OM 601UQC

6 DIGIT UNIVERSAL
IMPULSE COUNTER
FREQUENCY METER
STOPWATCH/WATCH

PRELIMINARY

orbit merret

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 601 UQC series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

They are up to the following European and Czech standards:
CSN EN 55 022, class B
CSN 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.

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

$$C \in$$

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

Tel: +420 - 2 - 8104 0200
Fax: +420 - 2 - 8104 0299
e-mail: orbit@merret.cz
www.orbit.merret.cz

1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OM 601UQC model is a universal 6 digit panel programmable impulse counter/frequency meter/repeat/stop-watch.

The instrument is based on an 8-bit microcontroller, that secures high accuracy, stability and easy operation of the instrument.

Measuring modes

SINGLE	Single-channel counter/frequency meter
UP/DW	Single-channel UP/DW counter/frequency meter
DUAL	Double-channel counter/frequency meter
QVADR	Counter/frequency meter for IRC sensors
Stopwatch	Watch/stop-watch

Programmable projection of the display

Calibration	calibration coefficient may be set in „CM" individually for every channel
Projection	–99999...999999 with fixed or floating DT in adjustable format 10/24/60
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 parameter set indicates the maximum possible measured frequency, that the instrument will process, 10 Hz...2 kHz
Exponential average	from 2...128 measurements
n-th value	from 2...255 measurements
Radius of insensitivenes	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 the calibration constant 1/10/60/100/1000/3600
Min/max. value	registration of min./max. value reached during the measurement
Tare	assigned to reset the display in case of non-zero input signal
Top value	only max. (min.) value for selected time period is displayed
Mathem. operations	between inputs A and B
	A+B, A-B, A*B, A/B, (A-B)/B, Polynom, Logaritmus

External control

Hold	display/instrument blocking
Lock	control keys blocking

Output

Limits	2 relays with switching contact
	type MEZ/OD-DO/DAVKA
	Limits have both adjustable hysteresis and optional delay of the switch-on. Reaching the limits is signalled by LED and at the same time by the switch-on of the relevant relay.

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 number code and contains complete instrument setting.

User menu (hereinafter referred to as "UM") may contain arbitrary programming settings, defined in "CM" with another selective restriction (see, change).

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

The measured units may be projected on the display.

EXTENSION

Additional voltage is suitable for feeding of sensors and transducers. It has a galvanic isolation with continuously adjustable value in the range of 2...24 VDC

Data outputs are for their rate and accuracy suitable for transmission of the measured data for further display or directly into the control systems. We offer an isolated RS 232 and RS 485 with the DIN MessBus/ASCII protocol.

Analogue outputs will find their place in applications where further evaluating or processing of measured data in external devices is required. We offer universal analogue output with the option of selection of the type of output - voltage/current. The value of analogue output corresponds with the displayed data and its type and range are selective in programming mode.

3. CONNECTION

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

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

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

The instruments are tested in compliance with standards for use in industrial area, yet we recommend to abide by the above mentioned principles..
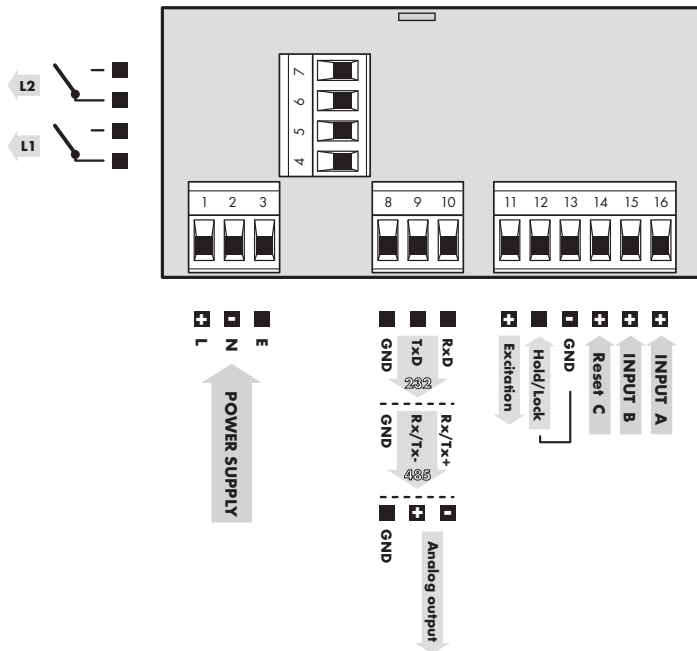
Signals
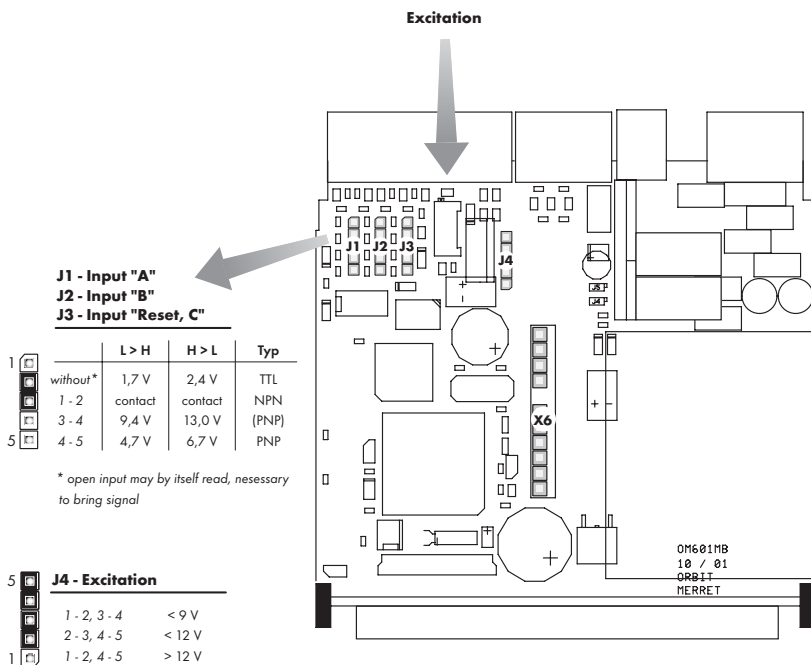
Input:	2,4...60 V, adjustable comparator level (shorting links inside the instrument)
	- against GND
Resetting:	2,4...60 V, adjustable comparator level (shorting links inside the instrument)
	- against GND
Control:	Lock - control keys blocking, upon contact on terminal no. 13
	Hold - stop measuring, upon contact against terminal no. 13

3.1 Configuration of the shorting links

Setting the comparator levels

Excitation

J1 - Input "A"
J2 - Input "B"
J3 - Input "Reset, C"

	L > H	H > L	Typ
*without**	1,7 V	2,4 V	TTL
1 - 2	contact	contact	NPN
3 - 4	9,4 V	13,0 V	(PNP)
4 - 5	4,7 V	6,7 V	PNP

* open input may by itself read, nesessary to bring signal

J4 - Excitation

1 - 2, 3 - 4	< 9 V
2 - 3, 4 - 5	< 12 V
1 - 2, 4 - 5	> 12 V

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4. INSTRUMENT SETTING

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

LED functions

1 2	signalization of the Limits switch-on
	- flashing LED signals that the set value was exceeded but the switch-on is blocked by the preset hysteresis and delay
M	projection of Min/Max value
T	projection with tare

