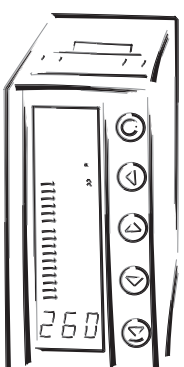
GUARANTEE 2 YEARS

OMB 411

PROGRAMMABLE BARGRAPH DISPLAY

DC VOLTMETER/AMMETER
PROCESS MONITOR
OHMMETER
THERMOMETER FOR PT 100/500/1000
THERMOMETER FOR THERMOCOUPLES
DISPLAY INSTRUMENT 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 411 series conform to the European regulation 89/336/EWG.

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

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

CONNECTION

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

CE

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1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OMB 411 model series are 25-point bargraph displays with auxiliary 3 digit display, which are manufactured in the following alternatives:

OMB 411DC	DC voltmeter/ammeter	DC
OMB 411PWR	*Nets analyzer	PWR
OMB 411PM	Process monitor	PM
OMB 411OHM	Ohmmeter	OHM
OMB 411DU	Display instrument for linear potentiometers	DU
OMB 411RTD	Thermometer for Pt 100/500/1000 and Ni 1000	RTD
OMB 411T/C	Thermometer for thermocouples	T/C

The instruments are based on an 8-bit microprocessor and a very precise A/D converter, that secures high accuracy, stability and easy operation of the instrument.

Programmable projection of the display

Calibration	manual or automatic
	manual - projection for the beginning and the end of the input range automatic - with reference signal
Projection	-99...999

Digital filters

Floating avergae	from 2...30 measurements
Exponen.average	from 2...100 measurements
n-th value	from 2...100 measurements
Radius of insensitiveness	adjustable in process units

Mathematic functions

Min/max value	registration of min/max value gained during the measurement
Tare	assigned to reset the display in case of non-zero input signal
Pre-set Tare	fixed pre-set second tare
Top value	the display shows only max (min) value for selected time period
Round-up	setting the projection step for the display
Mathematic functions	see the instructions

External control

Hold	display/instrument blocking
Lock	locking the control keys
Blocking the „CM"	blocking the access into Configuration menu
Tare	tare activation
Resetting MM	resetting min/max value to zero

OPERATION

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

Configuration menu (hereinafter referred to as CM) is protected by an optional number code and contains com plete instrument setting

User menu may contain arbitrary programming settings defined in „CM" with another selective restric tion (see, change)

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

EXTENSION

Excitation is suitable for the feeding sensors and converters. It has a galvanic isolation with continuously adjustable value within the range 2..24 VDC.

Comparators are assigned to control one, two, three or four limit values with relay output. The limits have adjustable hysteresis within full display range, as well as selectable delay of the switch-on within the range 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 DIN-MessBus /ASCII protocols.

Analog outputs will find their place in application where further evaluation 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 the programming mode.

Real time is an internal time control of data collection. It is suitable everywhere where it is necessary to register measured values in a given time segment. Up to 65 000 values may be stored in the instrument´s memory. Data transmission into PC via serial interface RS232/485.

FIRMWARE

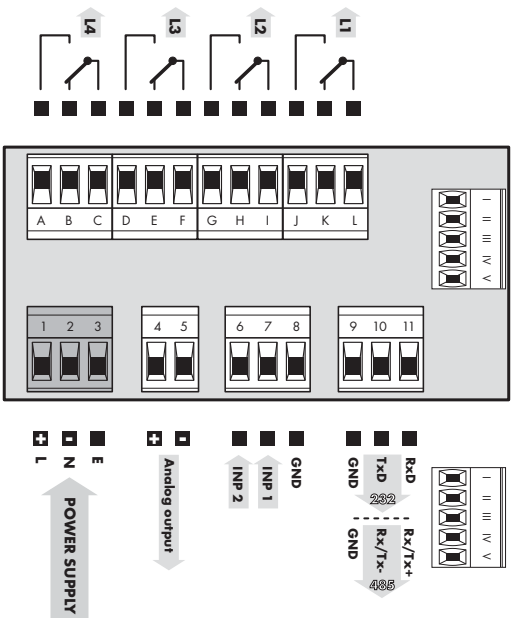
In consideration of the continuous development and improvements of our products it is now possible to download the most recent version of a program for every instrument directly from the web pages. Because the program modernisation is performed via data line RS 232/485 it is necessary to equip the machine with this interface.

After the instrument is connected to PC and the program is launched, modernisation will be performed automatically. When it is completed, all customer settings are replaced by manufacture settings, i.e. it is necessary to set the items again. Number of the current version of the program in your instrument can be found in „Configuration menu - service - identification".

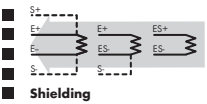
! *The function for recording of the new Firmware is supported in all instruments since version 043*

3. CONNECTION

The lead for feeding the instrument should not be in the proximity of the incoming low-potential signals.
Contactors, motors with larger input power and other efficient elements should not be in the proximity of the instrument.
The lead into the input of the instrument (the 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.
The instruments are tested in compliance with standards for use in industrial area, yet we recommend to abide by the above mentioned principles.

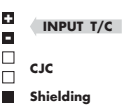


OMB 411RTD/OHM



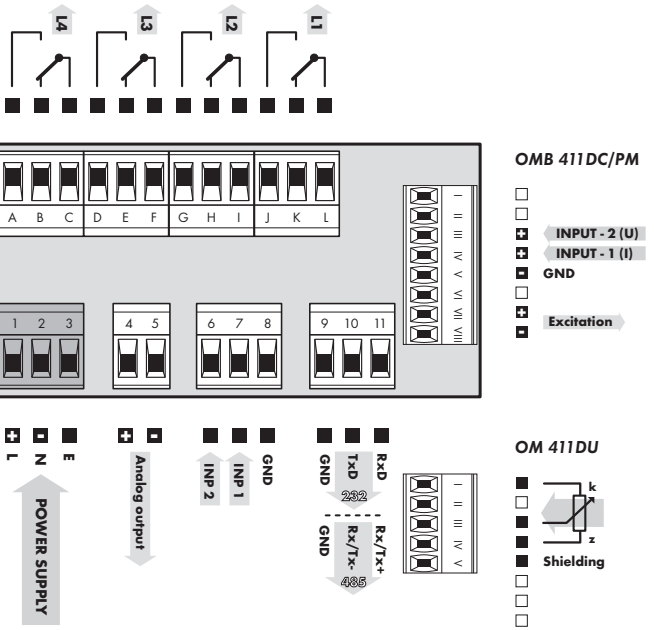
! For type OMB 411RTD/OMH it is necessary in case of 2-wire lead to connect the brackets I+II / III+IV and in case of 3-wire lead brackets III+IV

OMB 411T/C



DESCRIPTION OF CONNECTORS

Input	Function	Description	Control
INP 1 INP 2	**Hold**	Blocking the instrument (adjustable in menu)	upon contact agst. GND (no.8)
	Lock	Keyboard blocking	upon contact agst. GND (no. 8)
	Tare	Resetting the tare	upon contact agst. GND (no. 8)
	Resetting MM	Resetting min/max or top value	upon contact agst. GND (no. 8)

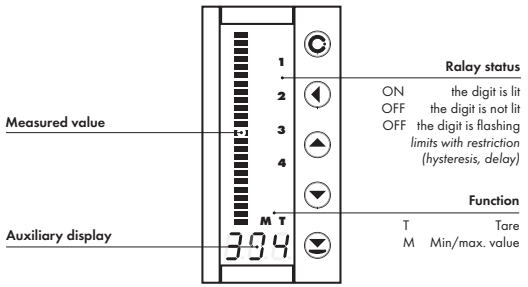


! *Grounding on terminal 3 has to be connected at all times.*

! *Relay parameters listed in the Technical data apply for resistance load. Upon connection of induction load we recommend fitting the leads to the relay 1 A with a fuse for protection of maximum load.;*

4. INSTRUMENT SETTING

Setting and controlling the instrument is performed through 5 control keys on the front panel. By means of these controls it is possible to browse through the operating program and to select and set the required values.



CONFIGURATION MODE

- designated for professional service and maintenance
- complete instrument setting
- access is password protected
- authorization for "User mode"

USER MODE

- designated for instrument service
- may contain setting the limits, analog and data output and brightness, with restriction as per the setting in "Configuration mode"

SYMBOLS USED IN THE INSTRUCTION

DEF Indicates manufacture setting

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

CONTROL KEYS FUNCTIONS

MENU	ENTER	LEFT	DOWN	UP
Measuring mode				
menu access	all control keys may be assigned functions as per selection			
Moving around in the menu				
exit the menu without saving	move to next level	back to previous level		move to next item
Setting/selecting - items				
cancel setting without saving	confirm selected item		move down	move up
Setting - number				
cancel setting without saving	confirm selected number	move to higher decade	change of current figure - down -	change of current figure - up -

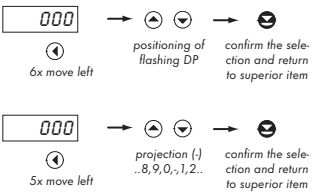
SETTING THE DECIMAL POINT AND THE MINUS SIGN

DECIMAL POINT

Its selection in calibration modes, upon modification of the number to be adjusted is performed by control key ◀ with transition beyond the highest decade, when the decimal point starts flashing. Positioning is performed by ▲.
Decimal point for display projection is set in item „CHA.A - MAX"

MINUS SIGN

Setting of the minus sign is performed on the highest valid degree by control key ▼/▲. The minus sign is in numerical row (0, 1, 2, 3...9, –).



