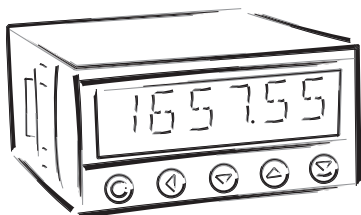# OM 611UQC

6 DIGIT PROGRAMMABLE

IMPULSE COUNTER
FREQUENCY-/PHASE-/PERIOD-METER

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 611 series conform to European regulation 89/336/EWG and Ordinance 168/1997 Coll.

They 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

Power supply from the main line has to be isolated from the measuring leads.

$$C \epsilon$$

1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OM 611UQC model is a universal 6 digit programmable panel impulse counter/frequency meter/repeat. The instrument is based on an 8-bit microprocessor, that secures high accuracy, stability and easy operation of the instrument.

Measuring modes

SINGLE	Single-channel counter/frequency meter/phase/repeat	**S**
UP/DW	Single-channel UP/DW counter/frequency meter	**U/D**
DUAL	Double-channel counter/frequency meter	**D**
QVADR	Counter/frequency meter for IRC sensors	**Q**

Programmable display projection

Calibration	calibration coefficient may be set in „CM" independently for every channel
Projection	-99999...999999 with fixed or floating DP
Measuring channels	A and B, two independent functions may be evaluated from each input
Time base:	0,05/0,5/1/2/5/10/20/50 s

Digital filters

Input filter:	the instrument allows to filter the input signal and thus suppress undesirable interfering signals (e.g. relay back-swings). The set parameter indicates maximum possible measured frequency, that the instrument will process, 10 Hz...2 kHz
Exponential average	from 2...100 measurements
n-th value	from 2...100 measurements
Radius of insensitiveness	adjustable in digits

Functions

Preset	initial non-zero value which is read always after instrument resetting
Summation	registration of the number upon shift operation
Interface constant	increases calibration constant 1/10/60/100/1000/3600
Min/max. value	registration of min./max. value reached during measurement
Tare	assigned to reset the display upon non-zero input signal
Top value	only max. (min.) value is displayed
Rounding	setting the projection step for the display
Mathem. operation	between inputs A a B, A+B, A-B, A*B, A/B, (A-B)/B, Polynome, 1/x, Logarithm, Exponential, Power, Radical

External control

Hold	display/instrument/menu access locking
Lock	control keys locking
Blocking the „CM"	blocking the access into Configuration menu
Tare	resetting tare to zero
Resetting MV	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 realised in two adjusting modes:

Configuration menu (hereinafter referred to as „CM") is protected by an optional numeric code and contains complete instrument setting

User menu may contain arbitrary programming setting defined in CM with another selective restriction (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.

Excitation is suitable for feeding of sensors and converters. It has a galvanic isolation with continuously adjustable value in the range of 2...9/9...12/15...24 VDC

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

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

Considering the continuous development and innovation of our products it is now possible to download the most recent versions of the program for all instruments. Because program upgrade is performed via RS 232 data line it is of course necessary that the instrument be equipped with this interface as well.

The upgrade and the program setup is performed automatically after the instrument is connected to a PC. After it is completed all customer settings of the instrument are replaced by manufacturer´s setting, i.e. repeated item setting is required.

Number of the current program version in your instrument you can find in the „Configuration menu - service - identification"

! *The function for recording the new Firmware is supported in all instruments from version 004*

3.   CONNECTION

The supply lead for feeding the instrument should not be in the proximity of low-potential signals.

Contactors, motors with larger input and other efficient elements should not be in the proximity of the instrument.

The lead into the instrument input (the measured quantity) should be in sufficient distance from all power leads and appliances. Provided this cannot be secured, it is necessary to use shielded leads with connection to ground.

The instruments are tested in compliance with standards for use in industrial area, yet, we recommend to abide by the above mentioned principles.

❗ *Inverted inputs are only in Line input*

■	INPUT - C̄
■	INPUT - B̄
■	INPUT - Ā
➕	INPUT - A
➕	INPUT - B
➕	INPUT - C/Reset
➖	GND
➕	Excitation
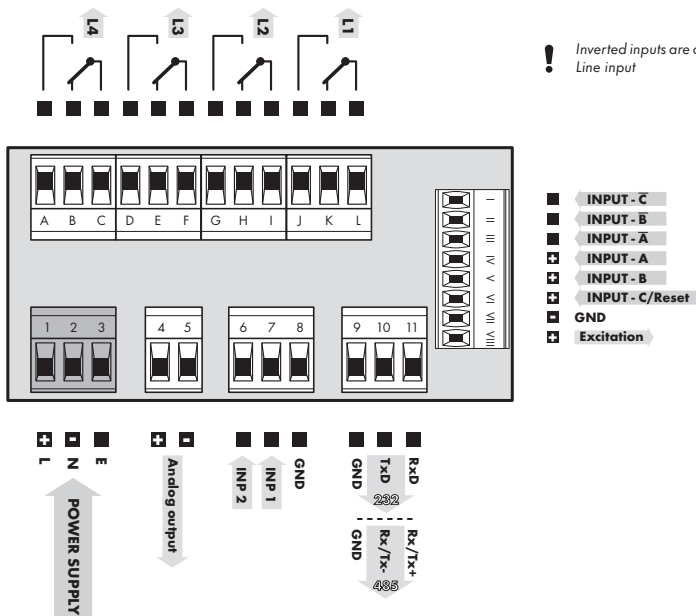
AUXILIARY INPUT

❗ *Grounding on terminal „E" must be connected at all times*

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	Tare activation	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)

3.1 CONFIGURATION OF THE JUMPERS

Setting the comparator levels
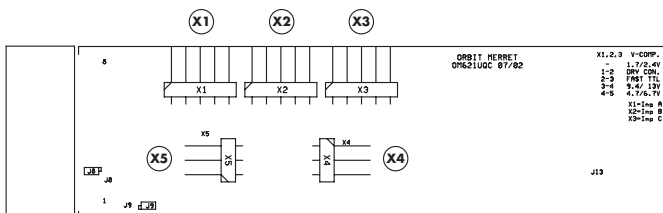
X1 - Input A, divider   **X4 - Amplyfing input A**

X2 - Input B, divider   **X5 - Amplyfing input B**

X3 - Input C, divider

Jumper X4, X5	Jumper X1, X2, X3	Type of input	Input voltage	Comparator levels		Input
				L > H	H > L	
1 - 2	1 - 2	NPN, Contact	xxx	1,7 V	2,4 V	Standard
1 - 2	bez	TTL (PNP)	2,5 - 5 V	1,7 V	2,4 V	
1 - 2	2 - 3	Fast TTL	2,5 - 5 V	1,7 V	2,4 V	
1 - 2	3 - 4	PNP	10 - 60 V	9,4 V	13,0 V	
1 - 2	4 - 5	PNP	5 - 10 V	4,7 V	6,7 V	
2 - 3	1 - 2	*Do not connect*				< 100 mV
2 - 3	without	*Do not connect*				
2 - 3	2 - 3	< 5 V	25 - 50 mV	17 mV	24 mV	
2 - 3	3 - 4	< 5 V	0,1 - 2,5 V	94 mV	130 mV	
2 - 3	4 - 5	< 5 V	50 - 100 mV	47 mV	67 mV	

❗ *For each jumper setting disconnect the instrument from the net*

❗ *Relay parameters specified in the technical data apply for resistance load. Upon connection of the induction load we recommend to fit the leads to relay 1 A with a fuse for maximum load protection.*

4. INSTRUMENT SETTING

The instrument is set and controlled by 5 control keys located on the front panel. By means of these control keys it is possible to browse through the operating program, to select and set the required values.

Measured value
the last two places may display measuring units

Ralay status
ON the digit is lit
OFF the digit is not lit
OFF the digit is flashing
*limits with restriction
(hysteresis, delay)*

Function
M Min/max. value
T Tare
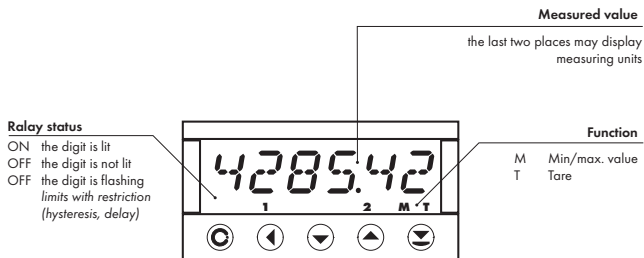
CONFIGURATION MODE

- 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"

S **U/D** **D** **Q** Indicates the setting for given type of instrument

CONTROL KEYS FUNCTIONS

MENU	ENTER	LEFT	DOWN	UP
Measuring mode				
menu access	keys may be assigned functions as per selection		min. value	max. value
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 - numbers				
cancel setting without saving	cancel 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

Upon modification of the edited number in the menu the decimal point is set by key ◀ with transition beyond the highest decade, when the decimal point starts flashing. Positioning is performed by ▲, and confirmation by ☻ with return into number editing.

Decimal point for display projection is set in item „CHAN. A - FORMAT" and „CHAN. B - FORMAT" by selection from preset values.

MINUS SIGN

Setting the minus sign is performed on the highest valid degree by key ▲/☻.

The minus sign is in numeric row (0, 1, 2, 3...9, –).

Setting

⇨ after transition beyond the highest decade ◀ the decimal point starts flashing

⇨ by pressing ▲ you will place the DP and you confirm it by ☻

000000 → ▲ → ☻

◀
6x shift left

positioning
flashing DP

confirm selection
and return to
superior item

ACCESS INTO THE CONFIGURATION MODE

⊙ + ☻

without saving   0, 1, 2...
⊙   ▲

PASSW ☻ →   0000 ☻ → OK

shift left ◀
9, 8, 7...

▲

INPUTS

CHANNE.

OUTPUT

SERVIC.

