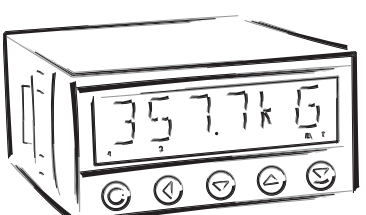
GUARANTEE
2
YEARS

OM 472

4 3/2 DIGIT PROGRAMMABLE
4 - CHANNEL

DC VOLTMETER/AMMETER
PROCESS MONITOR



SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OM 472 series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

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

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

CONNECTION

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

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

1. CONTENTS

2. INSTRUMENT DESCRIPTION

The OM 472 model series are 4 3/4 digit panel programmable instruments, which are manufactured in the following alternatives:

OM 472DC	DC voltmeter/ammeter	DC
OM 472PM	Process monitor	PM

These Instructions for use describes solely the instruments OM 472 DC and OM 472PM in expanded version with 4 inputs, other instruments of the OM 472 series are described in separate Instructions for use

The instruments are based on an 8-bit microcontroller 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	±49999
Inputs:	2...4 (with common GND)

Digital filters

Floating avergae	from 2...10 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 tare
Top value	the display shows only max (min) value
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	resetting tare to zero
Resetting MV	resetting min/max value to zero

Switching of channels (inputs)

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 units 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 043*

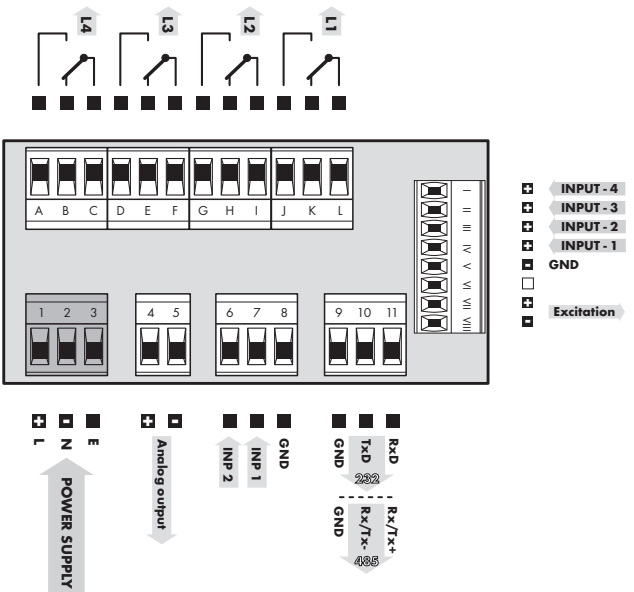
3. CONNECTION

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



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

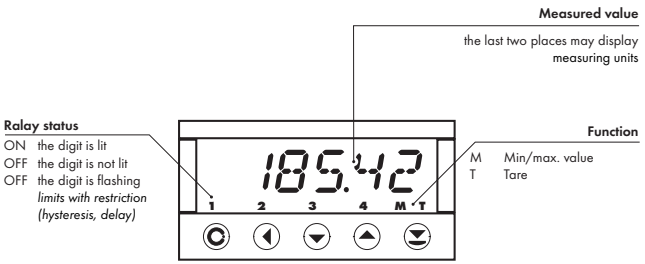
! *Relay parameters listed in the Technical data apply for resistance load. Upon connection of induction load we recommend fitting the leads to the relay 1 A with a fuse for protection of maximum load.*

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)

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 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 -

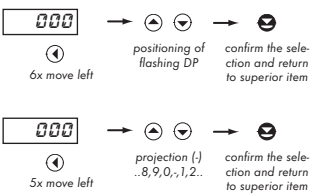
SETTING THE DECIMAL POINT AND THE MINUS SIGN

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 „CHAN. x - 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

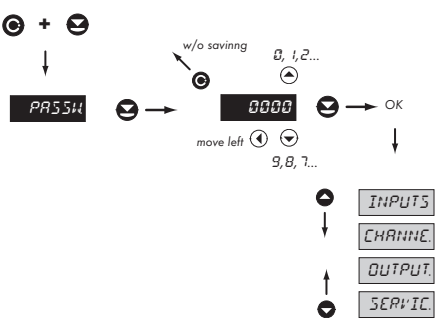
⇨ „Calibration mode" ⇨ menu of projection on the display - maximum INP. ⇨ MAX.

⇨ 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 individual*

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"

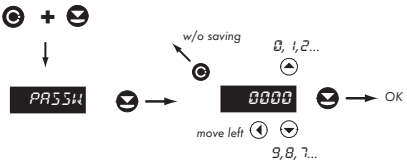
4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

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"

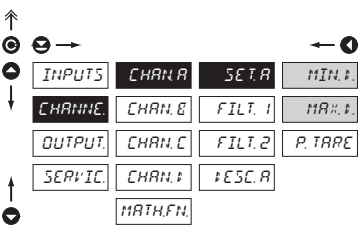


PASSW **Entering the introductory access password**

0000 Standard manufacture setting of the access password

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

❷ Setting projection on display



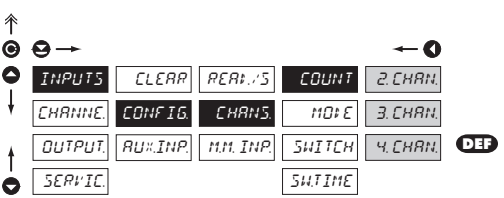
SET.A **Setting projection on display**

MIN.P Setting display projection for minimum input signal value

MAX.P Setting display projection for maximum input signal value

Repeat the setting for required number of channels (inputs)

❸ Setting the instrument inputs



COUNT **Setting the number of active channels (inputs)**

- *measuring rate is proportionately decreasing depending on the number of measuring channels*

MODE **Setting measuring mode of the input part**

SWITCH Manual switching of inputs

- *manual switching of channels*
- *instrument measures and evaluates only from selected channel*
- *working possible up to maximum measuring rate*

CYCLE Automatic input switching

- *instrument measures continuously on all active channels (inputs)*
- *measuring rate is proportionate to the number of active channels (inputs), e.g. 2 inputs > maximum measuring rate on one input is 1/2*
- *this „CYCLE" has to be switched on always when using „Mathematic functions" and evaluation of limits for all channels*

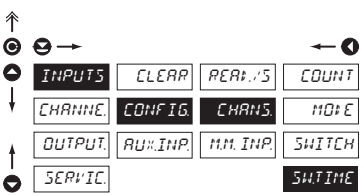
SWITCH **Setting projection on display**

