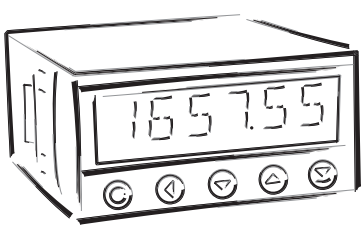
GUARANTEE 5 YEARS

OM 602UQC

6 DIGIT PROGRAMMABLE

DUAL
IMPULSE COUNTER/FREQUENCY METER
STOPWATCH/TIMER



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 602 series conform to the European regulation No. 73/23/EHS and No. 2004/108/EC.

They are up to the following European:
EN 61010-1 Electrical safety
EN 61326-1 Electrical measurement, EMC standards „Industrial use"

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.

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2.1 Description

OM 602UQC is a versatile 6-digit, 2-channel programable counter/frequency meter/IRC singnal monitor/stopwatch/clock panel instrument. It is based on a single microprocessor and a powerful gatte array which ensure high accuracy, stability and easy controling.

Measuring modes - Channels 1 and 2

SINGLE	Counter/Frequency meter	C / F
A*B	Counter/Frequency meter with function AND	C / F
xNOR	Counter/Frequency meter with function NOR	C / F
DUTY	Duty cycle measurement	C / F
QVADR	Counter/Frequency meter for IRC encoders	C / F
UP/DW	UP/DW Counter/Frequency meter	C / F
	- measures on inputs A, B (B defines direction) and can display count/frequency	
UP + DW	UP + DW Counter/Frequency meter C / F	C / F
	- measures on inputs A (UP), B (DW) and can display count/frequency	
TIME	Stopwatch	H
RTC	Clock	H

Programable display projectoion

Calibration	it is possible to set the calibration coefficients in the programming menu
Projection	-99999...999999 with fixed or floating decimal point, for measuring modes STOPWATCH/CLOCK with the option to set in the format 10/24/60
Masuring channelsy	it is possible to process two independednt functions from inputs 1 and 2 (counter/frequency)
Time base	0,05 s/0,5 s/1 s/2 s/5 s/10 s/20 s/1 min/2 min/5 min/10 min/ 15 min

DIGITAL FILTERS

Input filter:	Input filter processes the input signal and reduces/eliminates interference (such as false signals originating from closing/opening relay contacts). The value entered represents the top measured frequency (for duty cycle 50% - identical period of Hi/Lo level), which the instrument will be able to process. - off/1 MHz/500 kHz/250 kHz/100 kHz/1 kHz/100 Hz/65 Hz/45 Hz/10 Hz/.../10 min - filter for shaft revolution measurement (setting a whole no. of pulses per revolution) - blocking (extending) the input pulse to a defined length 0...120 s
Floating average:	from 2...30 measurements
Exponen.average:	from 2...100 measurements
Arithmetic average:	from 2...100 measurements
Rounding:	setting the projection step for display

LINEARIZATION

Linearization	by linear interpolation in 45 points (solely via OM Link)

FUCTIONS

Setting the value	Entering the current count when installing the counter during a countitng cycle
Preset	initial non-zero value, unloaded always after instrument resetting
Summation	registration of the number upon shift operation
Tare	designed to reset display upon non-zero input signal

EXTERNAL CONTROL

Lock:	control keys blocking
Hold:	display/instrument blocking
Tare:	tare activation/resetting tare to zero
Resetting MM:	resetting min/max value
Resettting	resetting/pre-setting the counter
Start/Stop	stopwatch/timer control
Pause	stopwatch/timer control

2.2 Operation

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

LIGHT **Simple programming menu**
- contains solely items necessary for instrument setting and is protected by optional number code

PROFI **Complete programming menu**
- contains complete instrument menu and is protected by optional number code

USER **User programming menu**
- may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
- acces without password

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

OMLINK Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments. Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).
The program OM LINK in „Basic" version will enable you to connect one instrument with the option of visualization and archiving in PC. The OM Link „Standard" version has no limitation of the number of instruments connected.

2.3 Option

Excitation is suitable for supplying power to sensors and transmitters. It has a galvanic separation.

Comparators are assigned to monitor one, two, three or four limit values with relay output. The following modes for limits are custom selectable: „Hysteresis" / „Reset and generate one pulse" for the first relay and for the stopwatch it is also „to close" action when the stopwatch/clock for the second relay. The limits have adjustable hysteresis within the full range of the display as well as selectable delay of the switch-on in the range of 0...99,9 s. Reaching the preset limits is signalled by LED and simultaneously by the switch-on of the relevant relay.

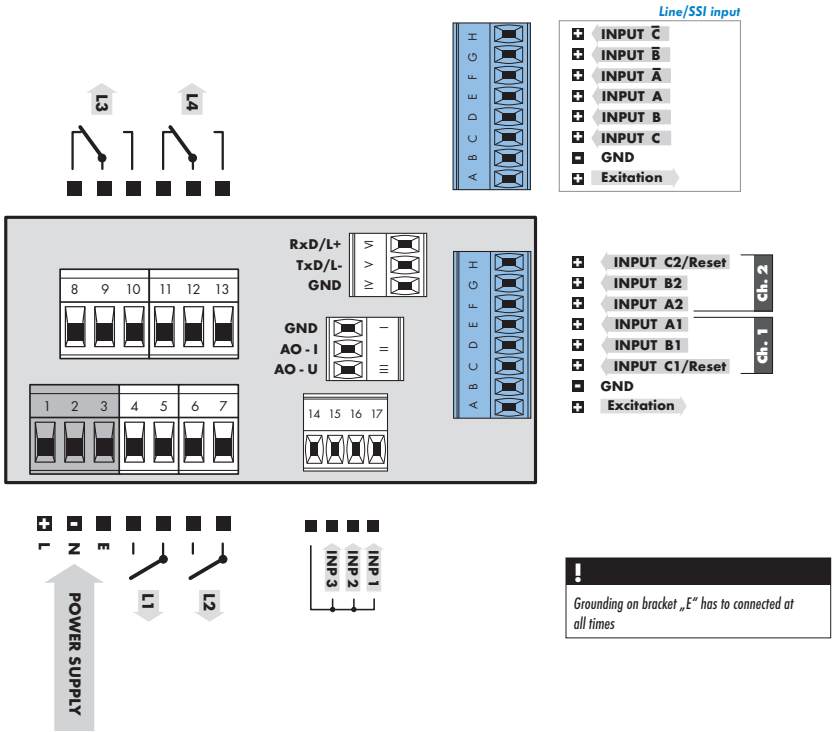
Data outputs are for their rate and accuracy suitable for transmission of the measured data for further projection or directly into the control systems. We offer an isolated RS232 and RS485 with the ASCII, MESSBUS, MODBUS-RTU or PROFIBUS protocol.

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

Time backup by means of RTC circuit is designed for the „TIMER" measuring mode and secures time measuring even if the instrument is switched-off (without display projection).
Measured data record is an internal time control of data collection. It is suitable where it is necessary to register measured values. Mode RTC, where data record is governed by Real Time with data storage in a selected time segment and cycle. Up to 266 k values may be stored in the instrument memory. Data transmis sion into PC via serial interface RS232/485 and OM Link.

INSTRUMENT CONNECTION

The instrument supply leads should not be in proximity of the incoming low-potential signals.
Contactors, motors with larger input power should not be in proximity of the instrument.
The leads into the instrument input (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 (bracket E).
The instruments are tested in compliance with standards for use in industrial area, yet we recommend to abide by the above mentioned principles.



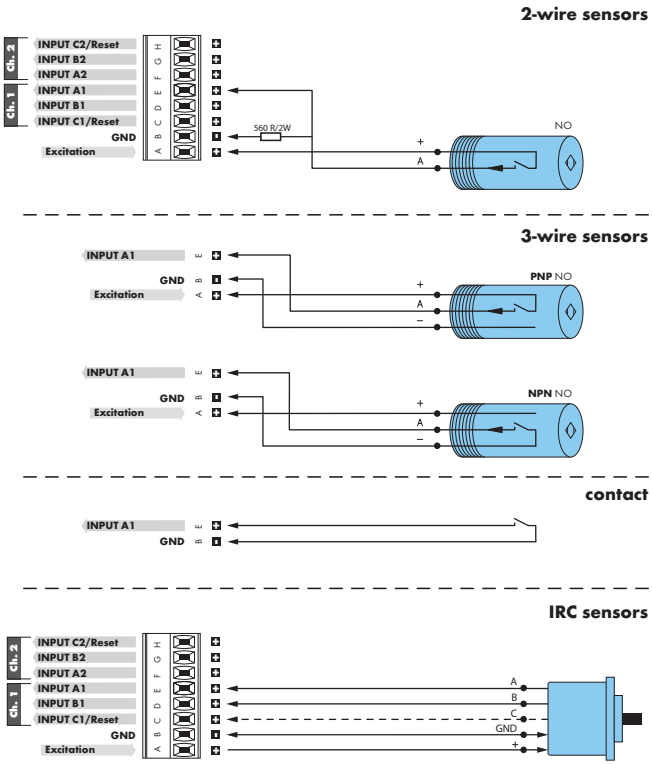
CONNECTION

	Description	Connection
Input A1	input signal < 60 V	GND + Input A1
Input B1	input signal < 60 V	GND + Input B1
Input C1/Reseting	input signal < 60 V	GND + Input C1/Reseting

Connection and technical specs of inputs A2, B2 and C2 are identical.

	Description	Connection
EXT. 1/2/3	According to setting in Menu (see Menu > EXT. IN., page 51)	upon contact, bracket (No. 14 + 15/16/17)

Sensor connection



!

Sensors with PNP or NPN output have always only one „fixed" level and therefore it is extremely important the leads are properly shielded and separated from possible sources of interference. If interference occurs, it can be included in the measurement. One of the ways of eliminating this possible problem is applying an input signal filter in the Menu.

*****

Connection for channel 2 is identical

Functions of inputs according to selected mode

Mode	Description	Functions of inputs
SINGLE	Pulse counter/Frequency counter	Input A, Reseting (Input B)
A * B	Pulse counter/Frequency counter with function AND	Input A, Reseting (Input B)
xNOR	Pulse counter/Frequency counter with function NOR	Input A, Reseting (Input B)
DUTY	Duty	Input A
QUADR.	Pulse counter/ Frequency counter for IRC sensors	Input A + Input B, Reseting (Input C)
UP/DW	UP or DW Pulse counter/Frequency counter	Input A, Input B - determines direction (Hi = UP, Lo = DW) Reseting (Input C)
UP+DW	UP/DW Pulse counter/Frequency counter	Input A (UP), Input B (DW), Reseting (Input C)
TIME	Stopwatch Clock	Input A, Input B (Reseting - M.STOP), Reseting (Input C)
RTC	Stopwatch Clock with time back up	Input A, Input B (Reseting - M.STOP), Reseting (Input C)

Comparator levels

Setting comparator levels for individual inputs is realised in the „LIGHT" or in the „PROFI" menu.
When setting the level manually by front panel buttons please set the required value first, then confirm by pressing the „ENTER" button. The value you have selected is automatically adjusted to the corresponding comparator level (see the table below).

Comparator level table (V)

standard	0,42 • 1,38 • 1,80 • 2,37 • 3,18 • 4,57 • 5,98 • 7,34 • 8,72 10,27 • 10,58 • 11,95 • 13,33 • 15,18 • 18,17 • 19,77 • 24,37
amplified (100x)	0,004 • 0,014 • 0,018 • 0,024 • 0,032 • 0,046 • 0,060 0,073 • 0,087 • 0,103 • 0,106 • 0,120 • 0,133 • 0,152 0,182 • 0,198 • 0,244 • 0,261 • 0,290 • 0,340 • 0,397

For an easier setting of inputs and the input levels the front panel LEDs signal their momentary state (it is necessary to wait for a approx 2 s).

LED „C" input A
LED „F" amplified input A
LED „1" input B
LED „2" input C

Amplified inputs

- only A1 and A2
- in case you enter voltage lower AB1 than 0.8304, the iput is processed by pre-amplifier (which limits the frequency range), input B1 automatically (if necessary) switches ower to amplified input A2 and therefore it is essential, if A2 is used as input B to the counter, to select identical parameters AB1 and AB2.

SETTING PROFI

- For expert users
- Complete instrument menu
- Access is password protected
- Possibility to arrange items of the „User" menu
- Tree menu structure

SETTING LIGHT

- For trained users
- Only items necessary for instrument setting
- Access is password protected
- Possibility to arrange items of the „User" menu
- Linear menu structure

SETTING USER

- For user operation
- Menu items are set by the user (Profi/Light) as per request
- Access is not password protected
- Optional menu structure either tree (PROFI) or linear (LIGHT)

4.1 Setting

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

LIGHT **Simple programming menu**
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- may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
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Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.

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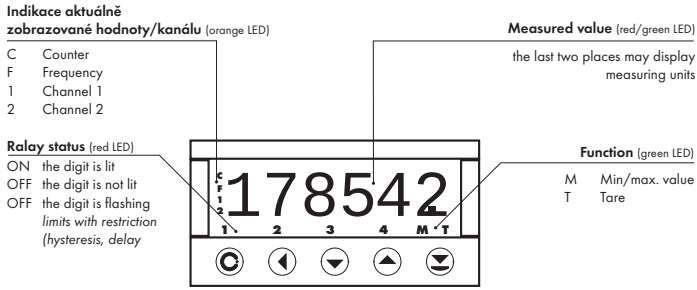
Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

4 INSTRUMENT SETTING

Setting and controlling the instrument is performed by means of 5 control keys located on the front panel. With the aid of these keys it is possble to browse through the operation menu and to select and set required values.



Symbols used in the instructions

C F H Q Indicates the setting for given type of instrument

DEF values preset from manufacture

42 symbol indicates a flashing light (symbol)

MIN inverted triangle indicates the item that can be placed in USER menu

CONECT broken line indicates a dynamic item, i.e. it is displayed only in particular selection/version

after pressing the key the set value will not be stored

after pressing the key the set value will be stored

30 continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT

Its selection in the menu, upon modification of the number to be adjusted it is performed by the control key ◀ with transition beyond the highest decade, when the decimal point starts flashing . Positioning is performed by ▲/▼.

THE MINUS SIGN

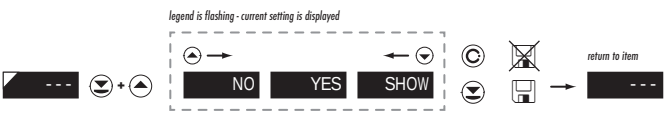
Setting the minus sign is performed by the key ▼ on higher decade. When editing the item substraction must be made from the current number (e.g..: 013 > ▼ , on class 100 > -87)

Control keys functions

Key	Measurement	Menu	Setting numbers/Selection
C	access into USER menu	exit menu w/o saving	transition to next item w/o saving
◀	programmable key function	return to previous level	move to higher decade
▼	programmable key function	move to previous item	move down
▲	programmable key function	move to next item	move up
▼▲	programmable key function	confirm selection	setting/selection confirmation
▲ + ▼			numeric value is set to zero
C + ▼▲	access into LIGHT/PROFI menu		
C + ▼	direct access into PROFI menu - temporary (remains LIGHT)		
▼▲ + ▲		confi guration of an item for "USER" menu	
▼▲ + ▼		determine the sequence of items in "USER - LIGHT" menu	

Setting items into „USER“ menu

- in **LIGHT** or **PROFI** menu
- no items permitted in **USER** menu from manufacture
- on items marked by inverted triangle



NO	item will not be displayed in USER menu
YES	item will be displayed in USER menu with the option of setting
SHOW	item will be solely displayed in USER menu

5.0 Setting "LIGHT"

LIGHT **Simple programming menu**

- contains only items necessary for instrument setting and is protected by optional numeral code

- **For capable users**
- **Only items necessary for instrument setting**
- **Password protected access**
- **Possibility to arrange items of the „User" menu**
- **Linear menu structure**

Preset from manufacture	
Password	*"0"*
Menu	*LIGHT*
USR menu	*off*
Setting the items	DEF

!

In „Light Menu" you can switch the measuring mode (Counter/Frequency meter) in item „RE.SET."

!

Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode

1428

C + ▼

PASSW. ▼ → 0 *Entering access password for access into the menu* → ▼

PASSW. **Vstup do menu přístroje**

PASSW. = 0
- access into menu is unrestricted, after releasing keys you automaticaly move to first item of the menu

PASSW. > 0
- access into menu is protected ny numeric code

Set "PASS." = 42 *Example*

0 ▲ 1 ▲ 2 ◀ 02 ▲ 12 ▲ 22 ▲
32 ▲ 42 ▼ SET.C1

C ↗

SET.C1 ▼ → 0 *Setting initial value* → ▼

▲

signalling active channel

SET.C1 **Setting the initial value - Channel 1**

- this function enables the user to set an initial value on the display
- if you need to set the initial value for a diferent mode it is necessary to change the mode first and then to set the initial value.
- setting "SET C.1" is a one time action, unlike "OFFSET", which means that when the couter is re-rest the dispaly will show "0", unless a "OFFSET" is set (then the value would be the offset value and not "0").

