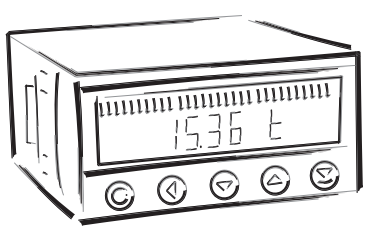
GUARANTEE 5 YEARS

OMB 402UNI

4 DIGIT PROGRAMMABLE UNIVERSAL BARGRAPH

DC VOLTMETER/AMMETER
PROCESS MONITOR
OHMMETER
THERMOMETER FOR PT/NI/CU
THERMOMETER FOR THERMOCOUPLES
DISPLAYS FOR LIN. POTENTIOMETERS



SAFETY INSTRUCTIONS

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

TECHNICAL DATA

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

The instruments are up to the following European standards:

EN 61010-1	Electrical safety
EN 61326-1	Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"

Seismic capacity:
IEC 980: 1993, čl. 6

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

CONNECTION

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

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2. INSTRUMENT DESCRIPTION

2.1 DESCRIPTION

The OMB 402 model series are 30 LED, 3-colour panel programmable horizontal bargraph designed for maximum efficiency and user comfort while maintaining their favourable price. Two models are available: UNI and PWR.

Type OMB 402UNI is a multifunction instrument with the option of configuration for 8 various input options, easily configurable in the instrument menu. By further options of input modules it is feasible to measure larger ranges of DC voltage and current or increase the number of inputs up to 4 (applies for PM).

The instrument is based on an 8-bit microcontroller with a multichannel 24-bit sigma-delta converter, which secures high accuracy, stability and easy operation of the instrument.

TYPES AND RANGES

UNI	DC:	0...60/150/300/1200 mV
	PM:	0...5/20 mA/4...20 mA; ±2/±5/±10/±40 V
	OHM:	0...100 Ω/0...1/10/100 kΩ
	RTD-Pt:	Pt 50/100/500/1000
	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)
UNI - A	DC:	±0,1/±0,25/±0,5/±2/±5; ±100/±250/±500 V
UNI - B	PM:	3x 0...5/20 mA/4...20 mA; ±2/±5/±10/±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:	30-segment LED 3-color bargraph + 6-digit display -9999...9999 (-99999...999999)

COMPENSATION

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

LINEARIZATION

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

DIGITAL FILTERS

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

MATHEMATIC FUCTIONS

Min/max. value:	registration of min./max. value reached during measurement
Tare:	designed to reset display upon non-zero input signal
Peak value:	the display shows only max. or min. value
Mat. operations:	polynome, 1/x, logarithm, exponential, power, root, sin x

* only for types DC, PM, DU

EXTERNAL CONTROL

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

2.2 OPERATION

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

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

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

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

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

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

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

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

2.3 OPTIONS

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

Comparators are assigned to monitor one, two, three or four limit values with relay output. The user may select limits regime: LIMIT/DOSING/FROM-TO. The limits have adjustable hysteresis within the full range of the display as well as selectable delay of the switch-on in the range of 0...99,9 s. Reaching the preset limits is signalled by LED and simultaneously by the switch-on of the relevant relay.

Data outputs are for their rate and accuracy suitable for transmission of the measured data for further projection or directly into the control systems. We offer an isolated RS232 and RS485 with the ASCII or DIN MessBus protocol.

Analog outputs will find their place in applications where further evaluating or processing of measured data is required in external devices. We offer universal analog output with the option of selection of the type of output - voltage/current. The value of analog output corresponds with the displayed data and its type and range are selectable in Menu.

Measured data record is an internal time control of data collection. It is suitable where it is necessary to register measured values. Two modes may be used. FAST is designed for fast storage (40 records/s) of all measured values up to 8 000 records. Second mode is RTC, where data record is governed by Real Time with data storage in a selected time segment and cycle. Up to 250 000 values may be stored in the instrument memory. Data transmis sion into PC via serial interface RS232/485 and OM Link.

3. INSTRUMENT CONECTION

The instrument supply leads should not be in proximity of the incoming low-potential signals.
Contactors, motors with larger input power should not be in proximity of the instrument.
The leads into the instrument input (measured quantity) should be in sufficient distance from all power leads and appliances. Provided this cannot be secured it is necessary to use shielded leads with connection to ground (bracket E).
The instruments are tested in compliance with standards for use in industrial area, yet we recommend to abide by the above mentioned principles.

MEASURING RANGES

TYPE	INPUT I	INPUT U
DC		0...60/150/300/1 200 mV
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V
OHM	0...100 Ω/0...1/10/100 kΩ	
RTD-Pt	Pt 50/100/500/1 000	
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/±0,25/±0,5 A to GND (C) ±2/±5 A to GND (B)	±100/±250/±500 V to GND (C)

OPTION "B"

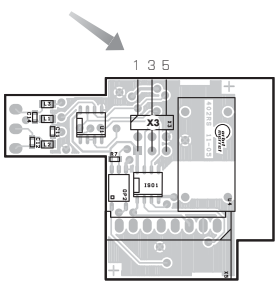
TYPE	INPUT 2, 3, 4/I	INPUT 2, 3, 4/U
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V

Termination of RS 485 communication line

X3 - Termination of commuication line RS 485

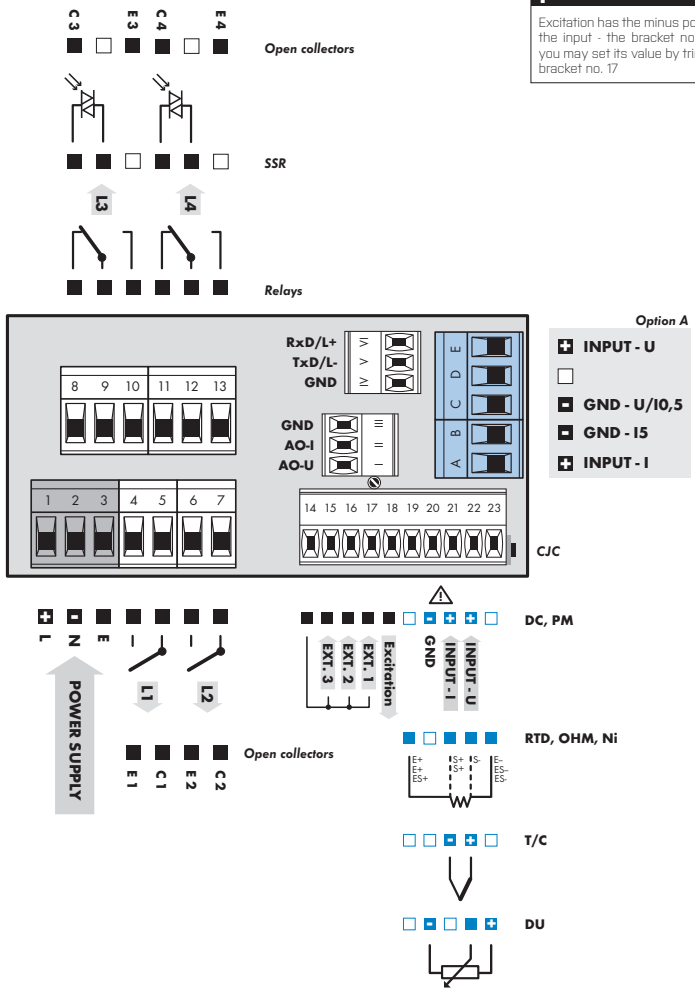
Full	Significance	Default	Recomendation
1-2	connect L+ to (+) source	terminalconnected	
3-4	termination of line 120 Ohm	disconnected	connect at the end of line
5-6	connect L- to (-) source	terminalconnected	do not disconnect

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



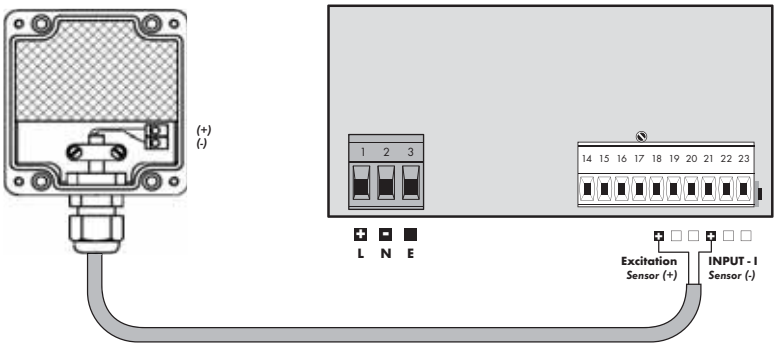
!

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

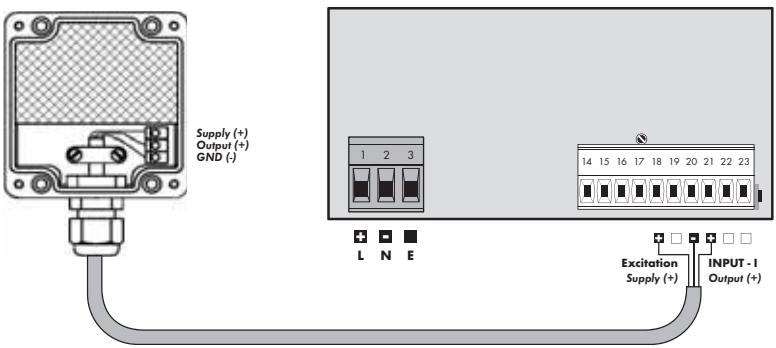


Maximum of 250 mA may be connected to "INPUT - I" (bracket no. 21) , i.e. 10-times range overload.
Mind the correct connection/mistaking of current - voltage input.
Destruction of measuring resistance in current input (15R) may occur.

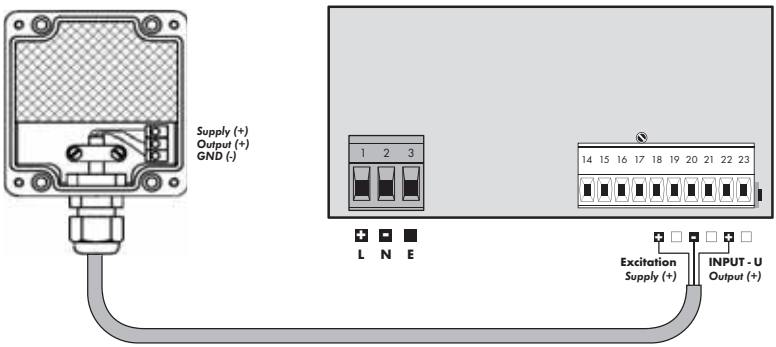
Example connection of a 2-wire sensor with current signal output powered by instrument's excitation



Example connection of a 3-wire sensor with current signal output powered by instrument's excitation

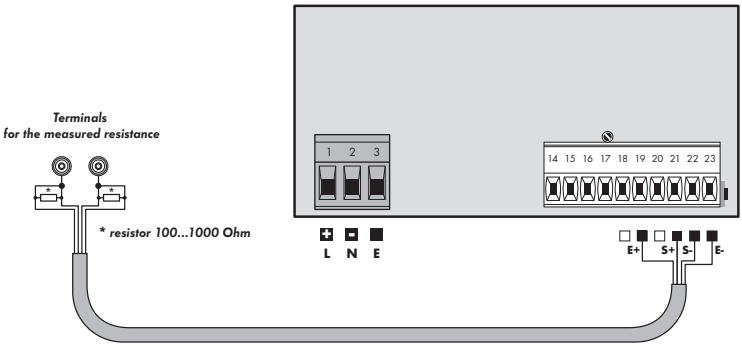


Example connection of 3-wire sensor with voltage signal output powered by instrument's excitation



Example connection of resistance measurement using 4 wires

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



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**
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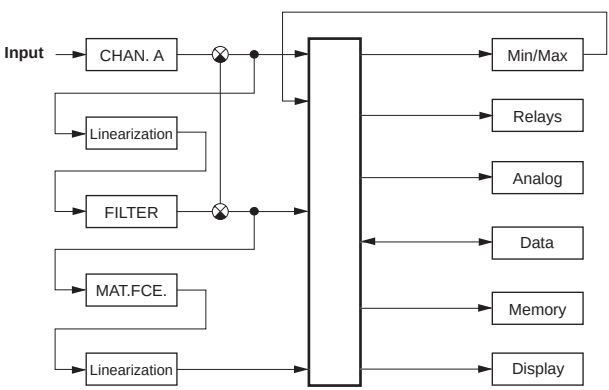
- acces without password

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

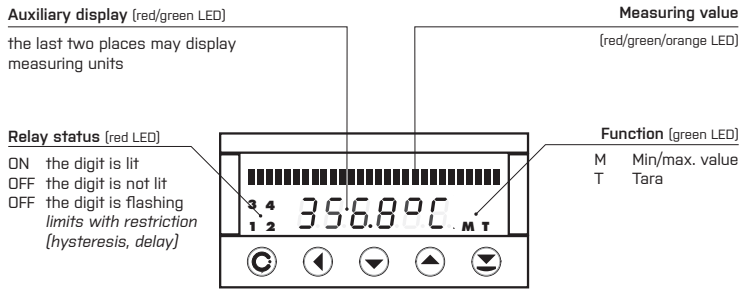
Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.
The operation program is freely accessible (www.orbit.merret.eu) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.
Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

Scheme of processing the measured signal



4. INSTRUMENT SETTING

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



Symbols used in the instructions

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

DEF — values preset from manufacture

42 — symbol indicates a flashing light (symbol)