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

4.1   MINIMUM INSTRUMENT SETTING

All settings are performed in the „Configuration menu"

❶ Presetting values in the menu
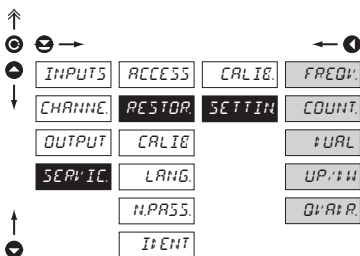
INPUTS	ACCESS	CALIB.	FREQV.
CHANNE.	RESTOR.	SETTIN	COUNT.
OUTPUT	CALIB		ᴵUAL
SERVIC.	LANG.		UP./ᴵ₩
	N.PASS.		ᴼVᴬᴵᴿ
	IᴵENT		

SETTIN	**Return to manufacture setting**

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

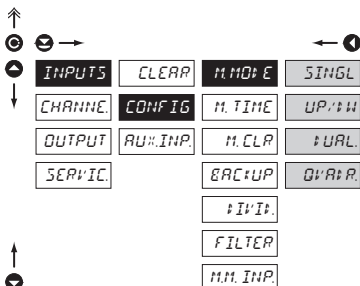|	
FREQV.	Manufacture setting for Frequency measurement
COUNT.	Manufacture setting for counter
ᴵUAL	Manufacture setting for „DUAL"
UP./ᴵ₩	Manufacture setting for „UP/DW"
ᴼVᴬᴵᴿ	Manufacture setting for „Counter - IRC"

❷ Selecting the measuring mode

INPUTS	CLEAR	M.MOᴵE	SINGL
CHANNE.	CONFIG	M.TIME	UP./ᴵ₩
OUTPUT	AUX.INP.	M.CLR	ᴵUAL.
SERVIC.	BACᴵUP	ᴼVᴬᴵᴿ.	
		ᴵIVIᴵ.	
		FILTER	
		M.M.INP.	

M.MOᴵE	**Setting the instrument measuring mode**

SINGL	Single impulse counter/ frequency meter

- measures at input A and may display numbers/frequency (phase/repeat)

UP./ᴵ₩	UP/DW impulse counter/ frequency meter

- measures at inputs A, B (direction) and may display numbers/frequency

ᴵUAL.	Dual impulse counter/ frequency meter

- measures at two inputs and may display numbers/frequency

ᴼVᴬᴵᴿ.	Impulse counter/frequency meter for IRC sensors

- measures at two inputs A+B and may display numbers/frequency

❸ Setting display projection
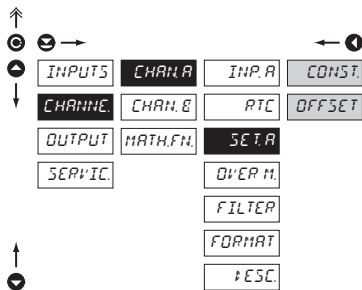
3ETA **Setting basic parameters of channel A**

`CONST.` Calibration constant

- *calibration constant is for the conversion of input value to required display value*
- *provided that the calibration constant range is insufficient, it may be enlarged by setting the pre-division constant (Config.menu)*
- *by setting the minus value the direction of counting changes, i.e. we count down*
- *range: -0,00001...999999*

- **DEF** = 1

`OFFSET` Additive constant, „PRESET"

- *shifting the beginning of measurement by a set value which will always be read upon resetting the instrument to zero*
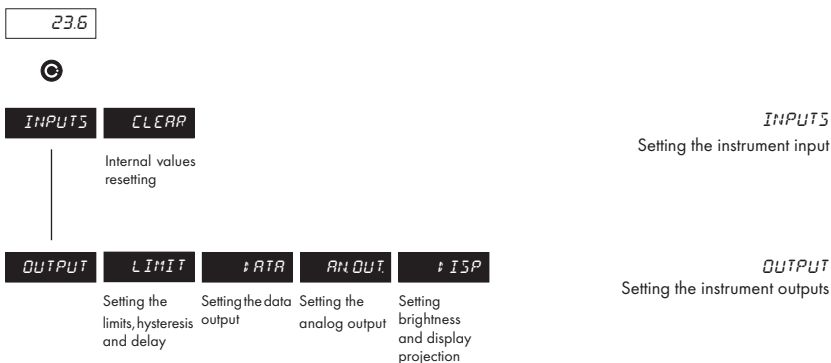- *range: -99999...999999*

- **DEF** = 0
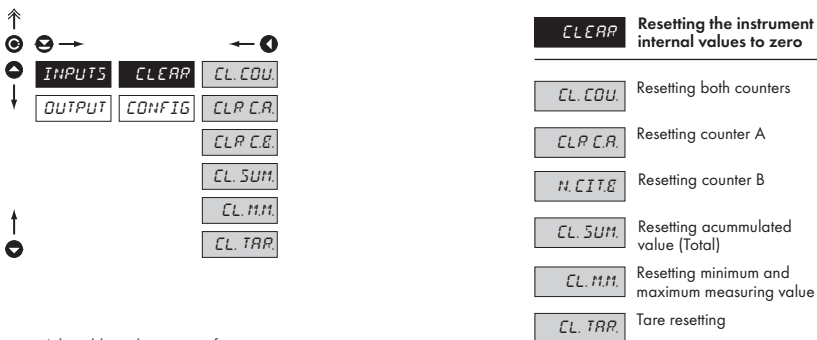
ITEMS ESSENTIAL FOR MINIMUM INSTRUMENT SETTING

Type	SERVICE > RESTOR.	INPUTS	CHANNELS	OUTPUT
Counter	> SETTIN. > COUNT.	> M.MODE > SINGL	> CHAN. A > SET. A > CONST.	
Frequency	> SETTIN. > FREQV	> M.MODE > SINGL	> CHAN. A > INP. A > FREQV > CHAN. A > SET. A > CONST.	
Counter/ frequency	> SETTIN. > FREQV	> M.MODE > SINGL	> CHAN. A > SET. A > CONST. > CHAN. B > INP. B > FREQV > CHAN. B > SET. B > CONST.	> DISP > SETTIN. > TEMPOR. > CHAN.B > LIMIT > LIM 2 > INP. L > CHAN.B
UP/DW	> SETTIN. > UP/DW	> M.MODE > UP/DW	> CHAN. A > SET. A > CONST.	
IRC counter	> SETTIN. > QUADR	> M.MODE > QUADR	> CHAN. A > SET. A > CONST.	

4.2   USER MENU

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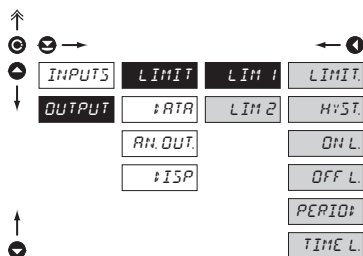 "Configuration mode"

`23.6`

⊚

`INPUTS`	`CLEAR`
	Internal values resetting

`INPUTS`
Setting the instrument input

`OUTPUT`	`LIMIT`	`▸ATA`	`AN.OUT.`	`▸ISP`
	Setting the limits, hysteresis and delay	Setting the data output	Setting the analog output	Setting brightness and display projection

`OUTPUT`
Setting the instrument outputs

4.2.1.1   USER MENU - RESETTING THE INTERNAL VALUES

↑
⊚ ⊖→   ←◖
⬥ `INPUTS` `CLEAR` `CL.COU.`
↓ `OUTPUT` `CONFIG` `CLR C.A.`
                       `CLR C.B.`
                       `CL.SUM.`
                       `CL.M.M.`
↑ `CL.TAR.`
⬥

🔒 *Adjustable authorization of access into items,
see page 39*

`CLEAR`	**Resetting the instrument internal values to zero**
`CL.COU.`	Resetting both counters
`CLR C.A.`	Resetting counter A
`N.CIT.B`	Resetting counter B
`CL.SUM.`	Resetting acummulated value (Total)
`CL.M.M.`	Resetting minimum and maximum measuring value
`CL.TAR.`	Tare resetting

4.2.2.1 LIMITS - ENTERING VALUES

LIM -	**Entering limit values for status evaluation**
$LIMIT$	Setting limit for relay switch-on - *in full display range*
$HYST.$	Setting hysteresis only in (+) values - *in 1/10 of the display range*
$ON L.$	Setting the beginning of the range of the limit switch-on - *in full display range*
$OFF L.$	Setting the end of the range of the limit switch-on - *in full display range*
$PERIOd$	Setting the period of the limit switch-on - *in full display range*
$TIME L$	Setting the delayed switch-on of the limit - *in range 0...99,9 s*

🔒 *Adjustable authorization of access into items, see page 40*

❗ *Projection of individual items depends on the set „Type" of the limits*
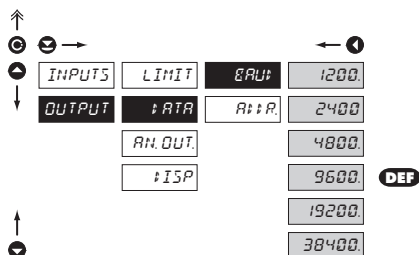
4.2.2.2 DATA OUTPUT - SETTING THE RATE

$bAUd$	**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

🔒 *Adjustable authorization of access into items, see page 40*

13

4.2.2.3   DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS

`INPUTS`	`LIMIT`	`EAU⠆`
`OUTPUT`	`⠆ATA`	`A⠆⠆A.`
	`AN.OUT.`	
	`⠆ISP`	
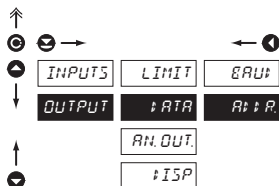
`A⠆⠆A.` **Setting the instrument address**

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

🔒 *Adjustable authorization of access into items, see page 40*

4.2.2.4   ANALOG OUTPUT - SETTING THE RANGE

`INPUTS`	`LIMIT`	`AO.MIN`
`OUTPUT`	`⠆ATA`	`AO.MA⠆`
	`AN.OUT.`	
	`⠆ISP`	
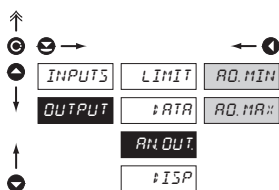
`AN.OUT.` **Setting the Analog output range**

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

`AO.MIN` Assignment of the display value to the beginning of the analog output range
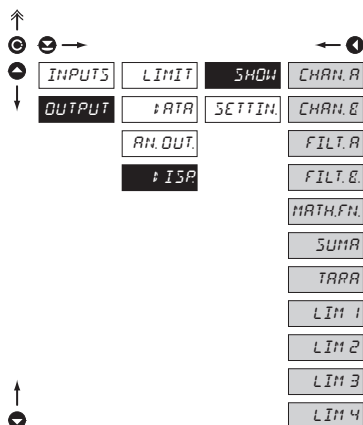
- *range of the setting is -99 999...999 999*

`AO.MA⠆` Assignment of the display value to the beginning of the analog output range