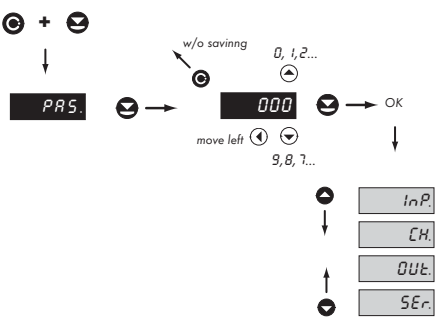
Setting

⇨ „Calibration mode" ⇨ menu of projection on the display - maximum inP. ⇨ MAX

⇨ after transition beyond the highest decade ◀ the DP starts flashing

⇨ by pressing ▲ or ▼ you place the DP and confirm it by ▼

ACCESS INTO THE CONFIGURATION MODE



The code from manufacture is always preset to 000. In case of loss of access password it is possible to use the universal access code "177"

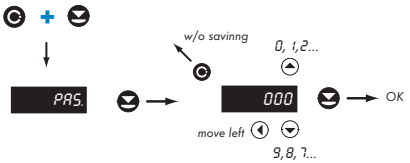
4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

All settings are performed in the „Configuration menu"

SETTING THE DISPLAY BRIGHTNESS (MANUAL CALIBRATION)

Two-point assignment of linear display projection for minimum and macximum range of the input signal

❶ Access into the „Configuration menu"

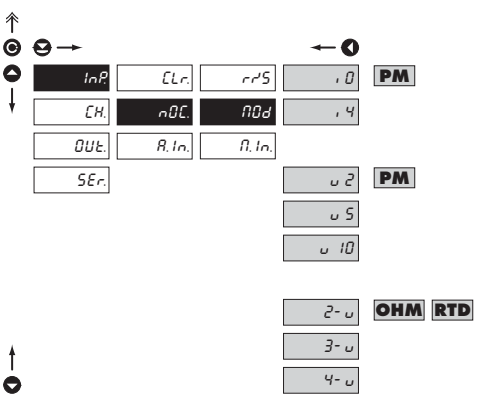


PAS. **Entering the introductory access password**

000 Standard manufacture setting of the access password

! *After contingent restoration of manufacture setting the password is set to „000"*

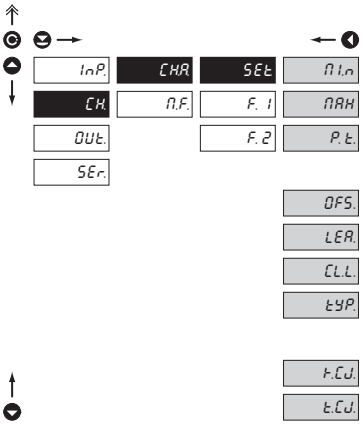
❷ Selection of the measuring range/input type



Mod **Setting the range or type of measuring device**

Type	Displayed items of the menu Manual calibration
OMB 411 PM	0-20/4-20mA, 0-2/0-5/0-10 V
OMB 411 OHM	2-w/3-w/4-w
OMB 411 RTD	2-w/3w/4-w

❸ Setting projection on the display

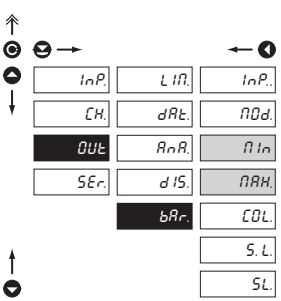


SEt. **Setting the input parameters**

Type	Active items of the menu				
OMB 411DC	MIN*	MAX	P.T.		
OMB 411PM	MIN*	MAX	P.T.		
OMB 411DU	MIN	MAX	P.T.		
OMB 411OHM	MIN*	MAX	OFS.	LEA..	CL.L.
OMB 411RTD	OFS.	LEA.	CL.L.	TYP	
OMB 411T/C	TYP	K.CJ.	T.CJ.		

*) *These items are not displayed after automatic calibration*
**) *These items are not displayed in manual calibration*

❹ Setting projection on to LED bargraph

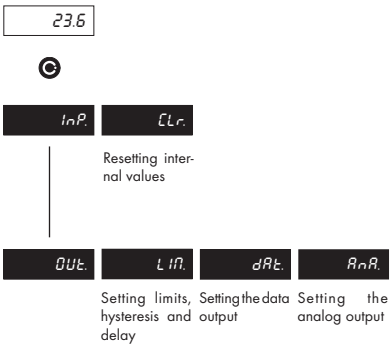


MIn Setting the input signal value for minimum projection of the bargraph

MAX Setting the input signal value for maximum projection of the bargraph

4.2 USER MENU

- designated for instrument service
- may contain setting the limits, analog and data output and brightness, with restriction as per the setting in "Configuration mode"

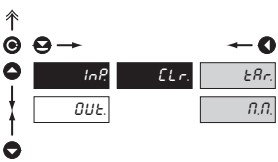


InP.
Setting the instrument input

OUt.
Setting the instrument outputs

! *Projection of items and their accessibility depends on the setting of item „RIGHTS“ in the „Configuration menu“*

4.2.1 USER MENU - RESETTING INTERNAL VALUES



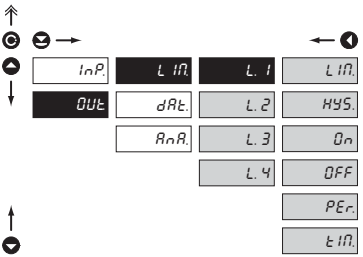
CLr. Resetting the internal values of the instrument

tAr. Tare resetting

n.n. Resetting the minimum and maximum measuring value

Adjustable authorization of access into items, see page 41

4.2.2 LIMITS - ENTERING THE VALUES



Adjustable authorization of access into items, see page 42

Menu is dynamic, i.e. the items are displayed in relationship with the setting of the type of limits in „configuration menu"

HYS ⇨ LIM. + HYS. + TIM.
F. T. ⇨ ON + OFF
DOS. ⇨ PER. + TIM.

L - **Entering the limit values for status evaluation**

LIM. Setting the limit for relay switch-on
- *in full display range*

HYS. Setting hysteresis only in (+) values
- *in 1/10 of the display range*

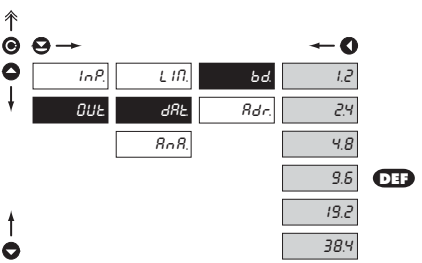
On Setting the beginning of the range of the limit switch-on
- *in full display range*

OFF Setting the end of the range of the limit switch-on
- *in full display range*

PEr. Setting the switch-on period of the limit
- *in full display range*

tIM. Setting the delayed switch-on of the limit
- *in range 0...99,9 s*

4.2.3.1 DATA OUTPUT - SETTING THE RATE



Adjustable authorization of access into items, see page 42

bd. **Setting the data output rate (baud)**

1.2 Rate - 1 200 Baud

2.4 Rate - 2 400 Baud

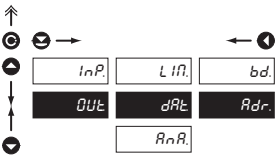
4.8 Rate - 4 800 Baud

9.6 Rate - 9 600 Baud

19.2 Rate - 19 200 Baud

38.4 Rate - 38 400 Baud

4.2.3.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS

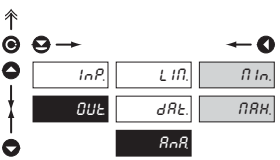


Adr. **Setting the instrument address**

- *setting in the range 0...31*
- *manufacture setting 00* **DEF**

Adjustable authorization of access into items, see page 42

4.2.4 ANALOG OTPUT - SETTING THE RANGE



AnA. **Setting the analog output range**

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

AIn. Assigning the display value to the beginning of the analog output range

- *range of the setting is -99 999...100 000*

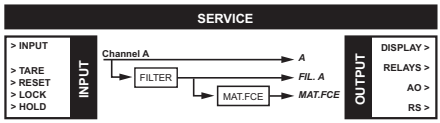
MAX. Assigning the display value to the end of the analog output range

- *range of the setting is -99 999...100 000*

Nastavitelné oprávnění přístupů do položek, viz str. 42

4.3 CONFIGURATION MENU

- designated for professional service and maintenance
- complete instrument setting
- access is protected by password or a shorting link on the input connector
- authorization for "User mode"



23.6

! *Upon delay longer than 60 s the programming mode is automatically discontinued and the instrument itself switches back to the measuring mode*

+

RES

000 Entering the access password

InP. — Setting the instrument input

- **CLr.** — Resetting internal values
- **nOC.** — Primary instrument setting
- **A.In.** — Setting the Hold function

CH. — Setting the measuring channels

- **CH.A** — Configuration of parameters of measuring channel
- **A.F.** — Setting the mathematic functions
- **Int.** — Configuration of parameters for „Integrator"

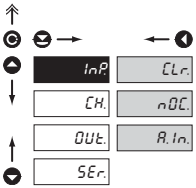
OUt. — Setting the instrument outputs

- **LIM.** — Setting the limits, hysteresis and delay
- **dAt.** — Setting the data output
- **AnA.** — Setting the analog output
- **dIS.** — Setting the projection of auxiliary display
- **bAr.** — Setting the projection of LED bargraph

SEr. — Service functions

- **ACC.** — Setting the access rights for „User menu"
- **rES.** — Displayed data which equals max bargraph projection
- **CAL.** — Instrument calibration
- **LAn.** — Setting the language version
- **n.P.** — Change of the access password
- **Id** — Instrument identification

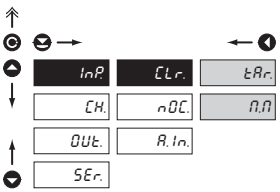
4.3.1 CONFIGURATION MODE - VSTUP



The basic instrument parameters are set here

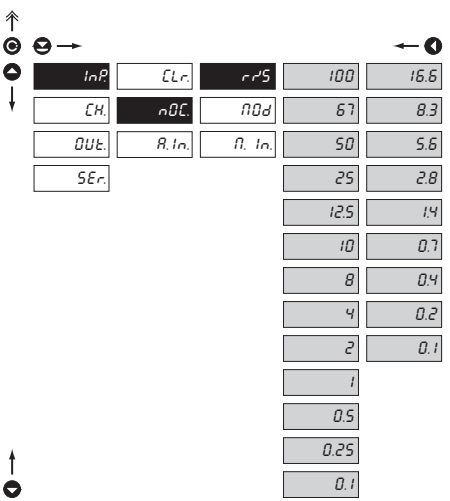
CLr.	Resetting the instrument internal values
nOC.	Basic instrument setting
A.In.	Setting the „Hold" function