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

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

Setting items into „USER" menu

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

USER

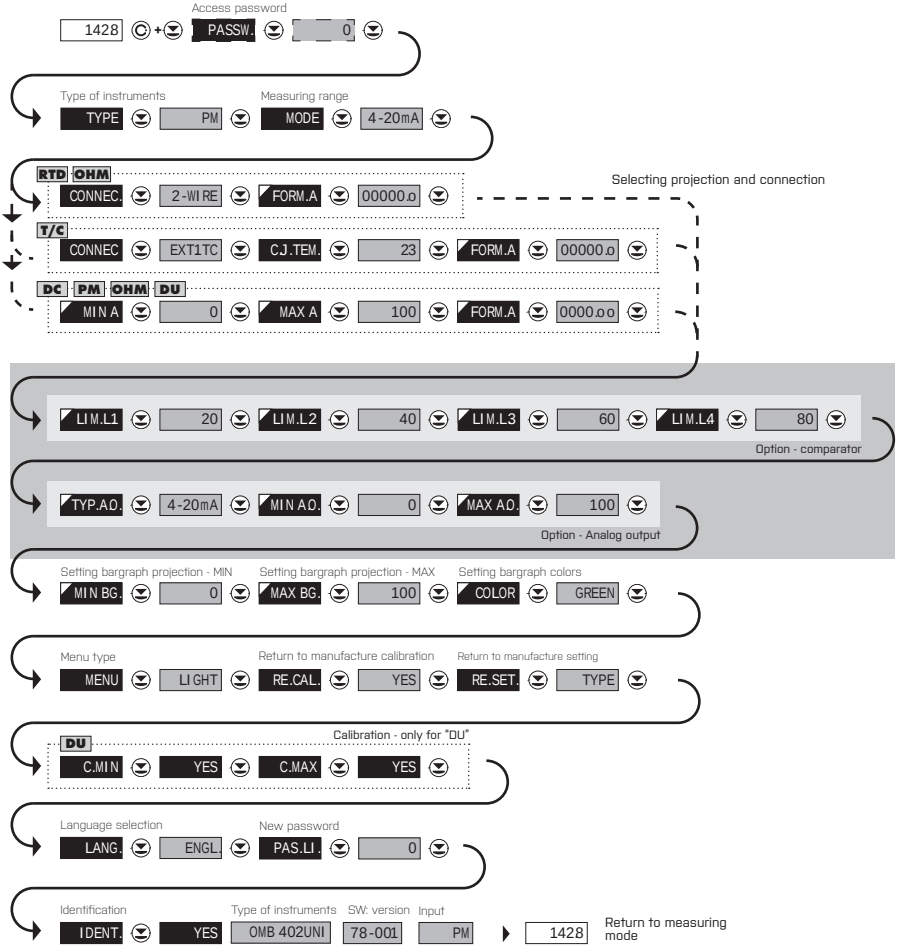
NO item will not be displayed in USER menu

YES item will be displayed in USER menu with the option of setting

SHOW item will be solely displayed in USER menu

SETTING **LIGHT**

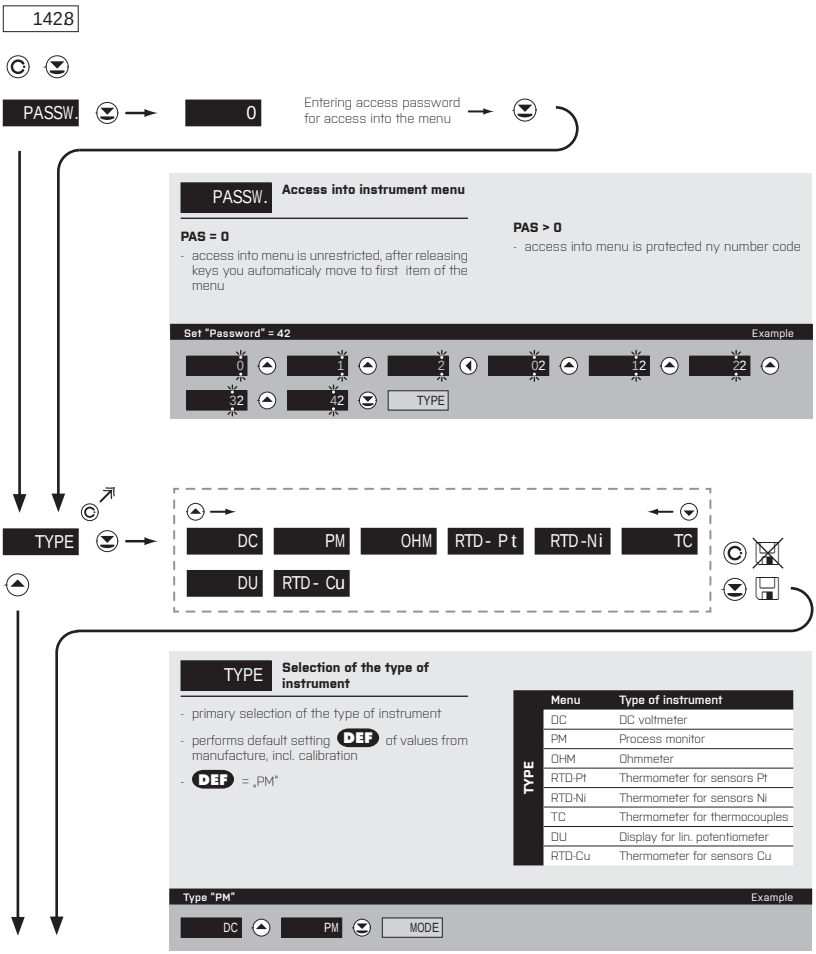
For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

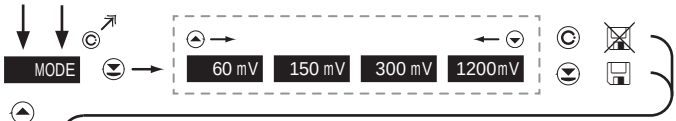


Preset from manufacture	
Password	"0"
Menu	LIGHT
USER menu	off
Setting the items	DEF

!

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





MODE **Selection of the instrument measuring range**

DEF = 60 mV

DEF = 500 V*

* only for option "A"

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

Range ±150 mV Example

60 mV → 150 mV → MIN A

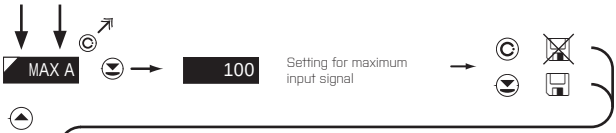
MIN A **Setting display projection for minimum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mV > MIN A = 0 Example

0 → MAX A

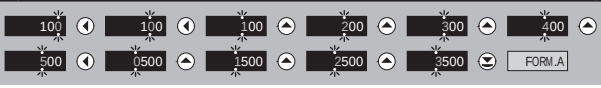


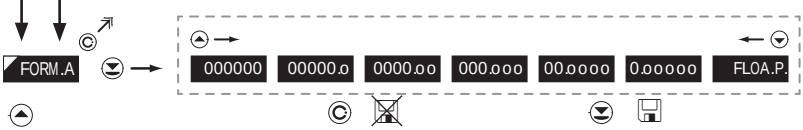
MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- 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



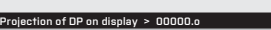


FORM.A **Setting projection of the decimal point**

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

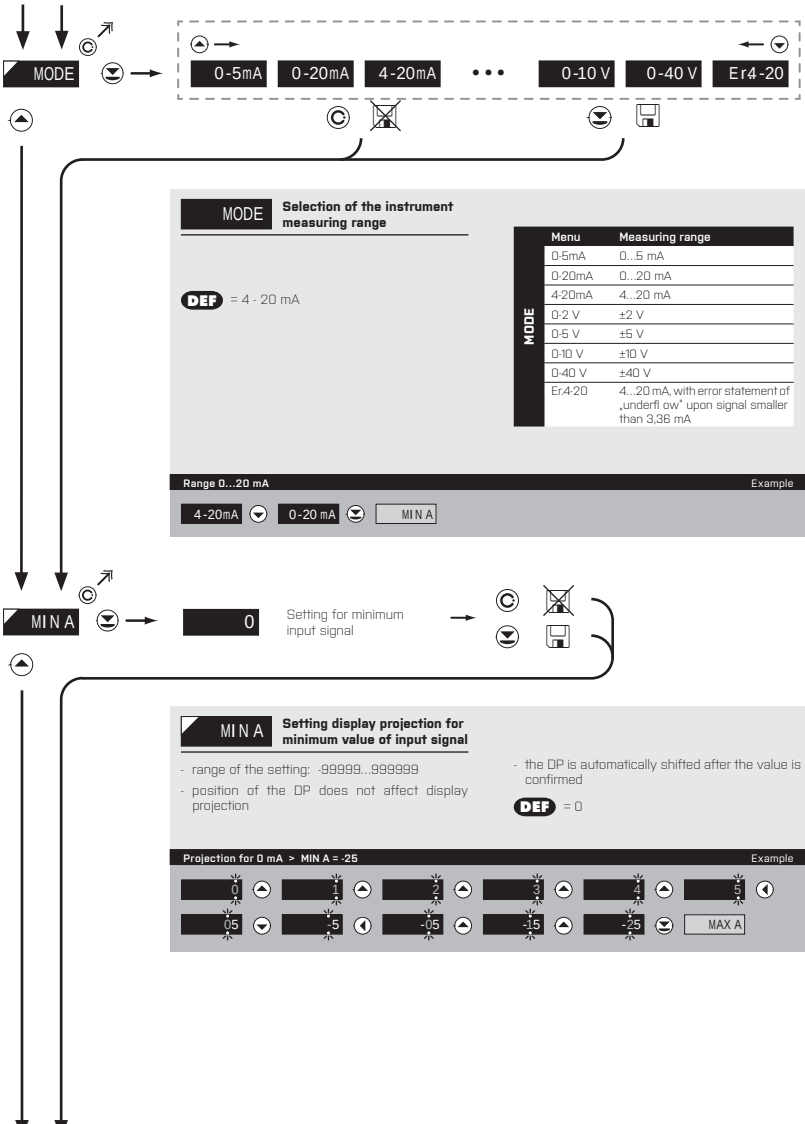
DEF = 0000.00

Projection of DP on display > 00000.0 Example



*subsequent item on the menu depends on instrument equipment

34



MODE **Selection of the instrument measuring range**

DEF = 4 - 20 mA

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

Range 0...20 mA Example

4-20mA → 0-20mA → MINA

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

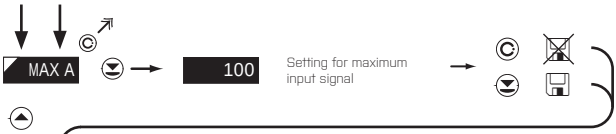
- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mA > MIN A = -25 Example

0 → 1 → 2 → 3 → 4 → 5

05 ← 5 ← -05 ← -15 ← -25 → MAX A



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

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

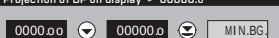
Projection for 20 mA > MAX A = 2500 Example

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

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

DEF = 0000.00

Projection of DP on display > 00000.0 Example



*subsequent item on the menu depends on instrument equipment

34

MODE **Selection of instrument measuring range**

DEF = 100 Ω

MODE	Menu	Measuring range
	100 R	0...100 Ω
	1 k	0...1 kΩ
	10 k	0...10 kΩ
	100 k	0...100 kΩ

Range 0...10 kΩ Example

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

DEF = 2-wire

CONECT.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

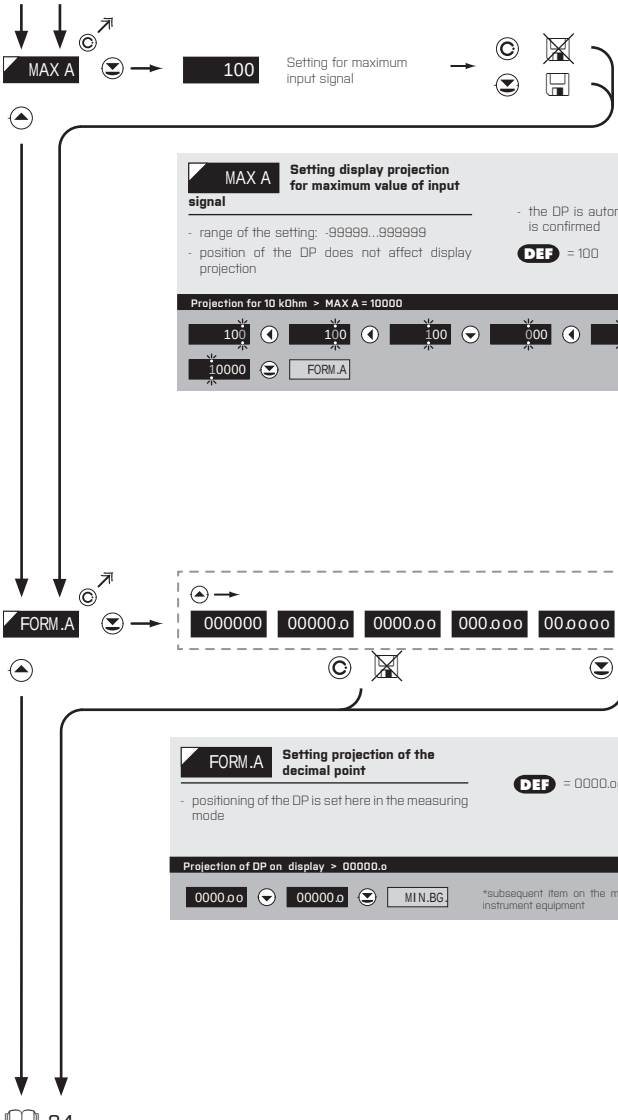
Type of connection - 3 wire > CONECT. = 3-WIRE Example

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

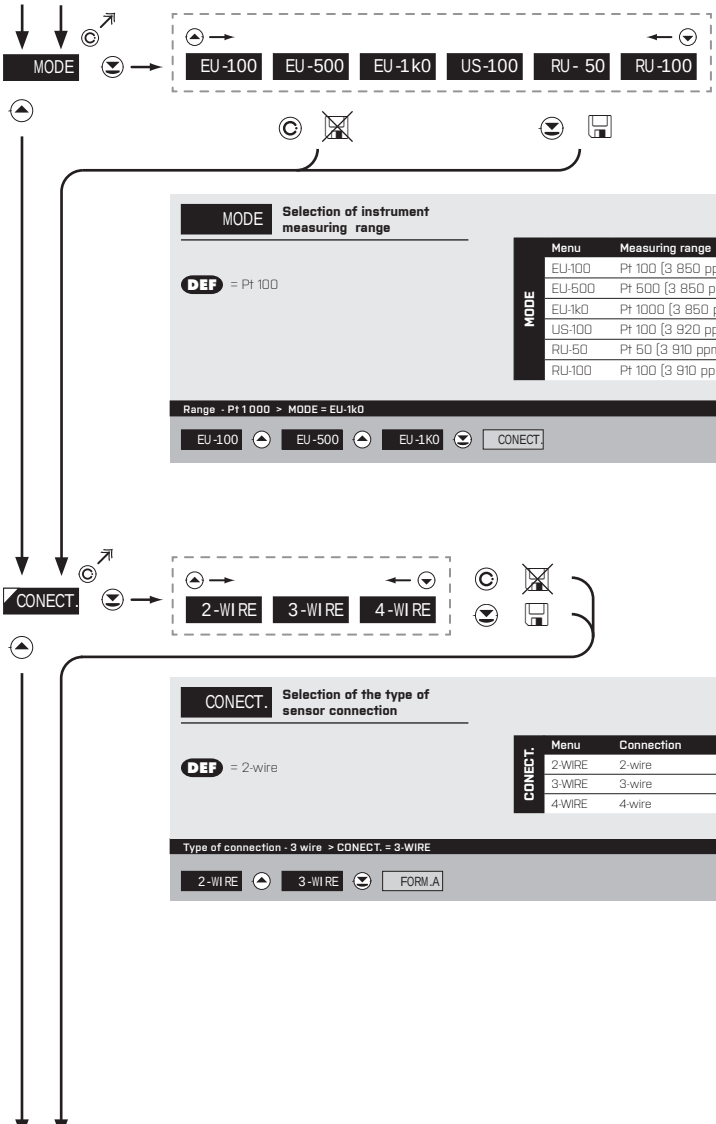
- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 Ohm > MIN A = 0 Example