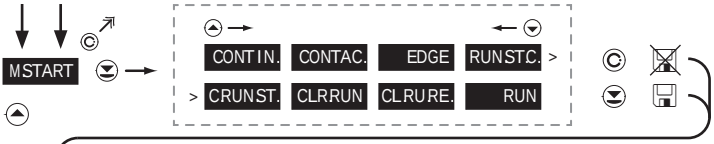
DEF = 0

Set "SET. C.1" = 233 *Example*

0 ▲ 1 ▲ 2 ▲ 3 ◀ 03 ▲ 13 ▲
23 ▲ 33 ◀ 033 ▼ 133 ▼ 233 ▼ MODE 1

!

The item „SET. C.1." is not projected for measuring mode „FREQU."



signalizace aktuálního kanálu

MSTART **Selection of stopwatch/ timer control**

- menu for time setting is accessible only in the stopwatch/timer mode

CONT IN. Stopwatch/timer is running constantly if the instrument is turned on

CONTAC. Stopwatch/timer is running upon contact making

EDGE Stopwatch/timer is controlled by the priming signal edge

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

RUn.STC. Stopwatch/timer is controlled and reset by the edge of the priming signal

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

CRUn.ST. Stopwatch/timer is controlled and reset by the edge of the priming signal

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

CLRRUN. Stopwatch/timer is reset and set off by the edge of the priming signal

CLRURE. Stopwatch/timer is reset and set off by the edge of the priming signal, the cycle is repeated with every other edge

RUN Stopwatch/timer is only set off by the edge

DEF = COntAC.

Selection of stopwatch control > EdGE *Example*

CONTAC. EDGE M.STOP

signalling active channel

M.STOP **Selection of stopwatch resetting - Channel 1**

- menu of the resetting option is accessible only in the stopwatch/timer regime

DEF = CLEAR

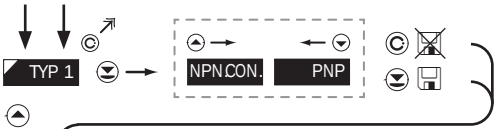
CLEAR Stopwatch/timer is reset through input „Clear"

ST.CLR. Stopwatch/timer is stopped and reset through input „Clear"

STOP Stopwatch/timer is stopped through input „Clear

Selection of type of stopwatch resetting > St. CLr. *Example*

OFF ST.CLR. TYP 1



signalling active channel

TYP 1 Selecting input 1 type

- setting applies for Inputs A and B

DEF = NPN.CON.

TYPE 1	Menu	Input type
	NPN.CON.	NPN or contact
	PNP	PNP

Example

In this example aplication a Wenglor sensor is used, model IB040BM37VB, type PNP
Typ 1 > PNP

NPN.CON. ▲ PNP ▼ LEV.1

!

After selecting "PNP" it is necessary to set the input level (Lev. 1)

signalling active channel

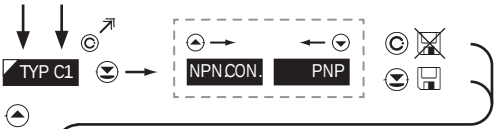
LEV.1 Setting input level Channel 1, Input A, B

- setting applies for Inputs A and B
- setting level (only for type PNP) of the input voltage, the instrument subsequently automatically selects divider and thus comparing levels
- range of setting 0,009...60 V
- table of comparing levels is on page 8

Example

The example sensor IB040BM37VB is powered by the instrument's own excitation of 24 V and this is the level we will set as input level, with the following comparing level (L>H: 2,0 V, H>L: 17,8 V). Suppl. 1 > 24

10 ▲ 11 ▲ 12 ▲ 13 ▲ 14 ◀ 14 ▲ 24 ▼ TYP C1



signalling active channel

TYP C1 Selecting input type

- setting applies for Input C

DEF = NPN.CON.

TYPE C.1	Menu	Input type
	NPN.CON.	NPN or contact
	PNP	PNP

Example

Resetting of the instrument will be done by a psh button (conatct) connected to terminals no. 12/14, TYPE C.1 > nPn.COn.

NPN.CON. → LEV.C1

!

After selecting "PNP" it is necessary to set the input level (Lev. C.1)

signalling active channel

LEV.C1 Setting input level Channel 1, Input C

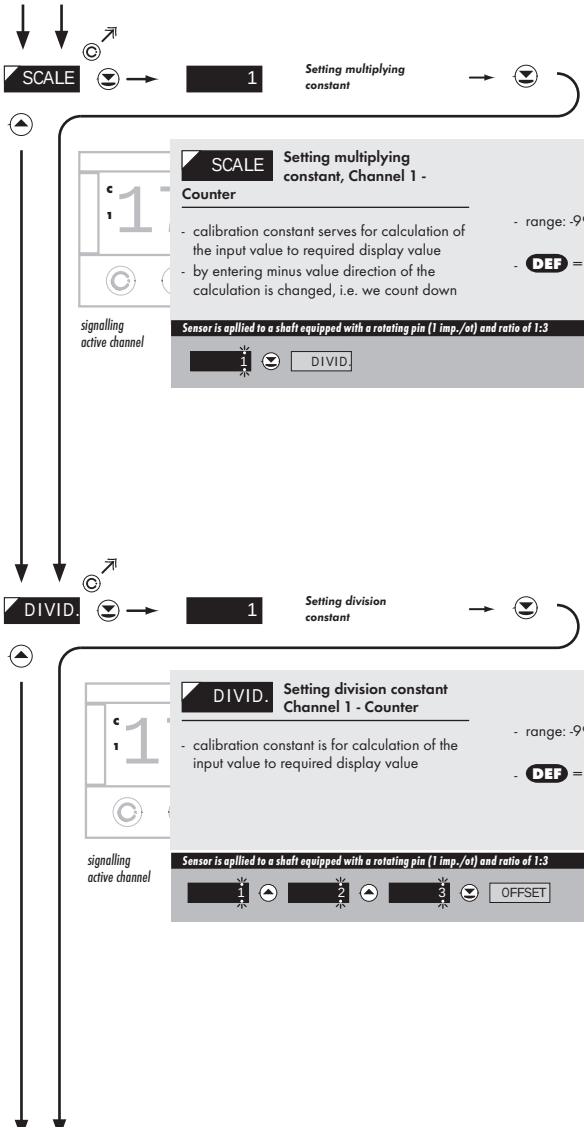
setting applies for Inputs C

- setting level (only for type PNP) of the input voltage, the instrument subsequently automatically selects divider and thus comparing levels

- range of setting 0,009...60 V
- table of comparing levels is on page 8

Example

In the previous type selection we chose „nPn.COn", so this option is not available now. If our choice had been „PNP" it is necessary to set the comparing level at this stage (see setting Level.A)



SCALE **Setting multiplying constant, Channel 1 - Counter**

- calibration constant serves for calculation of the input value to required display value
- by entering minus value direction of the calculation is changed, i.e. we count down

- range: -99999...999999
- DEF = 1

signalling active channel

Sensor is apllied to a shaft equipped with a rotating pin (1 imp./ot) and ratio of 1:3 ***Example***

1 → DIVID.

DIVID. **Setting division constant Channel 1 - Counter**

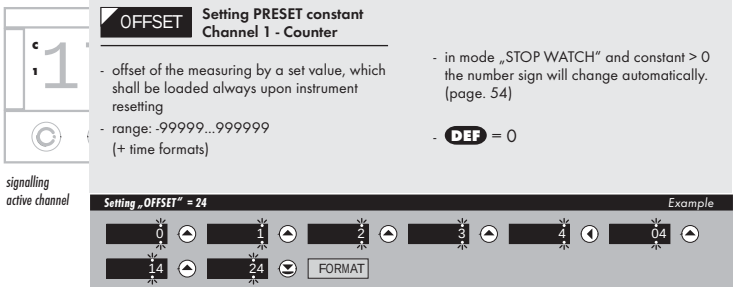
- calibration constant is for calculation of the input value to required display value

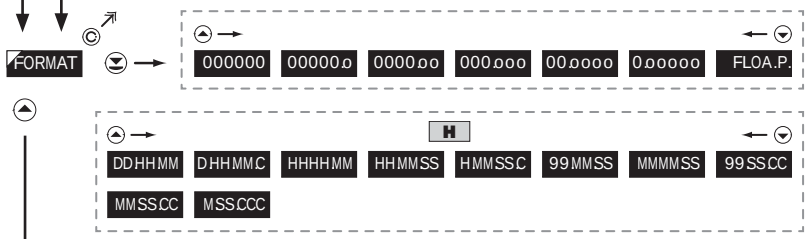
- range: -99999...999999
- DEF = 1

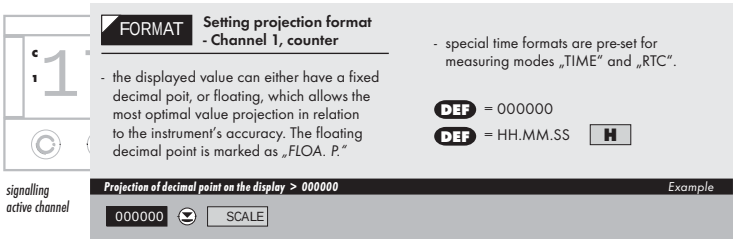
signalling active channel

Sensor is apllied to a shaft equipped with a rotating pin (1 imp./ot) and ratio of 1:3 ***Example***

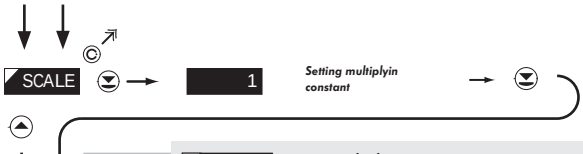
1 → 2 → 3 → OFFSET







Only for measuring mode „COUNTER"



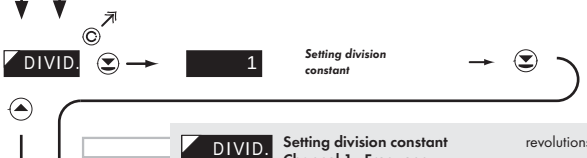
signalling active channel

SCALE **Setting multiplying constant - Channel 1 Frequency**

- calibration constant serves for calculation of the input value to required display value
- range: -99999...999999

- **DEF** = 1

Sensor is apllied to a shaft equipped with a rotating pin (1 imp./ot) and ratio of 1:3 which is rotating at 3753 revs./min., (3753:60:3=20,85), SCALE > 20,85 Example



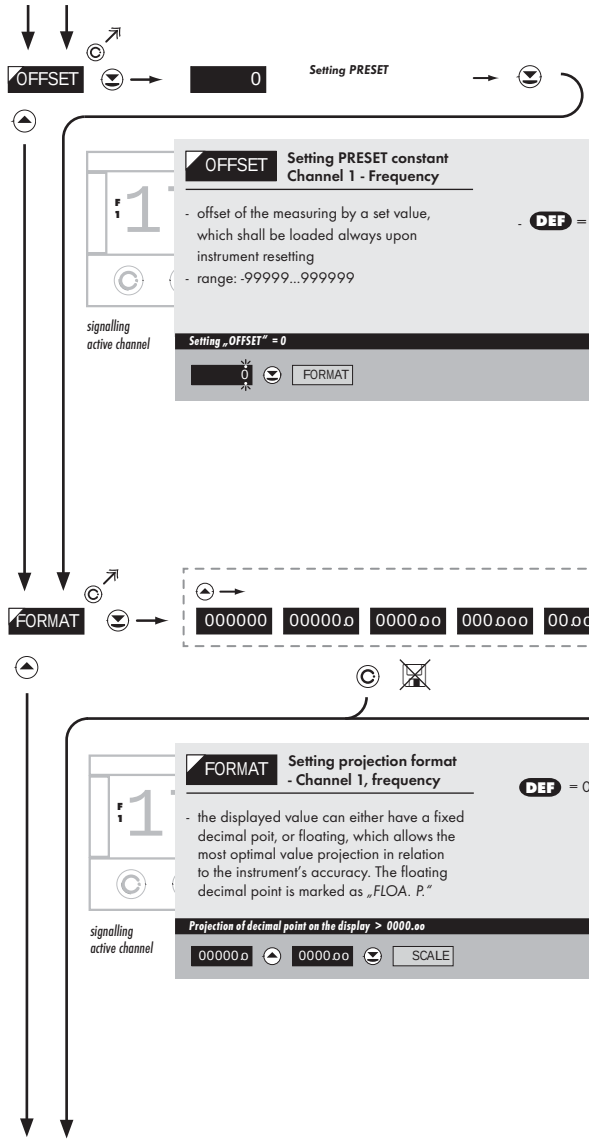
signalling active channel

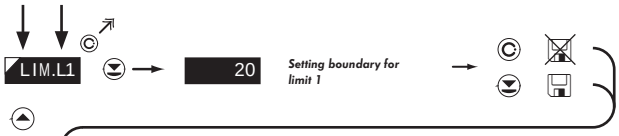
DIVID. **Setting division constant Channel 1 - Frequency**

- calibration constant is for calculation of the input value to the required display value
- division constant - an integer number in the range of 2 to 100 which will enable accurate measurements relative to the set value, or its multiplication. In reality this means that revolutions are measured precisely after a comlpete number of revolutions, which results in improved measurement stability. This mode is not suitable for higher frequencies, where it can increase the measurement period. If you do not wish to use this mode, use a decimal number instead and adjust the multiplication constant apropriately.
- range: -99999...999999

- **DEF** = 1

On the display we want to see speed as revolutions/s. It is necessary to devide the figure by 60 (1 minute=60 s), It is possible to ener the resulting value in to the multiplication constant, diviD. > 60 Example


OFFSET
0
Setting PRESET
OFFSET
Setting PRESET constant
Channel 1 - Frequency
- offset of the measuring by a set value, which shall be loaded always upon instrument resetting
- range: -99999...999999
- DEF = 0
signalling active channel
Setting „OFFSET“ = 0
Example
0
FORMAT
FORMAT
000000
00000.0
0000.00
000.000
00.0000
0.00000
FLOA.P.
FORMAT
Setting projection format
- Channel 1, frequency
DEF = 00000.0
- the displayed value can either have a fixed decimal poit, or floating, which allows the most optimal value projection in relation to the instrument's accuracy. The floating decimal point is marked as „FLOA. P.“
signalling active channel
Projection of decimal point on the display > 0000.00
Example
00000.0
0000.00
SCALE



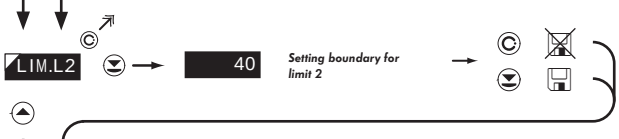
LIM.L1 **Setting boundary for limit 1**

- range of the setting is -99999...999999
- default "Hystresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 20

Setting limit 1 > LIM. L.1 = 32 *Example*



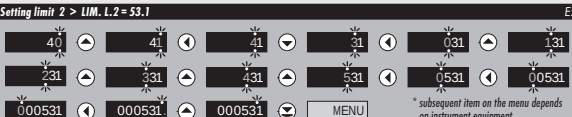
LIM.L2 **Setting boundary for limit 2**

- range of the setting is -99999...999999
- default "Hystresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 40

Setting limit 2 > LIM. L.2 = 53.1 *Example*



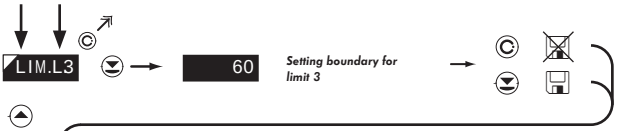
* subsequent item on the menu depends on instrument equipment

!

As a default setting, limits are active for the couter input "COUNT."
To change the input type to which the limits will be responding change the setting in item "RE. SET." or by switching into "Profi Menu" in item"INP. L-"

!

Items for "Limits" and "Analog output" are accessible only if incorporated in the instrument.



