



OMB 451/452UNI

4 DIGIT PROGRAMMABLE UNIVERSAL INSTRUMENT

DC VOLTMETER/AMMETER

PROCESS MONITOR

OHMMETER

THERMOMETER FOR PT 100/500/1 000

THERMOMETER FOR NI 1 000

THERMOMETER FOR THERMOCOUPLES

DISPLAYS FOR LIN. POTENTIOMETERS



SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OMB 451/452 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, par. 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 451/452 models series are programmable, three-color panel bargraphs with auxiliary display and adjustable LCD scale. The instruments are designed as dimensional replacement of the ZEPAKOMP instruments. Available are types UNI, PWR and UQC. Type OMB 451/452UNI is a multifunction instruments with the option of configuration for 8 different types of input, 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 multi-channel 24-bit sigma-delta converter, which secures high accuracy, stability and easy operation of the instrument.

TYPES AND RANGES

UNI	DC: 0...60/150/300/1200 mV
	PM: 0...5 mA/0...20 mA/4...20 mA/±2 V/±5 V/±10 V/±40 V
	OHM: 0...100 Ω/0...1 kΩ/0...10 kΩ/0...100 kΩ/Autorange
	RTD-Pt: Pt 50/100/Pt 500/Pt 1000
	RTD-Cu: Cu 50/Cu 100
	RTD-Ni: Ni 1 000/Ni 10 000
	T/C: J/K/T/E/B/S/R/N/L
	DU: Linear potentiometer (min. 500 Ω)
UNI - A	DC: ±0.1 A/±0.25 A/±0.5 A/±2 A/±5 A/±100 V/±250 V/±500 V
UNI - B	PM: 3x 0...5 mA/0...20 mA/4...20 mA/±2 V/±5 V/±10 V/±40 V

PROGRAMMABLE PROJECTION

Selection:	of type of input and measuring range
Measuring range:	adjustable as fixed or with automatic change
Setting:	manual, optional projection on the display may be set in the menu for both limit values of the input signal, e.g. input 0...20 mA > 0...850,0
LCD scale:	illuminated and freely programmable
Projection:	-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 two control keys and a turn knob located on the front panel. All programmable settings of the instrument are implemented in three setting 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) - access 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 transmission into PC via serial interface RS232/485 and OM Link.

3. INSTRUMENT CONNECTION



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	$\pm 2/\pm 5/\pm 10/\pm 40$ V
DHM	0...100 Ω /1 k Ω /10 k Ω /100 k Ω /B/Autorange	
RTD-Pt	Pt 50/100/Pt 500/ Pt 1 000	
RTD-Cu	Cu 50/100	
RTD-Ni	Ni 1 000/10 000	
T/C	J/K/T/E/B/S/R/N/L	
DU	Linear potentiometer (min. 500 Ω)	

OPTION "A"

TYPE	INPUT I	INPUT U
DC	± 0.1 A/ ± 0.25 A/ ± 0.5 A to GND (C) ± 2 A/ ± 5 A to GND (E)	± 100 V/ ± 250 V/ ± 500 V to GND (C)

OPTION "B"

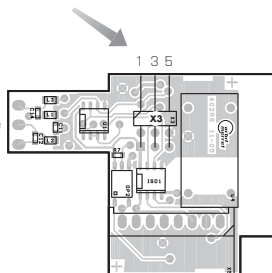
TYPE	INPUT 2, 3, 4/I	INPUT 2, 3, 4/U
PM	0...5/20 mA/4...20 mA	$\pm 2/\pm 5/\pm 10/\pm 40$ V

Termination of RS 485 communication line

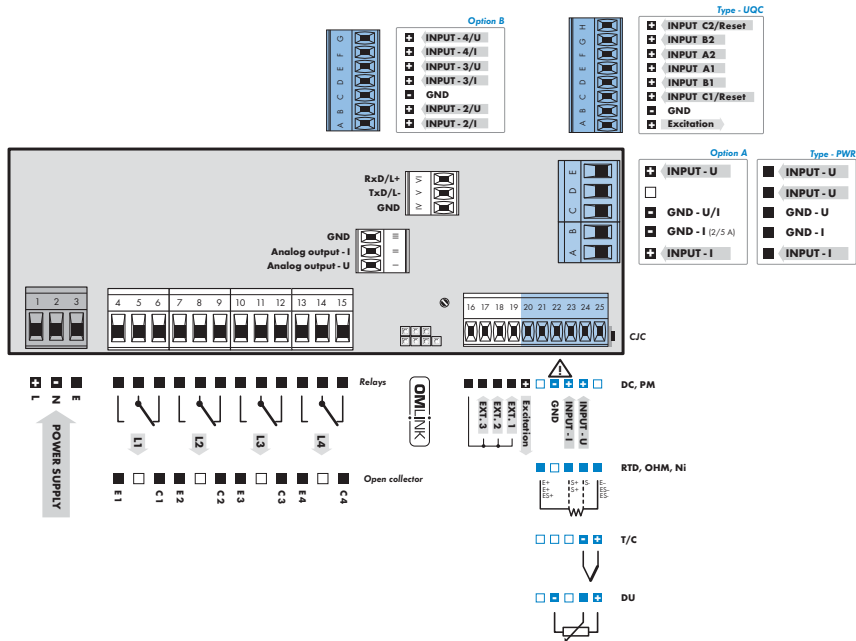
X3 - Termination of communication line RS 485

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

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



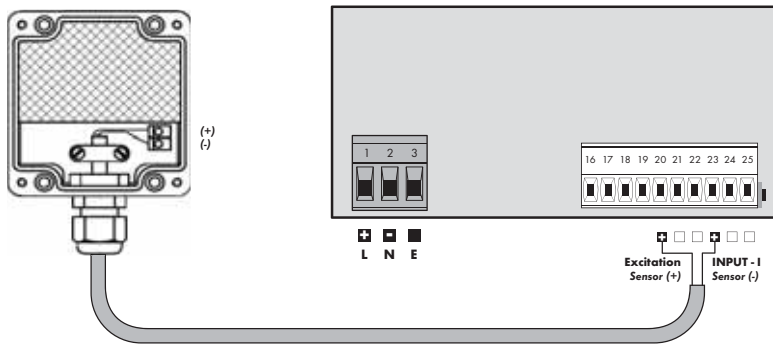
! Excitation has the minus pole common with the input - the bracket no. 22 - GND and you may set its value by trimmer above the bracket no. 16



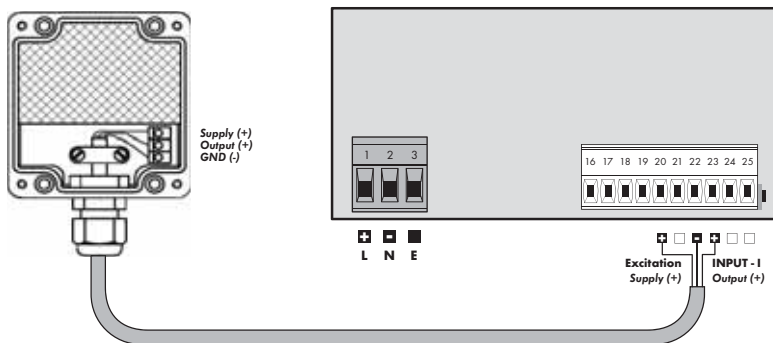
Maximum of 250 mA may be connected to "INPUT - I" (bracket no. 23), i.e. 10-times range overload. Mind the correct connection/mistaking of current - voltage input. Destruction of measuring resistance in current input (15R) may occur.

3. INSTRUMENT CONNECTION

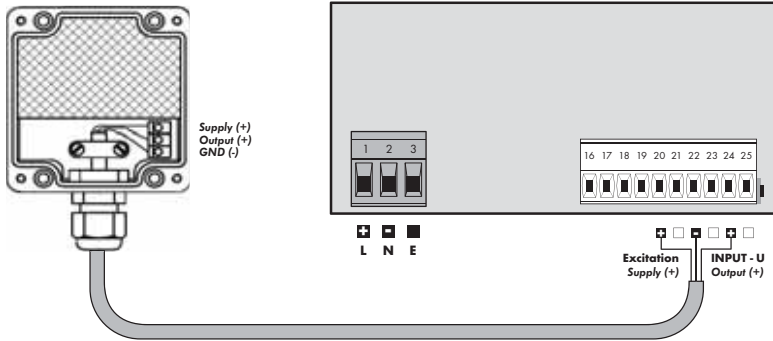
Example connection of a 2-wire sensor with current signal output powered by instrument's excitation



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

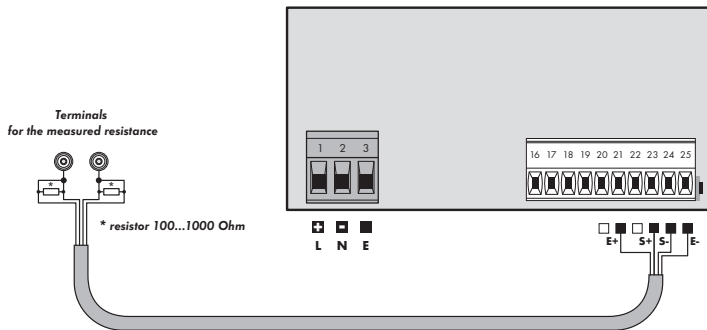


Example connection of 3-wire sensor with voltage signal output powered by instrument's excitation



Example connection of resistance measurement using 4 wires

By connecting resistor R^* we eliminate error message E. I.O.v. (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 two control keys and a turn knob located on the front panel. All programmable settings of the instrument are implemented in three setting modes.

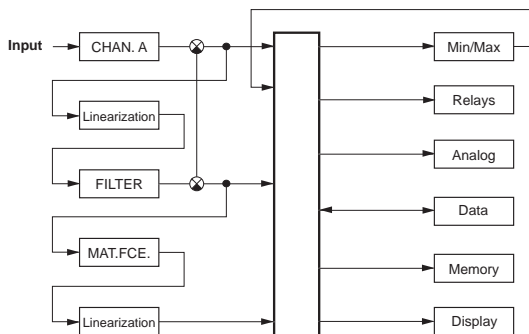
- LIGHT** **Simple programming menu**
 - contains solely items necessary for instrument setting and is protected by optional number code
- PROFI** **Complete programming menu**
 - contains complete instrument menu and is protected by optional number code
- USER** **User programming menu**
 - may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
 - acces without password

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

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

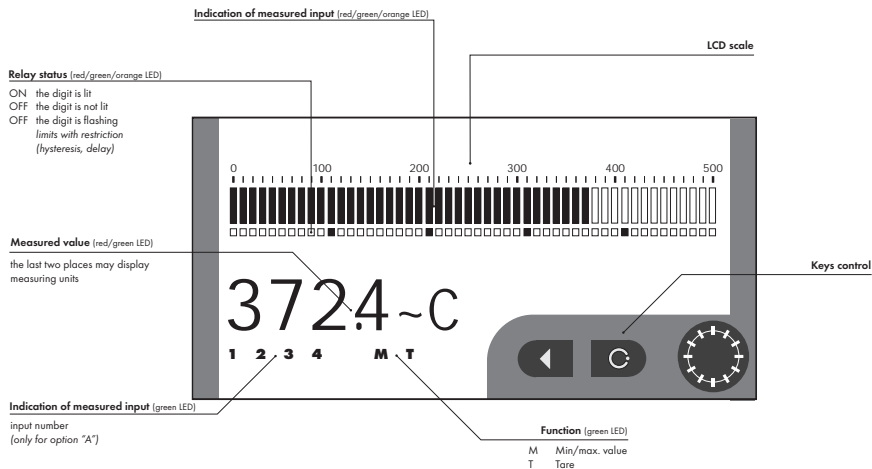
The operation program is freely accessible (www.orbit.merret.eu) and the only requirement is the purchase of QML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments. Another option for connection is with the aid of data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

Scheme of processing the measured signal



4. INSTRUMENT SETTING

The instrument is set and controlled by two control keys and a turn knob located on the front panel. With the aid of these keys it is possible to browse through the operation menu and to select and set required values.



Symbols used in the instructions

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

DEF

values preset from manufacture



symbol indicates a flashing light (symbol)

MIN

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

CONNEC

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



increasing the value by rotating the key to the right (UP)



decreasing the value by rotating the key to the left (DOWN)



pressing the key shortly



pressing the key for longer than 2 seconds (> 2 s.)



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 short push 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 subtraction must be made from the current number (e.g.: 013 > , on class 100 > -87)

