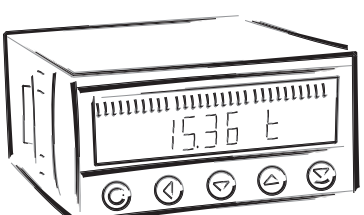
GUARANTEE
2
YEARS

OMB 401

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 401 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

ORBIT MERRET, spol. s r.o.
Vodnanska 675/30
198 00 Prague 9
Czech Republic

Tel: +420 - 281 040 200
Fax: +420 - 281 040 299
e-mail: orbit@merret.cz
www.orbit.merret.cz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2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OMB 401 model series are 30-point bargraph displays with auxiliary 6 digit display, which are manufactured in the following alternatives:

OMB 401DC	DC voltmeter/ammeter	DC
OMB 401PWR	*Nets analyzer	PWR
OMB 401PM	Process monitor	PM
OMB 4101OHM	Ohmmeter	OHM
OMB 401DU	Display instrument for linear potentiometers	DU
OMB 401RTD	Thermometer for Pt 100/500/1000 and Ni 1000	RTD
OMB 401T/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). The measured untis may be projected on the display.

EXTENSION

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 *www.orbit.merret.cz/update*

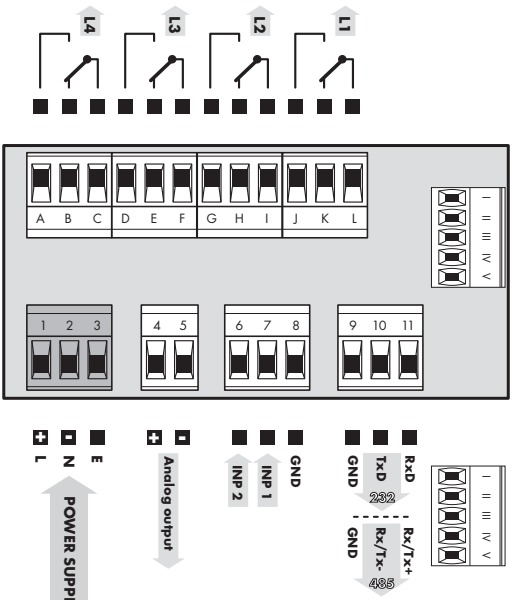
In consideration of the continuous development and improvements of our products it is now possible to download directly from web pages the most recent version of a program for every instrument. Because the program modernisation is performed via data line RS 232 it is necessary to equip the machine with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

Modernisation will be performed automatically after connection of the instrument to PC and the program is launched autmatically. After it is completed, all customer settings are replaced by manufacture settings, i.e. it is necessary to set the control key again. Number of the current version of the program in your instrument can be found in Configuration menu - service - identification.

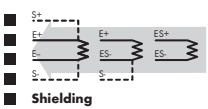
! *The function for recording of the new Firmware is supported for all instruments since version 004*

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 stand ards for use in industrial area, yet we recommend to abide by the above mentioned principles.

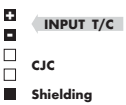


OMB 4x1RTD/OHM



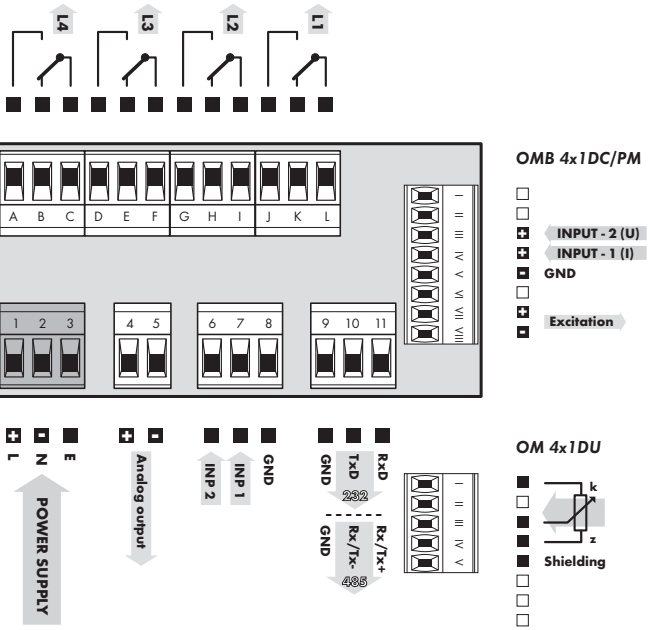
For type OMB 401RTD/OMH it is necessary in case of 2-wire lead to connect the brackets I+II / III+IV and for 3-wire lead brackets III+IV

OMB 4x1T/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)
	Lock C.M.	Locking the access into Configuration menu	upon contact agst. GND (no. 8)
	Resetting MM	Resetting min/max or top value	upon contact agst. GND (no. 8)

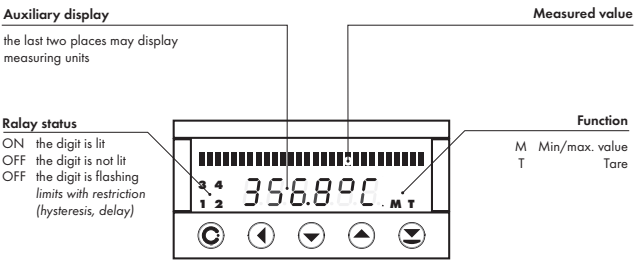


! *Grounding on terminal 3 has to be connected at all times.*

! *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 INSTRUCTIONS

DEF So marked items are preset from manufacture and will always be preset after „Return to manucture setting"

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

CONTROL KEYS FUNCTIONS

MENU	ENTER	LEFT	DOWN	UP
Measuring MODEe				
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 -

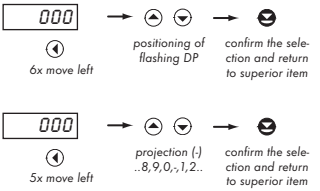
SETTING THE DECIMAL POINT AND THE MINUS SIGN

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 „CHAN.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

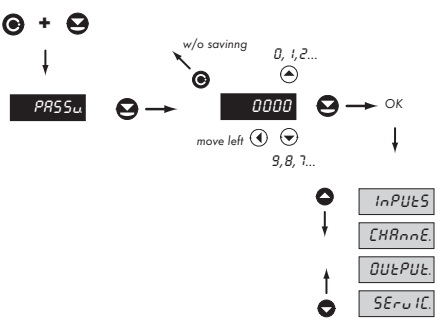
⇨ „Calibration mode" ⇨ menu of projection on the display - maximum *InP.* ⇨ *MAX*

⇨ after transition beynd hiughest decade ◀ the DP starts flashing

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

! *Setting the DP is determining only for the items MIN (input) and P.TARA. For other items it is independent and their setting is independent*

ACCESS INTO THE CONFIGURATION MODE



The code from manufacture is always preset to 0000
In case of loss of access password it is possible to use the universal access code "8177"

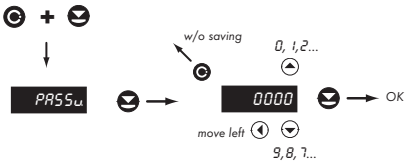
4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

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"

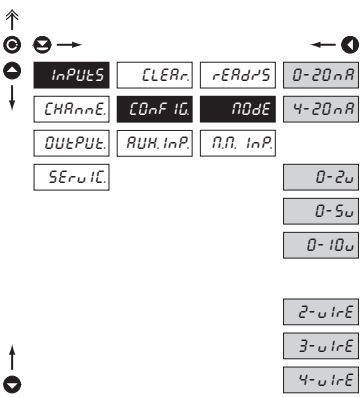


PASSu **Entering the introductory access password**

0000 Standard manufacture setting of the access password

! *After contingent restoration of manufacture setting the password is set to „0000"*

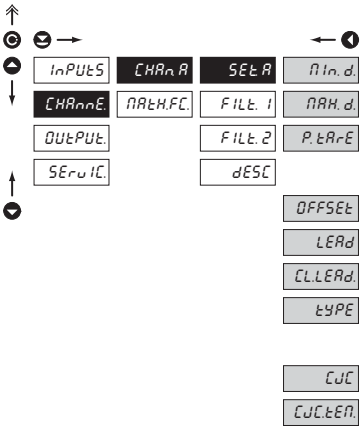
❷ Selection of the measuring range/input type



nOdE **Setting the range or tape of measuring device**

Type	Displayed items of the menu Manual calibration
OM 472PM	0-20/4-20mA, 0-2/0-5/0-10 V
OM 472OHM	2-WIRE/3-WIRE/4-WIRE
OM 472RTD	2-WIRE/3-WIRE/4-WIRE

❸ Setting projection on the display

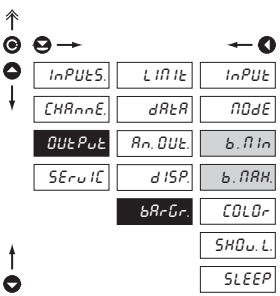


SEt.A **Setting the input parameters**

Type	Displayed menu items Manual calibration
OMB 401DC	MIN.D*, MAX.D
OMB 401PM	MIN.D, MAX.D
OMB 401DU	MIN.D, MAX.D
OMB 401OHM	MIN.D, MAX.D, OFF., LEAD, TYPE
OMB 401RTD	OFFSET, LEAD. CL.LEAD, TYPE
OMB 401T/C	TYPE, CJC., CJC.TEM.