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

🔒 *Adjustable authorization of access into items, see page 40*

4.2.2.5   PROJECTION OF DATA ON THE DISPLAY

5HOW	In this menu item the following data may be displayed

CHAN. A	Value of „Channel A"
CHAN. B	Value of „Channel B"
FILT. A	Value of „Channel A" after filtration
FILT. B	Value of „Channel B" after filtration
MATH.FN.	Value of „Mathematic function"
5UMA	Value of „Accumulated quantity"
TARA	Tare value
LIM 1	Value of „Limit 1"
LIM 2	Value of „Limit 2"
LIM 3	Value of „Limit 3"
LIM 4	Value of „Limit 4"

🔒 *Adjustable authorization of access into items,
see page 41*

4.2.2.6   SETTING THE DISPLAY BRIGHTNESS
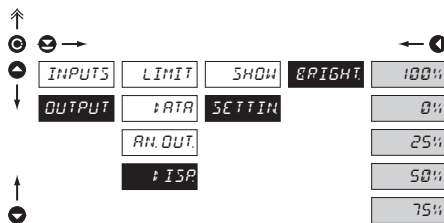
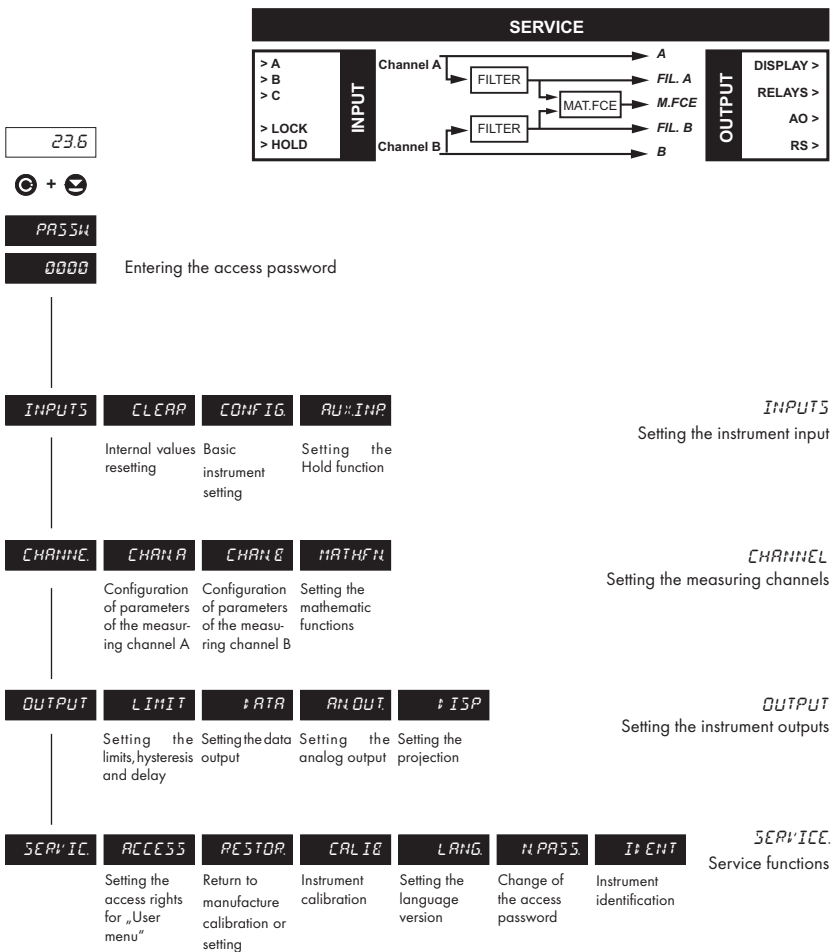
BRIGHT.	Setting the display brightness

| 100% | Brightness 100 % |
| 0% | Brightness 0 %, display switched-off |

*- display switches off after approximately 10 s
and it switches on after pressing any key*

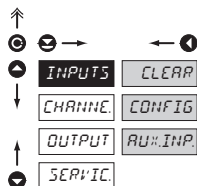| 25% | Brightness 25 % |
| 50% | Brightness 50 % |
| 75% | Brightness 75 % |

🔒 *Adjustable authorization of access into items,
see page 41*

4.3   CONFIGURATION MENU

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

SERVICE		

> A	Channel A						*A*		DISPLAY >
> B		FILTER					*FIL. A*		RELAYS >
> C			MAT.FCE			*M.FCE*		AO >
> LOCK		FILTER			*FIL. B*		RS >
> HOLD	Channel B					*B*		

INPUT

OUTPUT

```
23.6
```

⊙ + ✉

```
PA55W
```

```
0000
```
Entering the access password

INPUT5	CLEAR	CONFIG.	AUx.INP.		INPUT5
	Internal values resetting	Basic instrument setting	Setting the Hold function		Setting the instrument input

CHANNE.	CHAN A	CHAN B	MATHFN.		CHANNEL
	Configuration of parameters of the measuring channel A	Configuration of parameters of the measuring channel B	Setting the mathematic functions		Setting the measuring channels

OUTPUT	LIMIT	×ATA	AN.OUT.	×ISP	OUTPUT
	Setting the limits, hysteresis and delay	Setting the data output	Setting the analog output	Setting the projection	Setting the instrument outputs

SERVIC.	ACCE55	RE5TOR.	CALIB	LANG.	N.PA55.	I×ENT	SERVICE.
	Setting the access rights for „User menu"	Return to manufacture calibration or setting	Instrument calibration	Setting the language version	Change of the access password	Instrument identification	Service functions

4.3.1 CONFIGURATION MODE - INPUTS

Here the basic instrument parameters are set

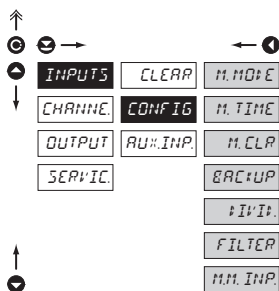|	
`CLEAR`	Resetting the internal values
`CONFIG`	Basic instrument setting
`AUX.INP.`	Setting the „Hold" function

4.3.1.1 RESETTING INTERNAL VALUES
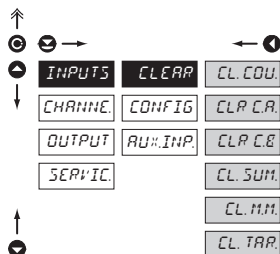
`CLEAR` **Resetting internal values of the instrument**

`CL.COU.` Resetting both counters

- *upon resetting, the value will be added to the total sum (accumulated value) in the internal memory of the instrument (only for input A)*

`CLR.C.A.` Resetting the counter (input A)

- *upon resetting, the value will be added to the total sum (accumulated value) in the internal memory of the instrument*

`CLR C.B.` Resetting the counter (input B)

`CL. SUM.` Resetting the total

- *summation serves for cumulative sums of values (e.g. shift operation), when after resetting the counter the display value is added to total sum*

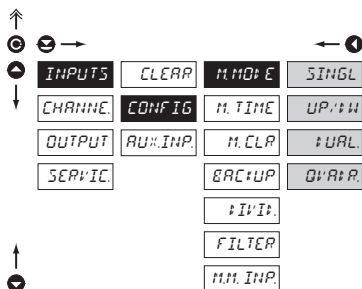`CL. M.M.` Resetting minimum and maximum measuring value

`CL. TAR.` Tare resetting

4.3.1.2   INSTRUMENT CONFIGURATION

INPUTS	CLEAR	M.MOϟE
CHANNE.	CONFIG	M.TIME
OUTPUT	AUϰ.INP.	M.CLR.
SERVIC.	ERCϟUP	ϟIϺIϟ
		FILTER
		M.M.INP.

CONFIG — Basic instrument setting

M.MOϟE — Setting the instrument measuring mode

M.TIME — Setting the time of measurement - time base

M.CLR. — Setting the instrument resetting

ERCϟUP — Setting the data backup

ϟIϺIϟ — Setting the pre-division constant

FILTER — Setting the input filter parameters

MM.INP. — Setting the source for evaluation of min/max. value

4.3.1.2.1 SETTING THE MEASURING MODE

INPUTS	CLEAR	M.MOϟE	SINGL
CHANNE.	CONFIG	M.TIME	UP⁄ϟϟ
OUTPUT	AUϰ.INP.	M.CLR.	ϟUAL.
SERVIC.	ERCϟUP	OVϟRϟ.	
		ϟIϺIϟ	
		FILTER	
		M.M.INP.	

M.MOϟE — Setting the measuring mode of the instrument

SINGL — Single impulse counter/ frequency meter
- *measures at input A and may display numbers/frequency (phase/repeat)*

UP⁄ϟϟ — UP/DW impulse counter/ frequency meter
- *measures at inputs A, B (direction) and may display numbers/frequency*

ϟUAL. — Dual impulse counter/ frequency meter
- *measures at two inputs and may display numbers/frequency*

OVϟRϟ. — Impulse counter/frequency meter for IRC sensors
- *measures at two inputs A+B and may display numbers/frequency*
- *in this regime both edges of signals A and B are taken into account*

4.3.1.2.2 SETTING THE TIME OF MEASUREMENT/TIME BASE

`M TIME` **Setting the time of measurement - time base**

- if you set the time of measurement for example to 1 s, the measuring time is approximately from 1 s to 2 s (1 s + maximum one period of measured signal). If no impulse comes within 2 s , it is understood that the signal has zero frequency
- for DUAL regime the time of measurement is exactly defined
- range of the setting of the time base is 50 ms to 50 s

- in the „RTC" regime with projection of date the set time determines the period of switching between time/date, min. is 5 s, the date is displayed for approximately 2,5 s

4.3.1.2.3 SETTING THE ZEROIZING INPUT

`M.CLR` **Setting the zeroizing input**

- setting zeroizing input (input C) and key with assigned resetting function

Dual counter
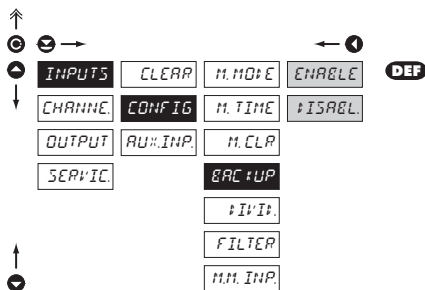
`COUNT.A` Resets Channel A

`COUNT.B` Resets Channel B

`C. A+B` Resets both Channel A and B **DEF**

Counter for IRC sensors

`ALWAYS` Resets always **DEF**

`IN AB` Resets only if input A and B in *log 1*

4.3.1.2.4 SETTING THE DISPLAY STATUS BACK-UP

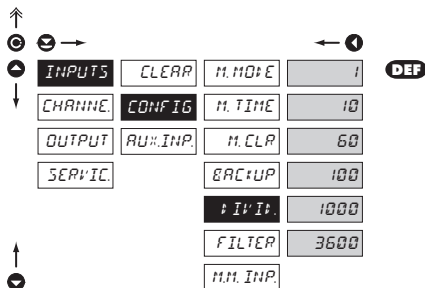|			
INPUTS	CLEAR	M.MODE	ENABLE
CHANNE.	CONFIG	M.TIME	DISABL.
OUTPUT	AUX.INP.	M.CLR	
SERVIC.		BAC·UP	
		DIVID.	
		FILTER	
		M.M.INP.	