Control keys functions

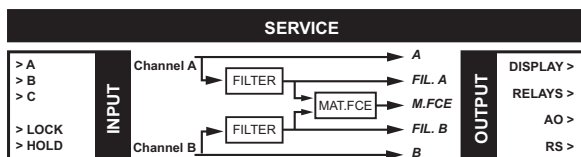| $\mathbb{C}$	$\blacktriangledown$	$\blacktriangleleft$	$\blacktriangledown$	$\blacktriangle$
measuring regime				
access into menu	adjustable function	adjustable function	projection of Min value	projection of Max value
item browsing				
exit from menu	access to next level	back to previous level	browsing down through items	browsing up through items
editing - list				
cancel editing	confirm selected item	shift to higher level	browsing down	browsing up
editing - numbers				
cancel editing	confirm selected number	shift to higher decade	change of selected no.-down	change of selected no.- up
Menu	*Enter*	*Left*	*Down*	*Up*

! *In case of delay longer than 60 s the programming mode will be automatically discontinued and the instrument returns by itself into the measuring mode.*

4.1. PROGRAMMING MODES

4.1.1. Configuration mode

- ■ complete instrument setting - designed for professional service and maintenance
- ■ access is password blocked
- ■ setting the authorization for „User Mode"

SERVICE

> A
> B
> C

> LOCK
> HOLD

INPUT

Channel A → FILTER → MAT.FCE → Channel B → FILTER

A
FIL. A
M.FCE
FIL. B
B

OUTPUT

DISPLAY >
RELAYS >
AO >
RS >

ⓒ + ☲   Access into the "Configuration mode" + entering a 4 digit code   ☲ →

INPUT5 ☲ CLEAR ▲ CONFIG ▲ AUX.INP

▲ ☲ → **CLEAR**   Values resetting
↓ ☲ → **CONFIG**   Setting the instrument parameters
☲ → **AUX.INP**   Setting auxiliary inputs

CHANNE ☲ CHAN.A ▲ CHAN.B ▲ MATHFN

▲ ☲ → **CHAN.A**   Setting measuring channel A
↓ ☲ → **CHAN.B**   Setting measuring channel B
☲ → **MATHFN**   Mathematic functions

OUTPUT ☲ LIMIT ▲ ▸ATA ▲ AN.OUT. ▲ ▸I5P

▲ ☲ → **LIMIT.**   Setting the limits, hysteresis, delay and type
↓ ☲ → **▸ATA**   Setting the data output
☲ → **AN.OUT**   Setting the analogue output
☲ → **▸I5P.**   Setting the projection, control keys functions

---

5ERVIC ☲ ACCE55 ▲ RE5TOR ▲ -- -- -- -- ▲ I▸ENT

▲ ☲ → **ACCE55**   Setting the access rights into the entries in the User menu
↓ ☲ → **RE5TOR**   Return to manufacturing calibration/setting
☲ → **CALI8**   Instrument calibration
☲ → **LANG**   Setting the language version
☲ → **N.PA55**   Change of the access password
☲ → **I▸ENT**   Instrument identification

4.1.2 User mode

■　　　　　is designated for the operator of the instrument
■　　　　　may contain setting the limis, brightness and resetting with a restraint, which is adjustable in the „Configuration mode"

ⓒ　　　　Access into the „User mode"

$$INPUT5 \;\; \circledcirc \;\; CLEAR$$

⊕ ⊚ → *CLEAR*　Resetting the counters, total, min/max value and tare
↓

$$OUTPUT \;\; \circledcirc \;\; LIMIT \;\; \textcircled{\tiny{▲}} \;\; \flat ATA \;\; \textcircled{\tiny{▲}} \;\; ANOUT. \;\; \textcircled{\tiny{▲}} \;\; \flat ISP$$

⊕ ⊚ → *LIMIT.*　Setting the limits, hysteresis, delay
↓ ⊚ → *ᵦATA*　Setting the data output
　⊚ → *ANOUT.*　Setting the analogue output
　⊚ → *ᵦISP.*　Setting the brightness and projection of selected data

> ❗ *Projection of entries in this menu depends on the setting in the „Configuration menu" i.e. entries not used are not being displayed*

4.1.3 Setting (.) a (-)

Decimal point

Its selection in calibration modes, upon modification of the number to be adjusted, is performed by the control ◀ with transition to higher decade, when the decimal point starts flashing. Positioning is performed by ▼ / ▲.

The minus sign

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

> 🔆 *In the configuration mode there are graphic symbols by individual entries, which will lead you through relevant settings*
>
> *Entries marked* **DEF** *are preset from manufacture and may be restored in menu (SERVIS - OBNOVA)*

4.2 CONFIGURATION MODE

4.2.1 Access into the configuration mode

ⓒ + ⬇   ⇨   entering and confirming a 4 digit access password

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

4.2.2 Configuration mode - INPUT

> *INPUTS* ⬇ *CLEAR* ⬆ *CONFIG* ⬆ *AUX.INP*

4.2.2.1 Resetting

> *CLEAR* ⬇ *CLR.CA* ⬆ *CLR.CB* ⬆ *CL.SUM* ⬆ *CL.MM* ⬆ *CL.TAR.*

CLAER   **Values resetting**
⬇ →

    CLR.CA   <u>Resets the counter (input A)</u>
    ⬆   *- resets the counters and adds the value to total sum in the internal memory*
    ↓   *of the instrument*
    - the total serves for cumulative sums of impulses (e.g. adding in shift operation), the
    displayed data is added into the sum upon resetting of the counter
    ⬇ →

    CLR.CB   <u>Resets the counter (input B)</u>
    ⬆   ⬇ →
    ↓

    CL.SUM   <u>Resets the total</u>
    ⬆   *- resets the total sum in the internal memory of the instrument*
    ↓   ⬇ →

    CL.MM.   <u>Resets the minimum and maximum projection value</u>
    ⬆   ⬇ →
    ↓

    CL.TAR.   <u>Resets the tare value</u>
    ⬇ →

4.2.2.2 Instrument configuration

| $CONFIG$ ⊙ $M.MODE$ ⊙ $M.TIME$ ⊙ $SET.T$ ⊙ $M.START$ ⊙ $M.STOP$ |
| ⊙ $M.CLR$ ⊙ $BACKUP$ ⊙ $DIVID$ ⊙ $FILTER$ ⊙ $FILT.F.$ ⊙ $MM.INP$ |

$CONFIG$ Instrument configuration
⊙ →

$M.MODE$ Setting the measuring mode of the instrument
⊙   ⊙ →
↓
$SINGLE.$ Simple impulse counter/frequency meter **S**
⊙   *- measures at input A and may display the numbers/frequency*
↓ *(phase/repeat)*

UP/DW UP/DW impulse counter/frequency meter **UD**
⊙ *- measures at inputs A, B (direction) and may display the*
↓ *numbers/frequency*

$DUAL.$ Double impulse counter/frequency meter **D**
⊙ *- measures at two inputs and may display the numbers/frequency*
↓