**) The items do not show after automatic calibration*

❹ Setting projection on to LED bargraph

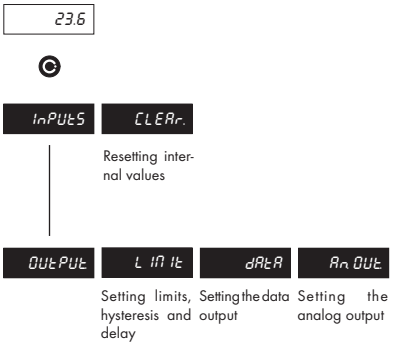


Min Setting the input signal value for minimum projection of the bargraph

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"

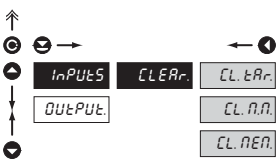


inPUtS
Setting the instrument input

OUtPUt.
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



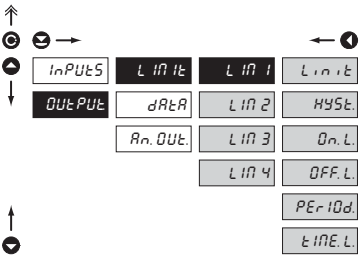
CLEAr. Resetting the internal values of the instrument

- **CL. tAr.** Tare resetting
- **CL. M.M.** Resetting the minimum and maximum measuring value
- **CL. MEM.** Resetting measured data from the instrument memory

- item is displayed only in version with RTC

Adjustable authorization of access into items, see page 44

4.2.2 LIMITS - ENTERING THE VALUES



Adjustable authorization of access into items, see page 45

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

HYSTER ⇨ Limit + HYST. + TIME. L
FROM ⇨ ON. L + OFF. L
DOSING ⇨ PERIOD. + TIME. L

LIN - Entering the limit values for status evaluation

Lin.it Setting the limit for relay switch-on
- *within full display range*

HYSt. Setting hysteresis only in (+) values
- *within full display range*

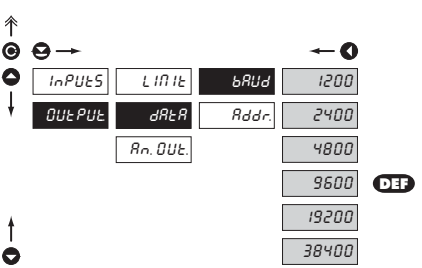
On.L Setting the beginning of the range of the limit switch-on
- *within full display range*

OFF.L Setting the end og the range of the limit switch-on
- *within full display range*

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

tIME.L 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 46

bAUd Setting the data output rate (baud)

1200 Rate - 1 200 Baud

2400 Rate - 2 400 Baud

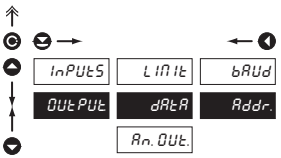
4800 Rate - 4 800 Baud

9600 Rate - 9 600 Baud

19200 Rate - 19 200 Baud

38400 Rate - 38 400 Baud

4.2.3.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS

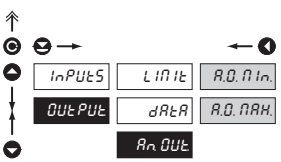


Adjustable authorization of access into items, see page 46

Addr. **Setting the instrument address**

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

4.2.4 ANALOG OTPUT - SETTING THE RANGE



Adjustable authorization of access into items, see page 46

An. OUt **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*

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

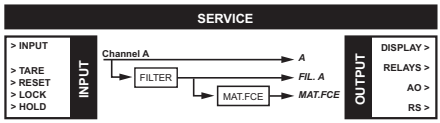
- *range of the setting is ±50 000*

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

- *range of the setting is ±50 000*

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*

C + ✉

PASSw

0000 Entering the access password

InPUtS | CLEAr. | CONF IG. | AUX. InP.

Resetting internal values | Primary instrument setting | Setting the Hold function

InPUtS
Setting the instrument input

CHAnnE. | CHAn.A | MAtHFC.

Configuration of parameters of measuring channel | Setting the mathematic functions

CHAnnE.
Setting the measuring channels

OUtPUt | LIMIt | dAtA | An.OUt | d ISP | bArGr.

Settin the limits, hysteresis and delay | Setting the data output | Setting the analog output | Setting display projection | Setting the projection of LED bargraph

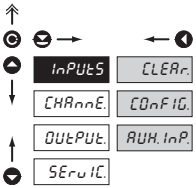
OUtPUt.
Setting the instrument outputs

SErvIC. | ACCESS | rESEt.Gr. | CAL Ib | LAnG. | nPASSw | IdEnt

Setting the access rights for „User menu" | Displayed data which equals max bargraph projection | Instrument calibration | Setting the language version | Change of the access password | Instrument identification

SErvIC.
Service functions

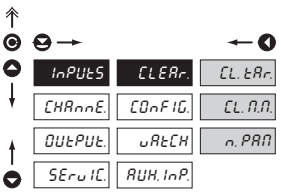
4.3.1 CONFIGURATION MODE - INPUTS



The basic instrument parameters are set here

- CLEAr. — Resetting the instrument internal values
- COnFIG. — Basic instrument setting
- AUX. inP.. — Setting the „Hold" function

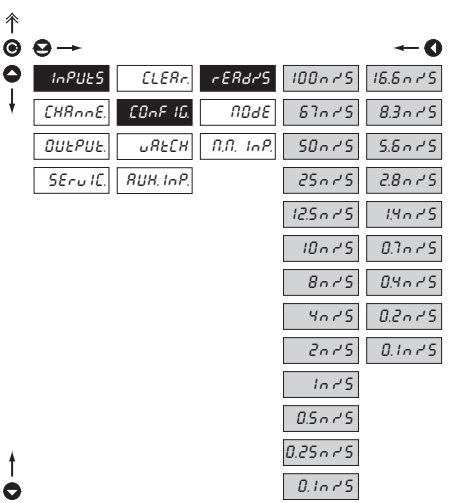
4.3.1.1 RESETTING THE INTERNAL VALUES



- CL. tAr. — Tare resetting
- CL. M.M. — Resetting the minimum and maximum measured value
- n. PAM — Resetting the measured data from the instrument memory

- *item is displayed only in version with RTC*

4.3.1.2.1 SETTING THE MEASURING RATE



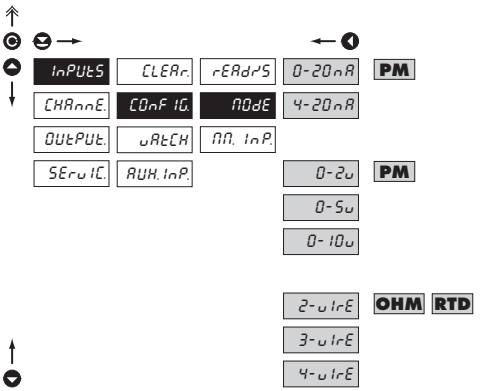
rEAdrS — Setting the instrument measuring rate

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

Type	Measuring rate
OMB 401DC	0,1...**1,4**...16,6 m/s
OMB 401PM	0,1...**1,4**...16,6 m/s
OMB 401DU	0,1...**4**...100 m/s
OMB 401OHM	0,1...**0,7**...16,6 m/s
OMB 401RTD	0,1...**0,7**...16,6 m/s
OMB 401T/C	0,1...**0,7**...16,6 m/s

**in bold are the preset values*

4.3.1.2.2 SETTING THE MEASURING RANGE



MOdE **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 VOLT./ CURR.*

OHM **RTD**

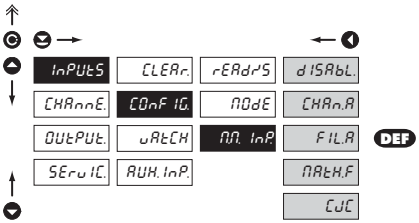
setting the type of connection

RTD

rAnGE **Setting the instrument measuring range**

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

4.3.1.2.5 SETTING EVALUATION OF MIN/MAX VALUE



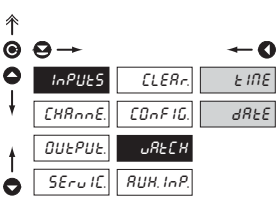
MM. inP. Setting the input „quantity" for evaluation of min/max value

- **dISAbL.** Min/max vaule is off ❶
- **CHAn.A** From value of Channel A ❷
- **FIL.A** From filtered value of Channel A ❸
- **MAtH.F** From mathematic function ❹
- **CJC** From temerature of the cold junction ❺

Type	Setting options
OM 472DC	① ② **❸** ④
OM 472PM	① ② **❸** ④
OM 472DU	① ② **❸** ④
OM 472OHM	① ② **❸** ④
OM 472RTD	① **❷**
OM 472T/C	① **❷** ⑤