LIM.L3 **Setting boundary for limit 3**

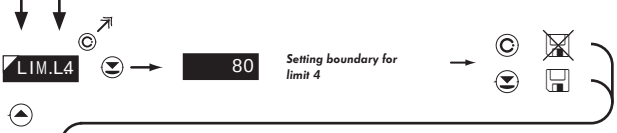
- range of the setting is -99999...999999
- default "Hystresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 60

Setting limit 3 > LIM. L.3 = 85 *Example*

** subsequent item on the menu depends on instrument equipment*



LIM.L4 **Setting boundary for limit 4**

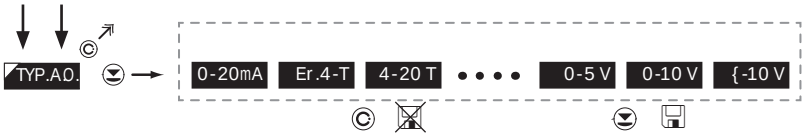
- range of the setting is -99999...999999
- default "Hystresis"=0 "Delay"=0

- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 80

Setting limit 4 > LIM. L.4 = 103 *Example*

** subsequent item on the menu depends on instrument equipment*



TYP.AO. Setting the type of analog output

- by default, the analogue output is set to respond to "Counter" input mode
- you can change this setting by accessing item "RE. SET." or by switching over to "Profi Menu" in item "INP. A.O."

Menu	Range	Description
0-20mA	0...20 mA	
Er. 4-T	4...20 mA	with error message indication and broken loop indication
4-20 T	4...20 mA	with broken loop indication
Er.4-20	4...20 mA	with indication of error statement (<3,6 mA)
4-20mA	4...20 mA	
0-5mA	0...5 mA	
0-2 V	0...2 V	
0-5 V	0...5 V	
0-10 V	0...10 V	
+-10 V	±10 V	

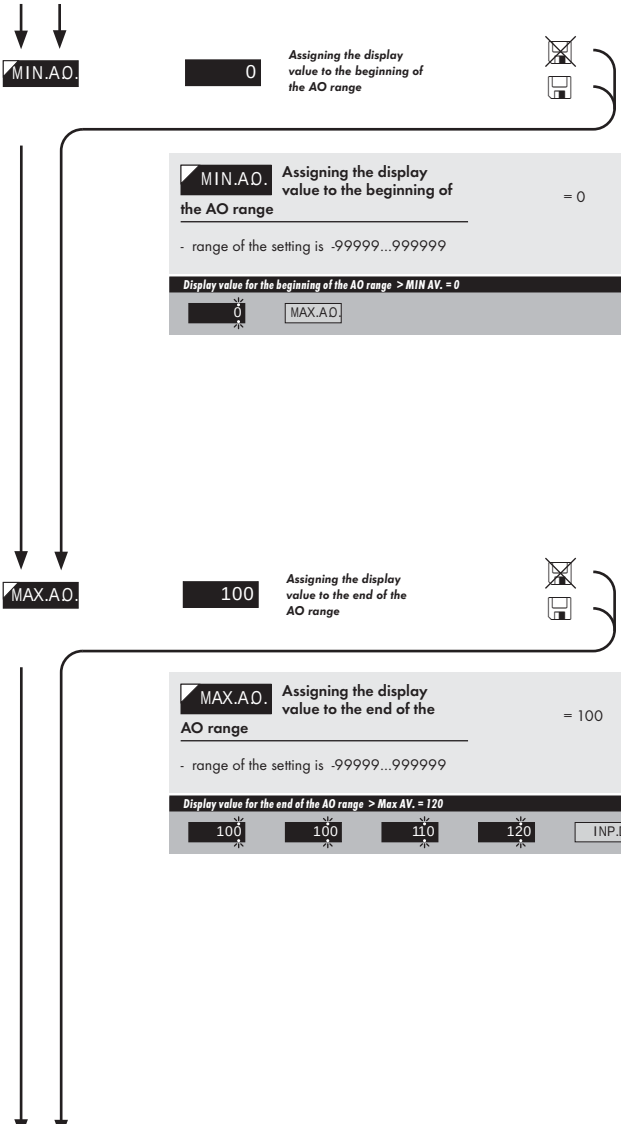
DEF = 4-20 mA

Type of analog output - 0...10 V > TYP AV. = U 10 *Example*

4-20mA | 0-5mA | 0-2 V | 0-5 V | 0-10 V | MIN.AO.

!

Items for "Limits" and "Analog output" are accessible only if incorporated in the instrument.


MIN.AO.
0
Assigning the display value to the beginning of the AO range
MIN.AO.
Assigning the display value to the beginning of the AO range
= 0
- range of the setting is -99999...999999
Display value for the beginning of the AO range > MIN AV. = 0
Example
0
MAX.AO.
MAX.AO.
100
Assigning the display value to the end of the AO range
MAX.AO.
Assigning the display value to the end of the AO range
= 100
- range of the setting is -99999...999999
Display value for the end of the AO range > Max AV. = 120
Example
100
100
110
120
INP.D.

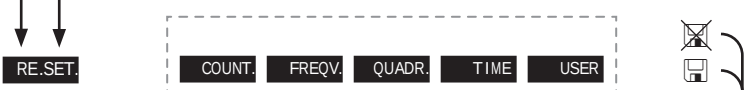
MENU **Setting the menu type LIGHT/PROFI**

LIGHT > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting
> linear tree structure

PROFI > menu PROFI, a complete menu for complete instrument setting
> tree menu structure

= LIGHT

Menu LIGHT > MENU = LIGHT *Example*



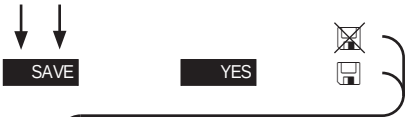
FIRM. **Return to manufacturer's setting**

- restores factory calibration and deafult menu items (DEF)
- by this restoration related menu items change as well, (input for limit evaluatin, analogue output, mathematical functions, ...)

COUNT.	Factory setting for counter
FREQV.	Factory setting for frequency measurement
QUADR.	Factory setting for IRC encoders
TIME	Factory setting for clock/ stop watch
USER	Return to the customised user menu

- reading the user setting of instrument which is the setting saved in item SERVIC./ RESTOR./SAVE

Return to manufacturer's setting, pre-setting mode > FREQU. *Example*

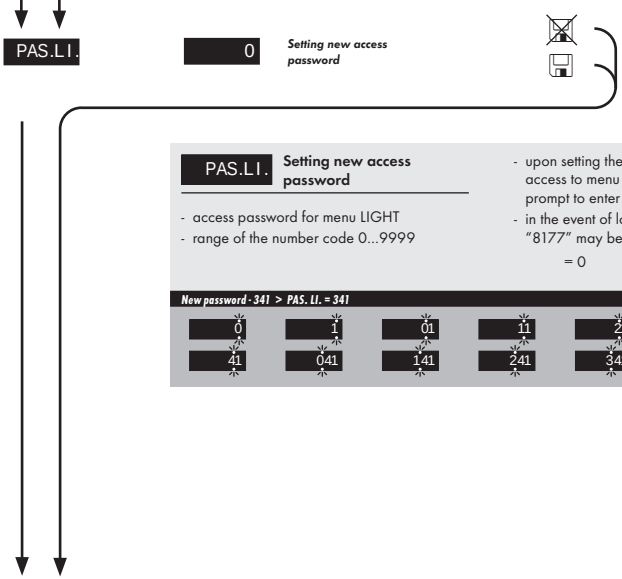


SAVE **Saving user setting**

- by saving it this customised user setting can easily by restored if ever needed

Saving user settings > SAVE *Example*

SAVE YES PAS.LI.

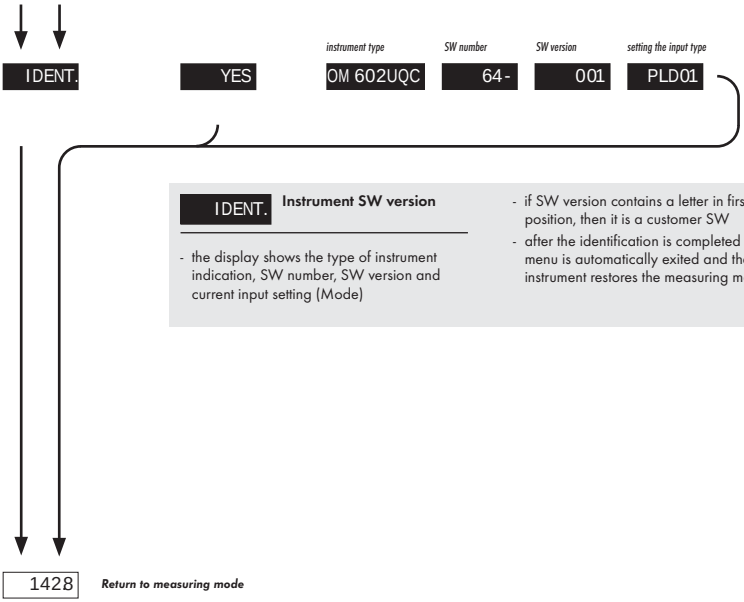


PAS.LI. **Setting new access password**

- access password for menu LIGHT
- range of the number code 0...9999
- upon setting the password to "000" the access to menu LIGHT is free without prompt to enter it
- in the event of loss universal password "8177" may be used = 0

New password - 341 > PAS. LI. = 341 *Example*

0 1 01 11 21 31
41 041 141 241 341 IDENT.



IDENT. **Instrument SW version**

- the display shows the type of instrument indication, SW number, SW version and current input setting (Mode)
- if SW version contains a letter in first position, then it is a customer SW
- after the identification is completed the menu is automatically exited and the instrument restores the measuring mode

6.0 Setting "PROFI"

PROFI **Complete programming menu**

- contains complete instrument menu and is protected by optional number code
- designed for expert users
- preset from manufacture is menu **LIGHT**

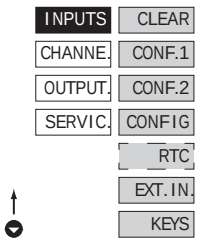
- **For expert users**
- **Complete instrument menu**
- **Access is password protected**
- **Possibility to arrange items of the „User" menu**
- **Tree menu structure**

Switchng over to "PROFI" menu

+
- access to **PROFI** menu
- authorization for access to **PROFI** menu does not depend on setting under item SERVIC. > MENU
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > PROFI =0)

+
- access to menu selected under item SERVIC. > MENU > **LIGHT/PROFI**
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > LIGHT =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used

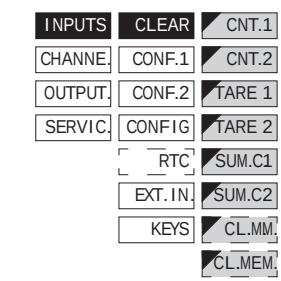
6.1 Setting "PROFI" - INPUT



The primary instrument parameters are set in this menu

- **CLEAR** – Resetting internal values
- **CONF.1** – Selection of measuring range and parameters Channel 1
- **CONF.2** – Selection of measuring range and parameters Channel 2
- **CONFIG** – Setting switching of channels
- **RTC** – Setting date and time for option with RTC
- **EXT. IN.** – Setting external inputs functions
- **KEYS** – Assigning further functions to keys on the instrument

6.1.1 Resetting internal values



CLEAR – **Resetting internal values to zero**

- (i.e. factory shifts) when values from individual shifts are added to the total sum

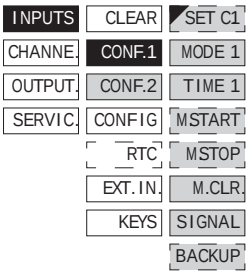
- **CNT.1** – Counter resetting Channel 1
- **CNT.2** – Counter resetting Channel 2
- **TARE 1** – Tare resetting Channel 1
- **TARE 2** – Tare resetting Channel 2
- **SUM.C1** – Zeroing of the sum Channel 1
- **SUM.C2** – Zeroing of the sum Channel 2
- **CL.MM.** – Zeroing of min/max value

- zeroes the memory used to store minimal a maximal values

- **CL.MEM.** – Clear instrument memory

- clear memory with data measured in the *"RTC"* mode (not in standard)

6.1.2 Instrument configurtion - Channel 1



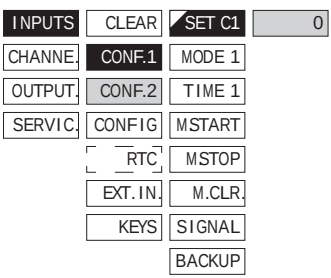
CONF.1 **Primary instrument setting - Channel 1**

- **SET C1** Setting the initial value
- **MODE 1** Setting the instrument measuring mode
- **TIME 1** Setting the time base
- **MSTART** Setting the stopwatch control
- **M.STOP** Setting stopwatchresetting
- **M.CLR.** Setting the zeroing of the instrument
- **SIGNAL** Setting input parameters
- **BACKUP** Setting data backup/ time

*****

Setting procedure is identical for channel 2 (CONF.2)

6.1.2a Setting the innitial displayed value



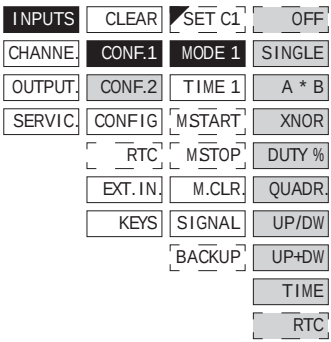
SET C1 Setting innitial displayed value

- used to set the displayed value to desired innitial value (useful when exchanging instruments yet still keeping the original value)

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2b Selection of measuring mode



MODE **Selection of instrument measuring mode**

OFF Measuring input is swithced off
- this item is available only for the second channel (CONF. 2)

SINGLE Impulse counter/ Frequency measurement

A * B Impulse counter/ Frequency meter with function „AND"
- instrument works with the following condition:

A	0	0	1	1
B	0	1	0	1
Out	0	0	0	1

XNOR Impulse counter/ Frequency meter with function „NOR"
- instrument works with the following condition:

A	0	0	1	1
B	0	1	0	1
Out	1	0	0	1

DUTY % Duty cycle
- duty cycle is calculated for channel F.1 or F. 2
- the maximum frequency duty cycle measurement is 100 kHz

QUADR. Impulse counter/ Frequency measurement for IRC encoders
- measurement on two inputs (A&B). Can display count and frequency
- in this mode every single rising edge of singnal A and B is included in the count

UP/DW UP/DW Impulse counter/Frequency meter
- measurement on input A, (inp. B/direction). Can display count and frequency

UP+DW UP+DW Impulse counter/Frequency meter
- measures on inputs A (UP), B (DW). Can display count and frequency

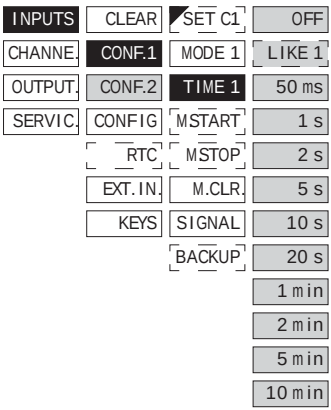
TIME Mode „Stopwatch/ timer"

RTC Mode „Stopwatch/ timer" with RTC backup

*****

Setting procedure is identical for channel 2 (CONF.2)

6.1.2c Selection of measuring period/time base



TIME 1 **Selection of measuring period/time base**

- if you set measuring period e.g. for 1 s, the measuring runs approximtely from 1 s to 2 s (1 s + maximum one cycle of measured signal). If no signal arrives within 2 s it is taken that the signal has zero frequency
- range of setting of the time base is 0,5 s to 10 s
- in the „RTC" regime with data projection the set time defines the cycle of switching between time/date, min. is 5 s,
- when synchronous frequency measurement on channels 1 and 2 are required, select in CONF. 1 > TIME 1 requested base and in CONF. 2 > TIME 1 > LIKE 1

*****

Setting procedure is identical for channel 2 (CONF. 2)

*****

Item "LIKE 1" will be active in 2-channel measurement (F. 2)

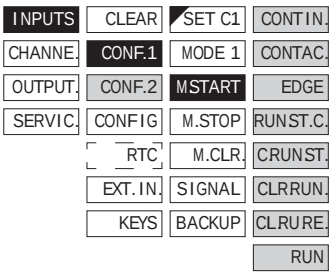
*****

For mode "TIME" the time base is 29 MHz, for mode "RTC" it is 1 s

!

Attention! When setting the division constant in the range of 2...255, and when we measure using an exact no. of incoming pulses we need to ensure that an integer no. of pulses arrive, othervise the frequency is declared as ZERO!

