DOWN	*Channel D, after filtration*
ENTER	*Channel switching "SWCH. 1"*

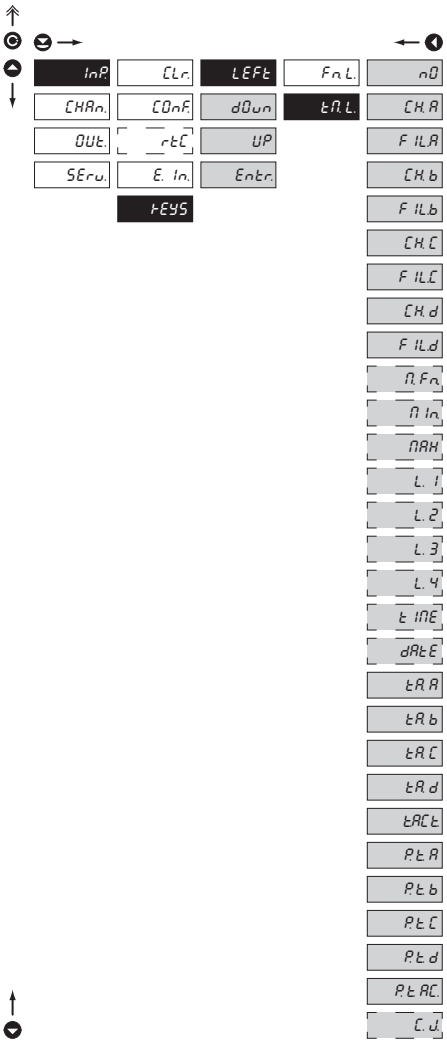
!

Setting is identical for LEFT, DOWN, UP and ENTER

!

The channel in use is the one permanently displayed

6.1.5b Optional accessory functions of the keys - Temporary projection



tn. L. Temporary projection of selected item

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

nO Temporary projection is off

CH. - Temporary projection of "Channel A, B, C or D" value

FIL. - Temporary projection of "Channel A, B, C or D" value after processing digital filters

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

n In Temporary projection of "Min. value"

nAH Temporary projection of "Max. value"

L. 1 Temporary projection of "Limit 1" value

L. 2 Temporary projection of "Limit 2" value

L. 3 Temporary projection of "Limit 3" value

L. 4 Temporary projection of "Limit 4" value

t IME Temporary projection of "TIME" value

dAtE Temporary projection of "DATE" value

tA. - Temporary projection of "TARE" value
- TARE A, B, C, D, All, Active

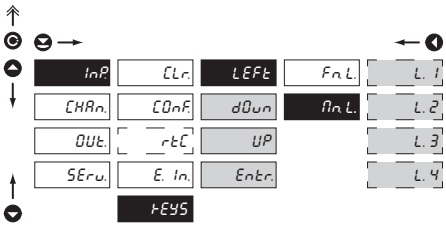
P.t. - Temporary projection of "P. TARE" value
- TARE A, B, C, D, Active

C. 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



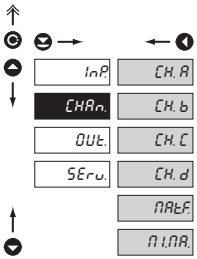
An. L. **Assigning access to selected menu item**

- 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

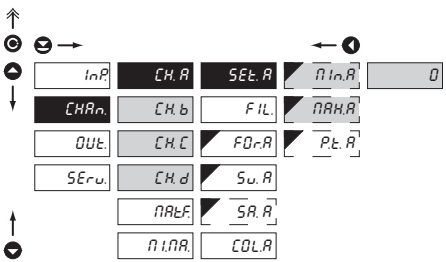


The primary instrument parameters are set in this menu

- CH.A — Setting parameters of measuring "Channel A"
- CH.b — Setting parameters of measuring "Channel B"
- CH.C — Setting parameters of measuring "Channel C"
- CH.d — Setting parameters of measuring "Channel D"
- MAt.F. — Setting parameters of mathematic functions
- MI.MA. — Selection of access and evaluation of Min/max value

6.2.1a Display projection

DC PM DU OHM



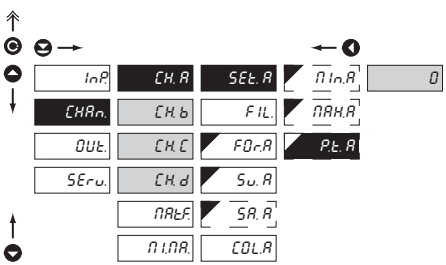
SEt.A Setting display projection

MIn.A — Setting display projection for minimum value of input signal
- range of the setting is -999...9999
- DEF = 0

MAX.A — Setting display projection for maximum value of input signal
- range of the setting is -999...9999
- DEF = 100

6.2.1b Setting fixed tare

DC PM DU OHM

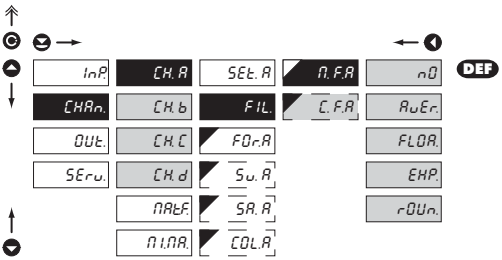


Pt.A Setting "Fixed tare" value

- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting (P.T. A > 0) display shows "T" symbol
- range of the setting is 0...9999

- DEF = 0

6.2.1c Digital filters



!