MAX A
100
Setting for maximum input signal
MAX A
Setting display projection for maximum value of input signal
- range of the setting: -99999...999999
- 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 = 10000
Example
100
100
100
000
0000
00000
10000
FORM.A
FORM.A
000000
00000.0
0000.00
000.000
00.0000
0.00000
FLOA.P.
FORM.A
Setting projection of the decimal point
- positioning of the DP is set here in the measuring mode
DEF = 0000.00
Projection of DP on display > 00000.0
Example
0000.00
00000.0
MIN.BG.
*subsequent item on the menu depends on instrument equipment

34



MODE **Selection of instrument measuring range**

DEF = Pt 100

MODE	Menu	Measuring range
	EU-100	Pt 100 (3 850 ppm/°C)
	EU-500	Pt 500 (3 850 ppm/°C)
	EU-1k0	Pt 1000 (3 850 ppm/°C)
	US-100	Pt 100 (3 920 ppm/°C)
	RU-50	Pt 50 (3 910 ppm/°C)
	RU-100	Pt 100 (3 910 ppm/°C)

Range - Pt 1 000 > MODE = EU-1k0 — Example

EU-100 ▲ EU-500 ▲ EU-1K0 ▼ CONECT.

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

DEF = 2-wire

CONECT.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONECT. = 3-WIRE — Example

2-WIRE ▲ 3-WIRE ▼ FORM.A

FORM.A Setting projection of the decimal point

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

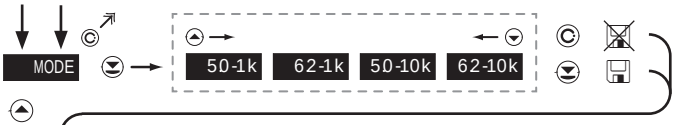
DEF = 00000.o

Projection of DP on display > 000000 Example

00000.o → 000000 → MIN.BG

*subsequent item on the menu depends on instrument equipment

34



MODE **Selection of instrument measuring range**

DEF = Ni 1 000 - 5 000 ppm/°C

MODE	Menu	Measuring range
	5.0-1k	Ni 1 000 (5 000 ppm/°C)
	6.2-1k	Ni 1 000 (6 180 ppm/°C)
	5.0-10k	Ni 10 000 (5 000 ppm/°C)
	6.2-10k	Ni 10 000 (6 180 ppm/°C)

Range - Ni 10 000, 5 000 ppm > MODE = 5.0-10k Example

50-1k ▲ 62-1k ▲ 50-10k ▼ CONECT.

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

DEF = 2-wire

CONECT.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONNEC = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ FORM.A

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

DEF = 00000.o

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

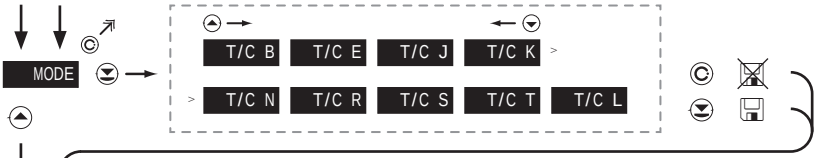
Projection of DP on display > 000000 Example

00000.o → 000000 → MIN.BG

*subsequent item on the menu depends on instrument equipment

34

MEASURING MODE > **T/C**



MODE **Selection of the type of thermocouple**

DEF = Type "J"

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

Type of thermocouple "K" Example

J ▲ K ▼ CONECT.

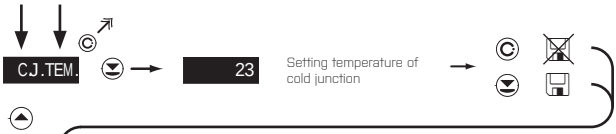
CONECT. **Selection of the type of sensor connection**

DEF = EXT. 1TC

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

Type of connection > CONECT. = EXT. 2TC Example

EXT1TC ▲ EXT2TC ▼ CJ.TEM.



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

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

DEF = 23

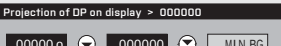
Setting temperature of cold junction > C.J. TEM. = 35 Example

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

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

DEF = 00000.0

Projection of DP on display > 000000 Example



*subsequent item on the menu depends on instrument equipment

!

For thermocouple type "B" the items **CONECT.** and **C.J. TEM.** are not available

!

Method and procedure of setting the cold junctions is described in separate chapter on page 86

34

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

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

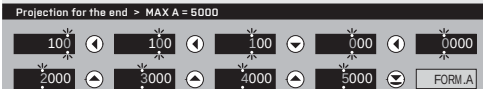
Projection for the beginning > MIN A = 0 Example

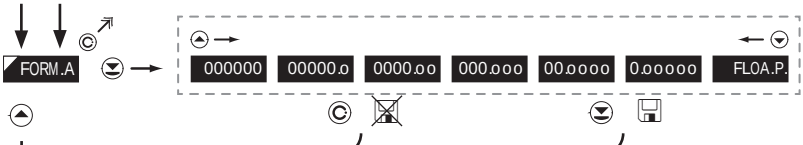
MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- 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





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

DEF = 0000.00

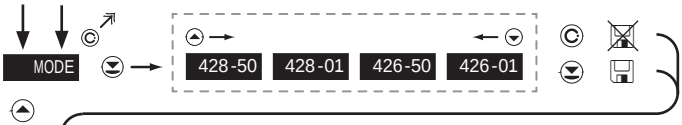
- positioning of the DP is set here in the measuring mode

Projection of DP on display > 0000.00 Example

0000.00 MIN.BG.

*subsequent item on the menu depends on instrument equipment

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



MODE **Selection of instrument measuring range**

DEF = Cu 50/4 280 ppm

MODE	Menu	Measuring range
	428-50	Cu 50 (4 285 ppm/°C)
	428-0.1	Cu 100 (4 285 ppm/°C)
	426-50	Cu 50 (4 260 ppm/°C)
	426-0.1	Cu 100 (4 260 ppm/°C)

Range - Cu-50/4 260 ppm > MODE = 426-50 Example

428-50 ▲ 428-01 ▲ 426-50 ▼ CONECT.

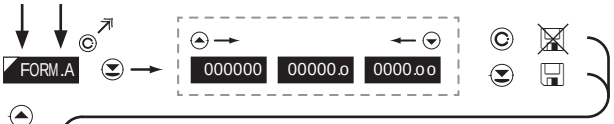
CONECT. **Selection of the type of sensor connection**

DEF = 2-wire

CONECT.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONECT. = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ FORM.A



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

DEF = 00000.o

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

Projection of DP on display > 000000 Example

00000.o → 000000 → MIN.BG.

*subsequent item on the menu depends on instrument equipment

34

LIM L1 **Setting boundary for limit 1**

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 20

DEF „Hystresis"=0, „Delay"=0

Setting limit 1 > L 1 = 32 Example

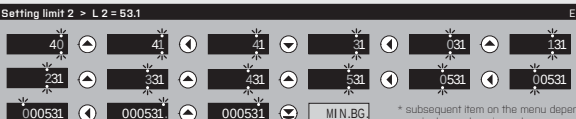
LIM L2 **Setting boundary for limit 2**

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 40

DEF „Hystresis"=0, „Delay"=0

Setting limit 2 > L 2 = 53.1 Example



* subsequent item on the menu depends on instrument equipment

!

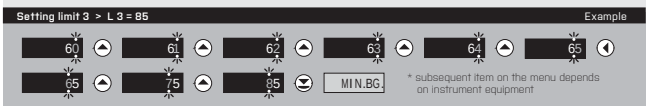
Items for "**Limits**" and "**Analog output**" are accessible only if incorporated in the instrument.

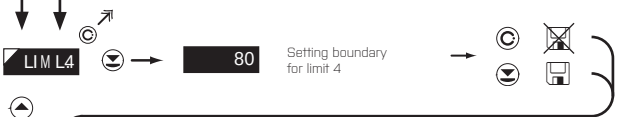
LIM L3 **Setting boundary for limit 3**

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 60

DEF „Hystresis"=0, „Delay"=0



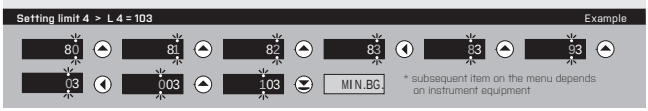


LIM L4 **Setting boundary for limit 4**

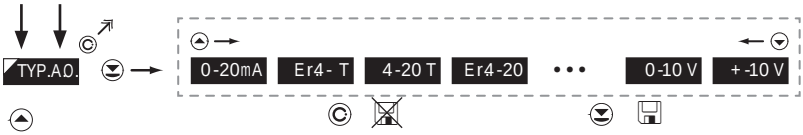
- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 80

DEF „Hystresis"=0, „Delay"=0



DISPLAYED ONLY WITH OPTIONS > **ANALOG OUTPUT**



TYP.AO. **Setting the type of analog output**

TYP. A.O.	Menu	Range	Description
	0-20mA	0...20 mA	
	Er.4- T	4...20 mA	with error message indication and broken loop indication (<3,6 mA)
	4-20 T	4...20 mA	with broken loop indication (<3,6 mA)
	Er.4-20	4...20 mA	with indication of error statement (<3,6 mA)
	4-20mA	4...20 mA	
	0-5mA	0...5 mA	
	0-2 V	0...2 V	
	0-5 V	0...5 V	
	0-10 V	0...10 V	
	+-10 V	±10 V	

DEF = 4...20 mA

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

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

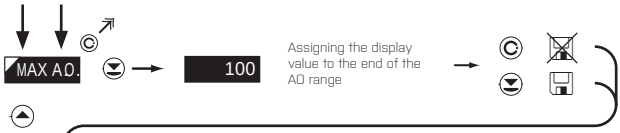
DEF = 0

- range of the setting: -99999...999999

Display value for the beginning of the AO range > MIN A.O. = 0 Example

!

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



MAX A0. **Assigning the display value to the end of the A0 range**

- range of the setting: -99999...999999

DEF = 100

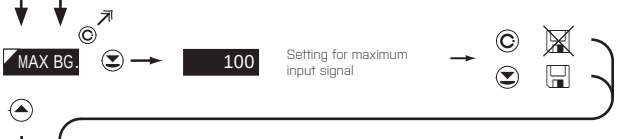
Display value for the end of the A0 range > MAX A.0. = 120 Example

MIN BG. **Setting bargraph projection for minimum input signal value**

- range of the setting: -99999...999999

DEF = 0

Projection for the beginning > MIN BG. = 0 Example

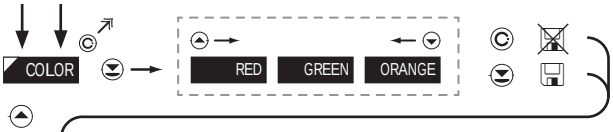


MAX BG. **Setting bargraph projection for maximum input signal value**

- range of the setting: -99999...999999

DEF = 100

Projection for the end > MAX BG. = 5000 Example



COLOR — Select bargraph color

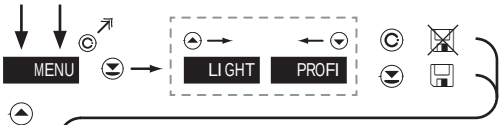
DEF = Green

- the color for bargraph in basic mode "**Column**" is set here
- for other bargraph working modes it is necessary to switch to the "**PROFI**" menu

Selection of bargraph color > Orange Example

GREEN ⌄ ORANGE ⌄ MENU

5. SETTING **LIGHT**



MENU **Setting the menu type LIGHT/PROFI**

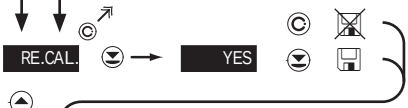
LIGHT > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting
> linear tree structure

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

DEF = LIGHT

Menu LIGHT > MENU = LIGHT Example

LIGHT ⏬ RE.CAL.

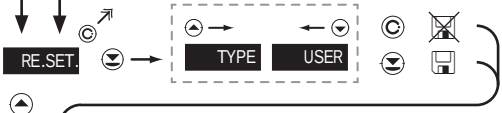


RE.CAL. **Restoration of manufacture calibration**

- 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 calibration > RE. CAL. Example

RE.CAL. ⏫ YES ⏬ RE.SET.



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

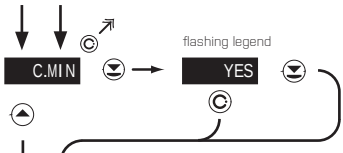
- in the event of error setting the manufacture setting may be restored
- restoration is performed for the currently selected type of the instrument input (select "**TYPE**")
- provided you stored your user setting in the "**PROFI**" menu, it may also be restored (select "**USER**")
- loading manufacture calibration and primary setting of items on the menu (**DEF**)

Restoration of manufacture setting > RE. SET. Example

RE.SET. ⏫ TYPE ⏬ LANG.

* subsequent item on the menu depends on instrument equipment

Type „DC"	42
Type "PM"	42
Type "OHM"	42
Type "RTD-Pt"	42
Type "RTD-Ni"	42
Type "T/C"	42
Type "DU"	41
Type "RTD-Cu"	42



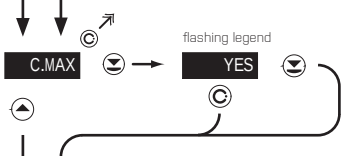
C.MIN **Calibration of input range - the potentiometer traveller in initial position**

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



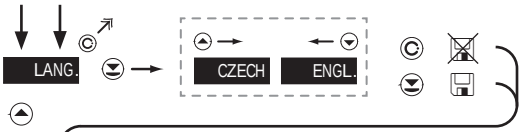
C.MAX **Calibration of input range - the potentiometer traveller in end position**

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.