1.2d **Selection of stopwatch/timer control**



MSTART **Selection of stopwatch/timer control**

- time setting menu is accessible only in the stopwatch/timer regime
- **setting applies only to Input „A"**

CONTIN. Stopwatch/timer is running constantly if the instrument is turned on

CONTAC. Stopwatch/timer is running upon contact making

EDGE Stopwatch/timer is controlled by the priming signal edge

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

RUN.STC. Stopwatch/timer is controlled and reset by the edge of the priming signal

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

CRUN.ST. Stopwatch/timer is controlled and reset by the edge of the priming signal

- time is set off by the edge (by the signal passing across the comparing level) and stopped by the next edge

CLRRUN. Stopwatch/timer is reset and set off by the edge of the priming signal (when the time is not running)

- pokud jsou zastaveny

CLRURE. Stopwatch/timer is reset and set off by the edge of the priming signal, the cycle is repeated with every other edge

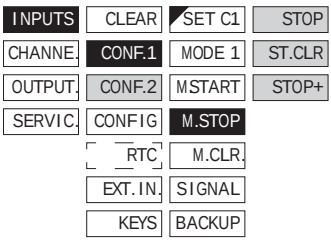
- egardles of whether the time is running or not

RUN Stopwatch/timer is only set off by the edge

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2e Selection of stopwatch/timer resetting



M.STOP **Selection of stopwatch resetting**

- menu of the resetting option is accessible only in the stopwatch/timer regime
- **setting applies only to Input „B"**

STOP Zeroing by external input is switched off

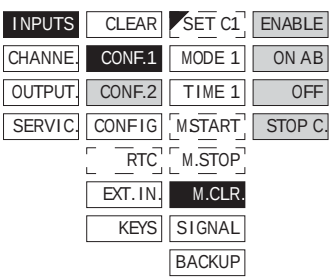
ST.CLR. Stopwatch/timer is stopped and reset through input „Clear"

STOP+ Stopwatch/timer is stopped through input „Clear"

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2f Selection of zeroing



M.CLR. **Selection of zeroing**

- **setting of external zeroing input (Input C)**

ENABLE „Zeroing" is permited

ON AB „Zeroing" is permited

- mode for IRC encoders
- Counter is zeroed only when sinals A and B are in logical1

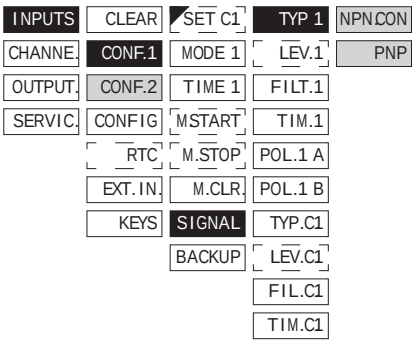
OFF „Zeroing" is switched off

STOP C. Stop watch/clock is stopped by input „Zeroing"

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2g Selection of the type of input - Inputs A and B



TYP.1 Selection of type of input

- **setting applies to Inputs A and B**

NPN CON — Type of input NPN and upon contact

PNP — Type of input PNP

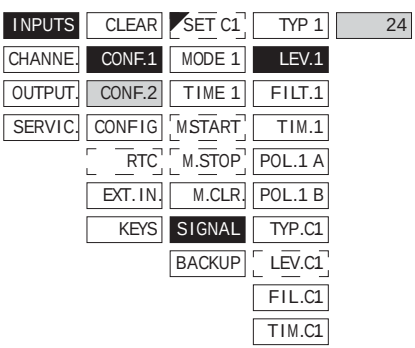
!

With selection of "PNP" it is necessary to set the input level (LEV. 1)

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2h Setting input level - Inputs A and B



LEV.1 Setting input level

- **setting applies for Inputs A and B**
- setting level (only for type PNP) of the input voltage, the instrument subsequently automatically selects divider and thus comparing levels
- range of setting 0,009...60 V
- table of comparing levels is on page 8

*****

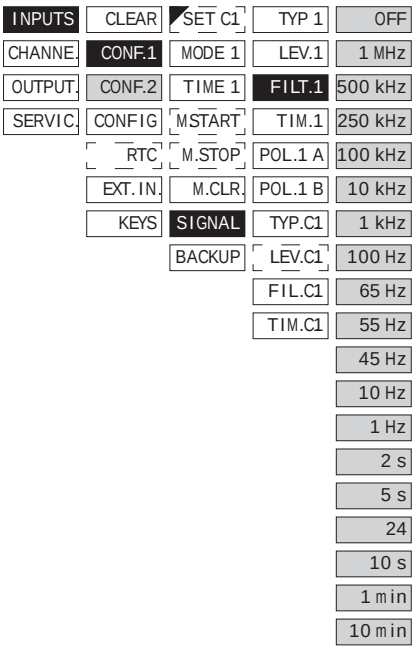
Signalization by LEDs when selecting input level:
LED "C" signals, that input A is active
LED "F" signals, that amplified imput A is active
LED "1" signals, that input B is active
LED "2" signals, that input C is active

When changing these menu items it is necessary to wait approx. 2 s before the input circuits switch to the new level.

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2i **Selection of input filter parameters - Inputs A and B**



FILT.1 **Selection of digital input filter**

- digital filter may suppress unwanted interfering impulses (e.g. relay backswings) on the input signal. The set parameter gives maximum possible frequency (Hz) of the instrument, which the instrument w/o limitatio
- for pulse duty cycle of 50 % - equal duration of Hi and Lo level"
- **in case if intereference the use of input filter is recommended**

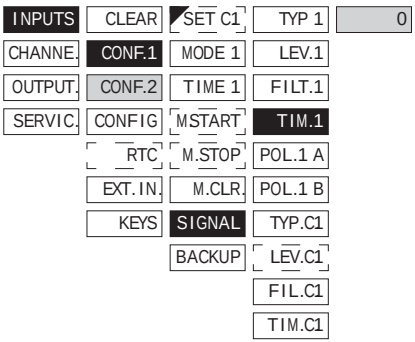
*****

Setting procedure is identical for channel 2 (CONF. 2)

!

When accessing upon contact and available maximum input frequency we recommend using filter

6.1.2j Setting the blocking of Inputs A, B



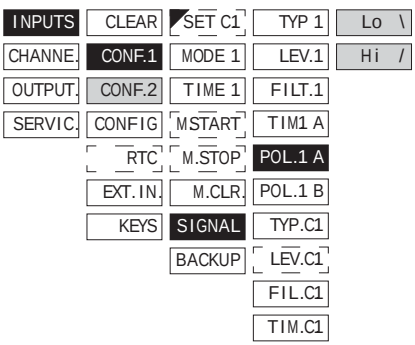
TIM.1 Setting the blocking of an input

- **this setting is valid both to Input A and Input B**
- setting the time period when no incoming input signals are counted
- range of setting 0...120 s

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2k Selection of active level or edge - Input A



POL.1 A Selection of active level or edge

Lo \ Active upon change of entering edge Hi > Lo

- upon entering the contact > active on switch-on

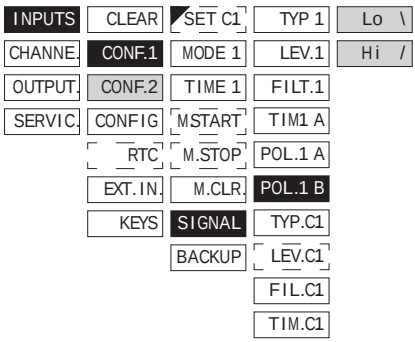
Hi / Active upon change of declining edge Lo >Hi

- upon entering the contact > active on switch-off

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2l Selection of active level or edge - Input B



POL.1 B **Selection of active level or edge**

**Lo ** Active upon change of entering edge Hi > Lo

- upon entering the contact > active on switch-on

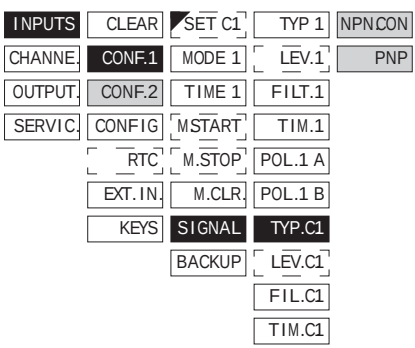
Hi / Active upon change of declining edge Lo >Hi

- upon entering the contact > active on switch-off

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2m Selection of the type of input - Input C



TYP.C1 **Selection of type of input**

- **setting applies for Input C**

NPN CON Type of input NPN and upon contact

PNP Type of input PNP

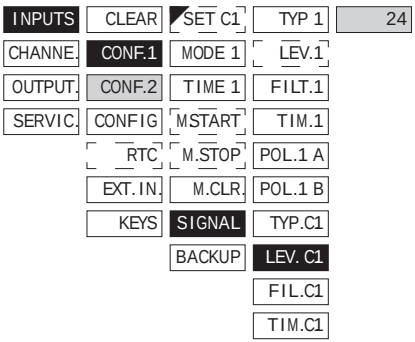
!

With selection of "PNP" it is necessary to set the input level (LEV.C. 1)

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2o Setting input level - Input C



LEV.C1 Setting input level

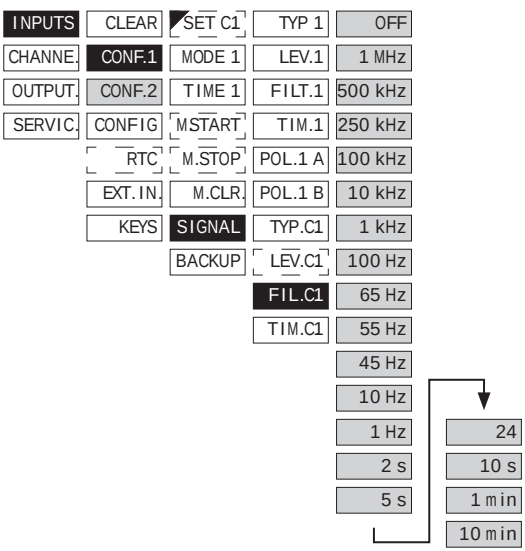
- **setting applies for Input C**
- setting level (only for type PNP) of the input voltage, the instrument subsequently automatically selects divider and thus comparing levels
- range of setting 0,009...60 V
- table of comparing levels is on page 8

*****

Signalization by LEDs when selecting input level: LED "2" signals, that input C is active

When changing these menu items it is necessary to wait approx. 2 s before the input circuits switch to the new level.

6.1.2p Selection of input filter parameters - Input C



FIL.C1 Selection of digital input filter

- digital filter may suppress unwanted interfering impulses (e.g. relay backswings) on the input signal. The set parameter gives maximum possible frequency (Hz) of the instrument, which the instrument w/o limitatio
- for pulse duty cycle of50% - equal duration of Hi and Lo level"
- **in case if intereference the use of input filter is recommended**

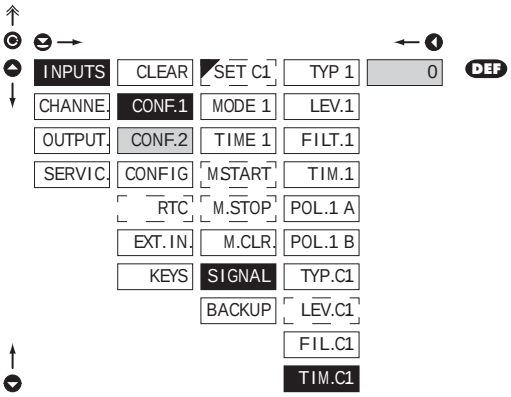
*****

Setting procedure is identical for channel 2 (CONF. 2)

!

When accessing upon contact and available maximum input frequency we recommend using filter

6.1.2q Setting the blocking for Input C



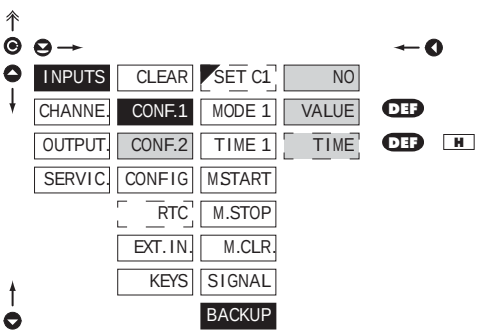
TIM.C1 **Setting the input blocking**

- **setting applies to input C**
- setting the time period when no incoming input signals are counted
- range of setting 0...120 s

*****

Setting procedure is identical for channel 2 (CONF. 2)

6.1.2r Setting the display status backup



BACKUP **Selection of display status backup**

- time setting menu is accessible only in the stopwatch/timer regime
- setting display value restoration after power failure or instrument switch-off

NO — Instrument resets itself after every switch-on

VALUE — After switch-on the instrument loads the display status from the memory

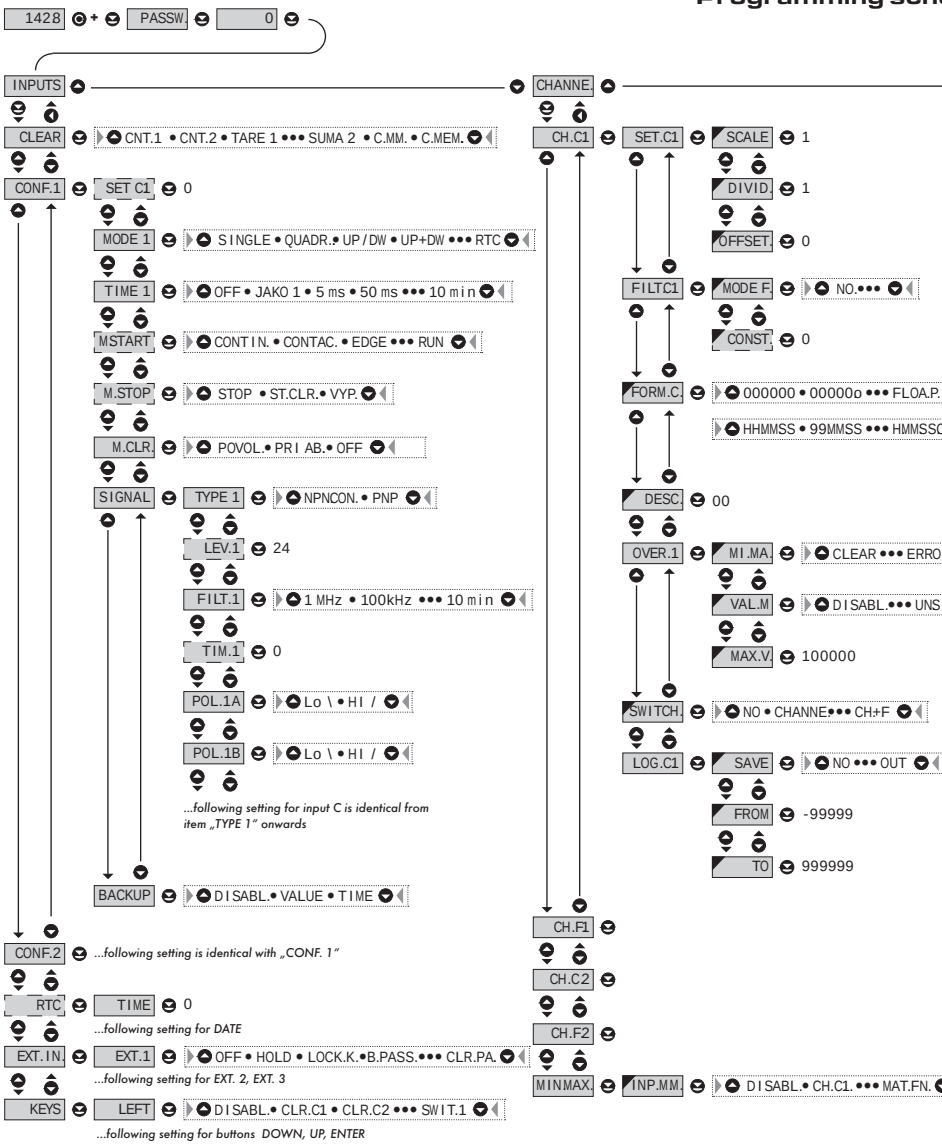
TIME — Instrument downloads „running" time from RTC

- item accessible only with extension „Time backup"