Setting is identical for "Channel B, C and D"

n.F.A 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

AuEr. Measured data average

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

FLOA. Selection of floating filter

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

EXP. Selection of exponential filter

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

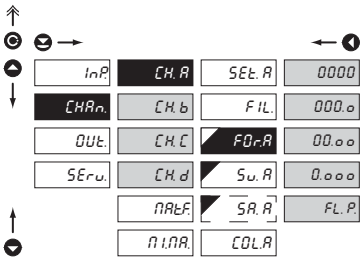
rOUn. Measured value rounding

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

C.F.A 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



!

Setting is identical for "Channel B, C and D"

FOr.A Selection of decimal point

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

0000 Setting DP - XXXX

000.o Setting DP - XXX.x

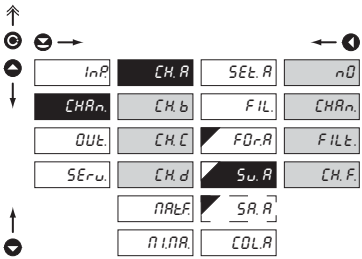
- DEF

00.oo Setting DP - XX.xx

0.ooo Setting DP - X.xxx

FL.P. Floating DP

6.2.1e Selection of channel projection upon swithing



!

Setting is identical for "Channel B, C and D"

Su.A Selection of channel projection upon switching

- setting in this item enables the user to select individual measuring channels which will be displayed upon switching the channel functions „SW. A"

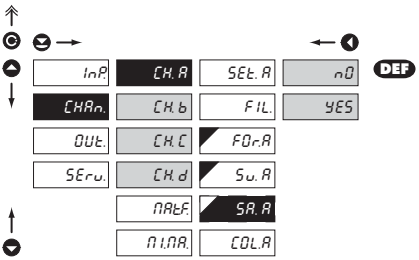
nO Projection restricted

CHAn. "Channel A" will be displayed

FIL. "Channel A" after modification by digital filter

CH.F. Will be displayed "Channel A" and subsequently also "Channel A" after modification by digital filter A

6.2.1f Selection of storing data into instrument memory



SA.A Selection of storing data into instrument memory

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

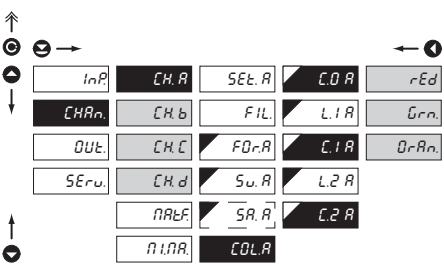
YES Measured data are stored in the memory

nO Measured data are not stored

!

Setting is identical for "Channel B, C and D"

6.2.1g Selection of display color



C.- A Selection of display color

- color selection is controlled through setting under items "L.1 A" and "L.2 A"

rEd Red color

Grn. Green color

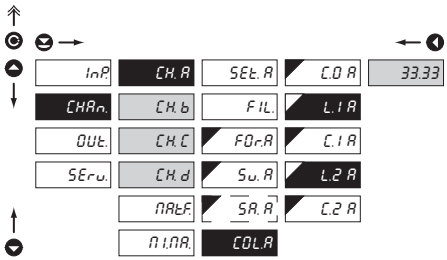
OrAn. Orange color

- "C.0x" DEF = Green
- "C.1x" DEF = Orange
- "C.2x" DEF = Red

!

Setting is identical for "Channel B, C and D"

6.2.1h Selection of display color change



L.- A Selection of display color change

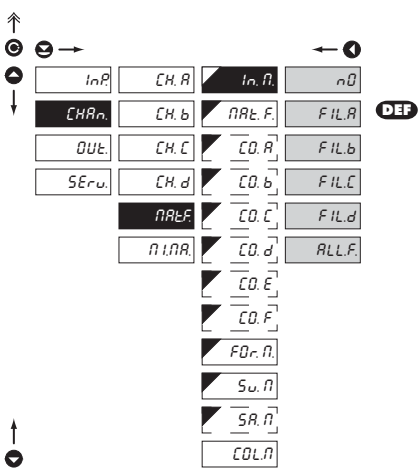
- under items "L.1 A" and "L.2 A" is set the limit when display color shall change

- "L.1 A" DEF = 33,33
- "L.2 A" DEF = 66,66

!

