

# OMD 202UQC

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**6 DIGIT PROGRAMMABLE  
LARGE DISPLAY**

COUNTER

FREQUENCY METER

DUTY CYCLE MEASUREMENT

STOPWATCH/TIMER/CLOCK





## 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 OMD 202 series conform to the European regulation No. 73/23/EHS and No. 2004/109/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. INSTRUMENT DESCRIPTION



### 2.1 DESCRIPTION

The OMD 202UQC model series are 4/6 digit large panel programmable counter/frequency meter/IRC signal monitor/stopwatch/clock instrument. It comes either with a 3-colour LED display (red/green/orange) or with High Brightness LEDs (red or green with brightness of 1300 mcd).

It is based on a single microprocessor and a powerful gate array which ensure high accuracy, stability and easy controlling.

#### MEASURING MODES

<b>SINGLE</b>	Counter/Frequency meter	<b>C</b> / <b>F</b>
<b>A*B</b>	Counter/Frequency meter with function AND between inputs A and B	<b>C</b> / <b>F</b>
<b>XNDR</b>	Counter/Frequency meter with function NDR between inputs A and B	<b>C</b> / <b>F</b>
<b>DUTY</b>	Duty cycle measurement	<b>C</b> / <b>F</b>
<b>QVADR</b>	Counter/Frequency meter for IRC encoders	<b>C</b> / <b>F</b>
<b>UP/DW</b>	UP/DW Counter/Frequency meter - measures on inputs A, B (B defines direction) and can display count/frequency	<b>C</b> / <b>F</b>
<b>UP + DW</b>	UP + DW Counter/Frequency meter C / F - measures on inputs A (UP), B (DW) and can display count/frequency	<b>C</b> / <b>F</b>
<b>TIME</b>	Stopwatch	<b>H</b>
<b>RTC</b>	Clock	<b>H</b>

#### PROGRAMMABLE DISPLAY PROJECTION

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
Measuring channels	it is possible to process two independent functions (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

#### LINEARIZATION

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

#### 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

#### FUNCTIONS

Setting the value	Entering the current count when installing the counter during a counting 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
OM Link	company communication interface for setting, operation and update of instrument SW

**EXTERNAL CONTROL**

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

**2.2** OPERATION

The instrument is set and controlled by IR Remote control. 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](http://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).

### 3. 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.

#### Functions of inputs according to selected mode

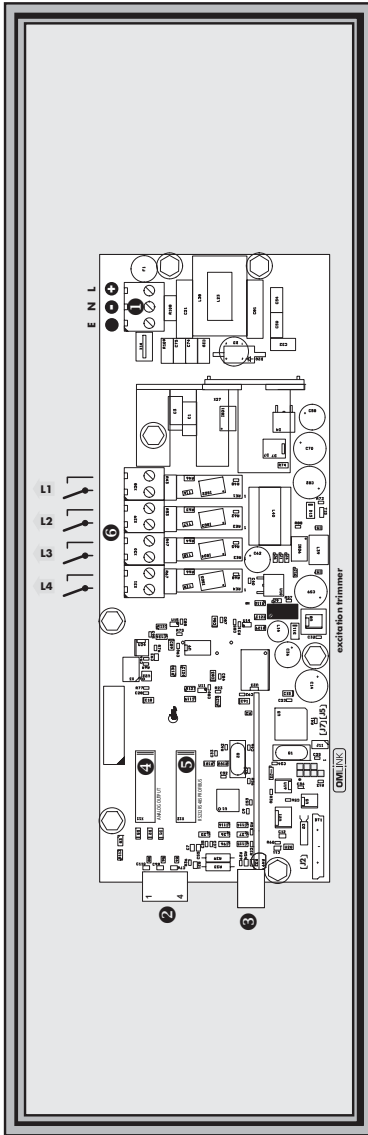
MODE	DESCRIPTION	FUNCTIONS OF INPUTS
<b>SINGLE</b>	Pulse counter/Frequency counter	Input A, Resetting (Input C)
<b>A * B</b>	Pulse counter/Frequency counter with function AND	Input A x B, Resetting (Input C)
<b>XNOR</b>	Pulse counter/Frequency counter with function xNOR	Input A + B, Resetting (Input C)
<b>DUTY</b>	Duty	Input A
<b>QUADR.</b>	Pulse counter/ Frequency counter for IRC sensors	Input A + Input B, Resetting (Input C)
<b>UP/DW</b>	UP or DW Pulse counter/Frequency counter	Input A, Input B - determines direction (Hi = UP, Lo = DW) Resetting (Input C)
<b>UP+DW</b>	UP/DW Pulse counter/Frequency counter	Input A (UP), Input B (DW), Resetting (Input C)
<b>TIME</b>	Stopwatch Clock (time base 29 MHz)	Input A, Input B (Resetting - M.STOP), Resetting (Input C), M. NUL.
<b>RTC</b>	Stopwatch Clock with time back up (time base 1 s)	Input A, Input B (Resetting - M.STOP), Resetting (Input C), M. NUL.

#### CONNECTION

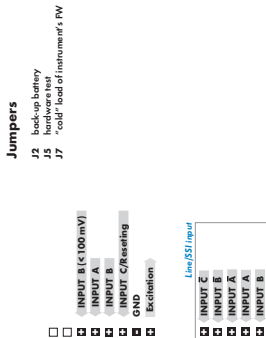
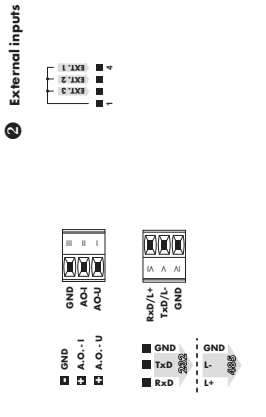
	DESCRIPTION	CONNECTION
<b>INPUT A</b>	input signal < 60 V	GND + Input A
<b>INPUT B</b>	input signal < 60 V	GND + Input B
<b>INPUT C</b>	input signal < 60 V	GND + Input C/Resetting

#### EXTERNAL INPUTS

	DESCRIPTION	CONTROL
<b>EXT. 1/2/3</b>	According to setting in Menu (see Menu > EXT. IN., page 48)	uppon contact, bracket [No. 14 + 15/16/17]



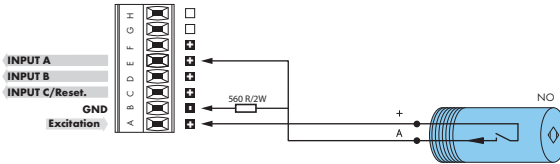
- 1 Power supply**
- 4 Analog output**
- 5 Data output**
- 6 Comparators**



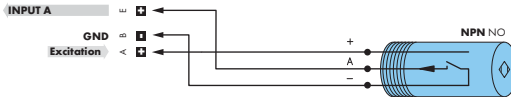
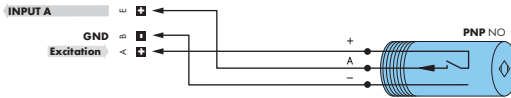
### 3. INSTRUMENT CONNECTION

#### Sensor connection

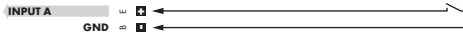
#### 2-wire sensors



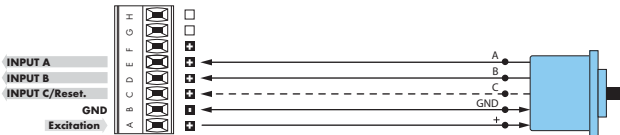
#### 3-wire sensors



#### contact



#### IRC sensors



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.

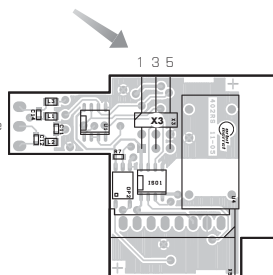


## Termination of RS 485 communication line

**X3 - Termination of communication line RS 485**

Full	Significance	Default	Recommendation
1-2	connect L+ to (+) source	terminalconnected	connect at the end of line do not disconnect
3-4	termination of line 120 Ohm	disconnected	
5-6	connect L- to (-) source	terminalconnected	

RS 485 line should have a linear structure - wires (ideally shielded and twisted) should lead from one device to another.



## 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]**

TYPE	LEVEL [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 A
- in case you enter voltage lower input A than 0.8304 the input is processed by pre-amplifier (which limits the frequency range), input B automatically (if necessary) switches over to amplified input B (< 100 mV) and therefore it is essential, if A2 is used as input B to the counter, to select identical parameters AB



## 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 IR Remote control. All programmable settings of the instrument are performed in three adjusting modes:

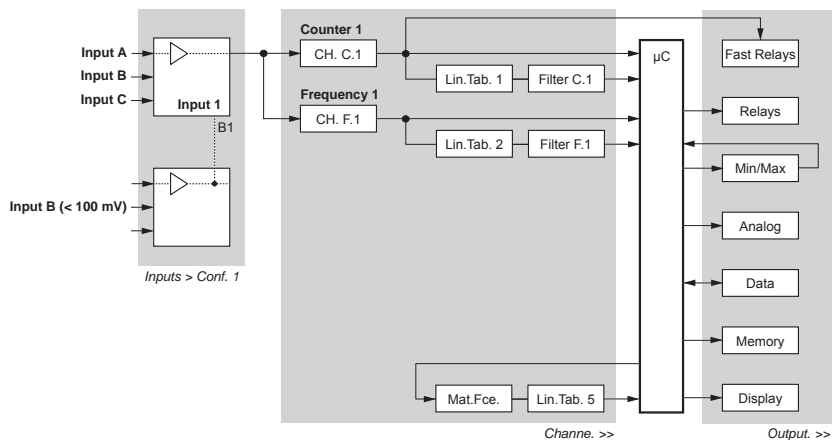
- LIGHT**      **Simple programming menu**  
 - contains solely items necessary for instrument setting and is protected by optional number code
- PROFI**      **Complete programming menu**  
 - contains complete instrument menu and is protected by optional number code
- USER**      **User programming menu**  
 - may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)  
 - acces without password

Complete instrument operation and setting may be performed via OMLink communication interface, which is a standard equipment of all instruments.

The operation program is freely accessible ([www.orbit.merret.cz](http://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.

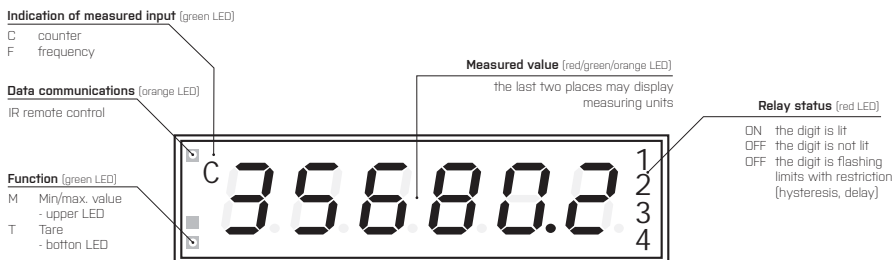
Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

Scheme of processing the measured signal



## 6. INSTRUMENT SETTING

Setting and controlling the instrument is performed by means of the Remote control. With the aid of the Remote control it is possible to browse through the operation menu and to select and set the required values.



### Symbols used in the instructions

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

**DEF** values preset from manufacture

symbol indicates a flashing light (symbol)

**MI N** inverted triangle indicates the item that can be placed in USER menu

**CONNECT** 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 subtraction must be made from the current number [e.g.: 013 > on class 100 > -87]

## Control keys functions

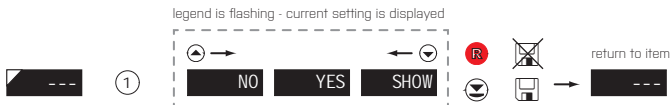
KEY	MEASUREMENT	MENU	SETTING NUMBERS/SELECTION
	access into USER menu	exit menu w/o saving	transition to next item w/o saving
	programmable key function	return to previous level	move to higher decade*
	programmable key function	move to previous item	move down*
	programmable key function	move to next item	move up*
	programmable key function	confirm selection	setting/selection confirmation
	access into LIGHT/PROFI menu		
	direct access into PROFI menu		
		configuration of an item for "USER" menu	
		determine the sequence of items in "USER - LIGHT" menu	
	cancellation of address instrument/remote controller		




\* alternatively, the setting may be done from the numeric keys of the remote control by selecting directly the number required

## Setting items into „USER“ menu

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

## USER



	item will not be displayed in USER menu
	item will be displayed in USER menu with the option of setting
	item will be solely displayed in USER menu



# 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

### Preset from manufacture

Password	"0"
Menu	LIGHT
USER menu	vypruté
Setting the items	<b>DEF</b>

### !

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

Access password

1428 PASSW 0

Current value: SET.C1 0

Setting stopwatch - Channel 1: MSTART CONTAC MSTOP STOP  
ONLY FOR MODE „STOPWATCH“

Resetting stopwatch - Channel 1

Type of input A, B: TYPE.1 NPN.CON

Voltage level - input A, B: LEV.1 24

Type of input C: TYP.C1 NPN.CON

Voltage level - input C: LEV.C1 24

Setting of projection - Channel, counter: SCALE 1 DIV.D 1 OFFSET 0 SHOW 000000

Primary color: COL0.C GREEN LIM1.C 16667

Color beyond first limit: COL1.C ORANGE LIM2.C 33333

Color beyond second limit: COL2.C RED

Setting of projection - Channel, frequency: SCALE 1 DIV.D 1 OFFSET 0 SHOW 00000.0