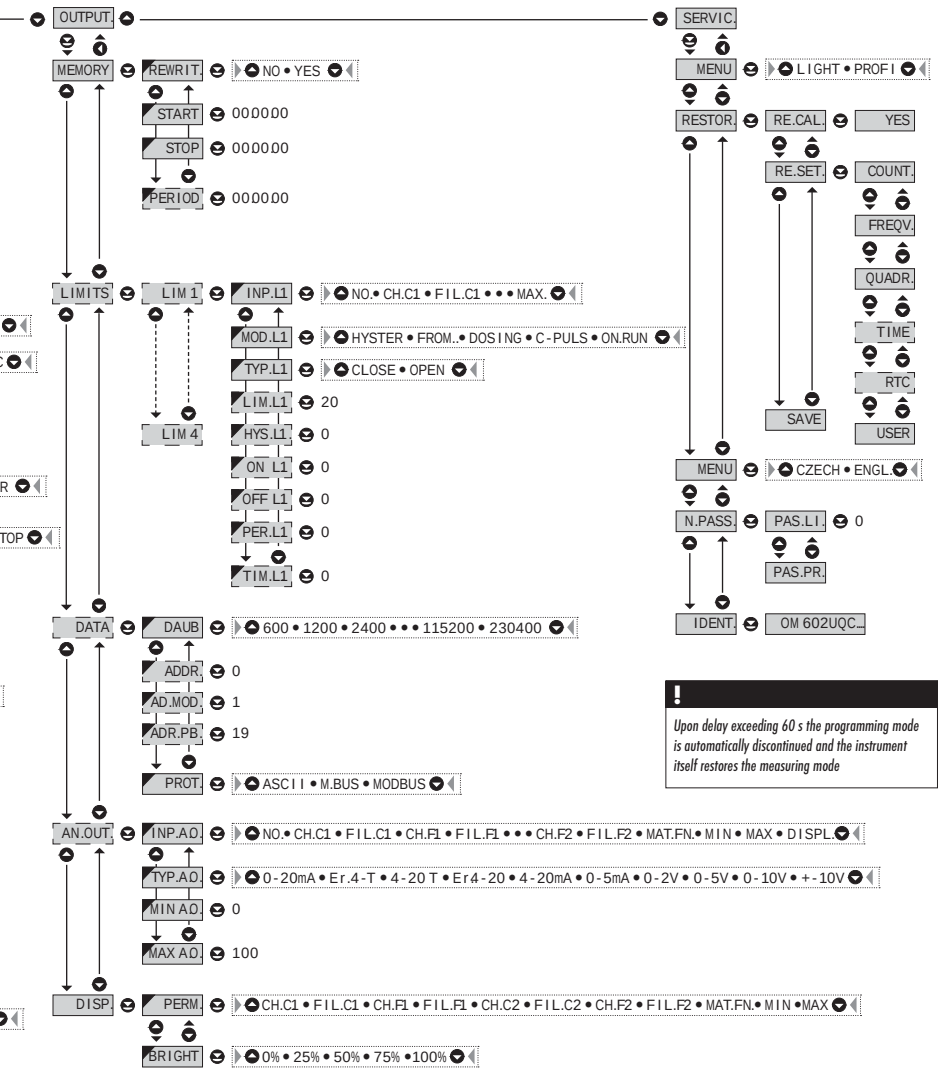
*****

Setting procedure is identical for channel 2 (CONF. 2)

Programming sch



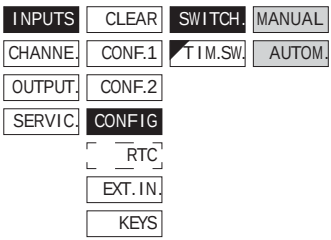
eme PROFI MENU



!

Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode

6.1.3a Selection of inputs switching



SWITCH. Selection of inputs switching

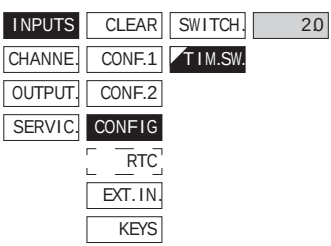
MANUAL Manual inputs switching

- inputs switching is controlled by selected key on the front panel or selected external input

AUTOM. Measuring on selected channel

- inputs switching is automatic in a time period set in "TIM. SW."

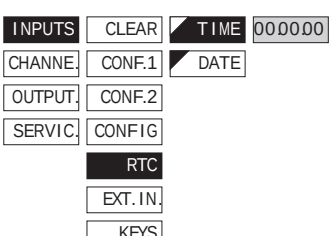
6.1.3b Setting the period for inputs switching



TIM.SW. Setting the period for inputs switching

- setting the time period for projection of channels in automatic mode ode of inputs switching ("AUTOM.")
- range of setting 0,5...99,9 s
- TIM. SW. = 2 s

6.1.4 Setting the real time clock



RTC Setting the real time clock (RTC)

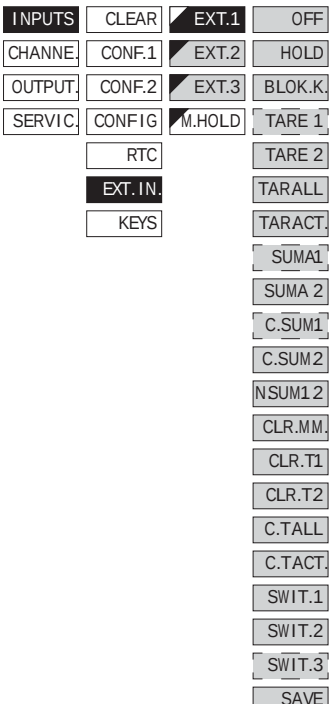
TIME Time setting

- format 23.59.59

DATE Date setting

- format DD.MM.YY

6.1.5a External input function selection



EXT. IN. External input function selection

OFF Input is off

HOLD Activation of HOLD

- input activates function HOLD, which blocks all functions of the instrument

BLOK.K. Locking keys on the instrument

- active input disables all the front pannel buttons

TARE - Tare activation

- Tare A, B, C, D, All, Active
- input activates function TARE, only in mode "Frequency"

SUM - External input controls function „Sum"

- active input dispalys the cummulated value of counter (channel 1, channel 2)

C.SUM.- External input controls function „Zeroing of sum"

- active input zeroes (clears) the cummulated value of counter (channel 1, channel 2, both channels)

CLR.MM. Resetting min/max value

CLR.T.- Tare resetting

- Tare1, 2, All, Active

SWIT.1 Successive switching of channel projection

SWIT.2 BCD switching of channel projection - EXT. 1,2

- for operation see the table
- following this choice the setting for "EXT. 2" is automatically restricted

SWIT.3 BCD switching of channel projection - EXT. 1,2, 3

- for operation see the table
- following this choice the setting for EXT.2" and "EXT. 3" is automatically restricted

SAVE Activation of the measured data record into instrument memory (not in standard equipment)

External inputs table

Functions	*Ext 1*	*Ext 2*	*Ext 3*
Channel 1 - counter	*0*	*0*	
Channel 1 - frequency	*0*	*1*	
Channel 2 - counter	*1*	*0*	
Channel 2 - frequency	*1*	*1*	
Mathematical Funct.	*0*	*0*	*1*
Min	*0*	*1*	*1*
Max	*1*	*0*	*1*
Max	*1*	*1*	*1*

- EXT. 1 > *HOLD*
- EXT. 2 > *BLOK. K.*
- EXT. 3 > *SWIT. 1*

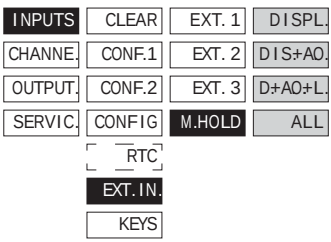
*****

Procedure identical for EXT. 2 and EXT. 3

!

Response to change of input is approx. 100 ms

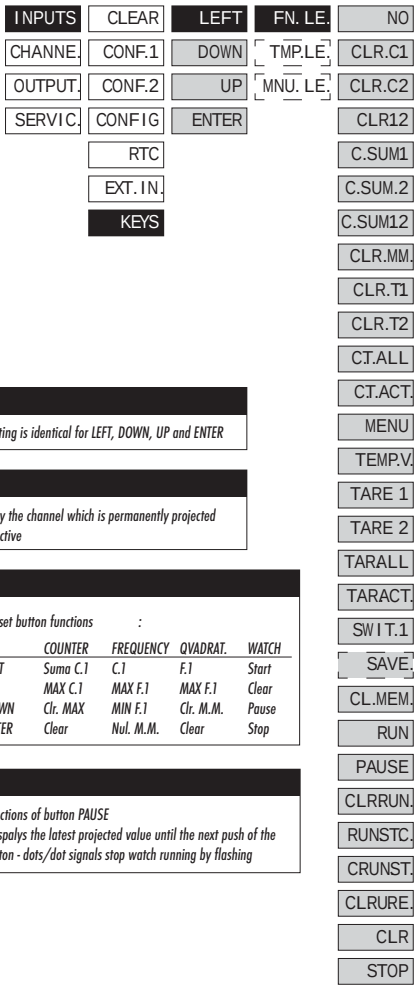
6.1.5b Selection of function "HOLD"



M.HOLD **Selection of function "HOLD"**

- DISPL. "HOLD" locks only the value displayed
- DIS+AO. "HOLD" locks the value displayed and on AO
- D+AO+L. "HOLD" locks the value displayed, on AO and limit evaluation
- ALL "HOLD" locks the entire instrument

6.1.5a Optional accessory functions of the keys



!

Setting is identical for LEFT, DOWN, UP and ENTER

!

Only the channel which is permanently projected is active

!

Preset button functions :

	COUNTER	FREQUENCY	QVADRAT.	WATCH
LEFT	Suma C.1	C.1	F.1	Start
UP	MAX C.1	MAX F.1	MAX F.1	Clear
DOWN	Clr. MAX	MIN F.1	Clr. M.M.	Pause
ENTER	Clear	Nul. M.M.	Clear	Stop

!

Functions of button PAUSE
- dispalys the latest projected value until the next push of the button - dots/dot signals stop watch running by flashing

FN. LE. Assigning further functions to instrument keys

- *„FN. LE."* > executive functions

NO Key has no further function

CLR.C.- Aux. input controls the „CELAR" function

- input zeroes (presets) the counter (channel1, channel 2, both channels)

C.SUM.- Clearing of Sum

- input zeroes the cumulated value of the couter (channel 1, channel 2, both channels)

CLR.MM Resetting min/max value

CLR.TA. Tare resetting

- Channel 1, Channel 2, Channel 1 and 2, Active channel.

MENU Direct access to the selected item in the menu

- when this chioce is made the item *"MENU" is displayed*, and desired further selection can be made.

TEMP.V. Temporary projection of selected values

- when this chioce is made the item *"TMP. LE." is displayed*, and desired further selection can be made.

TARE - Activation of Tare function

- Channel 1, Channe 2, Channels1 and 2, Active channel

SWIT.1 Continuous switching of projected channels

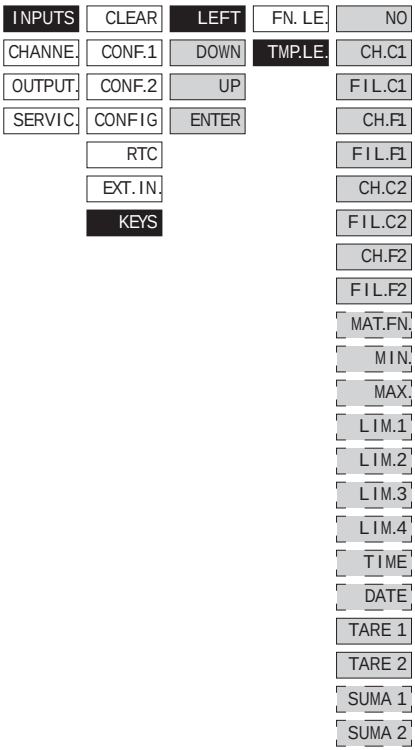
SAVE Activation of recording of measured values into the instrument's mamory. (option)

C.MEM. Clearing the instrument's memory(in conjunction with RTC)

CLRRUN Stopwatch/clock is zeroed and launched again by the edge of the launching signal

- other items arelate only to stopwatch conntrol (deatil description on p. 38/39)

6.1.5b Optional accessory functions of the keys - Temporary projection



!

Setting is identical for LEFT, DOWN, UP and ENTER

TMP.LE. Temporary projection of selected item

- *„TMP. LE."* > temporary projection of selected values
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing + "Selected key", this holds until the stroke of any key

NO Temporary projection is off

CH.C.- Temporary projection of counter value on Channel 1 or Channel 2

FIL.C.- Temporary projection of counter value on Channel 1 or Channel 2 after being processed by digital filtres

CH.F.- Temporary projection of frequency on Channel 1 or Channel 2

FIL.F.- Temporary projection of frequency on Channel 1 or Channel 2 after being processed by digital filtres

MAT.FN. Temporary projection of "Mathematic functions"

MIN. Temporary projection of "Min. value"

MAX. Temporary projection of "Max. value"

LIM.1 Temporary projection of "Limit 1" value

LIM.2 Temporary projection of "Limit 2" value

LIM.3 Temporary projection of "Limit 3" value

LIM.4 Temporary projection of "Limit 4" value

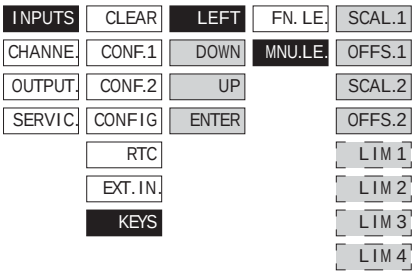
TIME Temporary projection of "TIME" value

DATE Temporary projection of "DATE" value

TARE - Temporary projection of "TARE", on Channel 1 or Channel 2

SUMA - Temporary projection of "SUMA", on Channel 1 or Channel 2

6.1.5c Optional accessory functions of the keys - Direct access to item



MNU.LE. **Assigning access to selected menu item**

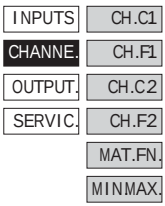
- *„MNU. LE."* > direct access into menu on selected item

SCAL.1	Direct access to item "SCAL. 1"
OFFS.1	Direct access to item "OFFS. 1"
SCAL.2	Direct access to item "SCAL. 2"
OFFS.2	Direct access to item "OFFS. 2"
LIM 1	Direct access to item "LIM 1"
LIM 2	Direct access to item "LIM 2"
LIM 3	Direct access to item "LIM 3"
LIM 4	Direct access to item "LIM 4"

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.2 Setting "PROFI" - CHANNEL



In this menu the instrument input parameters are set

CH.C1 Setting parameters of measuring "Channel 1" - Counter

CH.F1 Setting parameters of measuring "Channel 1" - Frequency/Watch

CH.C2 Setting parameters of measuring "Channel 2" - Counter

CH.F2 Setting parameters of measuring "Channel 2" - Frequency/Watch

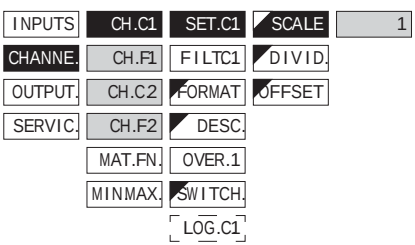
MAT.FN. Setting parameters of mathematic functions

MINMAX Selection of access and evaluation of Min/max value

!

Setting is identical for "Channels F.1, C.2 and F.2"

6.2.1a Setting multiplying constant - Channel Counter



SCALE **Setting multiplying constant - Channel "C"**

- multiplying constant serves for calculation of input value to required display value
- by entering minus value the direction of calculation is changed, i.e. we count down
- range: -99999...999999
- = 1

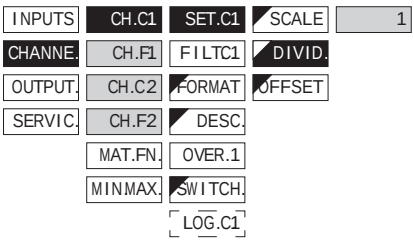
!

Setting is identical for "Channels F.1, C.2 and F.2"

!

If non-zero value is set in the "TIME" or "RTC" mode in the "OFFSET" item, it applies that the multiplying constant "SCALE" is negative

6.2.1b Setting division constant - Channel Counter



DIVID. Setting division constant Channel - Counter

- division constant serves for calculation of input value to required display value
- range
- = 1

!

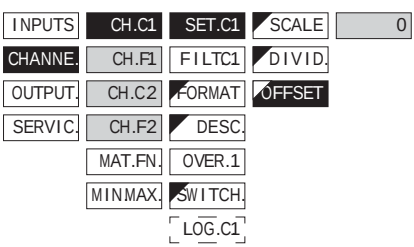
Setting is identical for "Channels F.1, C.2 and F.2"

*****

Revolution measurement function

If you set the division constant (invariable) for channel F1 (F2) as an integer number (range 2...255), the measurement will be realised according to the preset multiplications of revolutions/pulses. In reality this means that revolutions are measured precisely after a number of revolutions have been fully completed, which results in an improved stability of the measured value. This mode is not suitable for higher frequencies, where it can increase the measurement period. If you do not wish to use this mode, mutliply both the multiplication and division constant by 10, 100 or 0,5 so that the resulting number is not integer or within the 2...255 range. Please pay attention to the time platform (TIME 1), which must must alow for adding up the 2...255 pulses within the set time period. ATTN! When this option is used in the QUADR mode, it may result in an error when the direction of revolution is reversed.