BAC·UP Setting the display status back-up

- *setting the renewal of the displayed value after power supply failure or switch-off of the instrument*

ENABLE The instrument will read the display status from memory

DISABL. The instrument will reset itself to zero after switch-on

4.3.1.2.5 SETTING THE PRE-DIVISION CONSTANT

INPUTS	CLEAR	M.MODE	1
CHANNE.	CONFIG	M.TIME	10
OUTPUT	AUX.INP.	M.CLR	60
SERVIC.		BAC·UP	100
		DIVID.	1000
		FILTER	3600
		M.M.INP.	

DIVID. Setting the pre-division constant

- *the pre-division constant serves to enlarge the calibration constant range*

1 Pre-division constant =1

10 Pre-division constant =10

60 Pre-division constant =60

100 Pre-division constant =100

1000 Pre-division constant =1000

3600 Pre-division constant =3600

4.3.1.2.6 SETTING THE INPUT FILTER PARAMETERS

INPUTS	CLEAR	M.MO‡E	OFF	DEF
CHANNE.	CONFIG	M.TIME	2 kHᴸ	
OUTPUT	AUᵡ.INP.	M.CLR	1 kHᴸ	
SERVIC.		BAC‡UP	500 Hᴸ	
		‡IᵥI‡.	200 Hᴸ	
		FILTER	100 Hᴸ	
		M.M.INP.	65 Hᴸ	
			55 Hᴸ	
			45 Hᴸ	
			20 Hᴸ	
			10 Hᴸ	

FILTER — Setting the digital input filter

- through the digital filter we may suppress undesirable interfering impulses (e.g. relay back-swings) on the input signal. The set parameter indicates the maximum possible instrument frequency, which the instrument processes without restriction

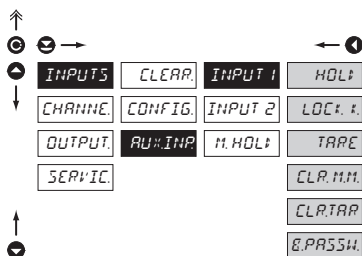When entering the contact and well known maximum input frequency we recommend to use the filter

4.3.1.2.7 SETTING THE INPUT FILTER PARAMETERS

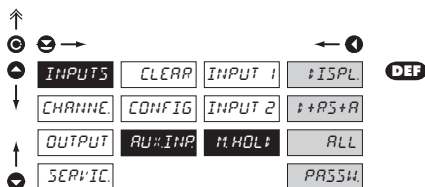| INPUTS	CLEAR	M.MO‡E	‡ISABL.
CHANNE.	CONFIG	M.TIME	CHAN.A
OUTPUT	AUᵡ.INP.	M.CLR	CHAN.B
SERVIC.		BAC‡UP	FILT.A
		‡IᵥI‡.	FILT.B
		FILTER	MATH.FN.
		MM.INP.	

MM.INP — Setting the input "quantity" for evaluation of the min/max. value

‡ISABL. Min/max value is switched-off
CHAN.A From Channel A value
CHAN.B From Channel B value
FILT.A From filtered value of Channel A
FILT.B From filtered value of Channel B
MATH.FN. From mathematic function

4.3.1.3 SETTING THE AUXILIARY INPUT

`INPUTS`	`CLEAR.`	`INPUT 1`	`HOLD`
`CHANNE.`	`CONFIG.`	`INPUT 2`	`LOC*. *.`
`OUTPUT.`	`AUX.INP.`	`M.HOLD`	`TARE`
`SERVIC.`			`CLR. M.M.`
			`CLR.TAR.`
			`E.PASSW.`

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

`INPUTS`	`CLEAR`	`INPUT 1`	`DISPL.`
`CHANNE.`	`CONFIG`	`INPUT 2`	`D+AS+A`
`OUTPUT`	`AUX.INP.`	`M.HOLD`	`ALL`
`SERVIC.`			`PASSW.`

`INPUT 1` **Assigning functions to auxiliary inputs**

`HOLD` Activation of the „Hold" function

`LOC*. *.` Activation of the function „Keyboard blocking"

`TARE` Activation of the „Tare" function

`CLR. M.M.` Activation of the function „Resetting min/max value"

`CLR. TAR.` Activation of the function „Tare resetting"

`E.PASSW.` Activation of the function „Blocking access into Configuration menu"

`M.HOLD` **Setting the auxiliary input - the HOLD function**

`DISPL.` HOLD blocks only display

`D+AS+A` HOLD blocks the display, data and analog output

`ALL` HOLD blocks the entire instrument

`PASSW.` HOLD blocks the access into „Configuration menu", access password cannot be set

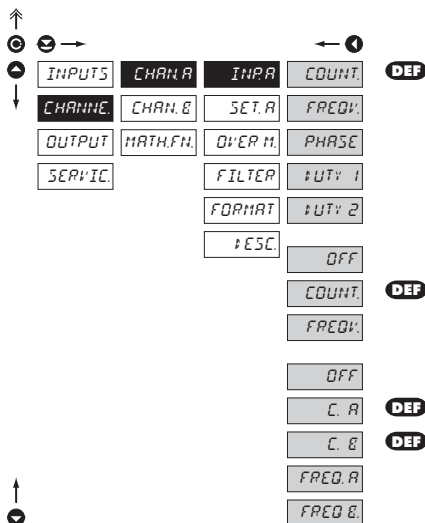*When entering the contact and well known maximum input frequency we recommend to use the filter*

22

4.3.2   CONFIGURATION MODE - CHANNELS

INPUTS	CHAN. A
CHANNE.	CHAN. B
OUTPUT	MATH.FN.
SERVIC.	
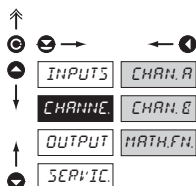
Here the basic parameters of the instrument input values are set

CHAN. A	Setting the parameters and range of the meas. channel
CHAN. B	Setting the parameters and range of the meas. channel
MATH.FN.	Setting the instrument mathematic functions

4.3.2.1.1 SETTING THE MEASURING „CHANNEL A"

INPUTS	CHAN.A	INP.A	COUNT.	DEF
CHANNE.	CHAN. B	SET. A	FREQV.	
OUTPUT	MATH.FN.	OVER M.	PHASE	
SERVIC.		FILTER	DUTY 1	
		FORMAT	DUTY 2	
		RESC.		

OFF	
COUNT.	DEF
FREQV.	

OFF		
C. A	DEF	channel A
C. B	DEF	channel B
FREQ.A		
FREQ B.		

SET.A	Setting the input parameters of channel A

For measuring mode SINGLE

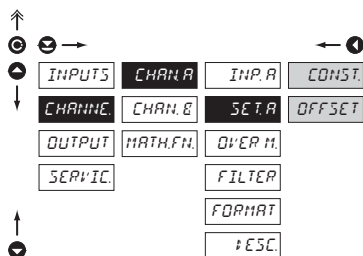| COUNT.	Input A is assigned with the measuring regime „Counter"
FREQV.	Input A is assigned with the meas. regime „Frequency"
PHASE	Input A is assigned with the measuring regime „Phase"
DUTY 1	Input A is assigned with the measuring regime „Repeat"
DUTY 2	Input A is assigned with the measuring regime „Repeat"

For measuring mode UP/DW and QVADR

OFF	No input is assigned
COUNT.	Inputs A+B are assigned to measuring regime „Counter"
FREQV.	Inputs A+B are assigned to measuring regime „Frequency"

For measuring mode DUAL

OFF	No input is assigned
C. A	Input A is assigned with the meas. regime „Counter A /A
C. B	Input B is assigned with the meas. regime „Counter B /B
FREQ.A	Input A is assigned with the meas. regime „Frequency A"
FREQ.B	Input B is assigned with the meas. regime „Frequency B"

4.3.2.1.2 SETTING THE „CHANNEL A" PARAMETERS

INPUTS	CHAN.A	INP.A	CONST.
CHANNE.	CHAN.B	SET.A	OFFSET
OUTPUT	MATH.FN.	OVER M.	
SERVIC.		FILTER	
		FORMAT	
		↱ESC.	

SET.A	**Setting the basic parameters of channel A**

CONST.	Calibration constant

- *calibration constant is for the conversion of input value to required display value*
- *if the calibration constant range is insufficient it may be enlarged by setting the pre-division constant (Configuration menu)*
- *by setting a minus value the direction of counting is changed, i.e. we count down*
- *range: -0,00001...999999*

- **DEF** = 1

OFFSET	Additive constant, „PRESET"

- *shift of the beginning of the measurement by a set value which will always be read upon instrument resetting*
- *range: -99999...999999*

- **DEF** = 0

In the menu „OUTPUT > DISP. > SETTIN > MENU it possible to set direct access (button ◀) in to item editing

**4.3.2.1.3 FUNCTIONS UPON READING THE DISPLAY/VALUE**

INPUTS	CHAN.A	INP.A	MI.MA	CLEAR	**DEF**
CHANNE.	CHAN.B	SET.A	VAL.M.	STOP	
OUTPUT	MATH.FN.	OVER M.	VALUE	ERROR	
SERVIC.		FILTER			
		FORMAT			
		↱ESC.			
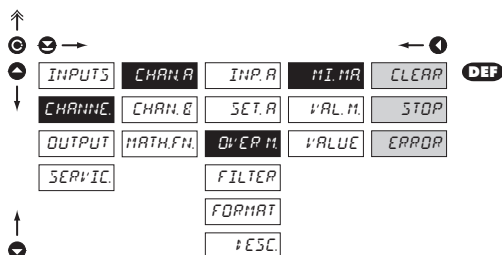
MI.MA	**Setting the instrument status when reading the display**

CLEAR	The instrument is automatically set to zero and counts on

STOP	The measuring stops

- *the display continues showing the max. resp. min. projectable value*

ERROR	Measuring stops

- *the display shows error statements „E.UND." or „E.OVER."*

25

**4.3.2.1.4 EXTENDED FUNCTION UPON EXCEEDING THE SET DISPLAY VALUE**
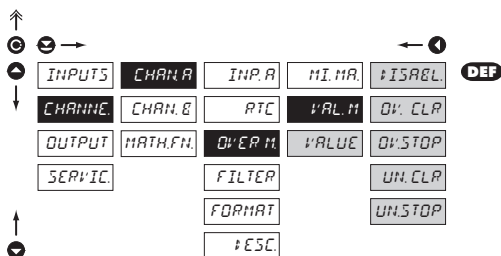
`VAL.M`	Setting the instrument status upon reaching the set display value
`DISABL.`	Instrument is automatically reset and counts on
`OV. CLR`	Display is reset upon overflow
`OV.STOP`	Measuring stops upon overflow
`UN.CLR`	Display is reset upon underflow
`UN.STOP`	Measuring stops upon underflow

**Above referred-to functions apply for the value set in menu „VALUE"**

`VALUE`	Display value after evaluation „VAL. M."