Primary color: COL0.F GREEN LIM1.F 16667

Color beyond first limit: COL1.F ORANGE LIM2.F 33333

Color beyond second limit: COL2.F RED

LIM.L1 500 LIM.L2 1000 LIM.L3 1500 LIM.L4 2000  
Option - Comparator

TYP.A0 4-20mA MIN.A0 0 MAX.A0 1000  
Option - Analog output

Remote controller address: ADR.I.R 0

Menu type: MENU LIGHT RE.SET

Return to manufacture setting: USER

Language selection: LANG ENGL

New password: PAS.U 0

Identification: IDENT YES

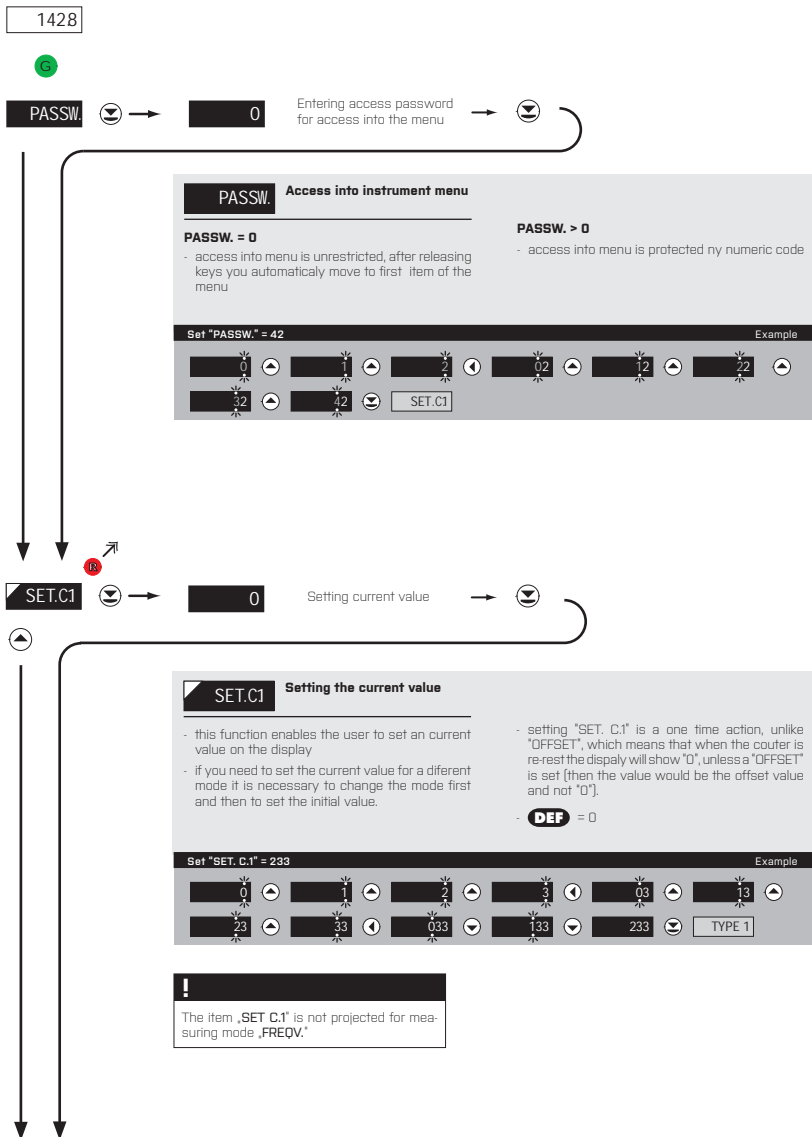
Type of instrument: OMD 202UQC

SW version: 76-001

Input: PLD01 1428

Return to the measuring mode

## 5. SETTING LIGHT







**M.START Selection of stopwatch/timer control**

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

**CONTI.N.** Stopwatch/timer is running constantly if the instrument is turned on

**CONTACT.** 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

**CLR.RUN.** Stopwatch/timer is reset and set off by the edge of the priming signal

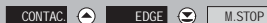
**CLR.RURE.** Stopwatch/timer is reset and set off by the edge of the priming signal, the cycle is repeated with every other edge

**RUN** Stopwatch/timer is only set off by the edge

**DEF** = CONTACT.

**Selection of stopwatch contro > EDGE**

Example



**M.STOP Selection of stopwatch resetting**

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

**DEF** = OFF

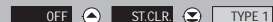
**OFF** Stopwatch/timer is reset through input „Clear“

**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



## 5. SETTING LIGHT

**TYPE 1** → **NPNCON** / **PNP** → **TYPE 1** (Selecting input type) → **LEV.1** → **10** (Setting input level)

### TYPE 1 Selecting input type

- setting applies for Inputs A and B

**DEF** = NPN.CON.

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

In this Example application a Wenglor sensor is used, model IB040BM37VB, type PNP Type 1 > PNP Example

NPNCON   PNP   LEV.1

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

### LEV.1 Setting input level - 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

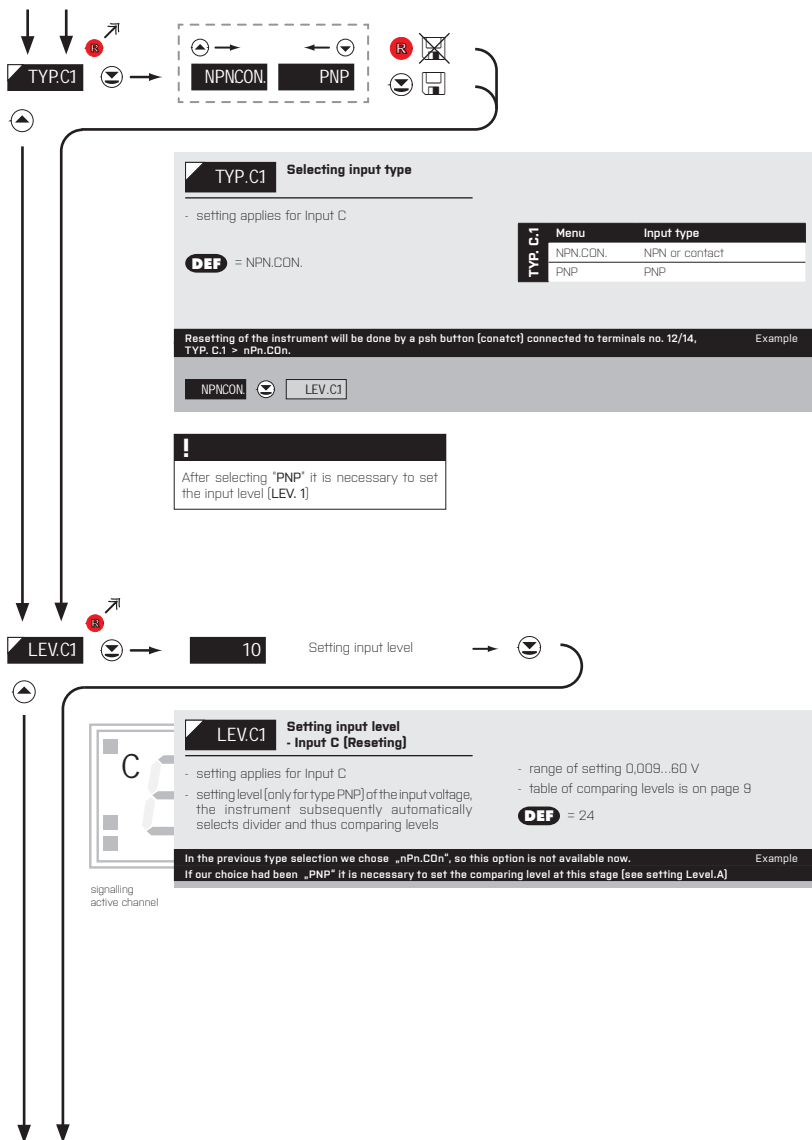
- table of comparing levels is on page 9

**DEF** = 24

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). LEV. 1 > 24 Example

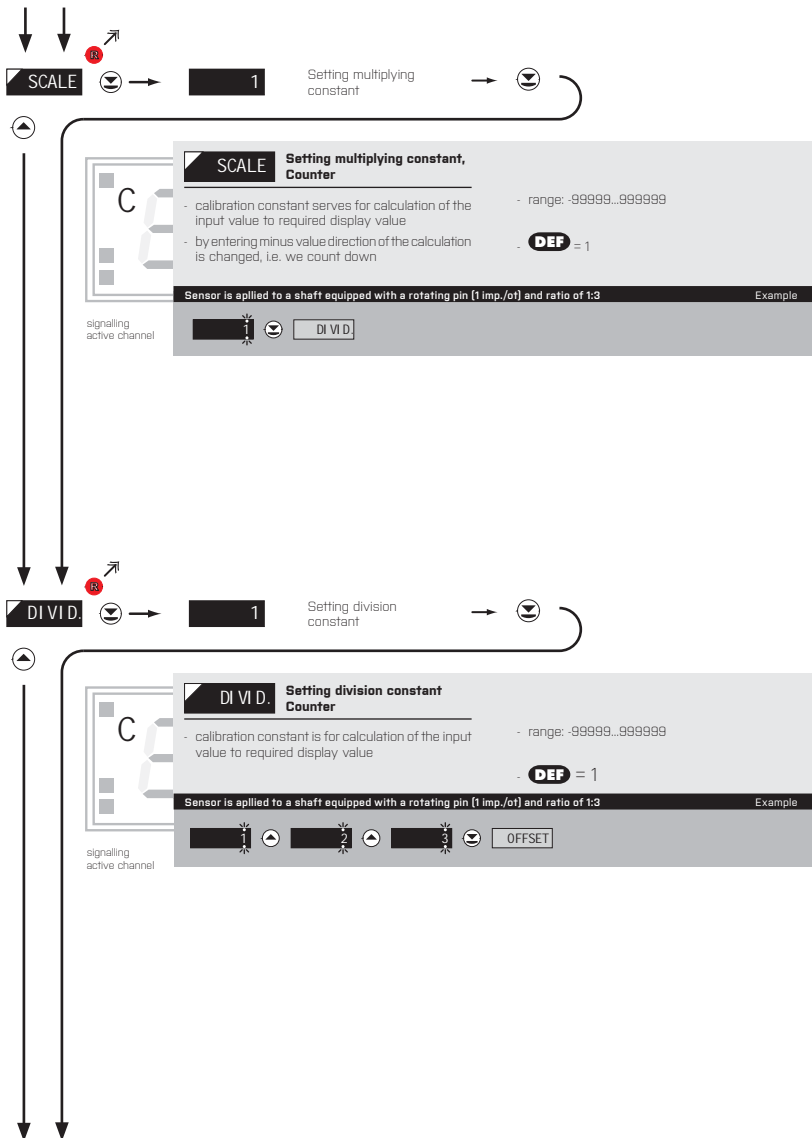
10   11   12   13   14   14

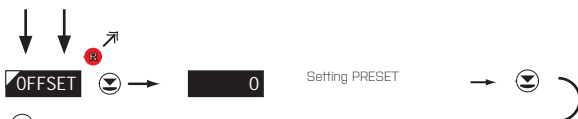
24   TYP.C1



## 5. SETTING LIGHT

MEASURING MODE > "COUNTER"





**OFFSET** Setting PRESET constant Counter

- offset of the measuring by a set value, which shall be loaded always upon instrument resetting
- range: -99999...999999 (+ time formats)
- **DEF** = 0

Setting „OFFSET“ = 24 Example

signaling active channel



**SHOW** Setting projection format, Counter

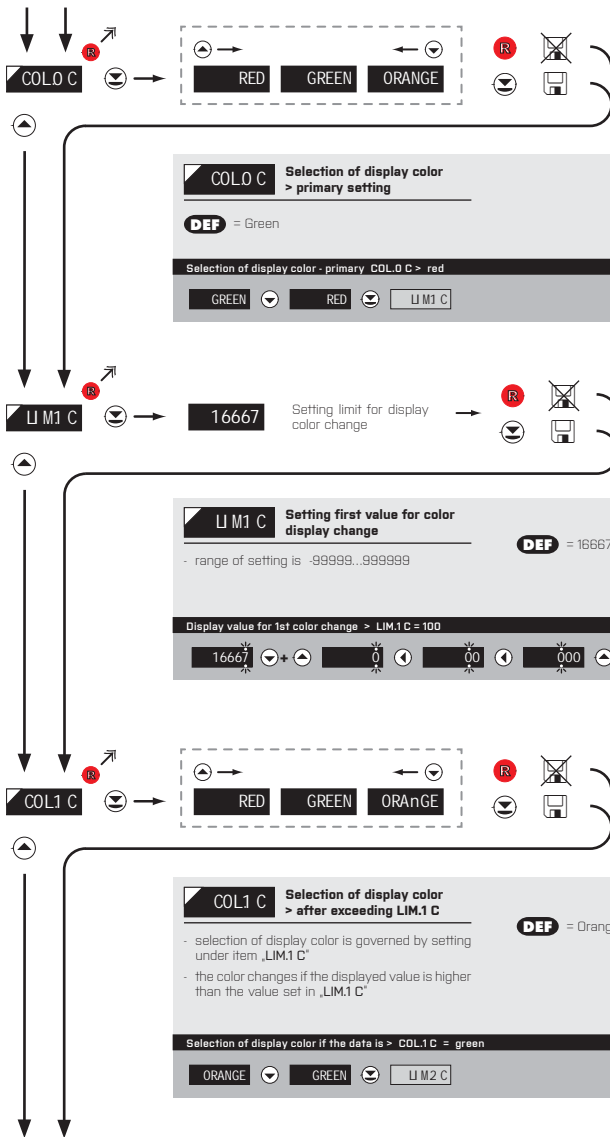
- the displayed value can either have a fixed decimal point, or floating, which allows the most optimal value projection in relation to the instrument's accuracy. The floating decimal point is marked as „FLDA. P.“
- special time formats are pre-set for measuring modes „TIME“ and „RTC“.
- **DEF** = 000000
- **DEF** = HH:MM:SS **H**

Projection of decimal point on the display = 000000 Example

000000 **COLD C**

## 6. SETTING PROFI

MEASURING MODE > "COUNTER"



↓ ↓ ↗

**LIM.2 C** → **33333** Setting limit for display color change → **IR**

**LIM.2 C** **Setting second value for display color change** **DEF** = 33333

- range of setting is -99999..999999

Display value for 2st color change > LIM.2 C = 400 Example

33333 0 00 000

200 300 400 **COL.2 C**

↓ ↓ ↗

**COL.2 C** → **RED** **GREEN** **ORANge** **IR**

**COL.2 C** **Selection of display color > after exceeding LIM.2 C** **DEF** = Red

- selection of display color is governed by setting under item „LIM.2 C“

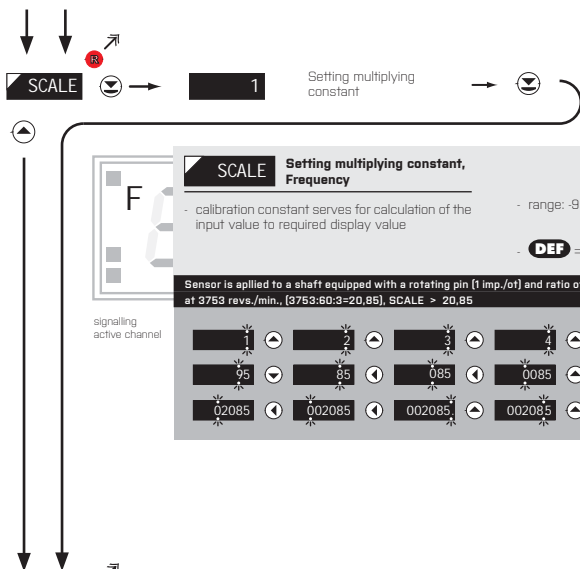
- the color changes if the displayed value is higher than the value set in „LIM.2 C“