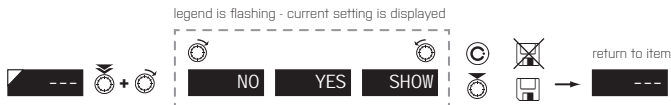
Control keys functions

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

Setting items into „USER“ menu

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

USER





SETTING **LIGHT**

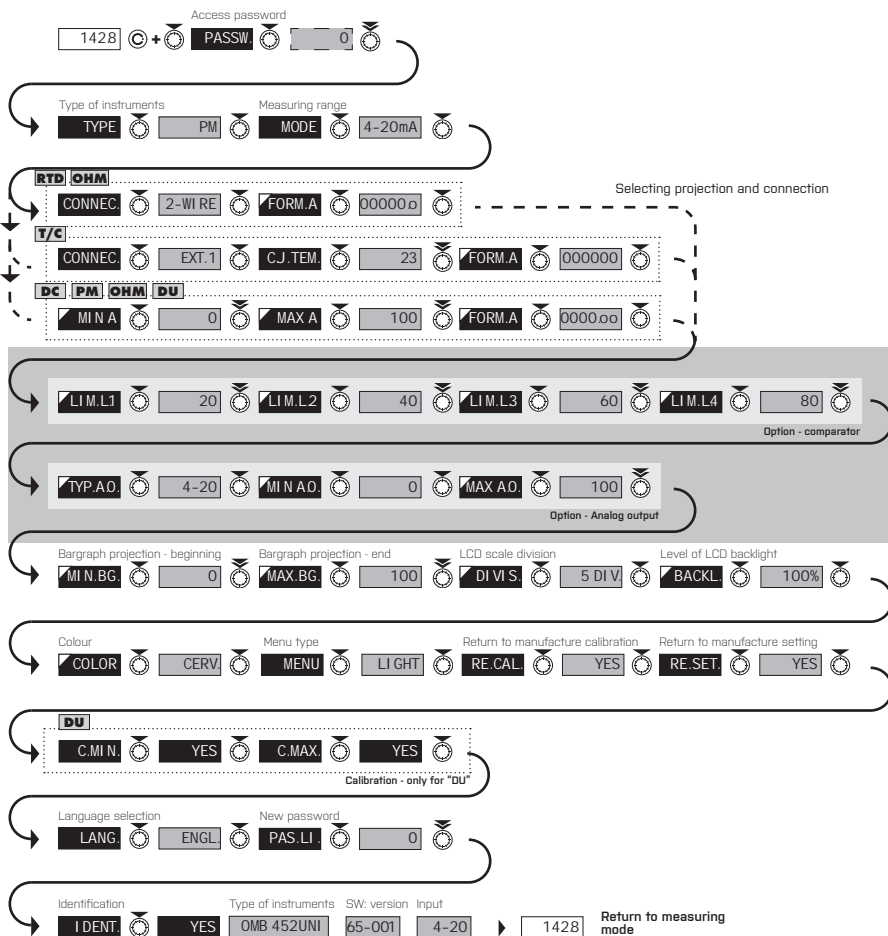
For trained users

Only items necessary for instrument setting

Access is password protected

Possibility to arrange items of the **USER MENU**

Linear menu structure

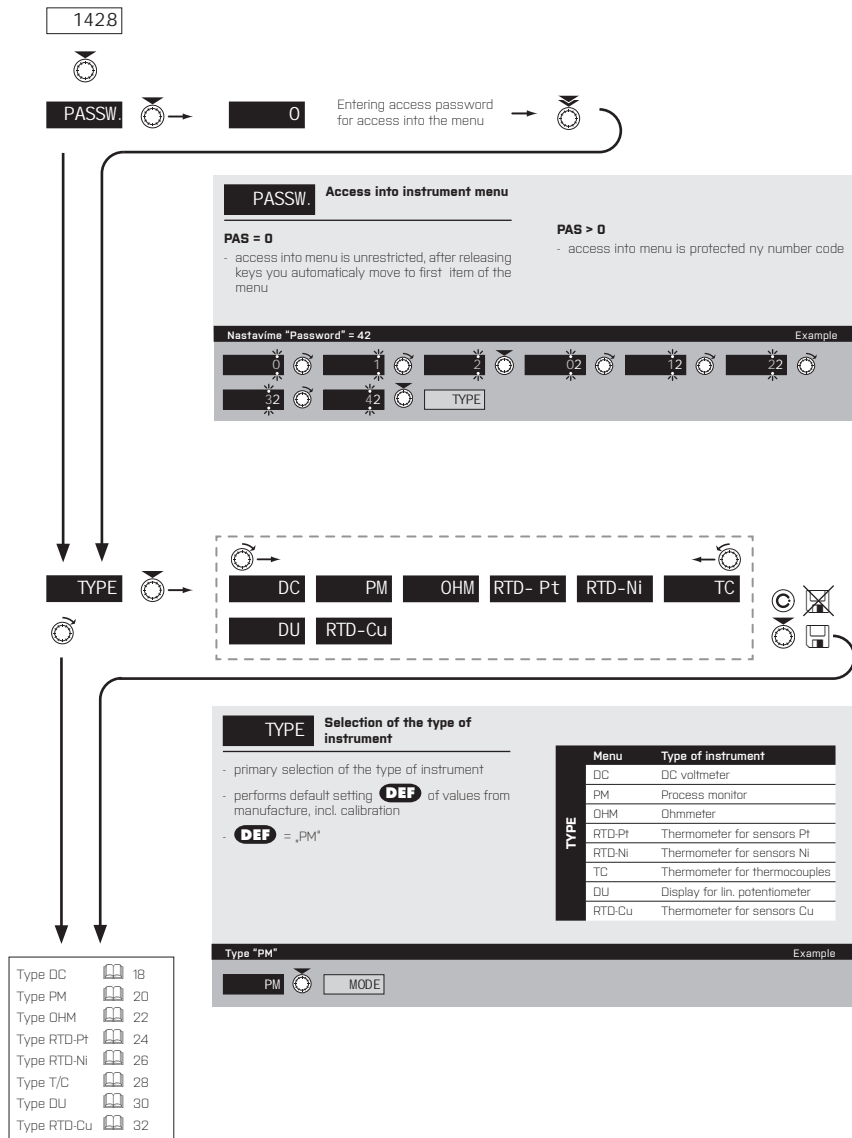

Preset from manufacture

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

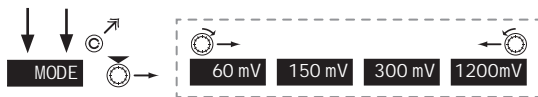
5. SETTING LIGHT





5. SETTING LIGHT

MEASURING MODE > DC



MODE Selection of the instrument measuring range

DEF = 60 mV

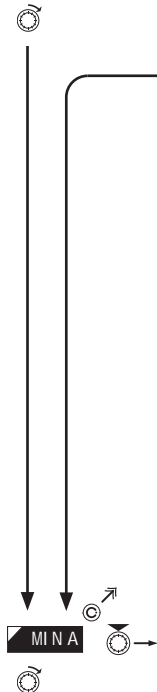
DEF = 500 V*

* only for option 'A'

	Menu	Measuring range
MODE	60 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



100

Setting for maximum input signal



MAX A Setting display projection for maximum value of input signal

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

100	100	100	200	300	400
500	0500	1500	2500	3500	FORM A

FORM.A

000000 00000.0 0000.00 000.000 00.0000 0.00000 FL0A.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	MI N.BG
---------	---------	---------

*subsequent item on the menu depends on instrument equipment

5. SETTING LIGHT

MEASURING MODE > PM

MODE

0-5mA 0-20mA 4-20mA ... 0-10 V 0-40 V Er4-20

MODE Selection of the instrument measuring range

DEF = 4 - 20 mA

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
Er4-20	4...20 mA, s chybovým hlášením „podřezání“ při signálu menším než 3,36 mA

Range 0...20 mA Example

4-20mA 0-2 V MIN A

MIN A

0 Setting for minimum input signal

MIN A Setting display projection for minimum value of input signal

- range of the setting: -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 0.5 -1 -1.5 -2 -2.5 -3 -3.5 -4 -4.5 -5

MAX A



MAX A Setting display projection for maximum value of input signal

signal

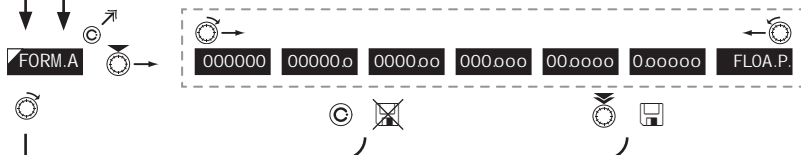
- range of the setting: .99999...999999
- position of the DP does not affect display projection

- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 20 mA > MAX A = 2500 Example

100	100	100	200	300	400
500	0500	1500	2500	FORM.A	



FORM.A Setting projection of the decimal point

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

DEF = 0000.00

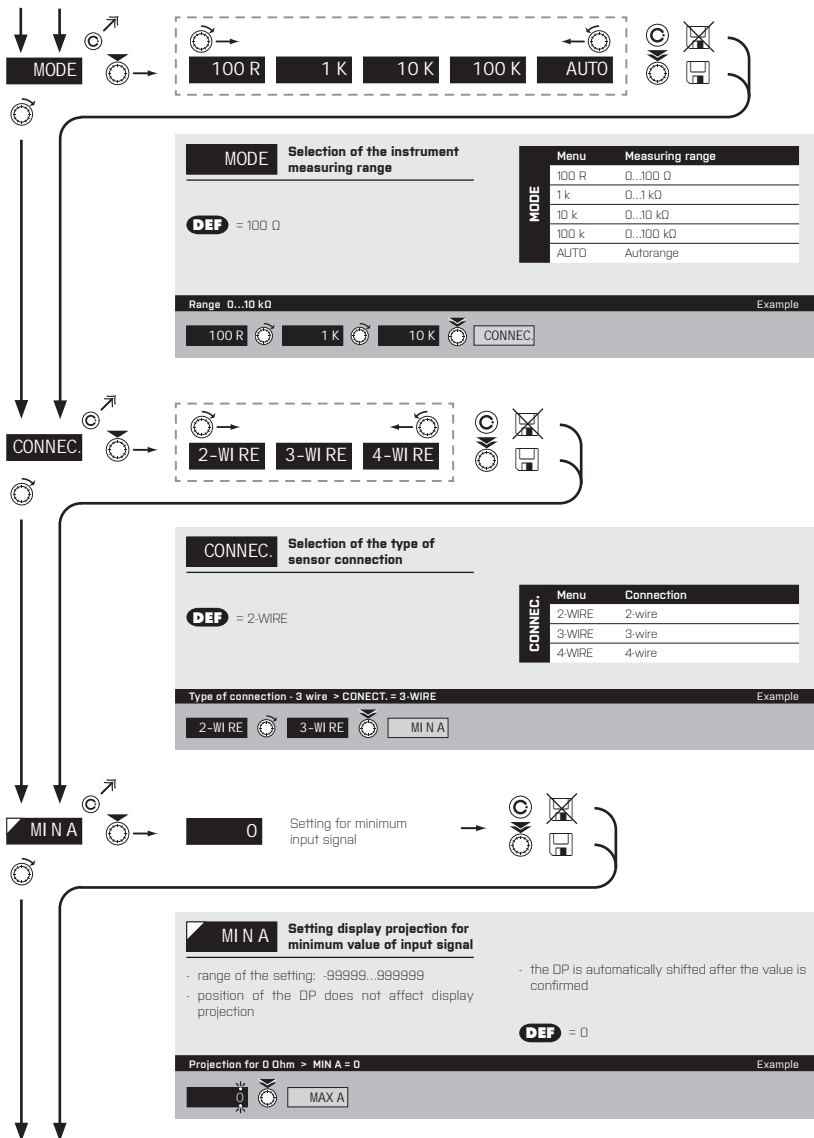
Projection of DP on display > 00000.0 Example

0000.00	00000.0	MI N.BG.
---------	---------	----------

*subsequent item on the menu depends on instrument equipment

5. SETTING LIGHT

MEASURING MODE > OHM





MAX A Setting display projection for maximum value of input signal

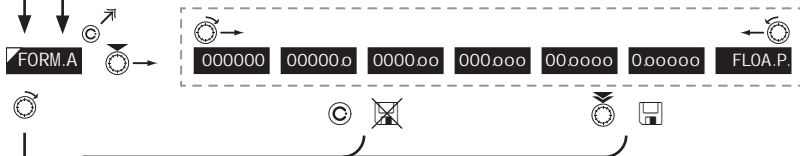
- range of the setting: -99999..999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 10 kOhm > MAX A = 1000 Example

100 100 100 000 0000 1000

FORM.A



FORM.A Setting projection of the decimal point

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

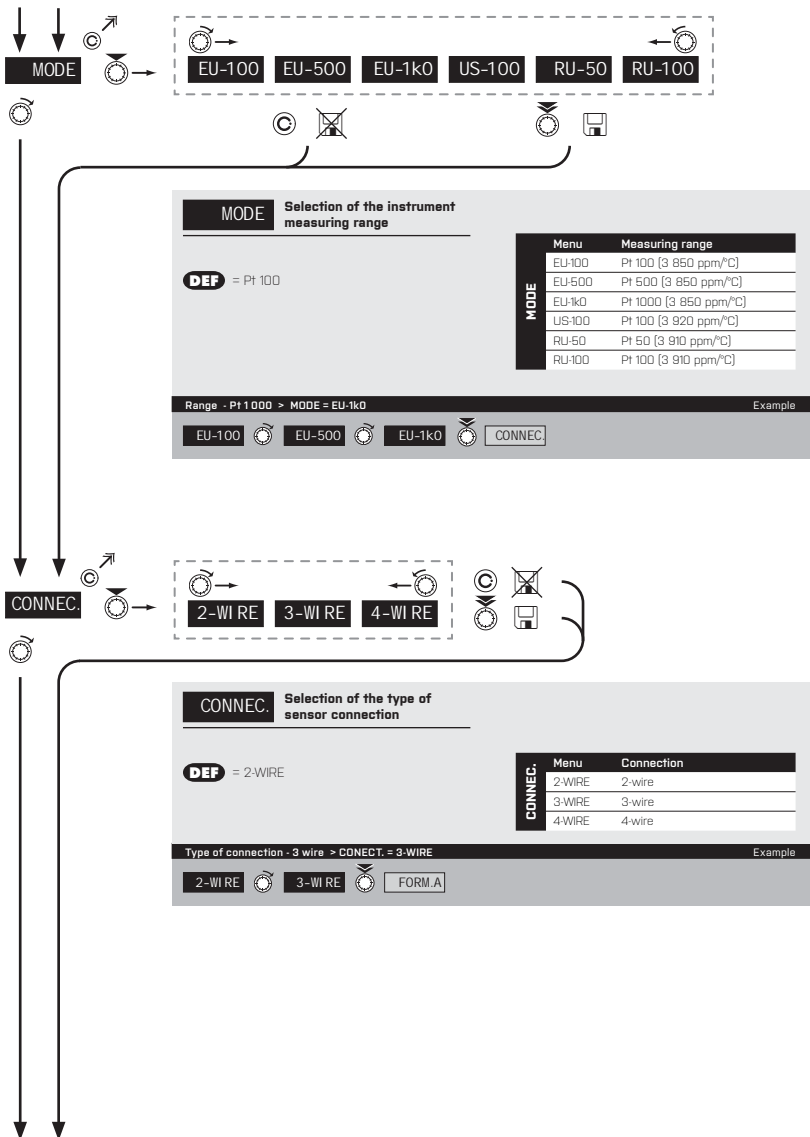
DEF = 0000.00

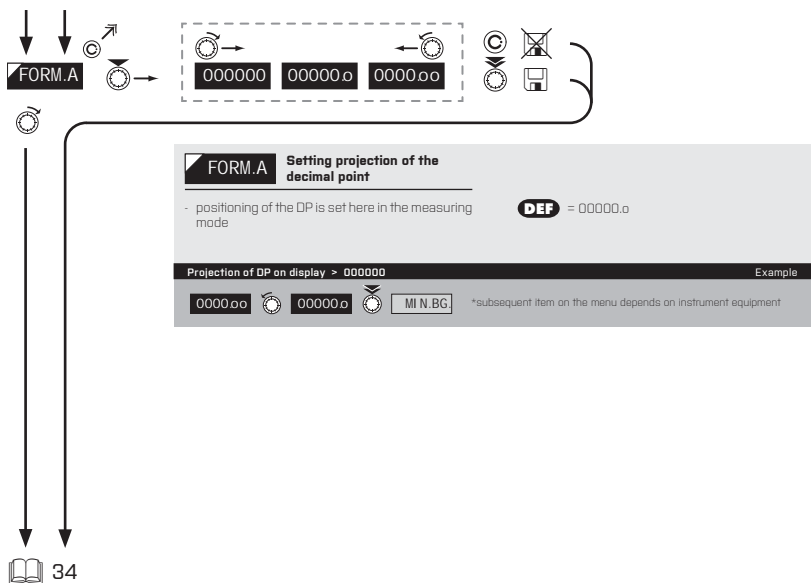
Projection of DP on display > 00000.0 Example

0000.00 00000.0 MI N.BG. *subsequent item on the menu depends on instrument equipment