Setting is identical for "Channel B, C and D"

6.2.2a Mathematic functions - input selection



InP.n. Selection of input for calculation of mathematic function

- selection of value from which the mathematic function will be calculated

n0 Mathematic functions are off

FIL.A From "Channel A" after modification by digital filter

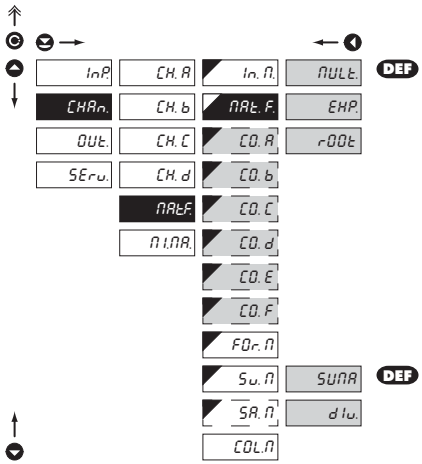
FIL.b From "Channel B" after modification by digital filter

FIL.C From "Channel C" after modification by digital filter

FIL.d From "Channel D" after modification by digital filter

ALL.F. From "Channels A, B, C, D" after modification y digital filters

6.2.2b Mathematic functions



nAt. F. Selection of mathematic functions

On selecting „FIL. - " in item„INP. M."

nULt. Polynome

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

EHP. Exponential

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

rOOt Root

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

On selecting „ALL. F." in item „INP. M."

SUnA Sum of the values from channels (inputs)

(A x KA + B x KB + C x KC + D x KD) x E + F

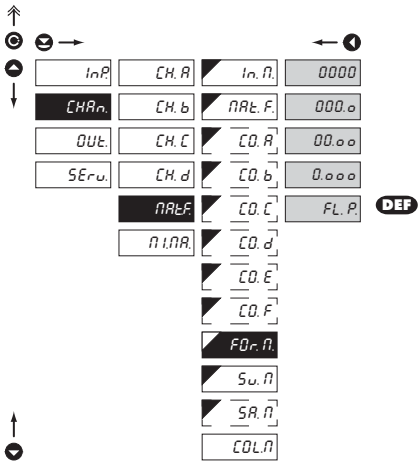
dIu. Quotient of values from channels (inputs)

(A x KA + C x KC) /(B x KB + D x KD) x E + F

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

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

6.2.2c Mathematic functions - decimal point



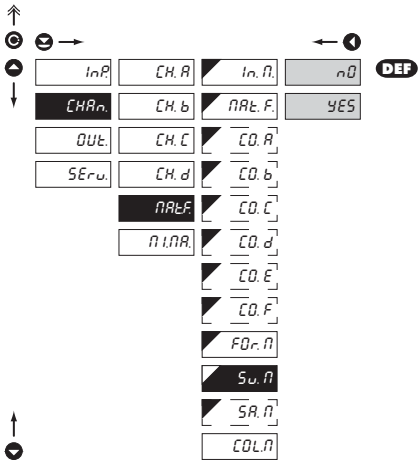
FOr.n. Selection of decimal point

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

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

- DEF

6.2.2d Mathematic functions - selection of channel projection upon switching

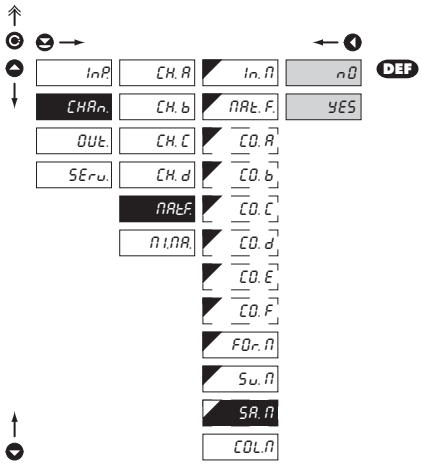


Su.n. Selection of channel projection upon switching

- setting in this item enables the user to select individual measuring channels which will be displayed upon switching the channel functions „SW. A"

nO	Projection restricted
YES	Projection permitted

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

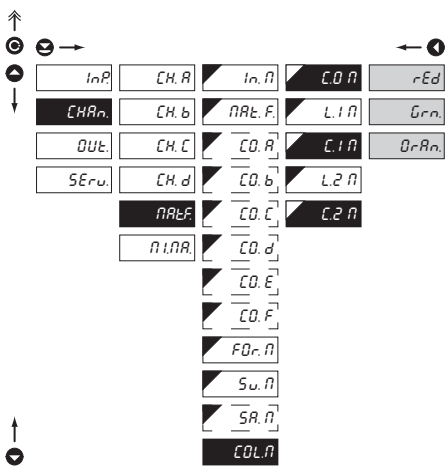


SA.A Selection of storing data into instrument memory

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

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

6.2.2f Selection of display color



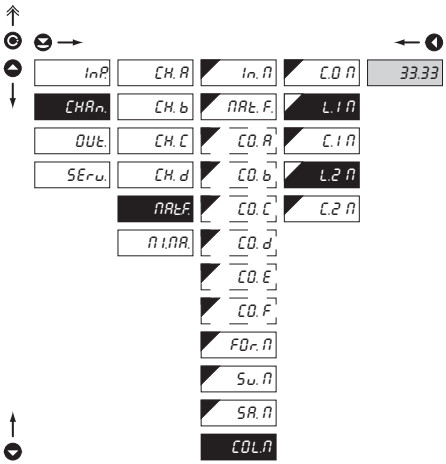
C.- A Selection of display color

- color selection is controlled through setting under items "L.1 M" and "L.2 M"