4.3.1.1 RESETTING THE INTERNAL VALUES



tAr.	Tare resetting
n.n.	Resetting the minimum and maximum measured value

4.3.1.2.1 SETTING THE MEASURING RATE



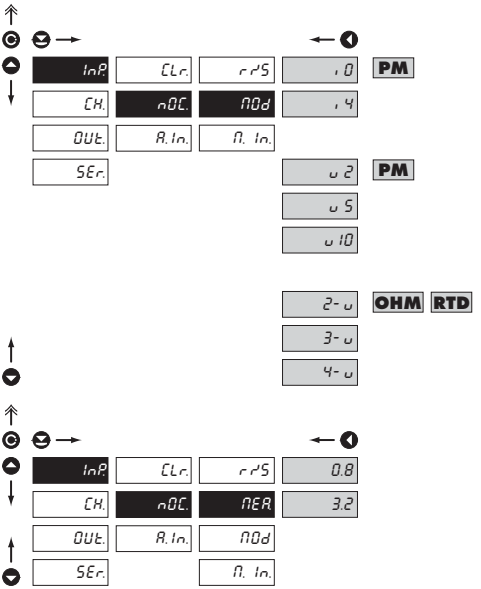
rrS **Setting the instrument measuring rate**

- *range of the setting of the measuring rate depends on the type of instrument, see table*

Type	Measuring rate
OMB 411DC	0,1...**1,4**...16,6 m/s
OMB 411PM	0,1...**1,4**...16,6 m/s
OMB 411DU	0,1...**4**...100 m/s
OMB 411OHM	0,1...**0,7**...16,6 m/s
OMB 411RTD	0,1...**0,7**...16,6 m/s
OMB 411T/C	0,1...**0,7**...16,6 m/s

**in bold are the preset values*

4.3.1.2.2 SETTING THE MEASURING RANGE



Mod **Setting the range or type of instrument measuring**

PM

setting the measuring range

- *after execution of the automatic calibration this menu shows always only items VOL./CER.*

OHM **RTD**

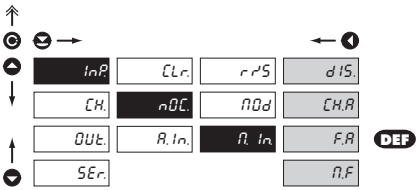
setting the type of connection

RTD

MEA. **Setting the instrument measuring range**

Setting	Type of sensor
800 Ohm	Pt 100 EU/US
3,2 kOhm	Pt 500/1 000, Ni

4.3.1.2.3 SETTING EVALUATION OF MIN/MAX VALUE



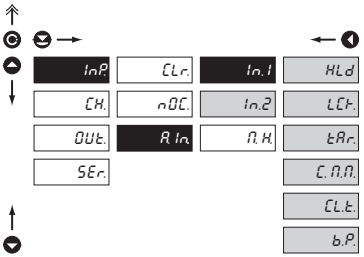
noC. Setting the input „quantity" for evaluation of min/max value

- diS. Min/max vaule is off ❶
- CH.A From value of Channel A ❷
- F.A From filtered value of Channel A ❸
- n.F From mathematic function ❹
- CJC From temperature of the cold junction ❺

Type	Setting options
OMB 411DC	① ② **❸** ④
OMB 411PM	① ② **❸** ④
OMB 411DU	① ② **❸** ④
OMB 411OHM	① ② **❸** ④
OMB 411RTD	① **❷**
OMB 411T/C	① **❷** ⑤

**in bold are the preset values*

4.3.1.3 AUXILIARY INPUTS

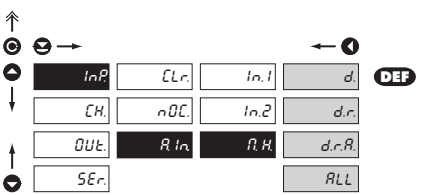


Setting the functions for Inputs 1 and 2 is the same

uS 1 **Assigning functions to auxiliary inputs**

- **HLd** Activation of the „Hold" function
- **LCk.** Activation of the function „Keyboard blocking"
- **tAr.** Activation of the „Tare" function
- **C.n.n.** Activation of the function „Resetting min/max value"
- **CL.t.** Activation of the function „Tare resetting"
- **b.K.** Activation of the function „Blocking access into Configuration menu"

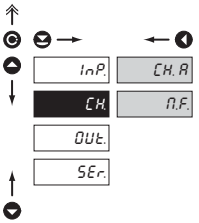
4.3.1.3.1 AUXILIARY INPUTS



n.H. **Setting the „Hold" function**

- **d.** Signal „Hold" blocks the displayed value
- **d.r.** Signal „Hold" blocks the displayed value and the data output function
- **d.r.A.** Signal „Hold" blocks the displayed value, data and analog output function
- **ALL** Signal „Hold" blocks the entire instrument

4.3.2 CONFIGURATION MODE - CHANNELS

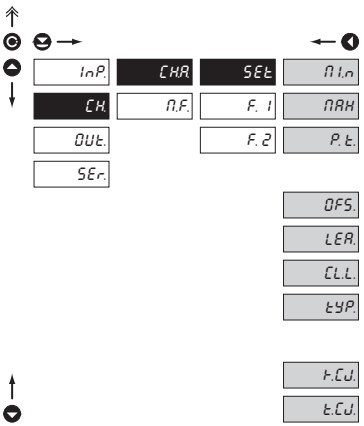


The basic parameters of instrument input values are set here

CH. A — Setting parameters and the range of the instrument measuring channel

n. F. — Setting the instrument mathematic functions

4.3.2.1 SETTING THE MEASURING „CHANNEL A"



SEt. Setting the input parameters

n.in. — Setting display projection for minimum value of input signal

- *range of the setting is ±999*
- *menu is dynamic, i.e. when using manual calibration this item is not projected*

nAH. — Setting display projection for maximum value of input signal

- *range of the setting is ±999*
- *determines the range of setting of the DP for display, MIN and P.TA*

P. t. — Setting the „Value of preset tare"

- *upon the setting the symbol T (LED) is active*
- *value of preset tare enters the calculation adjusted according to the relevant segment size and may be projected in „Temporary projection"*
- *„Automatic tare resetting" does not apply for this function*

Type	Active items of the menu				
OMB 411DC	MIN*	MAX	P.T.		
OMB 411PM	MIN*	MAX	P.T.		
OMB 411DU	MIN	MAX	P.T.		
OMB 411OHM	MIN*	MAX	OFS.	LEA.	CL.L.
OMB 411RTD	OFS.	LEA.	CL.L.	TYP	
OMB 411T/C	TYP	K.CJ.	T.CJ.		

*) *These items do not show after automatic calibration*
**) *These items do not show in manual calibration*

OMB 411RTD		OMB 411T/C	
Type	Designation	Type	Designation
Pt 100 - EU	01E	B	T.C. B
Pt 500 - EU	05E	E	T.C. E
Pt 1 000 - EU	10E	J	T.C. J
Pt 100 - US	01U	K	T.C. K
NI 1 000/ppm	N50	N	T.C. N
NI 1 000/ppm	N61	R	T.C. R
		S	T.C. S
		T	T.C. T

OHM **RTD**

`OFS.` Shifting the beginning of the measuring range

- *value of conduct resistance from sensor to head (indicated by sensor manufacturer)*

`LER.` Compensation of two-wire conduct

- *automatic measurement of conduct resistance, with short-circuited sensor*

`CL.L.` Resetting compensation of the conduct

- *sets the conduct resistance to zero*

`tYP` Setting the type of sensor

- *selection of the type of sensor, see table*

T/C

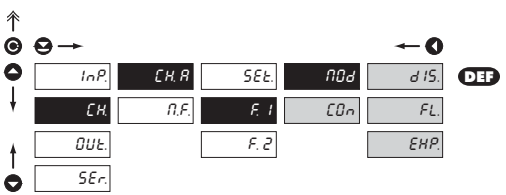
`t.CJ.` Setting the type of compensation of the cold junction

- *setting the type of compensation and connection of thermocouple with/without compensation T/C*

`t.CJ.` Setting the temperature of the cold junction

- *range of the setting is 0...99°*

4.3.2.2 SETTING THE MEASURING „CHANNEL A" - FILTERS



`nOd` **Setting the digital filters -1**

- *values entering the filter are modified from „SET."*

`COn` Setting the filtration constants

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

`d IS.` Filters are off

`FL.` Selection of floating filter

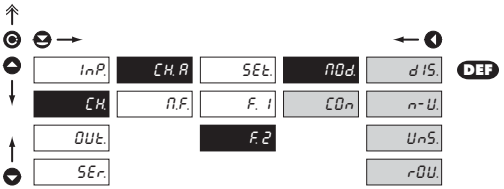
- *calculation of value is from the number of measurements selected in „CON"*
- *range 2...30 measurements*

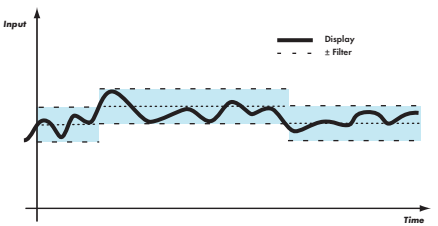
`EXP.` Selection of exponential filter

- calculation of value is from the number of measurements selected in „CON"

- range 2...100

4.3.2.3 SETTING THE MASURING „CHANNEL A“ - FILTERS 2





AOd. **Setting digitál filters - 2**

- *values entering the filter are modified by „Filter 1“*

COn Setting the filtration constants

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

diS. Filters are off

n-U Selection of n-th value

- *this filter allows to drop n-1 values and for further processing use every n-th measured value*
- *range 2...100 measurements*