MANUAL Manual switching of inputs

- *manual switching of channel projection*

AUTOM. Automatic input switching

- *projected channel (input) is automatically switched after time „SW TIME"*

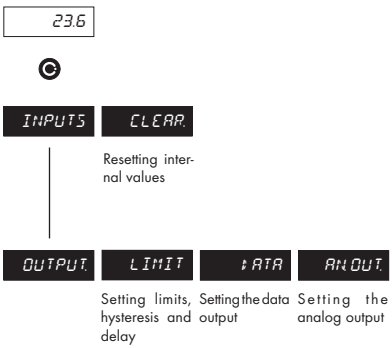


SW.TIME **Setting time for automatic input switching**

- *time setting range is 0,5...99,9 s*

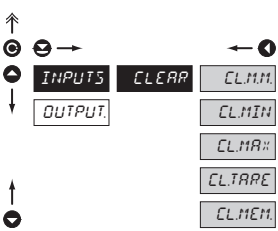
4.2 USER MENU

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



! *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



Adjustable authorization of access into items, see page. 42

CLEAR **Resetting the internal values of the instrument**

CL.M.M. Resetting the minimum and maximum measuring value

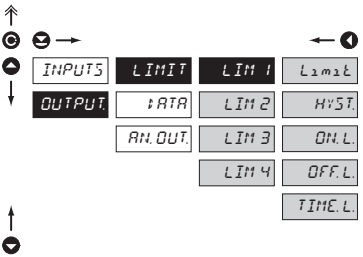
CL.TARE Tare resetting

- *in this entry individual channels may be reset separately*

CL.MEM. Resetting measured data from the instrument memory

- *item is displayed only in version with RTC*

4.2.2 LIMITS - ENTERING THE VALUES



Adjustable authorization of access into items, see page 43

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

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

Limit 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*

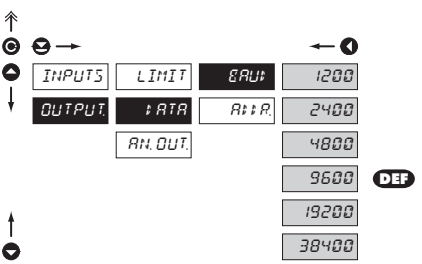
OFF. L. Setting the end og the range of the limit switch-on

- *within full display range*

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 44

BAUD **Setting the data output rate (baud)**

1200 Rate - 1 200 Baud

2400 Rate - 2 400 Baud

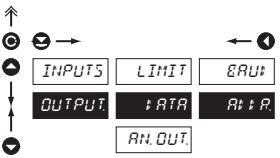
4800 Rate - 4 800 Baud

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

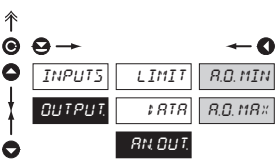


ADDR **Setting the instrument address**

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

Adjustable authorization of access into items, see page 44

4.2.4 ANALOG OTPUT - SETTING THE RANGE



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*

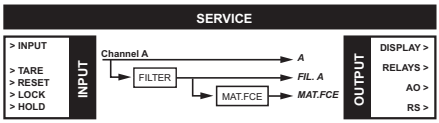
A.O.MAX Assigning the display value to the end of the analog output range

- *range of the setting is ±50 000*

Adjustable authorization of access into items, see page. 44

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 + E

PASSW

0000 Entering the access password

INPUTS | CLEAR | CONFIG. | AU»INP.

INPUTS
Setting the instrument input

- CLEAR: Resetting internal values
- CONFIG.: Primary instrument setting
- AU»INP.: Setting the Hold function

CHANNE. | CHAN A | CHAN B | CHAN C | CHAN D | MATHFN.

CHANNE..
Setting the measuring channels

- CHAN A: Configuration of parameters of measuring channel A
- CHAN B: Configuration of parameters of measuring channel B
- CHAN C: Configuration of parameters of measuring channel C
- CHAN D: Configuration of parameters of measuring channel D
- MATHFN.: Setting the mathematic functions

OUTPUT. | LIMIT | DATA | ANOUT. | DISP

OUTPUT.
Setting the instrument outputs

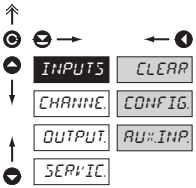
- LIMIT: Settin the limits, hysteresis and delay
- DATA: Setting the data output
- ANOUT.: Setting the analog output
- DISP: Setting display projection

SERVIC. | ACCESS | RESTOR. | CALIB | LANG. | N.PASS. | IDENT

SERVIC.
Service functions

- ACCESS: Setting the access rights for „User menu"
- RESTOR.: Displayed data which equals max bargraph projection
- CALIB: Instrument calibration
- LANG.: Setting the language version
- N.PASS.: Change of the access password
- IDENT: Instrument identification

4.3.1 CONFIGURATION MODE - INPUTS



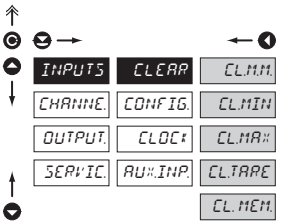
The basic instrument parameters are set here

CLEAR. Resetting the instrument internal values

CONFIG. Basic instrument setting

AUX.INP. Setting the „Hold" function

4.3.1.1 RESETTING THE INTERNAL VALUES



CLEAR Resetting the internal values of the instrument

CL.M.M. Resetting the minimum and maximum measuring value

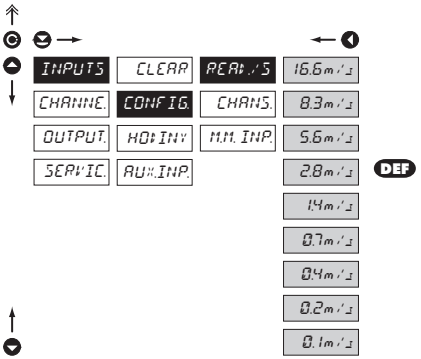
CL.TARE Tare resetting

- *in this entry individual channels may be reset separately*

CL.MEM. Resetting measured data from the instrument memory

- *item is displayed only in version with RTC*

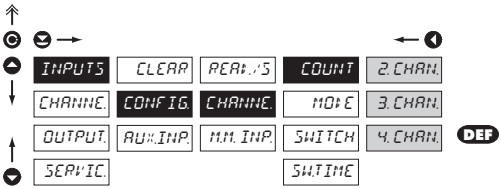
4.3.1.2.1 SETTING THE MEASURING RATE



MEAS.RATE Setting the instrument measuring rate

- *selected measuring rate applies for one active channel, with every other it is proportionately decreasing*

4.3.1.2.2 SETTING SWITCHING OF CHANNELS (INPUTS)



COUNT **Setting the number of active channels (inputs)**

- *measuring rate is proportionately decreasing depending on the number of measuring channels*

MODE **Setting measuring mode of the input part**

SWITCH Input switching

- *instrument measures and evaluates only from selected channel*
- *working possible up to maximum measuring rate*

CYCLE Cyclic input switching

- *instrument measures continuously on all active channels (inputs)*
- *measuring rate is proportionate to the number of active channels (inputs), e.g. 2 inputs > maximum measuring rate on one input is 1/2*
- *the „CYCLE" mode has to be switched on always when using „Mathematic functions" and evaluation of limits for all channels*

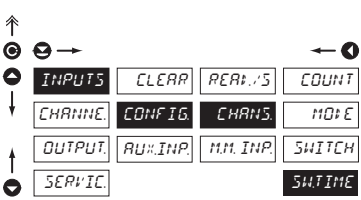
SWITCH **Setting projection on display**