rEd	Red color
Grn.	Green color
OrAn.	Orange color

- "C.0 M" DEF = Green
- "C.1 M" DEF = Orange
- "C.2 M" DEF = Red

6.2.2g Selection of display color change

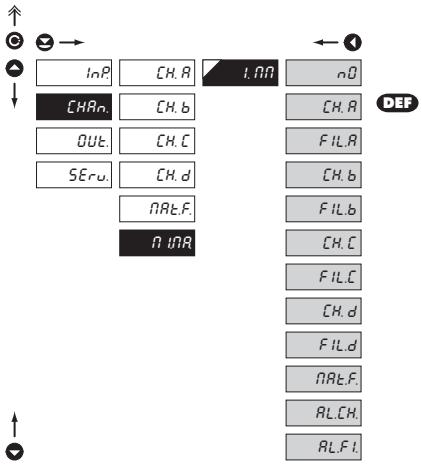


L.- n **Selection of display color change**

- under items "L.1 M" and "L.2 M" is set the limit when display color shall change

- "L.1 M" DEF = 33,33
- "L.2 M" DEF = 66,66

6.2.3 Selection of evaluation of min/max value

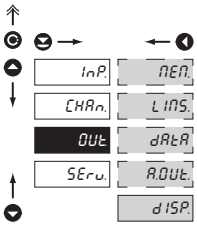


I.nA. Selection of evaluation of min/max value

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

nO	Evaluation of min/max value is off
CH. A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
CH. b	From "Channel B"
FIL.b	From "Channel B" after digital filters processing
CH. C	From "Channel C"
FIL.C	From "Channel C" after digital filters processing
CH. d	From "Channel D"
FIL.d	From "Channel D" after digital filters processing
nAt.F.	From "Mathematic functions"
AL.CH.	From "Channel A, B, C and D"
AL.FI.	From "Channel A, B, C and D" after digital filters processing

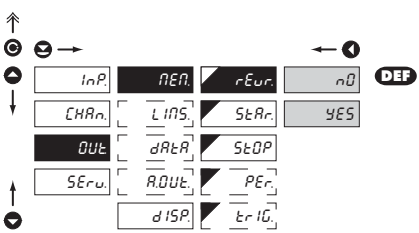
6.3 Setting „PROFI“ - OUTPUTS



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

- MEM. Setting data logging into memory
- LIMS. Setting type and parameters of limits
- dAtA Setting type and parameters of data output
- A.OUt. Setting type and parameters of analog output
- dISP. Setting display projection and brightness

6.3.1a Selection of mode of data logging into instrument memory

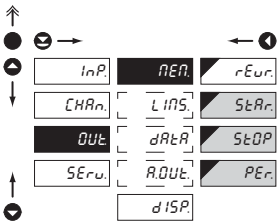


rEur. Selection of the mode of data logging

- 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



StAr. Start of data logging into instrument memory

- time format HH.MM.SS

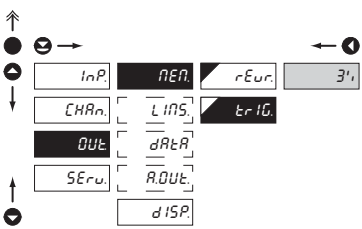
StOP Stop data logging into instrument memory

- time format HH.MM.SS

PEr. Period of data logging into instrument memory

- determines the period in which values will be logged in an interval delimited by the time set under items *START* and *STOP*
- time format HH.MM.SS
- records are made on a daily basis in selected interval and period
- item not displayed if "SAVE" is selected in menu *(Input > E. IN.)*

6.3.1c Setting data logging into instrument memory - FAST



trIG. **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
- initialization is on ext. input or button
- setting in range 1...100 %
- when setting 100 %, datalogging works in the mode ROLL > data keep getting rewritten in cycles

1. Memory initialization

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

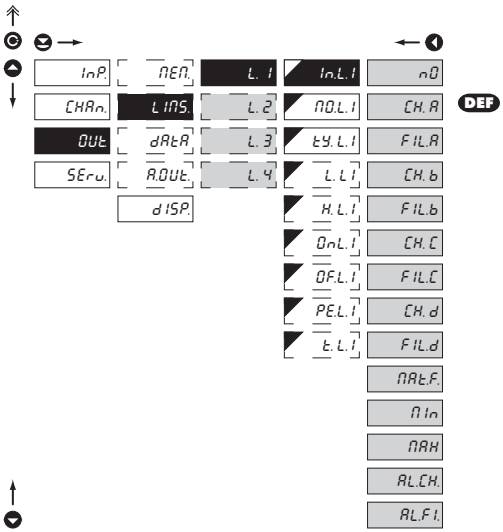
2. Triggering

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

3 . Termination

- ext.input, button or reading data via RS

6.3.2a Selection of input for limits evaluation



In.L.1 Selection evaluation of limits

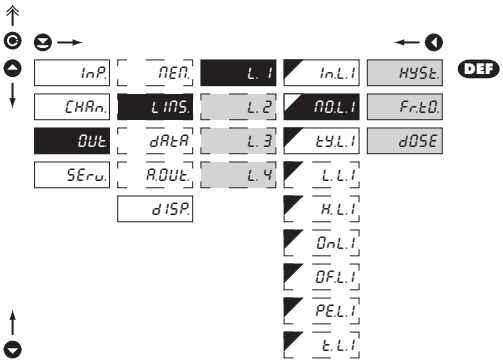
- selection of value from which the limit will be evaluated