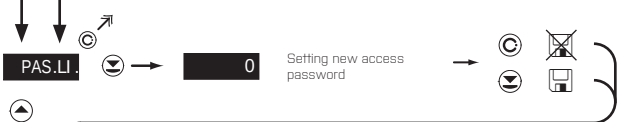


LANG. **Selection of language in instrument menu**

- selection of language version of the instrument menu

DEF = English

Language selection - ENGLISH > LANG. = ENGL. Example

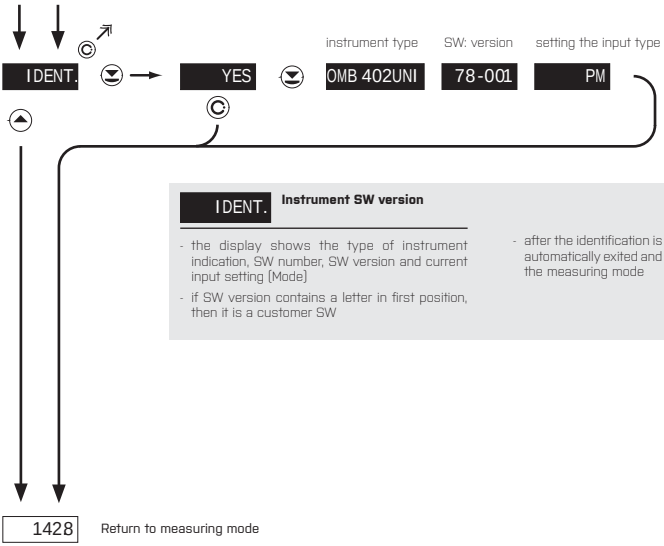


PAS.LI. **Setting new access password**

- access password for menu **LIGHT**
- range of the number code 0...9999
- upon setting the password to "**0000**" the access to menu **LIGHT** is free without prompt to enter it
- in case the password is lost, please contact the adminstrator of this device

DEF = 0

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



IDENT. **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

SETTING
PROFI

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

6.0 SETTING "PROFI"

PROFI **Complete programming menu**

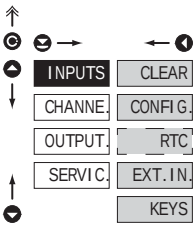
- contains complete instrument menu and is protected by optional number code
- designed for expert users
- preset from manufacture is menu **LIGHT**

Switching over to "PROFI" menu

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

C + ▲
- access to menu selected under item SERVIC. > MENU > **LIGHT**/**PROFI**
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > LIGHT =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used

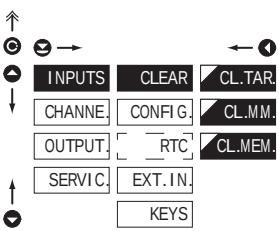
6.1 SETTING "PROFI" - INPUT



The primary instrument parameters are set in this menu

CLEAR	Resetting internal values
CONFIG.	Selection of measuring range and parameters
RTC	Setting date and time for option with RTC
EXT.IN.	Setting external inputs functions
KEYS	Assigning further functions to keys on the instrument

6.1.1 RESETTING INTERNAL VALUES



CLEAR — **Resetting internal values**

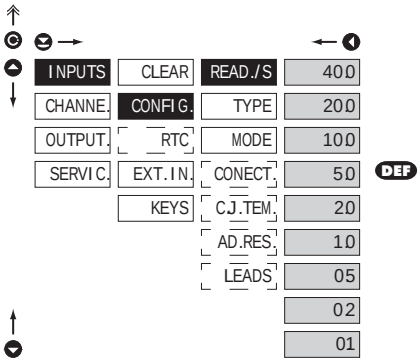
CL.TAR.	Tare resetting
CL.MM.	Resetting min/max value

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

CL.MEM.	Resetting the instrument memory

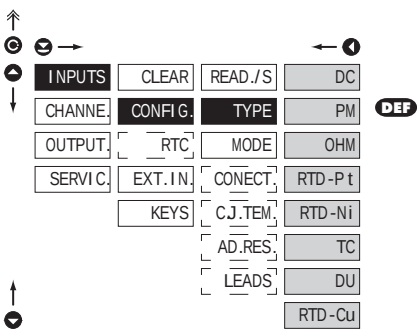
- resetting memory with data measured in the "FAST" or "RTC" modes
- not in standard equipment

6.1.2a SELECTION OF MEASURING RATE



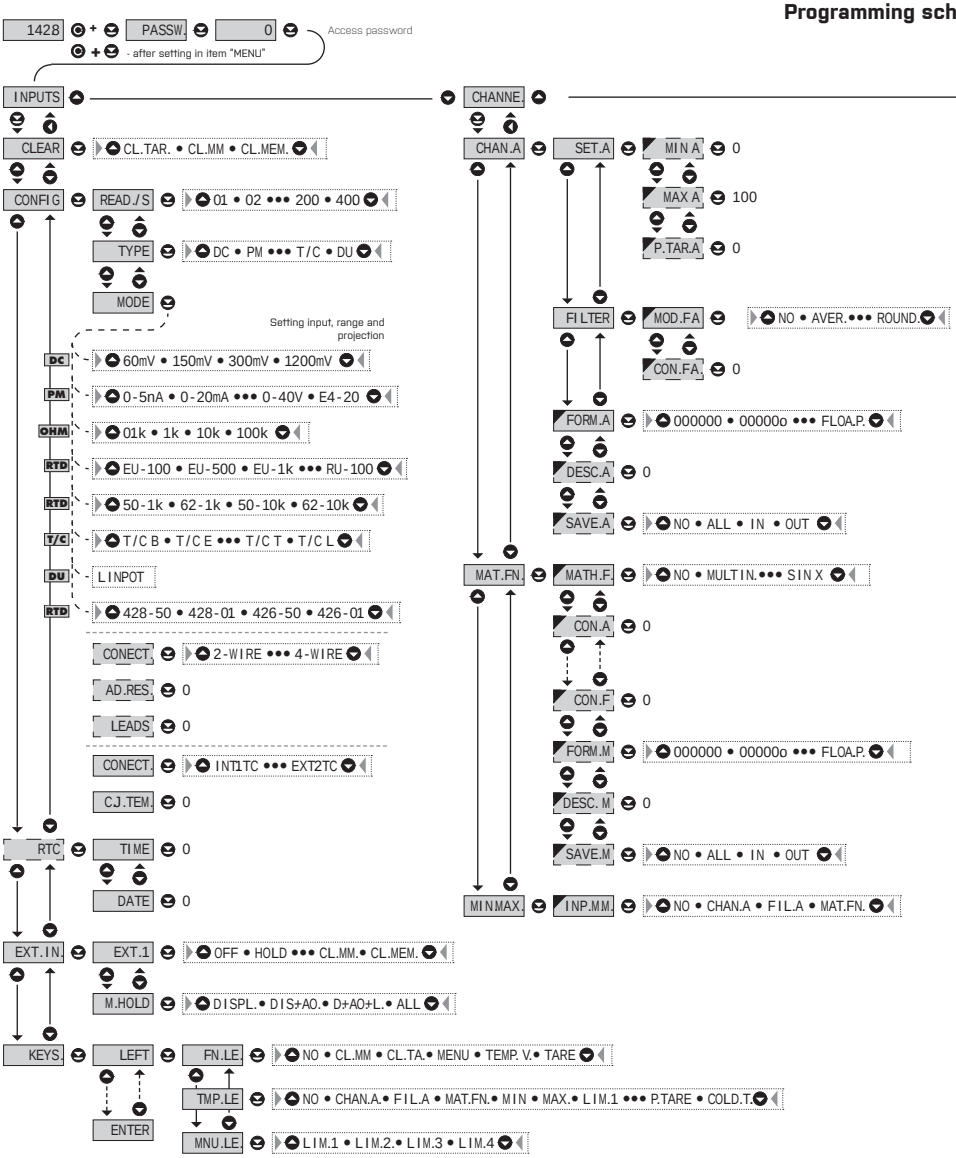
READ./S	Selection of measuring rate
400	40,0 measurements/s
200	20,0 measurements/s
100	10,0 measurements/s
50	5,0 measurements/s
20	2,0 measurements/s
10	1,0 measurement/s
05	0,5 measurements/s
02	0,2 measurements/s
01	0,1 measurements/s

6.1.2b SELECTION OF „INSTRUMENT" TYPE

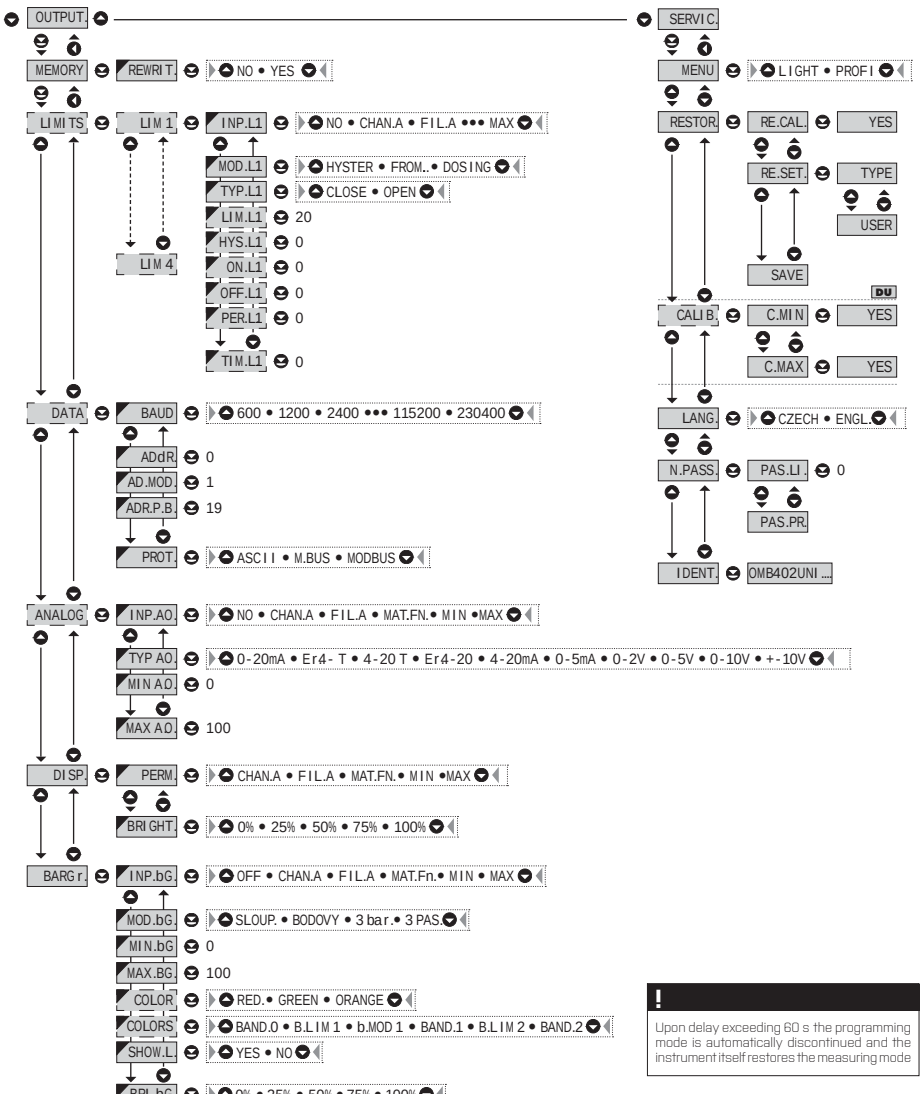


TYPE	Selection of „instrument" type
	- selection of particular type of "instrument" is bound to relevant dynamic items
DC	DC voltmeter
PM	Process monitor
OHM	Ohmmeter
RTD-Pt	Thermometer for Pt xxx
RTD-Ni	Thermometer for Ni xxxx
TC	Thermometer pro thermocouples
DU	Display for linear potentiometers
RTD-Cu	Thermometer for Cu xxx

Programming sch



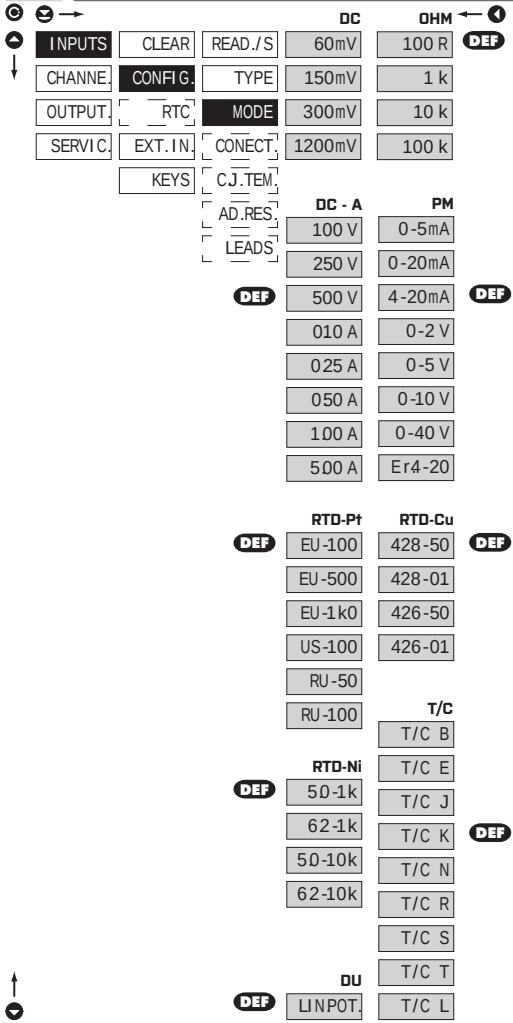
heme PROFI MENU



!