Selection of display color if the data is > LIM.2 C > orange Example

**RED** **ORANGE** **SCALE**

## 5. SETTING LIGHT

MEASURING MODE > "FREQUENCY"



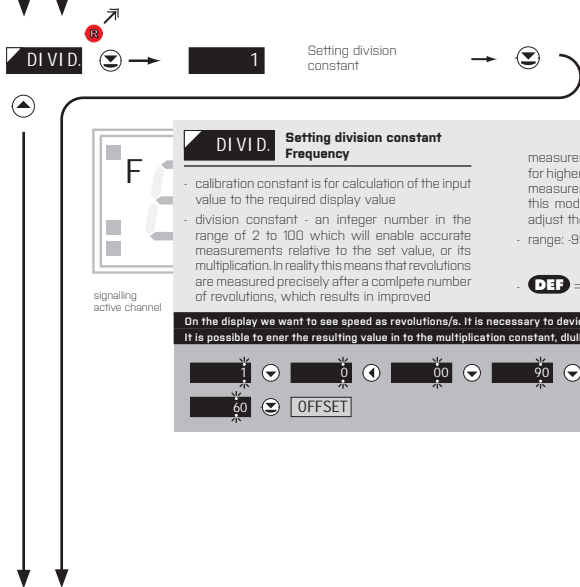
**SCALE** Setting multiplying constant, Frequency

- calibration constant serves for calculation of the input value to required display value
- range: 99999...999999
- **DEF** = 1

Sensor is applied to a shaft equipped with a rotating pin (1 imp./ot) and ratio of 1:3 which is rotating at 3763 revs./min., (3763:60=3=20,85), SCALE > 20,85 Example

signalling active channel

1	2	3	4	5	05
95	85	085	0085	1085	2085
02085	002085	002085	002085	002085	DI V I D.



**DI V I D.** Setting division constant Frequency

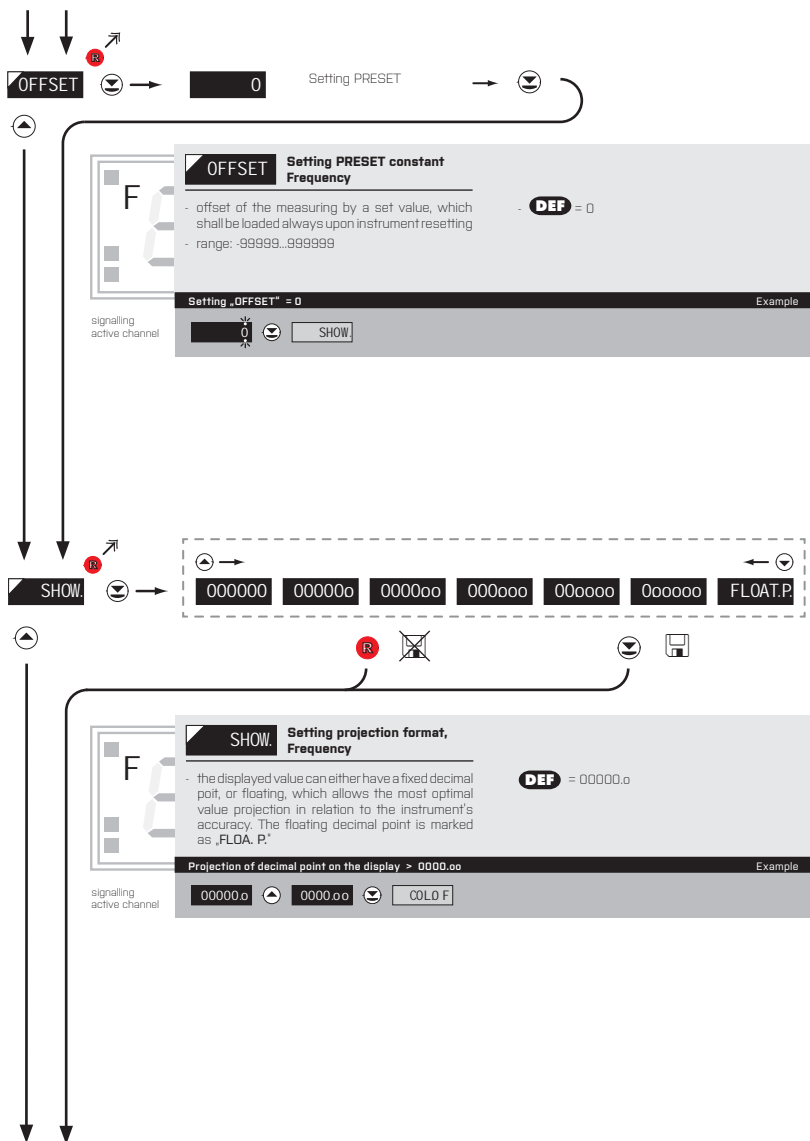
- calibration constant is for calculation of the input value to the required display value
- division constant - an integer number in the range of 2 to 100 which will enable accurate measurements relative to the set value, or its multiplication. In reality this means that revolutions are measured precisely after a complete 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 appropriately.
- range: 99999...999999
- **DEF** = 1

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

signalling active channel

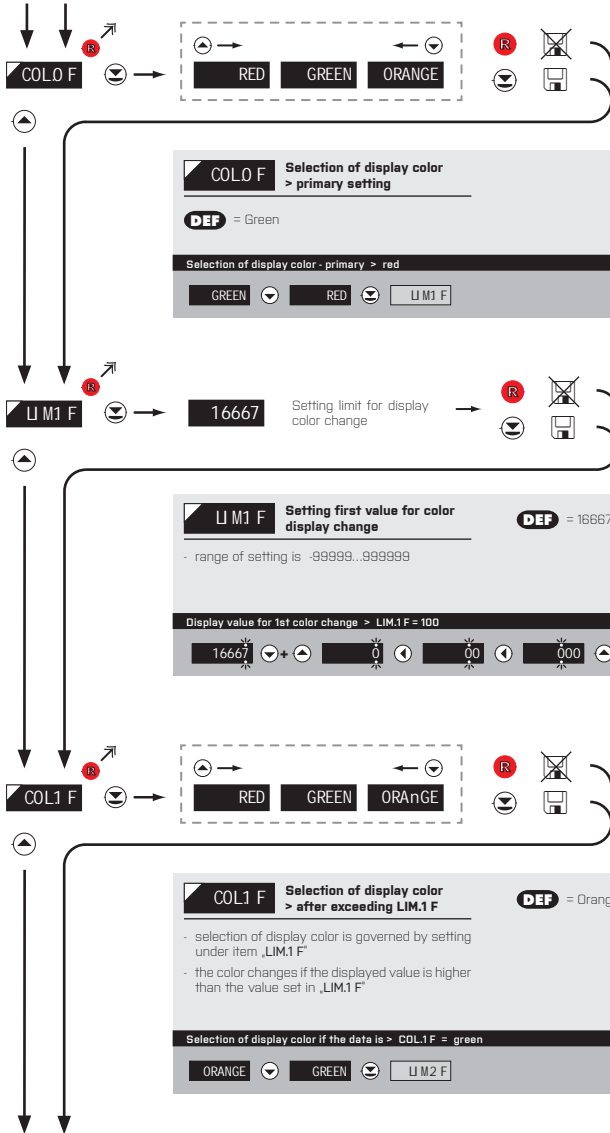
1	0	00	90	80	70
60	OFFSET				





## 6. SETTING PROFI

MEASURING MODE > "FREQUENCY"



**LIM.2 F** → **33333** Setting limit for display color change → **IR**

**LIM.2 F** **Setting second value for display color change** **DEF** = 33333  
 - range of setting is -99999..999999

Display value for 1st color change > LIM.2 F = 400 Example

33333 0 00 000  
 200 300 400 COL.2 F

**COL.2 F** → **RED** **GREEN** **ORANge** **IR**

**COL.2 F** **Selection of display color > after exceeding LIM.2 F** **DEF** = Red

- selection of display color is governed by setting under item „LIM.2 F“
- the color changes if the displayed value is higher than the value set in „LIM.2 F“

Selection of display color if the data is > LIM.2 F > orange Example

**RED** **ORANGE** **ADR.1 R** \* subsequent item on the menu depends on instrument equipment

## 5. SETTING LIGHT

DISPLAYED ONLY WITH OPTIONS > COMPARATORS

LIM.L1

→

500

Setting boundary for limit 1

→

R

↕

↕

↕

↕

LIM.L1

Setting boundary for limit 1

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

**DEF** = 500

**DEF** „Hysteresis“=0, „Delay“=0

Setting limit 1 > LIM.L1 = 512 Example

500

501

502

502

512

MENU

LIM.L2

→

1000

Setting boundary for limit 2

→

R

↕

↕

↕

↕

LIM.L2

Setting boundary for limit 2

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

**DEF** = 1000

**DEF** „Hysteresis“=0, „Delay“=0

Setting limit 2 > LIM.L2 = 169.1 Example

1000

1001

1001

1091

1091

1191

1291

1391

1491

1591

1591

01591

001591

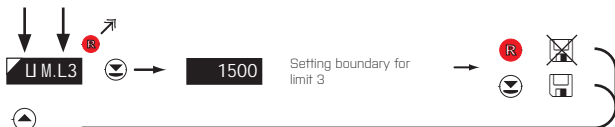
001591

001591

MENU

**!** As a default setting, limits are active for the counter 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 "PROF Menu" in item "INP. L1"

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



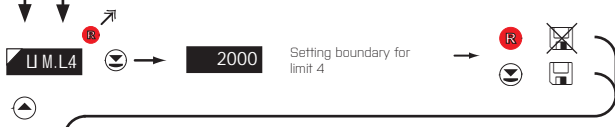
**U.M.L.3 Setting boundary for limit 3**

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

**DEF** = 1500  
**DEF** ,Hysteresis'=0, ,Delay'=0

Setting limit 3 > LIM. L.3 = 1525 Example

1500	1501	1502	1503	1504	1505
1505	1515	1525	MENU	* subsequent item on the menu depends on instrument equipment	



**U.M.L.4 Setting boundary for limit 4**

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in 'PROF' menu

**DEF** = 2000  
**DEF** ,Hysteresis'=0, ,Delay'=0

Setting limit 4 > LIM. L.4 = 2123 Example

2000	2001	2002	2003	2004	2005
2023	2023	2123	MENU	* subsequent item on the menu depends on instrument equipment	

## 5. SETTING LIGHT

DISPLAYED ONLY WITH OPTIONS > ANALOG OUTPUT

← →
0-20mA Er4-T 4-20T Er4-20 ... 0-10 V +10 V →

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

Menu	Range	Description
0-20mA	0...20 mA	
Er4-T	4...20 mA	with error message indication and broken loop indication (<3,6 mA)
4-20T	4...20 mA	with broken loop indication (<3,6 mA)
Er4-20	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. A.O. = U 10 Example

4-20mA 0-5mA 0-2V 0-5V 0-10 V MIN A.O.

**MIN A.O.** Assigning the display value to the beginning of the AD range

- range of the setting: -99999...999999 **DEF** = 0

Display value for the beginning of the AD range > MIN A.O. = 0 Example

0 MAX A.O.

**!**

As a default setting, analog output are active for the counter 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. A.O"

**!**

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



**MAX A.O.** Assigning the display value to the end of the AD range

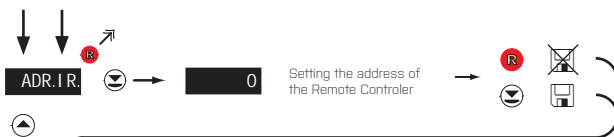
- range of the setting: -99999...999999 **DEF** = 1000

Display value for the end of the AD range > MAX A.O. = 1020 Example

1000 1000 1010 1020 MENU

DISPLAYED ONLY WITH OPTIONS &gt; ANALOG OUTPUT

## 5. SETTING LIGHT



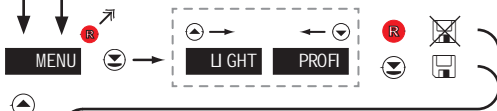
**ADR.I.R.** **Setting the address of the Remote Controller**

- setting the address of the IR Remote Controller is needed only when more than one QMD 202 are within the controller's reach
- range of setting: 0...99
- possible cancellation of address is done by pressing the RC's blue button

**DEF** = 0

Setting address - 21 > Adr. Ir. = 21 Example

0 1 01 11 21 MENU



**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 PROF, a complete menu for complete instrument setting  
> tree menu structure

**DEF** = LIGHT

Menu LIGHT > MENU = LIGHT Example

LI GHT RE.SET





### RE.SET. Return to manufacturer's setting

- restores factory calibration and default menu items (DEF)
- by this restoration related menu items change as well, (input for limit evaluation, 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

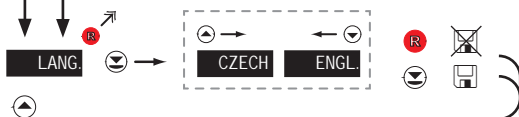
USER Return to the customised user menu

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

Return to manufacturer's setting, pre-setting mode > FREQV.

Example

COUNT. ◀ FREQV. ▶ LANG



### LANG. Selection of language in instrument menu

- selection of language version of the instrument menu

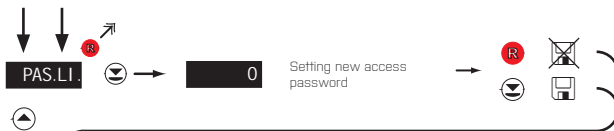
**DEF** = ENGL.

Language selection - ENGLISH > LANG. = ENGL.