MANUAL Manual switching of inputs

- *manual switching of channel projection*

AUTOM. Automatic input switching

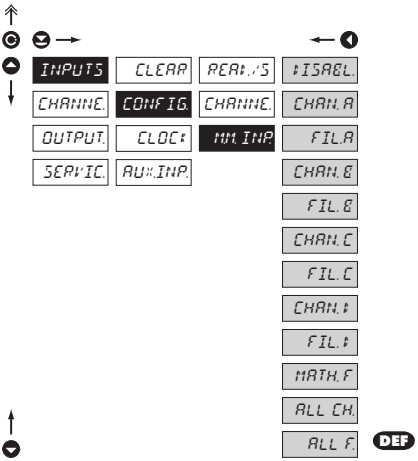
- *projected channel (input) is automatically switched after time „SW TIME"*



SW.TIME **Setting time for automatic input switching**

- *time setting range is 0,5...99,9 s*

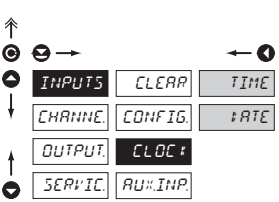
4.3.1.2.3 SETTING EVALUATION OF MIN/MAX VALUE



MIN.INP. Setting the input „quantity“ for evaluation of min/max value

DISABL.	Min/max vaule is off
CHAN.A	From value of Channel A
FIL.A	From filtered value of Channel A
CHAN.B	From value of Channel B
FIL.B	From filtered value of Channel B
CHAN.C	From value of Channel C
FIL.C	From filtered value of Channel C
CHAN.D	From value of Channel D
FIL.D	From filtered value of Channel D
MATH.F	From mathematic function
ALL CH.	From value of Channels A, B, C, D
FIL.A-D	From filtered value of Channels A, B, C, D

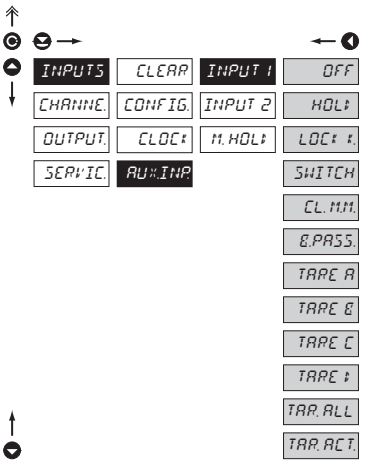
4.3.1.3 SETTING THE REAL TIME CLOCK



WATCH Setting the real time clock (RTC)

TIME	Setting the time
DATE	Setting the date

4.3.1.4 AUXILIARY INPUTS

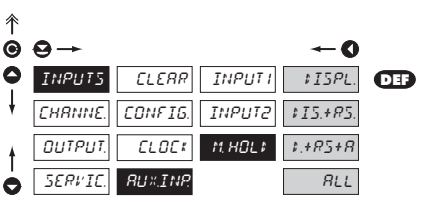


Setting the functions for Inputs 1 and 2 is the same

INPUT x **Assigning functions to auxiliary inputs**

OFF	Vstup je odpojen
HOLD	Activation of the „Hold" function
LOCK K.	Activation of the function „Keyboard blocking"
SWITCH	Ruční přepínání měřicích vstupů
CL.M.M.	Activation of the function „Resetting min/max value"
B.PASS.	Activation of the function „Blocking access into Configuration menu"
TARE A	Activation of the „Tare" function for Channel A
TARE B	Activation of the „Tare" function for Channel B
TARE C	Activation of the „Tare" function for Channel C
TARE D	Activation of the „Tare" function for Channel D
TAR.ALL	Activation of the „Tare" function for all Channels
TAR.ACT.	Activation of the „Tare" function for active Channel

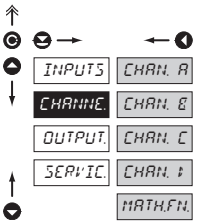
4.3.1.4.1 AUXILIARY INPUTS



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

DISPL.	Signal „Hold" blocks the displayed value
DIS.+RS	Signal „Hold" blocks the displayed value and the data output function
D.+RS+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

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

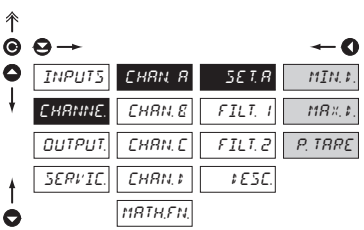
CHAN. B — Setting parameters and the range of the instrument measuring channel B

CHAN. C — NSetting parameters and the range of the instrument measuring channel C

CHAN. D — Setting parameters and the range of the instrument measuring channel D

MATH.FN. — Setting the instrument mathematic functions

4.3.2.1 SETTING THE MEASURING „CHANNEL A"



SET.A — Setting the input parameters

MIN.D — Setting display projection for minimum value of input signal

- *range of the setting is ±49999*

MAX.D — Setting display projection for maximum value of input signal

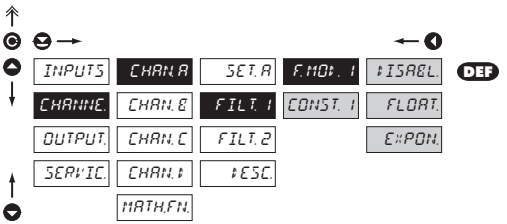
- *range of the setting is ±49999*
- *determines the range of setting of the DP for display, MIN.D and P. TARE*

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

- *upon the setting the symbol T (LED) is active*

! *Setting for inputs CHAN. B, CHAN. C and CHAN. D is identical*

4.3.2.2 SETTING THE MEASURING „CHANNEL A" - FILTERS



Setting for inputs CHAN. B, CHAN. C and CHAN. D is identical

F.MOD.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

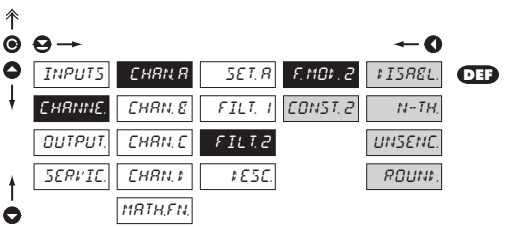
FLOAT. Selection of floating filter

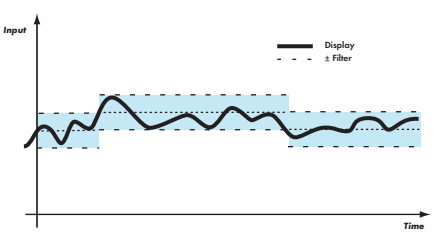
- *calculation of value is from the number of measurements selected in „CONST 1"*
- *range 2...10 measurements*

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





Setting for inputs CHAN. B, CHAN. C and CHAN. D is identical

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

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

CONST.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

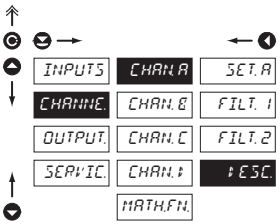
- *this filter allows to stabilise the resulting value. The previous value is taken as a result of the measurement if the measured value is not higher than the previous + P or lower than the previous - P. The value „±P" indicates the band of insensitiveness in which the measured value may change without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

the result - change of data on the display
- *range 0,00001...100 000*

ROUN	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 DESCRIPTION OF MEASURING UNITS