**in bold are the preset values*

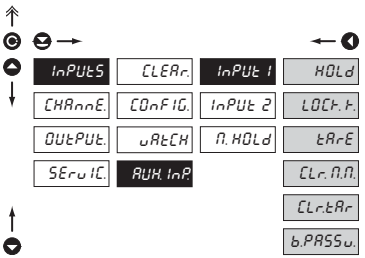
4.3.1.3 SETTING THE REAL TIME CLOCK



uRtCH Setting the real time clock (RTC)

- **tIME** Setting the time
- **dAtE** Setting the date

4.3.1.4 AUXILIARY INPUTS

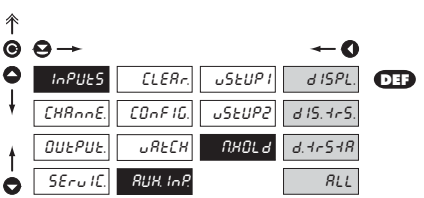


inPUt 1 **Assigning functions to auxiliary inputs**

- **HOLd** Activation of the „Hold" function
- **LOCk.t.** Activation of the function „Keyboard blocking"
- **tArE** Activation of the „Tare" function
- **CLr.n.n.** Activation of the function „Resetting min/max value"
- **CLr.tAr.** Activation of the function „Tare resetting"
- **b.PASSu.** Activation of the function „Blocking access into Configuration menu"

! *Setting the functions for Inputs 1 and 2 is the same*

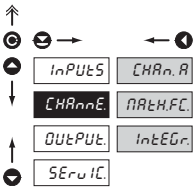
4.3.1.4.1 AUXILIARY INPUTS



AUX. inP **Setting the „Hold" function**

- **diSPL.** Signal „Hold" blocks the displayed value
- **diS.trS** Signal „Hold" blocks the displayed value and the data output function
- **d.trSnA.** Signal „Hold" blocks the displayed value, data and analog output function
- **ALL** Signal „Hold" blocks the entire instrument

4.3.2 CONFIGURATION MODEE - CHANNELS

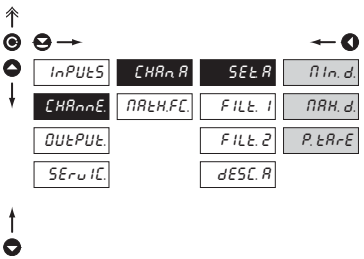


The basic parameters of instrument input values are set here

CHAn.A Setting parameters and the range of the instrument measuring channel

MAt.FCE Setting the instrument mathematic functions

4.3.2.1 SETTING THE MEASURING „CHANNEL A“



Type	Active items of the menu				
OMB 401DC	MIN.D*	MAX.D	P.TARE		
OMB 401PM	MIN.D*	MAX.D	P.TARE		
OMB 401DU	MIN.D	MAX.D	P.TARE		
OMB 401OHM	MIN.D*	MAX.D	ADD.RES.	LEADS.	CL. LEAD.
OMB 401RTD	ADD.RES.	LEADS	CL. LEAD.	TYPE	
OMB 401T/C	TYP	CJC	CJC.TEM.		

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

SEt.A Setting the input parameters

Min.d Setting display projection for minimum value of input signal

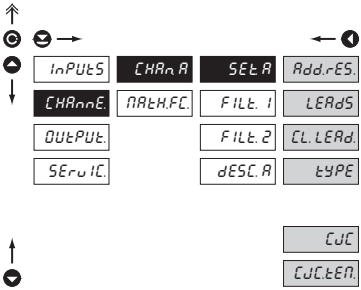
- *range of the setting is ±49999*
- *menu is dynamic, i.e. when using manual calibration this item is not projected*

MAX.d Setting display projection for maximum value of input signal

- *range of the setting is ±49999*
- *determines the range of setting of the DP for display, MIN.D and P. TARE*

P.tArE 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*



OMB 401RTD		OMB 401T/C	
Type	Designation	Type	Designation
Pt 100 - EU	Pt01EU	B	T/C B
Pt 500 - EU	Pt05EU	E	T/C E
Pt 1 000 - EU	Pt10EU	J	T/C J
Pt 100 - US	Pt01US	K	T/C K
NI 1 000/ppm	Ni5000	N	T/C N
NI 1 000/ppm	Ni6185	R	T/C R
		S	T/C S
		T	T/C T

Add.rES. Shifting the beginning of the measuring range

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

LEAdS Compensation of two-wire conduct

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

CL. LEAd. Resetting compensation of the conduct

- *sets the conduct resistance to zero*

tYPE Setting the type of sensor

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

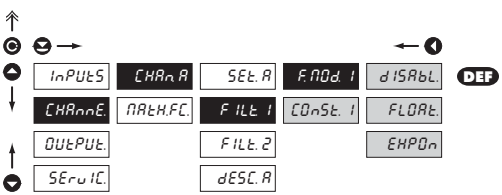
CJC Setting the type of compensation of the cold junction

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

CJC.tEn. Setting the temperature of the cold junction

- *range of the setting is 0...99°*

4.3.2.2 SETTING THE MEASURING „CHANNEL A" - FILTERS



F.nOd. 1 **Setting the digital filters -1**

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

COnSt. 1 Setting the filtration constants

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

dISAbL. Filters are off

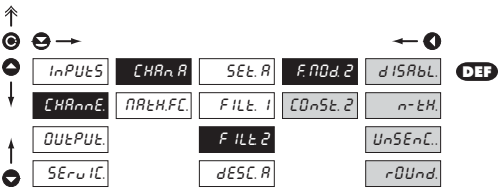
FLOAt. Selection of floating filter

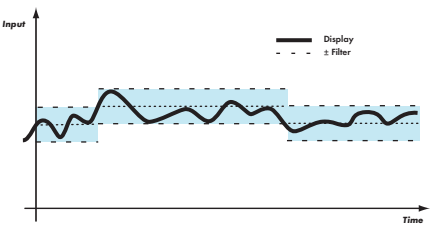
- *calculation of value is from the number of measurements selected in „CONST 1"*
- *range 2...30 measurements*

EXPOn Selection of exponential filter

- *calculatuion of value is from the number of measurements selected in „CONST 1"*
- *range 2...100*

4.3.2.3 SETTING THE MEASURING „CHANNEL A" - FILTERS 2





F.ndd.2 **Setting the digital filters -2**

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

rOnSt.2 Setting the filtration constants

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

dISAbL. Filters are off

n-tH 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*

UnSEnC. Selection of the band of insensitiveness

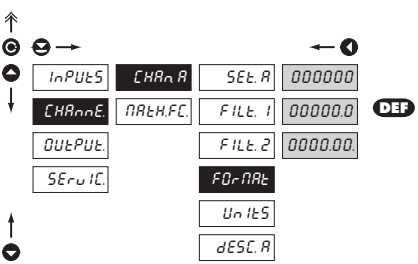
- *this filter allows to stabilise the resulting value. The previous value is taken as a result of the measurement if the measured value is not higher than the previous + P or lower than the previous - P. The value „±P" indicates the band of insensitiveness in which the measured value may change without having effect on the result - change of data on the display*
- *range 0,00001...100 000*

rOUnd 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, 7.5, etc.)*

4.3.2.4 SETTING THE NUMBER OF DECIMAL PLACES

RTD T/C



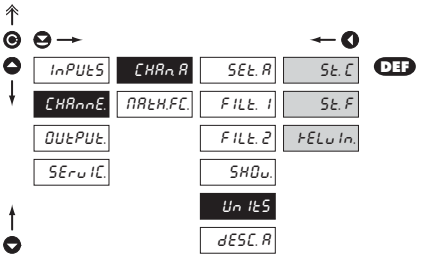
FOrMAt **Setting the number of decimal places**

- *the selection allows for three types of setting*

! *For other instruments the projection format is set in Chan. A - Set. A - MAX. D.*

4.3.2.4.1 SETTING THE PROJECTION OF MEASURING UNITS

RTD T/C



Un ItS **Setting the projection of measuring units**

- **dEG. C** Temperature is displayed in °C
- **dEG. F** Temperature is displayed in °F
- **dEG. C** Temperature is displayed in KELVIN

4.3.2.5 SETTING THE DESCRIPTION OF MEASURING UNITS

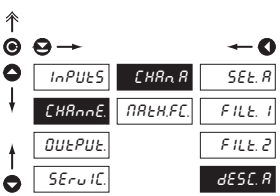


Table of symbols on page 51

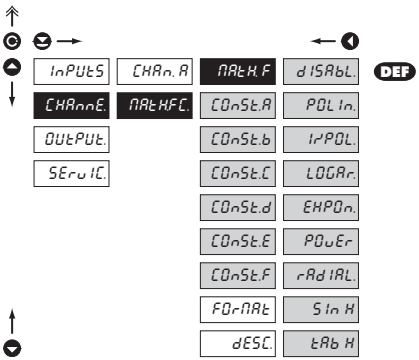
dESC. A **Setting the projection of measuring units on the display for Channel A**

- *the instrument allows to add two description symbols to the classic numeric formats (at the expense of the number of displayed places). Entering is performed through shifted ASCII code. Upon setting the first two places show the entered symbols and the last two the code of the relevant symbol from 0 to 95. Description is cancelled by entering 00*