Example

ENGL. ▶ PAS.U

## 5. SETTING LIGHT



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

- access password for menu **LIGHT**
- range of the number code 0...9999
- upon setting the password to "0000" the access to menu **LIGHT** is free without prompt to enter it

- in case the password is lost, please contact the administrator of this device

**DEF** = 0

---

Nové heslo - 341 > HES, LI. = 341 Example

0	1	01	11	21	31
41	41	41	41	41	41

**I DENT**



**I DENT. 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

1428

Return to measuring mode





# SETTING **PROFI**

For expert users

Complete instrument menu

Access is password protected

Possibility to arrange items of the **USER MENU**

Tree menu structure

### 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**

#### Switching over to "PROFI" menu

>3 s



- 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)

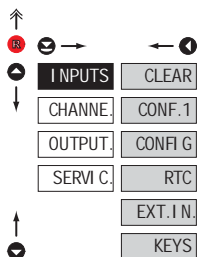


- access to menu selected under item **SERVIC.** > **MENU** > **PROFI**
- password protected access (unless set as follows under the item **SERVIC.** > **N.** **PASS.** > **LIGHT** =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used



## 6. SETTING PROFI

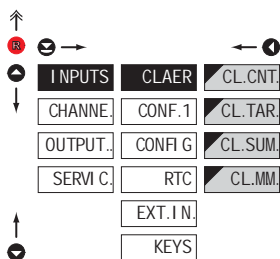
### 6.1 SETTING "PROFI" - INPUTS



The primary instrument parameters are set in this menu

CLEAR	Resetting internal values
CONF. 1	Selection of measuring range and parameters Channel 1
CONFI G	Setting switching of channels
RTC	Setting date and time for option with RTC
EXT. I.N.	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

**CL.CNT.** Counter resetting

- when zeroed, the figure on the display will be added to the total sum („grand total“), a value which is stored in the instrument's internal memory

**CL.TAR.** Tare resetting

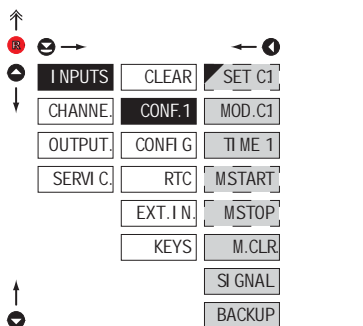
**CL.SUM.** Zeroing of the sum

- summation is used for cumulated values (i.e. factory shifts) when values from individual shifts are added to the total sum

**CL.MM.** Zeroing of min/max value

- zeroes the memory used to store minimal and maximal values

## 6.1.2 INSTRUMENT CONFIGURATION - CHANNEL 1

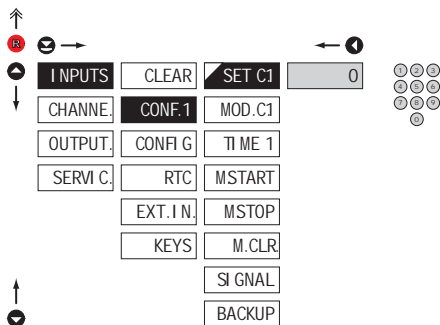


## CONF. 1 Primary instrument setting

- SET C1 Setting the initial value
- MOD. C1 Setting the instrument measuring mode
- TI ME 1 Setting the time base
- MSTART Setting the stopwatch control
- M. STOP Setting stopwatch resetting
- M. CLR Setting the zeroing of the instrument
- SI GNAL Setting input parameters
- BACKUP Setting data backup/time

## 6.1.2a SETTING THE INITIAL DISPLAYED VALUE

C H



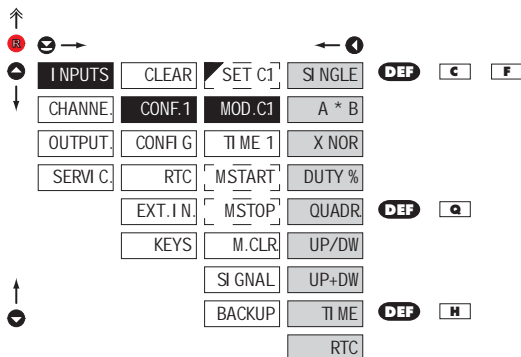
## SET C1 Setting initial displayed value

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

## 6. SETTING PROFI

6.1.2b

SELECTION OF MEASURING MODE



MOD.C1

Selection of instrument measuring mode

SI NGL E

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 „xNOR“

- instrument works with the following condition:

A	0	0	1	1
B	0	1	0	1
OUT	1	0	0	1

DUTY %

Duty cycle

- the maximum frequency duty cycle measurement is 100 K-Hz

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 signal 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

TI ME

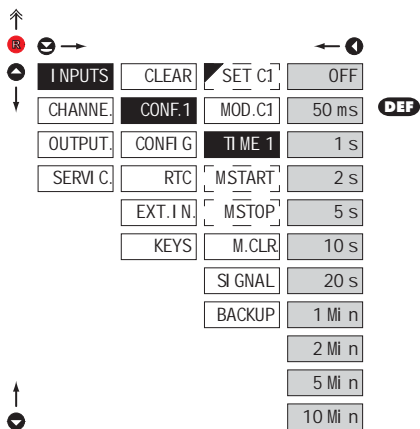
Mode „Stopwatch/timer“

RTC

Mode „Stopwatch/timer“ with RTC backup



## 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 approximately 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 min.
- in the „RTC“ regime with data projection the set time defines the cycle of switching between time (min. is 5 s), date (cca 2,5 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, otherwise the frequency is declared as ZERO!



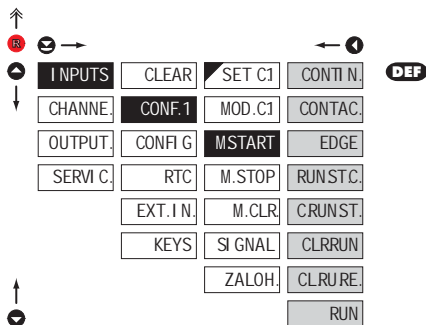
For mode "TIME" the time base is 29 MHz, for mode "RTC" it is 1 s

## 6. SETTING PROFI

6.1.2d

SELECTION OF STOPWATCH/TIMER CONTROL

H



### MSTART Selection of stopwatch/timer control

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

**CONTI N.** 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

**RUNSTC.** 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

**CRUNST.** 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

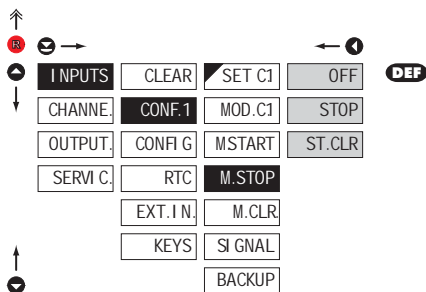
**CLRRUN** Stopwatch/timer is reset and set off by the edge of the priming signal (when the time is not running)

**CLRURE.** Stopwatch/timer is reset and set off by the edge of the priming signal, the cycle is repeated with every other edge (when the time is running)

**RUN** Stopwatch/timer is only set off by the edge

## 6.1.2e SELECTION OF STOPWATCH/TIMER RESETTING

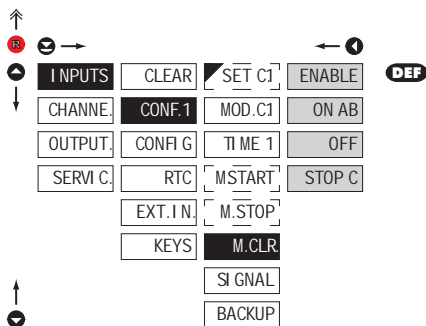
H

**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“**

OFF	Zeroing by external input is switched off
STOP	Stopwatch/timer is stopped through input „Clear“
ST. CLR	Stopwatch/timer is stopped and reset through input „Clear“

## 6.1.2f SELECTION OF ZEROING

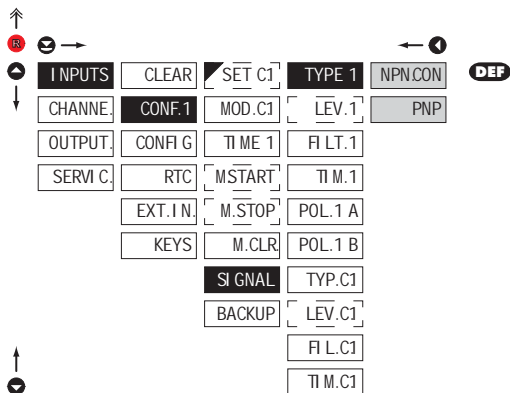
**M.CLR** Selection of zeroing

- **setting of external zeroing input „C“**

ENABLE	„Zeroing“ is permitted
ON AB	„Zeroing“ is permitted
OFF	„Zeroing“ is switched off
STOP C	Stop watch/clock is stopped by input „Zeroing“

## 6. SETTING PROFI

### 6.1.2g SELECTION OF STOPWATCH/TIMER RESETTING FOR INPUT A & B



#### TYPE 1 Selection of type of input

- setting applies to Inputs A and B

NPN.CON

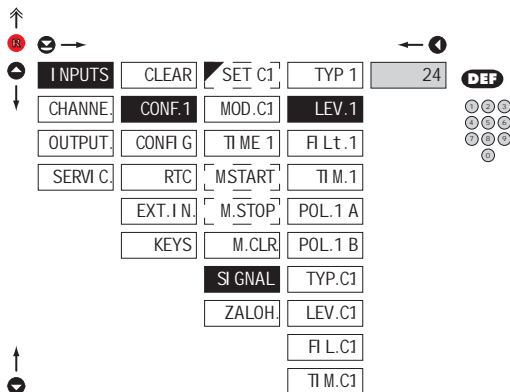
Type of input NPN and upon contact

PNP

Type of input PNP

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

### 6.1.2h SELECTION OF ZEROING FOR INPUT A & B



#### LEV. C1 Setting input level 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 9

\*

Signalization by LEDs when selecting input level:

LED "C" signals, that input A is active

LED "F" signals, that amplified input 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.

6.1.2i

SELECTION OF INPUT FILTER PARAMETERS FOR INPUT A &amp; B

Navigation icons: ↑, ↓, ←, →, [RECALL], [MENU], [ENTER]

INPUTS	CLEAR	SET C1	TYPE 1	OFF	
CHANNE.	CONF. 1	MOD. C1	LEV. 1	1 MHz	
OUTPUT.	CONF. G	TI ME 1	FL T. 1	500 kHz	DEF
SERVI. C.	RTC	M. START	TI M. 1	250 kHz	
	EXT. I. N.	M. STOP	POL. 1 A	100 kHz	
	KEYS	M. CLR	POL. 1 B	10 kHz	
		SIGNAL	TYP. C1	1 kHz	
		BACKUP	LEV. C1	100 Hz	
			FL. C1	65 Hz	
			TI M. C1	55 Hz	
				45 Hz	
				10 Hz	DEF H
				1 Hz	
				2 s	
				5 s	
				24	
				10 s	
				1 Mi n	
				10 Mi n	

**FL T. 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 limitation
- for pulse duty cycle of 50 % - equal duration of Hi and Lo level
- **in case if interference the use of input filter is recommended**

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

## 6. SETTING PROFI

### 6.1.2j | SETTING THE BLOCKING FOR INPUT A & B

The screenshot shows a multi-level menu for setting PROFIBUS parameters. The menu structure is as follows:

- Level 1: I INPUTS, CLEAR, SET C1, TYP 1, 0
- Level 2: CHANNE., CONF.1, MOD.C1, LEV.1
- Level 3: OUTPUT., CONF. G, TI ME 1, FI LT.1
- Level 4: SERV. C., RTC, MSTART, TI M.1
- Level 5: EXT. I N., M.STOP, POL.1 A
- Level 6: KEYS, M. CLR, POL.1 b
- Level 7: SI GNAL, TYP.C1
- Level 8: ZALOH, LEV.C1
- Level 9: FI L.C1
- Level 10: TI M.C1

The 'TI M.1' option is highlighted in black. Navigation arrows are visible on the left and right sides of the menu.

#### TI M.1 | Setting the blocking of an input

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

### 6.1.2k | SELECTION OF ACTIVE LEVEL OR EDGE FOR INPUT A

The screenshot shows the same menu structure as 6.1.2j, but with 'POL.1 A' highlighted in black. The 'TYPE 1' option is now set to 'Lo \', and 'POL.1 b' is set to 'Hi /'.

- Level 1: I INPUTS, CLEAR, SET C1, TYPE 1, Lo \
- Level 2: CHANNE., CONF.1, MOD.C1, LEV.1, Hi /
- Level 3: OUTPUT., CONF. G, TI ME 1, FI LT.1
- Level 4: SERV. C., RTC, MSTART, TI M1 A
- Level 5: EXT. I N., M.STOP, POL.1 A
- Level 6: KEYS, M. CLR, POL.1 b
- Level 7: SI GNAL, TYP.C1
- Level 8: BACKUP, LEV.C1
- Level 9: FI L.C1
- Level 10: TI M.C1

#### 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

## 6.1.2I SELECTION OF ACTIVE LEVEL OR EDGE FOR INPUT B

↑

←

DEF

I INPUTS	CLEAR	SET C1	TYPE 1	Lo \
CHANNE	CONF.1	MOD.C1	LEV.1	Hi /
OUTPUT	CONF.G	TI ME 1	FI LT.1	
SERVIC.	RTC	MSTART	TI M1 A	
	EXT.I.N	M.STOP	POL.1 A	
	KEYS	M.CLR	POL.1 B	
		SI GNAL	TYP.C1	
		BACKUP	LEV.C1	
			FI L.C1	
			TI M.C1	

↑

↓

## POL.1 b Selection of active level or edge

Lo \

Active upon change of entering edge Hi &gt; Lo

- upon entering the contact &gt; active on switch-on

Hi /

Active upon change of declining edge Lo &gt;Hi

- upon entering the contact &gt; active on switch-off

## 6.1.2m SELECTION OF THE TYPE OF INPUT FOR INPUT C

↑

←

DEF

I INPUTS	CLEAR	SET C1	TYPE 1	NPN.CON
CHANNE	CONF.1	MOD.C1	LEV.1	PNP
OUTPUT	CONF.G	TI ME 1	FI LT.1	
SERVIC.	RTC	MSTART	TI M.1	
	EXT.I.N	M.STOP	POL.1 A	
	KEYS	M.CLR	POL.1 B	
		SI GNAL	TYP.C1	
		BACKUP	LEV.C1	
			FI L.C1	
			TI M.C1	

↑

↓

## 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]

## 6. SETTING PROFI

142B PASSW 0

I INPUTS

CLEAR CNT.1 TARE 1 SUM.C1 CL.MM

CONF.1

SET C1 0  
 MOD.C1 SINGLE QUADR. UP/DW UP+DW RTC

TIME 1 OFF 5 ms 50 ms 10 min

MSTART CONTIN. CONTACT. EDGE RUN

MSTOP OFF STOP ST.CL.