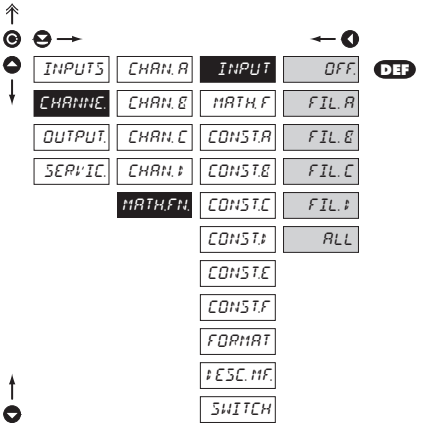
↑ESC. Setting the projection of measuring units on the display for Channel A

- *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*

! *Setting for inputs CHAN. B, CHAN. C and CHAN. D is identical*

Table of symbols on page 47

4.3.2.5 MATHEMATIC FUNCTIONS

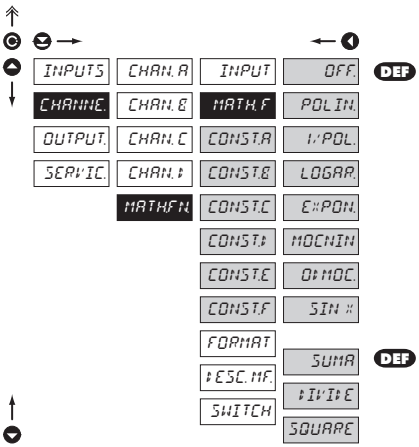


INPUT Selection of input „quantity" for evaluation of Mathematic function

- *this menu is displayed always after selection of particular mathematic functions with option of entering constants A, B, C, D, E and F*

OFF.	Mathematic functions are off
FIL.A	From filtered value of channel (input) A
FIL.B	From filtered value of channel (input) B
FIL.C	From filtered value of channel (input) C
FIL.D	From filtered value of channel (input) D
ALL	From filtered values of all channel (inputs) A, B, C, D

4.3.2.5.1 MATHEMATIC FUNCTIONS



MATH.F **Selection of mathematic functions**

CONST. - 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*

Upon entering the input „quantity" „FIL. -" the entry INPUT displays the following selection

OFF Mathematic functions are off

POLIN Polynome

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

1/POL 1/x

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

LOGAR. Logarithm

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

EXPON. Exponential

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

MOCNIN. Power

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

DIMOC. Radical

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

SIN X Sin x

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

\Upon entering input „quantity" „VSE" in entry INPUT the following selection is displayed

SUMA Sum of the values from channels (inputs)

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

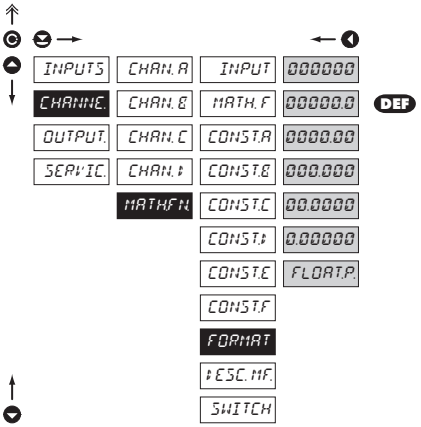
DIVIDE — Quotient of values from channels (inputs)

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

SQUARE — Square of values from channels (inputs)

(A x KA² + B x KB² + C x KC² + D x KD²) x E + F

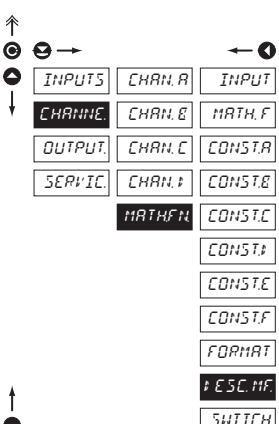
4.3.2.5.2 MATHEMATIC FUNCTIONS - PROJECTION FORMAT



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."*

4.3.2.5.3 MATHEMATIC FUNCTIONS - DESCRIPTION ON THE DISPLAY

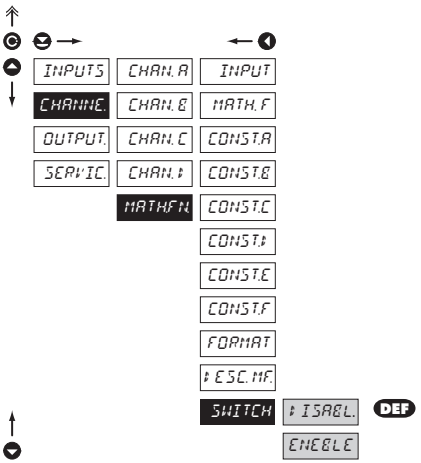


ESC. MF. — Setting the measuring units on the display upon projection of mathematic functions

- *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."*

Table of symbols on page 47

4.3.2.5.4 MATEMATICKÉ FUNKCE - PERNAMENT PROJECTION



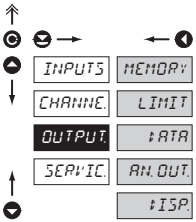
SWITCH Permission to switch math.functions in permanent projection

- *allows for switching of the math.functions channel as another channel for permanent projection*

DISABL. Switching the math.functions channels - prohibited

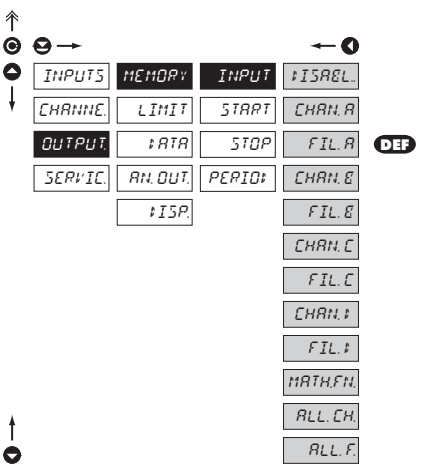
ENABLE Switching the math.functions channels - permitted

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

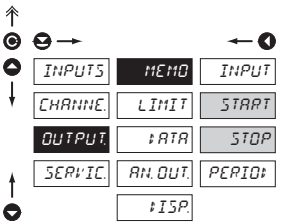
4.3.3.1.1 RTC - SETTING DATA FOR EVALUATION



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
CHAN.B	Record will be realized from the data from „Channel B"
FIL.B	Record will be realized from the data from „Channel B" after their modification by digital filters
CHAN.C	Record will be realized from the data from „Channel C"
FIL.C	Record will be realized from the data from „Channel C" after their modification by digital filters
CHAN.D	Record will be realized from the data from „Channel D"
FIL.D	Record will be realized from the data from „Channel D" after their modification by digital filters
MATH.FN.	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

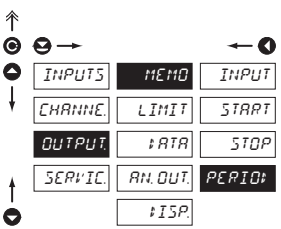
START — Beginning of the recording of measured data into the instrument's memory

- *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

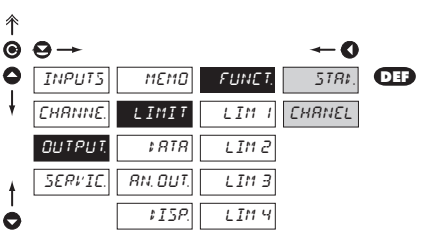
4.3.3.1.1 RTC - SETTING THE PERIOD OF DATA RECORDIN