RTD T/C

- *for RTD and T/C instruments it is possible to set the selection of projection DISABL. - ENABLE*

4.3.2.6 MATHEMATIC FUNCTIONS



Type	Active menu for MATH. FC
OMB 401DC	all
OMB 401PM	all
OMB 401DU	all
OMB 401OHM	all
OMB 401RTD	no
OMB 401T/C	no

nAtH.F — Selection of mathematic functions

CnSt.- 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*

dISAbL. Mathematic functions are off

POL In Polynome

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

IrPOL 1/x

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

LOGAr. Logarithm

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

EHPOn. Exponential

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

POuEr Power

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

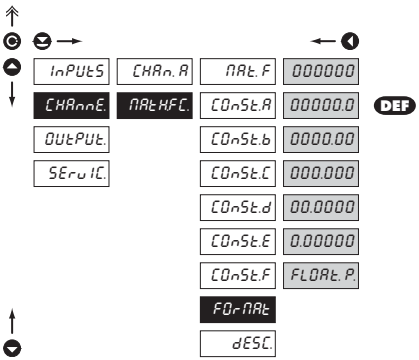
rAdIAL Radical

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

SIn H Sin x

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

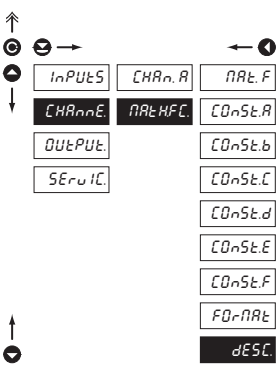
4.3.2.6.2 MATHEMATIC FUNCTIONS - PROJECTION FORMAT



FOrMAt **Setting the format of projection on the display for „MF"**

- *the instrument allows for classic projection of a number with positioning of the DP (00000/ 0000,0/.../0,00000) and projection with floating point which allows for projection of a number in its most precise form „FLOAT. P."*

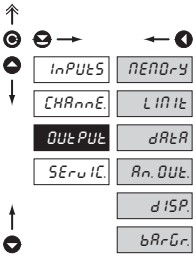
4.3.2.6.3 MATHEMATIC FUNCTIONS - DESCRIPTION ON THE DISPLAY



dESC. **Setting the measuring units on the display upon projection of mathematic functions**

- *in this menu the independent projection of the symbol of mathematic function is set, which is independent of the projection of description of measured quantity and is displayed only with the relevant function*
- *setting is the same as the description of measured unit „CHANNE. - CHAN. A - DESC."*

4.3.3 CONFIGURATION MODE - OUTPUT



MEMOrY Setting the storing of measured data

LIMIt Setting the function and type of the limit switch-on

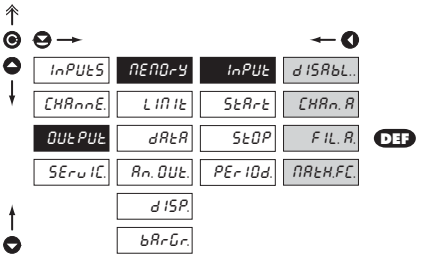
dAtA Setting the type and parameters of data output

An. OUt. Setting the type and parameters of analog output

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

bArGr. Setting projection of the LED bargraph

4.3.3.1.1 RTC - SETTING DATA FOR EVALUATION



InPUt Setting the input „quantity" for the record of measured data

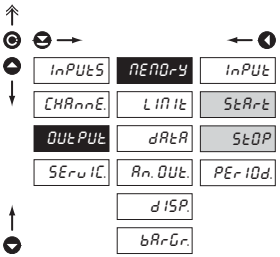
dISAbL. Without data backup

CHAn. A Record will be realized from the data from „Channel A"

FIL. A Record will be realized from the data from „Channel A" after their modification by digital filters

MAtH.FC. Record will be realized from the data from mathematic functions

4.3.3.1.1 RTC - SETTING THE TIME INTERVAL FOR DATA RECORDING



Setting the time interval for the recording of measured data - within one day

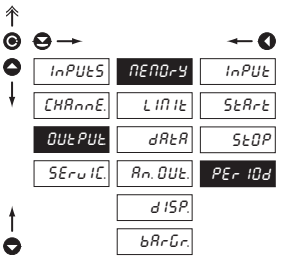
StArt Beginning of the recording of measured data into the instrument's memory

- *range of the setting* 00:00:00...23:59:59

StOP End of the recording of measured data into the instrument's memory

- *range of the setting* 00:00:00...23:59:59

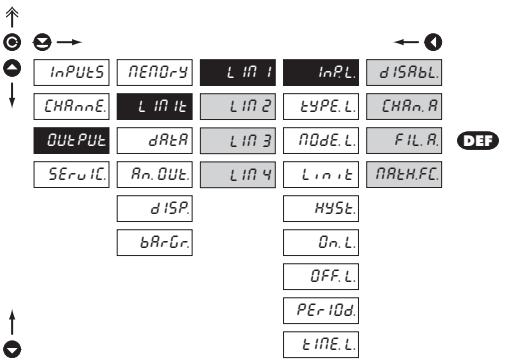
4.3.3.1.1 RTC - SETTING THE PERIOD OF DATA RECORDING



PEr IOd **Setting the time period of the recording of measured data into the instrument's memory**

- *range of the setting 00:00:00...23:59:59*

4.3.3.2.1 LIMITS - SETTING THE DATA FOR EVALUATION



InP L **Setting the input „quantity" for limits evaluation**

dISAbL The limit will not be evaluated

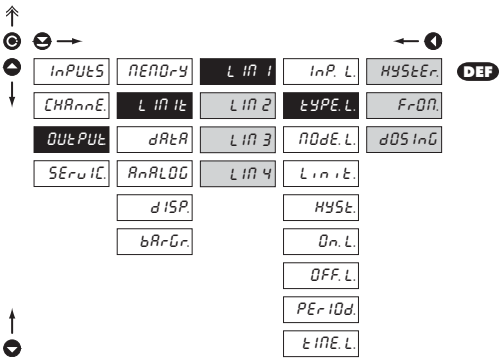
CHAn. A The limit will be evaluated from the output of „Channel A"

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

MAtH.FC. The limit will be evaluated from the output of mathematic functions

! *Setting for limits 2,3 and 4 is the same as for limit 1*

4.3.3.2.2 LIMIT - SETTING THE TYPE OF LIMITS



Setting for limits 2,3 and 4 is the same as for limit 1

tYPE. L **Setting the type of limis**

HYSter The limit has a boundary, hysteresis and delay

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

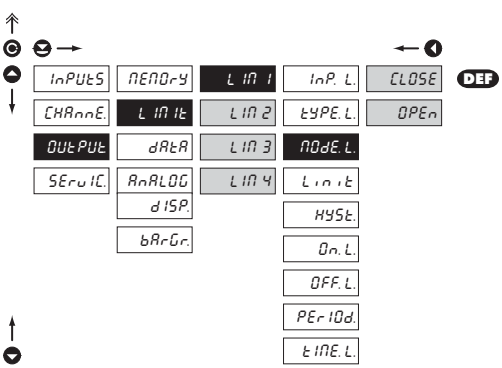
FrOn. The limit is in the mode switch-on „from - to"

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

dOSInG The limit is in mode „dosing"

- *in this mode two „PERIOD." 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 „TIME L." 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*

4.3.3.2.3 LIMITS - SETTING THE RELAY MODEE



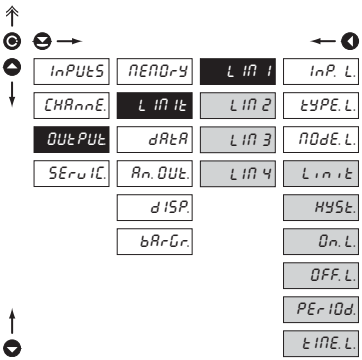
MOdE. L **Setting the relay switching mode**

CLOSE Relay switches on when the condition is met

OPEn Relay switches off when the condition is met

Setting for limits 2,3 and 4 is the same as for limit 1

4.3.3.2.4 LIMITS - SETTING THE LIMITS



L IN - **Setting the values for limits evaluation**

L IN It Setting the limit for relay switch-on

- *within full display range*

HYSt. Setting hysteresis only in (+) values

- *within 1/10 of the display range*

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

- *within full display range*

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

- *within full display range*

PEr IOd. Setting the period of the limit switch-on

- *within full display range*

tIME. L Setting the time delay of the limit switch-on

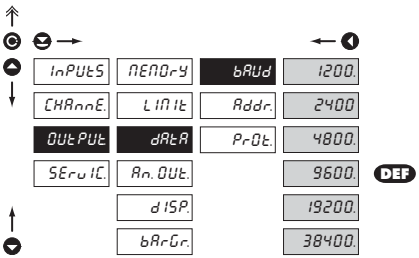
- *in range 0...99,9 s*

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

! *Menu is dynamic, i.e. that the items are displayed in dependance on the setting of the type of limits.*