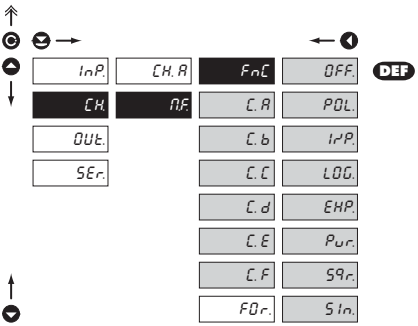
UnS. Selection of the band of insensitiveness

- *this filter allows to stabilise the resulting value. The previous value is taken as a result of the measurement if the measured value is not higher than the previous + P or lower than the previous - P. The value „±P“ indicates the band of insensitiveness in which the measured value may change without having effect on the result - change of data on the display*
- *range 0,001...999*

rOU. Round-up of the measured value

- *it is set by arbitrary number which determines the projection step (e.g. step 2,5 - 0, 2.5, 5, etc.)*

4.3.2.4 MATHEMATIC FUNCTIONS



Type	Active items MAT. F
OMB 411DC	all
OMB 411PM	all
OMB 411DU	all
OMB 411OHM	all
OMB 411RTD	none
OMB 411T/C	none

FCE **Selection of mathematic functions**

C.- Setting the constants for calculation of math.functions

- *this menu is displayed always after selection of particular mathematic function with the option to enter constants A, B, C, D, E and F*

OFF Mathematic functions are off

POL Polynome

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

1/P. 1/x

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

LOG. Logarithm

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

EXP. Exponential

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

Pwr. Power

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

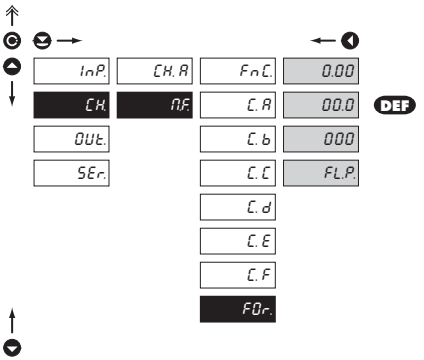
SQr. Radical

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

Sin. Sin x

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

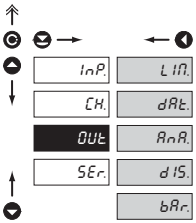
4.3.2.4.1 MATHEMATIC FUNCTIONS - PROJECTION FORMAT



FOr. Setting the format of projection on the display for „MF“

- *the instrument allows for classic projection of a number with positioning of the DP (0.00/ 00.0/000) and projection with floating point which allows for projection of a number in its most precise form „FL. P.“*

4.3.3 CONFIGURATION MODE - OUTPUT



LIN. Setting the function and type of the limit switch-on

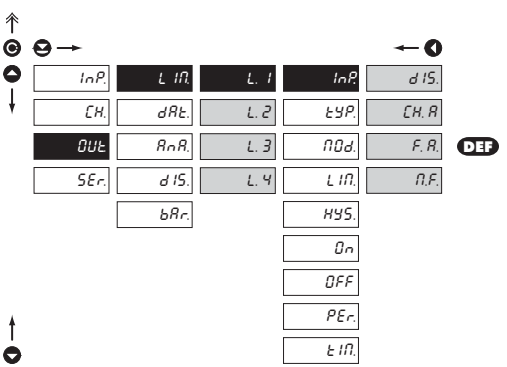
dAt. Setting the type and parameters of data output

AnA. Setting the type and parameters of analog output

diS. Setting perrmanent and temporary display projection and assigning another projection of internal data to arbitrary control keys of the instrument

bAr. Setting projection of the LED bargraph

4.3.3.1.1 LIMITS - SETTING DATA FOR EVALUATION



inP. Setting the input „quantity“ for limits evaluation

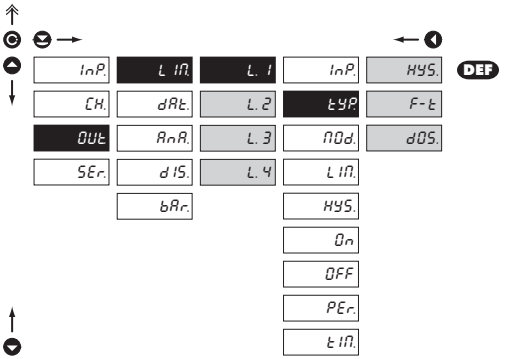
diS. The limit will not be evaluated

CH. A The limit will be evaluated from the output of „Channel A“

F. A The limit will be evaluated from the output of „Channel A“ after their modification by digital filters

n.F. The limit will be evaluated from the output of mathematic functions

4.3.3.1.2 LIMITS - SETTING THE TYPE OF LIMITS



tYP. Setting the type of limis

HYS. The limit has a boundary, hysteresis and delay

- *for this mode the „LIM" parameters are set, at which the limit should react and is adjustable within the full display range, „HYS." is an auxiliary parameter preventing osciallation at unsteady value, it is adjustable only in plus values. The limit parameter is „TIM" determining the delay of relay switch-on from the time of exceeding the set limit in range 0,0...99,9 s*

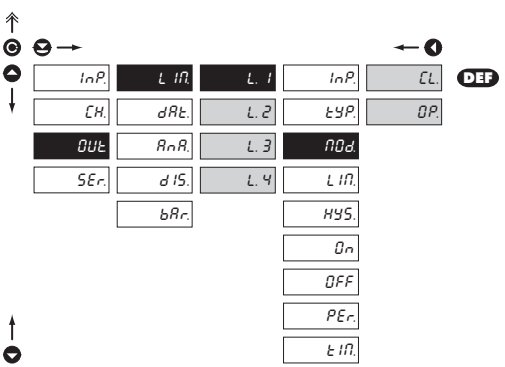
F-t The limit is in the mode switch-on „from - to"

- *for this mode the parameters „ON." and „OFF." are entered between which the limit shall switch-on, they are adjustable within full display range*

dOS. The limit is in mode „dosing"

- *in this mode two „PER" parameters are entered, which determine at what value the relay shall switch-on and how much higher shall be the next value. Second parameter is „TIM" in range 0,0 to 99,9 s determining the time for which the relay shall be switched on*
- *the relay is evaluated upon decreasing as well as increasing data on the display*

4.3.3.1.3 LIMITS - SETTING THE RELAY MODE



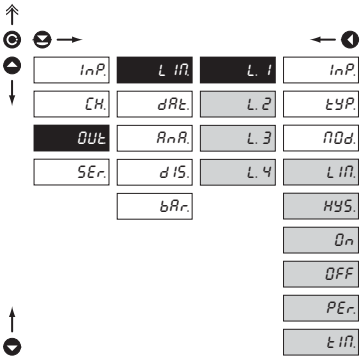
nOd. Setting the relay switching mode

CL. Relay switches on when condition is met

OP. Relay switches off when condition is met

! *Setting for limits 2,3 and 4 is identical with the one for Limit 1*

4.3.3.1.4 LIMITS - SETTING BOUNDARIES



! *Setting for limits 2,3 and 4 is the same as for limit 1 only with exception of the „DOS" regime, which is only in Limit 1*

! *Menu is dynamic, i.e. the items are displayed in relationship with the setting of the type of limits in „configuration menu"*

HYS ⇨ LIM. + HYS. + TIM.
F. T. ⇨ ON + OFF
DOS. ⇨ PER. + TIM.

L - **Setting values for limits evaluation**

L IN. Setting boundary for the relay switch-on

- *in full display range*

HYS. Setting hysteresis only in (+) values

- *in 1/10 of the display range*

On Setting the beginning of the range of limit switch-on

- *in full display range*

OFF Setting the end of the range of limit switch-on

- *in full display range*

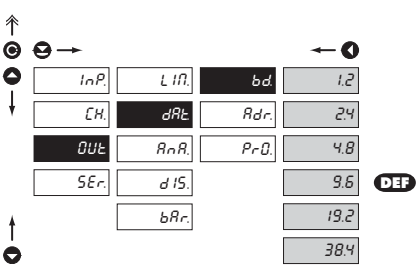
PEr. Setting the period of the limit switch-on

- *in full display range*

t IN. Setting the time-delay of limit switch-on

- *in range 0...99,9 s*

4.3.3.2.1 DATA OUTPUT - SETTING THE TRANSMISSION RATE



bd. **Setting the transmission rate (baud)**

1.2 Rate - 1 200 Baud

2.4 Rate - 2 400 Baud

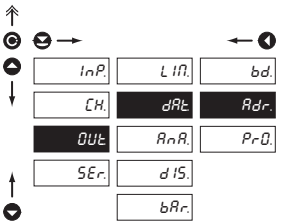
4.8 Rate - 4 800 Baud

9.6 Rate - 9 600 Baud

19.2 Rate - 19 200 Baud

38.4 Rate - 38 400 Baud

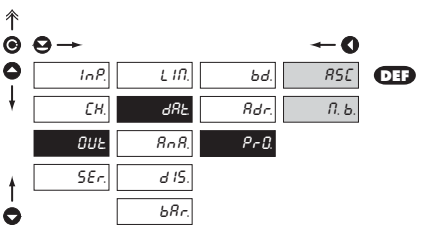
4.3.3.2.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS



Adr. **Setting the instrument address**

- *setting in range 0...31*
- *manufacture setting 00* DEF

4.3.3.2.3 DATA OUTPUT - SETTING THE DATA PROTOCOL

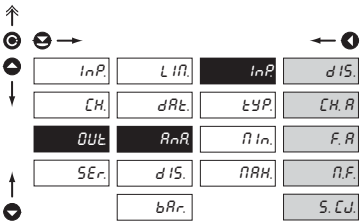


Pro. **Setting the type of data protocol**

ASC. ASCII protocol

n. b. DIN MessBus protocol

4.3.3.3.1 ANALOG OUTPUT - SETTING THE DATA FOR EVALUATION



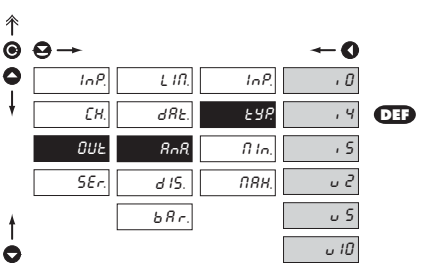
InP. Setting the input „quantity“ for Analog output evaluation