$QUADR$ Impulse counter/frequency meter for IRC sensors **Q**
⊙ *- measures at two inputs A+B and may display the numbers/fre-*
↓ *quency*

$TIME$ Watch/Stop-watch **H**
 - without reserve battery the time is not stored, after the switch-on to
 el.supply the display is reset or pre-set

💡 *Setting the measuring mode of the instrument is the essential entry for configuration and projection of active entries of the menu*

$M.TIME$ Setting the measuring time - time base **S UD D Q**
⊙ *- if you set measuring time e.g. to 1 s, the time of measuring is approximately from 1 s*
↓ *to 2 s (1 s + maximum of one period of measured signal). If no impulse arrives within*
 2 s it is understood that the input signal has zero frequency
 - for the DUAL regime the measuring time is precisely set
⊙ →
$50 m⌐$ 50 ms
$500 m⌐$ 500 ms
$1 ⌐$ 1 s **DEF**
$2 5$ 2 s
$5 ⌐$ 5 s
$10 ⌐$ 10 s
$20 ⌐$ 20 s
$50 ⌐$ 50 s

$SET.T.$ Setting the required time value **H**
⊙ *- setting the actual time on instrument*
↓ ⊙ →

M.5TART <u>Setting the stop-watch/watch switch-on</u> **H**

    CONTIN   Watch is running all the time - if the instrument is on

    CONTAC.   Watch is running upon connected contact, input A   **DEF**

    A TO A   Starting at the edge of signal, input B
    - the stop-watch is triggered by the edge (passage of signal accross the comparator level) and stopped by the subsequent edge

    Au 5tN   Start/stop and resetting, input B
    - the stop-watch is triggered by the edge (passage of signal accross the comparator level) and stopped and reset by the subsequent edge

M.5TOP <u>Setting the resetting, stop-watch/watch stopping</u> **H**

    CLEAR   Stop-watch/watch will be reset through input C   **DEF**

    5t CLA.   Stop-watch/watch will be stopped and reset through input C

M.CLR <u>Setting the resetting</u>
    - function of the „Resetting" input (input C) and the resetting control keys

    Double counter   **D**

    C A   Channel A

    C B   Channel B

    C A+B   Channel A and B at the same time   **DEF**

    Counter for IRC sensors   **Q**

    ALWAYS   Always   **DEF**

    I n AB   Only if A and B is in log 1

BAC tUP <u>Remembering the status of the instrument's display</u>   **S** **UD** **D** **Q**
    - data backup (the displayed data) upon the drop-out of the electrical supply or the instrument switch-off

    ENABLE   Instrument reads data from memory after switch-on   **DEF**

    DISABL.   Instrument is reset after switch-on

DIVID <u>Additional interface constant (input A and B)</u>
    - increasing the range of calibration constant: 1/10/60/100/1000/3600
    DEF, =1
    - increasing the range of calibration constant for stop-watch: **DEF**, =10

FILTER <u>Setting parameters of input filter</u>   **S** **UD** **D** **Q**
    - instrument allows to filter the input signal and thus suppress undesired interfering signals (e.g. relay back-swings) The set parameter indicates maximum possible measured frequency of signal, which is processed by the instrument.

$\textcircled{\ominus} \rightarrow$

$\textcircled{\ominus}$	*OFF*	Without restraint **DEF**
$\downarrow$	*2 kHZ*	to 2 kHz
	1 kHZ	to 1 kHz
	500 HZ	to 500 Hz
	200 HZ	to 200 Hz
	100 HZ	to 100 Hz
	65 HZ	to 65 Hz
	55 HZ	to 55 Hz
	45 HZ	to 45 Hz
	20 HZ	to 20 Hz
	10 HZ	to 10 Hz **DEF**, for the TIME regime

FILT.F <u>Selection of switch-on/off of the filter function</u> **S** **UD** **D** **Q**
$\textcircled{\ominus}$ for frequency measuring
$\downarrow$ *- upon switched-on filtration in frequency measuring occurs delayed reaction to the edge of input signal according to the set filter. In applications where this quality is an obstruction the filter may be switched-off.*

$\textcircled{\ominus} \rightarrow$

$\textcircled{\ominus}$	*DISABL.*	Filter is switched off **DEF**
$\downarrow$	*ENABLE.*	Filter is switched on

MM. INP. <u>Setting the quantity for evalutaion of min/max value</u> **S** **UD** **D** **Q**
- allows to assign a quantity from which min/max value is calculated to display

$\textcircled{\ominus} \rightarrow$

$\textcircled{\ominus}$	*DISABL.*	Min/max. value is off (does not slow down measuring)
$\downarrow$	*CHAN.A*	Calculation of value from channel A **DEF**
	CHAN.B	Calculation of value from channel B
	FIL.A	Calculation of value from channel A, after filtration
	FIL.B	Calculation of value from channel B, after filtration
	MATHFN	Calculation of value from mathematic functions

4.2.2.3 Additional inputs

AUX.INP $\textcircled{\ominus}$ *L. HOLD* $\textcircled{\ominus}$ *M.HOLD.*

AUX.INP **Instrument configuration**
$\textcircled{\ominus} \rightarrow$

L. HOLD <u>Turning on the Hold function</u> **S** **UD** **D** **Q**
$\textcircled{\ominus}$ *- on terminal 12 the „Lock - keyboard blocking", is as a standard active, which*
$\downarrow$ *can be switched to „Hold"*

$\textcircled{\ominus} \rightarrow$

$\textcircled{\ominus}$	*DISABL.*	Hold is off, Lock is on **DEF**
$\downarrow$	*ENABLE.*	Hold is on

- the Lock function is shifted to terminals of additional voltage (if it does not have option excitation)

M.HOLD   <u>Configuration of the Hold function</u>   **S** **UD** **D** **Q**

    ⊛ →

     ⌃ *DISPL.*   Signal „Hold" blocks only display   **DEF**
     ↓ *DIS.+DS*   Signal „Hold" blocks display and data output
     D.+DS+A   Signal „Hold" blocks display, data and analogue output
     ALL   Signal „Hold" blocks the entire instrument

4.2.3 Configuration mode - CHANNELS

CHANNE ⊛ *CHAN.A* ⌃ *CHAN.B* ⌃ *MATHFN*

4.2.3.1 Channel A

CHAN.A ⊛ *INP.A* ⌃ *SET.A* ⌃ *OVER M* ⌃ *FILTER*

    ⌃ *FORMAT* ⌃ *DESC.*

CHAN.A   **Configuration of measuring channel A**

    ⊛ →

     INP.A   <u>Assigning input for Channel A</u>
     ⌃   *- for both channels optional measuring regime may be selected*
     ↓   ⊛ →

       Mode SINGLE.E   **S**
       ⌃ *OFF*   No input assigned
       ↓ *COUNT.*   Input A   **DEF**
       FREQV.   Input A
       PHASE   Input A
       DUTY 1   Input A
       DUTY 2   Input A