nO	Limit evaluation is off
CH.A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
CH.b	From "Channel B"
FIL.b	From "Channel B" after digital filters processing
CH.C	From "Channel C"
FIL.C	From "Channel C" after digital filters processing
CH.d	From "Channel D"
FIL.d	From "Channel D" after digital filters processing
MAt.F.	From "Mathematic functions"
Min.	From "Min.value"
MAX	From "Max.value"
AL.CH.	From "Channel A, B, C and D"
AL.FI.	From "Channel A, B, C and D" after digital filters processing

!

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

6.3.2b Selection of type of limit



nOL.1 **Selection the type of limit**

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

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

FrtO. Frame limit

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

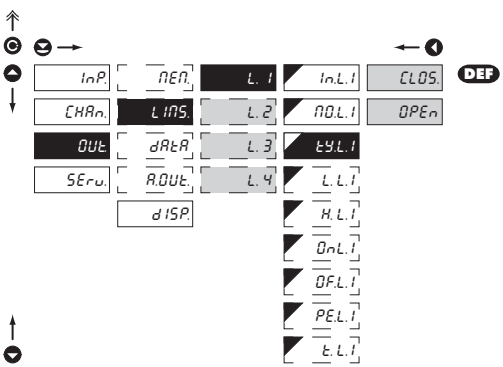
dOSE Dosing limit (periodic)

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

!

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

6.3.2c Selection of type of output



tYL.1 **Selection of type of output**

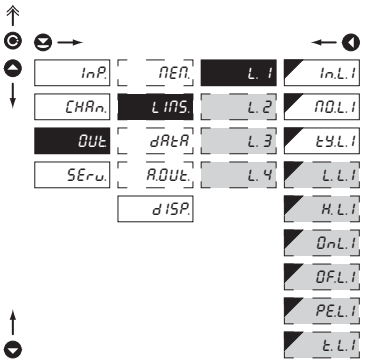
CLOS. Output switches on when condition is met

OPEn Output switches off when condition is met

!

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

6.3.2d Setting values for limits evaluation

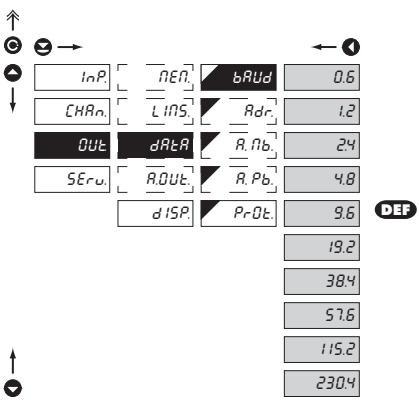


!

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

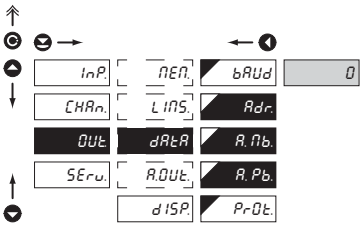
L.L.1	Setting limit for switch-on
- for type "HYST."	
H.L.1	Setting hysteresis
- for type "HYST."	
- indicates the range around the limit (in both directions, LIM. ±1/2 HYS.)	
OnL.1	Setting the outset of the interval of limit switch-on
- for type "FR.TO."	
OFL.1	Setting the end of the interval of limit switch-on
- for type "FR.TO."	
PEL.1	Setting the period of limit switch-on
- for type "DOSE"	
t.L.1	Setting the time switch-on of the limit
- for type "HYST." and "DOSE"	

6.3.3a Selection of data output baud rate



bAUd	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
115.2	Rate - 115 200 Baud
230.4	Rate - 230 400 Baud

6.3.3b Setting instrument address



Adr. Setting instrument address

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

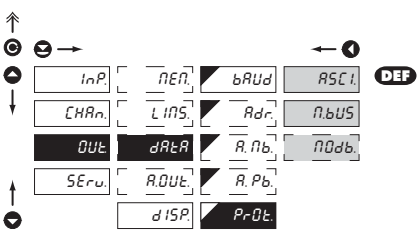
A.Nb. Setting instrument address - MODBUS

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

A.Pb. Setting instrument address - PROFIBUS

- setting in range 1...127
- DEF = 1

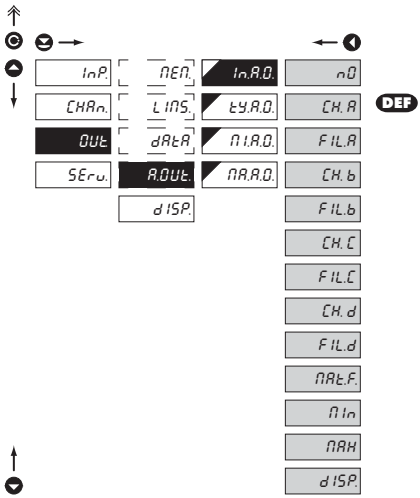
6.3.3c Selection of data output protocol