- **diS** AO will not be evaluated ❶
- **CH.A** AO will be evaluated from the output of „Channel A“ ❷
- **F.A** AO will be evaluated from the output of „Channel A“ after modification by digital filters ❸
- **M.F.** AO will be evaluated from the output of mat.functions ❹
- **S.CJ.** AO will be evaluated from the value of cold junction ❺

Type	Setting options
OMB 411DC	① ② **❸** ④
OMB 411PM	① ② **❸** ④
OMB 411DU	① ② **❸** ④
OMB 411OHM	① ② **❸** ④
OMB 411RTD	① **❷**
OMB 411T/C	① **❷** ⑤

**in bold are the preset values*

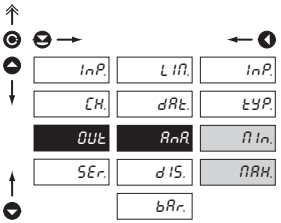
4.3.3.3.2 ANALOG OUTPUT - SETTING THE TYPE



tYP Setting the type of analog output

- **0...20** Range - 0...20 mA
- **4...20** Range - 4...20 mA
- **0...5** Range - 0...5 mA
- **0...2** Range - 0...2 V
- **0...5** Range - 0...5 V
- **0...10** Range - 0...10 V

4.3.3.3.3 ANALOG OUTPUT - SETTING THE RANGE



AnA. Setting analog output range

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

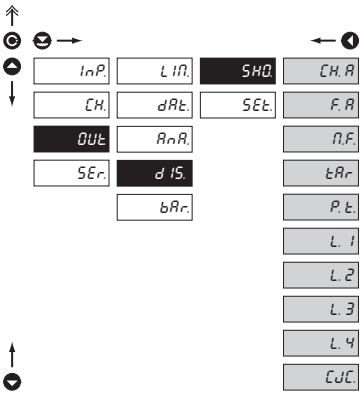
Min. Assigning the display value to the beginning of the analog output range

- *range of the setting is* ±999

MAX. Assigning the display value to the end of the analog output range

- *range of the setting is* ±999

4.3.3.4 DISPLAY PROJECTION

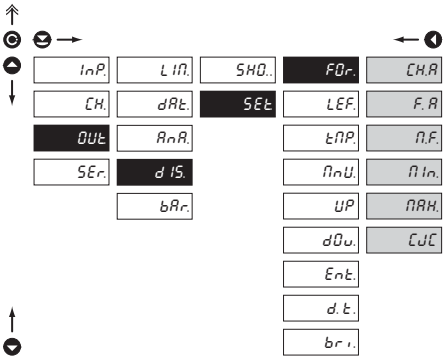


SHO. In this menu item the following data may be displayed

CH.A	Value of „Channel A“ ⓪
F.A	Value of „Channel A“ after filtration ❶
M.F.	Value of „Mathematic functions“ ❷
tAr	Tare Value ❸
P.t.	Fixed Tare Value ❹
L. 1	Value of „Limit 1“ ❺
L. 2	Value of „Limit 2“ ❻
L. 3	Value of „Limit 3“ ❼
L. 4	Value of „Limit 4“ ❽
CJC	Value of the „Cold junction“ ❾

Type	Setting options
OMB 411DC	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411PM	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411DU	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411OHM	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411RTD	⓪ ① ② ⑤ ⑥ ⑦ ⑧
OMB 411T/C	⓪ ① ② ⑤ ⑥ ⑦ ⑧ ⑨

4.3.3.4.1 PROJECTION ON THE DISPLAY - PERMANENT



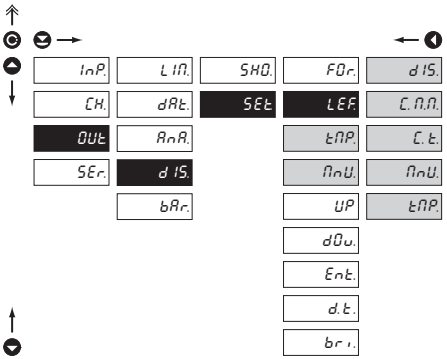
FOr. Selection of values for permanent projection on the instrument display

CH.A	Value of „Channel A“ ⓪
F.A	Value of „Channel A“ after filtration ❶
M.F.	Value of „Mathematic functions“ ❷
M.In	Minimum value ❸
MAX	Maximum value ❹
CJC.	Value of temperature of the cold junction ❺

Type	Setting options
OMB 411DC	⓪ **❶** ② ③ ④
OMB 411PM	⓪ **❶** ② ③ ④
OMB 411DU	⓪ **❶** ② ③ ④
OMB 411OHM	⓪ **❶** ② ③ ④
OMB 411RTD	**❶** ③ ④
OMB 411T/C	⓪ ③ ④ **❺**

**in bold are the preset values*

4.3.3.4.2 PROJECTION ON THE DISPLAY - AFTER PRESSING KEY „LEFT“



LEF. **Assigning function to key „LEFT“**

diS. The key is without function ⓪

C.M.M. Resetting the min/max. value ❶

C.t. Resetting Tare ❷

MnU. Direct access to selected item on the menu ❸

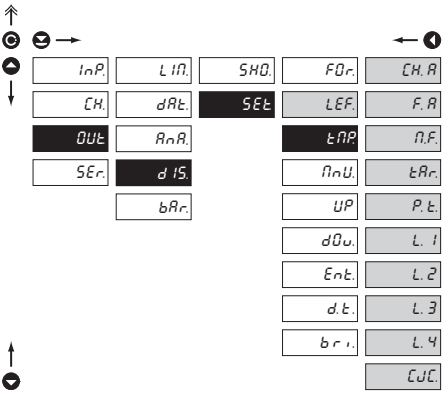
- *see the „MENU“ setting*

tMP. Projection of temporary value ❹

- *after pressing the key selected value will be displayed with flashing DP for approx. 2 s*

Type	Setting options
OMB 411DC	⓪ **❶** ② ③ ④
OMB 411PM	⓪ **❶** ② ③ ④
OMB 411DU	⓪ **❶** ② ③ ④
OMB 411OHM	⓪ **❶** ② ③ ④
OMB 411RTD	**⓪** ③ ④
OMB 411T/C	⓪ ③ ④ **❺**

**in bold are the preset values*



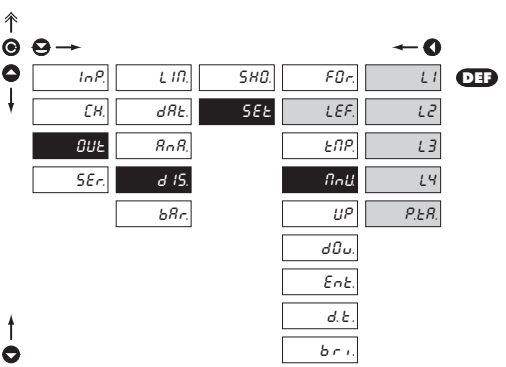
Type	Setting options
OMB 411DC	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411PM	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411DU	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 411OHM	⓪ ① ② ⑤ ⑥ ⑦ ⑧
OMB 411RTD	⓪ ⑤ ⑥ ⑦ ⑧
OMB 411T/C	⓪ ① ⑤ ⑥ ⑦ ⑧ ❾

**in bold are the preset values*

tMP. After selection of item „TMP." from menu „LEF." the following options are accessible

- *in this menu it is possible to select value for temporary projection on the display (after pressing ◀), which will be projected for approx. 2 s, with flashing DP*

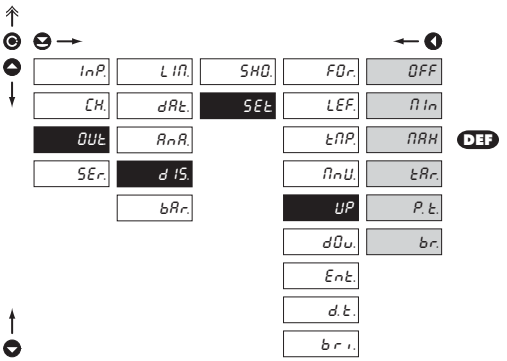
CH.A	Value of „Channel A" ⓪
F.A	Value of „Channel A" after filtration ❶
n.F.	Value of „Mathematic function" ❷
tAr.	Tare Value ❸
P.t.	Fixed Tare Value ❹
L. 1	Value of „Limit 1" ❺
L. 2	Value of „Limit 2" ❻
L. 3	Value of „Limit 3" ❼
L. 4	Value of „Limit 4" ❽
CJC.	Value of the „Cold junction" ❾



MnU. After selection of item „MNU." from menu „LEFT" the following options are accessible

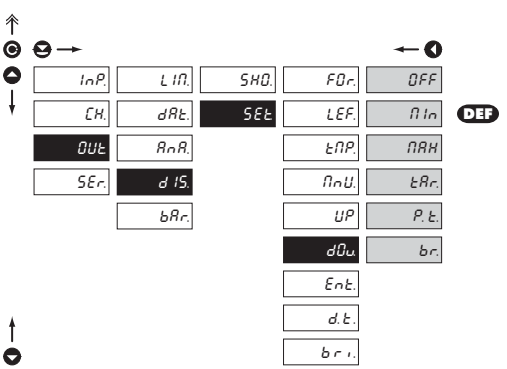
L1	Direct access into menu „Limit 1 - LIM 1"
L2	Direct access into menu „Limit 2 - LIM 2"
L3	Direct access into menu „Limit 3 - LIM 3"
L4	Direct access into menu „Limit 4 - LIM 4"
P.t.	Direct access into menu„Preset Tare"