HYSTER ⇨ Limit + HYST. + TIME. L
FROM ⇨ ON. L + OFF. L
DOSING ⇨ PERIOD. + TIME. L

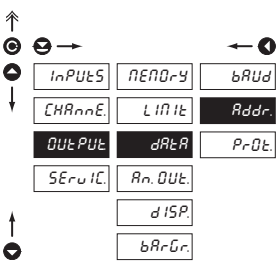
4.3.3.3.1 DATA OUTPUT - SETTING THE TRANSMISSION RATE



bAUd **Setting the transmission rate (baud)**

1200	Rate - 1 200 Baud
2400	Rate - 2 400 Baud
4800	Rate - 4 800 Baud
9600	Rate - 9 600 Baud
19200	Rate - 19 200 Baud
38400	Rate - 38 400 Baud

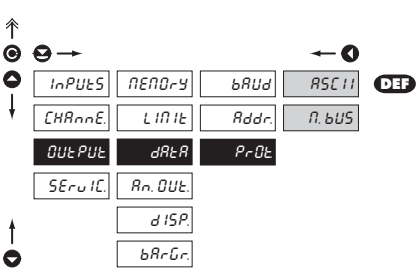
4.3.3.3.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS



Addr. **Setting the instrument address**

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

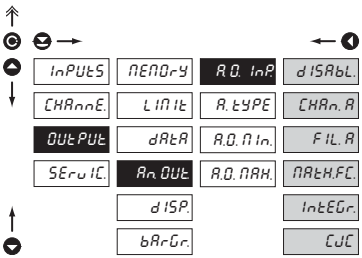
4.3.3.3.3 DATA OUTPUT - SETTING THE DATA PROTOCOL



PrOt **Setting the type of data protocol**

ASCII	ASCII protocol
n. bUS	DIN MessBus protokol

4.3.3.4.1 ANALOG OUTPUT - SETTING THE DATA FOR EVALUATION



A.O. InP **Setting the input „quantity“ for evaluation of the analog output**

dISAbL. AO will not be evaluated ❶

CHAn. A AO will be evaluated from the output of „Channel A“ ❷

FIL. A AO will be evaluated from the output of „Channel A“ after their modification by digital filters ❸

MAtH.FC. AO will be evaluated from the output of mathematic functions ❹

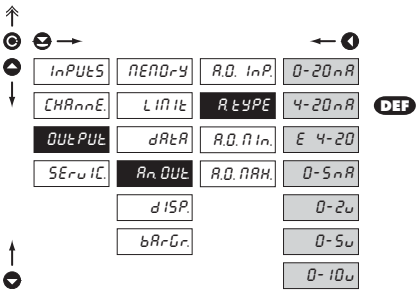
IntEGr. AO will be evaluated from the integrated value ❺

CJC AO will be evaluated from the value of cold junction ❻

Type	Setting options
OMB 401DC	① ② **❸** ④
OMB 401PM	① ② **❸** ④
OMB 401DU	① ② **❸** ④
OMB 401OHM	① ② **❸** ④
OMB 401RTD	① **❷**
OMB 401T/C	① **❷** ⑥

**in bold are the preset values*

4.3.3.4.2 ANALOG OUTPUT - SETTING THE TYPE



A.tYPE **Setting the type of analog output**

0-20mA Type - 0...20 mA

4-20mA Type - 4...20 mA

E 4-20 Type - 4...20 mA with indication of error statement

- *upon error statement the output shows value < 3,6 mA*

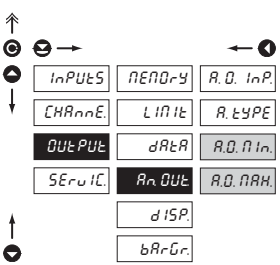
0-5mA Type - 0...5 mA

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

0-5U Type - 0...5 V

0-10U Type - 0...10 V

4.3.3.4.3 ANALOG OUTPUT - SETTING THE RANGE



An.OUt **Setting the range of analog output**

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

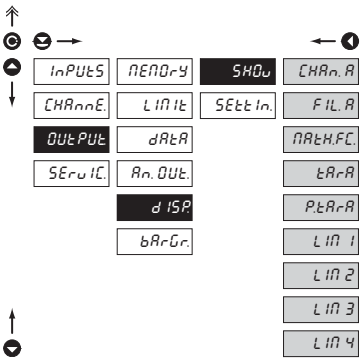
A.O.MIn. Assigning the display value to the beginning of the range of the analog output

- *range of the setting je ±50 000*

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

- *range of the setting je ±50 000*

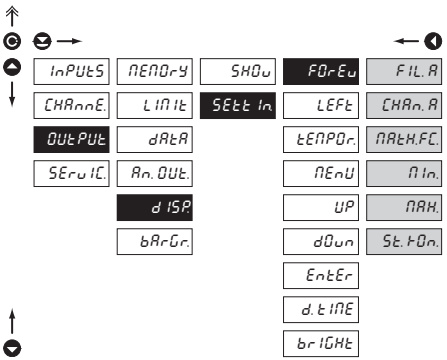
4.3.3.5 PROJECTION ON THE DISPLAY



SHOw	The following data may be projected in this item
CHAn. A	Value of „Channel A“ ⓪
FIL. A	Value of „Channel A“ after filtration ❶
MAtH.FC.	Value of „Mathematic functions“ ❷
tArE	Tare value ❸
P.tArE	Fixed tare value ❹
LIM 1	Value of „Limit 1“ ❺
LIM 2	Value of „Limit 2“ ❻
LIM 3	Value of „Limit 3“ ❼
LIM 4	Value of „Limit 4“ ❽
CJC	Value of „Cold junctions“ ❾

Type	Setting options
OMB 401DC	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 401PM	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 401DU	⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
OMB 401OHM	⓪ ① ② ⑤ ⑥ ⑦ ⑧
OMB 401RTD	⓪ ⑤ ⑥ ⑦ ⑧
OMB 401ST/C	⓪ ① ⑤ ⑥ ⑦ ⑧ ⑨

4.3.3.5.1 PROJECTION ON THE DISPLAY - PERMANENT



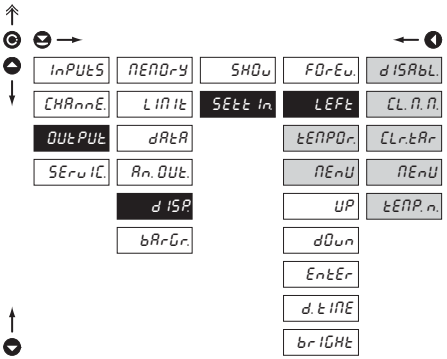
FOrEw Selection of values for permanent projection on the instrument display

- CHAn.A — Value of „Channel A“ ⓪
- FIL.A — Value of „Channel A“ after filtration ❶
- MAtH.FC. — Value of „Mathematic functions“ ❷
- Min — Minimum value ❸
- MAX — Maximum value ❹
- CJC — Value of temperature of the cold junction ❺

Type	Setting options
OMB 401DC	⓪ **❶** ② ③ ④
OMB 401PM	⓪ **❶** ② ③ ④
OMB 401DU	⓪ **❶** ② ③ ④
OMB 401OHM	⓪ **❶** ② ③ ④
OMB 401RTD	**⓪** ③ ④
OMB 401T/C	⓪ ③ ④ **❺**

** in bold are the preset values*

4.3.3.5.2 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „LEFT“



LEFt **Assigning function to the control key „LEFT“**

d ISAbL.	The control key has no function ⓪
CL. M. M.	Resetting the min/max value ❶
CLr. tAr	Tare resetting ❷
MEnU	Direct access to selected item of the menu ❸

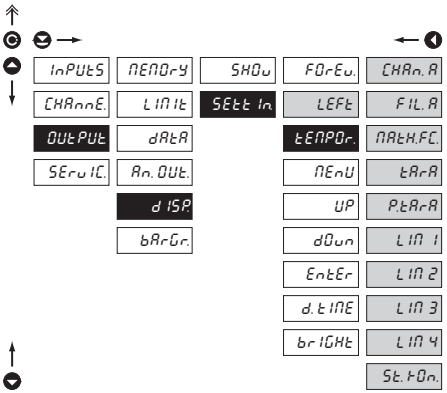
- *see the setting „MENU“*

tEMP. n.	Projection of temporary value ❹

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

Type	Setting options
OMB 401DC	⓪ **❶** ② ③
OMB 401PM	⓪ **❶** ② ③
OMB 401DU	⓪ **❶** ② ③
OMB 401OHM	⓪ **❶** ② ③
OMB 401RTD	**⓪** ③
OMB 401T/C	⓪ ③ **❹**

** in bold are the preset values*



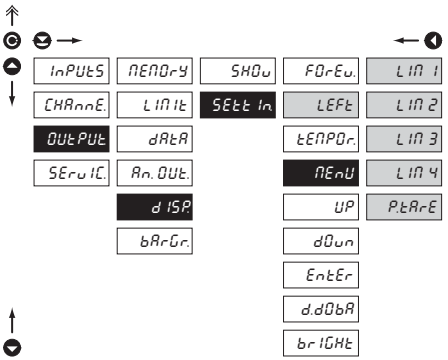
tEMPOr. After selection of the item „TEMP. N.“ from menu „LEFT“ the following options are accessible