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

6.1.2c SELECTION OF MEASURING RANGE



MODE — **Selection of instrument measuring range**

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

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

	Menu	Measuring range
OHM	100 R	0...100 Ω
	1 k	0...1 kΩ
	10 k	0...10 kΩ
	100 k	0...100 kΩ

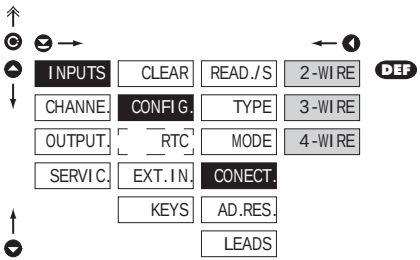
	Menu	Measuring range
RTD-PT	EU-100	Pt 100 (3 850 ppm/°C)
	EU-500	Pt 500 (3 850 ppm/°C)
	EU-1k0	Pt 1000 (3 850 ppm/°C)
	US-100	Pt 100 (3 920 ppm/°C)
	RU-50	Pt 50 (3 910 ppm/°C)
	RU-100	Pt 100 (3 910 ppm/°C)

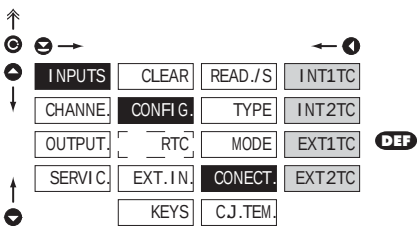
	Menu	Measuring range
RTD-NI	5.0-1k	Ni 1 000 (5 000 ppm/°C)
	6.2-1k	Ni 1 000 (6 180 ppm/°C)
	5.0-10k	Ni 10 000 (5 000 ppm/°C)
	6.2-10k	Ni 10 000 (6 180 ppm/°C)

	Menu	Measuring range
RTD-CU	428-50	Cu 50 (4 280 ppm/°C)
	428-0.1	Cu 1 00 (4 280 ppm/°C)
	426-50	Cu 50 (4 260 ppm/°C)
	426-0.1	Cu 100 (4 260 ppm/°C)

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

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





CONECT. **Selection of type of sensor connection**

RTD **OHM**

2-WIRE 2-wire connection

3-WIRE 3-wire connection

4-WIRE 4-wire connection

T/C

INT1TC Measurement without reference thermocouple

- measuring cold junction at instrument brackets

INT2TC Measurement with reference thermocouple

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

EXT1TC Measurement without reference thermocouple

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

EXT2TC Measurement with reference thermocouple

- when using compensation box

!

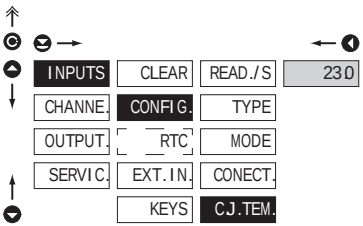
Method and procedure of setting the cold junctions is described in separate chapter on page 86

!

For thermocoule type "**B**" the items **CONECT.** and **C.J. TEM.** are not available

6.1.2e SETTING TEMPERATURE OF COLD JUNCTION

T/C

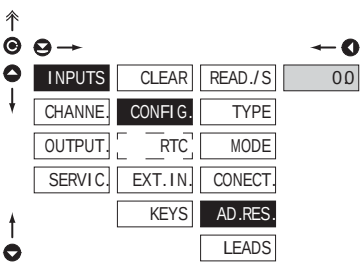


CJ.TEM. **Setting temperature of cold junction**

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

6.1.2f ZERO OFFSET OF THE MEASUREMENT RANGE

RTD OHM

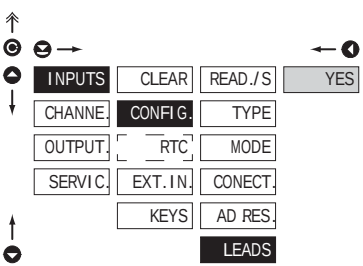


AD.RES. **Offset of the beginning of the measuring range**

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

6.1.2g COMPENSATION OF 2-WIRE CONDUCT

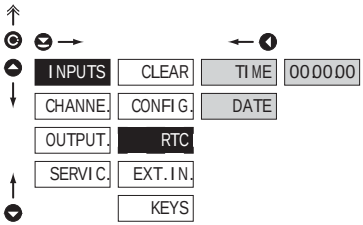
RTD OHM



LEADS **Compensation of 2-wire conduct**

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

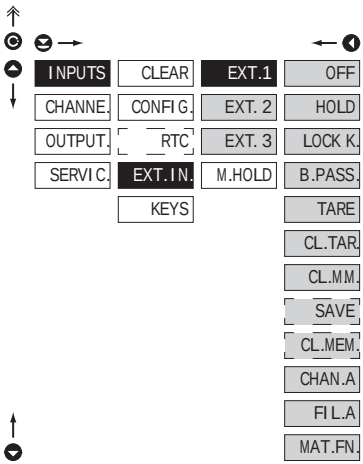
6.1.3 SETTING THE REAL TIME CLOCK



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

- **TI ME** — Time setting
  - format 23.59.59
- **DATE** — Date setting
  - format DD.MM.YY

6.1.4a EXTERNAL INPUT FUNCTION SELECTION



EXT. I N. — **External input function selection**

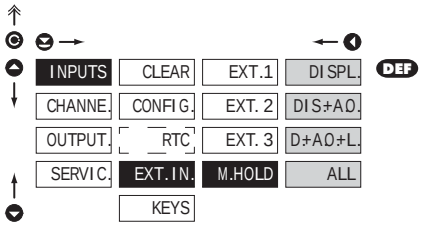
- **OFF** — Input is off
- **HOLD** — Activation of HOLD
- **LOCK K.** — Locking keys on the instrument
- **B.PASS.** — Activation of locking access into programming menu LIGHT/PROFI
- **TARE** — Tare activation
- **CL.TAR.** — Tare resetting
- **CL.MM.** — Resetting min/max value
- **SAVE** — Activation of measured data record in instrument memory
- **CL.MEM.** — Clearing memory for option FAST/RTC
- **CHAN.A** — Displaying value of "Channel A"
- **FI L.A** — Displaying value of "Channel A" after being processed by digital filters
- **MAT.FN.** — Displaying value of "Mathematical function"

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

*****

Procedure identical for **EXT. 2** and **EXT. 3**

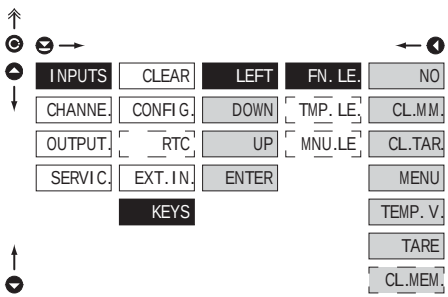
6.1.4b SELECTION OF FUNCTION "HOLD"



M.HOLD — **Selection of function "HOLD"**

- **DISPL.** — "HOLD" locks only the value displayed
- **DIS+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. LE. — **Assigning further functions to instrument keys**

- „FN. LE." > executive functions

- **NO** — Key has no further function
- **CL.MM.** — Resetting min/max value
- **CL.TAR.** — Tare resetting
- **MENU** — Direct access into menu on selected item
  - after confirmation of this selection the "MNU. LE." item is displayed on superior menu level, where required selection is performed
- **TEMP. V.** — Temporary projection of selected values
  - after confirmation of this selection the item "TMP. LE." is displayed on superior menu level, whererequired selection is performed
- **TARE** — Tare function activation
- **CL.MEM.** — Clearing memory
  - clearing memory with data measured in modes "FAST" or "RTC"

!

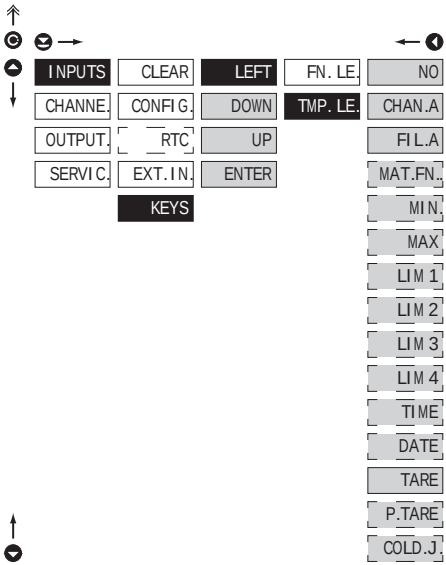
Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

!

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

LEFT	Show Tare
UP	Show Max. value
DOWN	Show Min. value
ENTER	w/o functione

6.1.5b OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION



TMP. LE. **Temporary projection of selected item**

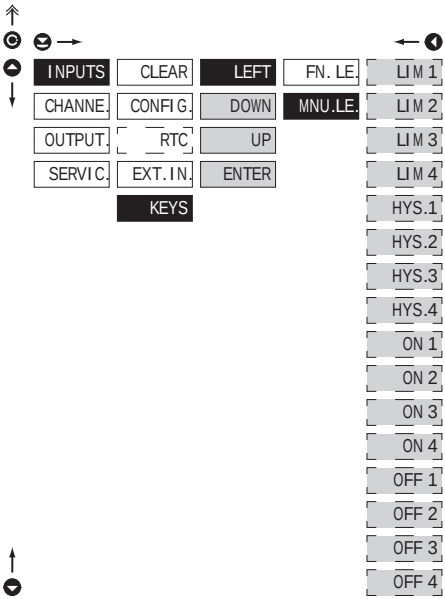
- „TMP. LE." > temporary projection of selected values
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing ⊙ + "Selected key", this holds until the stroke of any key

NO	Temporary projection is off
CHAN.A	Temporary projection of "Channel A" value
FIL.A	Temporary projection of "Channel A" value after processing digital filters
MAT.FN.	Temporary projection of "Mathematic functions" value
MIN	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
LIM 1	Temporary projection of "Limit 1" value
LIM 2	Temporary projection of "Limit 2" value
LIM.3	Temporary projection of "Limit 3" value
LIM.4	Temporary projection of "Limit 4" value
TIME	Temporary projection of "TIME" value
DATE	Temporary projection of "DATE" value
TARE	Temporary projection of "TARE" value
P.TARE	Temporary projection of "P. TARE" value
COLD.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



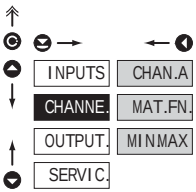
MNU.LE. **Assigning access to selected menu item**

LIM 1	Direct access to item "LIM 1"
LIM 2	Direct access to item "LIM 2"
LIM 3	Direct access to item "LIM 3"
LIM 4	Direct access to item "LIM 4"
HYS.1	Direct access to item "HYS. 1"
HYS.2	Direct access to item "HYS. 2"
HYS.3	Direct access to item "HYS. 3"
HYS.4	Direct access to item "HYS. 4"
ON 1	Direct access to item "ON 1"
ON 2	Direct access to item "ON 2"
ON 3	Direct access to item "ON 3"
ON 4	Direct access to item "ON 4"
OFF 1	Direct access to item "OFF 1"
OFF 2	Direct access to item "OFF 2"
OFF 3	Direct access to item "OFF 3"
OFF 4	Direct access to item "OFF 4"

!

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

6.2 SETTING "PROFI" - CHANNELS

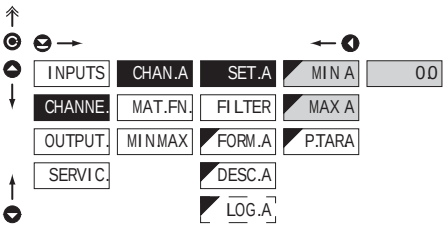


The primary instrument parameters are set in this menu

CHAN.A	Setting parameters of measuring "Channel A"
MAT.FN.	Setting parameters of mathematic functions
MINMAX	Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION

DC PM DU OHM



SET.A **Setting display projection**

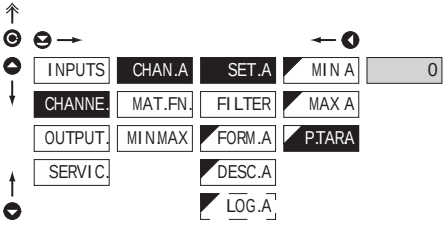
MIN A Setting display projection for minimum value of input signal

- range of the setting: -99999...999999
- DEF = 0.0

MAX A Setting display projection for maximum value of input signal

- range of the setting: -99999...999999
- DEF = 100.0

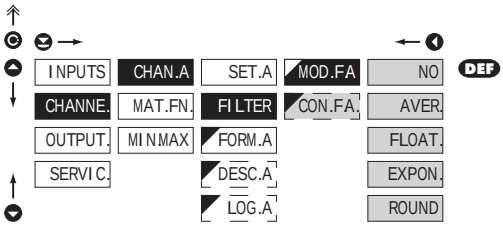
6.2.1b SETTING FIXED TARE

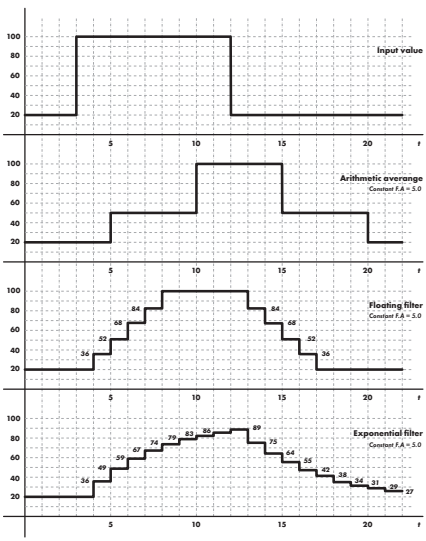


P.TAR.A **Setting "Fixed tare" value**

- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting [P. TAR. A≠ 0] is in effect, display does not show the "**T**" symbol
- range of the setting: -99999...999999
- DEF = 0

6.2.1d DIGITAL FILTERS





MOD.FA **Selection of digital filters**

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

NO Filters are off

AVER. Measured data average

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

FLOAT. Selection of floating filter

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

EXPON. Selection of exponential filter

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

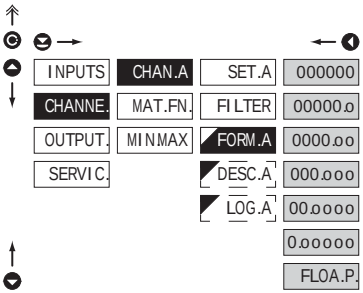
ROUND Measured value rounding

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

CON.FA Setting constants

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

6.2.1e PROJECTION FORMAT - POSITIONING OF DECIMAL POINT



FORM.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 „FLOAT. P."