4.3.3.4.3 PROJECTION ON THE DISPLAY - AFTER PRESSING KEY „UP“



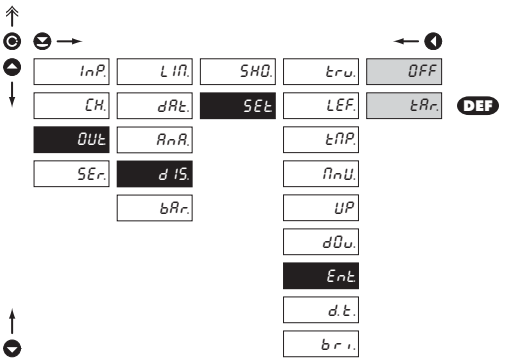
UP	**Assigning function to key „UP“**
OFF	The key is without function
Min	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
tAr.	Projection of value „Tare“
P.t.	Projection of value „Fixed Tare“
br.	Projection of value „CH. A + TAR + P. T. “

4.3.3.4.4 PROJECTION ON THE DISPLAY - AFTER PRESSING KEY „DOWN“



dOu.	**Assigning function to key„DOWN“**
OFF	The key is without function
Min	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
tAr.	Projection of value „Tare“
P.t.	Projection of value „Fixed Tare“
br.	Projection of value „CH. A + TAR + P. T. “

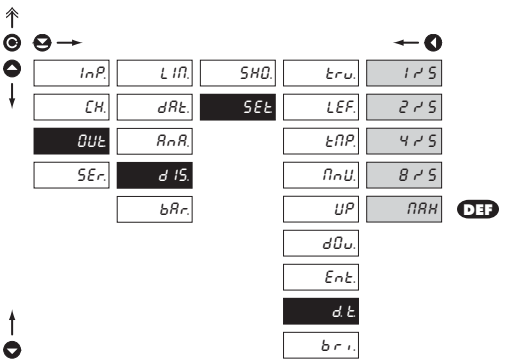
4.3.3.4.5 PROJECTION ON THE DISPLAY - AFTER PRESSING KEY „ENTER“



Ent. Assigning function to key „ENTER“

- OFF — The key is without function
- tAr. — Display taring

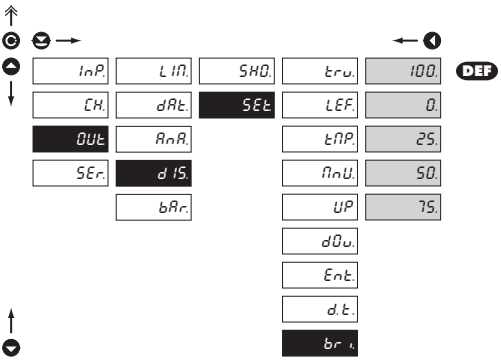
4.3.3.4.6 PROJECTION ON THE DISPLAY - RESTORATION FREQUENCY



d.t. Restoration frequency of display projection

- 1 / S — Restoration 1x per second
- 2 / S — Restoration 2x per second
- 4 / S — Restoration 4x per second
- 8 / S — Restoration 8x per second
- MAX — Maximum rate restoration, approx 20x per second

4.3.3.4.7 PROJECTION ON THE DISPLAY - BRIGHTNESS



br . **Setting the display brightness**

100 Brightness 100 %

0 Brightness 0 %, the display is off

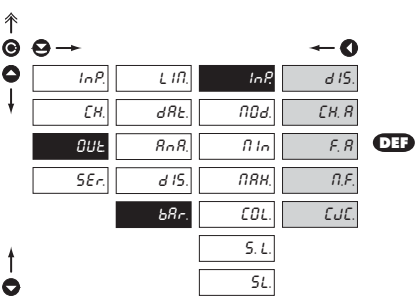
- the display dies out after approx 10 s, and turn on after pressing arbitrary keys.

25 Brightness25 %

50 Brightness 50 %

75 Brightness 75 %

4.3.3.5.1 BARGRAPH - SETTING DATA FOR EVALUATION



inP. **Setting the input „quantity" for bargraph**

d IS. Bargraph is off ❶

CH. A Bargraph will be evaluated from the output of „Channel A" ❷

F. A Bargraph will be evaluated from output of „Channel A" after their modification by digital filters ❸

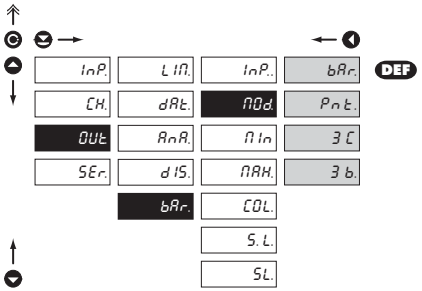
M.F. Bargraph will be evaluated from the output of math.functions ❹

CJC Bargraph will be evaluated from the value of cold junction ❺

Type	Setting options
OMB 411DC	① ② **❸** ④
OMB 411PM	① ② **❸** ④
OMB 411DU	① ② **❸** ④
OMB 411OHM	① ② **❸** ④
OMB 411RTD	① **❷**
OMB 411T/C	① **❷** ⑤

**in bold are the preset values*

4.3.3.5.2 BARGRAPH - PROJECTION MODE



MOd. Setting the projection mode for bargraph

bAr. Column projection

Pnt. Point projection

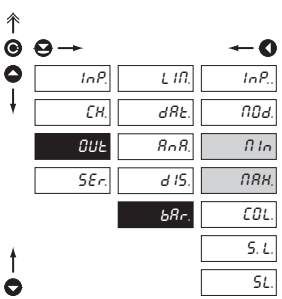
3 C. 3-coloured column projection

- *change of color is determined by certain boundaries*
- *upon trespassing of a boundary, the entire display color is changed, i.e. the display is always on, showing a single-colour column*

3 b. 3-colour bargraph projection, cascade

- *change of color is determined by set limits*
- *Upon tresspasing the boundary the color in given place of is changed, i.e up to 3 colours may be seen on the display*

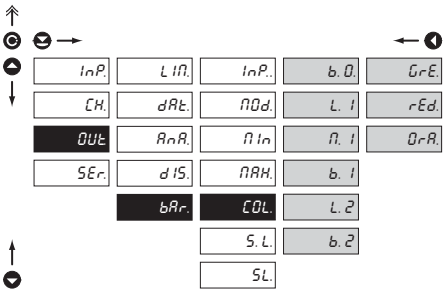
4.3.3.5.3 BARGRAPH - PROJECTION RANGE



MIn Setting bargraph projection for minimum input signal value

MAX Setting bargraph projection for maximum input signal value

4.3.3.5.4 BARGRAPH - SETTING THE COLOURS



COL. Setting colours and their boundaries for bargraph

b.0 0. band colour

b. 1 1. band colour

b.2 2. band colour

In all items it is possible to select from the following colours

GrE. Green

rEd. Red

OrA. Orange

L. 1 Boundary between 0./1. band

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

L.2 Boundary between1./ 2. band

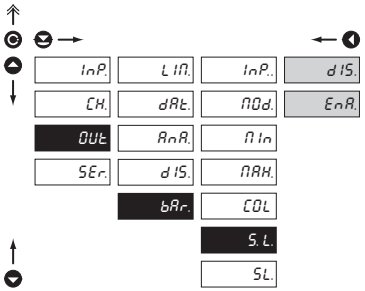
- range of the setting is -99...999

M. I. Selection of inverse projection

- selection NOR./INV.

- setting the INV is designated for projection when indication of zero „centre" is necessary

4.3.3.5.5 BARGRAPH - PROJECTION OF LIMITS



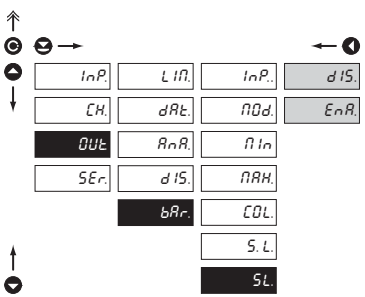
S.L. Projection of limits on the LED bargraph

diS. Limits will be projected on LED bargraph

- *the limits colour is always inverse with respect to the bargraph colour used*

EnA. Limits will not be projected on LED bargraph

4.3.3.5.6 BARGRAPH - PROJECTION SWITCHED OFF



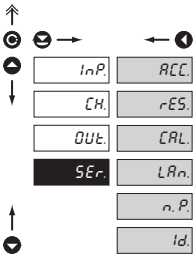
SL. Projection of LED bargraph switched off

- *in this menu it is possible to entirely switch off the projection of LED bargraph and use only the auxiliary display*

diS. LED bargraph is on

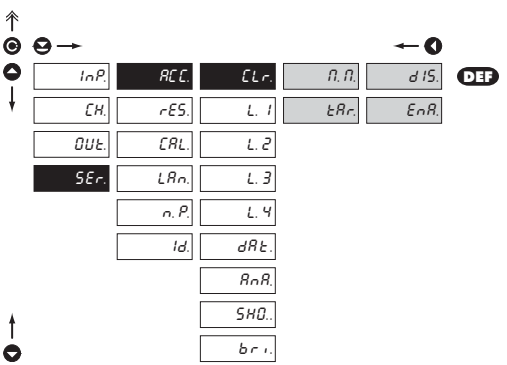
EnA. LED bargraph is off

4.3.4 CALIBRATION MODE - SERVICE



ACC.	Setting the access rights for „User mode“
rES.	Return to manufacture calibration or setting
CAL.	Instrument calibration
LAn.	Setting the language version
n.P.	Change of the access password
Id.	Instrument identification

4.3.4.1.1 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - RESETTING TO ZERO



CLr. Authorization for resetting of the internal values of the instrument

n. n. Authorization for item „MM“, permitted resetting of Min/max value

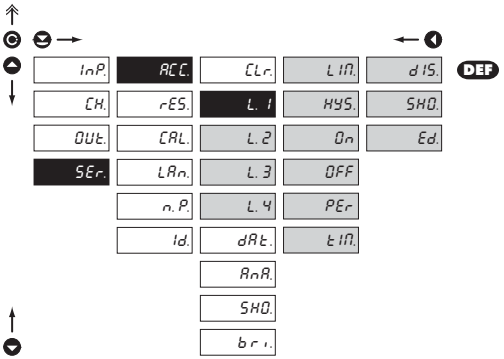
tAr. Authorization for item „C. T.“, permitted resetting of tare