       Mode UP/DW and QVADR   **UD** **Q**
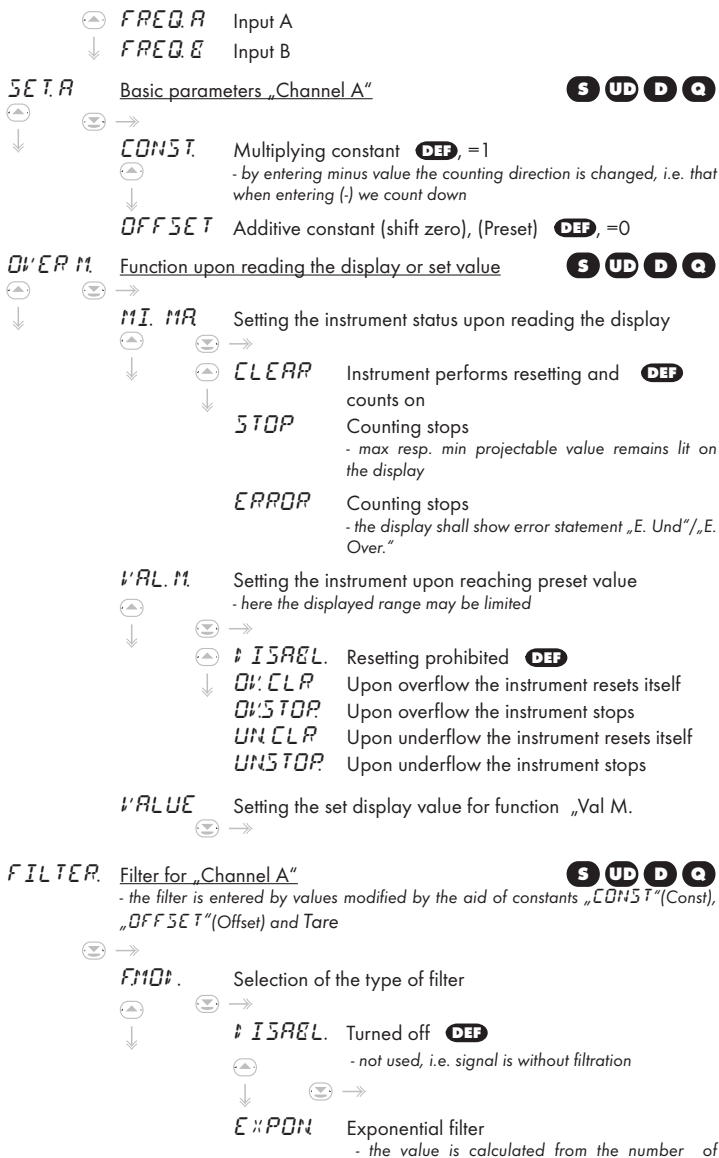   ⌃ *OFF*   No input assigned
       ↓ *COUNT.*   Input A + B   **DEF**
       FREQV   Input A + B

       Mode DUAL   **D**
       ⌃ *OFF*   No input assigned
       ↓ *COUNT.A*   Input A **DEF**, for Channel A
       COUNT.B   Input B **DEF**, for Channel B

$\textit{FREQ. A}$ Input A
$\textit{FREQ. B}$ Input B

$\textit{SET. A}$ <u>Basic parameters „Channel A"</u>   **S** **UD** **D** **Q**

    $\textit{CONST.}$ Multiplying constant **DEF**, =1
       - by entering minus value the counting direction is changed, i.e. that when entering (-) we count down

    $\textit{OFFSET}$ Additive constant (shift zero), (Preset) **DEF**, =0

$\textit{OVER M.}$ <u>Function upon reading the display or set value</u>   **S** **UD** **D** **Q**

    $\textit{MI. MA}$ Setting the instrument status upon reading the display

       $\textit{CLEAR}$ Instrument performs resetting and **DEF** counts on

       $\textit{STOP}$ Counting stops
          - max resp. min projectable value remains lit on the display

       $\textit{ERROR}$ Counting stops
          - the display shall show error statement „E. Und"/„E. Over."

    $\textit{VAL. M.}$ Setting the instrument upon reaching preset value
       - here the displayed range may be limited

       $\textit{DISABL.}$ Resetting prohibited **DEF**
       $\textit{OV. CLR}$ Upon overflow the instrument resets itself
       $\textit{OV.STOP.}$ Upon overflow the instrument stops
       $\textit{UN. CLR}$ Upon underflow the instrument resets itself
       $\textit{UN.STOP.}$ Upon underflow the instrument stops

    $\textit{VALUE}$ Setting the set display value for function „Val M."

$\textit{FILTER.}$ <u>Filter for „Channel A"</u>   **S** **UD** **D** **Q**
- the filter is entered by values modified by the aid of constants „CONST"(Const), „OFFSET"(Offset) and Tare

    $\textit{FMOD.}$ Selection of the type of filter

       $\textit{DISABL.}$ Turned off **DEF**
          - not used, i.e. signal is without filtration

       $\textit{EXPON}$ Exponential filter
          - the value is calculated from the number of

⊝ *measurements selected in „CONST.F"(Const F)*

⊜ →

CONST.F Filter length (no. of values)
- range 2...100

N-TH. n-th value
⊝ *- this filter allows to leave out the n-1 values and for further processing use every n-th measured value*

⊜ →

CONST.F Parameter *n*
- range 2...100

UNSEN Radius of insensitivity
- this filter allows to stabililze the resultant value. The preceding value is considered for the measuring result, if the measured value is not higher than the preceding + P and or smaller than preceding - P. Value„2xP" indicates the band of insensitivity in which the measured value may change without having impact on the result - change of the displayed data.

⊜ →

CONST.F Filter lenght
- range 0,00001...999999

FORMAT <u>Format of projection on the display „Channel A"</u> **S UD D Q**
⊝ ⊜ →

Mode Counter

- the instrument allows classical projection of number with positioning of the decimal point (000000/00000,0/.../0,00000) and projection with floating decimal point, allowing for projection of the number in its most precise form „FLOAT.P". It is further possible to project the data in a time format, i.e. combination of decimal, twentyfour and sixty system (99.23.59/9.23.59.9/23.59.59/99.59.59/9.59.59.9/99.59.99/9999.59/ 9.59.999) 000000 **DEF**

Mode FRQUENCY METER

- the instrument allows classical projection of number with positioning of the decimal point (000000/00000,0/.../0,00000) and projection with floating decimal point, allowing for projection of the number in its most precise form „FLOAT.P"(Float) 00000,0 **DEF**

⌐ESC. <u>Description (of measuring unit) „Channel A"</u> **S UD D Q**
⊝ ⊜ →

- the instrument allows to add two descriptive characters to the classic numeric formats (at the expense of the number of displayed places). The setting is performed with the aid of shifted ASCII code. Upon modification the first two places display the entered characters and the last two places the code of the relevant sign from 0 to 95.