000000. Setting DP - XXXXXX.

00000.0 Setting DP - XXXXX.x

- DEF > RTD T/C

0000.00 Setting DP - XXXX.xx

- DEF > DC PM DU OHM

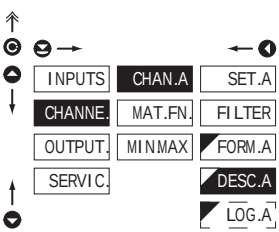
000.000 Setting DP - XXX.xxx

00.0000 Setting DP - XX.xxxx

0.00000 Setting DP - X.xxxxx

FLOA.P. Floating DP

6.2.1f PROJECTION OF DESCRIPTION - THE MEASURING UNITS



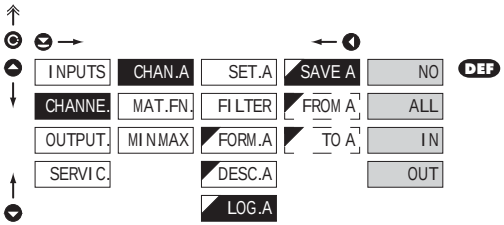
DESC.A **Setting projection of descript. for "Channel A"**

- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by code 00
- RTD T/C DEF = °C
- DC PM DU OHM DEF = none

!

Table of signs on page 91

6.2.1g SELECTION OF STORING DATA INTO INSTRUMENT MEMORY



LOG.A **Selection of storing data into instrument memory**

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

NO Measured data is not stored

ALL Measured data is stored in memory

IN Only data measured within the set interval is stored in memory

OUT Only data measured outside the set interval is stored in memory

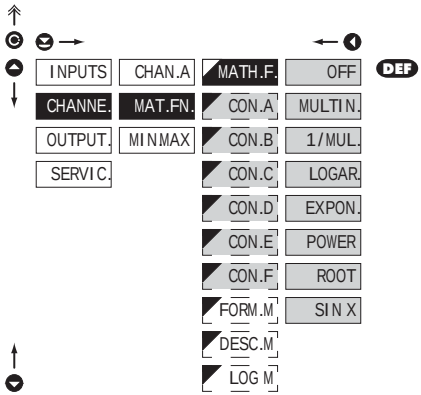
FROM A Setting the initial interval value

- setting range: -99999...999999

TO A Setting the final interval value

- setting range: -99999...999999

6.2.2a MATHEMATIC FUNCTIONS



MATH.F. **Selection of mathematic functions**

OFF Mathematic functions are off

MULTIN. Multinominal

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

1/MUL. 1/x

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

LOGAR. Logarithm

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

EXPON. Exponential

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

POWER Power

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

ROOT Root

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

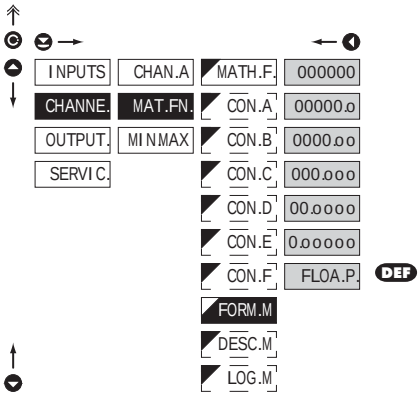
SIN X Sin x

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

CON.- Setting constants for calculation of mat.functions

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

6.2.2b MATHEMATIC FUNCTIONS - DECIMAL POINT



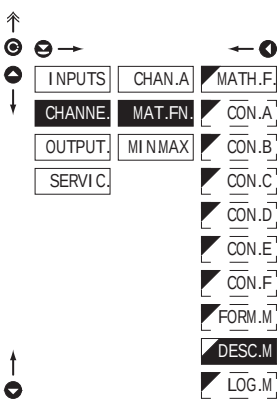
FORM.M. Selection of decimal point

- 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 „FLOA. P."

000000.	Setting DP - XXXXXX.
00000.0	Setting DP - XXXXX.x
0000.00	Setting DP - XXXX.xx
000.000	Setting DP - XXX.xxx
00.0000	Setting DP - XX.xxxx
0.00000	Setting DP - X.xxxxx
FLOA.P.	Floating DP

- DEF

6.2.2c MATHEMATIC FUNCTIONS - MEASURING UNITS



DESC.M Setting projection of description for "MAT. FN."

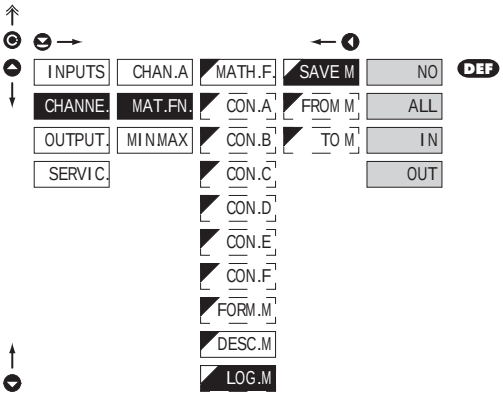
- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by code 00

- DEF = no description

!

Table of signs on page 91

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



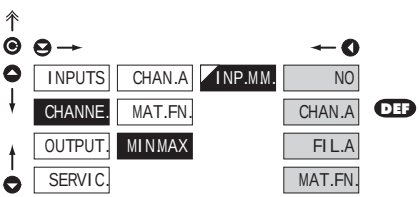
LOG.M — Selection of storing data into instrument memory

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

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

FROM M	Setting the initial interval value
	- setting range: -99999...999999
TO M	Setting the final interval value
	- setting range: -99999...999999

6.2.3 SELECTION OF EVALUATION OF MIN/MAX VALUE

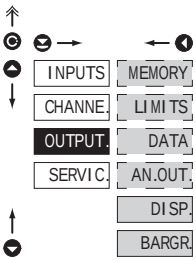


INP.MM. — Selection of evaluation of min/max value

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

NO	Evaluation of min/max value is off
CHAN.A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
MAT.FN.	From "Mathematic functions"

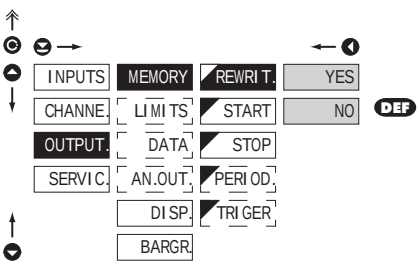
6.3 SETTING „PROFI" - OUTPUTS



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

- MEMORY — Setting data logging into memory
- LIMITS — Setting type and parameters of limits
- DATA — Setting type and parameters of data output
- AN.OUT. — Setting type and parameters of analog output
- DISP. — Setting display projection and brightness
- BARGR. — Setting bargraph projection and brightness

6.3.1a SELECTION OF MODE OF DATA LOGGING INTO INSTRUMENT MEMORY

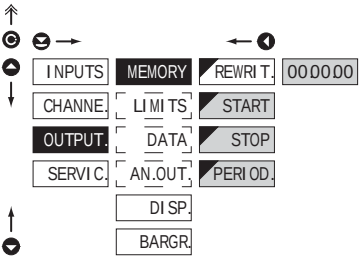


REWRIT. — Selection of the mode of data logging

- 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



START Start of data logging into instrument memory

- time format HH.MM.SS

STOP Stop data logging into instrument memory

- time format HH.MM.SS

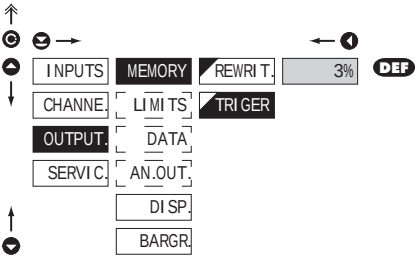
PERIOD. Period of data logging into instrument memory

- 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 > EXT. IN.**)

RTC

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

6.3.1c SETTING DATA LOGGING INTO INSTRUMENT MEMORY - FAST



TRIGER **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 shining. In ROLL flashes constantly.

2. Triggering

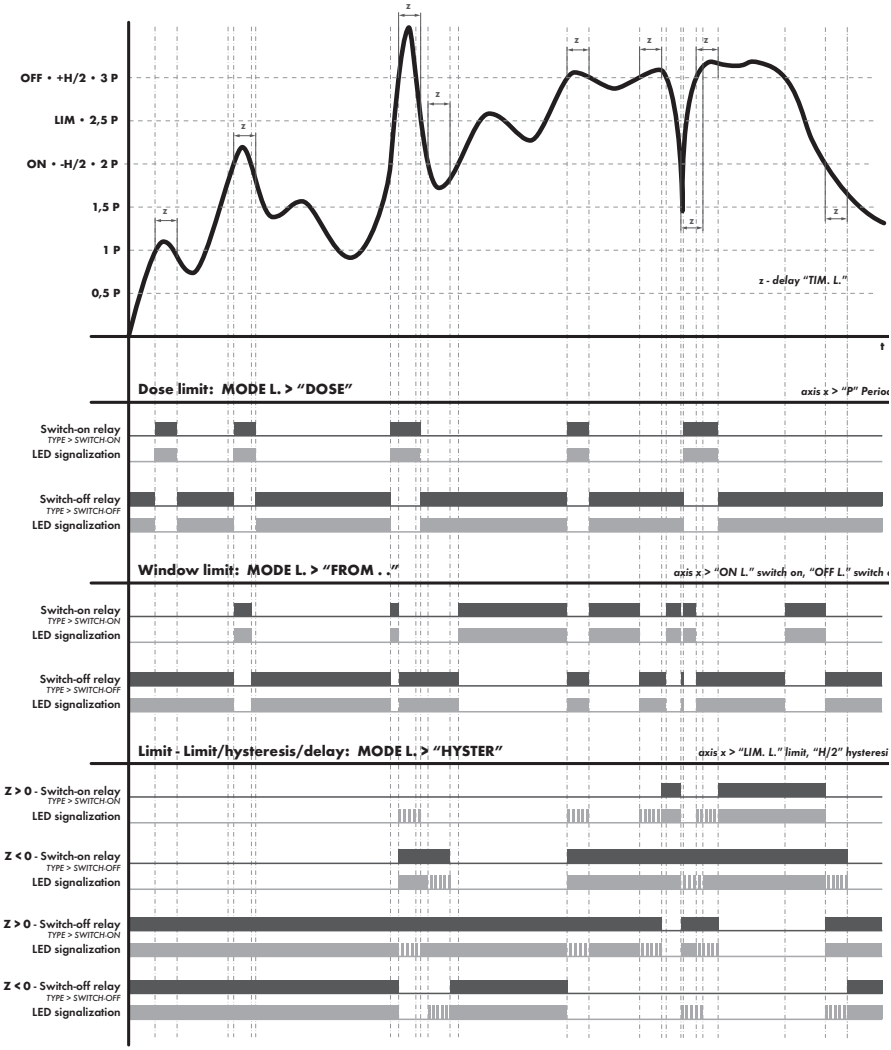
- external input, button
- after the memory LED is full "M" turns off
- in the ROLL mode the trigger ends datalogging and LED turns off

3 . Termination

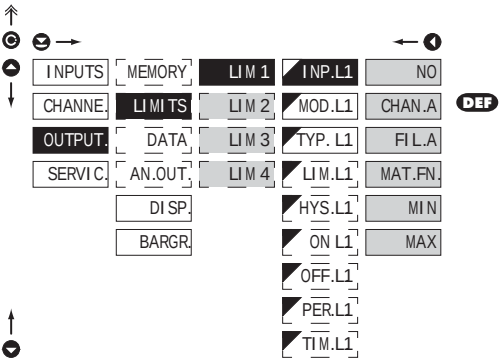
- ext. input, button or reading data via RS

FAST

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


OFF • +H/2 • 3 P
LIM • 2,5 P
ON • -H/2 • 2 P
1,5 P
1 P
0,5 P
z
z - delay "TIM. L."
t
Dose limit: MODE L. > "DOSE"
axis x > "P" Period
Switch-on relay
TYPE > SWITCH-ON
LED signalization
Switch-off relay
TYPE > SWITCH-OFF
LED signalization
Window limit: MODE L. > "FROM . . ."
axis x > "ON L." switch on, "OFF L." switch
Limit - Limit/hysteresis/delay: MODE L. > "HYSTER"
axis x > "LIM. L." limit, "H/2" hysteresi
Z > 0 - Switch-on relay
Z < 0 - Switch-on relay
Z > 0 - Switch-off relay
Z < 0 - Switch-off relay

6.3.2a SELECTION OF INPUT FOR LIMITS EVALUATION



INP.L1 **Selection evaluation of limits**

- selection of value from which the limit will be evaluated

NO Limit evaluation is off

CHAN.A Limit evaluation from "Channel A"

FI L.A Limit evaluation from "Channel A" after digital filters processing

MAT.FN. Limit evaluation from "Mathematic functions"

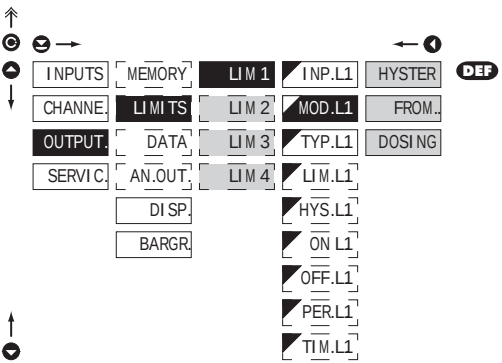
MI N Limit evaluation from "Min. value"

MAX Limit evaluation from "Max. value"

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2b SELECTION OF TYPE OF LIMIT



MOD.L1 **Selection the type of limit**

HYSTER Limit is in mode "Limit, hysteresis, delay"

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

FROM.. Frame limit

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

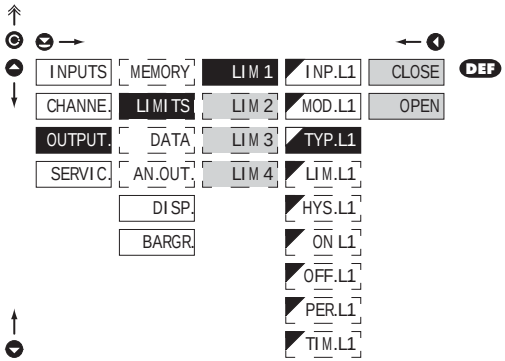
DOSI NG Dose limit (periodic)

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

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2c SELECTION OF TYPE OF OUTPUT



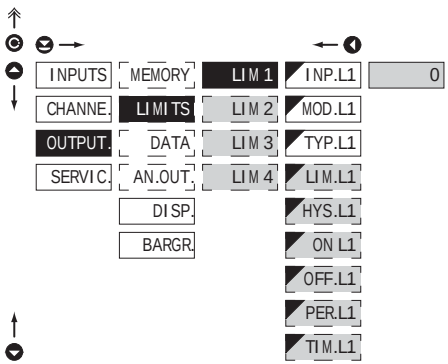
TYP.L1 **Selection of type of output**

CLOSE	Output switches on when condition is met
OPEN	Output switches off when condition is met