PERIOD — 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 LIMITY - FUNKCE RELÉ



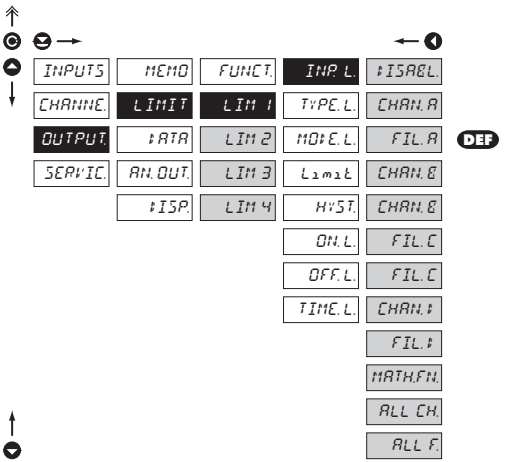
FUNCT. — Setting the input „quantity" for limits evaluation

STAT. — Relay status is governed by limits evaluation

CHANEL — Signalization of active channel (input)

- *limits are not evaluated. Depending on which input is selected for permanent projection relays 1 - 4 get switched.*

4.3.3.2.2 LIMITS - SETTING THE DATA FOR EVALUATION



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

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

CHAN.B The limit will be evaluated from the output of „Channel B“

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

CHAN.C The limit will be evaluated from the output of „Channel C“

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

CHAN.D The limit will be evaluated from the output of „Channel D“

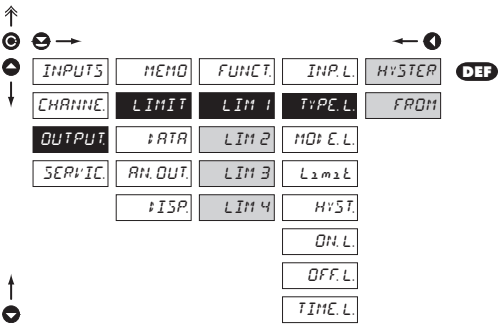
FIL.D The limit will be evaluated from the output of „Channel D“ after their modification by digital filters

MATH.FN. The limit will be evaluated from the output of mathematic functions

ALL.CH. The limit will be evaluated from the output of „Channels A, B,C,D“

ALL.F. The limit will be evaluated from the output of „Channels A, B,C,D“ after their modification by digital filters

4.3.3.2.3 LIMIT - SETTING THE TYPE OF LIMITS



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

HYSTER The limit has a boundary, hysteresis and delay

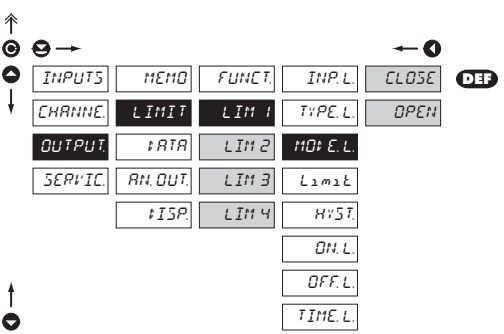
- *for this mode the „Limit" parameters are set, at which the limit should react and is adjustable within the full display range, „HYST." is an auxiliary parameter preventing osciallation at unsteady value, it is adjustable only in plus values. The limit parameter is „TIME L." determining the delay of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

FROM 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*

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

4.3.3.2.4 LIMITS - SETTING THE RELAY MODE



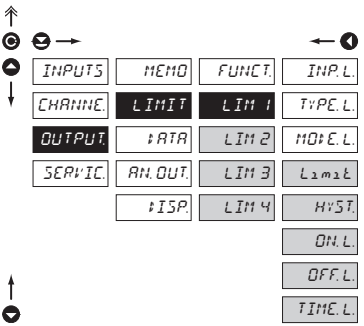
MOD E. L **Setting the relay switching mode**

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*

4.3.3.2.5 LIMITS - SETTING THE LIMITS



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

LIM - **Setting the values for limits evaluation**

LIMIT 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*

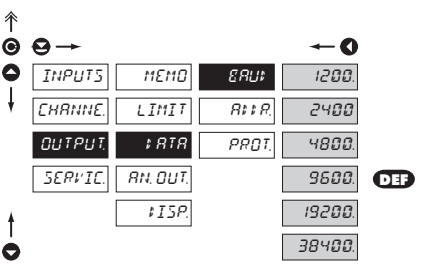
OFF. L Setting the end of the range of the limit switch-on

- *within full display range*

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

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

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

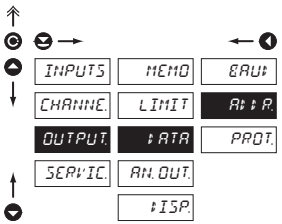
4800 Rate - 4 800 Baud

9600 Rate - 9 600 Baud

19200 Rate - 19 200 Baud

38400 Rate - 38 400 Baud

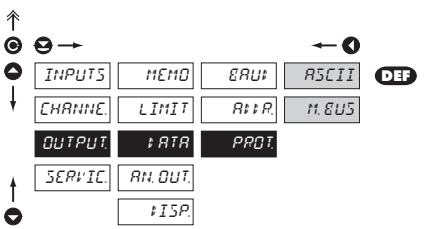
4.3.3.3.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS



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

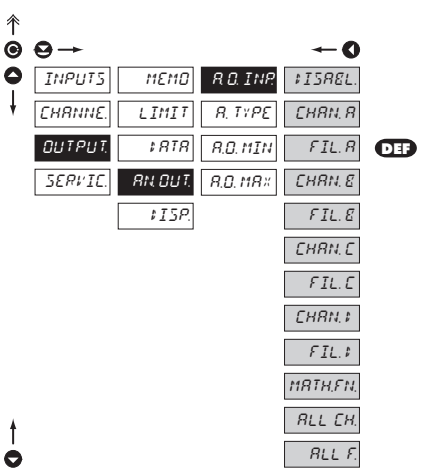


PROT. Setting the type of data protocol

ASCII — ASCII protocol

M.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

CHAN. A — AO will be evaluated from the output of „Channel A“

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

CHAN. B — AO will be evaluated from the output of „Channel B“

FIL. B — AAO will be evaluated from the output of „Channel B“ after their modification by digital filters

CHAN. C — AO will be evaluated from the output of „Channel C“

FIL. C — AO will be evaluated from the output of „Channel C“

after their modification by digital filters

CHAN.D AO will be evaluated from the output of „Channel D"

FIL.D AO will be evaluated from the output of „Channel D" after their modification by digital filters

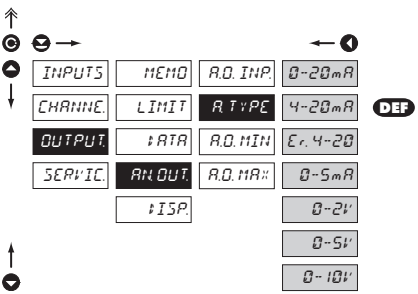
MATH.FN. AO will be evaluated from the output of mathematic functions

ALL.CH. AO will be evaluated from the output of „Channels A,B,C,D"

ALL.F. AO will be evaluated from the output of „Channels A, B, C, D" after their modification by digital filters

Selection of „Chan. A-D" and „Fil. A-D" use only in measuring mode „SWITCHING". In mode „CYCLE" the AO data would be permanently changing.