- *in this menu the value for temporary projection on the display may be selected (after pressing ◐), which is projected for approx. 2 s with flashing DP*

CHAn.A	Value of „Channel A“ ⓪
FIL.A	Value of „Channel A“ after filtration ❶
MAtH.FC.	Value of „Mathematic functions“ ❷
tArE	Tare value ❸
PtArE	Fixed tare value ❹
LIN 1	Value of „Limit 1“ ❺
LIN 2	Value of „Limit 2“ ❻
LIN 3	Value of „Limit 3“ ❼
LIN 4	Value of „Limit 4“ ❽
CJC	Value of „Cold junction“ ❾

Type	Setting options
OM 472DC	⓪ **❶** ② ③ ④ ⑤ ⑥ ⑦ ⑧
OM 472PM	⓪ **❶** ② ③ ④ ⑤ ⑥ ⑦ ⑧
OM 472DU	⓪ **❶** ② ③ ④ ⑤ ⑥ ⑦ ⑧
OM 472OHM	⓪ ① ② ⑤ ⑥ ⑦ ⑧
OM 472RTD	**⓪** ⑤ ⑥ ⑦ ⑧
OM 472T/C	**⓪** ⑤ ⑥ ⑦ ⑧ ⑨

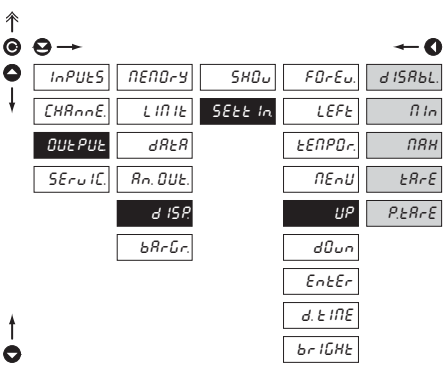
** in bold are the preset values*



MEnU **After selecting item „MENU“ from the menu „LEFT“ the following options are accessible**

LIM 1	Direct access into menu „Limit 1 - Limit“
LIM 2	Direct access into menu „Limit 2 - Limit“
LIM 3	Direct access into menu „Limit 3 - Limit“
LIM 4	Direct access into menu „Limit 4 - Limit“
PtArE	Direct access into menu „Preset tare“

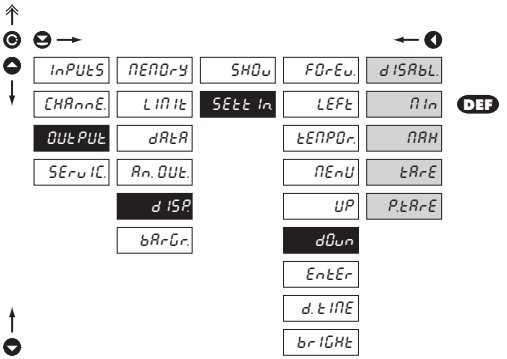
4.3.3.5.3 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „UP“



UP **Assigning function to control key „UP“**

d ISAbL.	The control key has no function
MIn	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
tArE	Projection of value „Tare“
PtArE	Projection of value „Fixed Tare“

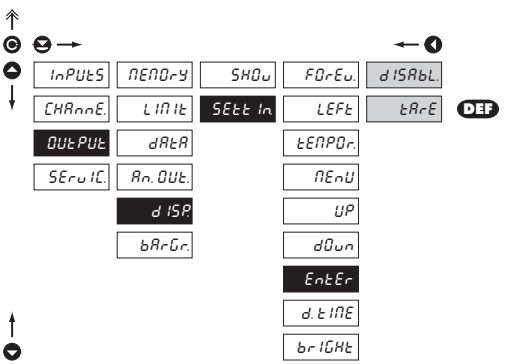
4.3.3.5.4 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „DOWN“



dOun **Assigning function to control key „DOWN“**

d ISAbL.	The control key has no function
Min	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
tArE	Projection of value „Tare“
P.tArE	Projection of value „Fixed Tare“
brUtO	Projection of value „CHAN. A + TARE + P. TARE “

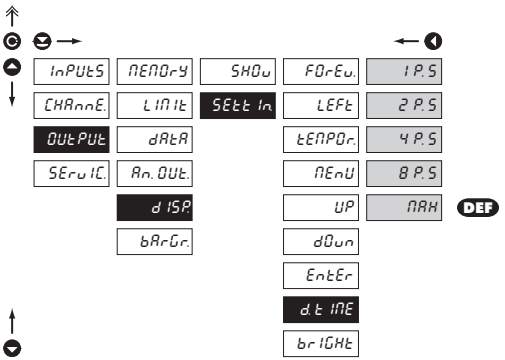
4.3.3.5.5 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „ENTER“



EntEr **Assigning function to control key „ENTER“**

d ISAbL.	The control key has no function
tArA	Display Taring

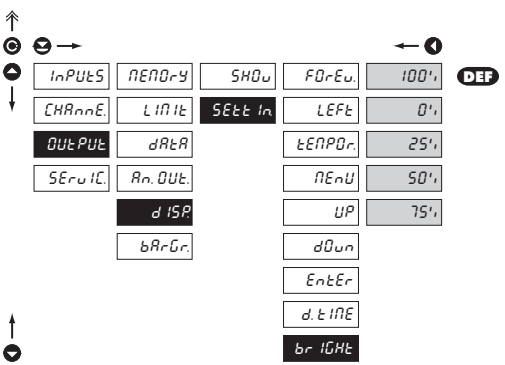
4.3.3.5.6 PROJECTION ON THE DISPLAY - RESTORATION FREQUENCY



d.t IME — **Restoration frequency of display projection**

1 P.S	Restoration 1x per second
2 P.S	Restoration 2x per second
4 P.S	Restoration 4x per second
8 P.S	Restoration 8x per second
MAX	Restoration at max rate, approx. 20x per second

4.3.3.5.7 PROJECTION ON THE DISPLAY - BRIGHTNESS



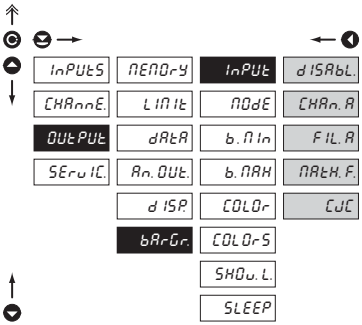
br IGHt — **Setting the display brightness**

100'	Brightness 100 %
0'	Brightness 0 %, the display is off

- *display switches off after approx. 10 s and switches on after pressing any arbitrary key*

25'	Brightness 25 %
50'	Brightness 50 %
75'	Brightness 75 %

4.3.3.6.1 BARGRAPH - SETTING DATA FOR EVALUATION



InPUt Setting the input „quantity" for bargraph

dISAbL. Bargraph is off ❶

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

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

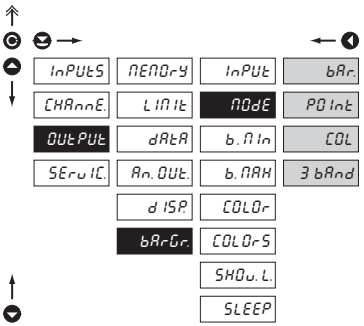
MAtH.F. Bargraph will be evaluated from the output of math.functions ❹

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

Type	Setting options
OMB 401DC	① ② **❸** ④
OMB 401PM	① ② **❸** ④
OMB 401DU	① ② **❸** ④
OMB 401OHM	① ② **❸** ④
OMB 401RTD	① **❷**
OMB 401T/C	① **❷** ⑤

**in bold are the preset values*

4.3.3.6.2 BARGRAPH - PROJECTION MODE



MOdE **Setting the projection mode for bargraph**

bAr. Column projection

Point. Point projection

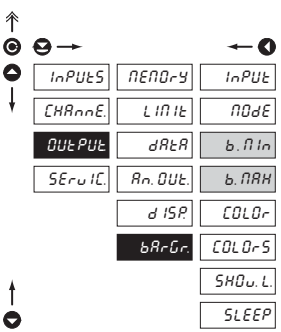
COL 3-coloured column projection

- *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 bAnd. 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*

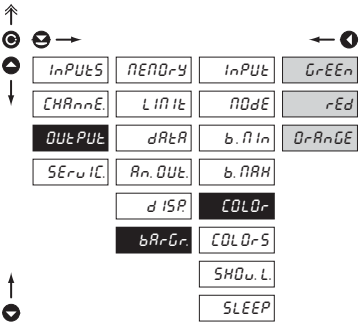
4.3.3.6.3 BARGRAPH - PROJECTION RANGE



MIn Setting bargraph projection for minimum input signal value

MAX Setting bargraph projection for maximum input signal value

4.3.3.6.4 BARGRAPH - SETTING THE COLOURS



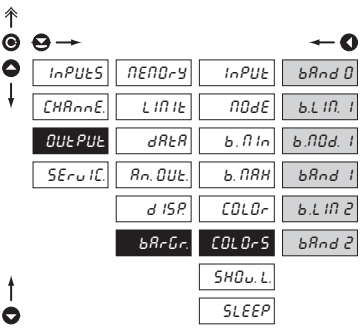
COLOr **Setting colours and their boundaries for bargraph**