MCLR YES ON AB. OFF

SIGNAL TYPE 1 NPNCON. PNP

LEV.1 24

FILT.1 1 MHz 100kHz 10 min

TIM.1 0

POL.1A Lo \ HI /

POL.1B Lo \ HI /

...FOLLOWING SETTING FOR INPUT C IS IDENTICAL FROM ITEM „TYPE 1“ ONWARDS

BACKUP NO VALUE TIME

CONF. G

PREP.N MANUAL  
 ...FOLLOWING SETTING FOR INPUTS SWITCHING

RTC

TIME 0  
 ...FOLLOWING SETTING FOR DATE

EXT. IN

EXT.1 OFF HOLD LOCK.K. B.PASS. SWCH.3  
 ...FOLLOWING SETTING FOR INPUTS EXT. 2, EXT. 3

KEYS

LEFT NO CLR.C1 C.SUM.1 SWI.T.1  
 ...FOLLOWING SETTING FOR BUTTONS DOWN, UP, ENTER

CHANNE

CH.C1

SET.C1 SCALE 1

DI.V.D 1

OFFSET 0

FILT.C1

MOD.F NO

CONST 0

FORM.C

000000 000000 FLOA.P.

HHMMSS 99MMSS HMSSC

DESC 00

OVER.1

M.MA CLEAR ERROR

VAL.M DI SABL UNSTO

MAX.V 100000

SWI.TCH

NO CHANNE. CHAN+F

COL.C

COL.C 0 RED GREEN OR

LMJ.C 16667

COL1.C RED GREEN OR

LM2.C 33333

COL2.C RED GREEN OR

CH.F1

...FOLLOWING SETTING FOR „CH.F1“ IS IDENTICAL FROM ITEM „CH.C1“ ONWARDS

MAT.FN

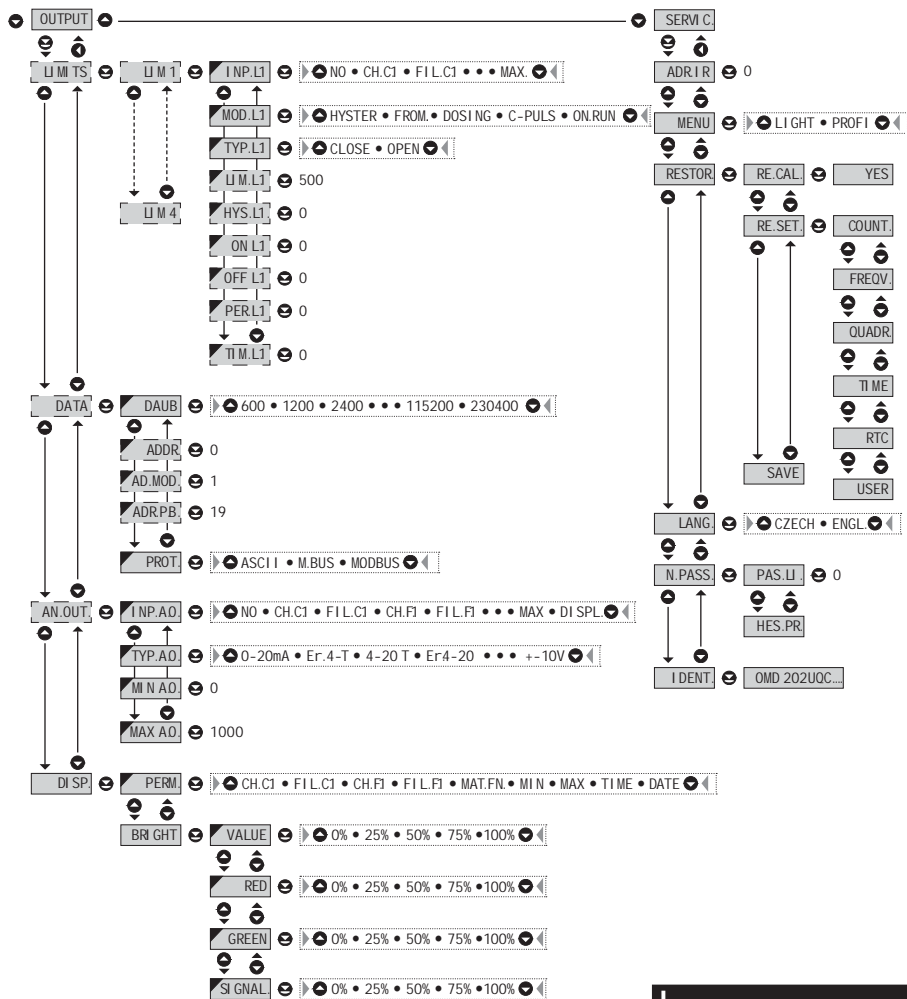
...FOLLOWING SETTING, PAGE 64

MINMAX

1 NP.MM NO CH.C1 MAT.FN



Home PROFI MENU



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

## 6. SETTING PROFI

### 6.1.2n SETTING INPUT LEVEL FOR INPUT C

INPUTS	CLEAR	SET C1	TYP 1	24	DEF
CHANNE	CONF.1	MOD.C1	LEV.1		
OUTPUT	CONFG	TI ME 1	FI Lt.1		
SERVI C.	RTC	MSTART	TI M.1		
	EXT.I N.	M.STOP	POL.1 A		
	KEYS	M.CLR	POL.1 B		
		SI GNAL	TYP.C1		
		ZALOH	LEV.C1		
			FI L.C1		
			TI M.C1		

#### 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 9

#### \*

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.

### 6.1.2o SELECTION OF INPUT FILTER PARAMETERS FOR INPUT C

INPUTS	CLEAR	SET C1	TYP 1	Off	
CHANNE	CONF.1	MOD.C1	LEV.1	1 MHz	
OUTPUT	CONFG	TI ME 1	FI Lt.1	500 kHz	
SERVI C.	RTC	MSTART	TI M.1	250 kHz	DEF
	EXT.I N.	M.STOP	POL.1 A	100 kHz	
	KEYS	M.CLR	POL.1 B	10 kHz	
		SI GNAL	TYP.C1	1 kHz	
		ZALOH	LEV.C1	100 Hz	
			FI L.C1	65 Hz	
			TI M.C1	55 Hz	

45 Hz	
10 Hz	DEF H
1 Hz	
2 s	
5 s	
24	
10 s	
1 Mi n	
10 Mi n	

#### FI L.C1 Volba digitálního vstupního filtru

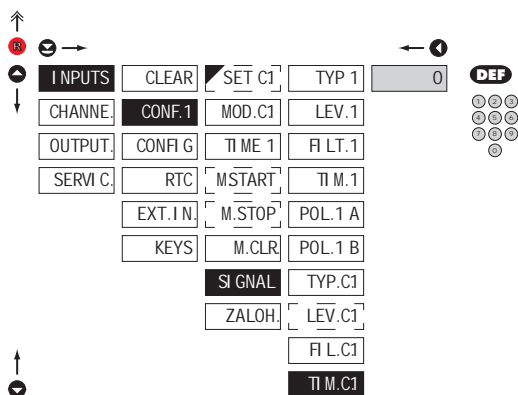
##### - setting applies for Input C

- 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 interference the use of input filter is recommended

#### !

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

## 6.1.2p SETTING THE BLOCKING FOR INPUT C

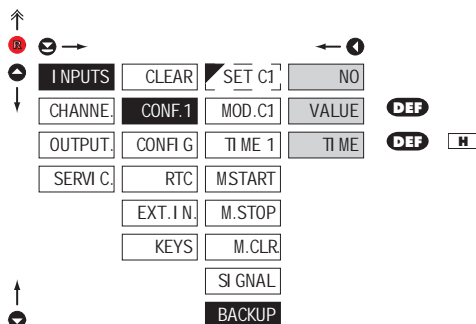


## TI M.1 Setting the input blocking

**- setting applies to input C**

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

## 6.1.2q 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

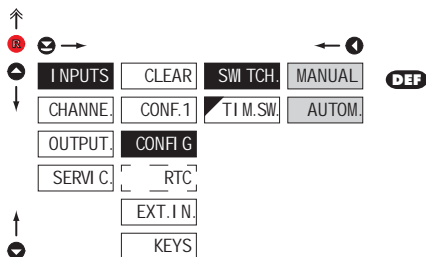
**NO** Instrument resets itself after every switch-on

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

**TI ME** Instrument downloads „running“ time from RTC

## 6. SETTING PROFI

### 6.1.3a SELECTION OF INPUTS SWITCHING



#### SWI TCH. Selection of inputs switching

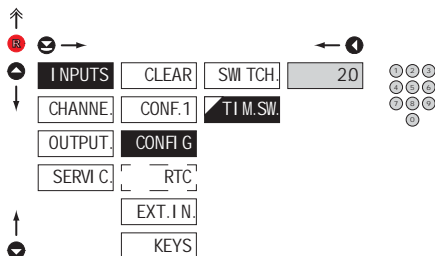
**MANUAL** Manual inputs switching

- 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.**

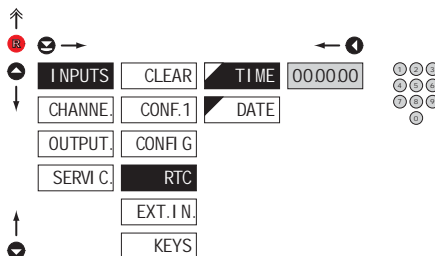
### 6.1.3b SETTING THE PERIOD FOR INPUTS SWITCHING



#### TIM.SW. Setting the period for inputs switching

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

### 6.1.4 SETTING THE REAL TIME CLOCK



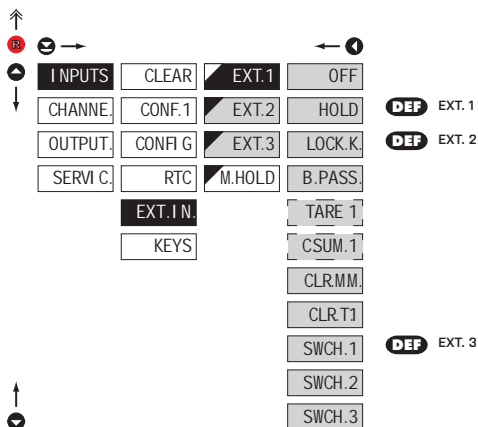
#### RTC Setting the real time clock [RTC]

**TIME** Time setting

- format 23.59.59

**DATE** Date setting

- format DD.MM.YY

**6.1.5a** EXTERNAL INPUT FUNCTION SELECTION

**!**  
Response to change of input is approx. 100 ms

External inputs table

Function	Ext 1	Ext 2	Ext 3
Channel - counter	0	0	
Channel - frequency	0	1	
MF	0	0	1
Min	0	1	1
Max	1	0	1
Max	1	1	1

**EXT. I.N.** External input function selection

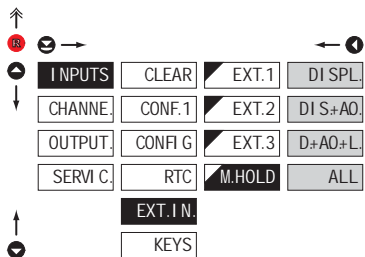
- OFF** Input is off
- HOLD** Activation of HOLD
- input activates function HOLD, which blocks all functions of the instrument
- LOCK.K.** Locking keys on the instrument
- active input disables all buttons to IR remote control
- TARE 1** Tare activation
- input activates function TARE, only in mode "Frequency"
- SUMA 1** External input controls function „Sum“
- active input displays the cumulated value of counter
- N.SUM1** External input controls function „Zeroing of sum“
- active input zeroes (clears) the cumulated value of counter
- CLRMM.** Resetting min/max value
- CLR T1** Tare resetting
- SWCH.1** Successive switching of channel projection
- SWCH.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
- SWCH.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
- **DEF** EXT. 1 > HOLD
  - **DEF** EXT. 2 > LOCK. K.
  - **DEF** EXT. 3 > SWCH. 1

**\***Procedure identical for **EXT. 2** and **EXT. 3**.

## 6. SETTING PROFI

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.

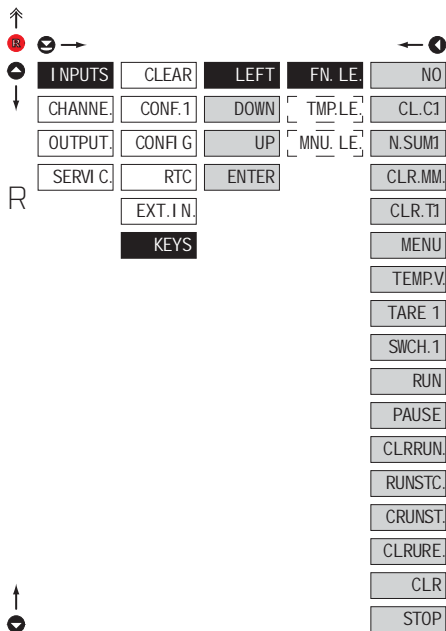
"HOLD" locks the value displayed, on AO and limit

evaluation

ALL

"HOLD" locks the entire instrument

## 6.1.6a OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS

**FN. LE.** Assigning further functions to instrument keys

- „FN. LE.“ > executive functions

**NO** Key has no further function

**CL. C1** Aux. input controls the „CLEAR“ function

- input zeroes (presets) the counter

**N. SUM1** Clearing of Sum

- input zeroes the cumulated value of the counter

**CLR. MM** Resetting min/max value

**CLR. T1** Tare resetting

**MENU** Direct access to the selected item in the menu

- when this choice is made the item „MENU“ is displayed, and desired further selection can be made

**TEMP. V.** Temporary projection of selected values

- when this choice is made the item „TMP. LE.“ is displayed, and desired further selection can be made

**TARE 1** Activation of Tare function

**SWT. 1** Continuous switching of projected channels

**RUN** Activation function „RUN“

**PAUSE** Activation function „PAUSE“

**CLR. RRUN** Stopy/hodiny se hranou spouštěcího signálu vynulují a spustí

- other items are relate only to stopwatch control (detail description on p. 38/39)

Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

Only the channel which is permanently projected is active

**!**  
Functions of button PAUSE

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

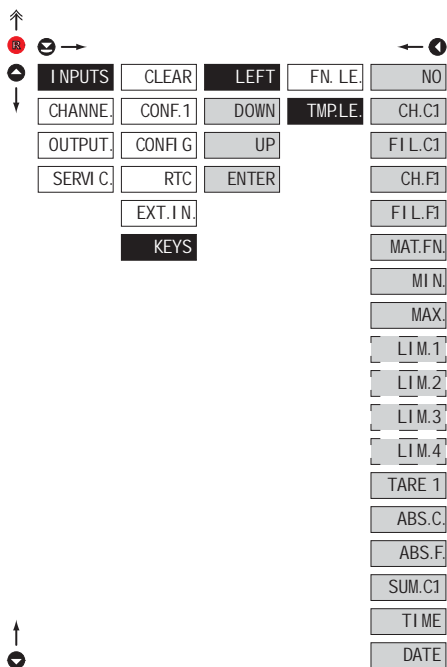
**!**  
Preset button functions **DEF**

	COUNTER	FREQUEN.	QVADRAT.	WATCH
LEFT	Sum C.1	C.1	F1	Start
UP	MAX C.1	MAX F1	MAX F1	Clear
DOWN	CLR. MAX	MIN F1	CLR. M.M.	Pause
ENTER	Clear	CLR. M.M.	Clear	Stop

## 6. SETTING PROFI

6.1.5b

OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION



### 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 **C** + „Selected key“, this holds until the stroke of any key

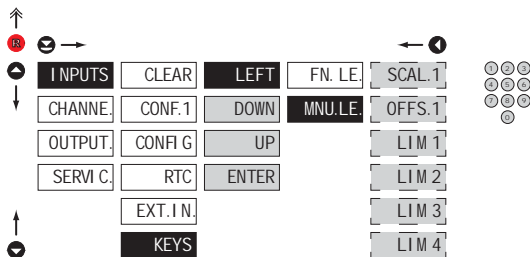
NO	Temporary projection is off
CH.C1	Temporary projection of counter value
FI L.C1	Temporary projection of counter value after being processed by digital filters
CH.F1	Temporary projection of frequency
FI L.F1	Temporary projection of frequency after being processed by digital filters
MAT.FN.	Temporary 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
TARE 1	Temporary projection of "TARE"
SUM.C1	Temporary projection of "SUMA"
TIME	Temporary projection of "TIME" value
DATE	Temporary projection of "DATE" value

**!**  
Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**



## 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

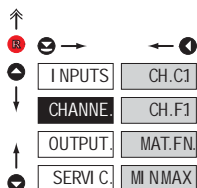
SCAL.1	Direct access to item "SCALE"
OFFS.1	Direct access to item "OFFSET"
LIM.1	Direct access to item "LIM 1"
LIM.2	Direct access to item "LIM 2"
LIM.3	Direct access to item "LIM 3"
LIM.4	Direct access to item "LIM 4"



Setting is identical for LEFT, DOWN, UP and ENTER

## 6. SETTING PROFI

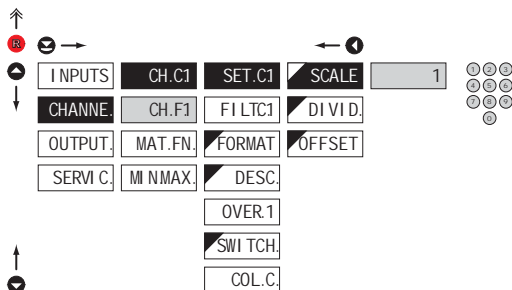
### 6.2 SETTING "PROFI" - CHANNEL



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
MAT.FN.	Setting parameters of mathematic functions
MI NMAX	Selection of access and evaluation of Min/max value

### 6.2.1a SETTING MULTIPLYING CONSTANT - CHANNEL COUNTER



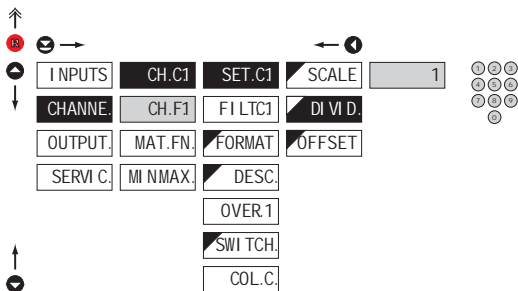
#### SCALE Setting multiplying constant

- 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
- **DEF** = 1

Setting is identical for "CH. F1"

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

**DI V I D.** Setting division constant  
Channel - Counter

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

- **DEF** = 1

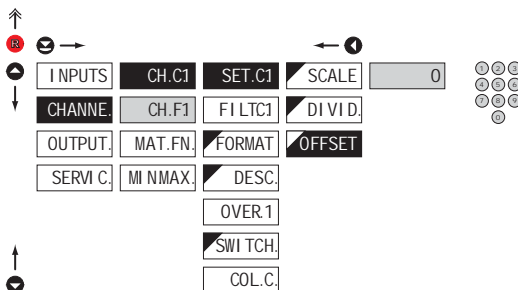
! Setting is identical for "CH. F1"

\*

**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, multiply 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 allow 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

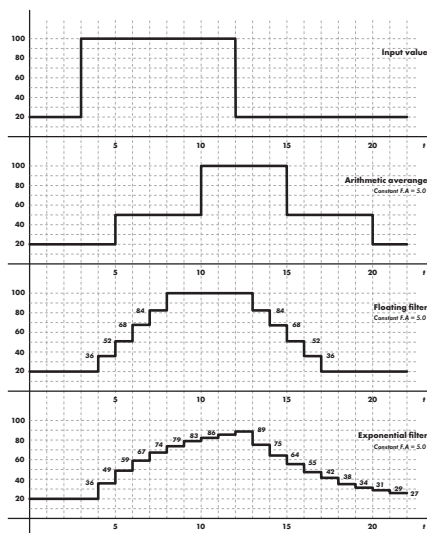
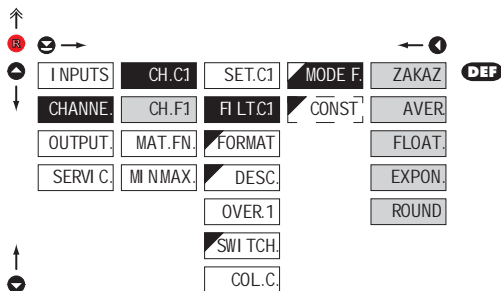
- offset of the measuring by a set value, which shall be loaded always upon instrument resetting
- range: :99999...999999

- **DEF** = 0

! Setting is identical for "CH. F1"

## 6. SETTING PROFI

### 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 prvniho 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 filter

**DEF** = 2

**!**  
Setting is identical for "CH. F1"

\*only for mode Frequency/Duty Cycle

## 6.2.1e PROJECTION FORMAT - POSITIONING OF DECIMAL POINT

The screenshot shows the PROFI 6 menu with the following structure:

- Top row: I INPUTS | CH.C1 | SET.C1 | 000000 | DEF | C
- Second row: CHANNE. | CH.F1 | F1 LTC1 | 00000.0 | DEF | F
- Third row: OUTPUT. | MAT.FN. | **FORMAT** | 0000.00
- Fourth row: SERVI C. | MI NMAX. | /DESC. | 0000000
- Sub-menu options for 'DESC.':
  - OVER.1 | 00.0000
  - SWI TCH. | 0.00000
  - COL.C. | FLOAT.P. | DEF | H
  - HHMMSS
  - 99MMSS
  - HHHHMM
  - MMMMSS
  - MMSS.CC
  - 99SS.CC
  - HMMSS.C
  - MSS.CCC
  - DHHMMS
  - DDHHMM

**FORMAT** 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 'CH. F1'

## 6.2.1f PROJECTION OF DESCRIPTION - THE MEASURING UNITS

The screenshot shows the PROFI 6 menu with the following structure:

- Top row: I INPUTS | CH.C1 | SET.C1 | 00 | 0 0 0 0
- Second row: CHANNE. | CH.F1 | F1 LTC1
- Third row: OUTPUT. | MAT.FN. | **FORMAT**
- Fourth row: SERVI C. | MI NMAX. | /DESC. | 00
- Sub-menu options for 'DESC.':
  - OVER.1
  - SWI TCH.
  - COL.C.

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

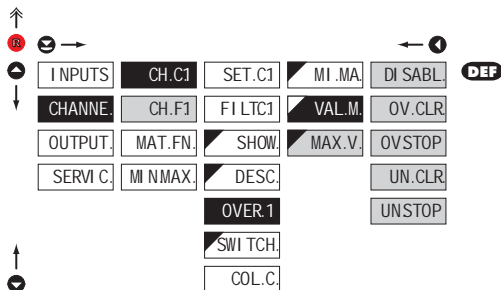
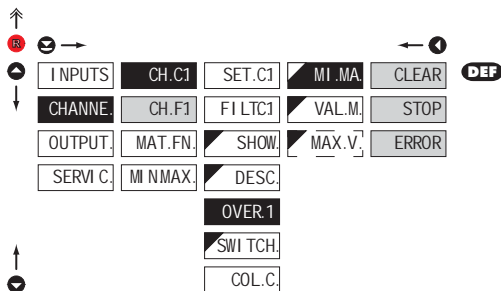
- projection of measured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled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

- **DEF** = 00 (no description)

! Table of signs on page 89

## 6. SETTING PROFI

### 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

**CLEAR**

The instrument zeroes itself and continues to count

**STOP**

Measurement stops

- the display will continue to show the maximum or the minimum displayable value

**ERROR**

Measurement stops

- display will show an error message „E. I.Un.“ or „E. I.Dv.“

#### 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

**DI SABL.**

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.**

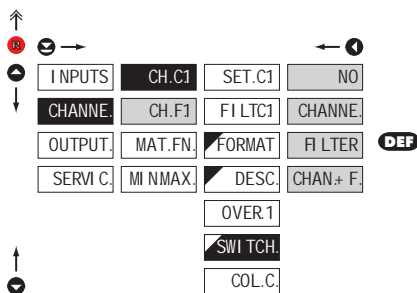
Setting the limit value

- Setting the value when the counter performs function selected in menu "MAX.V."



Setting is identical for "CH. F1"

## 6.2.1h SETTING THE CHANNEL PROJECTION IN SWITCH MODE

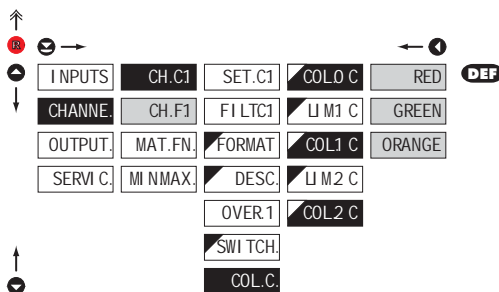
**SWI TCH.** Channel projection in switch mode

- 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
- FI LTER** „Channel 1“ after being processed by digital filter will be displayed
- CHAN+ F.** „Channel 1“ will be displayed followed by „Channel 1“ after being processed by digital filter

Setting is identical for "CH. F1"

## 6.2.1i SELECTION OF DISPLAY COLOR FOR CHANNEL COUNTER

**COL.C** Selection of display color

- the color selection is governed by setting under items "LIM1 C." and "LIM2 C."

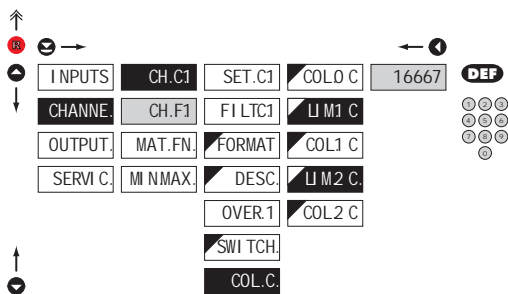
- RED** Red color
- GREEN** Green color
- ORANGE** Orange color

- "COL.0 C" **DEF** = Green
- "COL.1 C" **DEF** = Orange
- "COL.2 C" **DEF** = Red

If the instrument is in the Hi Brightness LEDs execution, this menu item is not accessible

## 6. SETTING PROFI

### 6.2.1j SELECTION OF DISPLAY COLOR CHANGE FOR CHANNEL COUNTER



#### LI M1 C Selection of display color change

- under items "LI M1 C" and "LI M2 C" the limit is set for the time when the display color shall change

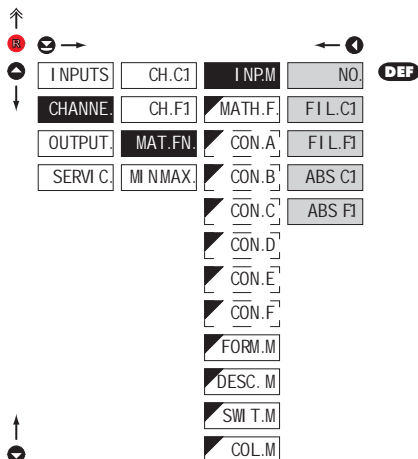
- "LI M1 C" **DEF** = 16667

- "LI M2 C" **DEF** = 33333



If the instrument is in the Hi Brightness LEDs execution, this menu item is not accessible

### 6.2.2a MATHEMATICAL FUNCTIONS - INPUT SELECTION



#### I NPM

#### 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

F I L.C1

From channel 1 - counter after digital filter

F I L.F1

From channel 1- frequen. after digital filter

ABS C1

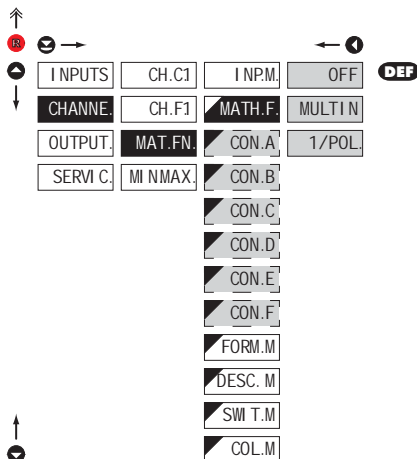
The absolute value of the channel counter

ABS F1

The absolute value of the channel frequency



## 6.2.2b MATHEMATIC FUNCTIONS



## MATH.F. Selection of mathematic functions

OFF Mathematic functions are off

MULTI N Polynomial

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

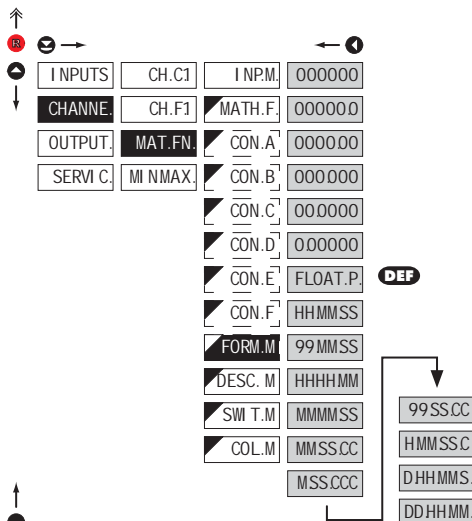
1/MUL  $1/x$ 

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

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

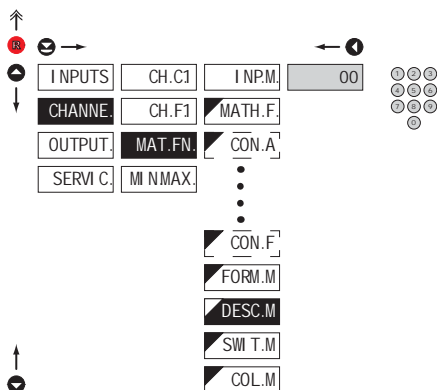
- the instrument can project numbers in a standard way incl. the decimal point, time formats and also floating decimal point which ensures the most accurate value projection when „FLOAT.P.“ is selected

## Abbreviations

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

## 6. SETTING PROFI

### 6.2.2d MATHEMATIC FUNCTIONS - MEASURING UNITS



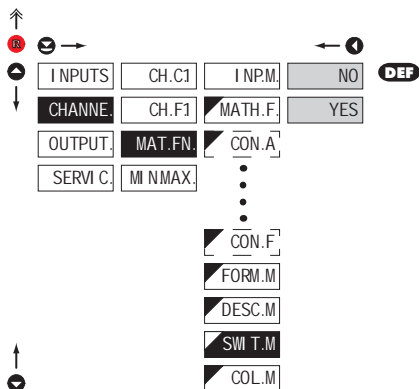
#### DESC. M Setting projection of description for "MAT. FN."