4.3.3.4.2 ANALOG OUTPUT - SETTING THE TYPE



RTYPE Setting the type of analog output

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

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

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

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

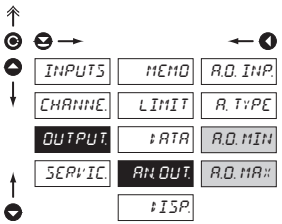
0-5 mA Type - 0...5 mA

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

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

0-10 V 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*

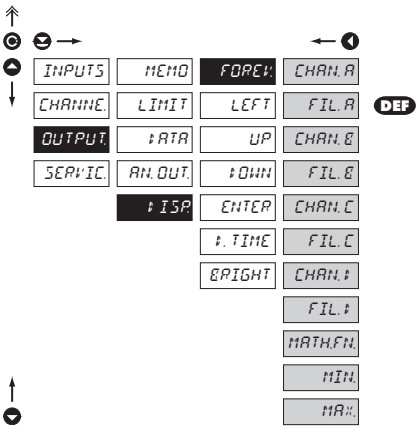
A.O. MIN. Assigning the display value to the beginning of the range of the analog output

- *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*

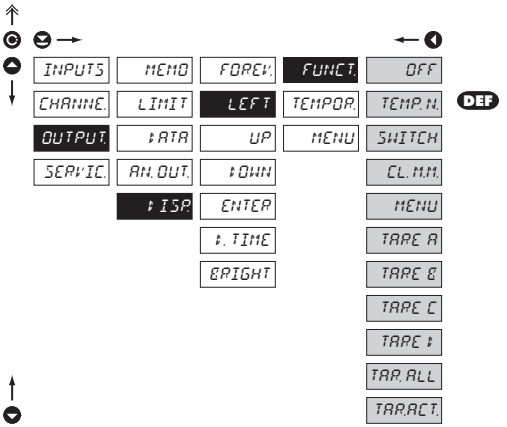
4.3.3.5.1 PROJECTION ON THE DISPLAY - PERMANENT



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

CHAN.A	Value of „Channel A“
FIL.A	Value of „Channel A“ after filtration
CHAN.B	Value of „Channel B“
FIL.B	Value of „Channel B“ after filtration
CHAN.C	Value of „Channel C“
FIL.C	Value of „Channel C“ after filtration
CHAN.D	Value of „Channel D“
FIL.D	Value of „Channel D“ after filtration
MATH.FN.	Value of „Mathematic functions“
MIN	Minimum value
MAX	Maximum value

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



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

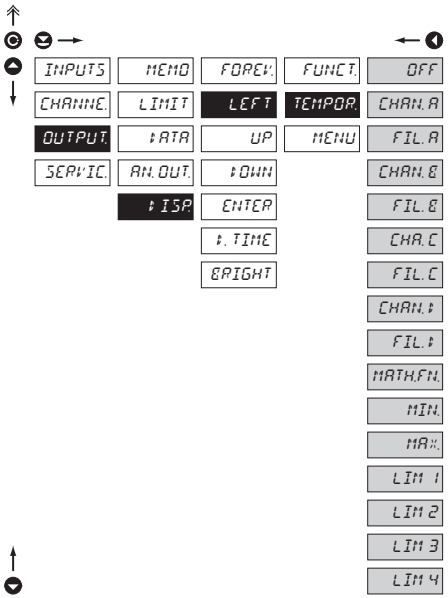
OFF	The control key has no function
TEMP.N.	Projection of temporary value

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

SWITCH	Přepínání zobrazení měřicích vstupů
CL.M.M.	Resetting the min/max value
MENU	Direct access to selected item of the menu

- *see the setting „MENU“*

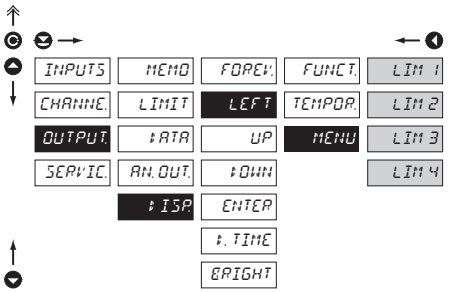
TARE A	Tare resetting - for input A
TARE B	Tare resetting - for input B
TARE C	Tare resetting - for input C
TARE D	Tare resetting - for input D
TAR.ALL	Tare resetting - for all inputs A, B, C, D
TAR.ACT.	Tare resetting - for active input



TEMPOR. After selection of the item „TEMPOR“ 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*

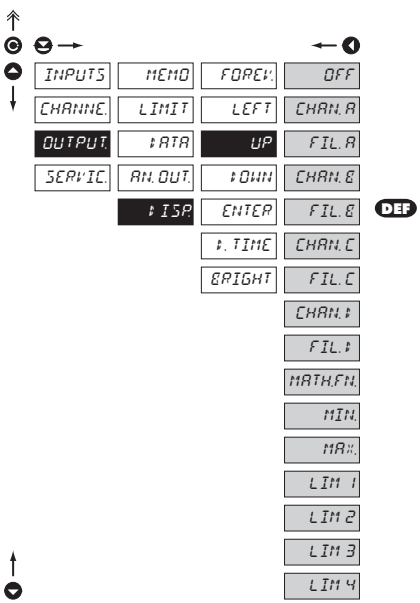
OFF	Funkce je vypnutá
CHAN.A	Projection of value „Channel A“
FIL.A	Projection of value „Channel A“ after filtration
CHAN.B	Projection of value „Channel B“
FIL.B	Projection of value „Channel B“ after filtration
CHAN.C	Projection of value „Channel C“
FIL.C	Projection of value „Channel C“ after filtration
CHAN.D	Projection of value „Channel D“
FIL.D	VProjection of value „Channel D“ after filtration
MATH.FN.	Projection of value „Mathematic functions“
MIN	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
LIM 1	Projection of value „Limit 1“
LIM 2	Projection of value „Limit 2“
LIM 3	Projection of value „Limit 3“
LIM 4	Projection of value „Limit 4“



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“

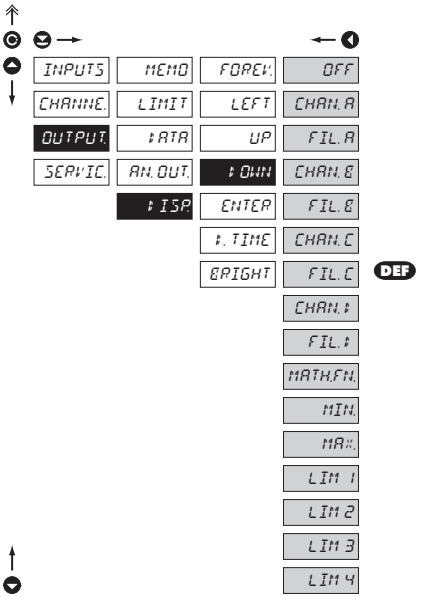
4.3.3.5.3 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „UP“