4.3.2.1.5 SETTING THE DIGITAL FILTERS
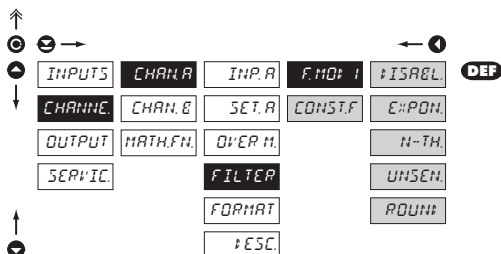
`F.MOD. 1`	Setting the digital filters

- *into the filter enter values adjusted from „SET. A"*

`CONSt.F`	Setting the filtration constants

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

`DISABL.`	Filters are turned off
`EXPON`	Selection of exponential filter

- *value is calculated from a number of measurements selected in „CONST. F"*

`N-TH`	Selection of n-th value

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

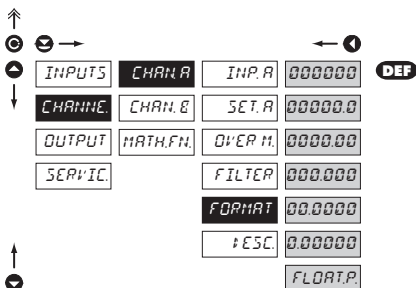**Input**

- - - - Display
- - - - ± Filter

Time
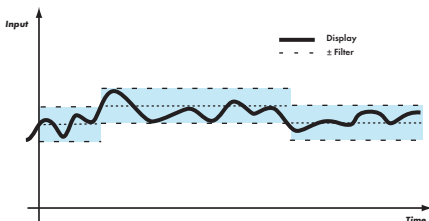
| UNSEN. | Setting the band of insensitiveness |

- *this filter allows to stabilize the resultant value. The previous value is taken as the measuring result, if the measured value is not larger than the previous + P or smaller then the previous - P. The value „±P" defines the band of insensitiveness in which the measured value can be changed without the change having any impact on the result - change of data on the display*
- *range 0,00001...100 000*

| ROUND | Rounding of the measured value |

- *it is set by an optional number which determines the projection step (e.g. step 2,5 - 0, 2.5, 5, 7.5, etc.)*

4.3.2.1.6 PROJECTION FORMAT

INPUTS	CHAN.A	INP.A	000000	DEF
CHANNE.	CHAN.B	SET.A	00000.0	
OUTPUT	MATH.FN.	OVER M.	0000.00	
SERVIC.		FILTER	000.000	
		FORMAT	00.0000	
		ꞏESC.	0.00000	
			FLOAT.P.	

| FORMAT | **Setting the projection format for Channel A** |

- *the instrument enables projection of a number with decimal positioning of the decimal point and projection with floating point, which allows projection of numbers in the most precise form „FLOAT. P."*

4.3.2.1.7 SETTING THE MEASURING UNITS DESCRIPTION

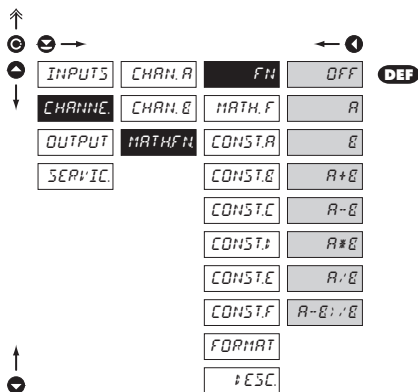|		
INPUTS	CHAN.A	INP.A
CHANNE.	CHAN.B	SET.A
OUTPUT	MATH.FN.	OVER M.
SERVIC.		FILTER
		FORMAT
		ꞏESC.
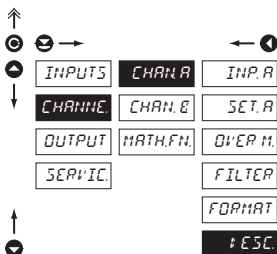
| ꞏESC. | **Setting projection of the measuring units on the display for Channel A** |

- *the instrument allows to add two description symbols to classical numeric formats (at the expense of number of displayed positions). Setting is performed with the aid of shifted ASCII code. Upon the setting the first two positions show the given symbols and the last two the code of the relevant symbol from 0 to 95.*
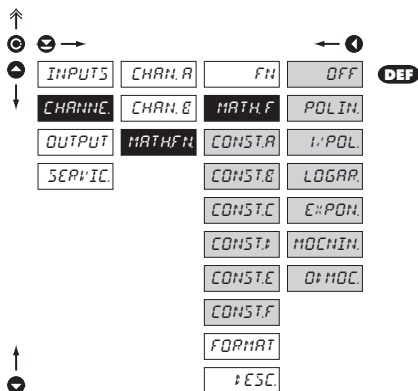
  Description is cancelled by entering 00

☀ *Description can not be set upon projection of 4 or 5 decimal places*

27

4.3.2.2.1 MATHEMATIC OPERATIONS BETWEEN THE INPUTS

INPUTS	CHAN.A	FN	OFF
CHANNE.	CHAN.B	MATH.F	A
OUTPUT	MATHFN	CONST.A	B
SERVIC.		CONST.B	A+B
		CONST.C	A-B
		CONST.I	A*B
		CONST.E	A/B
		CONST.F	A-B:/B
		FORMAT	
		¦ESC.	

FN Selection of mathematic operations between inputs A and B

OFF	Mathematic operations between inputs are off
A	Mathematic functions will be evaluated in Channel A
B	Mathematic functions will be evaluated in Channel B
A+B	Mathematic functions will be evaluated from Channels (A+B)
A-B	Mathematic functions will be evaluated from the difference between Channels (A-B)
A*B	Mathematic functions will be evaluated from the product of Channels (A*B)
A/B	Mathematic functions will be evaluated from quotient of the Channels (A/B)
A-B:/B	Mathematic functions will be evaluated from equation (A-B)/B

4.3.2.2.2 MATHEMATIC FUNCTIONS

INPUTS	CHAN.A	FN	OFF
CHANNE.	CHAN.B	MATH.F	POLIN.
OUTPUT	MATHFN	CONST.A	1/POL.
SERVIC.		CONST.B	LOGAR.
		CONST.C	EXPON.
		CONST.I	MOCNIN.
		CONST.E	O¦MOC.
		CONST.F	
		FORMAT	
		¦ESC.	

MATH.F Selection of mathematic functions

CONST. -	Setting the constants for calculation of mat. functions

- this menu is displayed always after selection of particular mathematic functions with the option to set constants A, B, C, D, E a F

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

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

$$\boxed{E\!:\!PON.}$$ Exponential

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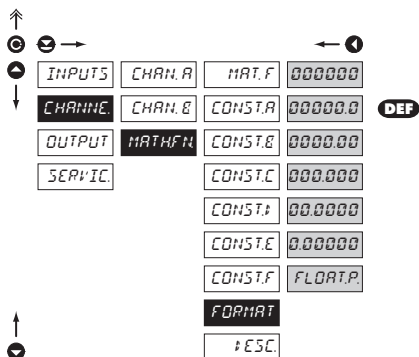
$$\boxed{MOCNIN.}$$ Power

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

$$\boxed{O\!:\!MOC.}$$ Radical

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

4.3.2.2.3 MATHEMATIC FUNCTIONS - PROJECTION FORMAT

INPUTS	CHAN. A	MAT. F	000000
CHANNE.	CHAN. B	CONST.A	00000.0	DEF
OUTPUT	MATHFN	CONST.B	0000.00
SERVIC.		CONST.C	000.000
		CONST.↓	00.0000
		CONST.E	0.00000
		CONST.F	FLOAT.P.
		FORMAT	
		↓ESC.	

FORMAT Setting the format of projection on display for "MATH.FN"

- the instrument enables classic projection of a number with positioning of the decimal point (000000/00000,0/.../0,00000) and projection with floating point, which allows projection of numbers in its most precise form "FLOAT. P."

4.3.2.2.4 MATHEMATIC FUNCTIONS - DESCRIPTION ON DISPLAY

INPUTS	CHAN. A	MAT. F
CHANNE.	CHAN. B	CONST.A
OUTPUT	MATHFN	CONST.B
SERVIC.		CONST.C
		CONST.↓
		CONST.E
		CONST.F
		FORMAT
		↓ESC.
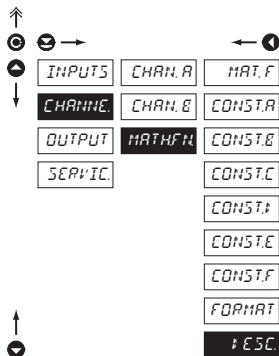
↓ESC. Setting the measuring units on the display upon the projection of mathematic functions

- in this menu we set independent projection of the symbol of mathematic function, which is independent on projection of description of the measured quantity and is projected only with given function
- setting is the same as description of measured unit "Channels - CHAN. A - DESC."