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2d SETTING VALUES FOR LIMITS EVALUATION



LIM.L1 Setting limit for switch-on

- for type "**HYSTER**"

HYS.L1 Setting hysteresis

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

ON.L1 Setting the outset of the interval of limit switch-on

- for type "**FROM..**"

OFF.L1 Setting the end of the interval of limit switch-on

- for type "**FROM..**"

PER.L1 Setting the period of limit switch-on

- for type "**DOSING**"

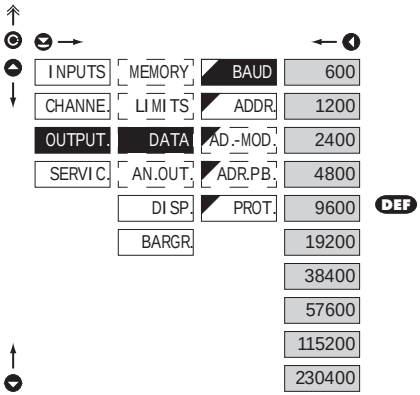
TIM.L1 Setting the time switch-on of the limit

- for type "**HYSTER**" and "**DOSING**"
- setting within the range: ±0...99,9 s
- positive time > relay switches on after crossing the limit (**LIM. L.1**) and the set time (**TIM. L.1**)
- negative time > relay switches off after crossing the limit (**LIM. L.1**) and the set negative time (**TIM. L.1**)

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

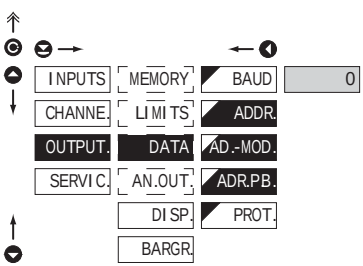
6.3.3a SELECTION OF DATA OUTPUT BAUD RATE



BAUD — **Selection of data output baud rate**

600	Rate - 600 Baud
1200	Rate - 1 200 Baud
2400	Rate - 2 400 Baud
4800	Rate - 4 800 Baud
9600	Rate - 9 600 Baud
19200	Rate - 19 200 Baud
38400	Rate - 38 400 Baud
57600	Rate - 57 600 Baud
115200	Rate - 115 200 Baud
230400	Rate - 230 400 Baud

6.3.3b SETTING INSTRUMENT ADDRESS



ADDR. — **Setting instrument address**

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

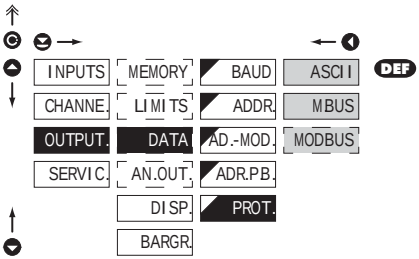
AD.-MOD. — **Setting instrument address - MODBUS**

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

ADR.PB. — **Setting instrument address - PROFIBUS**

- setting in range 1...127
- DEF = 19

6.3.3c SELECTION OF DATA OUTPUT PROTOCOL

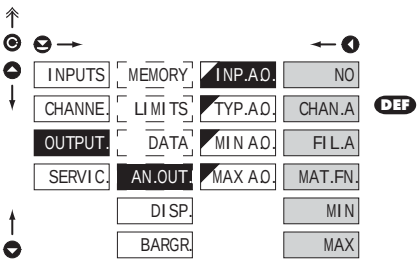


PROT. **Selection of the type of analog output**

- **ASCII** Data protocol ASCII
- **M.BUS** Data protocol DIN MessBus
- **MODBUS** Data protocol MODBUS-RTU

- option is available only for RS 485

6.3.4a SELECTION OF INPUT FOR ANALOG OUTPUT

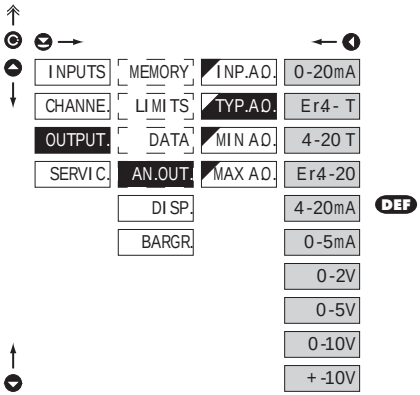


INP.AO. **Selection evaluation analog output**

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

- **NO** AO evaluation is off
- **CHAN.A** AO evaluation from "Channel A"
- **FIL.A** AO evaluation from "Channel A" after digital filters processing
- **MAT.FN.** AO evaluation from "Math. functions"
- **MIN** AO evaluation from "Min. value"
- **MAX** AO evaluation from "Max. value"

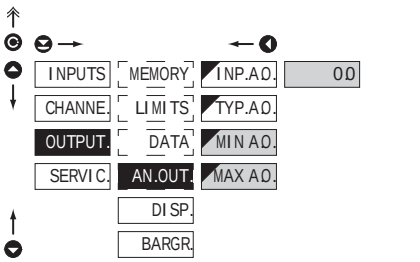
6.3.4b SELECTION OF THE TYPE OF ANALOG OUTPUT



TYP. AO. **Selection of the type of analog output**

- **0-20mA** Type - 0...20 mA
- **Er4-T** Type: 4...20 mA with indication
  - with broken loop detection and indication of error statement (< 3,6 mA)
- **4-20 T** Type: 4...20 mA with indication
  - with broken loop detection (< 3,6 mA)
- **Er4-20** Type: 4...20 mA with indication
  - with indic. of error statement (< 3,6 mA)
- **4-20mA** Type - 4...20 mA
- **0-5mA** Type - 0...5 mA
- **0-2V** Type - 0...2 V
- **0-5V** Type - 0...5 V
- **0-10V** Type - 0...10 V
- **+-10V** Type - ±10 V

6.3.4c SETTING THE ANALOG OUTPUT RANGE



AN.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

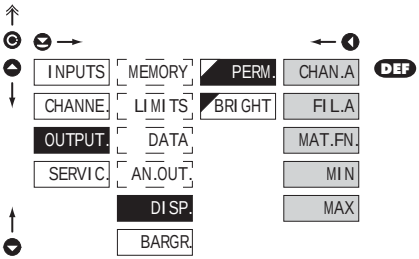
MIN AO. Assigning the display value to the beginning of the AO range

- range of the setting: -99999...999999
- DEF = 0

MAX AO. Assigning the display value to the end of the AO range

- range of the setting: -99999...999999
- DEF = 100

6.3.5a SELECTION OF INPUT FOR DISPLAY PROJECTION

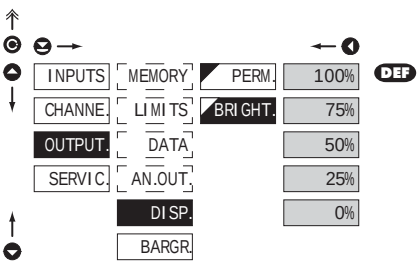


PERM. Selection display projection

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

CHAN.A	Projection of values from "Channel A"
FIL.A	Projection of values from "Channel A" after digital filters processing
MAT.FN.	Projection of values from "Math. functions"
MIN	Projection of values from "Min. value"
MAX	Projection of values from "Max. value"

6.3.5b SELECTION OF DISPLAY BRIGHTNESS



BRIGHT Selection of display brightness

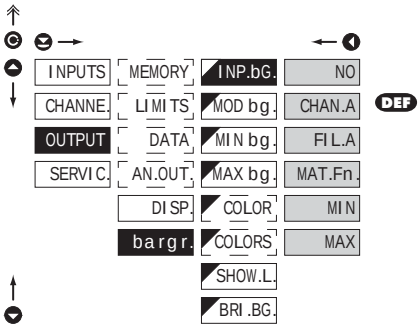
- by selecting display brightness we may appropriately react to light conditions in place of instrument location

0%	Display is off

- after keystroke display turns on for 10 s

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

6.3.6a BARGRAPH - SELECTION OF PROJECTION INPUT

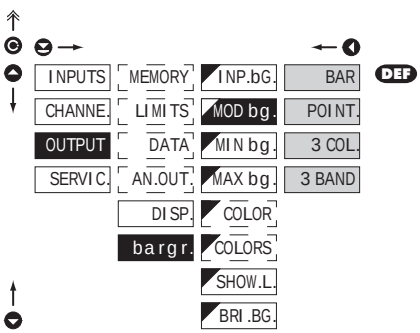


INP.BG. Selection of bargraph evaluation

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

NO	Analog evaluation is off
CHAN.A	From "Channel A"
FIL.A	From "Channel A" after digital filter modification
MAT.Fn.	From "Mathematic function"
MIN	From "Minimum va-lue"
MAX	From "Maximum value"

6.3.6b BARGRAPH - SELECTION OF PROJECTION MODE



MOD BG. Selection of bargraph projection mode

BAR	Column projection

- the display shows only a column in one colorě

POINT.	Point projection

- the display shows one point in one color

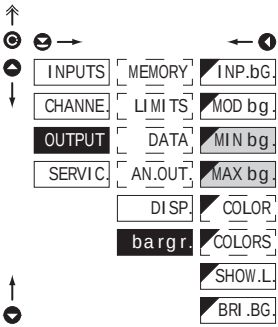
3 COL.	3-colored column projection

- change of color is determined by set limits [COLORS > BAND]
- upon exceeding the limit the color of the entire display, i.e. there is always only one column of one color lit

3 BAND	3-colored bar projection, cascade

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

6.3.6c BARGRAPH - SETTING THE PROJECTION RANGE



BARGR. **Setting the bargraph projection range**

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

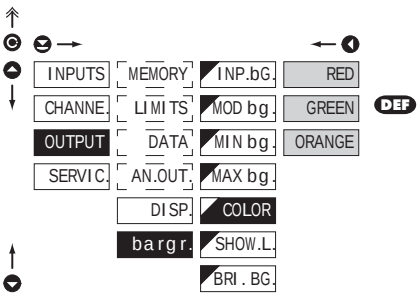
MIN BG. Setting bargraph projection for minimum input signal value

- range of the setting is -99999...999999
- DEF = 0

MAX BG. Setting bargraph projection for maximum input signal value

- range of the setting is -99999...999999
- DEF = 100

6.3.6d BARGRAPH - SETTING COLOR



COLOR **Selection of bargraph color**

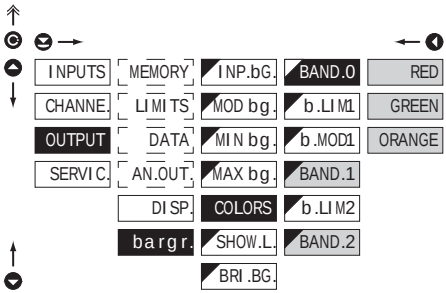
- the item "COLOR" is displayed only with selected mode ("BARGR. > MOD. BG.") "BAR." or "POINT."

RED Red color

GREEN Green color

ORANGE Orange color

6.3.6e BARGRAPH - COLOR SETTING



BAND.0 **Selection of bargraph color**

- the item "COLORS" is displayed only with selected mode ("BARGR. > MOD. BG.") "3 COL." or "3 BAND"

RED — Red color

GREEN — Green color

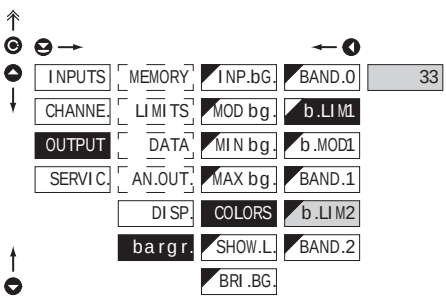
ORANGE — Orange color

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

!

Setting is identical for **BAND. 1** and **BAND. 2**

6.3.6f BARGRAPH - SETTING THE COLOR CHANGES BANDS



b.LIM1 **Setting color limits for color projection**

- the item "COLORS" is displayed only with selected mode ("BARGR. > MOD. BG.") "3 COL." or "3 BAND."
- items „b. LIM 1" and „b. LIM 2" determine the borders of the bargraph color changes

b.LIM 1 — Boundary between bands 0 - 1

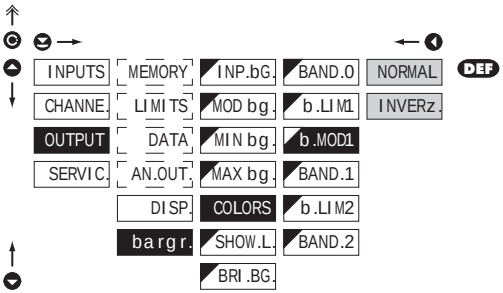
b.LIM 2 — Boundary between bands 1 - 2

- DEF = 33 (b. LIM 1))
- DEF = 66 (b. LIM 2)

!