- projection of measured 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

**DEF** = 00 (no description)

! Table of signs on page 89

### 6.2.2e MATHEMATIC FUNCTIONS - SELECTION OF CHANNEL PROJECTION UPON SWITCHING



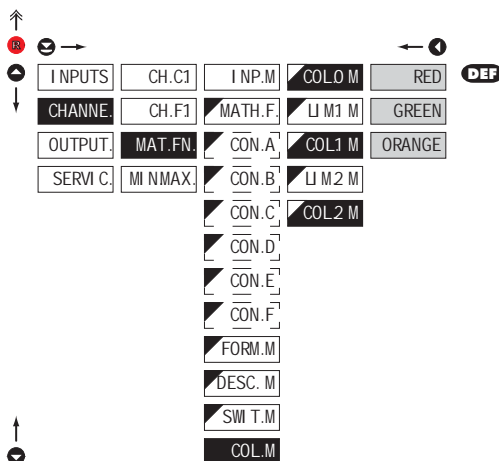
#### SWI T.M Selection of channel rejection upon switching

- 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 DISPLAY COLOR



## COL.M Selection of display color

- the color selection is governed by setting under items "LIM.1 M" and "LIM.2 M"

RED Red color

GREEN Green color

ORANGE Orange color

- "COL.O M" **DEF** = Green

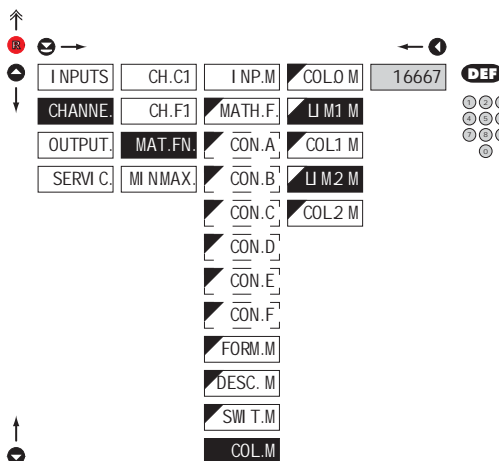
- "COL.1 M" **DEF** = Orange

- "COL.2 M" **DEF** = Red



If the instrument is in the Hi Brightness LEDs execution, this menu item is not accessible

## 6.2.2g MATHEMATIC FUNCTIONS - SELECTION OF DISPLAY COLOR CHANGE



## LJ M1 M Selection of display color change

- under items "LIM.1 M" and "LIM.2 M" the limit is set for the time when the display color shall change

- "LIM.1 M" **DEF** = 16667

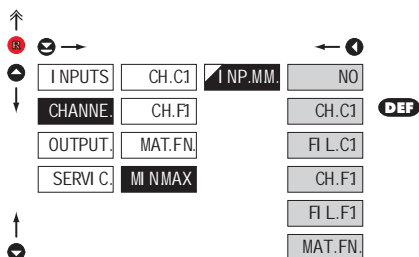
- "LIM.2 M" **DEF** = 33333



If the instrument is in the Hi Brightness LEDs execution, this menu item is not accessible

## 6. SETTING PROFI

### 6.2.3 SELECTION OF EVALUATION OF MIN/MAX VALUE



#### I NP.MM. Selection of evaluation of min/max value

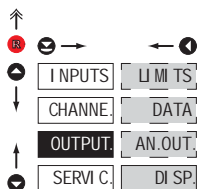
- selection of value from which the min/max value will be calculated

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



## 6. SETTING PROFI

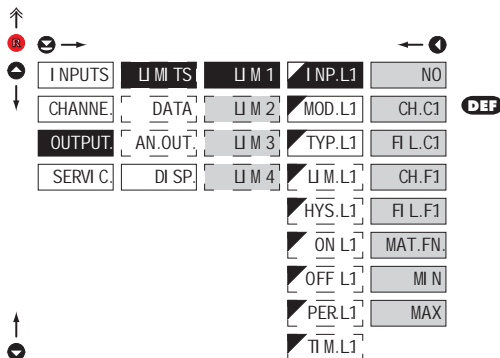
### 6.3 SETTING „PROFI“ - OUTPUTS



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

L I M I T S	Setting type and parameters of limits
D A T A	Setting type and parameters of data output
A N . O U T	Setting type and parameters of analog output
D I S P	Setting display projection and brightness

### 6.3.1a SELECTION OF INPUT FOR LIMITS EVALUATION



#### I N P . L 1 Selection evaluation of limits

- selection of value from which the limit will be evaluated

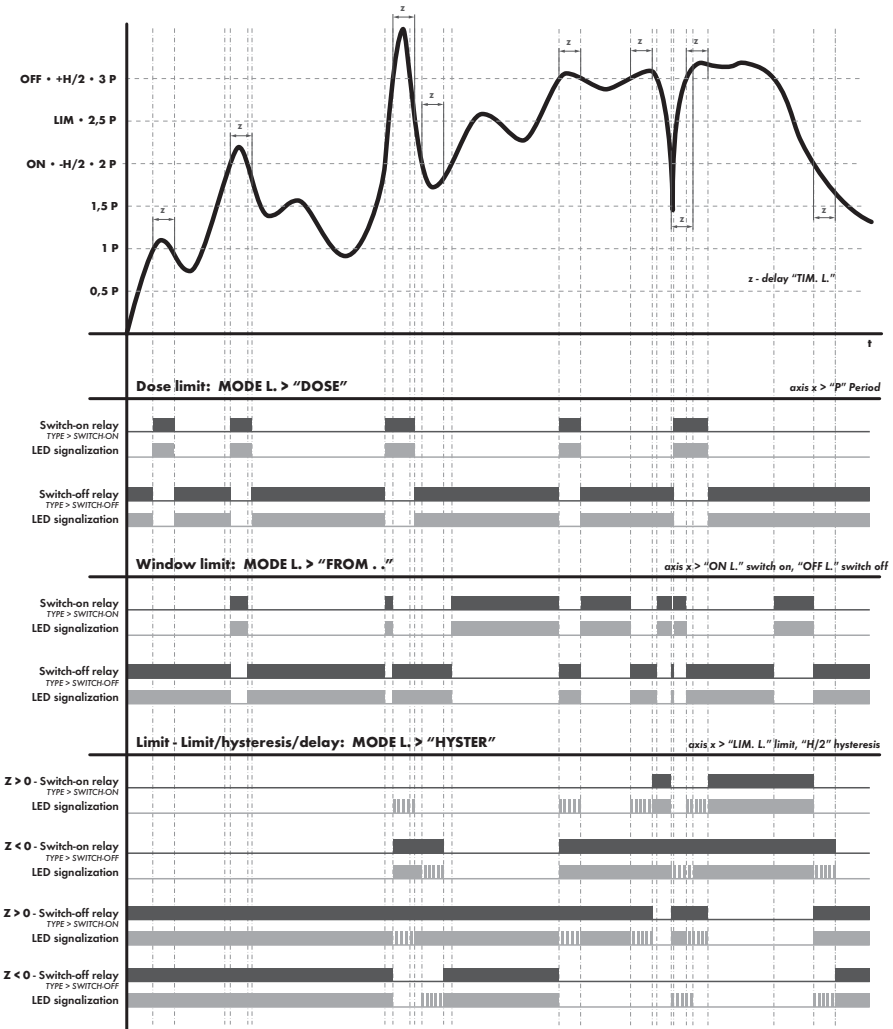
N O	Limit evaluation is off
C H . C 1	From "Channel 1" counter
F I L . C 1	From "Channel 1" counter, after digital filters processing
C H . F 1	From "Channel 1" frequency
F I L . F 1	From "Channel 1" frequency, after digital filters processing
M A T . F N	From "Mathematic functions"
M I N	From "Min. value"
M A X	From "Max. value"



If you require the relay to react to the change of the measured value immediately, select no filtration. This way the value is evaluated directly in the gate array.



Setting is identical for L I M 1, L I M 2, L I M 3, and L I M 4



## 6. SETTING PROFI

### 6.3.1b SELECTION OF TYPE OF LIMIT

I NPUTS	L I M I T S	L I M 1	I N P. L1	HYSTER
CHANNE.	DATA	L I M 2	MOD. L1	FROM..
OUTPUT.	AN. OUT.	L I M 3	TYP. L1	DOSI NG
SERVI C.	DI SP.	L I M 4	L J M. L1	C-PULS

**DEF**

HYS. L1	ON RUN
ON L1	
OFF L1	
PER L1	
TIM. L1	

**!**  
Dose limit puts a heavy burden on the  $\mu P$  and therefore we do not recommend using it at frequencies exceeding 25 kHz

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

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

- for this mode the parameters of "LIM. L1" are set, at which the limit will shall react, "HYS. L1" the hysteresis range around the limit (LIM  $\pm 1/2$  HYS) and time "TIM. L1" determining the delay of relay switch-on

**FROM..** Frame limit

- for this mode the parameters are set for interval "ON. L1" the relay switch-on and "OFF. L1" the relay switch-off

**DOSI NG** Dose limit (periodic)

- for this mode the parameters are set for "PER. L1" determining the limit value as well as its multiples at which the output is active and "TIM. L1" 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. L1"

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

**!**  
Setting is identical for LIM 1, LIM 2, LIM 3, and LIM 4

\* only for "fast limits"

### 6.3.1c SELECTION OF TYPE OF OUTPUT

I NPUTS	L I M I T S	L I M 1	I N P. L1	CLOSE
CHANNE.	DATA	L I M 2	MOD. L1	OPEN
OUTPUT.	AN. OUT.	L I M 3	TYP. L1	
SERVI C.	DI SP.	L I M 4	L J M. L1	

**DEF**

HYS. L1	ON RUN
ON L1	
OFF L1	
PER L1	
TIM. L1	

#### TYP. L1 Selection of type of output

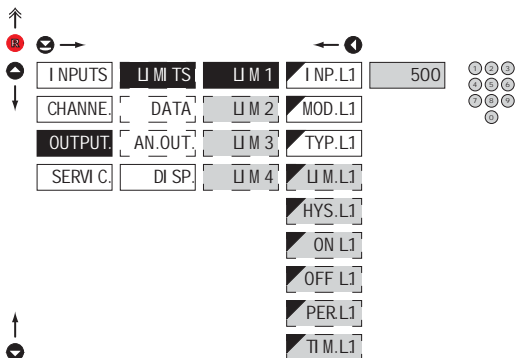
**CLOSE** Output switches on when condition is met

**OPEN** Output switches off when condition is met

**!**  
Setting is identical for LIM 1, LIM 2, LIM 3, and LIM 4



## 6.3.1d 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,  $LIM.L1 \pm 1/2 HYS.L1$ )

**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 'DOSING'

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

- for type 'HYSTER', 'DOSE' and 'C-PULS'
- setting within the range:  $\pm 0...99,9$  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 'DOSING' 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 1**, **LIM 2**, **LIM 3**, and **LIM 4**

## 6. SETTING PROFIBUS

### 6.3.2a SELECTION OF DATA OUTPUT BAUD RATE

↑

⏪ ⏩

⏪ ⏩

↑	I NPUTS.	LI MI TS	BAUD	600
↓	CHANNE.	DATA	ADDR	1200
	OUTPUT.	AN_OUT.	AD.MOD	2400
	SERVI.C.	DI.SP.	ADR.PB.	4800
		PROT	9600	<b>DEF</b>
			19200	
			38400	
			57600	
			115200	
			230400	

↑

⏪ ⏩

BAUD	Selection of data output baud rate
600	600 Baud
1200	1 200 Baud
2400	2 400 Baud
4800	4 800 Baud
9600	9 600 Baud
19200	19 200 Baud
38400	38 400 Baud
57600	57 600 Baud
115200	115 200 Baud
230400	230 400 Baud

### 6.3.2b SETTING INSTRUMENT ADDRESS

↑

⏪ ⏩

⏪ ⏩

↑	I NPUTS.	LI MI TS	BAUD	00
↓	CHANNE.	DATA	ADDR	
	OUTPUT.	AN_OUT.	AD.MOD	
	SERVI.C.	DI.SP.	ADR.PB.	
		PROT		

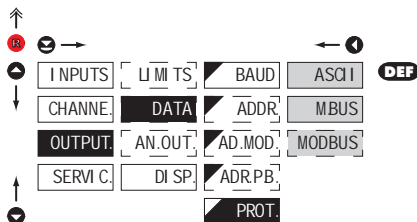
↑

⏪ ⏩

⏪ ⏩

ADDR	Setting instrument address
	- setting in range: 0...31
	- <b>DEF</b> = 00
AD.MOD	Setting instrument address - MODBUS
	- setting in range: 1...247
	- <b>DEF</b> = 01
ADR.PB.	Setting instrument address - PROFIBUS
	- setting in range: 1...127
	- <b>DEF</b> = 19