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

OFF	The control key has no function
CHAN.A	Projection of value „Channel A“
FIL.A	Projection of value „Channel A“ after filtration
CHAN.B	Projection of value „Channel B“
FIL.B	Projection of value „Channel B“ after filtration
CHAN.C	Projection of value „Channel C“
FIL.C	Projection of value „Channel C“ after filtration
CHAN.D	Projection of value „Channel D“
FIL.D	Projection of value „Channel D“ after filtration
MATH.FN.	Projection of value „Mathematic functions“
MIN	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
LIM -	Projection of value „Limit 1...4“

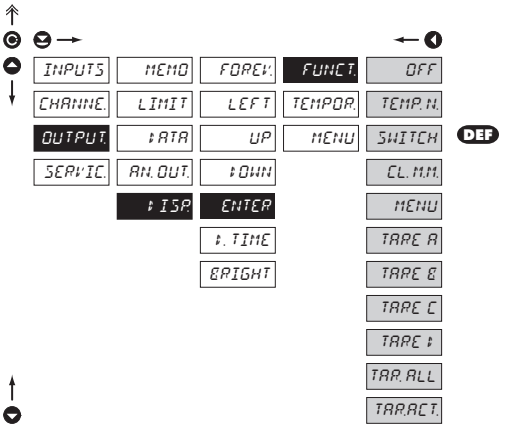
4.3.3.5.4 PROJECTION ON THE DISPLAY - AFTER PRESSING CONTROL KEY „DOWN“



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

OFF	The control key has no function
CHAN.A	Projection of value „Channel A“
FIL.A	Projection of value „Channel A“ after filtration
CHAN.B	Projection of value „Channel B“
FIL.B	Projection of value „Channel B“ after filtration
CHAN.C	Projection of value „Channel C“
FIL.C	Projection of value „Channel C“ after filtration
CHAN.D	Projection of value „Channel D“
FIL.D	Projection of value „Channel D“ after filtration
MATH.FN.	Projection of value „Mathematic functions“
MIN	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
LIM -	Projection of value „Limit 1...4“

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



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

OFF The control key has no function

TEMP.N. Projection of temporary value

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

SWITCH Switching the projection of measuring inputs

CL.M.M. Resetting the min/max value

MENU Direct access to selected item of the menu

- *see the setting „MENU“*

TARE A Tare resetting - for input A

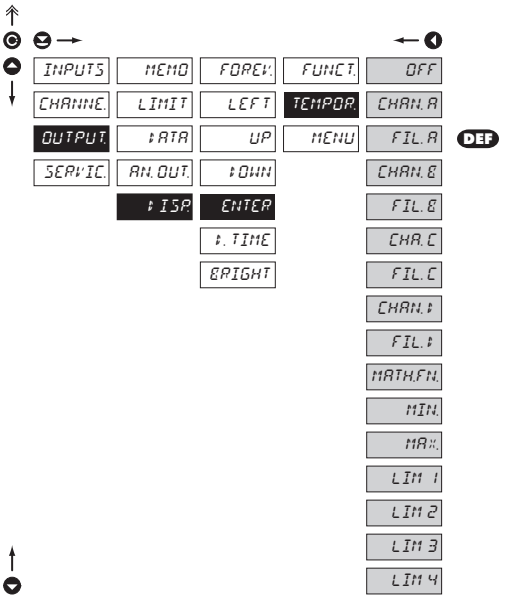
TARE B Tare resetting - for input B

TARE C Tare resetting - for input C

TARE D Tare resetting - for input D

TAR.ALL Tare resetting - for all inputs A, B, C, D

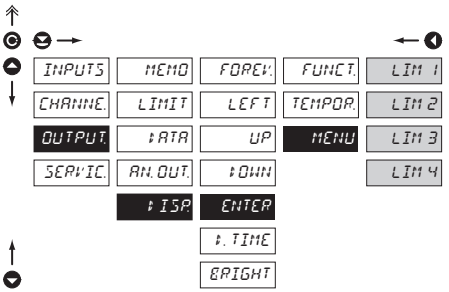
TAR.ACT. Tare resetting - for active input



TEMPOR. After selection of the item „TEMPOR.“ from menu „ENTER“ 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*

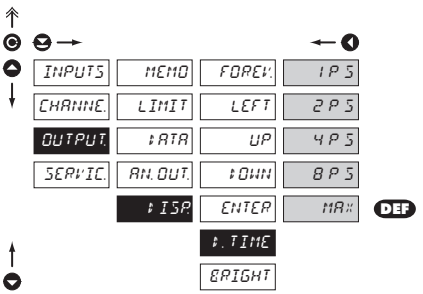
OFF	Function is off
CHAN.A	Projection of value „Channel A“
FIL.A	Projection of value „Channel A“ after filtration
CHAN.B	Projection of value „Channel B“
FIL.B	Projection of value „Channel B“ after filtration
CHAN.C	Projection of value „Channel C“
FIL.C	Projection of value „Channel C“ after filtration
CHAN.D	Projection of value „Channel D“
FIL.D	VProjection of value „Channel D“ after filtration
MATH.FN.	Projection of value „Mathematic functions“
MIN	Projection of value „Minimum value“
MAX	Projection of value „Maximum value“
LIM 1	Projection of value „Limit 1“
LIM 2	Projection of value „Limit 2“
LIM 3	Projection of value „Limit 3“
LIM 4	Projection of value „Limit 4“



MENU **After selecting item „MENU“ from the menu „ENTER“ 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“

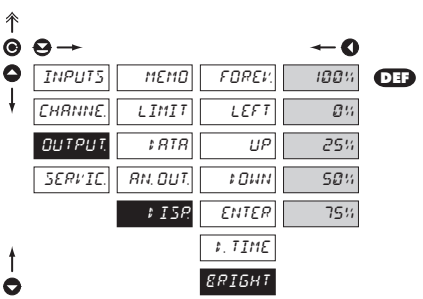
4.3.3.5.6 PROJECTION ON THE DISPLAY - RESTORATION FREQUENCY



P. TIME **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



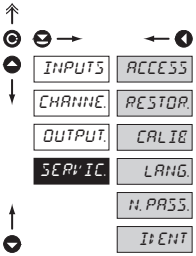
BRIGHT **Setting the display brightness**

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*

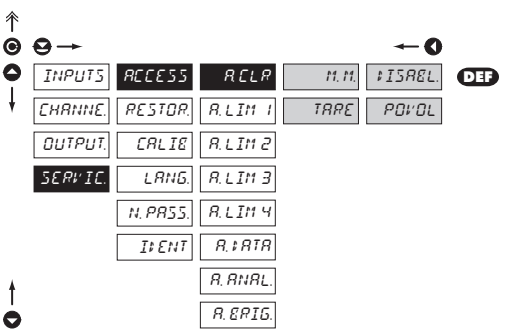
25%	Brightness 25 %
50%	Brightness 50 %
75%	Brightness 75 %

4.3.4 CALIBRATION MODE - SERVICE



ACCESS	Setting the access rights for „User mode“
RESTOR.	Return to manufacture calibration or setting
CALIB	Instrument calibration
LANG.	Setting the language version
N.PASS.	Change of the access password
I▸ENT	Instrument identification