Setting is identical for **B. LIM 2**

6.3.6g BARGRAPH - SELECTION OF INVERSE PROJECTION

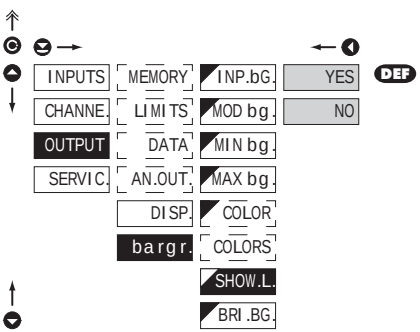


b.MOD 1 **Selection of inverse projection of "Band 0"**

- the item "COLORS" is displayed only with selected mode ("BARGR. > MOD. BG.") "3 COL." or "3 BAND."
- setting „b. MOD 1" is designed for projection where indication of zero center is required

NORMAL	Column in "BAND 0" moves from left to right
INVERZ.	Column in "BAND 0" moves from right to left

6.3.6h BARGRAPH - SELECTION OF LIMITS PROJECTION

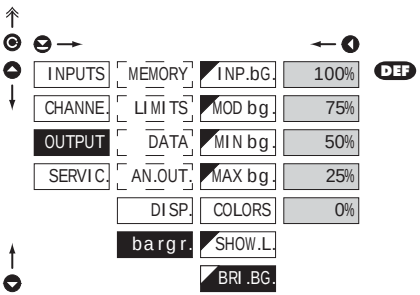


SHOW.L. **Selection of limit projection on the bargraph**

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

YES	Limits are projected
NO	Limity are not projected

6.3.6i BARGRAPH - SELECTION OF DISPLAY BRIGHTNESS



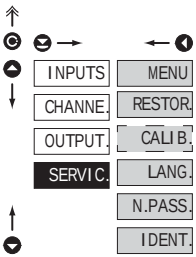
BRI .BG. **Selection of bargraph brightness**

0%	Bargraph is off

- after pres. the key the display lights up for 10s

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

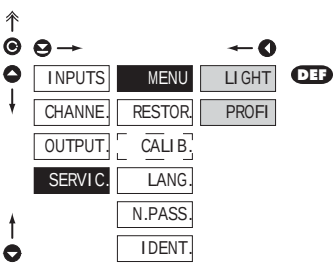
6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

MENU	Selection of menu type LIGHT/PROFI
RESTOR.	Restore instrument manufacture setting and calibration
CALIB	Input range calibration for „DU" version
LANG.	Language version of instrument menu
N.PASS.	Setting new access password
IDENT.	Instrument identification

6.4.1 SELECTION OF TYPE OF PROGRAMMING MENU



MENU **Selection of menu type - LIGHT/PROFI**

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

LIGHT Active LIGHT menu

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

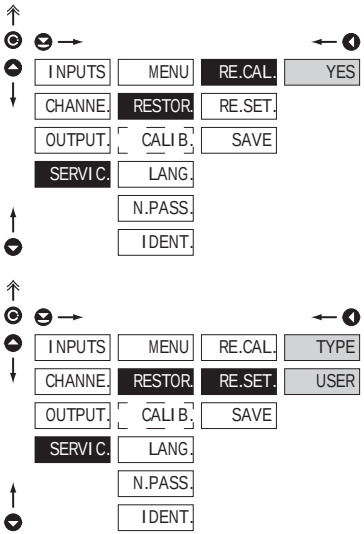
PROFI Active PROFI menu

- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.2 RESTORATION OF MANUFACTURE SETTING



RESTOR. **Restoration of manufacture setting**

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

RE.CAL. Restoration of manufacture calibration of the instrument

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

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

TYPE Restoration of instrument manufacture setting

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

USER Restoration of instrument user setting

- generating the instrument user setting, i.e. setting stored under SERVIC./RESTOR./SAVE

SAVE Save instrument user setting

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

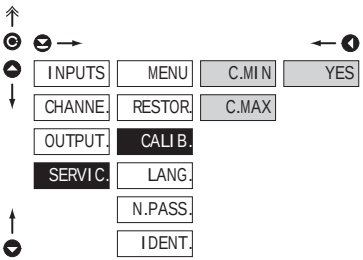
!

After restoration the instrument switches off for couple seconds

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

6.4.3 CALIBRATION - INPUT RANGE

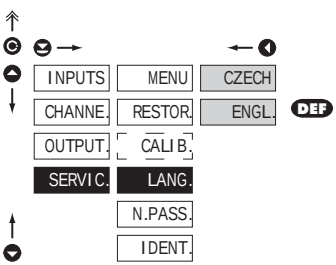
DU



CALIB. **Input range calibration**

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

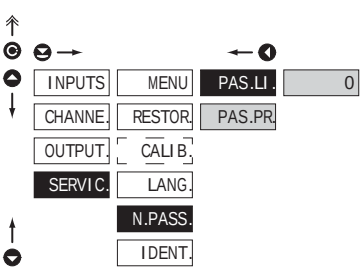
6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION



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

CZECH	Instrument menu is in Czech
ENGL.	Instrument menu is in English

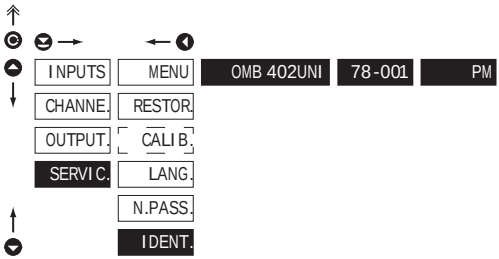
6.4.5 SETTING NEW ACCESS PASSWORD



N.PASS. **Setting new password for access to LIGHT and PROFI menu**

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

6.4.6 INSTRUMENT IDENTIFICATION



IDENT. **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

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

SETTING
USER

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

7.0 SETTING ITEMS INTO "USER" MENU

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

Setting

NO item will not be displayed in USER menu

YES item will be displayed in USER menu with editing option

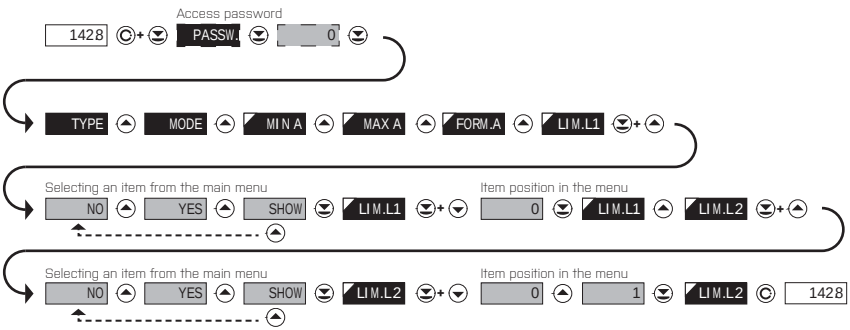
SHOW item will be solely displayed in USER menu

Setting sequence of items in "USER" menu

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

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

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

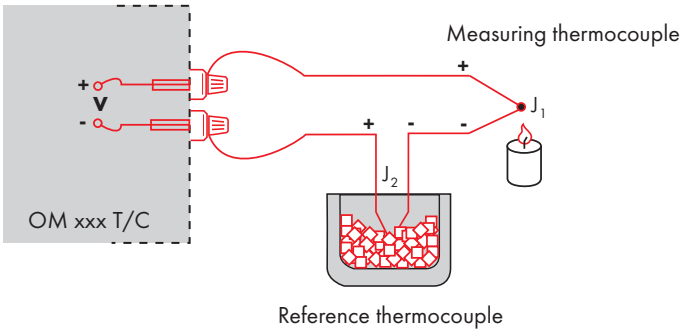


The result of this setting is that when the © button is pressed, the display will read „**LIM L.1**". By pressing ⏬ button you confirm your selection and then you can set the desired limit value, or by pressing the ⏫ button you can go to setting of „**LIM. L.2**" where you can proceed identically as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

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

8. METHOD OF MEASURING THE CJC

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 CONECT. in the instrument menu to INT2TC or EXT2TC
- when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu CJCTEM. its temperature (applies for setting CONECT. to EXT2TC)
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CONECT. to INT2TC. 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 CONECT. in the instrument menu to INT1TC or EXT1TC
- when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CONECT. to EXT1TC)

9. DATA PROTOCOL

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

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

The transfer rate is adjustable in the instrument menu. The instrument address is set in the instrument menu in the range of 0 ÷ 31. The manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232 / RS485 - is determined by an output board automatically identified by the instrument.
The commands are described in specifications you can find at www.orbit.merret.eu or software OM Link.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

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

LEGEND

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

RELAY, TARE

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

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

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

10. ERROR STATEMENTS

ERROR	CAUSE	ELIMINATION
E.DIS._	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E.DIS.-	Number is too large to be displayed	change DP setting, channel constant setting
E.TAB._	Number is outside the table range	increase table values, change input setting (channel constant setting)
E.TAB.-	Number is outside the table range	increase table values, change input setting (channel constant setting)
E.INP._	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E.INP.-	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.Hw.	A part of the instrument does not work properly	send the instrument for repair
E.EE.	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.SET.	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
E.OUT.	Analogue output current loop disconnected	check wire connection

The instrument allows to add two descriptive characters to the classic numeric formats (at the expense of the number of displayed places). The setting is performed by means of a shifted ASCII code. Upon modification the first two places display the entered characters and the last two places the code of the relevant symbol from 0 to 95. Numeric value of given character equals the sum of the numbers on both axes of the table.

Description is cancelled by entering characters with code 00

	0	1	2	3	4	5	6	7
0		!	"	#	$	%	&	'
8	(	)	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7
24	8	9	VA	Vr	<	=	>	?
32	@	A	B	C	D	E	F	G
40	H	I	J	K	L	M	N	O
48	P	Q	R	S	T	U	V	W
56	X	Y	Z	[	\	]	^	_
64	`	a	b	c	d	e	f	g
72	h	i	j	k	l	m	n	o
80	p	q	r	s	t	u	v	w
88	x	y	z	{	|	}	~	

INPUT

range is adjustbale			**DC**
	±60 mV	>100 MΩ	Input U
	±150 mV	>100 MΩ	Input U
	±300 mV	>100 MΩ	Input U
	±1200 mV	>100 MΩ	Input U
range is adjustbale			**DC - option "A"**
	±0,1 A	< 300 mV	Input I
	±0,25 A	< 300 mV	Input I
	±0,5 A	< 300 mV	Input I
	±1 A	< 30 mV	Input I
	±5 A	< 150 mV	Input I
	±100 V	20 MΩ	Input U
	±250 V	20 MΩ	Input U
	±500 V	20 MΩ	Input U
range is adjustbale			**PM**
	0/4...20 mA	< 400 mV	Input I
	±2 V	1 MΩ	Input U
	±5 V	1 MΩ	Input U
	±10 V	1 MΩ	Input U
	±40 V	1 MΩ	Input U

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

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

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

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

PROJECTION

Display:	30-segment 3-color bargraph red/green/orange
Auxiliary display	999999, intensive red or green 7 segment LED, digit height 9,1mm
Projection:	30 LED/-99999...999999
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

TC:	50 ppm/°C	
Accuracy:	±0,1% of range + 1 digit	
	±0,15% of range + 1 digit	**RTD, T/C**
	Above accuracies apply for projection 9999	
Resolution:	0,01°/0,1°/1°	**RTD**
Rate:	0,1...40 measurements/s**	
Overload capacity:	10x (t < 100 ms) not for 500 V and 5 A, 2x (long-term)	
Linearisation:	by linear interpolation in 38 points - solely via OM Link	
Digital filters:	Averaging, Floating average, Exponential filter, Rounding	
Comp. of conduct:	max. 40 Ω/100 Ω	**RTD**
Comp. of cold junc.:	adjustable 0°...99°C or automatic	**T/C**
Functions:	Tare - display resetting Hold - stop measuring (at contact) Lock - control key locking MM - min/max value Mathematic functions	
OM Link:	company communication interface for setting, operation and update of instrument SW	
Watch-dog:	reset after 400 ms	
Calibration:	at 25°C and 40% of r.h.	

COMPARATOR

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

* values apply for resistance load

DATA OUTPUTS

Protocols:	ASCII, DIN MessBus, MODBUS, PROBUS
Data format:	8 bit + no parity + 1 stop bit (ASCII) 7 bit + even parity + 1 stop bit (MessBus)
Rate:	600...230 400 Baud 9 600 Baud...12 Mbaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)
PROFIBUS	Data protocol SIEMENS

ANALOG OUTPUTS

Type:	isolated, programmable with 16 bits D/A convertor, analogoutput corresponds with displayed data, type and range are adjustable
Non-linearity:	0,1% of range
TC:	15 ppm/°C
Rate:	response to change of value < 1 ms
Voltage:	0...2 V/5 V/10 V/±10 V
Curernt:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ω/12 V or 1 000 Ω/24 V

MEASURED DATA RECORD

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

EXCITATION

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

POWER SUPPLY

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

MECHANIC PROPERTIES

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

OPERATING CONDITIONS

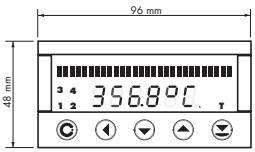
Connection:	connector terminal board, conductor cross-section <1,5 mm² /<2,5 mm²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP64 (front panel only)
Construction:	safety class I
Dielectric strength:	4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and data/ analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between supply and data/ analog output
Overvoltage cat.:	EN 61010-1, A2
Insulation resist.:	for pollution degree II, measurement cat. III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61326-1
Seismic resistance:	IEC 980: 1993, par. 6

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

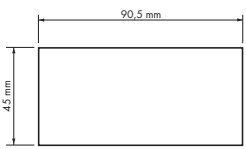
Channels/Rate	40	20	10	5	2	1	0,5	0,2	0,1
No.of channels: 1 (Type: DC, PM, DU)	40,00	20,00	10,00	5,00	2,00	1,00	0,50	0,20	0,10
No.of channels: 2	5,00	2,50	1,25	1,00	0,62	0,38	0,22	0,09	0,05
No.of channels: 3	3,33	1,66	0,83	0,66	0,42	0,26	0,14	0,06	0,03
No.of channels: 4	2,50	1,25	0,62	0,50	0,31	0,19	0,11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

PI - Primary insulation, DI - Double insulation

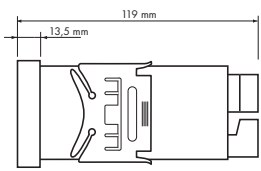
Front view



Panel cut



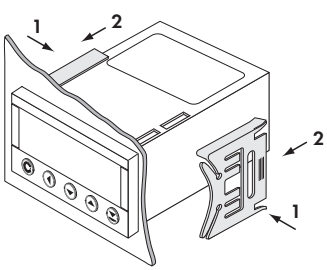
Side view

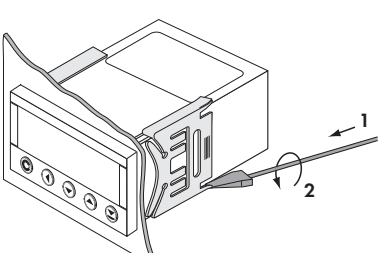


Panel thickness: 0,5...20 mm

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	**OMB 402UNI**	**A**
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.

5 YEARS

Stamp, signature

ES DECLARATION OF CONFORMITY

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

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

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

Product: Programmable panel instrument

Type **OMB 402**

Version: UNI, PWR, RS

Thas been designed and manufactured in line with requirements of:

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

The product qualities are in conformity with harmonized standard:

El. safety: EN 61010-1

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

Seismic resistance: IEC 980: 1993, par. 6

The product is furnished with CE label issued in 2007

As documentation serve the protocoles of authorized and accredited organizations:

EMC MO CR, Testing institute of technical devices, protocol no. 80/6-328/2006 of 15/01/2007
MO CR, Testing institute of technical devices, protocol no. EMI.80/6-333/2006 of 15/01/2007
Seismic resistance VOP-026 Stemberk, protocol no.: 6430-109/2007 of 13/09/2007

Place and date of issue: Prague, 19. Juli 2010

Miroslav Hackl
Company representative

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