6.2.1c Setting additive constant - PRESET, Channel Counter



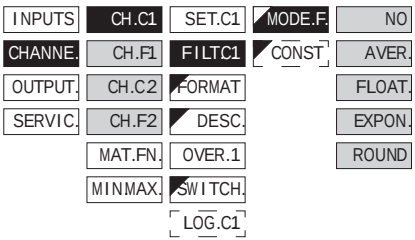
OFFSET Setting PRESET constant Channel - Counter

- offset of the measuring by a set value, which shall be loaded always upon instrument resetting
- range: -99999...999999
- = 0

!

Setting is identical for "Channels F.1, C.2 and F.2"

6.2.1d Setting digital filters - channel counter



MODE.F. Selection of digital filters

- at times it is useful for better user projection of data on display to modify it mathematically and properly , wherefore the following filters may be used:

NO Filters are off

AVER. Measured data average

- arithmetic average from given number („CONST.") of measured values
- range 2...100

FLOAT. Selection of floating filter

- floating arithmetic average from given number („CONST.") of measured data and updates with each measured value
- range 2...30

EXPON. Selection of exponential filter

- integration filter of first prvního grade with time constant („CONST.") measurement
- range 2...100

ROUND Measured value rounding

- is entered by any number, which determines the projection step (e.g: "CONST"=2,5 > display 0, 2.5, 5,..)

CONST. Setting constants

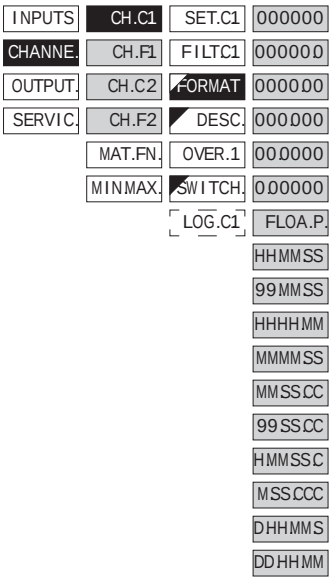
- this menu item is always displayed after selection of particular type of filte
- = 2

**only for mode Frequency/Duty Cycle*

!

Setting is identical for "Channels F.1, C.2 and F.2"

6.2.1e Projection format - positioning of decimal point



FORM.A **Selection of decimal point**

- the instrument can project numbers in a standard way incl. the decimal point, time formats and also floating decimal point which ensures the most accurate value projection when *„FLOA. P." is selected*

Abbreviations
- "FLOA. P." > floating decimal point
- "D." > day
- "H." > hour
- "M." > minute
- "S." > second
- "C." > hundredth of a second

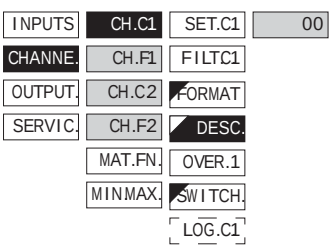
!

Setting is identical for "Channels F.1, C.2 and F.2"

!

Hourly formates apply only to "Channels C.1 and C.2"

6.2.1f Projection of description - the measuring units



!

Setting is identical for "Channels F.1, C.2 and F.2"

DESC.A **Setting projection of descript. for "Channel A"**

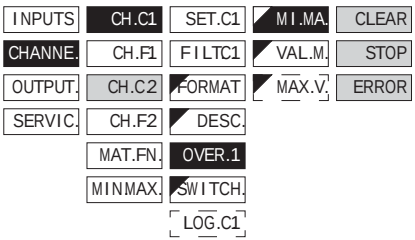
- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by code 00

= 00 (no description)

!

Table of signs on page 85

6.2.1g Setting functions when there is display/value overflow



MI.MA. Setting the state of the instrument in the event of display overflow

- setting the state when there is an overflow/underflow of display
- can be used only for Chan. C.1 and C.2

CLEAR — The instrument zeroes itself and continues to count

STOP — Measurement stops

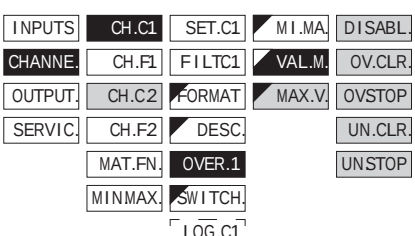
- The dislpay will continue to show the maximum or the minimum displayable value

ERROR — Measurement stops

- na displeji se zobrazí chybové hlášení „E. I.Un." nebo „E. I.Ov."

!

Setting is identical for "Channel C.2"



VAL.M. Setting the state of the instrument in the event of value overflow

- setting the state when the instrument reaches a preset display value

DISABL. — Function is disabled

OV.CLR. — Counter clears itself over a certain value

OVSTOP — Counter stops itself over a certain value

UN.CLR. — Counter clears itself just under a certain value

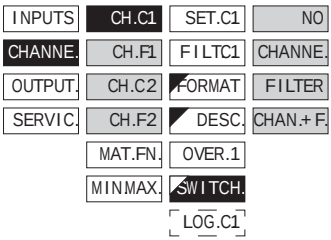
UNSTOP — Counter stops itself just under a certain value

MAX.V. — Setting the limit value - Setting the value when the counter performes function selected in menu "MAX. V"

!

Setting is identical for "Channel C.2"

6.2.1h Setting the channel projection in SWITCH mode



!

Setting is identical for "Channels F.1, C.2 and F.2"

SWITCH. Channel projection in SWITCH mode

- this menu item allows the user to select individual measuring channels which will be displayed when switching amongst channels is active - function „*SWITCH.*"

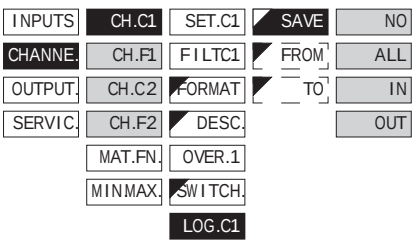
NO — Switching is disabled

CHANNE. — "Channel 1" will be displayed

FILTER — "Channel 1" after being processed by digital filter will be displayed

CHAN.+ F. — "Channel 1" will be displayed followed by "Cahnnel 1" after being processed by digital filter

6.2.1i Selection of storing data into instrument memory



!

Setting is identical for "Channels F.1, C.2 and F.2"

LOG.C1 Selection of storing data into instrument memory

- by selection in this item you allow to register values into instrument memory
- another setting in item *"OUTPUT. > MEMORY"* (not in standard experiment)

NO — Measured data is not stored

ALL — Measured data is stored in memory

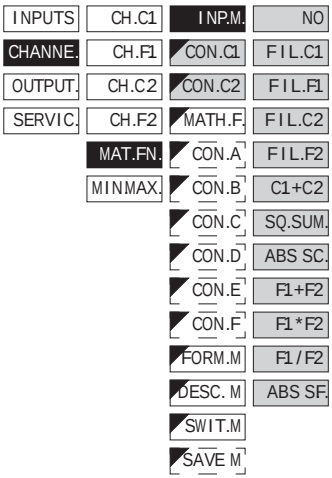
IN — Only data measured within the set interval is stored in memory

OUT — Only data measured outside the set interval is stored in memory

FROM — Setting the initial interval value
- setting range: -99999...999999

TO — Setting the final interval value
- setting range: -99999...999999

6.2.2a Mathematical functions - input selection



INP.M. Selecting the channel to be processed by mathematical function

- selecting the value from which the mathematical function will be calculated

NO Mathematical functions are off

FIL.C1 From channel 1 - counter after digital filter

FIL.F1 From channel 1- frequen. after digital filter

FIL.C2 From channel 2 - counter after digital filter

FIL.F2 From channel 2 - frequen. after digital filter

C1+C2 From channels - counter after digital filter in format K1xC1+K2xC2

SQ.SUM. From channels - counter after digital filter and in format $(K1xC1)^2+(K2xC2)^2$

ABS.SC. From channels - counter after digital filter and in format $|K1xC1+K2xC2|$

F1+F2 From channels - frequency after digital filter and in format K1xF1+K2xF2

F1*F2 From channels - frequency after digital filter and in format K1xF1xK2xF2

F1/F2 From channels - frequency after digital filter and in formátu K1xF1/K2xF2

ABS SF. From channels - frequency after digital filter and in format $|K1xF1+K2xF2|$

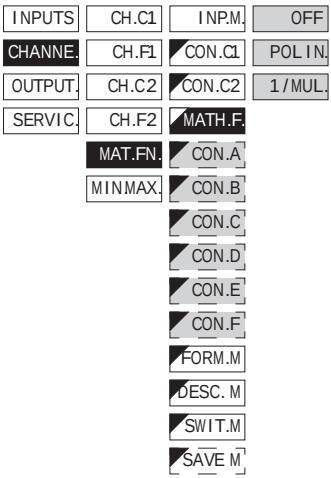
CON.C1 Setting constant 1 = 1

- range: -99999...999999

CON.C2 Setting constant 2 = 1

- range: -99999...999999

6.2.2b Mathematic functions



MATH.F. **Selection of mathematic functions**

OFF Mathematic functions are off

POLIN Polynome

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

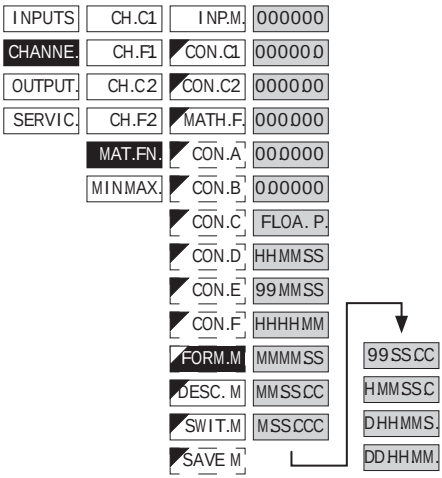
1/MUL. 1/x

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

CON.- Setting constants for calculation of mat. functions

- this menu is displayed only after selection of given mathematic function

6.2.2c Mathematic functions - decimal point

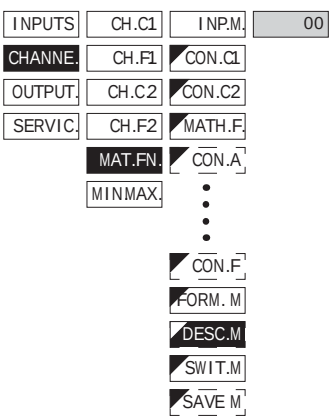


FORM. M **Selection of decimal point**

- the instrument can project numbers in the standard way incl. the decimal point, time formats and also floating decimal point which ensures the most accurate value projection when *„FLOA. P." is selected*

Abbreviations
- "FLOA. P." > floating decimal point
- "D." > day
- "H." > hour
- "M." > minute
- "S." > second
- "C." > hundredth of a second

6.2.2d Mathematic functions - measuring units



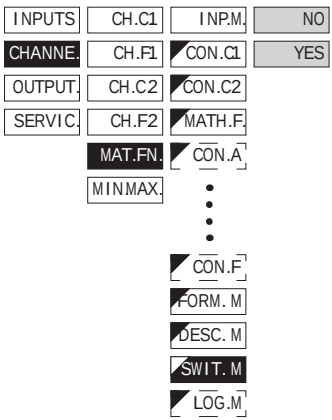
DESC.M **Setting projection of description for "MAT.FN"**

- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by code 00
- = no description

!

Table of signs on page 85

6.2.2e Mathematic functions - selection of channel projection upon switching



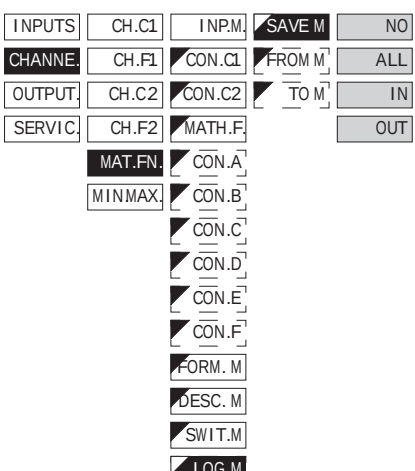
SWIT.M Selection of channel rojection upon switching

- setting in this item enables the user to select individual measuring channels which will be displayed upon switching the channel functions „SWIT. M"

NO — Projection permitted

YES — Projection restricted

6.2.2f Mathematic functions - selection of storing data into instrument memory



SAVE M Selection of storing data into instrument memory

- by selection in this item you allow to register values into instrument memory
- another setting in item *"OUTPUT. > MEMORY"* (not in standard experiment)

NO — Measured data is not stored

ALL — Measured data is stored in memory

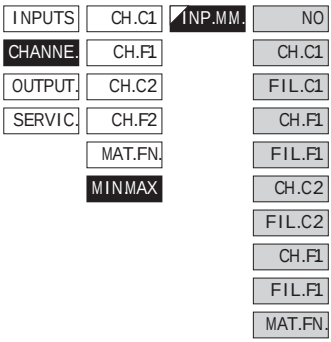
IN — Only data measured within the set interval is stored in memory

OUT — Only data measured outside the set interval is stored in memory

FROM M — Setting the initial interval value
- setting range: -99999...999999

TO M — Setting the final interval value
- setting range: -99999...999999

6.2.3 Selection of evaluation of min/max value

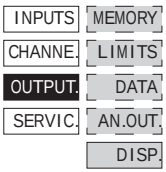


INP.MM. Selection of evaluation of min/max value

- selection of value from which the min/max value will be calculated

NO	Evaluation of min/max value is off
CH.C1	From "Channel 1" counter
FIL.C1	From "Channel 1" counter, after digital filters processing
CH.F1	From "Channel 1" frequency
FIL.F1	From "Channel 1" frequency, after digital filters processing
CH.C2	From "Channel 2" counter
FIL.C2	From "Channel 2" counter, after digital filters processing
CH.F2	From "Channel 2" frequency
FIL.F2	From "Channel 2" frequency, after digital filters processing
MAT.FN.	From "Mathematic functions"

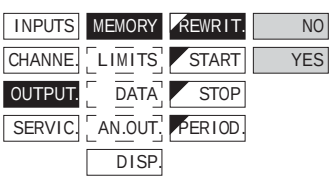
6.3 Setting „PROFI“ - OUTPUTS



In this menu it is possible to set parame ters of the instrument output signals

- MEMORY — Setting data logging into memory
- LIMITS — Setting type and parameters of limits
- DATA — Setting type and parameters of data output
- AN.OUT. — Setting type and parameters of analog output
- DISP. — Setting display projection and brightness

6.3.1a Selection of mode of data logging into instrument memory

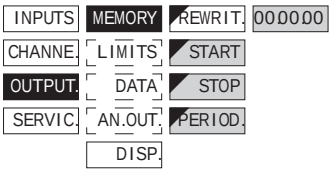


REWRIT. Selection of the mode of data logging

- selection of the mode in the event of full instrument memory

- NO — Rewriting values prohibited
- YES — Rewriting values permitted, the oldest get rewritten by the latest