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



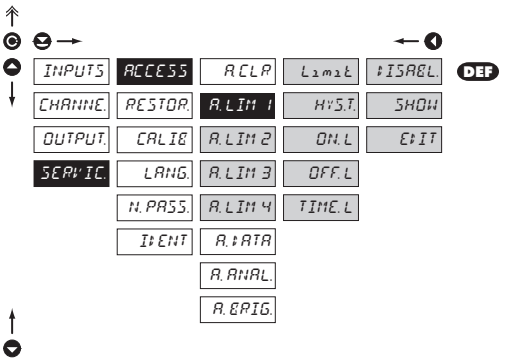
R.CLR **Authorization for resetting of the internal values of the instrument**

M.M.	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

▸ISABL.	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

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)

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

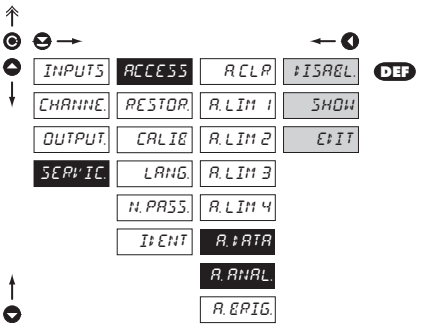
In all items it is possible to select the following parameters

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 MODE“ - OUTPUTS



A▷ATA **Authorization for item „DATA“, setting the data output**

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

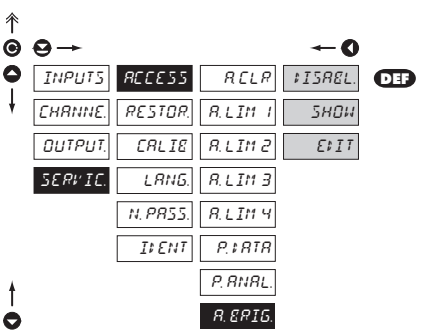
In all items it is possible to select the following parameters

▷ISABL. The item is not displayed in the „UM“

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

E▷IT The item has full acces in the „UM“, including editing

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



A BRIG **Authorization for item „BRIGHT“, setting of the display brightness**

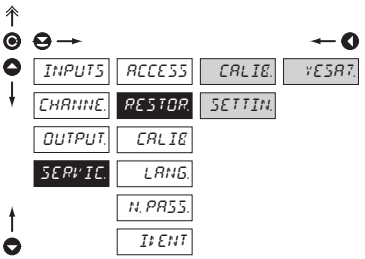
The following parameters may be selected in this item

▷ISABL. The item is not displayed in the „UM“

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

E▷IT The item has full access in the „UM“ including editing

4.3.4.2 RETURN TO MANUFACTURE CALIBRATION/SETTING



RESTOR. **Return to manufacture calibration or instrument setting**

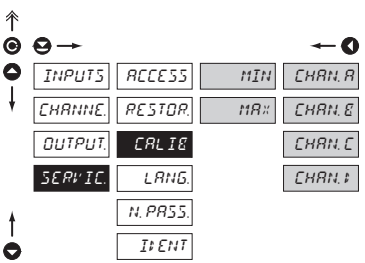
- *in case of error setting or calibration it is possible to return to manufacture setting. Prior execution of any changes you will be invited to confirm your selection by „Yes ?"*

CALIB. Return to manufacture calibration of the instrument

SETTIN. Return to manufacture setting and calibration

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

4.3.4.3 INSTRUMENT CALIBRATION



CALIB **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?"*

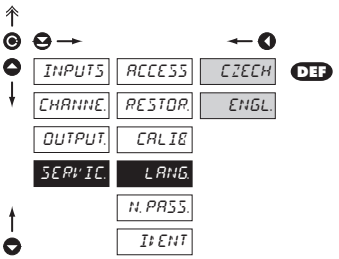
MIN Entering and connectinng the reference signal for minimum input value

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

MAX Entering and connecting the reference signal for maximum input value

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

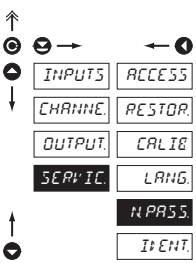
4.3.4.4 LANGUAGE VERSION FOR THE INSTRUMENT MENU



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

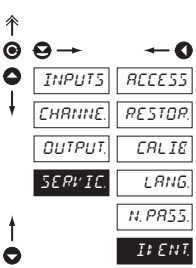


NPASS. **Setting new access password for „Configuration menu“**

- *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*

The code from manufacture is always set to 0000
In case of loss of access password the universal access code "8177" may be used

4.3.4.6 INSTRUMENT IDENTIFICATION



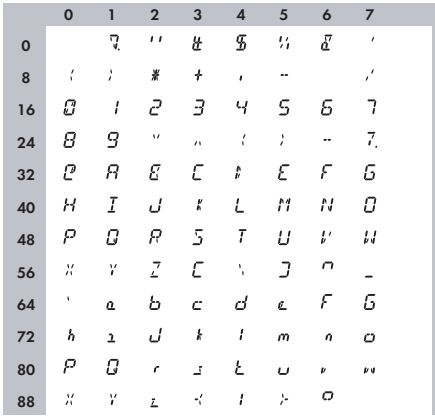
IDENT **Projection of the instrument version**

- *the display shows type identification of the instrument with the number of revision*
- *instrument name - input - program version - SW date (DD/MM/YY), e.g.: 472 PM > 3. KAN. > 043-18 > 250504*

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 PROTOKOL

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>													

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
N	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

8. ERROR STATEMENTS

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

9. TECHNICAL DATA

INPUT

DC

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

PM

Range:	0...20 mA	< 260 mV
	4...20 mA	< 260 mV
	±2 V	1,8 MOhm
	±5 V	1,8 MOhm
	±10 V	1,8 MOhm
	upon request	
Number of inputs:	max. 4	

PROJECTION

Display:	999999, intensive red or green 14-ti segment LED, digit height 14 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
Measuring rate:	0,1...16,6 m/s
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:	±50 000
Hysteresis:	0...50 000
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

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

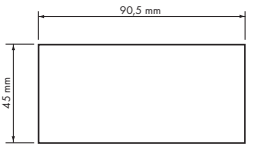
Connection:	connector terminal board, conductor section up to 2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temperature:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage category:	EN 61010-1, A2
	III. - instrument 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

** values apply for resistance load*

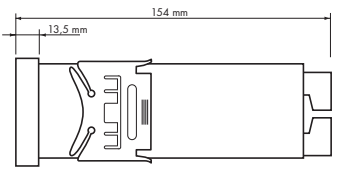
10. INSTRUMENT DIMENSIONS AND INSTAL.

Front view

Panel cut



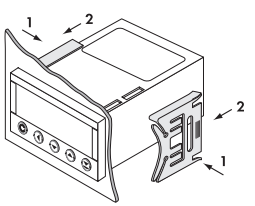
Side view

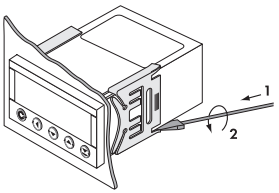


Panel thickness: 0,5...20 mm

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

11. CERTIFICATE OF GUARANTEE

Product	**OM 472 DC PM**
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

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:	4 3/4 -digit programmable panel instrument
Type:	OM 472, 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