4.3.3 CONFIGURATION MODE - OUTPUT
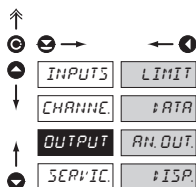
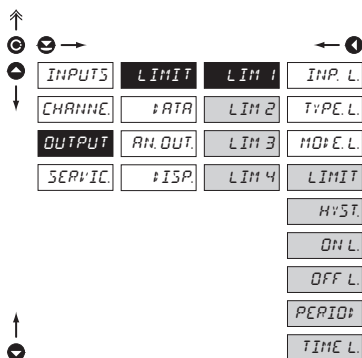|	
`LIMIT`	Setting the functions and type of limits switch-on
`᛭ATA`	Setting the type and parameters of data output
`AN.OUT.`	Setting the type and parameters of analog output
`᛭ISP.`	Setting the permanent and temporary projection on display and adding another projection of internal data on arbitrary keys of instrument

4.3.3.1.1 LIMITS - SETTING DATA FOR EVALUATION
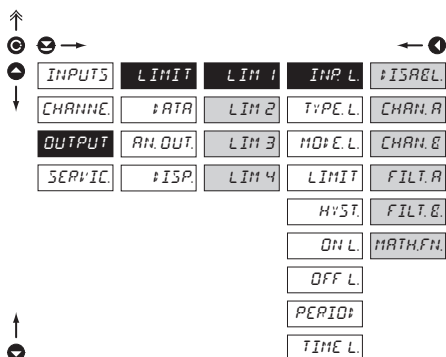
`INP. L`	Setting the input "quantities" for limits evaluation
`᛭ISABL.`	The limit will not be evaluated
`CHAN.A`	The limit will be evaluated from output of „Channel A"
`CHAN.B`	The limit will be evaluated from output of „Channel B"
`FILT.A`	The limit will be evaluated from output of „Channel A" after their modification by digital filters
`FILT.B`	The limit will be evaluated from output of „Channel B" after their modification by digital filters
`MATH.FN.`	The limit will be evaluated from the mathematic functions output

4.3.3.1.2 LIMITS - SETTING THE TYPE OF LIMITS

INPUTS	LIMIT	LIM 1	INP. L.	HYSTER.	DEF
CHANNE.	¦RTR	LIM 2	TYPE. L.	FROM	
OUTPUT	RN. OUT.	LIM 3	MO¦E. L.	¦OSING	
SERVIC.	¦ISP.	LIM 4	LIMIT.		
			HYST.		
			ON L.		
			OFF L.		
			PERIO¦		
			TIME L.		

| TYPE. L | **Setting the type of limits** |

| HYSTER | The limit has a boundary, hysteresis and delay |

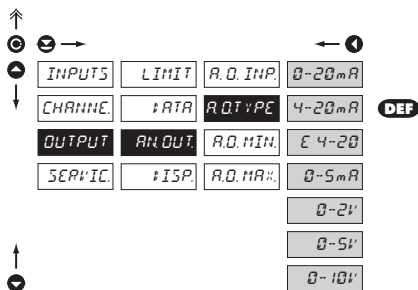- for this regime we set the parameters „LIMIT", at which the limit shall react and is adjustable in full range of the display, „HYST." is an auxiliary parameter preventing the vibration at unsteady value and is adjustable only in plus values. The limit parameter is „TIME L." determining the delay of relay switch-on from exceeding the set boundary in range 0,0... 99,9 s

| FROM | The limit is in the switch-on regime „from - to" |

- for this regime we set parameters „ON L." and „OFF L." adjustable in full range of the display between which the limit shall be switched on

| ¦OSING | The limit is in the regime „dosing" |

- in this regime we set two parameters „PERIOD" in full range, determining at which value the relay shall switch on and by how much higher shall be the next value. Second parameter is „TIME L." in range 0,0... 99,9 s determining the time for which the relay shall be switched on. Upon resetting the counter to zero the value is set, at which the relay shall switch on to value „PERIOD"

! „DOSING" regime may be set only for Limit 1

4.3.3.1.3 LIMITS - SETTING THE RELAY MODE

INPUTS	LIMIT	LIM 1	INP. L.	CLOSE	DEF
CHANNE.	¦RTR	LIM 2	TYPE. L.	OPEN	
OUTPUT	RN. OUT.	LIM 3	MO¦E. L.		
SERVIC.	¦ISP.	LIM 4	LIMIT.		
			HYST.		
			ON L.		
			OFF L.		
			PERIO¦		
			TIME L.		

| MO¦E. L | **Setting the relay switching mode** |

| CLOSE | The relay switches on when the condition is met |

| OPEN | The relay switches off when the condition is met |

4.3.3.1.4 LIMITS - SETTING THE BOUNDARIES

INPUT5	LIMIT	LIM 1	INP. L.
CHANNE.	⊦ATA	LIM 2	TYPE. L.
OUTPUT	AN. OUT.	LIM 3	MO⊦E. L.
5ERVIC.	⊦ISP.	LIM 4	LIMIT
			HY5T.
			ON L.
			OFF L.
			PERIO⊦
			TIME L.

! *Projection of individual units depends on the set „Type" of the limits*

LIM -	**Setting the values for limits evaluation**
LIMIT	Setting limit for relay switch on

- in full display range

HY5T.	Setting hysteresis only in (+) values

- in 1/10 of the display range

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

- in full display range

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

- in full display range

PERIO⊦	Setting the period of the limit switch-on

- in full display range

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

- in range 0...99,9 s

4.3.3.2.1 DATA OUTPUT - SETTING THE TRANSMISSION RATE

INPUT5	LIMIT	⸆AU⸆	1200.
CHANNE.	⊦ATA	A⊦⊦R.	2400.
OUTPUT	AN. OUT.	PROT.	4800.
5ERVIC.	⊦ISP.		9600. **DEF**
			19200.
			38400.
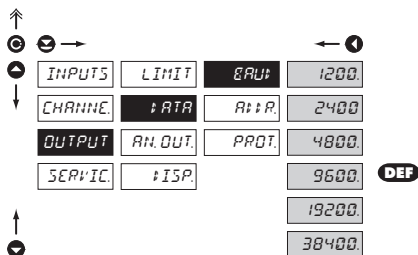
⸆AU⸆	**Setting the rate of data output (baud)**
1200	Rate - 1 200 Baud
2400	Rate - 2 400 Baud
4800	Rate - 4 800 Baud
9600	Rate - 9 600 Baud
19200	Rate - 19 200 Baud
38400	Rate - 38 400 Baud

4.3.3.2.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS
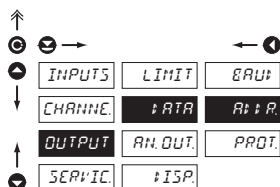
| `Abbr.` | **Setting the instrument address** |

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

4.3.3.2.3 DATA OUTPUT - SETTING THE DATA PROTOCOL
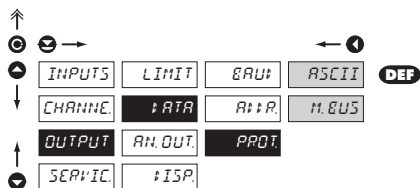
| `PROT.` | **Setting the type of the data protocol** |

| `ASCII` | ASCII protocol |

| `PROT.` | DIN MessBus protocol |

4.3.3.3.1 ANALOG OUTPUT - SETTING THE DATA FOR EVALUATION
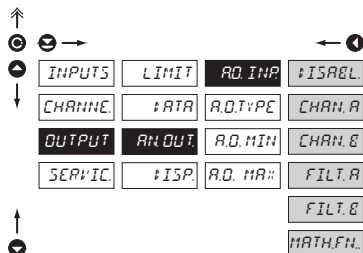
| `AO.INP.` | **Setting the input „quantity" for evaluation of the analog output** |

| `DISABL.` | AO will not be evaluated |

| `CHAN.A` | AO will be evaluated from output of „Channel A" |

| `CHAN.B` | AO will be evaluated from output of „Channel B" |

| `FILT.A` | AO will be evaluated from output of „Channel A" after their modification by digital filters |

| `FILT.B` | AO will be evaluated from output of „Channel B" after their modification by digital filters |

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

4.3.3.3.2 ANALOG OUTPUT - SETTING THE TYPE

INPUTS	LIMIT	A.O. INP.	0-20mA
CHANNE.	DATA	A.O.TYPE	4-20mA DEF
OUTPUT	AN.OUT.	A.O. MIN.	E 4-20
SERVIC.	DISP.	A.O. MAX.	0-5mA
			0-2V
			0-5V
			0-10V

A.O.TYPE **Setting the type of analog output**

- current and voltage outputs are galvanically separated

0-20mA Output: 0...20 mA

4-20mA Output: 4...20 mA

E 4-20 Output: 4...20 mA with Error status indication

- upon this Error statement the output value is < 3,6 mA

0-5mA Output: 0...5 mA

0-2V Output: 0...2 V

0-5V Output: 0...5 V

0-10V Output: 0...10 V

4.3.3.3.3 ANALOG OUTPUT - SETTING THE RANGE

INPUTS	LIMIT	A.O. INP
CHANNE.	DATA	A.O.TYPE
OUTPUT	AN.OUT.	A.O. MIN
SERVIC.	DISP.	A.O. MAX
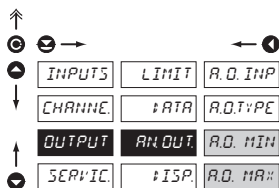
AN.OUT. **Setting the range of the analog output**

- analog output is isolated and its value corresponds with the displayed data. It is fully programmable, i.e. that enables to assign the AO limit points to two arbitrary points from 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 is -99 999...999 999

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

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

4.3.3.4 PROJECTION ON THE DISPLAY

`INPUTS`	`LIMIT`	`SHOW`	`CHAN.A`
`CHANNE.`	`↓ ATA`	`SETTIN.`	`CHAN.B`
`OUTPUT`	`AN.OUT.`		`FILT.A`
`SERVIC.`	`↓ ISP.`		`FILT.B.`
			`MAT.FN.`
			`SUM`
			`TARA`
			`LIM 1`
			`LIM 2`
			`LIM 3`
			`LIM 4`
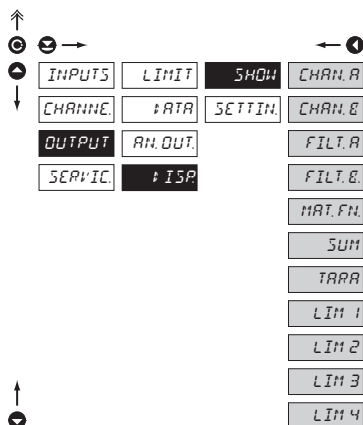
`SHOW` **In this menu item the following data may be projected**

`CHAN.A`	Value of „Channel A"
`CHAN.B`	Value of „Channel B"
`FILT.A`	Value of „Channel A" after filtration
`FILT.B`	Value of „Channel B" after filtration
`MAT.FN.`	Value of „Mathematic functions"
`SUM`	Value of „Accumulated quantity"
`TARA`	Tare value
`LIM 1`	Value of „Limit 1"
`LIM 2`	Value of „Limit 2"
`LIM 3`	Value of „Limit 3"
`LIM 4`	Value of „Limit 4"