5. SETTING LIGHT

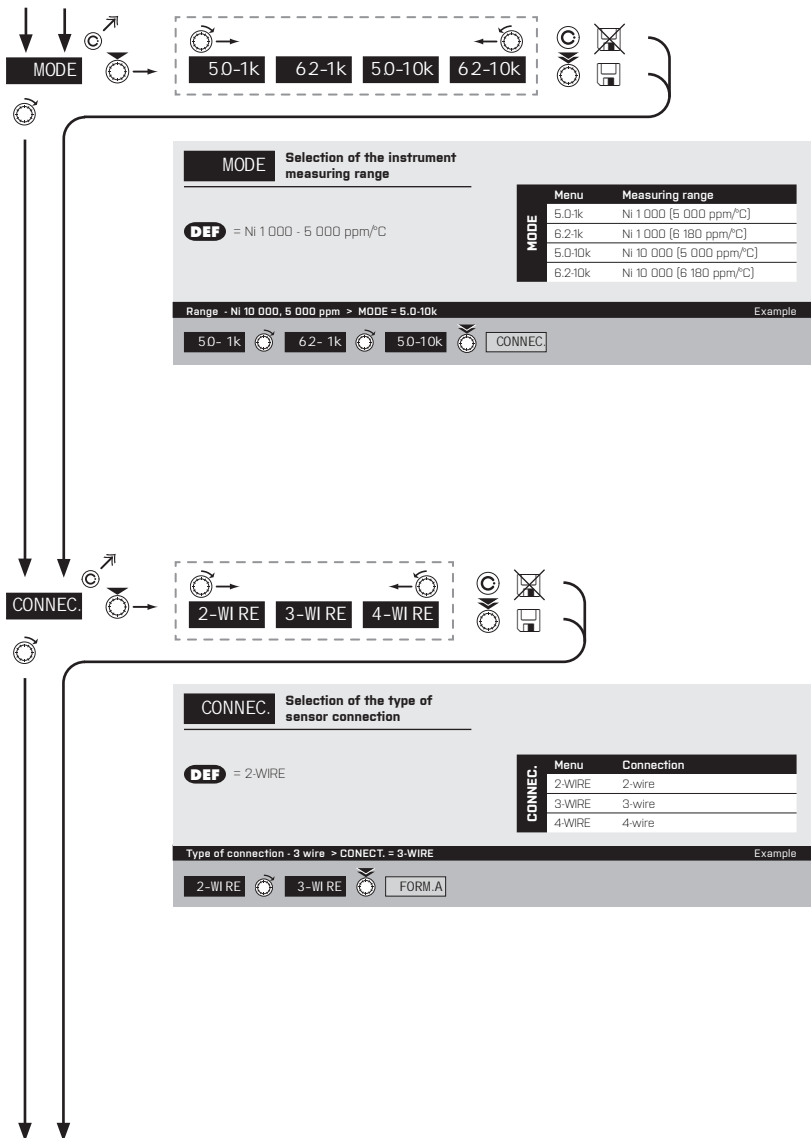
MEASURING MODE > RTD-Pt

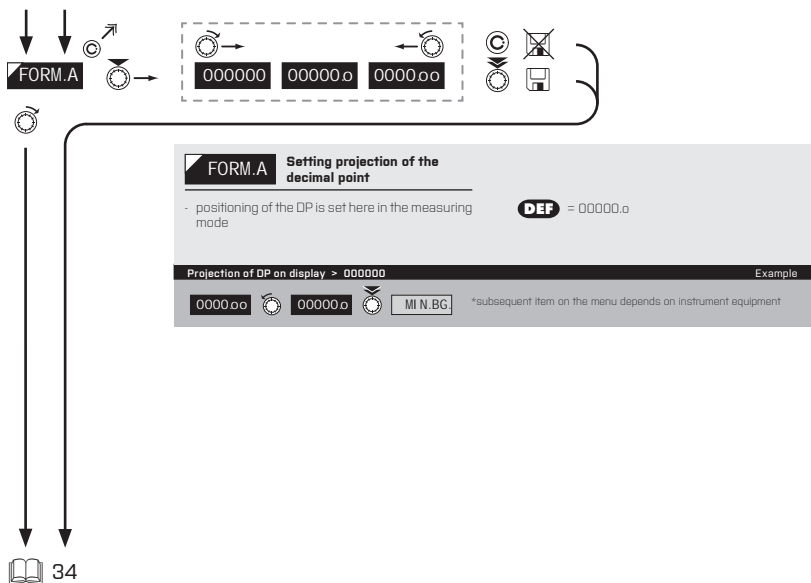




5. SETTING LIGHT

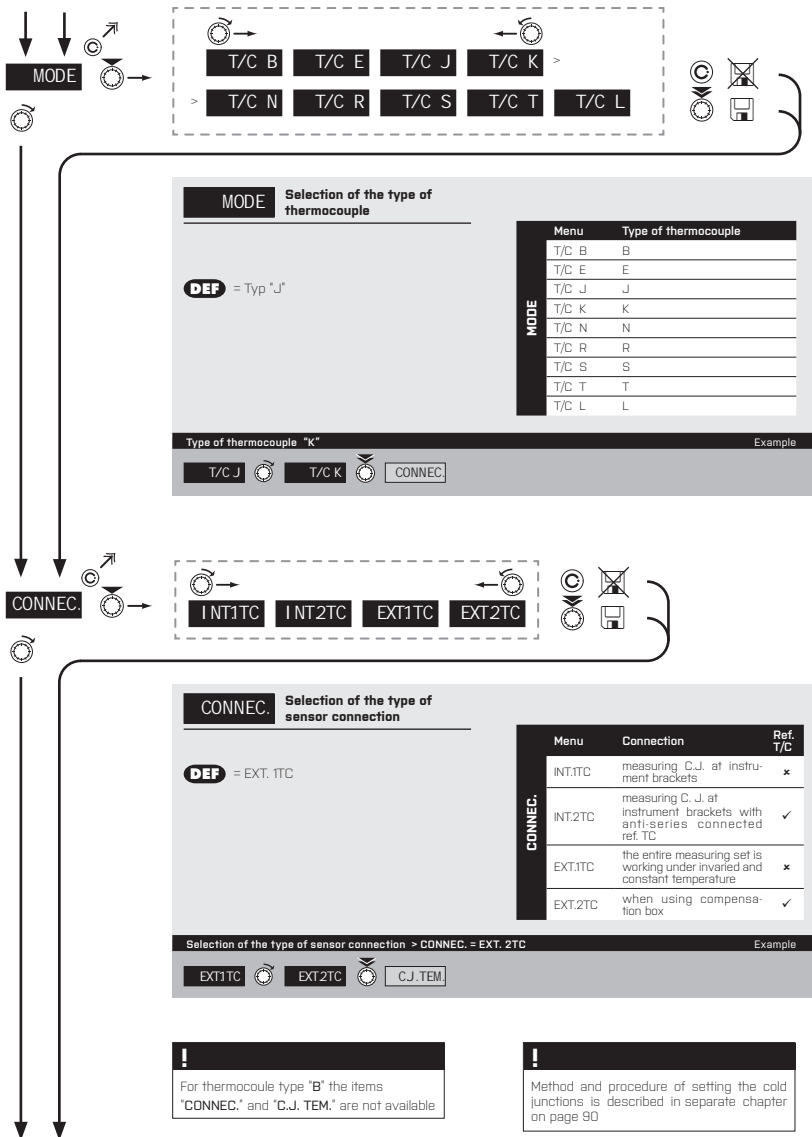
MEASURING MODE > RTD-NI

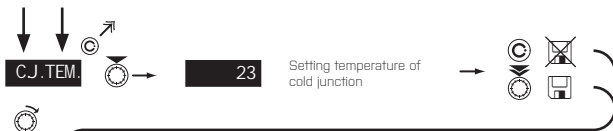




5. SETTING LIGHT

MEASURING MODE > T/C





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

23 24 25 35 FORM.A



FORM.A Setting projection of the decimal point

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

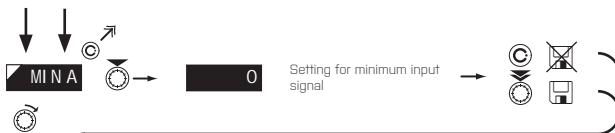
DEF = 00000.0

Projection of DP on display > 000000 Example

0000.00 00000.0 MIN.BG *subsequent item on the menu depends on instrument equipment

5. SETTING LIGHT

MEASURING MODE > DU



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

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

DEF = 0

Projection for the beginning > MIN A = 0 Example



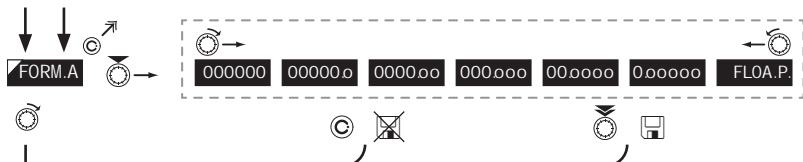
MAX A **Setting display projection for maximum value of input signal**

signal

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

DEF = 100

Projection for the end > MAX A = 5000 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 > 0000.00 Example

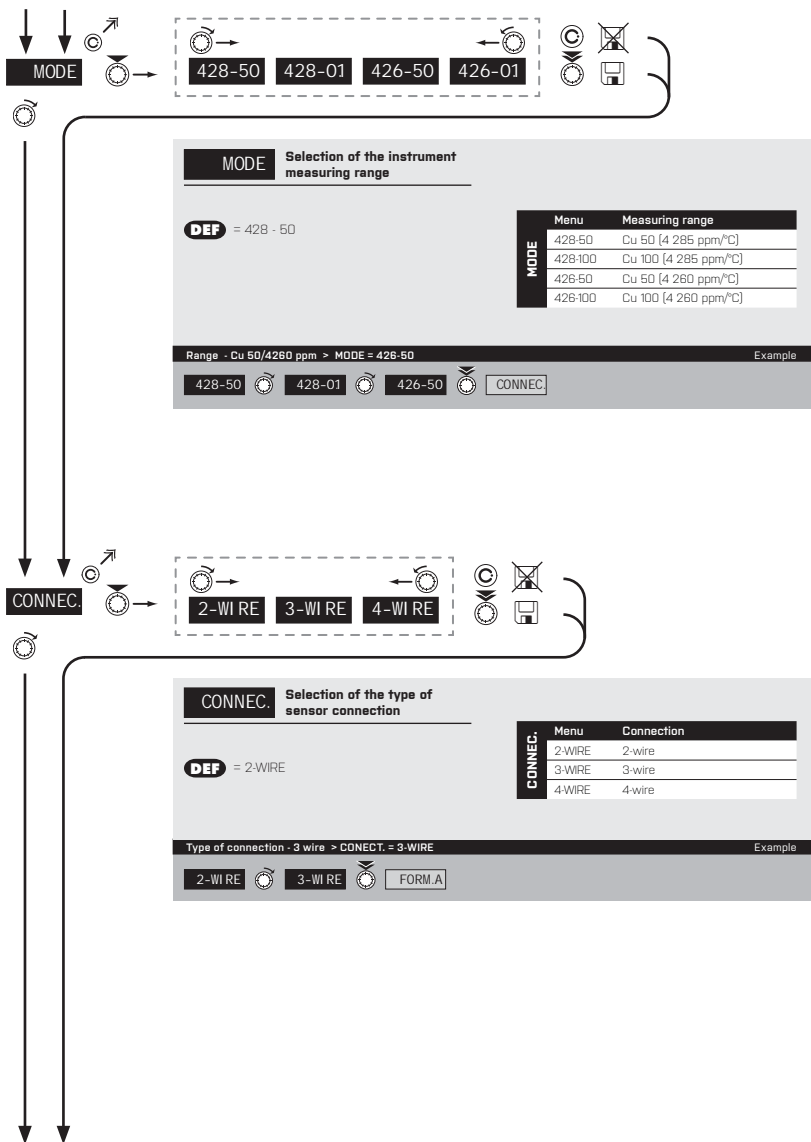
0000.00 *subsequent item on the menu depends on instrument equipment

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Calibration of the beginning and the end of range of linear potentiometer is on page 42

5. SETTING LIGHT

MEASURING MODE > RTD-CU





FORM.A Setting projection of the decimal point

- positioning of the DP is set here in the measuring mode **DEF** = 00000.0

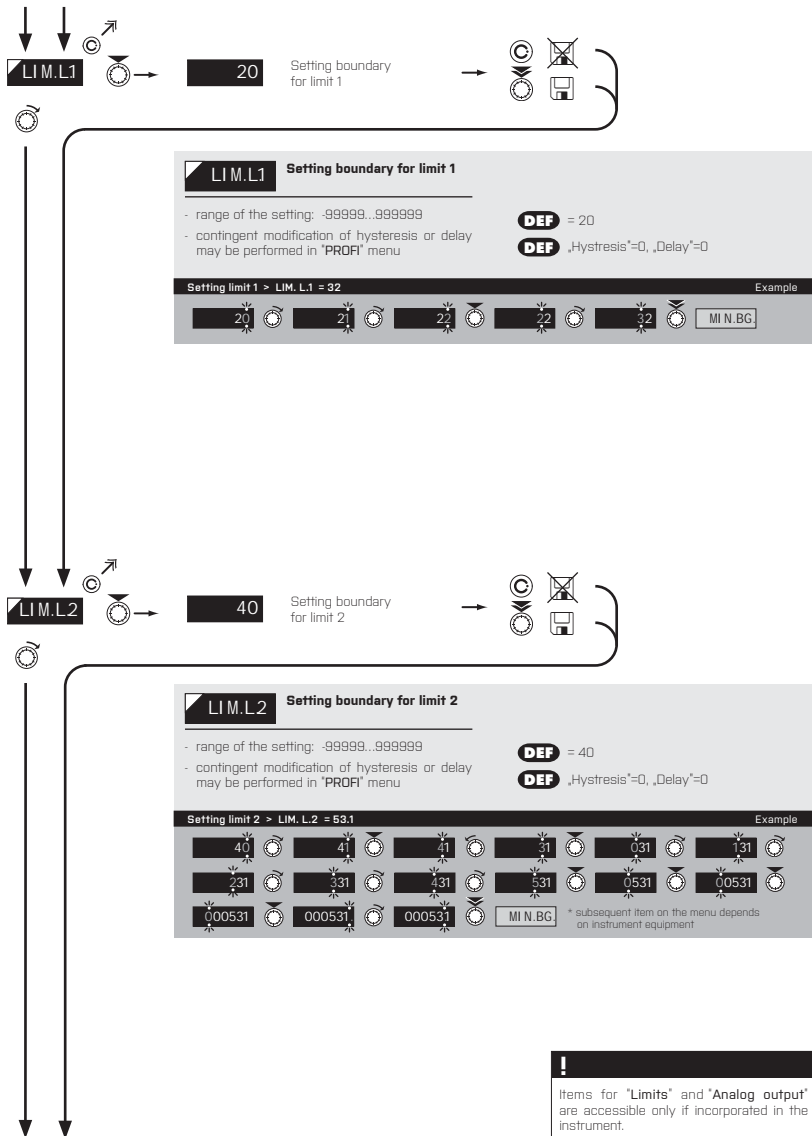
Projection of DP on display > 000000 Example