- *for MODE > BAR or Point*

GrEEn Green

rEd Red

OrAnGE Orange



COLOr **Setting colours and their boundaries for bargraph**

- *for MODE > 3 COL or 3 BAND*

bAnd.0 0. band colour

bAnd. 1 1. band colour

bAnd.2 2. band colour

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

GrEEn Green

rEd Red

OrAnGE Orange

b.LIM. 1 Boundary between 0./1. band

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

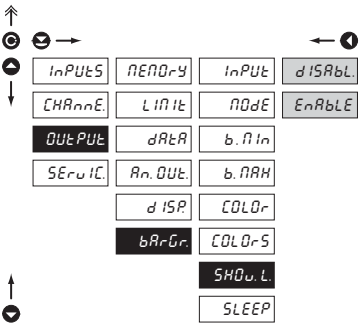
b.LIM.2. Boundary between1./ 2. band

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

b.MOd. 1. Selection of inverse projection

- *selection NOR./INV.*
- *setting the INV is designated for projection when indication of zero „centre" is necessary*

4.3.3.6.5 BARGRAPH - PROJECTION OF LIMITS



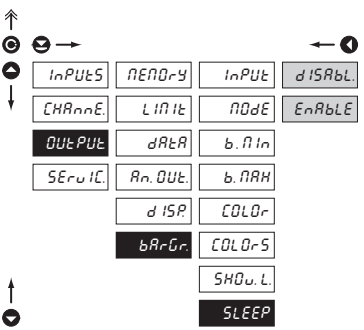
SHOu.L. **Projection of limits on the LED bargraph**

dIAbL. Limits will be projected on LED bargraph

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

EnAbLE Limits will not be projected on LED bargraph

4.3.3.6.6 BARGRAPH - PROJECTION SWITCHED OFF



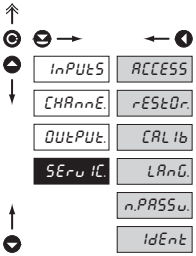
SL. **Projection of LED bargraph switched off**

- *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

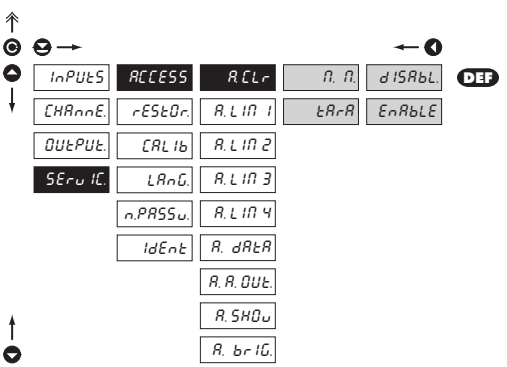
EnA. LED bargraph is off

4.3.4 CALIBRATION MODE - SERVICE



ACCESS	Setting the access rights for „User mode“
rESEOr.	Return to manufacture calibration or setting
CALIb	Instrument calibration
LAnG.	Setting the language version
n.PASSu.	Change of the access password
IdEnt	Instrument identification

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



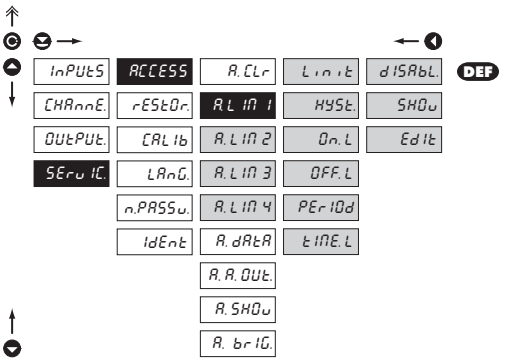
A.CLr **Authorization for resetting of the internal values of the instrument**

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

In all items it is possible to select the following parameters

diSAbL.	The item is not displayed in the „UM“
EnAbLE	The item has full access in the „UM“

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



! *Menu is dynamic, i.e. the items are displayed in dependance on the setting of the type of the limits.*

HYSTER ⇨ Limit + HYST. + TIME. L
FROM ⇨ ON. L + OFF. L
DOSING ⇨ PERIOD + TIME. L

A.LIM - Setting the access rights into limits in the „UM“

Limit Authorization for item „Limit“, setting limit

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

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

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

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

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

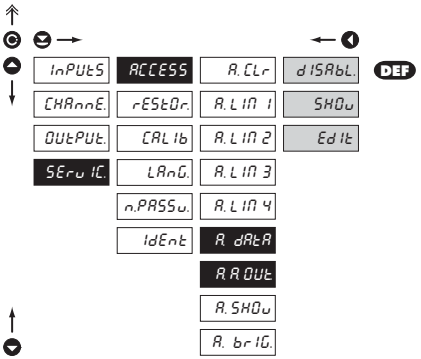
In all items it is possible to select the following parameters

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

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

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

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



A. dAtA **Authorization for item „DATA“, setting the data output**

AA OUt **Authorization for item „ANALOG“, setting the analog output**

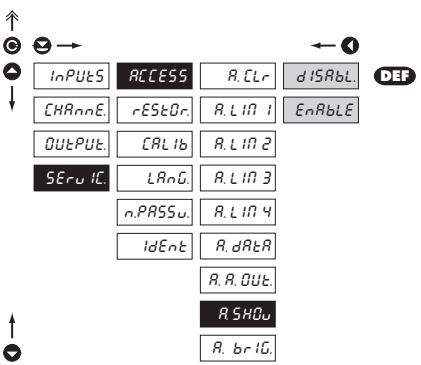
In all items it is possible to select the following parameters

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

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

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

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



A SHOu **Authorization for projection of internal values „SHOW“ from menu „OUTPUT. - DISP“**

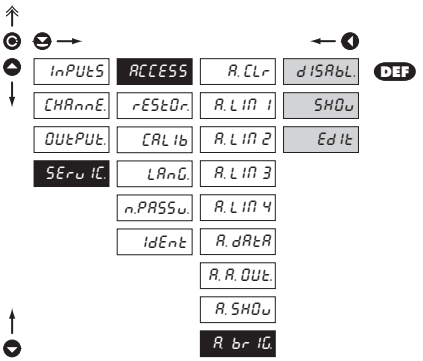
- *sets authorization for temporary projection of internal values of the instrument*

The following parameters may be selected in this item

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

EnAbLE The item has full access in the „UM“

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

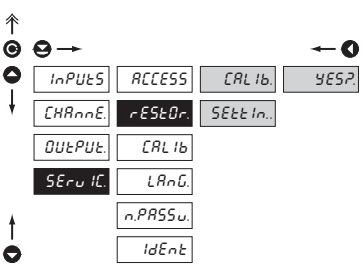


A. br IG. Authorization for item „BRIGHT“, setting of the display brightness

The following parameters may be selected in this item

- **dISAbL.** The item is not displayed in the „UM“
- **SHOu** The item is displayed in the „UM“ but cannot be changed
- **Edit** The item has full access in the „UM“ including editing

4.3.4.2 RETURN TO MANUFACTURE CALIBRATION/SETTING



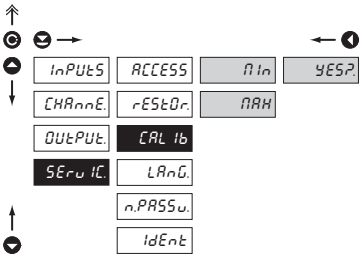
rESEt0r. Return to manufacture calibration or instrument setting

- *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 Ib.** Return to manufacture calibration of the instrument
- **SEtt In..** Return to manufacture setting and calibration

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

4.3.4.3 INSTRUMENT CALIBRATION



CAL Ib **Instrument calibration**

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

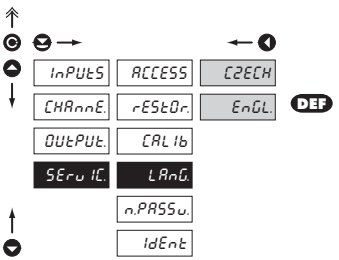
MIn Entering and connectinng the reference signal (weight) for minimum input value

- *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

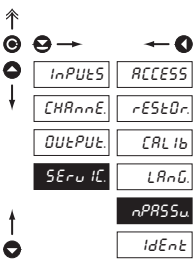


LAnG. **Setting the language version for the instrument menu**

CZECH Instrument menu is in Czech language

EnGL. Instrument menu is in English language

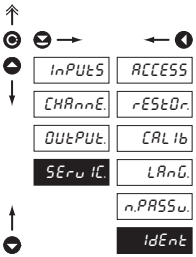
4.3.4.5 SETTING NEW ACCESS PASSWORD



nPASSw **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...9999*

4.3.4.6 INSTRUMENT IDENTIFICATION

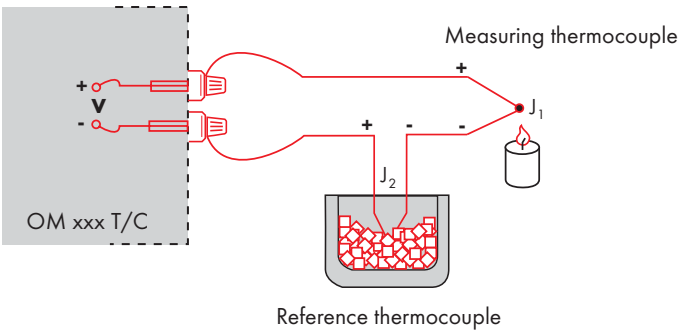


IdEnt **Projection of the instrument version**

- *the display shows type identification of the instrument with the number of revision*
- *instrument name - input - program version - SW date (MM/DD/RR), e.g.: OMB401PM > 004-02 > 052902*

5. MEASURING OF THE COLD JUNCTION

The instrument OMB 401T/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 CJC to C. YES
- when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu CJC. tEM. its temperature
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CJC. tEM. to number 99. 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 CJC to C. nOt
- when measuring tempreature without reference thermocouple the error in the measured data may be even 10°C

6. TABLE OF SYMBOLS

The instrument allows to add two description symbols to the classic numeric formats (at the expense of the number of displayed places). Entering is performed through shifted ASCII code. Upon MODEification the first two places show the entered symbols and the last two the code of the relevant symbol from 0 to 95. Numeric value of a given symbol equals the sum of the number on both axes of the table.