Prot. Selection of the type of analog output

- ASCI. Data protocol ASCII
- n.bUS Data protocol DIN MessBus
- nOdb. Data protocol MODBUS-RTU
- option is available only for RS 485

6.3.4a Selection of input for analog output

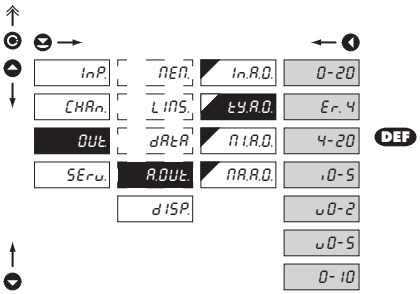


In.A.O. Selection evaluation analog output

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

nO	AO evaluation is off
CH.A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
CH.b	From "Channel B"
FIL.b	From "Channel B" after digital filters processing
CH.C	From "Channel C"
FIL.C	From "Channel C" after digital filters processing
CH.d	From "Channel D"
FIL.d	From "Channel D" after digital filters processing
MAt.F.	From "Math.functions"
Min	From "Min.value"
MAX	From "Max.value"
diSP.	From "Permanently projected display value"

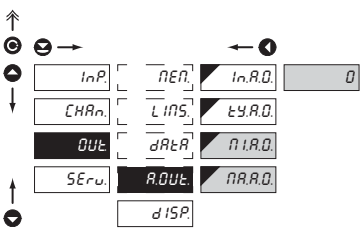
6.3.4b Selection of the type of analog output



tY.A.0. Selection of the type of analog output

- 0-20 Type - 0...20 mA
- Er.4 Type - 4...20 mA
  - with indication of error statement (< 3,0 mA)
- 4-20 Type - 4...20 mA
- ,0-5 Type - 0...5 mA
- u0-2 Type - 0...2 V
- u0-5 Type - 0...5 V
- 0-10u Type - 0...10 V

6.3.4c Setting the analog output range



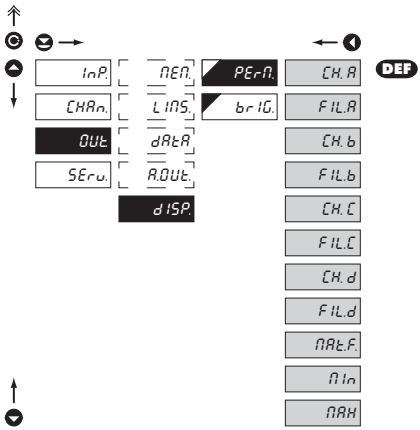
A.OUt. Setting the analog output range

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

n1.A.0. Assigning the display value to the beginning of the AO range
- range of the setting is -999...9999
- DEF = 0

nA.A.0. Assigning the display value to the end of the AO range
- range of the setting is -999...9999
- DEF = 100

6.3.5a Selection of input for display projection

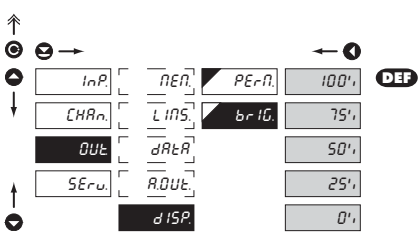


PErn. Selection display projection

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

CH.A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
CH.b	From "Channel B"
FIL.b	From "Channel B" after digital filters processing
CH.C	From "Channel C"
FIL.C	From "Channel C" after digital filters processing
CH.d	From "Channel D"
FIL.d	From "Channel D" after digital filters processing
MAt.F.	From "Math.functions"
Min	From "Min.value"
MAX	From "Max.value"

6.3.5b Selection of display brightness



brIG. Selection of display brightness

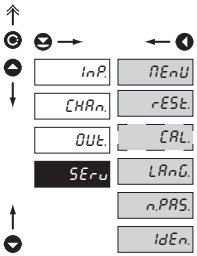
- by selecting display brightness we may appropriately react to light conditions in place of instrument location

0'	Display is off

- after keystroke display turns on for 10 s

25'	Display brightness - 25 %
50'	Display brightness - 50 %
75'	Display brightness - 75 %
100'	Display brightness - 100 %

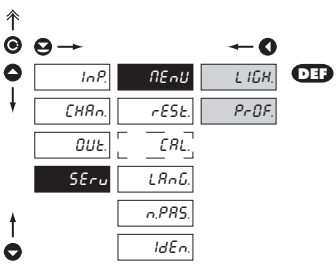
6.4 Setting "PROFI" - SERVIS



The instrument service functions are set in this menu

- MEnU — Selection of menu type LIGHT/PROFI
- rESt. — Restore instrument manufacture setting and calibration
- CAL. — Input range calibration for „DU" version
- LAnG. — Language version of instrument menu
- n.PAS. — Setting new access password
- IdEn. — Instrument identification

6.4.1 Selection of type of programming menu



!