4.3.3.4.1 PROJECTION ON THE DISPLAY - PERMANENT

`INPUTS`	`LIMIT`	`SHOW`	`FOREV.`	`CHAN.A`
`CHANNE.`	`↓ ATA`	`SETTIN`	`↓EY`	`CHAN.B`
`OUTPUT`	`AN.OUT.`		`TEMPOR.`	`FILT.A`
`SERVIC.`	`↓ ISP.`		`MENU`	`FILT.B`
			`ENTER`	`MAT.FN..`
			`8RIGHT.`	`MIN`
				`MAX`

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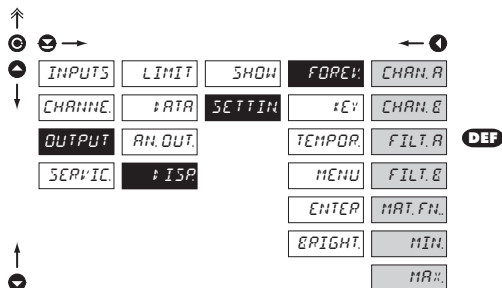
`FOREV.` **Selection of values for permanent projection on the instrument display**

`CHAN.A`	Value of „Channel A"
`CHAN.B`	Value of „Channel B"
`FILT.A`	Value of „Channel A" after filtration
`FILT.B`	Value of „Channel B" after filtration
`MAT.FN.`	Value of „Mathematic functions"
`MIN`	Minimum value
`MAX`	Maximum value

35

4.3.3.4.2 DISPLAY PROJECTION - AFTER PRESSING „LEFT"　◖

INPUTS	LIMIT	SHOW	FOREV.	┼ISABL.
CHANNE.	┼ATA	SETTIN	┼EY	CL. C.A.
OUTPUT	AN.OUT.		TEMPOR.	CL. C.B.
SERVIC.	┼ISP		MENU	CL.SUM.
			ENTER	CL. M.M.
			&RIGHT.	MENU
				TEMP.N.
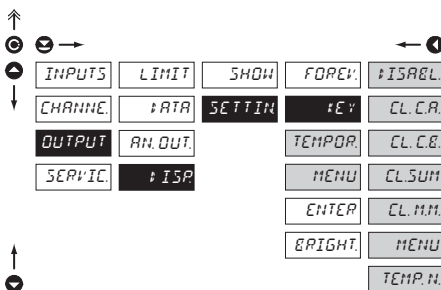
┼EY **Setting the functions of key „LEFT" -** ◖

┼ISABL. The key is inactive

CL. C.A. Resetting „Channel A"

CL. C.B. Resetting „Channel B"

CL.SUM. Resetting the total

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

MENU Direct access to a selected menu item

- *after pressing the key the menu item (selected in „MENU") is displayed, which can be edited*

TEMP.N. Projection of temporary value

- *after pressing the key the selected value is displayed for approximately 2 s (selected in „TEMPOR.") with flashing decimal point*

INPUTS	LIMIT	SHOW	FOREV.	CHAN.A
CHANNE.	┼ATA	SETTIN	┼EY	CHAN.B
OUTPUT	AN.OUT.		TEMPOR.	FILT. A
SERVIC.	┼ISP		MENU	FILT. B.
			ENTER	MAT. FN.
			&RIGHT.	SUM
				TARA
				LIM 1
				LIM 2
				LIM 3
				LIM 4
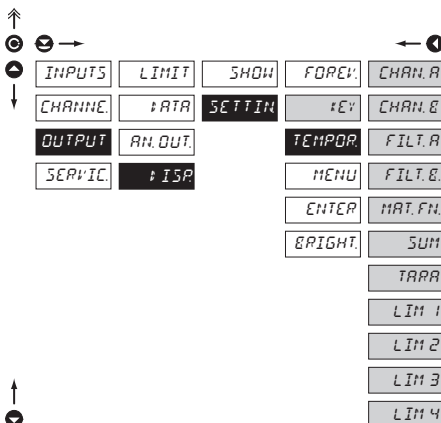
TEMPOR. **Projection of temporary value**

- *in this menu the value for temporary projection on the display may be selected (after pressing ◖), which is displayed for approximately 2 s, with flashing decimal point*

CHAN. A Value of „Channel A"

CHAN. B Value of „Channel B"

FILT. A Value of „Channel A" after filtration

FILT. B Value of „Channel B" after filtration

MAT. FN. Value of „Mathematic functions"

SUM Value of „Accumulated quantity"

TARA Tare value

The function is suitable for quick ascertainment of the value by pressing one key
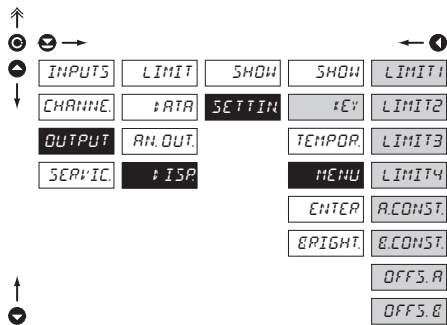
`LIM 1`	Value of „Limit 1"
`LIM 2`	Value of „Limit 2"
`LIM 3`	Value of „Limit 3"
`LIM 4`	Value of „Limit 4"

`MENU`	**Direct access to selected menu item (with. pasw.)**

- the item is accessible after its setting in menu „KEY" > „MENU"

`LIMIT1`	Limit 1
`LIMIT2`	Limit 2
`LIMIT2`	Limit 3
`LIMIT2`	Limit 4
`A.CONST`	Multiplying constant „Channel A"
`B.CONST`	Multiplying constant „Channel B"
`OFFS. A`	Shift of the beginning for „Channel A"
`OFFS. B`	Shift of the beginning for „Channel B"

37

4.3.3.4.3 DISPLAY PROJECTION - AFTER PRESSING THE KEY „ENTER" 😕
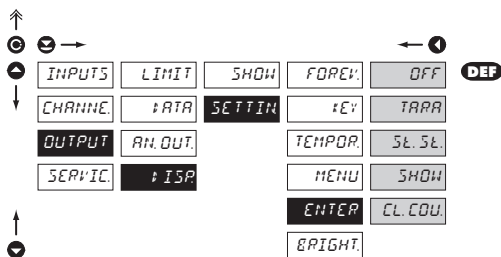
| `ENTER` | **Assigning function to the key „ENTER"** |

| `OFF` | The key has no function |

| `TARA` | Display taring |

| `St.St.` | Control of the START - STOP function |

- only in the Stop-watch regime

| `SHOW` | Direct projection of selected values |

| `Cl.COU.` | Resetting the counter (Input C) |

- as per setting > INPUT > CONFIG > M. CLR.

4.3.3.4.4 SETTING THE DISPLAY BRIGHTNESS
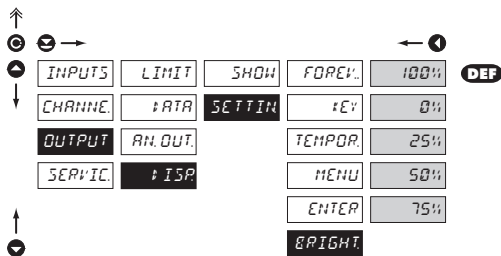
| `BRIGHT.` | **Setting the display brightness** |

| `100%` | Brightness 100 % |

| `0%` | Brightness 0 %, display is switched off |

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

| `25%` | Brightness 25 % |

| `50%` | Brightness 50 % |

| `75%` | Brightness 75 % |

4.3.4 CALIBRATION MODE - SERVICE
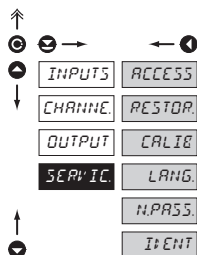
`ACCESS`	Setting the access rights for „User mode"
`RESTOR.`	Return to manufacture calibration or setting
`CALIB`	Instrument calibration
`LANG.`	Setting the language version
`N.PASS.`	Change of the access password
`IdENT`	Instrument identification

4.3.4.1.1 SETTING THE ACCESS RIGHTS FOR „USER MODE" - RESETTING TO ZERO
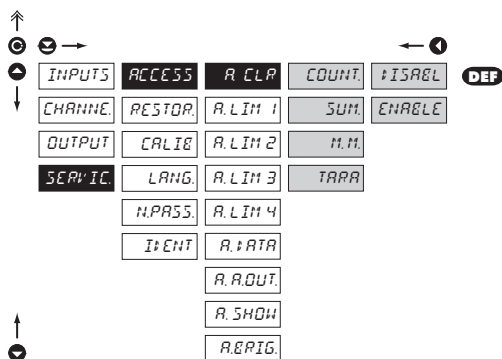
`A.CLR` **Authorization for resetting the internal values of the instrument to zero**

`COUNT.` Authorization for item „CLR C.A." and „CLR C.B.", permission to reset the counter to zero, Channel A and B

`SUM.` Authorization for item „CL. SUM.", permission to reset the total value to zero

`M.M.` Authorization for item „CL. MM", permission to reset the Min/max. value to zero

`TARA` Authorization for item „CL. TAR.", permission to reset the tare to zero

In all items the following parameters may be selected

`DISABL` The item is not projected in the „UM"

`ENABLE` The item may be reset to zero

**4.3.4.1.2 SETTING THE ACCESS RIGHTS FOR „USER MODE" - LIMITS**

⇑					
⊙ ☻→				←◐	
↕	INPUT5	ACCE55	A.CLR	LIMIT	▸I5ABL	DEF
	CHANNE.	RE5TOR.	ALIM 1	HY5T	5HOW
	OUTPUT	CALIB	A.LIM 2	ON L	E▸IT
	5ERVIC.	LANG.	A.LIM 3	OFF L	
		N.PA55.	A.LIM 4	PERIO▸	
↑		I▸ENT	A.▸ATA	TIME.L	
⊙			A.A.OUT.		
			A.5HOW.		
			A.ERIG.		

ALIM ˟ — Setting the access rights into Limits in the „UM"

LIMIT — Authorization for item „LIMIT", setting the limits

HY5T — 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)

PERIO▸ — Authorization for item „PERIOD", setting the switch-on period (dose - Lim 1)

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

In all items the following parameters may be selected

▸I5ABL — The item is not projected in the „UM"

5HOW — The item is projected in the „UM" but cannot be changed

**E▸IT** — The item has full access in the „UM" incl. editing

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

⇑					
⊙ ☻→				←◐	
↕	INPUT5	ACCE55	A.CLR	▸I5ABL	DEF
	CHANNE.	RE5TOR.	A.LIM 1	5HOW	
	OUTPUT	CALIB	A.LIM 2	E▸IT	
	5ERVIC.	LANG.	A.LIM 3		
		N.PA55.	A.LIM 4		
		I▸ENT	A.▸ATA		
↑			A.A.OUT		
⊙			A.5HOW.		
			A.ERIG.		