Description is cancelled by entering characters with code 00

4.2.3.2 Channel B

$CHAN.B$ ⊙ $INP.B$ ⊙ $SET B$ ⊙ $OVER M.$ ⊙ $FILTER$

⊙ $FORMAT$ ⊙ $\flat ESC$

! *Ranging the entries and their setting is the same as for „Channel A"*

4.2.3.3 Mathematic functions

$MATHFN$ ⊙ FN ⊙ $MATH.F$ ⊙ $CONST.$

$MATHFN$ **Selection of mathematic function**
⊙ →

FN <u>Setting the mathematic operation</u>
⊙ *- Channel A and B are after filtration*
↓ ⊙ →
⊙ OFF Without function **DEF**
↓ A Channel A
B Channel B
$A + B$ Channel A + Channel B
$A - B$ Channel A - Channel B
$A * B$ Channel A x Channel B
$A ' B$ Channel A / Channel B
$A - B ' B$ (Channel A - Channel B) / Channel B

$MATH F$ <u>Setting the mathematic function</u>
⊙ ⊙ →
↓ ⊙ OFF Without function **DEF**
↓ $POL IN$ Polynom
$(((((A*x)*x+B)*x+C)*x+D)*x+E)*x+F=Ax^5+Bx^4+Cx^3+Dx^2+Ex+F$

$LOGAR$ Logaritmus
$A*log\frac{(B*x+C)}{D*x+E}+F$

$CONST$ <u>Constants setting</u>
⊙ ⊙ →
↓ ⊙ A Constant A
↓ B Constant B
C Constant C
$\flat$ Constant D
E Constant E
F Constant F

4.2.4 Configuration mode - OUTPUT

$$OUTPUT \; \textcircled{\small\vee} \; LIMIT \; \textcircled{\small\wedge} \; \textit{i} RTR \; \textcircled{\small\wedge} \; RNOUT \; \textcircled{\small\wedge} \; \textit{i} ISP$$

4.2.4.1 Limits

$$LIMIT \; \textcircled{\small\vee} \; LIM \; \textit{i} \; \textcircled{\small\wedge} \; LIM \; 2$$

$LIMIT$ **Setting the values and types of limits**   🅢 🆄🅓 🅓 🅠

$\textcircled{\small\vee} \rightarrow$

$\quad LIM \; \textit{i}$ <u>Limit 1</u>

$\quad \textcircled{\small\wedge} \quad \textcircled{\small\vee} \rightarrow$

$\qquad INP.L.$ Setting the source for limits evaluation

$\qquad \textcircled{\small\wedge} \quad \textcircled{\small\vee} \rightarrow$

$\qquad\qquad \textcircled{\small\wedge} \; \textit{i} ISRBL.$ Limit is off

$\qquad\qquad \downarrow \; CHRN. R$ Calculation of value from Channel A   **DEF**

$\qquad\qquad\qquad CHRN. B$ Calculation of value from Channel B

$\qquad\qquad\qquad FIL. R$ Calculation of value from Channel A, after filtration

$\qquad\qquad\qquad FIL. B$ Calculation of value from Channel B, after filtration

$\qquad\qquad\qquad MRTHFN$ Calculation of value from mathematic functions

$\qquad TYPE.L.$ Setting the type of limits

$\qquad \textcircled{\small\wedge} \quad \textcircled{\small\vee} \rightarrow$

$\qquad\qquad HYSTER.$ <u>The limit is in regime with hysteresis and</u>
$\qquad\qquad \textcircled{\small\wedge}$ <u>delay</u> **DEF**
$\qquad\qquad \downarrow$ *- the parameters set for this regime are „L IMI T."(Limit L.), at which the limit shall react, „HYSL."(Hyst) is an auxiliary parameter preventing vibration at unsteady value. Last parameter of the limit is „Ti me L."(Time L.) determining the delay of relay switch-on from the time of exceeding the set limit*

$\qquad\qquad \textcircled{\small\vee} \rightarrow$

$\qquad\qquad FROM.$ <u>The limit is in regime switch-on from-to</u>
$\qquad\qquad \textcircled{\small\wedge}$ *- the parameters „ON L."(Switch-on L.) and „OFF*
$\qquad\qquad \downarrow$ *L."(Switch-off L.) are set for this regime, between which the limit shall be switched*

$\qquad\qquad \textcircled{\small\vee} \rightarrow$

$\qquad\qquad \textit{i} OSING$ <u>The limit is in regime dosing</u>
$\qquad\qquad \textcircled{\small\wedge}$ *- the following two parameters are set in this regime*
$\qquad\qquad \downarrow$ *„PERIOi."(Per L.) within the full range, determining at what value the relay is to switch on and how much higher shall be the next value. Second paramter*

is „T₁mε L."(Time L.) determining the time of the relay switch-on. At resetting the counter to zero the value is set at which the relay shall be switched on to value „PERIOD."(Per L.).

⊙ →

MOD E. L.   Setting the relay mode

⊙   ⊙ →

↓   ⊙ CLOSE   relay switches on when the condition
            ↓   is met **DEF**.

       OPEN   relay switches off when the condition is met

⊙ LIMIT.   Setting the limit (-99999...999999)

↓ HYST.   Setting the hysteresis (only in (+) values)

T₁mε L.   Setting the delay of the limit switch-on (0...99,9 s)

ON L.   Setting the beginning of the switch-on range (-99999...999999)

OFF L.   Setting the end of the switch-on range (-99999...999999)

PERIOD   Setting the period (-99999...999999)
         - adjustable only for LIMIT 1

TIME L.   Setting the time of relay switch-on (0...99,9 s)

LIM 2   Limit 2

! *Ranging the entries and their setting is the same as for „LIM 1", without the mode DAVKA*

4.2.4.2 Data output

DATA   ⊙ EAUD   ⊙ ADDR.   ⊙ PROT

Data output is isolated, in the RS 232 or RS 485 design. Both lines are two-way, with the option of remote control and instrument setting (protocol see chapter 7.)

DATA   **Setting parameters and type of analogue output**   **S** **UD** **D** **Q**

⊙ →

EAUD   Setting the transfer rate

⊙   ⊙ →

↓   ⊙ 600   600 Baud
       ↓ 1200   1 200 Baud
         2400   2 400 Baud
         4800   4 800 Baud
         9600   9 600 Baud   **DEF**

⏶	*19200*	19 200 Baud
↓	*38400*	38 400 Baud
	57600	57 600 Baud
	115200	115 200 Baud

RDIR Setting the instrument address
⏶ *- setting within the range 0...31, forRS 232 and RS 485*
↓ ⏷ →→

PROT. Setting the data protocol
  ⏷ →→
⏶ *ASCII* ASCII protocol **DEF**
↓ *M.BUS* DIN MESSBUS protocol

4.2.4.3 Analogue output

ANOUT ⏷ *AN INP* ⏶ *A TYPE* ⏶ *AMIN* ⏶ *AMAX.*

Analogue output is isolated and its value corresponds with the displayed data. It is fully programmable, i.e. allows to assign the limit points AO to two optional points from the entire measuring range.