6.3.1b Setting data logging into instrument memory - RTC



START Start of data logging into instrument memory

- time format HH.MM.SS

STOP Stop data logging into instrument memory

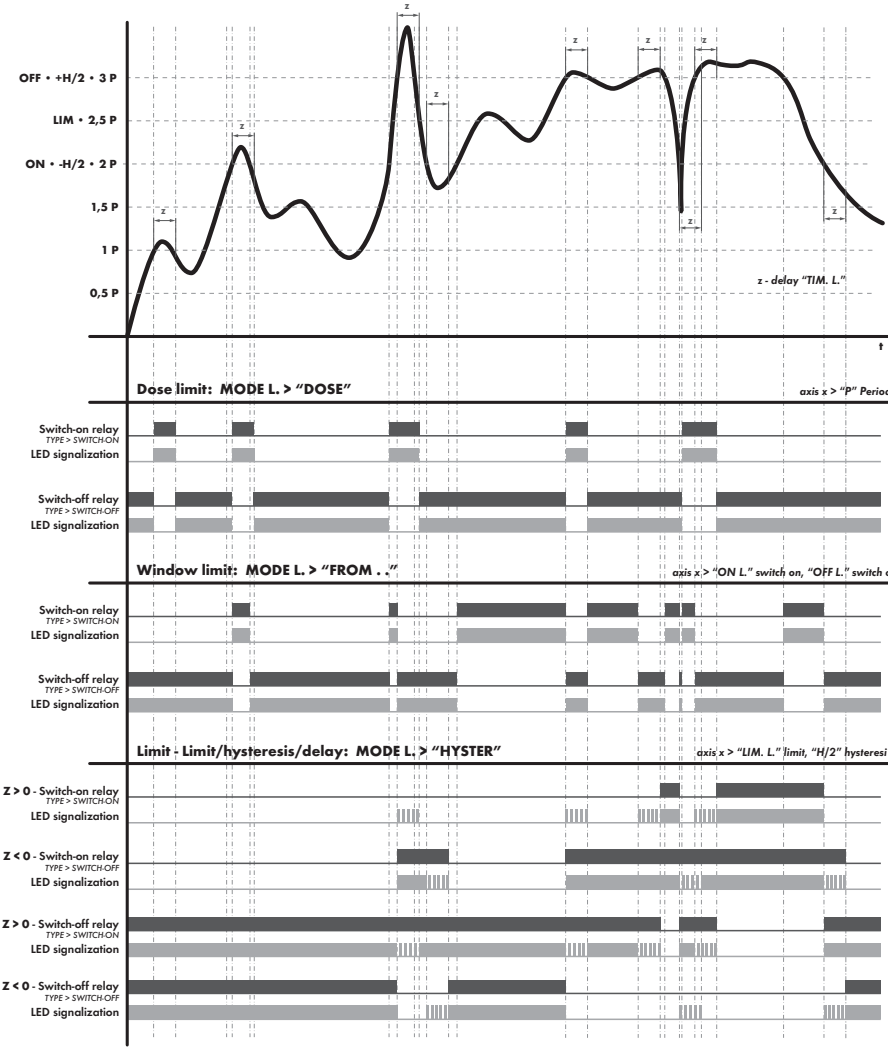
- time format HH.MM.SS

PERIOD. Period of data logging into instrument memory

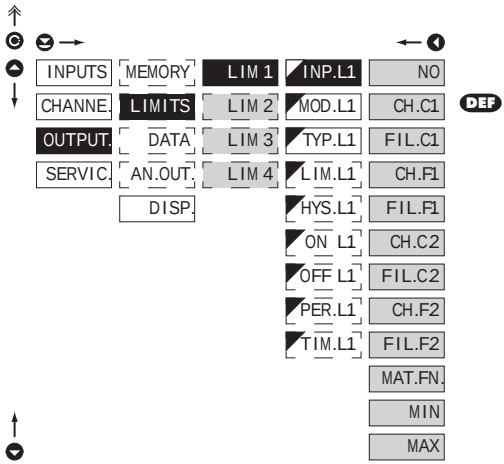
- determines the period in which values will be logged in an interval delimited by the time set under items *START* and *STOP*
- time format HH.MM.SS
- records are made on a daily basis in selected interval and period
- item not displayed if "STORE" is selected in menu *(INPUT > EXT. IN.)*

RTC

The lowest recording rate possible is once a day, the highest is every second. Under exceptional circumstances it is possible to set the rate to 8 times per second by entering the recording period as 00:00:00. However, this mode is not recommended due to the memory overload. Recordings are realised in a timeframe of one day and are repeated periodically every following day. Recordings can take place either inside or outside of selected time intervals. The duration of re-writing can be determined by the number of channels recorded as well as by the recording rate.


OFF • +H/2 • 3 P
LIM • 2,5 P
ON • -H/2 • 2 P
1,5 P
1 P
0,5 P
z
z - delay "TIM. L."
t
Dose limit: MODE L. > "DOSE"
axis x > "P" Period
Switch-on relay
TYPE > SWITCH-ON
LED signalization
Switch-off relay
TYPE > SWITCH-OFF
LED signalization
Window limit: MODE L. > "FROM . ."
axis x > "ON L." switch on, "OFF L." switch
Switch-on relay
TYPE > SWITCH-ON
LED signalization
Switch-off relay
TYPE > SWITCH-OFF
LED signalization
Limit - Limit/hysteresis/delay: MODE L. > "HYSTER"
axis x > "LIM. L." limit, "H/2" hysteresi
Z > 0 - Switch-on relay
TYPE > SWITCH-ON
LED signalization
Z < 0 - Switch-on relay
TYPE > SWITCH-OFF
LED signalization
Z > 0 - Switch-off relay
TYPE > SWITCH-ON
LED signalization
Z < 0 - Switch-off relay
TYPE > SWITCH-OFF
LED signalization

6.3.2a Selection of input for limits evaluation



!

If you require an immediate relay response select no filter

INP.L1 Selection evaluation of limits

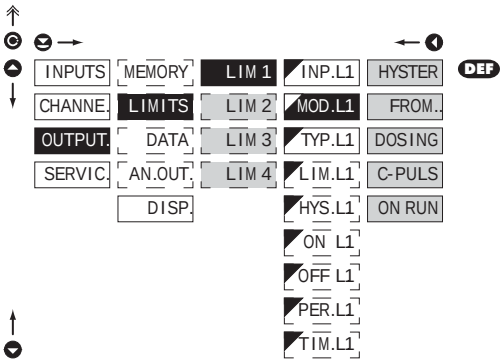
- selection of value from which the limit will be evaluated

NO	Limit evaluation is off
CH.C1	From "Channel 1" counter
FIL.C1	From "Channel 1" counter, after digital filters processing
CH.F1	From "Channel 1" frequency
FIL.F1	From "Channel 1" frequency, after digital filters processing
CH.C2	From "Channel 2" counter
FIL.C2	From "Channel 2" counter, after digital filters processing
CH.F2	From "Channel 2" frequency
FIL.F2	From "Channel 2" frequency, after digital filters processing
MAT.FN.	From "Mathematic functions"
MIN	From "Min. value"
MAX	From "Max. value"

!

Setting is identical for LIM 2, LIM 3 and LIM 4

6.3.2b Selection of type of limit



!

Dose limit puts a heavy burden on the µP and therefore we do not recommned using it at frequencies exceeding 25 kHz

!

Setting is identical for LIM 2, LIM 3 and LIM 4

MOD.L1 **Selection the type of limit**

HYSTER Limit is in mode "Limit, hysteresis, delay"

- for this mode the parameters of *"LIM. L."* are set, at which the limit will shall react, *"HYS. L."* the hysteresis range around the limit (LIM ±1/2 HYS) and time *"TIM. L."* determining the delay of relay switch-on

FROM.. Frame limit

- for this mode the parameters are set for interval *"ON. L."* the relay switch-on and *"OFF. L."* the relay switch-off

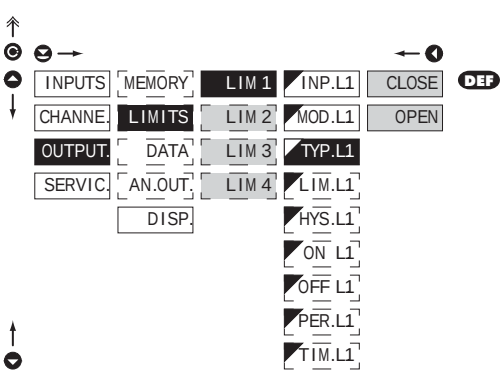
DOSING Dose limit (periodic)

- for this mode the parameters are set for *"PER. L."* determining the limit value as well as its multiples at which the output is active and *"TIM. L."* indicating the time during which is the output active

C.-PULS. Automatic zeroing of the counter at a preset value and a generating an impulse of duration set in "TIM. L.1"*

ON RUN Relay si closed/opened while the stopwatch is running*

6.3.2c Selection of type of output



TYP. L1 **Selection of type of output**

CLOSE Output switches on when condition is met

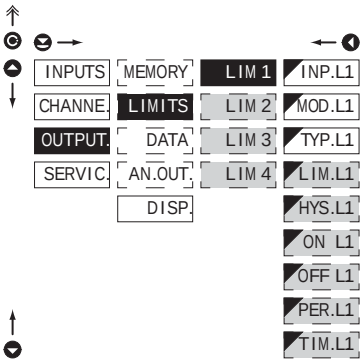
OPEN Output switches off when condition is met

!

Setting is identical for LIM 2, LIM 3 and LIM 4

** only for fast limits*

6.3.2d Setting values for limits evaluation



LIM.L1 Setting limit for switch-on

- for type *"HYSTER"*

HYS.L1 Setting hysteresis

- for type *"HYSTER"*
- indicates the range around the limit (in both directions, LIM. ±1/2 HYS.)

ON.L1 Setting the outset of the interval of limit switch-on

- for type *"FROM"*

OFF.L1 Setting the end of the interval of limit switch-on

- for type *"FROM"*

PER.L1 Setting the period of limit switch-on

- for type *"DOSE"*

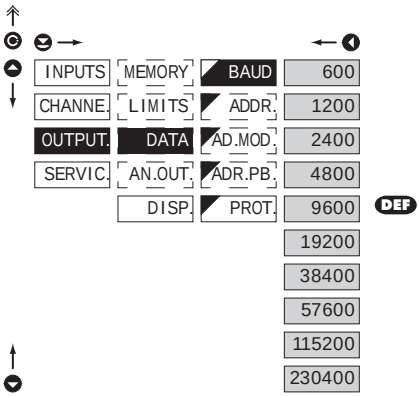
TIM.L1 Setting the time switch-on of the limit

- for type *"HYSTER"* and *"DOSE"*
- setting within the range: ±0...99,9 s
- positive time > relay switches on after crossing the limit (LIM. L1) and the set time (TIM. L1)
- negative time > relay switches off after crossing the limit (LIM. L1) and the set negative time (TIM. L1)
- in mode „DOSE" relay switches on at pre-set value (PER. L1) and the duration of the switch-on (TIM. L1) determines its next function. If the time is zero, then the state will change permanently (until next period), if the time is set for a non zero value, the switch-on will only last for the selected duration

!

Setting is identical for LIM 2, LIM 3 and LIM 4

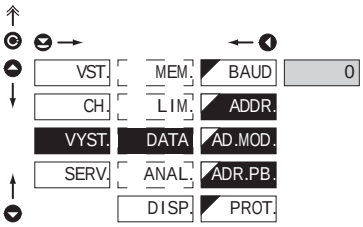
6.3.3a Selection of data output baud rate



BAUD — **Selection of data output baud rate**

600	Rate - 600 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
57600	Rate - 57 600 Baud
115200	Rate - 115 200 Baud
230400	Rate - 230 400 Baud

6.3.3b Setting instrument address



ADDR. — **Setting instrument address**

- setting in range 0...31
- DEF = 00

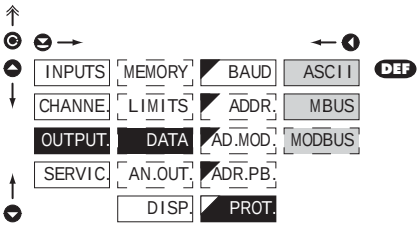
AD.MOD. — **Setting instrument address - MODBUS**

- setting in range 1...247
- DEF = 1

ADR.PB. — **Setting instrument address - PROFIBUS**

- setting in range 1...127
- DEF = 19

6.3.3c Selection of data output protocol

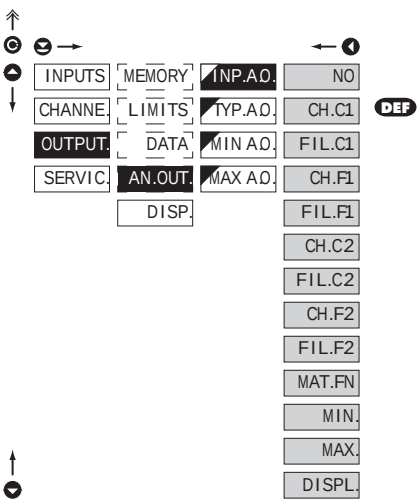


PROT. Selection of the type of analog output

ASCII	Data protocol ASCII
M.BUS	Data protocol DIN MessBus
MODBUS	Data protocol MODBUS-RTU

- option is available only for RS 485

6.3.4a Selection of input for analog output

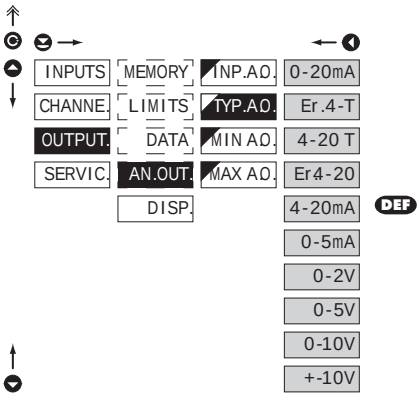


INP.AO. Selection of source for analogue output

- selecting the value, on which the analogue output is based

NO	Analogue output is off
CH.C1	From ch. 1 - counter
FIL.C1	From ch. 1 - counter after digital filter
CH.F1	From ch. 1 - frequency
FIL.F1	From ch. 1 - frequency after digital filter
CH.C2	From ch. 2 - counter
FIL.C2	From ch. 2 - counter after digital filter
CH.F2	From ch. 2 - frequency
FIL.F2	From ch. 2 - frequency after digital filter
MAT.FN.	From "Matematical function"
MIN.	From "Min. value"
MAX.	From "Max. value"
DISPL.	From "Permanently projected display value"

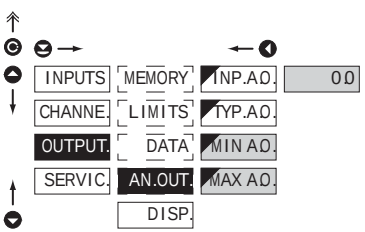
6.3.4b Selection of the type of analog output



TYP.AO. Selection of the type of analog output

- **0-20mA** Type - 0...20 mA
- **Er.4-T** Type - 4...20 mA with broken loop detection and indication of error statement
- **4-20 T** Type - 4...20 mA with broken loop detection
- **Er4-20** Typ - 4...20 mA, with indic. of error statement (< 3,0 mA)
- **4-20mA** Type - 4...20 mA
- **0-5mA** Type - 0...5 mA
- **0-2V** Type - 0...2 V
- **0-5V** Type - 0...5 V
- **0-10V** Type - 0...10 V
- **+-10V** Type - ±10 V

6.3.4c Setting the analog output range



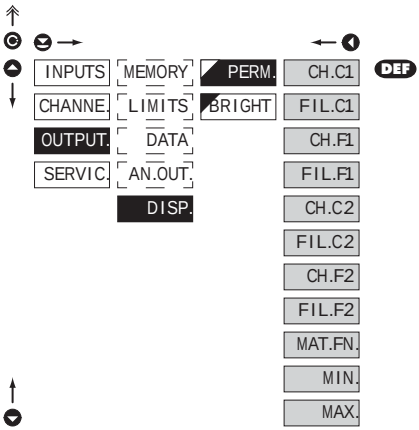
AN.OUT. Setting the analog output range

- analog output is isolated and its value corresponds with 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

MIN AO. Assigning the display value to the beginning of the AO range
- range of the setting is -99999...999999
- DEF = 0

MAX AO. Assigning the display value to the end of the AO range
- range of the setting is -99999...999999
- DEF = 100

6.3.5a Selection of input for display projection

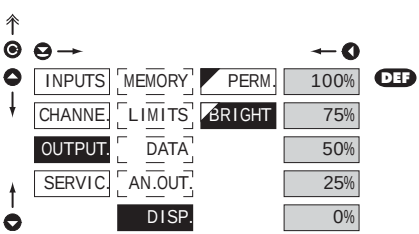


PERM. Selection display projection

- selection of value which will be shown on the instrument display

CH.C1	Channel 1 - Counter
FIL.C1	Channel 1 - Counter, after digital filters processing
CH.F1	Channel 1 - Frequency
FIL.F1	Channel 1 - Frequency, after digital filters proces.
CH.C2	Channel 2 - Counter
FIL.C2	Channel 2 - Counter, after digital filters processing
CH.F2	Channel 2 - Frequency
FIL.F2	Channel 2 - Frequency, after digital filters proces.
MAT.FN.	"Math. functions"
MIN.	"Min. value"
MAX.	"Max. value"

6.3.5b Selection of display brightness



BRIGHT Selection of display brightness

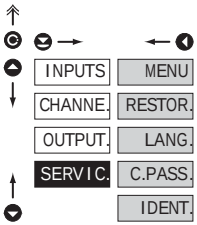
- by selecting display brightness we may appropriately react to light conditions in place of instrument location

0%	Display is off

- after keystroke display turns on for 10 s

25%	Display brightness - 25 %
50%	Display brightness - 50 %
75%	Display brightness - 75 %
100%	Display brightness - 100 %

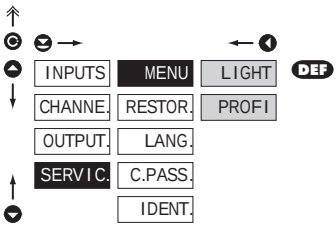
6.4 Setting "PROFI" - SERVICE



The instrument service functions are set in this menu

- **MENU** Selection of menu type LIGHT/PROFI
- **RESTOR.** Restore instrument manufacture setting and calibration
- **LANG.** Language version of instrument menu
- **C.PASS.** Setting new access password
- **IDENT.** Instrument identification

6.4.1 Selection of type of programming menu



MENU Selection of menu type - LIGHT/PROFI

- enables setting the menu complexity according to user needs and skills

LIGHT Active LIGHT menu

- simple programming menu, contains only items necessary for configuration and instrument setting
- linear menu > items one after another

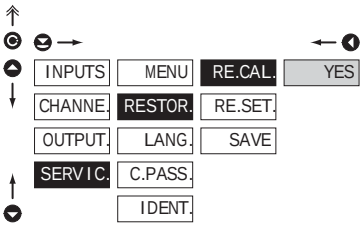
PROFI Active PROFI menu

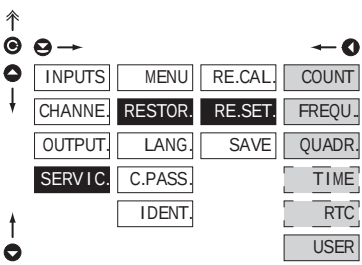
- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.2 Restoration of manufacture setting





Jobs performed	Restore	
	Calibration	Setting
cancels USER menu rights	✓	✓
deletes table of items order in USER - LIGHT menu	✓	✓
adds items from manufcture to LIGHT menu	✓	✓
deletes data stored in FLASH	✓	✓
cancels or linearization tables	✓	✓
clears tare	✓	✓
clears conduct resistances	✓	✓
restore manufacture calibration	✓	✗
restore manufacture setting	✗	✓

RESTOR. Restoration of manufacture setting

- in the event of error setting or calibration, manufacture setting may be restored.