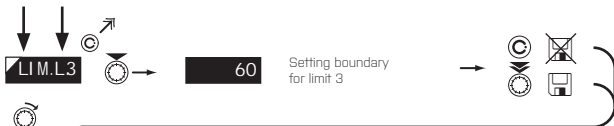
0000.00 00000.0 MI N.BG. *subsequent item on the menu depends on instrument equipment

34

5. SETTING LIGHT

DISPLAYED ONLY WITH OPTIONS > COMPARATORS





LIM.L3
Setting boundary for limit 3

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

DEF = 60

DEF ,Hysteresis'=0, ,Delay'=0

Setting limit 3 > LIM.L3 = 65 Example

60	61	62	63	64	65
65	75	85	MIN.BG	* subsequent item on the menu depends on instrument equipment	



LIM.L4
Setting boundary for limit 4

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

DEF = 80

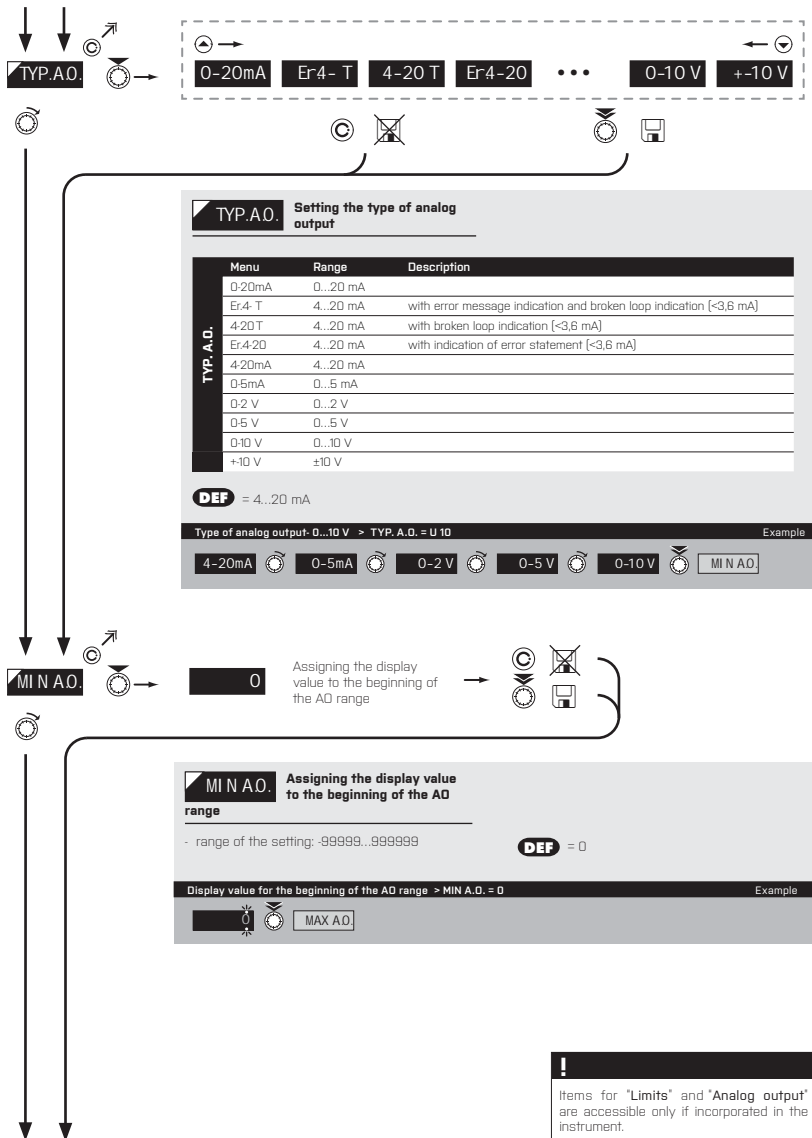
DEF ,Hysteresis'=0, ,Delay'=0

Setting limit 4 > LIM.L4 = 103 Example

80	81	82	83	93	93
03	003	103	MIN.BG	* subsequent item on the menu depends on instrument equipment	

5. SETTING LIGHT

DISPLAYED ONLY WITH OPTIONS > ANALOG OUTPUT





MAX A.D. Assigning the display value to the end of the AD range

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

Display value for the end of the AD range > MAX A.D. = 120 Example

100	100	120	120	MIN.BG.
-----	-----	-----	-----	---------

DISPLAYED ONLY WITH OPTIONS > ANALOG OUTPUT

6. SETTING PROFI

BARGRAPH PROJECTION SETTING



MIN.BG. Bargraph projection setting for the minimum value of the input signal

DEF = 0

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

Bargraph value at min. input > MIN.BG. = 0 Example

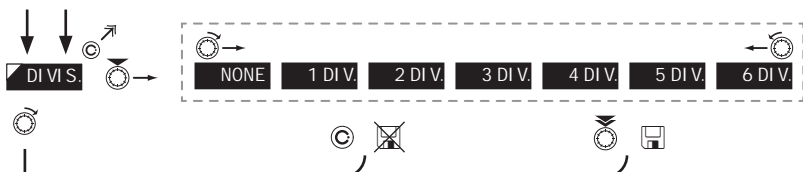


MAX.BG. Bargraph projection setting for the maximum value of the input signal

DEF = 100

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

Bargraph value at max. input > MAX.BG. = 120 Example



DIVIS Selection of LCD scale division

- LCD scale division can be emphasized as shown on the right

DEF = 5 Division

DIVIS.	Menu	Range
	NONE	bez rozdělení
	1 DIV.	1 section/2 emphasized lines
	2 DIV.	2 section/3 emphasized lines
	3 DIV.	3 section/4 emphasized lines
	4 DIV.	4 section/5 emphasized lines
	5 DIV.	5 section/6 emphasized lines
	6 DIV.	6 section/7 emphasized lines

Selection of LCD scale division > DIVIS. = 4 DIV. Example

5 DIV. 4 DIV. **VALUES**

VALUES Selection of numerical description on LCD scale

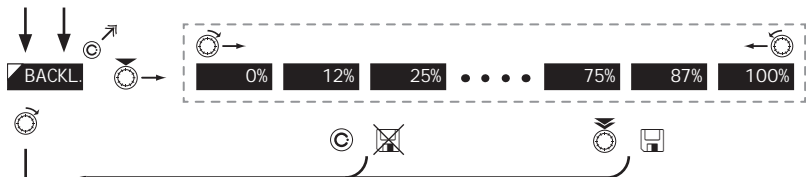
- autonomous control of numerical description on LCD scale **DEF** = YES

Description selection > VALUES = NO Example

YES NO **BACKL**

6. SETTING PROFI

LCD SCALE



BACKL. LCD backlight level selection

- LCD backlight level can be contolled to match the ambient lighting conditions
- range of setting: 0/12/25/37/50/62/75/87/100 %

DEF = 100 %

LCD backlight level selection > BACKL. = 87 % Example

100% 87%

BARGRAPH COLOUR



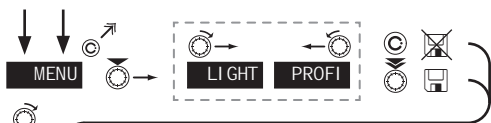
COLOR Selecting the bargraph colour

- this is to select the bargraph colour in the basic mode "Single bar"
- for other modes it is necessary to switch into the "PROFI" menu

DEF = Green

Selecting the bargraph colour > COLOR = ORANGE Example

GREEN ORANGE



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



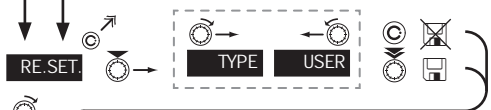
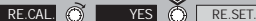
RE.CAL. Restoration of manufacture calibration

- 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 > YES

Example



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 > TYPE

Example

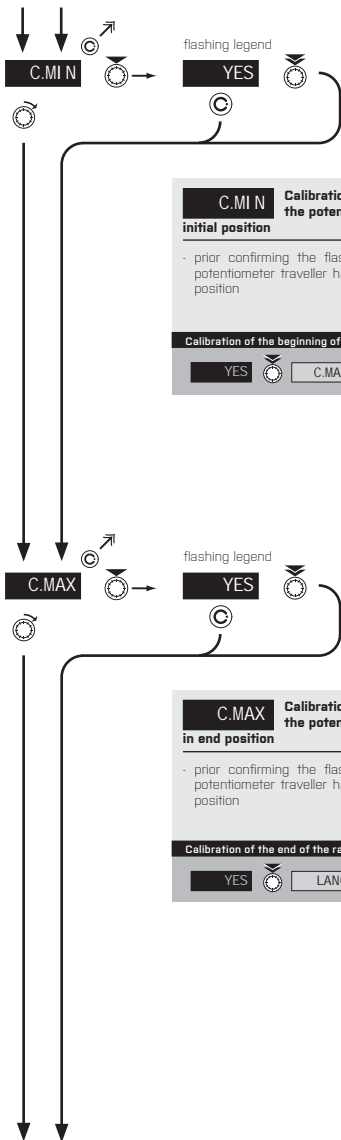


* subsequent item on the menu depends on instrument type, for "DU" > "C. MIN"

- Type „DC“ 43
- Type "PM" 43
- Type "OHM" 43
- Type "RTD-Pr" 43
- Type "RTD-Ni" 43
- Type "T/C" 43
- Type "DU" 42
- Type "RTD-Cu" 43

5. SETTING LIGHT

MEASURING MODE > DU



C.MIN Calibration of input range - the potentiometer traveller in initial position Only for type "DU"

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

Calibration of the beginning of the range > C. MIN Example

YES **C.MAX**

C.MAX Calibration of input range - the potentiometer traveller in end position Only for type "DU"

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

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

YES **LANG**



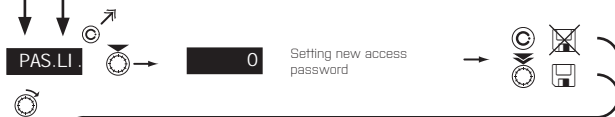
LANG. Selection of language in instrument menu

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL. Example

ENGL. PAS.LI



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

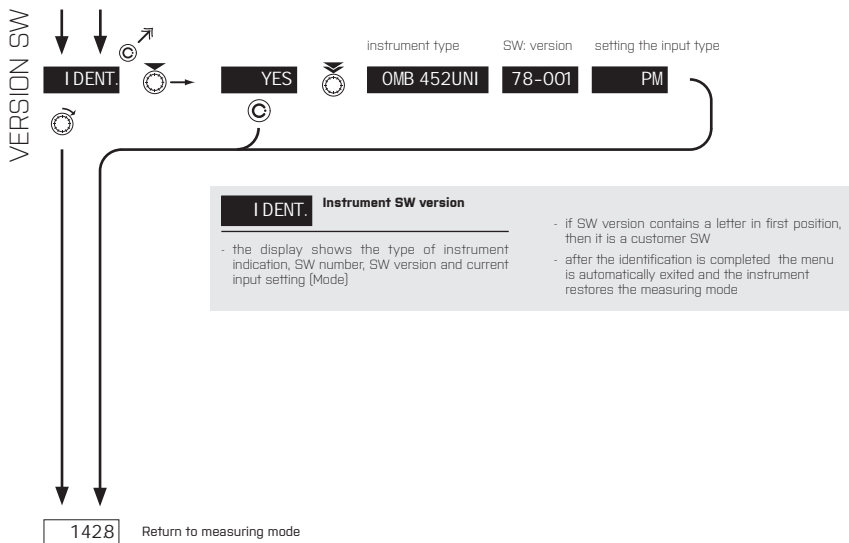
DEF = 0

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

0	1	01	11	21	31
41	041	141	241	341	I DENT

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

5. SETTING LIGHT







SETTING **PROFI**

For expert users

Complete instrument menu

Access is password protected

Possibility to arrange items of the **USER MENU**

Tree menu structure

6.0 SETTING "PROFI"

PROFI

Complete programming menu

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

Switching over to "PROFI" menu



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

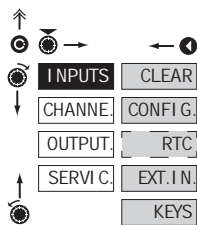


- access to menu selected under item **SERVIC. > MENU > LIGHT/PROFI**
- password protected access (unless set as follows under the item **SERVIC. > N. PASS. > LIGHT =0**)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used



6. SETTING PROFI

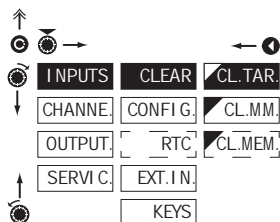
6.1 SETTING "PROFI" - INPUT



The primary instrument parameters are set in this menu

CLEAR	Resetting internal values
CONFI G.	Selection of measuring range and parameters
RTC	Setting date and time for option with RTC
EXT. I.N.	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

INPUTS	CLEAR	READ/S	40.0	DEF
CHANNE.	CONF I G.	TYPE	20.0	
OUTPUT.	RTC	MODE	10.0	
SERVI C.	EXT. I N	CONNEC.	5.0	
	KEYS	C.J. TEM.	2.0	
		AD. RES.	1.0	
		LEADS	05	
			02	
			01	

READ/S Selection of measuring rate

40.0	40,0 measurements/s
20.0	20,0 measurements/s
10.0	10,0 measurements/s
5.0	5,0 measurements/s
2.0	2,0 measurements/s
1.0	1,0 measurements/s
0.5	0,5 measurements/s
0.2	0,2 measurements/s
0.1	0,1 measurements/s

6.1.2b SELECTION OF „INSTRUMENT“ TYPE

INPUTS	CLEAR	READ/S	DC	DEF
CHANNE.	CONF I G.	TYPE	PM	
OUTPUT.	RTC	MODE	OHM	
SERVI C.	EXT. I N	CONNEC.	RTD-Pt	
	KEYS	C.J. TEM.	RTD-Ni	
		AD. RES.	TC	
		LEADS	DU	
			RTD-Cu	

TYPE Selection of „instrument“ type

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

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

6. SETTING PROFI

Programming sch

142B PASSW 0 Access password
 - after setting in item "MENU"

I INPUTS

CLEAR CL.TAR • NMM • CL.MEM

CONFIG READ/S 01 • 02 ••• 200 • 400

TYPE DC • PM ••• DU • Cu

MODE

Setting input, range and projection

DC 60mV • 150mV • 300mV • 1200mV

PM 0-5mA • 0-20mA ••• 0-40 V • Er4-20

OHM 100R • 1k • 10k • 100k

RTD EU-100 • EU-500 • EU1k0 ••• RJ-100

RTD 50-1k • 62-1k • 50-10k • 62-10k

T/C T/CB • T/C E ••• T/C T • T/C L

DU LI NPOT

RTD 428-50 • 428-01 • 426-50 • 426-01

CONNEC 2-WI RE • 3-WI RE • 4-WI RE

AD.RES 0

LEADS 0

CONNEC INT1TC ••• EXT2TC

CJ.TEM 0

RTC TIME 000000

DATE 000000

EXT.IN EXT.1 OFF • HOLD ••• CL.MM

M.HOLD DI SPL • DI S+AO • D+AO+L • ALL

KEYS LEFT FN.LE NO • CL.MM • CL.TAR • MENU • TEMP.V • TARE • SAVE • CL.MEM

DO.LE NO • CHAN.A • FI L A • MAT.FN • MI N • MAX. • LI M.1 ••• P.TARE • COLD.J

ENTER MNU.LU LI M.1 • LI M.2 • LI M.3 • LI M.4 ••• ON 4 • OFF 1 • OFF 2 • OFF 3 • OFF 4

CHANNE

CHAN.A SET.A MIN.A 0

MAX.A 100

P.TAR.A 0

TARED CHANA • FI L A

FILTER MOD.FA NO ••• ROUND.