ANOUT **Setting parameters and type of analogue output** **S** **UD** **D** **Q**
⏷ →→

    AN INP Setting the source for analogue output
    ⏶ ⏷ →→
    ↓ ⏶ *DISABL.* Analogue output is off
      ↓ *CHAN A* Calculation of value from Channel A **DEF**
        CHAN B Calculation of value from Channel B
        FIL. A Calculation of value from Channel A, after filtration
        FIL. B Calculation of value from Channel B, after filtration
        MATHFN Calculation of value from mathematic functions

    A TYPE. Setting the type of analogue output
    ⏶ ⏷ →→
    ↓ ⏶ *0-20mA* 0 - 20 mA
      ↓ *4-20mA* 4 - 20 mA **DEF**
        0-5mA 0 - 5 mA
        0-2V 0 - 2 V
        0-5V 0 - 5 V
        0-10V 0 - 10 V

$R\,MIN$ <u>Assigning the display value to the beginning of the AO range</u>
⏶ ⏷ →
↓
$R\,MR\!X$ <u>Assigning the display value to the end of the AO range</u>
⏷ →

4.2.4.4 Projection on display

$DISP.$	⏷ $SHOW$ ⏶ $SETTIN$

$DISP.$ **Setting the displayed value**   **UD** **D** **Q**
⏷ →

$SHOW$ <u>Direct projection of selected values</u>
⏶ *- values contained in this menu may be propted by the key „Enter" directly from the*
↓ *measuring regime (see Setting - Enter)*
⏷ →
⏶ $CHAN\,R$ Value of the „Channel A"
↓ $CHAN\,B$ Value of the „Channel B"
$FIL.\,R$ Value of the „Channel A", after filtration
$FIL.\,B.$ Value of the „Channel B", after filtration
$MATHFN$ Value of the mathematic function
SUM Value of the sum
$TARA$ Tare value
$LIM\,1$ Value of limit 1
$LIM\,2$ Value of limit 2

$SETTIN$ <u>Setting the values projected on display</u>
⏶ ⏷ →
↓ $FOREV.$ <u>Setting the value permanently projected on display</u>
⏶ ⏷ →
↓ $CHAN\,R$ Value of the „Channel A" **DEF**
$CHAN\,B.$ Value of the „Channel B"
$FIL\,R$ Value of the „Channel A", after filtration
$FIL\,B.$ Value of the „Channel B", after filtration
$MATHFN$ Value of the mathematic function
MIN Minimum value
$MR\!X.$ Maximum value

KEY <u>Setting the key function</u> ⏴
⏶ ⏷ →
↓ ⏶ OFF Without function **DEF**
↓ $CL.\,CR$ Resetting the „Channel A"
$CL.\,CB.$ Resetting the „Channel B"
$CL.SUM.$ Sum resetting

⏶ *CL. MM.*   Resetting the min/max.value

⤓ *MENU*   Direct access into the menu to selected entry

- after pressing ◀ the selected menu value is displayed, which may be edited

TEMP.N.   Projection of temporary value

- after pressing ◀ the selected value with flashing decimal point is displayed for approx.2 s

TEMPOR.   <u>Setting the temporary value</u> ◀

⏶ ⤓ *- the entry is displayed and is accessible after selecting „TEMP. N." in menu „KEY"*

⥥ →

⏶ *CHAN. A*   Value of the „Channel A"
⤓ *CHAN. B*   Value of the „Channel B"
  FIL. A   Value of the function of „Channel A", after filtration
  FIL. B.   Value of the function of „Channel B", after filtration
  MATHFN   Value of the mathematic function
  SUM   Value of the sum
  TARA   Tare value
  LIM 1   Value of limit 1
  LIM 2   Value of limit 2

MENU   <u>Direct access into the menu to selected entry</u> ◀

⏶ ⤓ *- the entry is displayed and is accessible after selecting „MENU" in menu „KEY"*

⥥ →

⏶ *LIMIT 1*   Limit 1
⤓ *LIMIT2*   Limit 2
  ACONST   Multiplying Constant „Channel A"
  B.CONST   Multiplying Constant „Channel B"
  OFFS. A   Offset „Channel A"
  OFFS. B   Offset „Channel B"

M.LOCK   <u>Blocking the access into menu by pressing the key</u> ◀

⏶ ⤓ *- this function serves for temporary blocking of control keys upon measurement (e.g.when time interval is measured in the regime Stopwatch - stopwatch)*

⥥ →

ENTER.   <u>Setting the key function</u> ⥥

⏶ ⥥ →

⤓ ⏶ *OFF*   Without function   **DEF**
 ⤓ *TARA*   Display taring
  St. St.   Controlling the Start/stop fce (TIME)
  SHOW   Direct projection of selected values

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$ERIGHT$ <u>Restoring frequency of display projection</u>
- brightness 0 % means that the instrument's display will go out after approx 10 s and will light up after pressing any control key on the display

⊛ →

$0\% \ 10\% \ 20\% \ 30\% \ 40\% \ 80\% \ 100\%$ **DEF**

4.2.5 Configuration mode - SERVICE

$SERVIC$ ⊛ $ACCESS$ ⊙ $RESTOR$ ⊙ -- -- -- ⊙ $IDENT$

⊙ ⊛ → $ACCESS$ Setting access rights into entries in the User menu
↓ ⊛ → $RESTOR$ Return to manufacture calibration/setting
  ⊛ → $CALIB$ Instrument calibration
  ⊛ → $LANG$ Setting the language version
  ⊛ → $NPASS$ Change of the access password
  ⊛ → $IDENT$ Instrument identification

4.2.5.1 Access rights into the „User menu"

$ACCESS$ ⊛ $P.LIM \ 1$ ⊙ $P.LIM2$ ⊙ $P.ERIG$ ⊙ $P.CLR$ ⊙ $P.SHOW$

⊙ $P.DATA$ ⊙ $P.ROUTL.$

$ACCESS$ **Setting access authorization for entries in the „User menu"**
  ⊛ →

  $P.LIM \ 1$ <u>Authorization for Limit 1</u>
  ⊙   ⊛ →
  ↓   ⊙ $LIMIT$ For entry „$LIMIT$"*(Limit L.)*, limits
    ↓ $HYST$ For entry „$HYST$"*(Hys L.)*, hysteresis
    $ON \ L.$ For entry „$ON \ L.$"*(Switch-on L.)*,
       beginning of range (from - to)
    $OFF \ L.$ For entry „$OFF \ L.$"*(Switch-off L.)*, end of range (from - to)
    $PERIOD$ For entry „$PERIOD.$"*(Per L.)*, period
    $TIME.L.$ For entry „$TIME \ L.$"*(Time L.)*, delay

    In all entries the following parameters may be selected
      ⊛ →
      ⊙ $DISABL.$ Entry is not projected **DEF**
      ↓ $SHOW$ Entry is only projected, cannot be changed
      $EDIT$ Entry has full access and editing

Projection of entries in this menu depends on the setting of the „Type of limits switch-on", i.e. entries not used are not projected

P.LIM 2 — Authorization for Limit 2
- *same as for LIM 1*

P.BRIG — Authorization for modification of display brightness
- DISABL.   Entry is not projected   **DEF**
- SHOW   Entry is only projected, cannot be changed
- EDIT   Entry has full access and editing

P.CLR — Authorization for the resetting menu
- CITACE.   For entry „CLR. C."(CLR. C), reset the counter A + B.
- SUM   For entry „CL. SUM"(CL. SUM), reset the total.
- M.A.M.   For entry „CL. MM"(CL. M.M.), reset min/max value.
- TARA   For entry „CL. TAR"(CL. TAR), reset the tare value.