In all items it is possible to select the following parameters

diS. The item is not displayed in the „UM“

EnA. The item has full access in the „UM“

4.3.4.1.2 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - LIMITS



L.- **Setting the access rights into limits in the „UM“**

LIM Authorization for item „Limit“, setting limit

HYS. Authorization for item „HYST.“, setting hysteresis

On Authorization for item „ON L.“, setting the beginning of the switch-on (from-to)

OFF Authorization for item „OFF L.“, setting the end of the switch-on (from-to)

PEr. Authorization for item „PERIOD“, setting the period of the switch-on (dosing - Lim 1)

tIM Authorization for item „TIM L.“, setting the time delay of the switch-on

In all items it is possible to select the following parameters

dIS. The item is not displayed in the „UM“

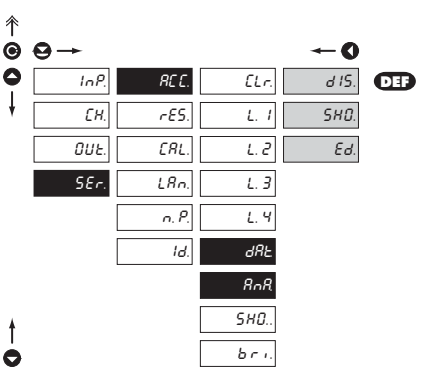
SHO. The item is displayed in the „UM“ but cannot be changed

Ed. The item has full access in the „UM“ including editing

! *Menu is dynamic, i.e. the items are displayed in relationship with the setting of the type of limits in „configuration menu“*

HYS ⇨ LIM. + HYS. + TIM.
F. T. ⇨ ON + OFF
DOS. ⇨ PER. + TIM.

4.3.4.1.3 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - OUTPUTS



dAt **Authorization for item „DAT.“, setting the data output**

AnA **Authorization for item „ANA.“, setting the analog output**

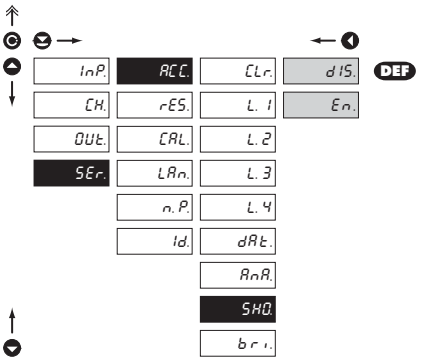
In all items it is possible to select the following parameters

dIS. The item is not displayed in the „UM“

SHO. The item is displayed in the „UM“ but cannot be changed

Ed The item has full acces in the „UM“, including editing

4.3.4.1.4 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - PROJECTION



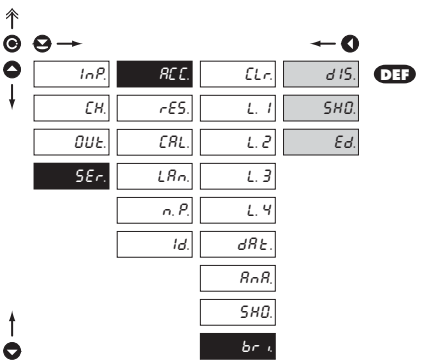
SHO Authorization for projection of internal values „SHO“ from menu „OUT. - DIS“

- *sets authorization for temporary projection of internal values of the instrument*

The following parameters may be selected in this item

diS	The item is not displayed in the „UM“
En	The item has full access in the „UM“

4.3.4.1.5 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - BRIGHTNESS

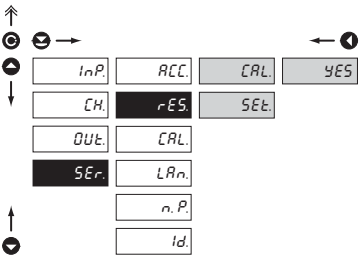


br. Authorization for item „BRIGHT“, setting the display brightness

The following parameters may be selected in this item

diS.	The item is not displayed in the „UM“
SHO.	The item is displayed in the „UM“ but cannot be changed
Ed.	The item has full access in the „UM“ including editing

4.3.4.2 RETURN TO MANUFACTURE CALIBRATION/SETTING



rES. Return to manufacture calibration or instrument setting

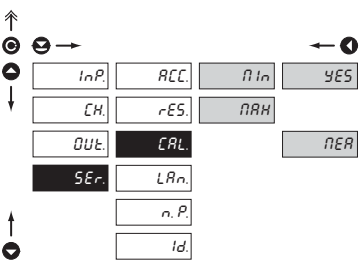
- *in case of error setting or calibration it is possible to return to manufacture setting. Prior execution of any changes you will be invited to confirm your selection by „Yes ?"*

CAL. Return to manufacture calibration of the instrument

SEt. Return to manufacture setting

- *reading the manufacture calibration and basic setting of items in menu (DEF)*

4.3.4.3 INSTRUMENT CALIBRATION



CAL Instrument calibration

- *in this menu you can perform instrument calibration. Prior execution of any changes you will be invited to confirm your selection of calibrated range by „Yes?"*

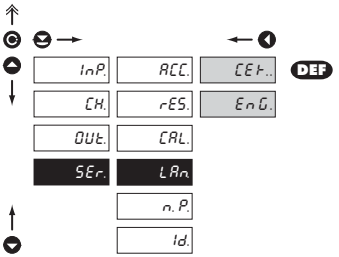
Min Entering and connecting the reference signal (weight) for minimum input value

- *prior confirmation of the selection the reference signal already has to be connected*

MAX Entering and connecting the reference signal (weight) for maximum input value

- *prior confirmation of the selection the reference signal already has to be connected*

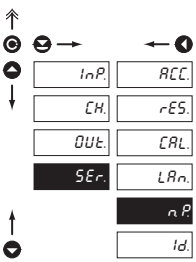
4.3.4.4 LANGUAGE VERSION FOR THE INSTRUMENT MENU



LAn. NSetting the language version for the instrument menu

- CzL. Instrument menu is in Czech language
- EnG. Instrument menu is in English language

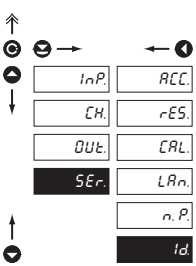
4.3.4.5 SETTING NEW ACCESS PASSWORD



n.P. Setting new access password for „Configuration menu“

- *this selection allows to change the numeric code which blocks the access into the instrument´s „Configuration mode“. Range of the numeric code is 0...999*

4.3.4.6 INSTRUMENT IDENTIFICATION



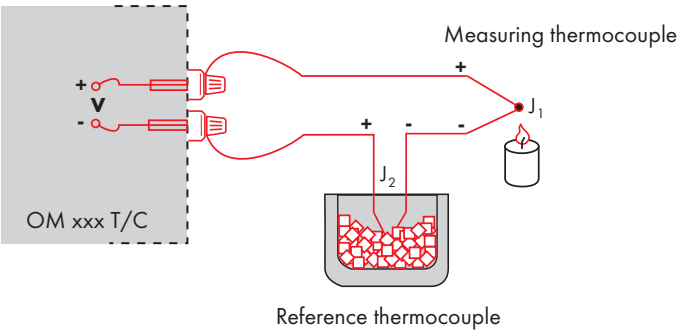
Id. Projection of the instrument version

- *the display shows the type identification of the instrument with the number of revision*
- *instrument name - input - program version - SW date (MM/DD/RR), e.g.:OMB411PM 004-02 052902*

The code from manufacture is always preset to 000. In case of loss of access password it is possible to use the universal access code "177"

5. MEASURING OF THE COLD JUNCTION

The instrument OMB 411T/C allows for setting of two types of measuring of the 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 in the instrument menu r.SEn. to In.2 or E.2
- when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu tESt. its temperature (applies for setting r.SEn to E.2)
- if the reference thermocouple is located in the same environ ent as the measuring instrument then set in the instrument menu r.SEn to In.2. Based on this selection the measurement of the surrounding 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 in the instrument menu r.SEn. to In.1 or E.1
  Use the option E.1 if the isntruent is located in an environment with constant temperature.
- when measuring tempreature without reference thermocouple the error in the measured data may be even 10°C (applies for setting r.SEn to E.1)

6. DATA PROTOCOL

The instrument communicate via serial line RS232 or RS485. For communication they use either the ASCII protocol or the DIN MessBus 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 and depends on the control processor used. The instrument address is set in the instrument menu in the range 0...31. The manufacture setting always presets the ASCII protocol, rate 9600 Baud, address 00. The type of line used - RS232 / RS485 - it is determined by an exchangeable card automatically identified by the instrument.