CON.FA 0

FORM.A 000000 • 00000o ••• FLOA.P

DESC.A 0

LOG.A SAVE M NO ••• OUT

MAT.FN MATH.F NO • MULTI N ••• ROOT

CON.A 0

CON.F 0

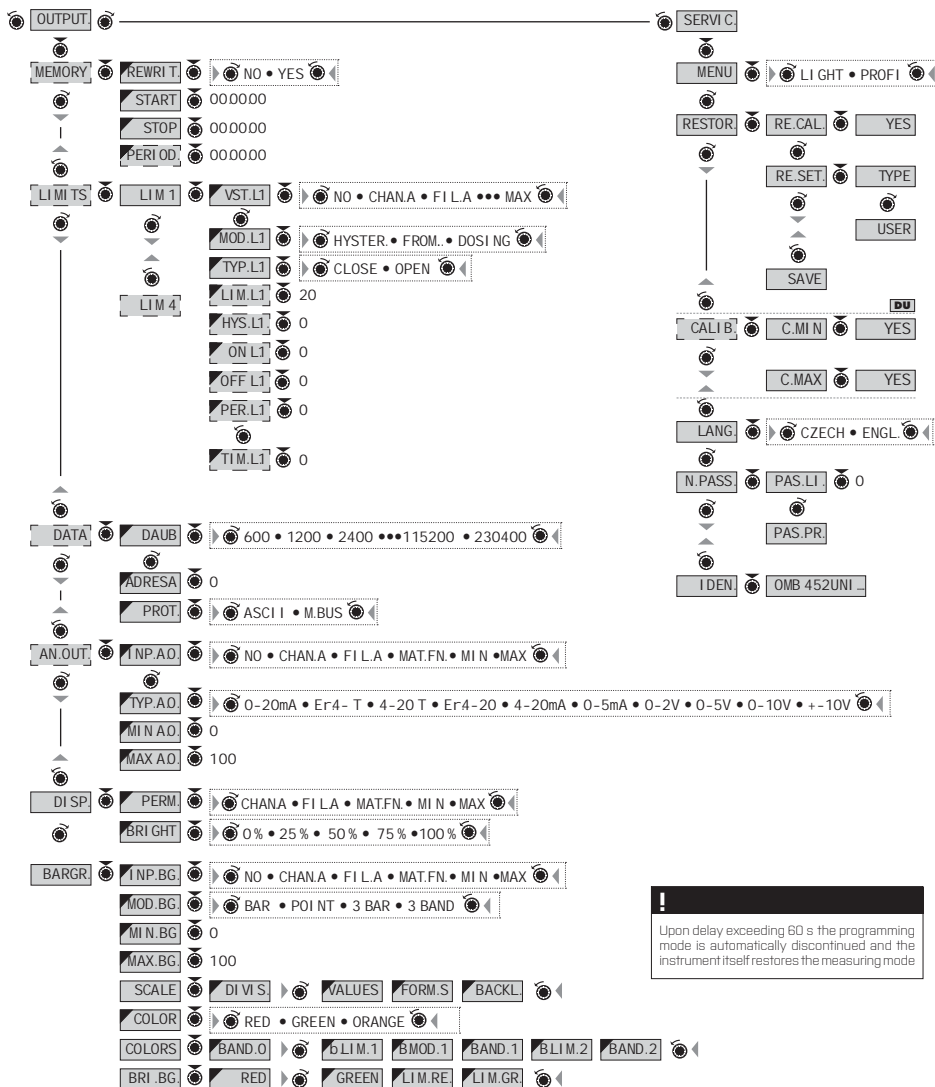
FORM.M 000000 • 00000o ••• FLOA.P

DESC.M 0

LOG.M SAVE M NO ••• OUT

MINMAX INP.MM NO • CHAN.A • FI L A • MAT.FN

Home PROFI MENU



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

6. SETTING PROFI

6.1.2c

SELECTION OF MEASURING RANGE

INP.U.T.S	CLEAR	READ/S	60mV	100 R	
CHAN.N.E	CONF.I.G.	TYPE	150mV	1 k	
OUTP.U.T	RT.C	MODE	300mV	10 k	
SERV.I.C.	EXT.I.N	CONN.E.C.	1200mV	100 k	
	KEYS	C.J.TEM.		AUTO	
		AD.RES.			
		LEADS			

			DC		OHM
			100 V		DEF
			250 V		
		DEF	500 V		DEF
			010 A		
			0.25 A		
			0.50 A		
			1.00 A		
			5.00 A		

			DC - A		PM
			0-5mA		
			0-20mA		
		DEF	4-20mA		DEF
			0-2 V		
			0-5 V		
			0-10 V		
			0-40 V		
			Er4-20		

			RTD-Pt		RTD-Cu
		DEF	EU-100		DEF
			EU-500		
			EU-1k0		
			US-100		
			RU-50		
			RU-100		

			RTD-Ni		T/C
		DEF	50-1k		T/C B
			62-1k		T/C E
			50-10k		T/C J
			62-10k		T/C K
					T/C N
					T/C R
					T/C S
					T/C T
		DEF	LI NPOT.		T/C L

!

Switching in the mode
AUTO - "OHM"

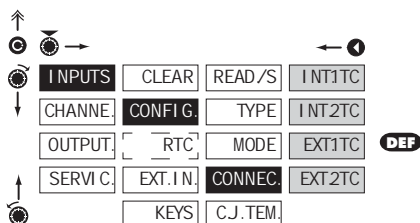
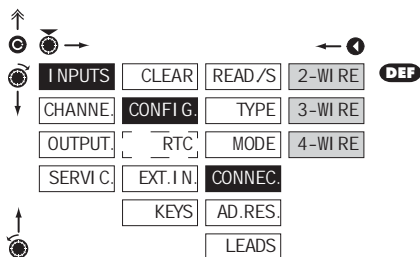
0.1 Ω > 1 kΩ	0.101 k
1 kΩ > 10 kΩ	1.010 k
10 kΩ > 100 kΩ	10.10 k
100 Ω > 10 kΩ	9.900 k
10 kΩ > 1 kΩ	0.990 k
1 kΩ > 0.1 kΩ	0.099 k

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

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
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
	Er4-20	4...20 mA, with error statement of „underfl ow“ upon signal smaller than 3.36 mA
OHM	100 R	0...100 Ω
	1 k	0...1 kΩ
	10 k	0...10 kΩ
	100 k	0...100 kΩ
	AUTO	Autorange
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]
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]
RTD-Cu	428-50	Cu 50 [4 280 ppm/°C]
	428-01	Cu 1 00 [4 280 ppm/°C]
	426-50	Cu 50 [4 260 ppm/°C]
	426-01	Cu 100 [4 260 ppm/°C]
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 THE TYPE OF SENSOR CONNECTION

RTD OHM T/C

**CONNEC.** Selection of the type of sensor connection**RTD/OHM**

- 2-WI RE 2-wire connection
- 3-WI RE 3-wire connection
- 4-WI RE 4-wire connection

T/C

- INT.1TC** 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



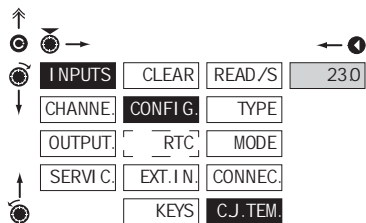
Method and procedure of setting the cold junctions is described in separate chapter on page 90



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

6. SETTING PROFI

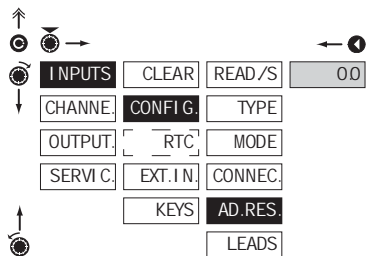
6.1.2e SETTING TEMPERATURE OF COLD JUNCTION

T/C

C.J. TEM. Setting temperature of cold junction

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

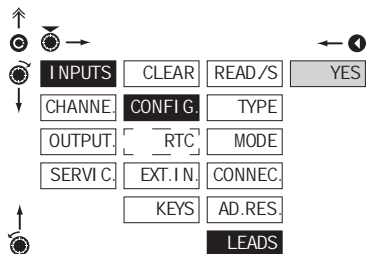
6.1.2f ZERO OFFSET OF THE MEASUREMENT RANGE

RTD OHM

AD.RES. Offset of the beginning of the measuring rang

- 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

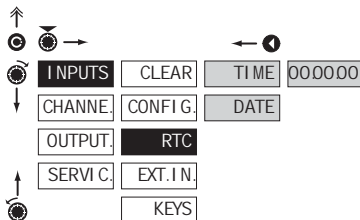
6.1.2g COMPENSATION OF 2-WIRE CONDUCT

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)

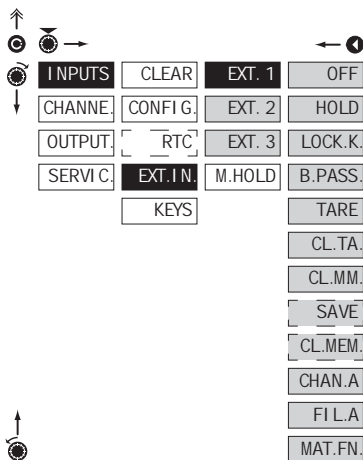
TIME Time setting

- format 23.59.59

DATE Date setting

- format DD.MM.YY

6.1.4a EXTERNAL INPUT FUNCTION SELECTION



EXT.IN 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 the measured data record into instrument memory (not in standard equipment)

CL.MEM Clearing memory for option FAST/RTC

CHAN.A Displaying value of "Channel A"

FI.LA 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.

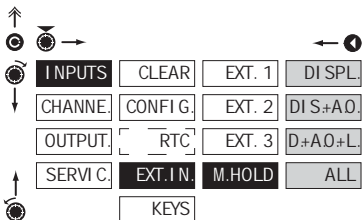
- **DEF** EXT. 3 > TARE

*

Procedure identical for EXT. 2 and EXT. 3

6. SETTING PROFI

6.1.4b SELECTION OF FUNCTION "HOLD"



M.HOLD Selection of function "HOLD"

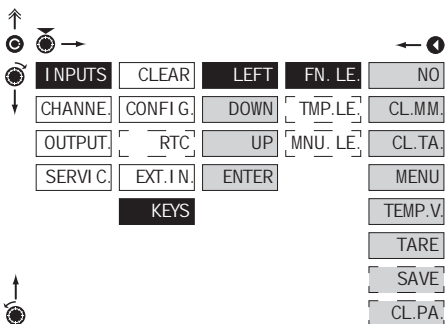
DI SPL. "HOLD" locks only the value displayed

DI S.+A.O. "HOLD" locks the value displayed and on AD

D.+A.O.+L. "HOLD" locks the value displayed, on AD 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, where required selection is performed

TARE Tare function activation

SAVE Activation of the measured data record into instrument memory (not in standard equipment)

CL. MEM. Clearing memory

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

!

Preset values of the control keys **DEF**

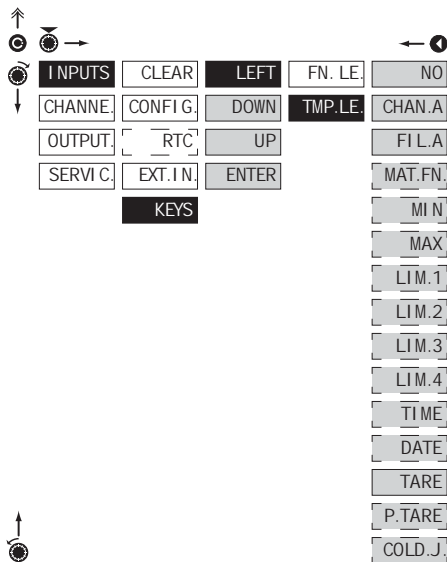
LEFT	Show Tare
UP	Show Max. value
DOWN	Show Min. value
ENTER	w/o functione

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.1.5b

OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION

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

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

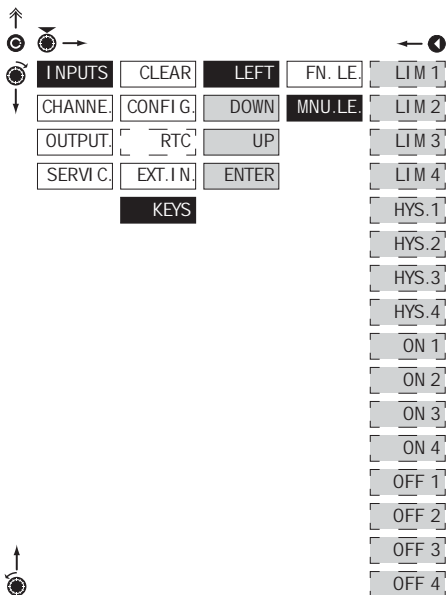
NO	Temporary projection is off
CHAN.A	Temporary projection of "Channel A" value
FIL.A	Temporary projection of "Channel A" value after processing digital filters
MAT.FN.	Temporary projection of "Mathematic functions" value
MIN	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
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 "C.JC" value

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

6. SETTING PROFI

6.1.5c

OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - DIRECT ACCESS TO ITEM



MNU.LE. Assigning access to selected menu item

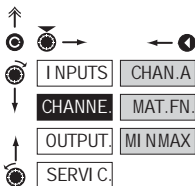
LIM 1	Direct access to item "LIM 1"
LIM 2	Direct access to item "LIM 2"
LIM 3	Direct access to item "LIM 3"
LIM 4	Direct access to item "LIM 4"
HYS.1	Direct access to item "HYS. 1"
HYS.2	Direct access to item "HYS. 2"
HYS.3	Direct access to item "HYS. 3"
HYS.4	Direct access to item "HYS. 4"
ON 1	Direct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

6.2 SETTING "PROFI" - CHANNELS



The primary instrument parameters are set in this menu

CHAN.A

Setting parameters of measuring "Channel"

MAT.FN.