    In all entries the following parameters may be selected
- DISABL.   Entry is not projected   **DEF**
- ENABLE.   Entry is accessible

P.SHOW — Authorization for access to projection of menu values
- *menu OUTPUT - DISPLAY*
- *entries: Chan A/Chan B/Fil. A/Fil. B/Mat.Fce/Sum/Tare/Lim 1/Lim 2*
- DISABL.   Entry is not projected   **DEF**
- ENABLE.   Entry is accessible

P.DATA — Authorization for the „Data output" menu
- DISABL.   Entry is not projected   **DEF**
- SHOW   Entry is only projected, cannot be changed
- EDIT   Entry has full access and editing

P.AOUT — Authorization for the „Analogue output" menu
- DISABL.   Entry is not projected   **DEF**
- SHOW   Entry is only projected, cannot be changed
- EDIT   Entry has full access and editing

4.2.5.2 Return to manufacture calibration/setting

$$\boxed{RESTORE \quad \text{⊙} \quad CALIB \quad \text{⊙} \quad SETTIN}$$

$RESTORE$ **Return to manufacture calibration and setting**

- in case of error setting or calibration it is possible to return to manufacture setting, prior the execution of changes you will be invited to confirm your selection „Yes ?"

⊙ →

$CALIB$ Instrument manufacture calibration, time base

⊙   ⊙ →

↓ $YES?$.   Request to confirm selected value

$SETTIN$ Manufacture setting, entries in menu + calibration

⊙ →

⊙ $FREQV$ Manufacture setting for FREQUENCY
↓ $COUNT.$ Manufacture setting for COUNTER
$DUAL$ Manufacture setting for DUAL
UP/DW Manufacture setting for UP/DW
$QVADR$ Manufacture setting for COUNTER FOR IRC
$TIME$ Manufacture setting for TIME

After the access into selected entry you confirm the selection by pressing ⊙

4.2.5.3 Time base calibration

$$\boxed{CALIB \quad \text{⊙}}$$

$CALIB.$ **Instrument calibration - time base**

- after access into this entry a reference frequency is set at which calibration is performed. For approval of the set frequency please confirm the notice „Merit", the instrument will then switch into calibration measuring (projected are %) with measuring period of approx 4 minutes

- stopwatch is calibrated by the aid of time normal (e.g. acoustic signal on the radio/phone), upon first signal the stopwatch starts from zero and approximately after 10 hours upon the second signal you confirm by ENTER the time lapsed, which you set here

⊙ →

4.2.5.4 Language

$$\boxed{LANG \quad \text{⊙}}$$

$LANG$ **Setting the language for instrument menu**

⊙ →

⊙ $CZECH$ Czech
↓ $ENGL.$ English

4.2.5.5 Setting new password

```
N PA55  ⊙
```

N PA55   **Setting new access password**
- 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 instrument always has a code preset from manufacture to 0000

⊙ →

The code from manufacture is always set to 0000
In case of loss of access password the universal code "8177" may be used
Upon restoration of manufacture setting the password will automatically change to 0000

4.3.5.6 Instrument identification

```
Ib ENT.  ⊙
```

Ib ENT.   **Instrument identification projection**
- the display show type designation of the instrument with the number of revision

⊙ →

5. TABLE OF SIGNS

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

Description is cancelled by entering characters with code 00

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

Setting see page 17 (18) - DESC

6. GUIDE THROUGH MINIMAL SETTING

All settings are performed in configuration menu.

ⓒ + ☻   ⇨ and by entering a 4-digit access code

Mode SINGLE.

SINGLE - input impulse counter

⇨ „INPUTS" ☻ ⇨„CONFIG" ☻ „M.MODE" ☻ „SINGLE." ☻
                - regime of a simple counter, the instrument assumes all manufacture presetting

⇨ „CHANNE." ☻ „CHAN A" ☻ ⇨„SET.A" ☻ „CONST" ☻
                - setting the multiplying constant

SINGLE - input frequency meter

⇨ „INPUTS" ☻ ⇨„CONFIG" ☻ „M.MODE" ☻ „SINGLE." ☻
                - regime of a simple frequency meter, the instrument assumes all manufacture presetting

⇨ „CHANNE." ☻ „CHAN A" ☻ „INP.A" ☻ ⇨„FREQ" ☻
                - selection of measuring regime for „Channel A"

⇨ „CHANNE." ☻ „CHAN A" ☻ ⇨„SET.A" ☻ „CONST" ☻
                - setting the multiplying constant

SINGLE - input impulse counter/frequency meter

⇨ „INPUTS" ☻ ⇨„CONFIG" ☻ „M.MODE" ☻ „SINGLE." ☻
                - regime of a simple counter, the instrument assumes all manufacture presetting

⇨ „CHANNE." ☻ „CHAN A" ☻ ⇨„SET.A" ☻ „CONST" ☻
                - setting the multiplying constant for „Channel A"

⇨ „CHANNE." ☻ ⇨„CHAN B" ☻ „INP.B" ☻ ⇨„FREQ" ☻
                selection of measuring regime for „Channel B"

⇨ „CHANNE." ☻ ⇨„CHAN B" ☻ ⇨„SET.B" ☻ „CONST" ☻
                - setting the multiplying constant for „Channel B"

⇨ „OUTPUT" ☻ ⇨„DISP" ☻ „SETTIN" ☻ ⇨„TEMPOR." ☻ ⇨„CHAN B" ☻
                - setting temporary projection of value of „Channel B" (frequency) to key ◄

⇨ „OUTPUT" ☻ „LIMIT" ☻ ⇨„LIM 2" ☻ „INP.L" ☻ ⇨„CHAN B" ☻
                - assigning the value from „Channel B" (frequency) to evaluation of Limit 2

Mode UP/DW

UP/DW impulse counter

⇨ „*INPUTS*" 🔄 ⇨„*CONFIG*" 🔄 „*M.MODE*" 🔄 ⇨„*UP/DW*" 🔄
- regime UP/DW of a counter, the instrument assumes all manufacture presetting

⇨ „*CHANNE.*" 🔄 „*CHAN.A*" 🔄 ⇨„*SET.A*" 🔄 „*CONST*" 🔄
- setting the multiplying constant

Mode QVADR

Impulse counter for IRC sensors

⇨ „*INPUTS*" 🔄 ⇨„*CONFIG*" 🔄 „*M.MODE*" 🔄 ⇨„*QVADR*" 🔄
- regime UP/DW of a counter, the instrument assumes all manufacture presetting

⇨ „*CHANNE.*" 🔄 „*CHAN.A*" 🔄 ⇨„*SET.A*" 🔄 „*CONST*" 🔄
- setting the multiplying constant

Mode TIME

Stopwatch, 99 min 59,99 s

⇨ „*INPUTS*" 🔄 ⇨„*CONFIG*" 🔄 „*M.MODE*" 🔄 ⇨„*TIME*" 🔄
- regime TIME, the instrument assumes all manufacture presetting

⇨ „*INPUTS*" 🔄 ⇨„*CONFIG*" 🔄 ⇨„*DIVID*" 🔄
- setting of predivision, time base for stopwatch is 1 ms, as per example we set 10

⇨ „*CHANNE.*" 🔄 „*CHAN.A*" 🔄 ⇨„*FORMAT*" 🔄
- setting the time format projection, select 99.59.99

7. COMMUNICATION PROTOCOL

ORBIT MERRET™ instruments communicate via serial line RS232 or RS485. For the communication they use either ASCII protocol or DIN MessBus protocol. The communication runs 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 set 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 of the instrument menu. A command consists of a couple number-letter. Size for letters is of importance. The command is followed by an isotype, which determines the type of command and data format.