Change of setting is valid upon next access into menu

MEnU Selection of menu type - LIGHT/PROFI

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

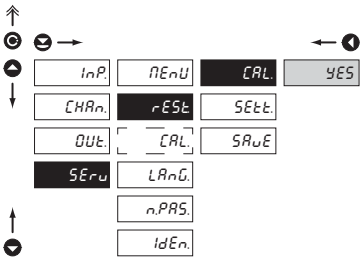
LIGH. Active LIGHT menu

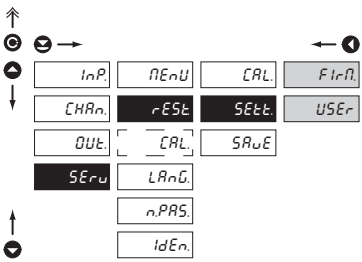
- simple programming menu, contains only items necessary for configuration and instrument setting
- linear menu > items one after another

PrOF. Active PROFI menu

- complete programming menu for expert users
- tree menu

6.4.2 Restoration of manufacture setting





rESt. 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*"

SEtt. Restoration of instrument manufacture setting

FirM. Restoration of instrument manufacture setting

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

USEr Restoration of instrument user setting

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

SAuE Save instrument user setting

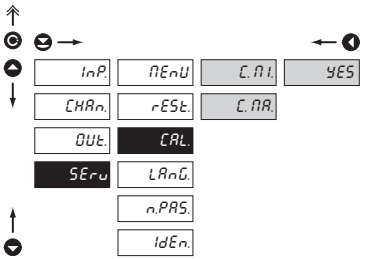
- storing the user setting allows the operator to restore it in future if needed

Jobs performed	Restore	
	Calibration	Setting
cancels USER menu rights	✓	✓
deletes table of items order in USER - LIGHT menu	✓	✓
adds items from manufcture to LIGHT menu	✓	✓
deletes data stored in FLASH	✓	✓
cancels or linearization tables	✓	✓
clears tare	✓	✓
clears conduct resistances	✓	✓
restore manufacture calibration	✓	✘
restore manufacture setting	✘	✓

!

After restoration the instrument switches off for couple seconds

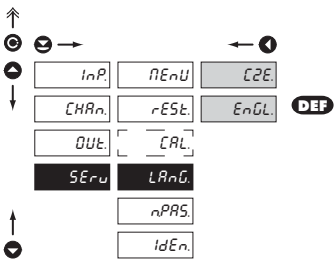
6.4.3 Calibration - Input range DU



CAL. Input range calibration

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

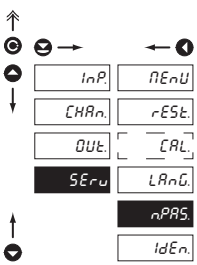
6.4.4 Selection of instrument menu language version



LAnG. Selection of instrument menu language version

CZE.	Instrument menu is in Czech
EnGL.	Instrument menu is in English

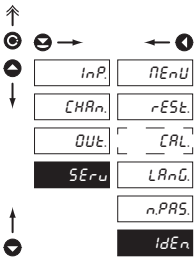
6.4.5 Setting new access password



nPAS. 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...9999
- universal password in the event of loss is „8177"

6.4.6 Instrument identification



IdEn. **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

nO	item will not be displayed in USER menu
YES	item will be displayed in USER menu with editing option
SHOu	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

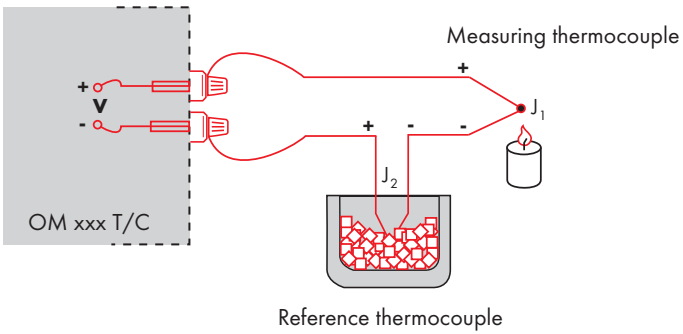
(keys +) > *TA. A*, *L. L 1*, *L. L 2*, *L. L 3*, for which we have preset this sequence (keys +):

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

Upon entering USER menu

(key) items will be projected in the following sequence: L.L 3 > L. L 2 > TA. A > L. 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 Int2 or EHt2
- when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu CJt its temperature (applies for setting CJn to EHt2)
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CJn to Int2 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 Int1 or EHt1
- when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CJn to EHt1)

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 49	10_H 31_H	Confirm correct statement
<NAK>	21	15_H	Confirm error statement
<BCC>			Check sum -XOR

RELAY, TARE

Sign	Relay 1	Relay 2	Tare	Change relay 3/4
P	0	0	0	0
Q	1	0	0	0
R	0	1	0	0
S	1	1	0	0
T	0	0	1	0
U	1	0	1	0
V	0	1	1	0
W	1	1	1	0
p	0	0	0	1
q	1	0	0	1
r	0	1	0	1
s	1	1	0	1
t	0	0	1	1
u	1	0	1	1
v	0	1	1	1
w	1	1	1	1

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

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

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

INPUT - CHANNEL A

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 — ***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
Connection: 2, 3 or 4 wire