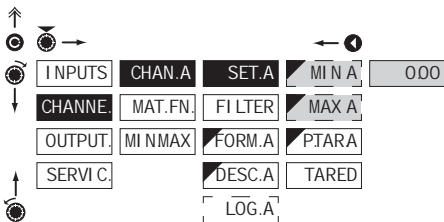
Setting parameters of mathematic functions

MI NMAX

Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION

DC PM DU OHM



SET.A

Setting display projection

MI N A

Setting display projection for minimum value of input signal

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

- DEF = 0

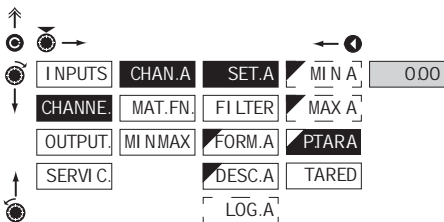
MAX A

Setting display projection for maximum value of input signal

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

- DEF = 100

6.2.1b SETTING FIXED TARE



P.TAR.A

Setting "Fixed tare" value

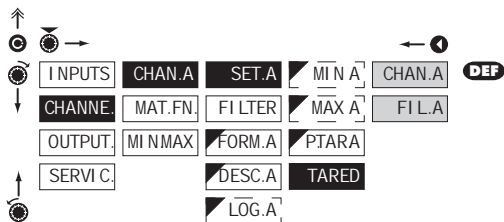
- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size

- when setting [P.TAR.A≠0] is in effect, display does not show the "T" symbol

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

- DEF = 0

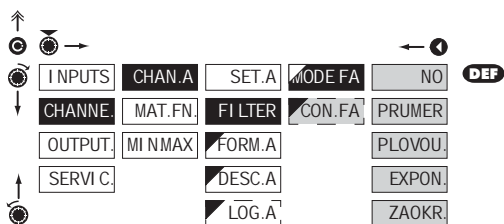
6.2.1c SELECTING WHERE TARE WILL BE APPLIED

**TARED** Selecting the position of tare

CHAN. A The value will be tared before linearisation and digital filter

FI L A The value will be tared after linearisation and digital filter

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. FA] of measured values
- range 2...100

FLOAT. Selection of floating filter

- floating arithmetic average from given number [CON. FA] of measured data and updates with each measured value
- range 2...30

EXPON. Selection of exponential filter

- integration filter of first prvniho grade with time constant [CON. FA] measurement
- range 2...100

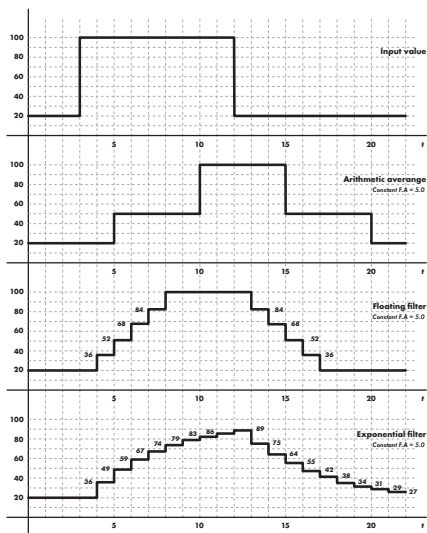
ROUND Measured value rounding

- is entered by any number, which determines the projection step [e.g. CON. FA = 2.5 > display 0, 2.5, 5,...]

CON. FA Setting constants

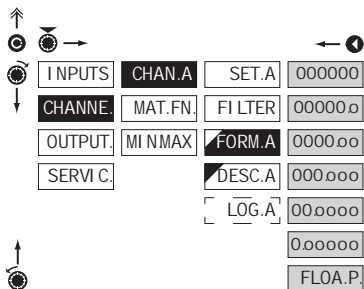
- this menu item is always displayed after selection of particular type of filter

DEF = 2



6. SETTING PROFI

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 „FLOA.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

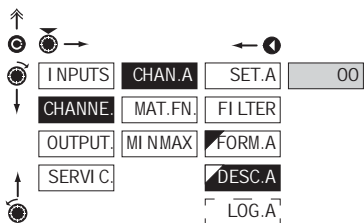
000.000 Setting DP - XXX.xxx

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 description for "Channel A"

- projection of measured 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

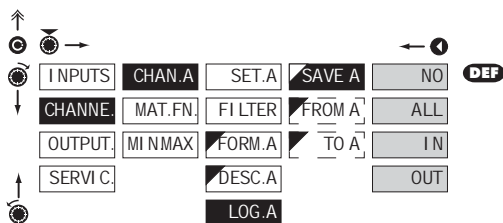
RTD T/C DEF = °C

DC PM DU OHM DEF = none

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6.2.1g

SELECTION OF STORING DATA INTO INSTRUMENT MEMORY



SAVE 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

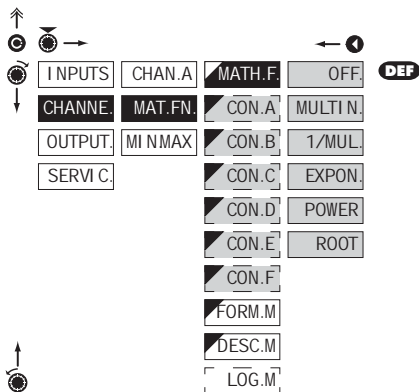
Setting the final interval value

- setting range: -99999...999999

6. SETTING PROFI

6.2.2a

MATHEMATIC FUNCTIONS



MATH.F. Selection of mathematic functions

OFF Mathematic functions are off

MULTI.N. Multinomial

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

1/MUL. $1/x$

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

EXPON. Exponential

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

POWER Power

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

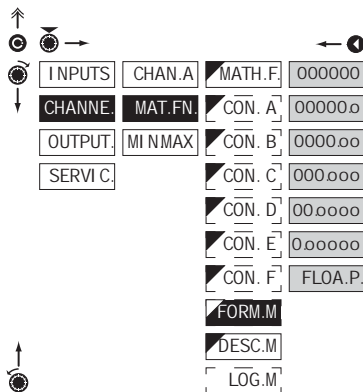
ROOT Root

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

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

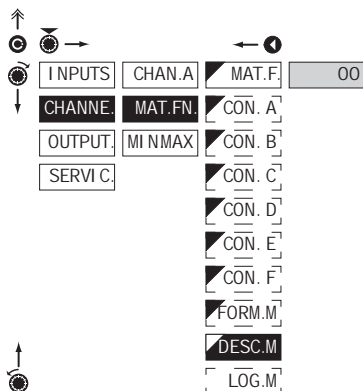
00.0000 Setting DP - XX.xxxx

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 measured 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

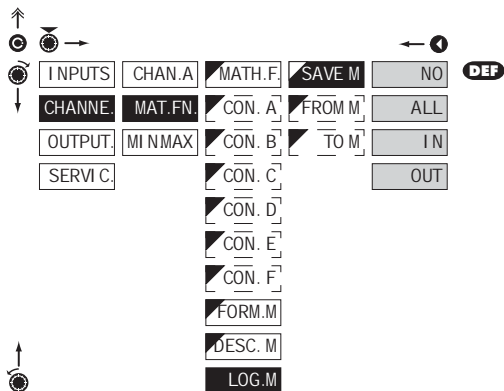
- **DEF** = no description

!

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6. SETTING PROFI

6.2.2d VOLBA UKLÁDÁNÍ DAT DO PAMĚTI PŘÍSTROJE



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

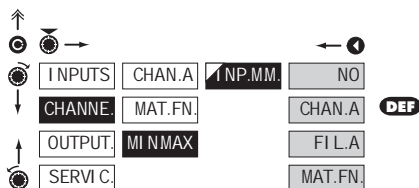
FROM M Setting the initial interval value

- 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"

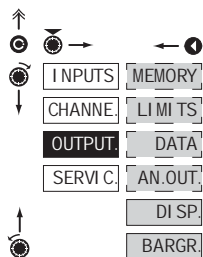
FI L.A From "Channel A" after digital filters processing

MAT.FN. From "Mathematic functions"



6. SETTING PROFI

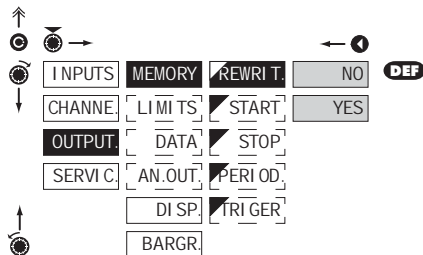
6.3 NASTAVENÍ „PROFI“ - VYSTUPY



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

MEMORY	Setting data logging into memory
LI MI TS	Setting type and parameters of limits
DATA	Setting type and parameters of data output
AN. OUT.	Setting type and parameters of analog output
DI SP.	Setting display projection and brightness
BARGR.	Setting bargraph projection and brightness

6.3.1a SELECTION OF MODE OF DATA LOGGING INTO INSTRUMENT MEMORY

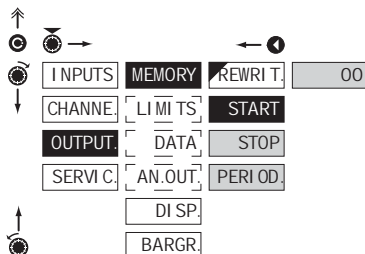


REWRI T. Selection of the mode of data logging

- 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

**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.

START Start of data logging into instrument memory

- time format HH.MM.SS

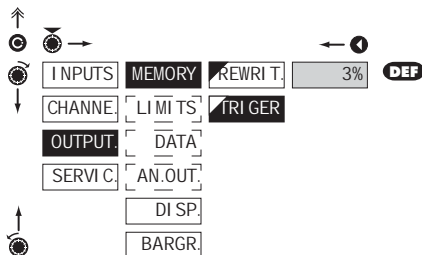
STOP Stop data logging into instrument memory

- 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.)

6.3.1c SETTING DATA LOGGING INTO INSTRUMENT MEMORY - FAST

**TRIGGER** Setting logging data into inst. memory

- logging data into inst. memory is governed by the following selection, which determines how many percent of the memory is reserved for data logging prior to initiation of trigger impulse
- 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

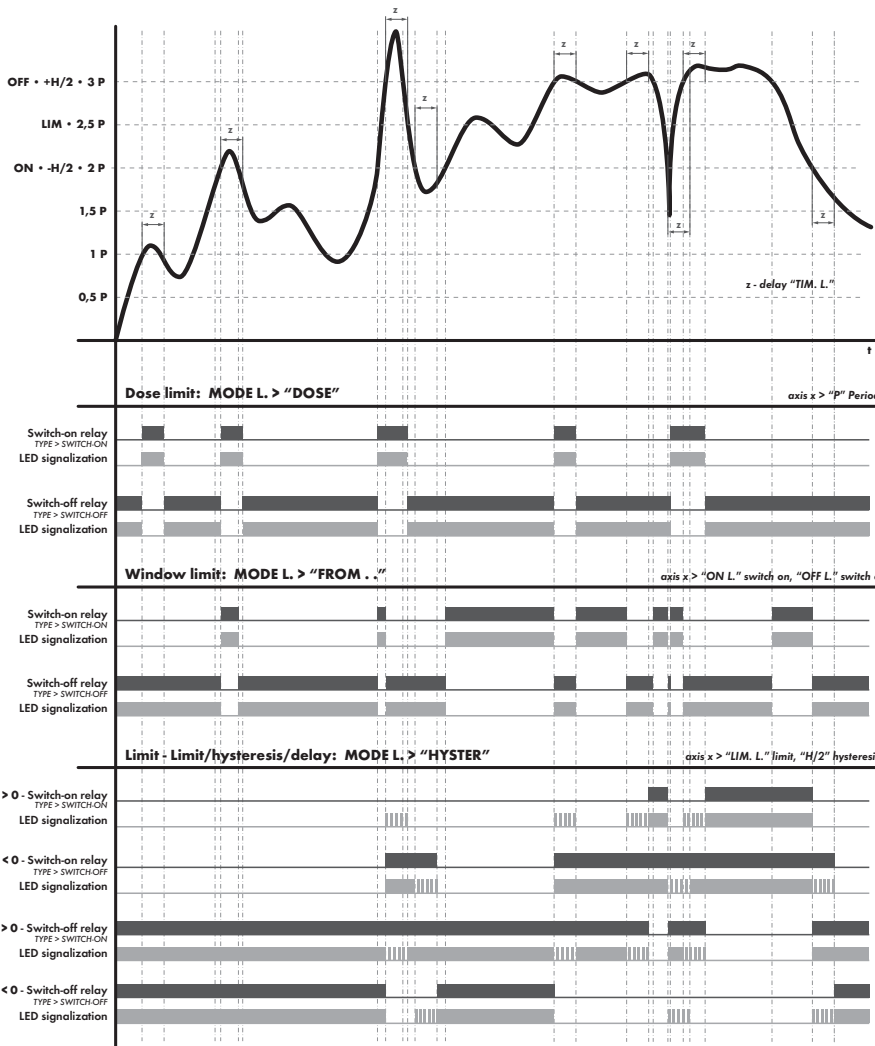
- external input, button
- after the memory LED is full "M" turns off
- in the ROLL mode the trigger ends datalogging and LED turns off

3. Termination

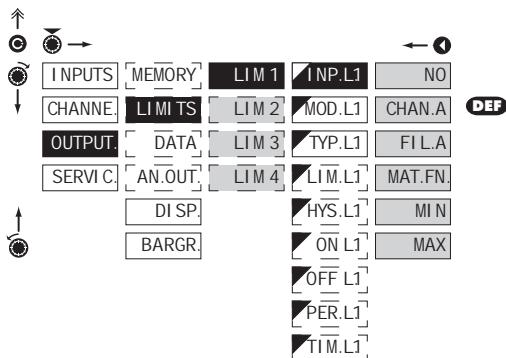
- ext. input, button or reading data via RS

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.