COMMANDS FOR INSTRUMENT OPERATION

The commands are described in the description you can find at **www.orbit.merret.cz/rs**.
The command consists of a number and a letter. The size of the letters have a significance. Behind the command an isotype determines the type of command and the data form

Symbol	Meaning	Symbol	Meaning
⇉	Send unit value	C	Complete number
⇇	Set unit value	V	Selection = complete number
■	Perform relevant action	D	Decimal number
		T	Text - printable ASCII characters
		H	Intel HEX format

COMMANDS NOT LISTED IN THE MENU

1M	⇉ D	Transmit the minimum value
2M	⇉ D	Transmit the maximum value
1X	⇉ T	Transmit the display value, data in format „R <SP> DDDDDDDD“
2X	⇉ T	Transmit the relay status, the instrument responds in a numeric row of 0,1 in the order from the 1st relay *1 means the relay is on, relay not used sends back X*
3X	⇉ H	Transmit the status of auxiliary inputs
1Z	⇉ H	Transmit instrument HW configuration
1x	⇉ D	Transmit the value of the filter output of Channel A
2x	⇉ D	Transmit the value of the filter output of Channel B
9x	⇉ D	Transmit the value of the output of mathematic functions

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

Action	Type	Protocol		Transmitted data												
Soliciting data (PC)	232	ASCII		#	A	A	<CR>									
		MessBus		Not present - data is transmitted permanently												
	485	ASCII		#	A	A	<CR>									
		MessBus		<SADR>	<ENQ>											
Sending data (OM)	232	ASCII		>	D	D	D	D	D	D	D	(D)	(D)	(D)	<CR>	
		MessBus		<SADR>	D	D	D	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>
	485	ASCII		>	D	D	D	D	D	D	D	(D)	(D)	(D)	<CR>	
		MessBus		<SADR>	D	D	D	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>
Confirmation of data receipt (PC)	232	ASCII														
		MessBus														
	485	ASCII														
		MB	ok	<DLE>	1											
			bad	<NAK>												
Sending address (PC) Prior command	232	ASCII														
		MessBus														
	485	ASCII														
		MessBus		<EADR>	<ENQ>											
Address confirmation (OM)	232	ASCII														
		MessBus														
	485	ASCII														
		MessBus		<SADR>	<ENQ>											
Sending command (PC)	232	ASCII		#	A	A	C	P	D	D	D	D	(D)	(D)	(D)	<CR>
		MessBus		<STX>	$	C	P	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>
	485	ASCII		#	A	A	C	P	D	D	D	D	(D)	(D)	(D)	<CR>
		MessBus		<STX>	$	C	P	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>
Command confirmation (OM)	232	A	ok	!	A	A	<CR>									
			bad	?	A	A	<CR>									
		MessBus		Not present - data is transmitted permanently												
	485	A	ok	!	A	A	<CR>									
			bad	?	A	A	<CR>									
		MB	ok	<DLE>	1											
			bad	<NAK>												

Legend				
#		35	23_H	Beginning of the command
A	A	0...31		Two signs of the inst. address (sent in ASCII - decades and units, ex."01")
<CR>		13	$0D_H$	Carriage return
<SP>		32	20_H	Space
C	P			Number and command - command code
D				Data - usually signs "0"..."9","-","." ; (D) - dp. and (-) may prolong data
R		30_H...$3F_H$		Relay status; zero bit corresponds with 1st relay, 1st bit with 2nd relay, etc.
!		33	21_H	Positive command confirmation (ok)
?		63	$3F_H$	Negative command confirmation (bad)
>		62	$3E_H$	Beginning of the transmitted data
<STX>		2	02_H	Beginning of the text
<ETX>		3	03_H	End of the command
<SADR>		adresa + 60_H		Appeal to transmit data from the address
<EADR>		adresa + 40_H		Appeal to receive command on the address
<ENQ>		5	05_H	Address termination
<DLE>	1	16, 49	10_H,31_H	Confirmation of correct report
<NAK>		21	15_H	Confirmation of error report
<BCC>				Kontrolní součet (XOR od <SADR> nebo <STX> po <ETX> včetně)

7. ERROR STATEMENTS

Error	Reason	Elimination
E.Po.	range underflow (A/D converter)	change the input signal value or change display projection
E.Pr	range overflow (A/D converter)	change the input signal value or change display projection
E.M	mathematic error, range of projection is out of display	change the set projection
E.dR	violation of data integrity in EEPROM, error upon data storage	in case of recurring report send the instrument for repair
E.PR	EEPROM error	the „Def" values will be used in emergency, instrument needs to be sent for repair

8. TECHNICAL DATA

INPUT

DC

Range:	±60 mV	>1,8 MOhm	Input 1
	±150 mV	>1,8 MOhm	Input 1
	±300 mV	>1,8 MOhm	Input 1
	±4,9999 V	1,8 MOhm	Input 2
	±49,999 V	1,8 MOhm	Input 2
	±300,00 V	1,8 MOhm	Input 2
	±4,9999 mA	< 300 mV	Input 2
	±49,999 mA	< 300 mV	Input 2
	±1,0000 A	< 50 mV	Input 1
	±5,0000 A	< 50 mV	Input 1
Number of inputs:	4		

PM

Range:	0...20 mA	< 260 mV	Input 1
	4...20 mA	< 260 mV	Input 1
	±2 V	1,8 MOhm	Input 2
	±5 V	1,8 MOhm	Input 2
	±10 V	1,8 MOhm	Input 2
	upon request		
Number of inputs:	4, as a standard, two inputs I and U are		

OHM

Range:	0...49,999 Ohm
	0...499,99 Ohm
	0...4,9999 kOhm
	0...49,999 kOhm
	0...100,00 kOhm
	5...105 Ohm
Connection:	2/4 wire

DU

Lin.pot.supply	2 VDC/6 mA
	lin.potentiometer resistance > 500 Ohm

RTD

Pt	-200,0°...850,0°C
Ni	-30°...250°C
Typ:	Pt 100/500/1 000 – 3 850 ppm/°C (EU)
	Pt 100 – 3 920 ppm/°C (US)
	Ni 1 000 – 5 000 ppm/°C
	Ni 1 000 – 6 180 ppm/°C
Connection:	2, 3 or 4 wire
Resolution:	0,1°C
Projection:	°C/°F/K

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°...1 000°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
Comp.of cold junc.:	adjustable 0°...99°C or automatic	
Resolution:	0,1°C	
Projection:	°C/°F/K	

ZOBRAZENÍ

Display:	Bargraph 25 LED - tricolours
	Display, 3 digit intesive red or green LED,
	digit height 9 mm
Projection:	-99...999
Decimal point:	adjustable - in programng mode
Brightness:	adjustable - v programming mode

INSTRUMENT ACCURACY

Temperature coeff.:	60 ppm/°C
Accuracy:	±0,2 % of the range
Measuring rate:	0,1...16,6 m/s
	1...8 m/s (OM 472I)
	1...100 m/s (OM 472DU, T)
Type of filter:	sample
Function:	Tare - display resetting
	Hold - stop measuring (upon contact)
	Blocking the keyboard (upon contact)
	Blocking the input into „CM“
	Resetting the min/max value
Mathem.functions:	see documentation
Watch-dog:	reset after 1,2 s
Calibration:	at 25°C and 40 % r.h.

COMPARATOR

Type:	digital, adjustable in the menu
Limits:	-99999...99999
Hysteresis:	0...99999
Delay:	0...99,9 s
Outputs:	4x relay with switching contact (230 VAC/50 VDC, 3 A)*
Relay:	1/3 HP 125 VAC, 1/2 HP 250 VAC, Pilot Duty B300

** the values apply for resistance load*

DATA OUTPUTS

Protocols:	DIN MESSBUS; ASCII
Data fromat:	7 bit + even parity + 1 stop bit (DIN MESSBUS) 8 bit + no parity + 1 stop bit (ASCII)
Rate:	1 200...38 400 Baud
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)

ANALOG OUTPUTS

Type:	isolated, programmable with resolution of max. 10 000 points, analog output corresponds with the displayed data, type and range are adjustable
Non-linearity:	0,2 % of the range
TC:	100 ppm/°C
Rate:	response to change of value < 100 ms
Voltage:	0...2 V/5 V/10 V
Current:	0...5/20 mA/4...20 mA - compensation of conduct to 600 Ohm

EXCITATION **DC** **PM**

Adjustable: 2...24 VDC/50 mA, isolated

POWER SUPPLY

Options:	24/110/230 VAC/50 Hz, ±10 %, 13,5 VA 10...30 VDC/max. 1,2 A ,isolated (after switch-on the short-term consumption may be approximately 3 A)
Protection:	by a fuse inside the instrument VAC (T 80 mA), VDC (T 4A)

MECHANIC PROPERTIES

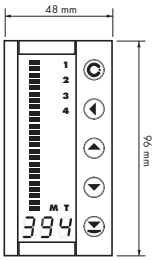
Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	48 x 96 x 142 mm
Panel cut-out:	45 x 90,5 mm

OPERATING CONDITIONS

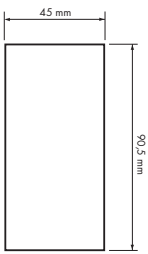
Connection:	connector terminal board, conductor section up to 2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temperature:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage category:	EN 61010-1, A2 III. - instrument power supply (300 V) II. -input, output, excitation (300 V) for pollution degree II
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11; EN 550222, A1, A2

9. INSTRUMENT DIMENSIONS AND INSTAL.

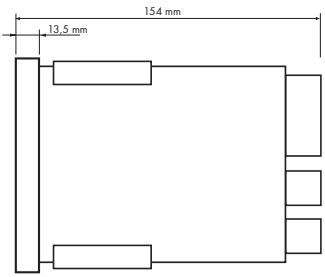
Front view



Panel cut



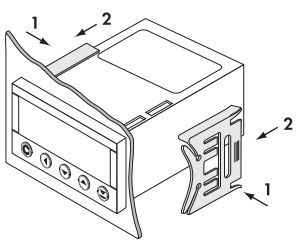
Side view

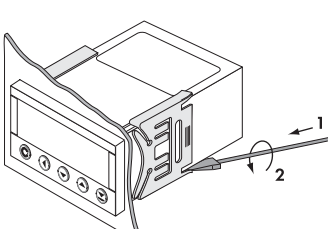


Panel thickness: 0,5...20 mm

Instrument installation

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





Instrument disassembly

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

10. CERTIFICATE OF GUARANTEE

Product	**OMB 411 DC PM DU RTD OHM T/C**
Type	. . . . .
Manufacturing No.	. . . . .
Date of sale	. . . . .

A guarantee period of 24 months from the date of sale to the user applies to this instrument.
Defects occuring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

For instrument quality, function and construction the guarantee shall apply provided that the instrument was connected and used in compliance with the instruction for use.

The guarantee shall not apply for defects caused by:

- mechanic damage
- in transport
- intervention of unqualified person incl. the user
- unavoidable event
- other unprofessional interventions

The manufacturer performs the guarantee and post-guarantee repairs unless provided for otherwise.

Stamp, signature

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