RTD

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

range is adjustbale in configuration menu — ***T/C***

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

DU

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

INPUT - CHANNEL B

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

INPUT - CHANNEL C

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

INPUT - CHANNEL D

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

PROJECTION

Display:	9999, intensive red/green/orange 7-segment LED, digit height 20 mm
Projection:	-999...9999
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***
	Above accuracies apply for projection 9999	
Resolution:	0,01°/0,1°/1°	***RTD***
Rate:	0,1...40 measurements/s, see table	
Overload capacity:	10x (t < 100 ms) not for 400 V and 5 A, 2x (long-term)	
Linearisation:	by linear interpolation in 50 points - solely via OM Link	
Digital filters:	Averaging, Floating average, Exponential filter, Rounding	
Comp. of conduct:	max. 40 Ohm/100 Ohm	***RTD***
Comp. of cold junct.:	adjustable 0°...99°C or automatic	***T / C***
Functions:	Tare - display resetting Hold - stop measuring (at contact) Lock - control key locking MM - min/max value Mathematic functions	
OM Link:	company communication interface for setting, operation and update of instrument SW	
Watch-dog:	reset after 400 ms	
Calibration:	at 25°C and 40 % of r.h.	

** values apply for resistance load*

COMPARATOR

Type:	digital, adjustable in menu
Mode:	Hysteresis, From, Dose
Limita:	-999...9999
Hysteresis:	0...9999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)*
	2x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)*
	2x SSR (250 VAC/ 1 A)*
	2x/4x open collector (30 VDC/100 mA)
	2x bistabil relays (250 VAC/250 VDC, 3 A/0,3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

DATA OUTPUTS

Protocols:	ASCII, DIN MessBus
Data format:	8 bit + no parity + 1 stop bit (ASCII)
	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 < 40 ms
Voltage:	0...2 V/5 V/10 V
Curernt:	0...5/20 mA/4...20 mA
	- compensation of conduct to 500 Ohm/12 V or 1 000 Ohm/24 V

MEASURED DATA RECORD

Type RTC:	time-controlled logging of measured data into instrument memory, allows to log up to 130 000 values
Type FAST:	fast data logging into instrument memory, allows to log up to 8 000 values at a rate of 40 records/s
Transmission:	via data output RS 232/485 or via OM Link

EXCITATION

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

POWER SUPPLY

Options:	10...30 V AC/DC, max 13,5 VA, isolated, - fuse inside (T 4000 mA)
	80...250 V AC/DC, max. 13,5 VA, isolated - fuse inside (T 630 mA)

MECHANIC PROPERTIES

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

OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section <1,5 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 instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11; EN 550222, A1, A2
Seismic capacity:	IEC 980: 1993, par. 6

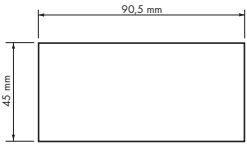
Table of mesuring rate depending on the number of inputs

Channels/Rate	*40*	*20*	*10*	*5*	*2*	*1*	*0,5*	*0,2*	*0,1*
Qty. 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*
Qty. of channels: 2	*5,00*	*2,50*	*1,25*	*1,00*	*0,62*	*0,38*	*0,22*	*0,09*	*0,05*
Qty. of channels: 3	*3,33*	*1,66*	*0,83*	*0,66*	*0,42*	*0,26*	*0,14*	*0,06*	*0,03*
Qty. of channels: 4	*2,50*	*1,25*	*0,62*	*0,50*	*0,31*	*0,19*	*0,11*	*0,05*	*0,02*
Qty. 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*
Qty. of channels: 2	*3,33*	*1,066*	*0,83*	*0,66*	*0,42*	*0,26*	*0,14*	*0,06*	*0,03*
Qty. of channels: 3	*2,50*	*1,25*	*0,62*	*0,50*	*0,31*	*0,19*	*0,11*	*0,05*	*0,02*
Qty. of channels: 4	*2,00*	*1,00*	*0,50*	*0,40*	*0,25*	*0,15*	*0,08*	*0,04*	*0,02*

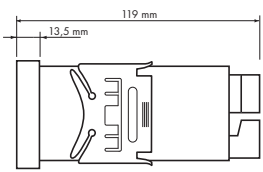
PI - Primary insulation, DI - Double insulation

Front view

Panel cut



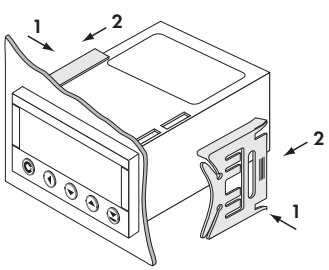
Side view

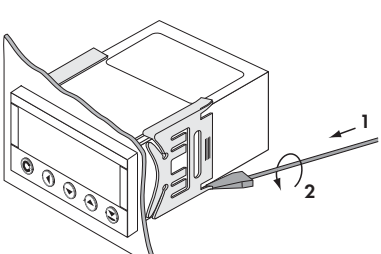


Panel thickness: 0,5...20 mm

Instrument installation

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





Instrument disassembly

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

Product	**OM 402UNI 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: **OM 402**

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.