Description is cancelled by entering symbols with code 00

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

7. 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.

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

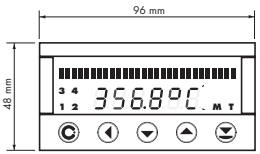
Action	Type	Protocol		Transmitted data												
Soliciting data (PC)	232	ASCII		#	A	A	<CR>									
		MessBus		Not present - data is transmitted permanently												
	485	ASCII		#	A	A	<CR>									
		MessBus		<SADR>	<ENQ>											
Sending data (OM)	232	ASCII		>	D	D	D	D	D	D	D	(D)	(D)	(D)	<CR>	
		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>												

8. ERROR STATEMENTS

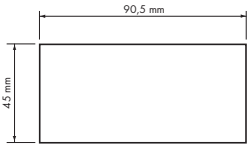
ERROR	REASON	ELIMINATION
E. Und.	range underflow (A/D converter)	change the input signal value or change display projection
E. OuEr.	range overflow (A/D converter)	change the input signal value or change display projection
E. MAt	mathematic error, range of projection is out of display	change the set projection
E.dAtAE	violation of data integrity in EEPROM, error upon data storage	in case of recurring report send the instrument for repair
E. MEn.	EEPROM error	the „Def" values will be used in emergency, instrument needs to be sent for repair
E.CAL 16	calibration error, loss of calibration data	instrument needs to be sent for repair

9. INSTRUMENT DIMENSIONS AND INSTAL.

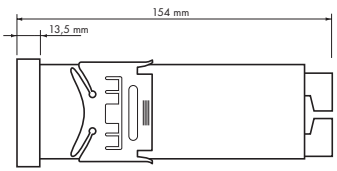
Front view



Panel cut



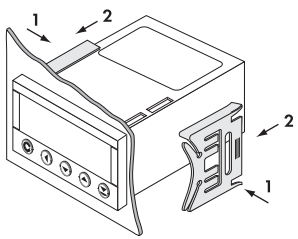
Side view

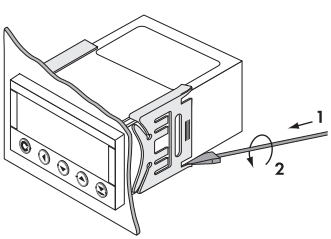


Panel thickness: 0,5...20 mm

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. 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 STAND.ard, two inputs I and U are osazeny		

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	

PROJECTION

Display:	Bargraph 30 LED - tricolours
	Display, 6 digit intesive red or green LED,
	digit height 9 mm
Projection:	±49999
Decimal point:	adjustable - in programng mode
Brightness:	adjustable - v programming mode

INSTRUMENT ACCURACY

Temperature coeff.:	60 ppm/°C
Accuracy:	±0,05 % of the range
	±0,1 % of the range (OMB 401DU)
	±0,2 % of the range (OMB 401RTD, T/C)
Measuring rate:	0,1...16,6 m/s
	1...8 m/s (OMB 401I)
	1...100 m/s (OMB 401DU)
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

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:	96 x 48 x 142 mm
Panel cut-out:	90,5 x 45 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

** the values apply for resistance load*

11. DECLARATION OF CONFORMITY

Company:	ORBIT MERRET, spol.s r.o. (Ltd.) Klánova 81/141 142 00 Prague 4 Czech Republic IDNo: 00551309
Manufactured:	ORBIT MERRET, spol.s r.o. (Ltd.) Vodňanská 675/30 198 00 Prague 9 Czech Republic

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

Product:	30 LED/6 -digit programmable panel bargraph
Type:	OMB 401, in versions: DC, PWR, PM, DU, OHM, RTD, T/C, I, LX, T
Mode of asses. of conformity:	§12, par. 4 b, d of Act No.22/1997 Sb.

Conformity is assessed pursuant to the following standards::

Electrical safety:	EN 61010-1
EMC:	EN 50131-1, par. 14 and par. 15 prEN 50131-2-1, par. 9.5.3 EN 50130-4, chapter 7. EN 50130-4, chapter 8, EN 61000-4-11 EN 50130-4, chapter 9, EN 61000-4-2 EN 50130-4, chapter 10, EN 61000-4-3 EN 50130-4, chapter 11, EN 61000-4-6 EN 50130-4, chapter 12, EN 61000-4-4 EN 50130-4, chapter 13, EN 61000-4-5 EN 61000-3-2 + A12, Cor. 1, change A1, change A2 EN 50130-4, chapter 8, EN 61000-4-11 EN 61000-3-2 + A12
and government ordinance:	
Electrical safety:	No. 168/1997 Sb.
EMC:	No. 169/1997 Sb.

The evidence are the protocols of authorized and accredited organization:
VTÚE Praha, experimental laboratory No. 1158 accredited by ČIA, o.p.s. with EN ISO/IEC 17025

Place and date of issue: Prague, 24. october 2002

Miroslav Hackl
Company representative

12. CERTIFICATE OF GUARANTEE

Product	**OMB 401 DC PM DU I LX T 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

ORBIT MERRET, spol. s r.o.
Vodnanska 675/30
198 00 Prague 9
Czech Republic
tel: +420 - 281 040 200
fax: +420 - 281 040 299
e-mail: orbit@merret.cz
www.orbit.merret.cz

Austria
ING.E.GRUBER GmbH
Edu. Kittenberger Gasse 97 Top2
A-1230 Wien
tel: +43 - 1 - 869 23 39-0
fax: +43 - 1 - 865 18 75
e-mail: office@gruber-components.at
www.gruber-components.at

Germany
MEGATRON Elektronik AG & Co.
Hermann-Oberth-Str. 7
85640 Putzbrunn/München
tel: +49 - 89 - 460 94 - 0
fax: +49 - 89 - 460 941 01
e-mail: sales@megatron.de
www.megatron.de

Lithuania
RIFAS UAB
Tinklu g. 29a
LT-5300 Panevėžys
tel: +370 - 5 - 510 400
fax: +370 - 5 - 582 729
e-mail: sales@metrix1.com
www.metrix1.com

The Netherlands
AE SENSORS B.V.
J. Valsterweg 92
3301 AB Dordrecht
tel: +31 - 78 - 621 31 52
fax: +31 - 78 - 621 31 46
e-mail: aesensors@aesensors.nl
www.aesensors.nl

Russian Federation
PO <INTERFACE>
a.b. 3408
Krasnodar, 350044
tel: +1 - 8612 - 660 483
fax: +1 - 8612 - 623 000
e-mail: itf@au.ru
www.meter.chat.ru

Slovakia
TECHREG, s.r.o.
Dukelských hrdinov 2
984 22 Lučenec
tel: +421 - 47 - 433 15 92
fax: +421 - 47 - 433 15 92
e-mail: techreg@bb.psg.sk
www.techreg.sk

Switzerland
ORBIT CONTROLS AG
Zürcherstrasse 137
8952 Schlieren
tel: +41 - 1 - 730 27 53
fax: +41 - 1 - 730 27 83
e-mail: info@orbitcontrols.ch
www.orbitcontrols.ch

Turkey
ALFA ELEKTRONIK Ltd.
Baglarbasi Mah. Ergenekon No: 33
TR - 81540 Maltepe - ISTANBUL
tel: +90 - 216 - 442 39 49
fax: +90 - 219 - 305 54 50
e-mail: sb@elmak.com.tr
www.alfa-technik.com

Ukraine
OOO <KOTRIS>
Nesterova 3, Office 907
030 57 Kyjev
tel: +44 - 446 - 21 42
fax: +44 - 446 - 21 42
e-mail: metrix-ua@svitonline.com

USA
METRIX Instruments Co.
1711 Townhurst Dr.
Houston, Texas 77043-2899
tel: +1 - 713 - 461 21 31
fax: +1 - 713 - 461 82 83
e-mail: sales@metrix1.com
www.metrix1.com