RE.CAL. Restoration of manufacture calibration of the instrument

- prior executing the changes you will be asked to confirm you selection *„YES"*

RE.SET. Restoration of instrument manufacture setting

- reading of factory calibrations and default menu item setting (DEF)
- by selecting desired settings interconnected items change as well, (source for relay evaluation, analogue output, Mathematical functions, ...)

COUNT Manufacturer setting for counter

FREQU. Manufacturer setting for frequency

QUADR. Manufacturer setting for IRC encoders

TIME Manufacturer setting for clock/timer

RTC Manufacturer setting for RTC

USER Restoration of instrument user setting

- generating the instrument user setting, i.e. setting stored under SERVIC./RESTOR./ SAVE

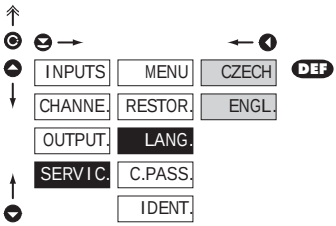
SAVE Save instrument user setting

- storing the user setting allows the operator to restore it in future if needed

!

After restoration the instrument switches off for couple seconds

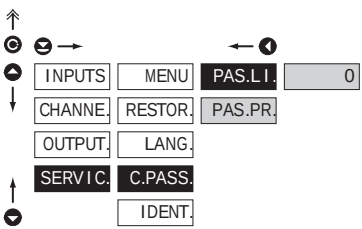
6.4.3 Selection of instrument menu language version



LANG. Selection of instrument menu language version

CZECH	Instrument menu is in Czech
ENGL.	Instrument menu is in English

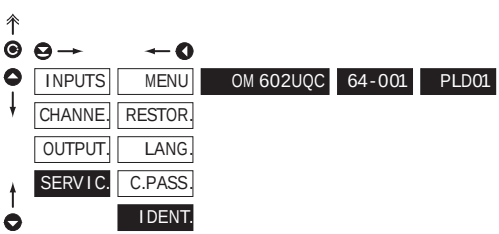
6.4.4 Setting new access password



C.PASS. Setting new password for access to LIGHT and PROFI menu

- this option allows to change the numeric code, which blocks the access into LIGHT and PROFI Menu.
- numerci code range: 0...9999
- universal passwords in the event of loss:
  LIGHT Menu > „8177"
  PROFI Menu > „7915" "

6.4.5 Instrument identification



IDENT. Projection of instrument SW version

- display shows type identification of the instrument, SW number, SW version and current input setting (Mode)
- if the SW version reads a letter on first position, it is a customer SW

IDEN.	pos	Desctription
	1.	type of instrument
	2.	SW: number - version
	3.	the input type

7.0 Setting items into "USER" menu

- **USER** menu is designed for users who need to change only several items of the setting without the option to change the primary instrument setting (e.g. repeated change of limit setting)
- there are no items from manufacture permitted in **USER** menu
- on items indicated by inverse triangle L 1
- setting may be performed in **LIGHT** or **PROFI** menu, with the **USER** menu then overtaking the given menu structure

- **For user operation**
- **Menu items are set by the user (Profi/Light) as per request**
- **Access is not password protected**

Setting

NO item will not be displayed in USER menu

YES item will be displayed in USER menu with editing option

SHOW item will be solely displayed in USER menu

Setting sequence of items in "USER" menu

In compiling USER menu from active LIGHT menu the items (max. 10) may be assigned a sequence, in which they will be projected in the menu

Example:

Into USER menu were selected these items

(keys +) > *CL. TAR.*, *LIM 1*, *LIM 2*, *LIM 3*, for which we have preset this sequence (keys +):

CL. TAR.	*5*
LIM 1	0 (sequence not determined)
LIM 2	2
LIM 3	1

Upon entering USER menu

(key) items will be projected in the following sequence: LIM 3 > LIM 2 > CL.TAR. > LIM 1

The instruments communicate via serial line RS232 or RS485. For communication they use the ASCII protocol. Communication runs in the following format:

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

The transfer rate is adjustable in the instrument menu. The instrument address is set in the instrument menu in the range of 0 ÷ 31. The manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232 / RS485 - is determined by an output board automatically identified by the instrument.
The commands are described in specifications you can find at **www2.merret.cz/podpora/Rs/Index.htm** or in the OM Link program.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

Event	Type	Protocol		Transmitted data												
Data solicitation (PC)	232	ASCII		#	A	A	<CR>									
		MessBus		No - data is transmitted permanently												
	485	ASCII		#	A	A	<CR>									
		MessBus		<SADR>	<ENQ>											
Data transmission (instrument)	232	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus		<SADR>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>
	485	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus		<SADR>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>
Confirmation of data acceptannce (PC) - OK	485	MessBus		<DLE>	1											
Confirmation of data acceptance (PC) - Bad				<NAK>												
Sending address (PC) prior command				<EADR>	<ENQ>											
Confirmation of address (instrument)				<SADR>	<ENQ>											
Command transmission (PC)	232	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
	485	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>
		MessBus		<SADR>	$	N	P	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
Command confirmation (instrument)	232	ASCII	OK	!	A	A	<CR>									
			Bad	?	A	A	<CR>									
		Messbus		No - data is transmitted permanently												
	485	ASCII	OK	!	A	A	<CR>									
			Bad	?	A	A	<CR>									
		MessBus	OK	<DLE>	1											
			Bad	<NAK>												
Command confirmation (inst.) - OK	485	MessBus		!	A	A	<CR>									
Command confirmati (instrument) - Bad				?	A	A	<CR>									
Instrument identification				#	A	A	1Y	<CR>								
HW identification				#	A	A	1Z	<CR>								
One-time transmission				#	A	A	7X	<CR>								
Repeated transmission				#	A	A	8X	<CR>								

LEGEND

#	35	23_H	Command beginning
A A	0...31		Two characters of instrument address (sent in ASCII - tens and units, e.g. "01", "99" universal
<CR>	13	$0D_H$	Carriage return
<SP>	32	20_H	Space
N, P			Number and command - command code
D			Data - usually characters "0"..."9", "-", "."; (D) - dp. and (-) may prolong data
R	30_H...$3F_H$		Relay and tare status
!	33	21_H	Positive confirmation of command (ok)
?	63	$3F_H$	Negative confirmation of command (point)
>	62	$3E_H$	Beginning of transmitted data
<STX>	2	02_H	Beginning of text
<ETX>	3	03_H	End of text
<SADR>	addresa +60_H		Prompt to send from address
<EADR>	addresa +40_H		Prompt to accept command at address
<ENQ>	5	05_H	Terminate address
<DLE>1	16 49	10_H 31_H	Confirm correct statement
<NAK>	21	15_H	Confirm error statement
<BCC>			Check sum -XOR

RELAY, TARE

Sign	Relay 1	Relay 2	Tare	Change relay 3/4
P	0	0	0	0
Q	1	0	0	0
R	0	1	0	0
S	1	1	0	0
T	0	0	1	0
U	1	0	1	0
V	0	1	1	0
W	1	1	1	0
p	0	0	0	1
q	1	0	0	1
r	0	1	0	1
s	1	1	0	1
t	0	0	1	1
u	1	0	1	1
v	0	1	1	1
w	1	1	1	1

Relay status is generated by command #AA6X<CR>. The instrument immediately returns the value in the format >HH <CR>, where HH is value in HEX format and range 00_H...FF_H. The lowest bit stands for „Relay 1", the highest for „Relay 8"

ERROR STATEMENTS

ERROR	CAUSE	ELIMINATION
E.d.Un.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E.d.0v.	Number is too large to be displayed	change DP setting, channel constant setting
E. t.Un.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. t.0v.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. I .Un.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E. I .0v.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E. HW.	A part of the instrument does not work properly	send the instrument for repair
E. EE.	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.SET.	Data in EEPROM outside the range	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E. CLR.	Memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
E.0UT.	Analogue output current loop disconnected	check wire connection

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 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		!	"	#	$	%	&	'
8	(	)	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7
24	8	9	VA	Vr	<	=	>	?
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	{	|	}	~	

TECHNICAL DATA

INPUT

Number:	2 inputs (only single „Line-input")
Type:	upon contact, TTL, NPN/PNP, „Line", SSI
Measurement:	counter/frequency UP or DOWN duty cycle counter/frequency UP/DOWN counter/frequency for IRC encoders timer/clock - measuring range selectable for both inputs
Input frequency:	0,001...1 MHz (< 100 kHz for duty cycle measurement)
Voltage levels:	10 mV - 1,5 V (amplified - only input A1, A2(B1)) 0,2 V - 60 V
Reaction time:	inputs react approx 3 s after instrument's switch-on

PROJECTION

Display:	999999, intensive red or green 14-ti segment LED, digit height 14 mm
Projection:	-99999...999999
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

TC:	50 ppm/°C
Accuracy:	±0,01 % of range + 1 digit (Frequency)
Time base:	0,05 s...15 minut
Multiplication const.:	-99999....999999
Division constant:	-99999....999999 - function RPM measurement in mode „Frequency"
Filtration constant:	helps to set max. valid frequency, which is processed (OFF/10 minutes...1 MHz)
Blocking measur.:	blocking/extending input pulse up to 120 s
Filter type:	digital
Offset:	-99999...999999
Data back up:	storing measured data after the instrument is switched off (EEPROM)
Linearisation:	by linear interpolation in 50 points - solely via OM Link
Digital filters:	Averaging, Floating average, Exponential filter, Rounding
Functions:	Tare - display resetting Hold - stop measuring (at contact) Lock - control key locking MM - min/max value Mathematic functions
RTC:	time back up by the means of a battery used when the power supply is off (possible to turn off - jumper inside instrument) minimal lifespan 1 year
Baterie:	Lithium battery CR 2032RV, 3V/220 mAh
OM Link:	company communication interface for setting, operation and update of instrument SW
Watch-dog:	reset after 400 ms
Calibration:	at 25°C and 40 % of r.h.

COMPARATOR

Type:	digital, adjustable in menu
Mode:	Hysteresis, From, Dose
Limita:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)* 2x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)* 2x SSR (250 VAC/ 1 A)* 2x/4x open collector (30 VDC/100 mA) 2x bistabil relays (250 VAC/250 VDC, 3 A/0,3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

DATA OUTPUTS

Protocols:	ASCII, DIN MessBus, MODBUS, PROBUS
Data format:	8 bit + no parity + 1 stop bit (ASCII) 7 bit + even parity + 1 stop bit (MessBus)
Rate:	600...230 400 Baud 9 600 Baud...12 Mbaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)
PROFIBUS	Data protocol SIEMENS

ANALOGUE OUTPUTS

Type:	isolated, programmable with 12 bits D/A convertor, analog output corresponds with displayed data, type and range are adjustable
Non-linearity:	0,2 % of range
TC:	100 ppm/°C
Rate:	response to change of value < 150 ms
Voltage:	0...2 V/5 V/10 V
Curernt:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ohm/12 V or 1 000 Ohm/24 V - broken loop detection

MEASURED DATA RECORD

Type RTC:	time-controlled logging of measured data into instrument memory, allows to log up to 266 000 values
Transmission:	via data output RS 232/485 or via OM Link

EXCITATION

Adjustable:	5...24 VDC/max. 1,2 W, isolated

** values apply for resistance load*

POWER SUPPLY

Options: 10...30 V AC/DC, 10 VA, isolated,
- fuse inside (T 4000 mA)
80...250 V AC/DC, 10 VA, isolated
- fuse inside (T 630 mA)

MECHANICAL PROPERTIES

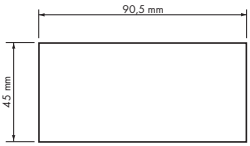
Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	96 x 48 x 120 mm
Panel cut-out:	90,5 x 45 mm

OPERATING CONDITIONS

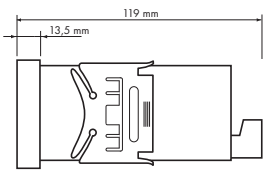
Connection:	connector terminal board,
	conductor cross-section <1,5 mm^2 /<2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Dielectric strength:	4 kVAC after 1 min between supply and input
	4 kVAC after 1 min between supply and data/analog output
	4 kVAC after 1 min between supply and relay output
	2,5 kVAC after 1 min between supply and data/analog output
Overvoltage cat.:	EN 61010-1, A2
Insulation resistance:	for pollution degree II, measurement category III
	instrum.power supply > 670 V (PI), 300 V (DI)
	Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61326-1

Front view

Panel cut



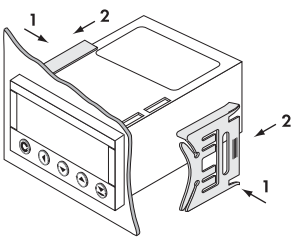
Side view

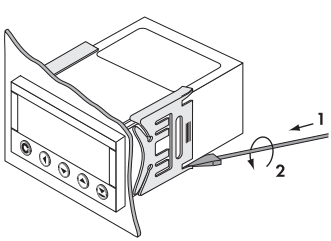


Panel thickness: 0,5...20 mm

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

Product	**OM 602UQC**
Type	. . . . .
Manufacturing No.	. . . . .
Date of sale	. . . . .

GUARANTEE

A guarantee period of 60 months from the date of sale to the user applies to this instrument.
Defects occuring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

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

The guarantee shall not apply to defects caused by:

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

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

YEARS

Stamp, signature

NOTE

ES DECLARATION OF CONFORMITY

Company: **ORBIT MERRET, spol. s r.o.**
Klánova 81/141, 142 00 Prague 4, Czech Republic, IDNo.: 00551309

Manufactured: **ORBIT MERRET, spol. s r.o.**
Vodňanská 675/30, 198 00 Prague 9, Czech Republic

declares at its explicit 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 types referred-to hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant Czech statutory orders.

Product: 5-digit programmable panel instrument

Type **OM 602**

Version: AV, RS, UQC

Thas been designed and manufactured in line with requirements of:

Statutory order no. 17/2003 Coll., on low-voltage electrical equipment (directive no. 73/23/EHS)
Statutory order no. 616/2006 Coll., on electromagnetic compatibility (directive no. 2004/108/EHS)

The product qualities are in conformity with harmonized standard:

El. safety: EN 61010-1

EMC: EN 61326-1
Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"
EN 50131-1, chap. 14 and chap. 15, EN 50130-4, chap. 7, EN 50130-4, chap. 8 (EN 61000-4-11, ed. 2), EN 50130-4, chap. 9 (EN 61000-4-2), EN 50130-4, chap. 10 (EN 61000-4-3, ed. 2), EN 50130-4, chap. 11 (EN 61000-4-6), EN 50130-4, chap. 12 (EN 61000-4-4, ed. 2), EN 50130-4, chap. 13 (EN 61000-4-5), EN 61000-4-8, EN 61000-4-9, EN 61000-6-1, EN 61000-6-2, EN 55022, chap. 5 and chap. 6

The product is furnished with CE label issued in 2007.

As documentation serve the protocoles of authorized and accredited organizations:

EMC MO CR, Testing institute of technical devices, protocol no. 80/6-332/2006 of 15/01/2007
MO CR, Testing institute of technical devices, protocol no. EMI.80/6-333/2006 of 15/01/2007

Place and date of issue: Prague, 1. March 2010

Miroslav Hackl
Company representative

Assessment of conformity pursuant to §22 of Act no. 22/1997 Coll. and changes as amended by Act no.71/2000 Coll. and 205/2002 Coll