6.3.2a SELECTION OF INPUT FOR LIMITS EVALUATION



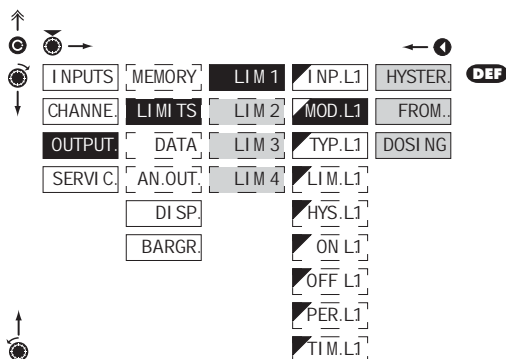
INP.L1 Selection evaluation of limits

- selection of value from which the limit will be evaluated

NO	Limit evaluation is off
CHAN.A	Limit evaluation from "Channel A"
FI.LA	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.L1" are set, at which the limit will shall react, "HYS.L1" the hysteresis range around the limit (LIM ±1/2 HYS) and time "TIM.L1" determining the delay of relay switch-on

FROM.. Frame limit

- for this mode the parameters are set for interval "ON.L1" the relay switch-on and "OFF.L1" the relay switch-off

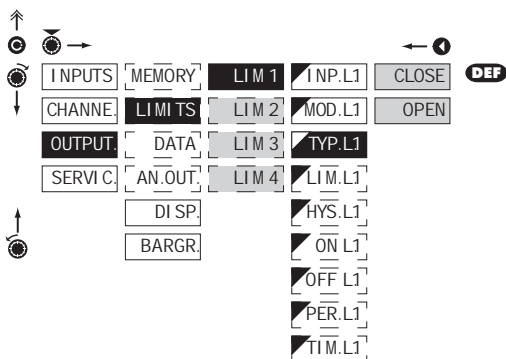
DOSI NG Dose limit (periodic)

- for this mode the parameters are set for "PER.L1" determining the limit value as well as its multiples at which the output is active and "TIM.L2" indicating the time during which is the output active

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

6. SETTING PROFI

6.3.2c SELECTION OF TYPE OF OUTPUT



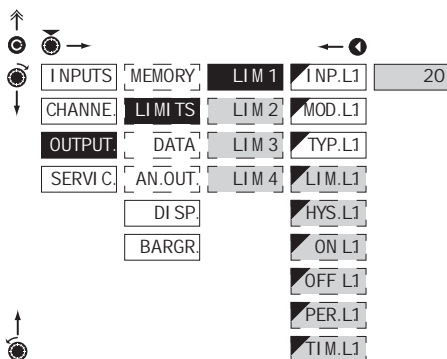
TYP.L1 Selection of type of output

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. $\pm 1/2$ 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

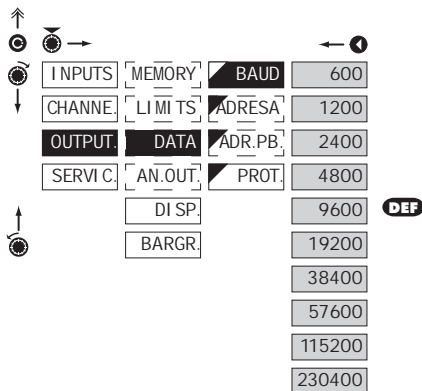
- for type "DOSING"

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

- for type "HYSTER" and "DOSING"
- setting within the range: $\pm 0..99,9$ s
- positive time > relay switches on after crossing the limit (LIM.L1) and the set time (TIM.L1)
- negative time > relay switches off after crossing the limit (LIM.L1) and the set negative time (TIM.L1)

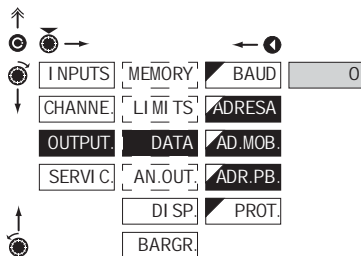
Setting is identical for LIM 1, LIM 2, LIM 3 and LIM 4

6.3.3a SELECTION OF DATA OUTPUT BAUD RATE



BAUD	Selection of data output baud rate
600	Rate - 600 Baud
1200	Rate - 1200 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

6.3.3b SETTING INSTRUMENT ADDRESS



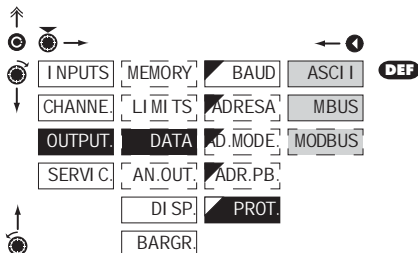
ADDR.	Setting instrument address
- setting in range 0...31	
- DEF = 00	

ADDR.	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. SETTING PROFI

6.3.3c SELECTION OF DATA OUTPUT PROTOCOL



PROT. Selection of the type of analog output

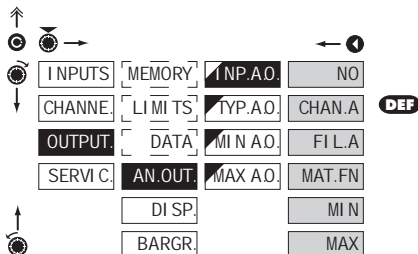
ASCII Data protocol ASCII

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.A.O. Selection evaluation analog output

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

NO AD evaluation is off

CHAN.A AD evaluation from "Channel A"

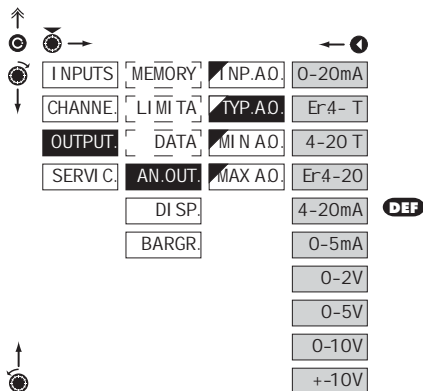
FI L A AD evaluation from "Channel A" after digital filters processing

MAT.FN. AD evaluation from "Math.functions"

MI N AD evaluation from "Min.value"

MAX AD evaluation from "Max.value"

6.3.4b SELECTION OF THE TYPE OF ANALOG OUTPUT



TYP. A.O. 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

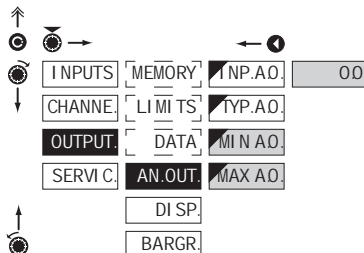
0-2V Type - 0...2 V

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

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

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

- DEF = 0

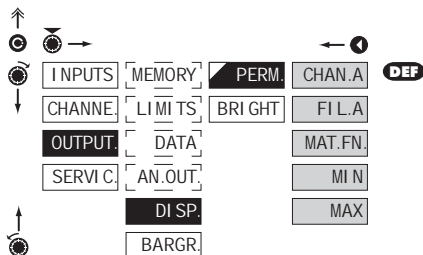
MAX A.O. Assigning the display value to the end of the AO range

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

- DEF = 100

6. SETTING PROFI

6.3.5a SELECTION OF INPUT FOR DISPLAY PROJECTION

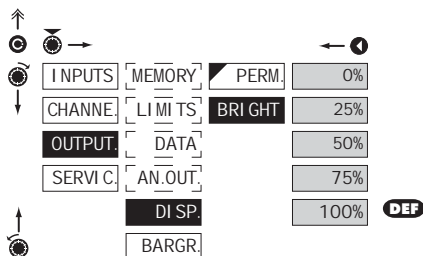


PERM. Selection display projection

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

CHAN.A	Projection of values from "Channel A"
FI LA	Projection of values from "Channel A" after digital filters processing
MAT. FN.	Projection of values from "Math.functions"
MI N	Projection of values from "Min.value"
MAX	Projection of values from "Max. value"

6.3.5b SELECTION OF DISPLAY BRIGHTNESS

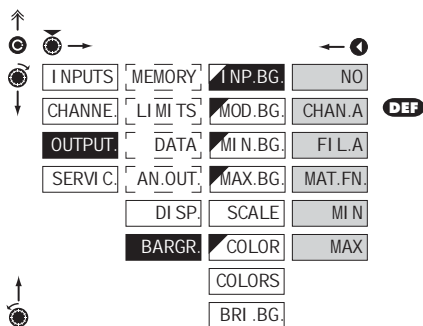


BRI GHT Selection of display brightness

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

0%	Display is off
25%	Display brightness - 25%
50%	Display brightness - 50%
75%	Display brightness - 75%
100%	Display brightness - 100%

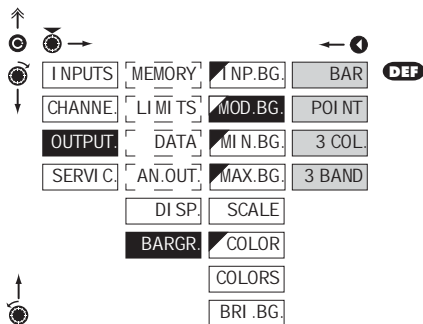
6.3.6a BARGRAPH - SELECTION OF INPUT TO BE DISPLAYED

**INP.BG.** Selection of value - bargraph

- selecting the value which is displayed by the bargraph

NO	Bargraph is OFF
CHAN.A	From "Channel A"
FI L.A	From "Channel A" after digital filters processing
MAT.FN.	From "Math.functions"
MI N	From "Min. value"
MAX	From "Max. value"

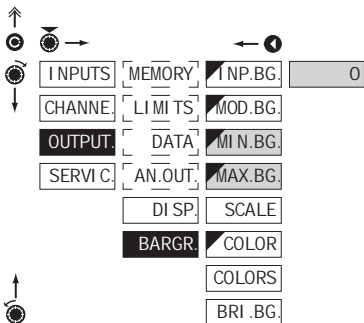
6.3.6b BARGRAPH - SELECTION OF DISPLAY MODE

**MOD.BG.** Selection of bargraph display mode

- | | |
|--------|--|
| BAR | Bar mode |
| POI NT | Point mode |
| 3 COL | Mono-colored bar which changes colours |
| 3 BAND | Tri-colour mode, "cascade" |
- Mono-colored bar
 - Single mono-coloured point
 - depending on the signal value relative to the limit setting [COLOURS > BAND]
 - when set value is exceeded, the colour of the entire bar changes, which means the bar is always mono-coloured
 - the colour changes within the set sections [COLOURS > BAND]
 - when a set value is exceeded, the colour of the bar changes only within the set section which means that 3 colours can be projected simultaneously

6. SETTING PROFI

6.3.6c BARGRAPH - SETTING OF PROJECTION RANGE



BARGR. Setting of the bargraph projection range

MI N. B G. Setting of the bargraph projection range for the minimum input signal

- Setting range is -99999...999999

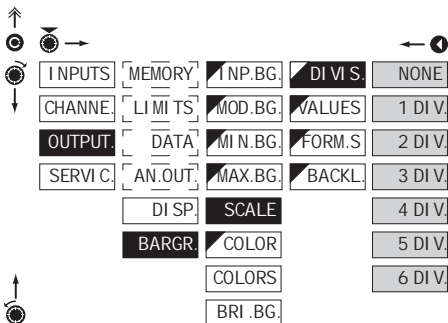
- **DEF** = 0

MAX. B G. Setting of the bargraph projection range for the maximum input signal

- Setting range is -99999...999999

- **DEF** = 0

6.3.6d BARGRAPH - SETTING OF LCD SCALE



DI VI S. Selecting the division of the LCD scale

- It enables emphasized division of the LCD scale

NONE Scale is off

1 DI V. Single division

- beginning and end of the scale are emphasized

2 DI V. Two divisions

- 3 segments are emphasized

3 DI V. Three divisions

- 4 segments are emphasized

4 DI V. Four divisions

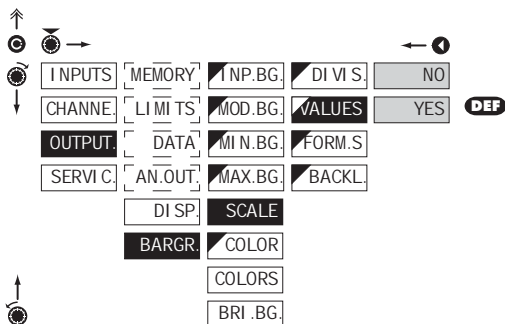
- 5 segments are emphasized

5 DI V. Five divisions

- 6 segments are emphasized

6 DI V. Six divisions

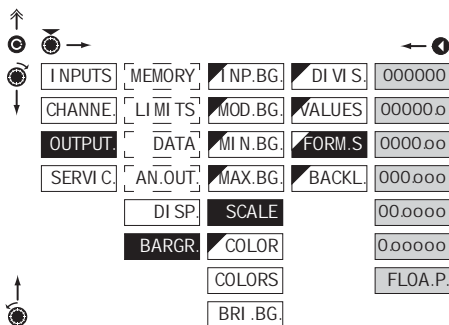
- 7 segments are emphasized


VALUES Selecting numeric description on LCD scale

- autonomous control of numeric description on the LCD scale

NO Numbers are disabled

YES Numbers are enabled


FORM.S Selecting the position of the decimal point [DP] on LCD scale

- in respect to the size of the numeric description we recommend using the preset value

000000 DP setting - XXXXXX

00000.0 DP setting - XXXXX.x

0000.00 DP setting - XXXX.xx

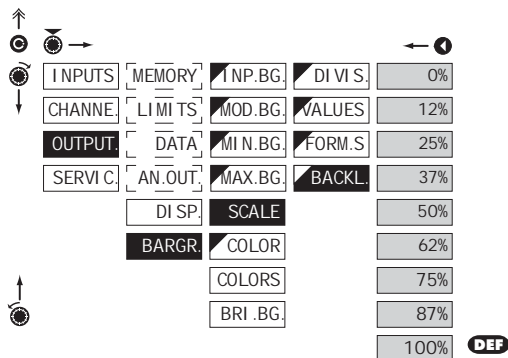
000.000 DP setting - XXX.xxx

00.0000 DP setting - XX.xxxxx

0.00000 DP setting - X.xxxxx

FLOA.P. Floating DP

6. SETTING PROFI

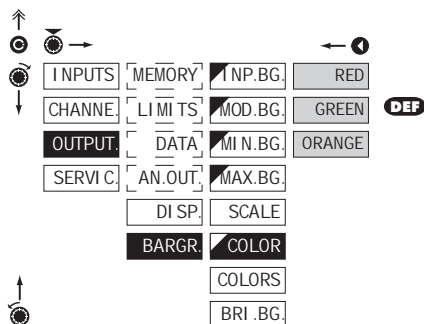


BACKL. Selecting the LCD backlight brightness

- by adjusting the LCD backlight brightness we can match the ambient lighting conditions

0%	Backlight is off
12%	Backlight level is set to 12 %
25%	Backlight level is set to 25 %
37%	Backlight level is set to 37 %
50%	Backlight level is set to 50 %
62%	Backlight level is set to 62 %
75%	Backlight level is set to 75 %
87%	Backlight level is set to 87 %
100%	Backlight level is set to 100 %

6.3.6e BARGRAPH - SETTING THE COLOUR

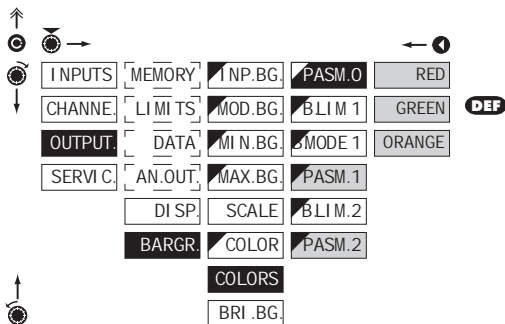


COLOR Setting the bargraph colour

- item 'COLOR' is displayed only in selected mode ['BARGR. > MOD. BG.'], 'BAR' or 'POINT'

RED	Red colour
GREEN	Green colour
ORANGE	Orange colour

6.3.6f BARGRAPH - BARGRAPH COLOUR SELECTION

**BAND.0** Selecting bargraph colour

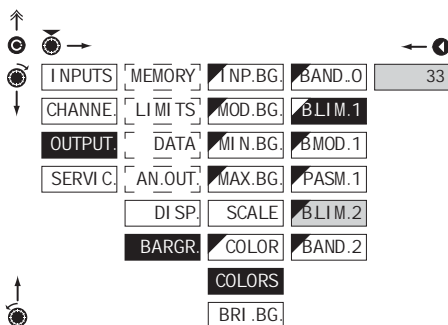
- item "COLORS" is displayed only in selected mode ("BARGR. > MOD. BG.") "3 COL." or "3 BAND"

- RED Red colour
- GREEN Green colour
- ORANGE Orange colour
- **DEF** = Green [Band 0]
 - **DEF** = Orange [Band 1]
 - **DEF** = Red [Band 2]

!