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

Commands not listed in the menu

1M	⊕ Ⓓ		Send minimum value
2M	⊕ Ⓓ		Send maximum value
1X	⊕ Ⓣ		Send display value
2X	⊕ Ⓣ		Send relay status the instrument responds by a row of numbers 0,1 in the orde from the 1st relay

1 means the relay is on, relays not used send back X

3X	⊕ Ⓗ		Send the status of auxiliary inputs
1Z	⊕ Ⓗ		Send HW instrument configuration
1x	⊕ Ⓓ		Send output value from the filter of Channel A
2x	⊕ Ⓓ		Send output value from the filter of Channel B
9x	⊕ Ⓓ		Send output value of mathematic functions

Detail 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	<SADR>	R	<SP>	D	D	D	D	D	(D)	(D)	(D)	<CR>		
		MessBus	<SADR>	R	<SP>	D	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>	
	485	ASCII	<SADR>	R	<SP>	D	D	D	D	D	(D)	(D)	(D)	<CR>		
		MessBus	<SADR>	R	<SP>	D	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>	
Confirmation of data receipt (PC)	232	ASCII														
		MessBus														
	485	ASCII														
		MB ok	<DLE>	1												
		MB bad	<NAK>													
Sending address (PC) Prior command	232	MessBus														
		ASCII														
	485	MessBus														
		ASCII	<EADR>	<ENQ>												
Address confirmation (OM)	232	MessBus														
		ASCII														
	485	MessBus														
		ASCII	<SADR>	<ENQ>												
Sending command (PC)	232	MessBus	#	A	A	C	D	D	D	D	D	(D)	(D)	(D)	<CR>	
		ASCII	<STX>	$	C	P	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>	
	485	MessBus	#	A	A	C	D	D	D	D	D	(D)	(D)	(D)	<CR>	
		ASCII	<STX>	$	C	P	D	D	D	D	(D)	(D)	(D)	<ETX>	<BCC>	
Command confirmation (OM)	232	A ok	!	A	A	<CR>										
		A bad	?	A	A	<CR>										
		MessBus	Not present - data is transmitted permanently													
	485	A ok	!	A	A	<CR>										
		A bad	?	A	A	<CR>										
		MB ok	<DLE>	1												
		MB 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
<CR>		32	20$_H$	Space
C	P			Number and command - command code
D				Data - usually signs "0"..."9","-","." ; (D) - dp. and (-) may prolong data
R		30$_H$...3F$_H$		Relay status; zero bit corresponds with 1st relay, 1st bit with 2nd relay, etc.
!		33	21$_H$	Positive command confirmation (ok)
?		63	3F$_H$	Negative command confirmation (bad)
>		62	3E$_H$	Beginning of the transmitted data
<STX>		2	02$_H$	Beginning of the text
<ETX>		3	03$_H$	End of the command
<SADR>		adresa + 60$_H$		Appeal to transmit data from the address
<EADR>		adresa + 40$_H$		Appeal to receive command on the address
<ENQ>		5	05$_H$	Address termination
<DLE>	1	16, 49	10$_H$,31$_H$	Confirmation of correct report
<NAK>		21	15$_H$	Confirmation of error report

8. ERROR STATEMENTS

9. TECHNICAL DATA

INPUT

Type:	upon contact, TTL, NPN/PNP
Measuring:	1x counter/freq./repeat/phase UPorDOW
	2x counter/frequency UP or DOWN
	1x counter/frequency UP/DOWN
	1x counter/frequency UP/DOWN for IRC
	1x stopwatch/watch
	- measuring range is adjustable
Input frequency:	0,02...100 kHz

PROJECTION

Display:	999999, red or green 14-segment LED, digit height 14 mm
Decimal point:	adjustable - in programming mode
Brightness:	adjustable - in programming mode

INSTRUMENT ACCURACY

Temperature coefficient:	25 ppm/°C
Accuracy:	±0,01 % of range (frequency)
Time base:	0,05/0,5/1/2/5/10/20/50 s
Calibration coefficient:	±0,00001....99999
Filtration constant:	allows to set max. valid frequency, which is processed (OFF/10...2 000 Hz)
Type of filter:	sampling
Presetting:	-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)
	Blocking 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...999999	
Hysteresis:	0...99999	
Delay:	0...99,9 s	
Outputs:	2x relays	
	- switch-on/-off contact	(2 A/230 VAC)
	- Solit state	(1A/230 VAC)

Data outputs

Data format:	7 bit + even parity + 1 stop bit (DIN MESSBUS)
	8 bit + no parity + 1 stop bit (ASCII)
Rate:	600...115 200 Baud
Protocols:	DIN MESSBUS; ASCII
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication addressing (max. 31 instruments)

Analogue outputs

Type:	isolated, programmable with resolution 12 bit, analogue output corresponds with the displayed data
Nonlinearity:	0,2 % of range
TK:	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

Additional voltage

Adjustable:	2...24 VDC/50 mA

Power supply

	24/110/230 VAC/50 Hz
	9...32 VDC, max. 500 mA, isolated

Mechanic properties

Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	96 x 48 x 120 mm
Panel cut-out:	90,5 x 45 mm

Operating conditions

Connection:	connector terminal board, up to 2,5 mm^2
Stabilization period:	within 15 minutes after switch-on
Working temperature:	0°...60°C
Storage temperature:	-10°...85°C
Shielding:	IP64 (front panel only)
Construction:	safety class I
Overload category:	ČSN EN 61010-1, A2
	III. - instrument power supply (300 V)
	II. - input, output, addit. votage (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

10. INSTRUMENT DIMENSIONS

Pohled zpředu

Výřez do panelu

96 mm

48 mm

90,5 mm

45 mm

7 3 3 9 5.0

1   2   M T

Pohled z boku

119 mm

13,5 mm
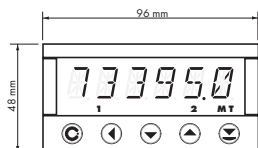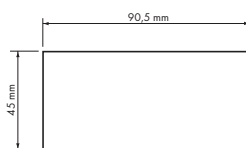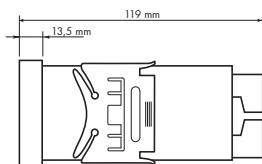
Síla panelu: 0,5 ... 20 mm

11. CERTIFICATE OF GUARANTEE

Product: **OM 601UQC**

Type: . . . .

Manufacturing No.:   . . . .

Date of sale: . . . .

For this instrument applies a guarantee period of 12 months of the date of sale to the user. Defects occurring during this period due to manufacturing error or due to material faults shall be eliminated free of charge.

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

The guarantee does not apply to defects caused by:

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

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

Stamp, signature

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or
175 % (A4)

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....

What measuring instruments produced by ORBIT MERRET™ do you use? ....
....
....

What measuring instruments produced by ORBIT MERRET™ are of interest to you? ....
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What type of measuring instrument do you miss in our prospectus?...
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