A.▸ATA — Authorization for item „DATA", setting the data output

A.A.OUT. — Authorization for item „AN. OUT.", setting the analog output

In all items the following parameters may be selected

▸I5ABL — The item is not projected in the „UM"

5HOW — The item is projected in the „UM" but cannot be changed

E▸IT — The item has full access in the „UM" incl. editing

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

INPUTS	ACCESS	A.CLR	DISABL.	DEF
CHANNE.	RESTOR.	A.LIM 1	ENABLE	
OUTPUT	CALIB	A.LIM 2		
SERVIC.	LANG.	A.LIM 3		
	N.PASS.	A.LIM 4		
	IDENT	A.DATA		
		A.A.OUT		
		A SHOW		
		A.BRIG.		

A SHOW   **Authorization for temporary projection of internal values „SHOW" from menu „OUTPUT - DISP"**

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

In all items the following parameters may be selected

DISABL.   The item is not projected in the „UM"

ENABLE   The item may be reset to zero

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

INPUTS	ACCESS	A.CLR	DISABL.	DEF
CHANNE.	RESTOR.	A.LIM 1	SHOW	
OUTPUT	CALIB	A.LIM 2	EDIT	
SERVIC.	LANG.	A.LIM 3		
	N.PASS.	A.LIM 4		
	IDENT	A.DATA		
		A.A.OUT		
		A.SHOW.		
		A.BRIG.		

A.BRIG.   **Authorization for item „BRIGHT.", setting the display brightness**

In all items the following parameters may be selected

DISABL.   The item is not projected in the „UM"

SHOW   The item is projected in the „UM" but cannot be changed

EDIT   The item has full access in the „UM" incl. editing

4.3.4.2 RETURN TO MANUFACTURE CALIBRATION/SETTING
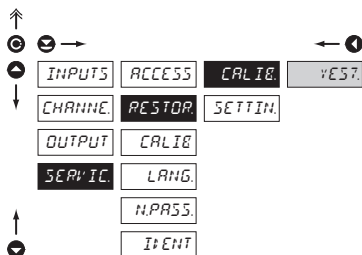
| RESTOR. | **Return to manufacture calibration and instrument setting** |

- in case of incorrect setting or calibration it is possible to return to manufacture setting. Prior execution of the changes you will be asked to confirm your choice „Yes?"

| CALIB. | Return to manufacture calibration of the instrument |

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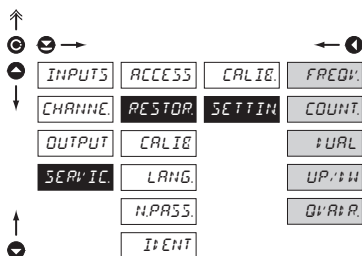
- reading the manufacture calibration and basic setting of items in the menu (DEF)

FREQV	Manufacture pre-setting for Frequency measurement
COUNT.	Manufacture pre-setting for counter
DUAL	Manufacture pre-setting for „DUAL"
UP/DW	Manufacture pre-setting for „UP/DW"
QVAP.R	Manufacture pre-setting for „Counter - IRC"

4.3.4.3 INSTRUMENT CALIBRATION
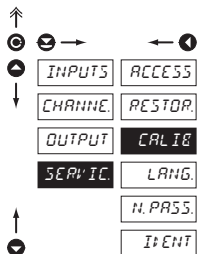
| CALIB | **Instrument calibration** |

- after entering this item the reference frequency is set, at which calibration is performed. To approve the set frequency, confirm the report MEAS", the instrument consequently switches to calibration measuring (% is displayed) with measuring time of approx. cca 30 s
- stop-watch is calibrated by means of a time normal (e.g.: audio signal on the radio/ telephone), at first signal the stop-watch gets going from zero and after approx. 10 hours at second signal your confirm by pressing ENTER the lapsed time which you set here

42

4.3.4.4 LANGUAGE VERSION FOR THE INSTRUMENT MENU
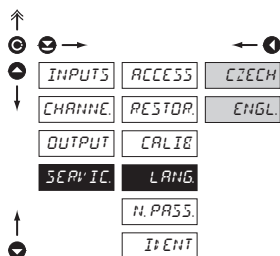
LANG. Setting the language version of the instrument menu

CZECH The instrument menu is in Czech language

ENGL. The instrument menu is in English language

4.3.4.5 SETTING NEW ACCESS PASSWORD
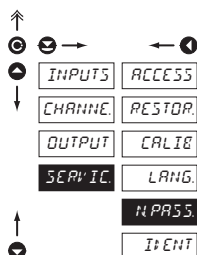
N.PASS. Setting new access password for „Configuration menu"

- this selection allows to change the numeric code which blocks the access into the „Configuration mode" of the instrument. Range of the numeric code is 0...9999

4.3.4.6 INSTRUMENT IDENTIFICATION
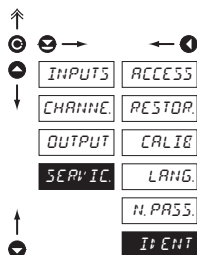
IDENT Projection of the instrument version

- the display shows the type identification of the instrument with the inspection number
- name of the instrument - measuring mode - version SW + hour SW - date (DD/MM/YY)

5. TABLE OF SYMBOLS

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

Description is cancelled by entering characters with code 00

	0	1	2	3	4	5	6	7
0		٦	''	&	S	''	&	'
8	(	)	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7
24	8	9	''	,,	(	)	-	?
32	C	A	E	C	♭	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	ι	J	k	l	m	n	o
80	P	Q	r	⌐	t	⊔	v	w
88	x	y	z	{			}	~

	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	{			}	~	

6. DATA PROTOCOL

The instruments communicate via serial line RS232 or RS485. For communication they use either ASCII protocol or DIN MessBus protocol. The communication is running in the following format:

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

Transmission rate is adjustable in the instrument menu and depends on the used control processor. The instrument address is in the instrument menu in the range of 0...31. Manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. Type of line used - RS232 / RS485 - is determined by exchangeable card automatically identified by the instrument.

COMMANDS FOR INSTRUMENT OPERATION

The commands are described in the description which can be found at **www.orbit.merret.cz/rs**.
The command consists of a couple number-letter, where the letter size is of importance.

COMMANDS NOT LISTED IN THE MENU

1M	🔁	D	Send minimum value
2M	🔁	D	Send maximum value
1X	🔁	T	Send display value, data format „R <SP> DDDDDDDD"
2X	🔁	T	Send relay status, the instrument responds in series of digits 0,1 in the order from 1st relay
			1 means the relay is on, relays not used send back X
3X	🔁	H	Send the status of auxiliary inputs
1Z	🔁	H	Send HW instrument configuration
1x	🔁	D	Send output value from filter of Channel A
2x	🔁	D	Send output value from filter of Channel B
9x	🔁	D	Send output value of mathematic functions

7. 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. MATH.	mathematic error, range of projection is out of display	change the set projection
E. DATA	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

8. TECHNICAL DATA

INPUT

Type:	upon contact, TTL, NPN/PNP
Measurements:	1x counter/freq./repeat/phase UP or DOWN
	2x counter/frequency UP nebo DOWN
	1x counter/frequency UP/DOWN
	1x counter/frequency UP/DOWN for IRC
	- measuring range is adjustable
Input frequency:	0,02...800 kHz (for IRC 300 kHz)

PROJECTION

Display:	999999, intensive red or green 14-segment LED, digit height 14 mm
Projection:	-99999...999999
Decimal point:	adjustable - in programming mode
Bright:	adjustable - in programming mode

INSTRUMENT ACCURACY

Temp. coefficient:	25 ppm/°C
Accuracy:	±0,01 % from range (frequency)
Time base:	0,05/0,5/1/2/5/10/20/50 s
Calibrat. coefficient:	±0,00001....99999
Filtration constant:	allows to set maximum valid frequency, which is processed (OFF/10...2 000 Hz)
Type of filter:	sampling
Pre-setting:	-99999...999999
Functions:	data backup - storing measured data even after the instrument switches off (EEPROM)
	summation - registration of shift operation
	Hold - stop measuring (upon contact)
	Locking the keyboard (upon contact)
Watch-dog:	reset after 1,2 s
Calibration:	at 25°C and 40 % r.h.

COMPARATOR

Type:	digital, adjustable in menu
Limits:	-99999...99999
Hysteresis:	0...99999
Delay:	0...99,9 s
Outputs:	4x relay with switc. 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 format:	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 up to 600 Ohm

EXCITATION

Adjustable:	2...9 VDC/150 mA, isolated
	9...12 VDC/100 mA, isolated
	15...24 VDC/80 mA, isolated

POWER SUPPLY

Options:	24/110/230 VAC, 50/60 Hz, ±10 %, 7,5 VA
	10...30 VDC/max. 1,2 A (24 VDC/350 mA),
Protection:	melting fuse inside the instrument
	VAC (T 80 mA), VDC (T 630 mA)

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 cross section up to 2,5 mm²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temp.:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage categ.:	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

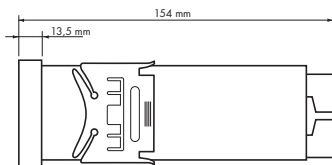# 9. INSTRUMENT DIMENSIONS AND INSTAL.

Front view
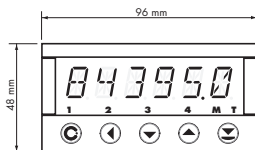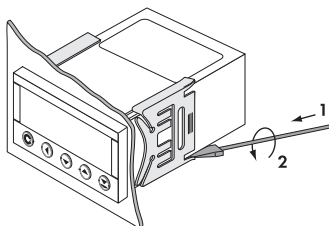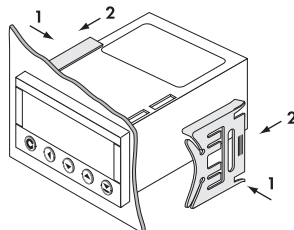

Panel cut
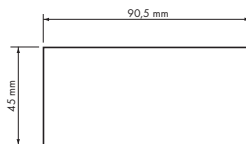
Side view

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. 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:	6 -digit programmable panel instrument
Type:	OM 611UQC

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 50130-5, chapter 20, prEN 50131-2-1, par. 9.3.1
	EN 61000-3-2 + A12
	EN 61000-4-8

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

11. CERTIFICATE OF GUARANTEE

Product   **OM 611UQC**

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 occurring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

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

The guarantee shall not apply for defects caused by:

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

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

Stamp, signature

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