Setting for BAND. 1 and BAND. 2 is identical

6.3.6g BARGRAF - SETTING THE BANDS FOR COLOUR CHANGE

**B.LIM 1** Setting the bands for colour change

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

- items ,B. LIM. 1' and ,B. LIM. 2' set the borderlines of the colour bands

- B.LIM 1 Borderline between band 0 - 1
- B.LIM 2 Borderline between band 1 - 2

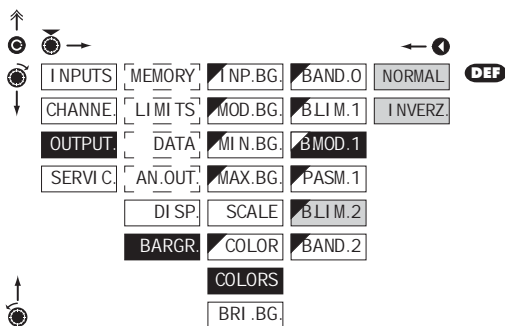
- **DEF** = 33 [b. LIM 1]
- **DEF** = 66 [b. LIM 2]

!

Setting for B. LIM 2 is identical

6. SETTING PROFI

6.3.6h BARGRAPH - SELECTION OF INVERTED PROJECTION



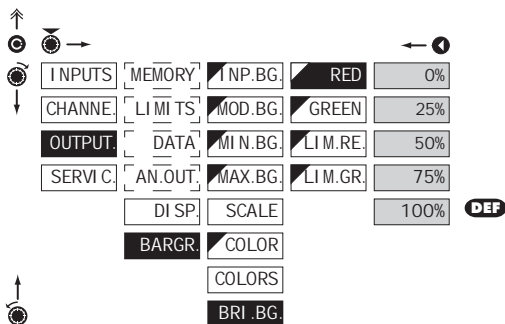
B. MOD. 1 Selection of inverted projection "Band 0"

- item "COLORS" is displayed only in selected mode ["BARGR. > MOD. BG."], "3 COL." or "3 BAND"
- setting „B. MOD. 1" is intended for projection where indication of the "central" zero point is required

NORMAL Bar in "Band 0" moves from left to right

INVERZ. Bar in "Band 0" moves from right to left

6.3.6i BARGRAPH - SETTING THE BARGRAPH BRIGHTNESS



BRI. BG. Setting the bargraph brightness

0% Display is off

- upon a keystroke it comes on for the duration of 10 seconds

25% Display brightness - 25%

50% Display brightness - 50%

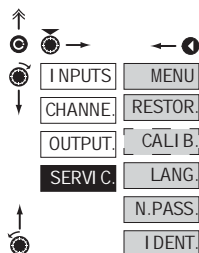
75% Display brightness - 75%

100% Display brightness - 100%



6. SETTING PROFI

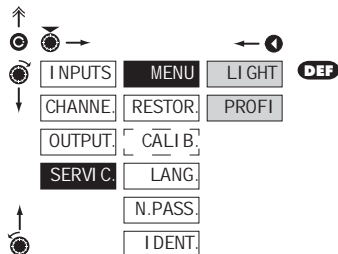
6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

MENU	Selection of menu type LIGHT/PROFI
RESTOR.	Restore instrument manufacture setting and calibration
CALI B.	Input range calibration for „DU“ version
LANG.	Language version of instrument menu
N.PASS.	Setting new access password
I DENT.	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

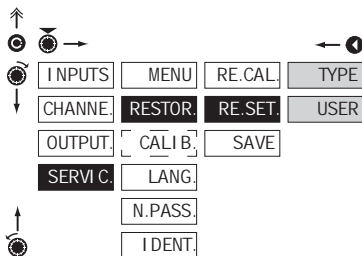
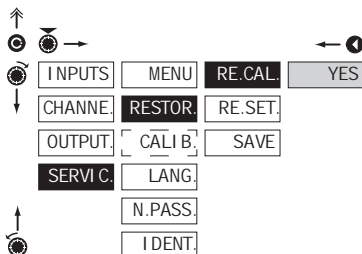
PROFI Active PROFI menu

- complete programming menu for expert users
- free 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 your 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 SERVI./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

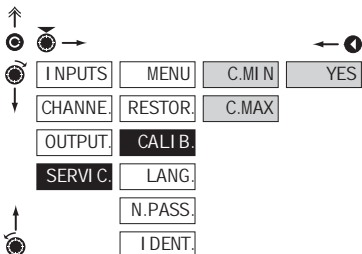
RESTORE

CALIBRATION SETTING

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

6. SETTING PROFI

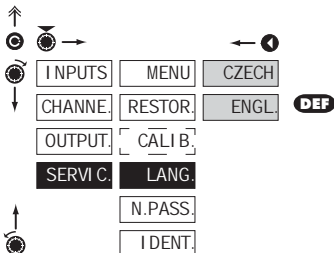
6.4.3 CALIBRATION - INPUT RANGE

DU

CALI B. 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“

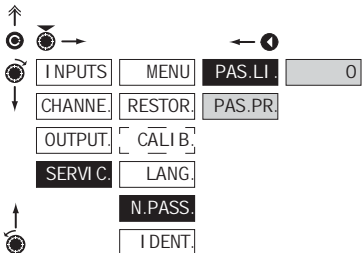
6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION



LANG. Selection of instrument menu language version

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

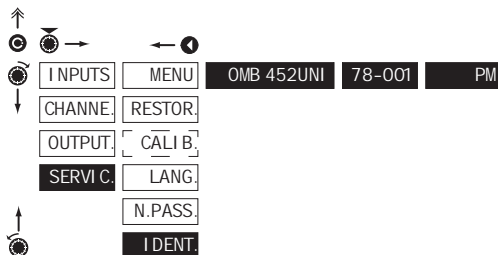
6.4.5 SETTING NEW ACCESS PASSWORD



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

- this option allows to change the number, which blocks the access into LIGHT and PROFi menu.
- numeri code range: 0...9999
- universal passwords in the event of loss:
LIGHT Menu > „B177“
PROFI Menu > „7915“

6.4.6 INSTRUMENT IDENTIFICATION

**I DENT.** Projection of instrument SW version

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

	Pos.	Description
I DENT.	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

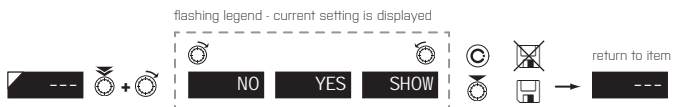
Access is not password protected

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

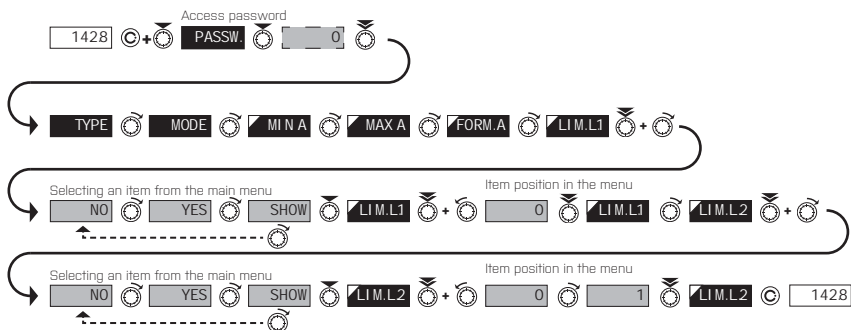
In compiling USER menu from active LIGHT menu the items (max. 10) may be assigned a sequence, in which they will be projected in the menu

setting projection sequence



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 equally be used in the Profi menu).

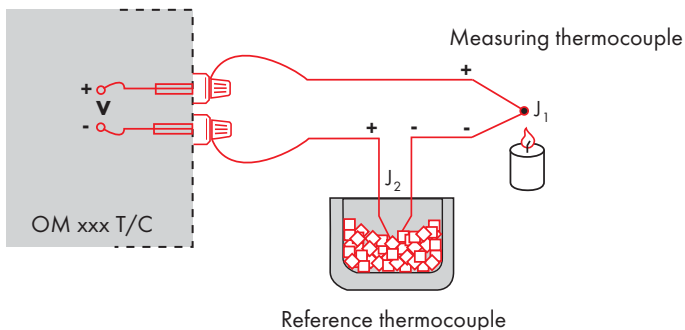


The result of this setting is that when the (C) button is pressed, the display will read „LIM. L1“. By pressing (M) button you confirm your selection and then you can set the desired limit value, or by pressing the (M) button you can go to setting of „LIM. L2“ where you can proceed identically as with Limit one.

You can exit the setting by pressing the (M) button by which you store the latest setting and pressing the (C) 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 **CONNECT.** 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 **CONNECT.** to **EXT2TC**)
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu **CONNECT.** 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 **CONNECT.** 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 **CONNECT.** 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.cz or 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) (D) (D) (D) <CR>	
		MessBus	<STX> D (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) <ETX> <BCC>	
	485	ASCII	> D (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) <CR>	
		MessBus	<STX> D (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) (D) <ETX> <BCC>	
Confirmation of data acceptance (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) (D) <CR>	
		MessBus	<STX> S N P (D) (D) (D) (D) (D) (D) (D) (D) <ETX> <BCC>	
	485	ASCII	# A A N P (D) (D) (D) (D) (D) (D) (D) (D) <CR>	
		MessBus	<STX> S N P (D) (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>			
	MessBus		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

SIGN	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 00 _H	Carriage return
<SP>	32 20 _H	Space
N, P		Number and command - command code
D		Data - usually characters "0"... "9", "*", ".", ";", ":", "[] - 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
<END>	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.d.Un.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E.d.Ow.	Number is too large to be displayed	change DP setting, channel constant setting
E.t.Un.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E.t.Ow.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E.I.Un.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E.I.Ow.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.Hw.	A part of the instrument does not work properly	send the instrument for repair
E.EE	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.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	1	2	3	4	5	6	7
0		7	"	#	\$	%	&	'	0	!	"	#	\$	%	&	'	
8	:	;	#	+	,	-	.	/	8	()	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7	16	0	1	2	3	4	5	6	7
24	8	9	VA	Vr	<	=	>	?	24	8	9	VA	Vr	<	=	>	?
32	P	Q	R	S	T	U	V	W	32	@	A	B	C	D	E	F	G
40	H	I	J	K	L	M	N	O	40	H	I	J	K	L	M	N	O
48	P	Q	R	S	T	U	V	W	48	P	Q	R	S	T	U	V	W
56	X	Y	Z	[\]	^	_	56	X	Y	Z	[\]	^	_
64	`	a	b	c	d	e	f	g	64	`	a	b	c	d	e	f	g
72	h	i	j	k	l	m	n	o	72	h	i	j	k	l	m	n	o
80	p	q	r	s	t	u	v	w	80	p	q	r	s	t	u	v	w
88	x	y	z	{		}	~		88	x	y	z	{		}	~	

12. TECHNICAL DATA



INPUT

range is adjustable		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 adjustable		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 adjustable		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 adjustable		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 adjustable 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	DU
	min. potentiometer resistance is 500 Ω	

PROJECTION

Display:	999999, intensive red or green
	7-segment LED, digit height 9,1mm [DMB 451]
	14-segment LED, digit height 14mm [DMB 452]
Projection:	±9999 [-99999...999999]
Bargraph project.:	50 segments
	intensive red/green/orange LED
	including independent signaling of set limits
LCD:	freely selectable scale
Decimal point:	adjustable - in menu
Brightness:	adjustable - in menu, individually for each display

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°/*	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 DM Link	
Digital filters:	Averaging, Floating average, Exponential filter, Rounding	
Comp. of conduct:	max. 40 Ω/100 Ω	RTD
Comp. of cold junc.:	adjustable	T/C
Functions:	0°...99°C or automatic 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:	4x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

* values apply for resistance load

DATA OUTPUTS

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

ANALOG OUTPUTS

Type:	isolated, programmable with 12 bits Q/A converter, analog output 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
Current:	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 QM Link

EXCITATION

Adjustbale:	5...24 VDC/max. 12 W, isolated
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POWER SUPPLY

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

MECHANIC PROPERTIES

Material:	PA 66, incombustible UL 94 V-1
Dimensions:	160 x 60 x 107 mm [OMB 451] 160 x 80 x 107 mm [OMB 452]
Panel cut-out:	150 x 50 mm [OMB 451] 150 x 70 mm [OMB 452]

OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section < 1,5 mm ² / < 2,5 mm ²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-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	1,66	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

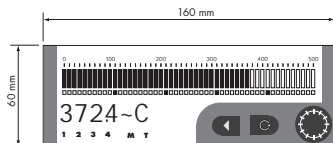
PI - Primary insulation, DI - Double insulation

13. INSTRUMENT DIMENSIONS AND INSTALLATION

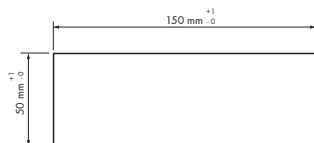


OMB 451

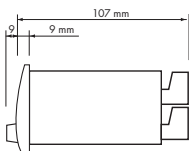
Front view



Panel cut



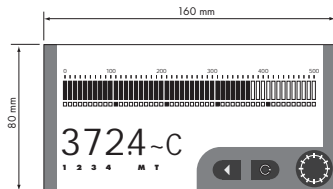
Side view



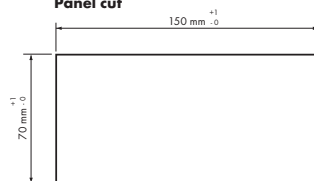
Panel thickness: 0,5...20 mm

OMB 452

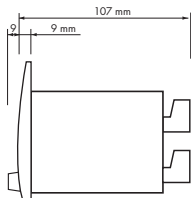
Front view



Panel cut



Side view



Panel thickness: 0,5...20 mm

Product	OMB 451UNI	OMB 452UNI
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 occurring 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.

Y E A R S

Stamp, signature



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 451/452**

Version: UNI, PWR, UQC

That has been designed and manufactured in line with requirements of:

Statutory order no. 17/2003 Coll., on low-voltage electrical equipment (directive no. 73/23/EHS)
Statutory order no. 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 60131, chap. 14 and chap. 16, EN 60130-4, chap. 7, EN 60130-4, chap. 8 [EN 61000-4-11, ed. 2],
EN 60130-4, chap. 9 [EN 61000-4-2], EN 60130-4, chap. 10 [EN 61000-4-3, ed. 2],
EN 60130-4, chap. 11 [EN 61000-4-6], EN 60130-4, chap. 12 [EN 61000-4-4, ed. 2],
EN 60130-4, 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 2008

As documentation serve the protocols of authorized and accredited organizations:

EMC MO CR, Testing institute of technical devices, protocol no. 171/17-337/2008 of 14/11/2008
MO CR, Testing institute of technical devices, protocol no. 171/17-340/2008 of 14/11/2008
Seismic resistance VOP-026 Stemberk, protocol no.: 7230-132/2012 of 12/09/2012

Place and date of issue: Prague, 12. September 2012

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