## 6.3.2c SELECTION OF DATA OUTPUT PROTOCOL

**PROT.** Selection of the type of analogue output

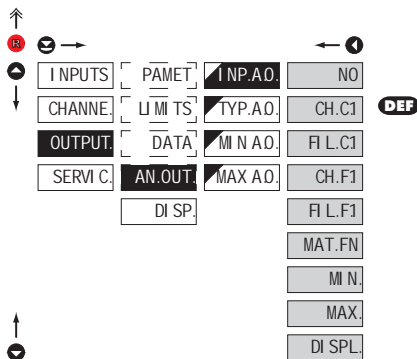
ASQI Data protocol ASCII

M.BUS Data protocol DIN MessBus

MODBUS Data protocol MODBUS-RTU

- option is available only for RS 485

## 6.3.3a SELECTION OF INPUT FOR ANALOGUE OUTPUT

**I NP.A.O.** 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

FI L.C1 From ch. 1 - counter after digital filter

CH.F1 From ch. 1 - frequency

FI L.F1 From ch. 1 - frequency after digital filter

MAT.FN. From "Mathematical function"

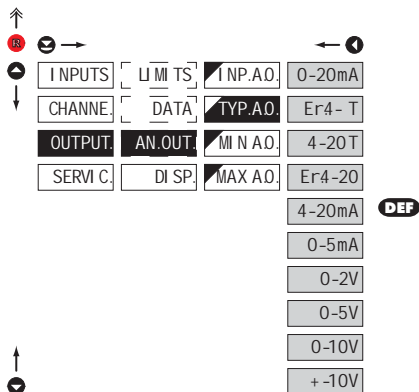
MI N. From "Min. value"

MAX. From "Max. value"

DI SPL. From "Permanently projected display value"

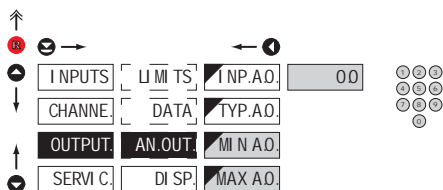
## 6. SETTING PROFI

### 6.3.3b SELECTION OF THE TYPE OF ANALOG OUTPUT



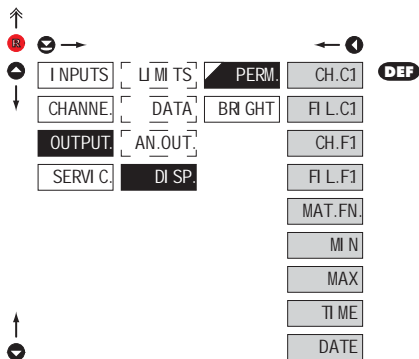
TYP. A.O.	Selection of the type of analog output
0-20mA	Type: 0...20 mA
Er4-T	Type: 4...20 mA with indication - with broken loop detection and indication of error statement (< 3.6 mA)
4-20T	Type: 4...20 mA with indication - with broken loop detection (< 3.6 mA)
Er4-20	Type: 4...20 mA with indication - with indic. of error statement (< 3.6 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

### 6.3.3c SETTING THE ANALOG OUTPUT RANGE



AN. OUT.	Setting the analog output range
MIN A.O.	Assigning the display value to the beginning of the AD range - setting in range: -99999...999999 - <b>DEF</b> = 0
MAX A.O.	Assigning the display value to the end of the AD range - setting in range: -99999...999999 - <b>DEF</b> = 1000

## 6.3.4a SELECTION OF INPUT FOR DISPLAY PROJECTION

**PERM.** Selection display projection

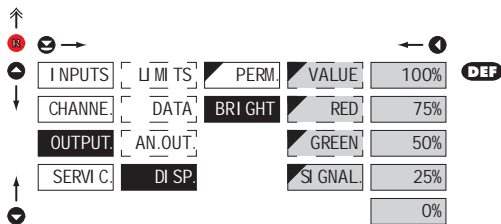
- selection of value which will be shown on the instrument display

CH.C1	Channel 1 - Counter
FI L.C1	Channel 1 - Counter, after digital filters processing
CH.F1	Channel 1 - Frequency
FI L.F1	Channel 1 - Frequency, after digital filters processing
MAT.FN.	"Math. functions"
MIN.	"Min. value"
MAX.	"Max. value"
TIME	"Time"
DATE	"Date"

- display switches between date/time in ratio of 2/13 s

## 6. SETTING PROFI

### 6.3.4b SELECTION OF DISPLAY BRIGHTNESS



#### B R I G H T Selection of display brightness

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

**VALUE** Brightness for display

- only for Hi brightness LEDs

**RED** Brightness for red colour

- only for 3-color 7 segmen display

**GREEN** Brightness for green colour

- only for 3-color 7 segmen display

**S I G N A L** Brightness LEDs for signaling

0% Display is off

- after keystroke display turns on for 10 s

25% Display brightness - 25 %

50% Display brightness - 50 %

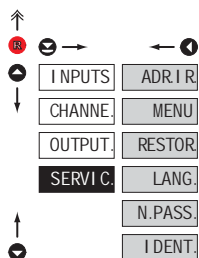
75% Display brightness - 75 %

100% Display brightness - 100 %



## 6. SETTING PROFI

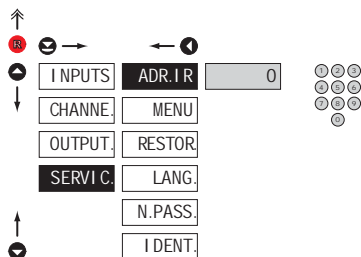
### 6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

<b>ADR.I R.</b>	Setting the address of IR remote control
<b>MENU</b>	Selection of menu type LIGHT/PROFI
<b>RESTOR.</b>	Restore instrument manufacture setting and calibration
<b>LANG.</b>	Language version of instrument menu
<b>N.PASS.</b>	Setting new access password
<b>I DENT.</b>	Instrument identification

#### 6.4.1 SETTING THE ADDRESS OF IR REMOTE CONTROL



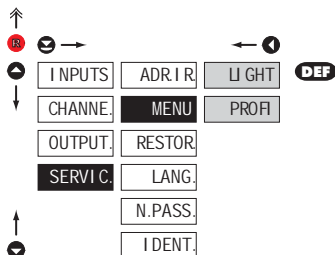
#### **ADR.I R.** Setting the address of IR remote control

- setting the remote control address is inevitable only in case there are other large displays OMD 202 within the reach of IR remote control
- range of the address setting is 0...99
- it is possible to cancel the address by pressing the blue button on the remote control

- **DEF** = 0



## 6.4.2 SELECTION OF TYPE OF PROGRAMMING MENU

**MENU** Selection of menu type - LIGHT/PROFI

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

**LI GHT** Active LIGHT menu

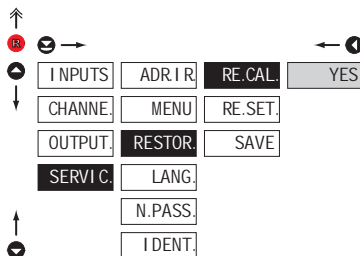
- simple programming menu, contains only items necessary for configuration and instrument setting
- linear menu > items one after another

**PROFI** Active PROFI menu

- complete programming menu for expert users
- tree menu

! Change of setting is valid upon next access into menu

## 6.4.3 RESTORATION OF MANUFACTURE SETTING

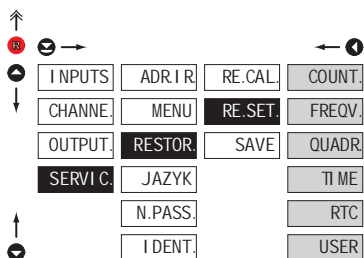
**RESTOR** Restoration of manufacture setting

- 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"

## 6. SETTING PROFI



### 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

**TI ME** 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

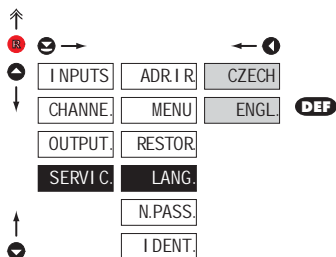
- storing the user setting allows the operator to restore it in future if needed



After restoration the instrument switches off for couple seconds

JOBS PERFORMED	RESTORE	
	CALIBRATION	SETTING
cancels USER menu rights	✓	✓
deletes table of items order in USER - LIGHT menu	✓	✓
adds items from manufacture to LIGHT menu	✓	✓
deletes data stored in FLASH	✓	✓
cancels or linearization tables	✓	✓
clears tare	✓	✓
restore manufacture calibration	✓	✗
restore manufacture setting	✗	✓

### 6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION

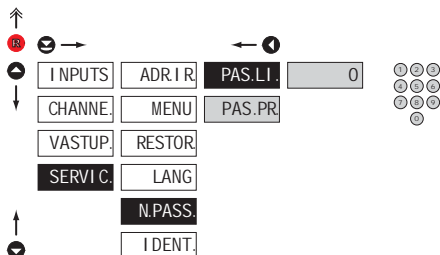


### LANG. Selection of instrument menu language version

**CZECH** Instrument menu is in Czech

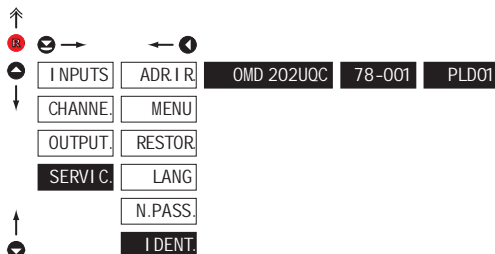
**ENGL.** Instrument menu is in English

## 6.4.5 SETTING NEW ACCESS PASSWORD

**N.PASS.** Setting new password for access to LIGHT and PROF1 menu

- this option allows to change the numeric code, which blocks the access into LIGHT and PROF1 menu.
- numeri code range: 0...9999
- universal passwords in the event of loss: LIGHT Menu > „8177” PROF1 Menu > „7915”

## 6.4.6 INSTRUMENT IDENTIFICATION

**I DENT.** 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

	Pos.	Description
<b>IDENT:</b>	1.	type of instrument
	2.	SW: number - version
	3.	the input type



# 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)

## 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  U M 1
- setting may be performed in **LIGHT** or **PROFI** menu, with the **USER** menu then overtaking the given menu structure

### 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

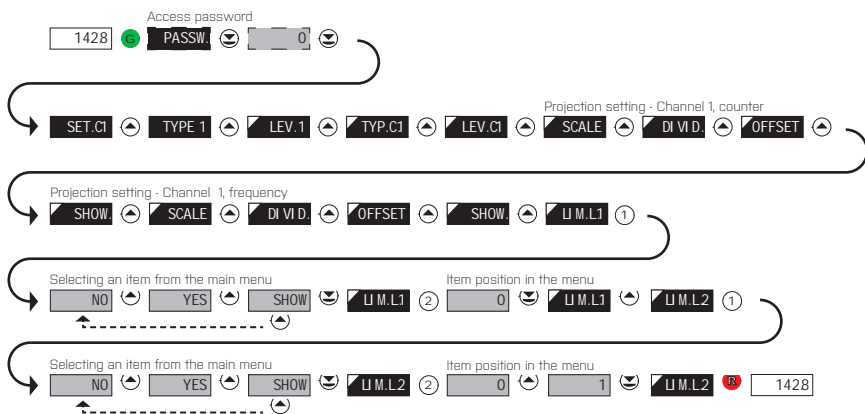
In compiling USER menu from active LIGHT menu the items (max. 10) may be assigned a sequence, in which they will be projected in the menu

setting projection sequence



## Example of ranking the order of menu items in the "USER" menu

In this example we want to have a direct access to menu items Limit 1 and Limit 2 [example show is for the Light menu, but can equally be used in the Profi menu].



The result of this setting is that when the **R** button is pressed, the display will read „LIM L.1“. By pressing **☺** button you confirm your selection and then you can set the desired limit value, or by pressing the **↻** button you can go to setting of „LIM. L.2“ where you can proceed identically as with Limit one.

You can exit the setting by pressing the **☺** button by which you store the latest setting and pressing the **R** button will take you back to the measuring mode.

## 8. DATA PROTOCOL



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 presents 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 [www.orbit.merret.cz](http://www.orbit.merret.cz)

### DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

EVENT	TYPE	PROTOCOL	TRANSMITTED DATA
Data sollicitation (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	> 0 [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] <CR>
		MessBus	<STX> 0 [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] <ETX> <BCC>
	485	ASCII	> 0 [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] <CR>
		MessBus	<STX> 0 [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] <ETX> <BCC>
Confirmation of data acceptance (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 [0] [0] [0] [0] [0] [0] [0] [0] <CR>
		MessBus	<STX> \$ N P [0] [0] [0] [0] [0] [0] [0] [0] <ETX> <BCC>
	485	ASCII	# A A N P [0] [0] [0] [0] [0] [0] [0] [0] <CR>
		MessBus	<STX> \$ N P [0] [0] [0] [0] [0] [0] [0] [0] <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>	
Instrument identification			# A A 1 Y <CR>
HW identification			# A A 1 Z <CR>
One-time transmission			# A A 7 X <CR>
Repeated transmission			# A A 8 X <CR>

## LEGEND

SIGN	RANGE	DESCRIPTION
#	35 23 <sub>H</sub>	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 <sub>H</sub>	Carriage return
<SP>	32 20 <sub>H</sub>	Space
Ĉ, P		Number and command - command code
D		Data - usually characters "0"... "9", "*", ".", ";"; [D] - dp. and [ ] may prolong data
R	30 <sub>H</sub> ...3F <sub>H</sub>	Relay and tare status
!	33 21 <sub>H</sub>	Positive confirmation of command (ok)
?	63 3F <sub>H</sub>	Negative confirmation of command (point)
>	62 3E <sub>H</sub>	Beginning of transmitted data
<STX>	2 02 <sub>H</sub>	Beginning of text
<ETX>	3 03 <sub>H</sub>	End of text
<SADR>	adresa +60 <sub>H</sub>	Prompt to send from address
<EADR>	adresa +40 <sub>H</sub>	Prompt to accept command at address
<END>	5 05 <sub>H</sub>	Terminate address
<DLE>!	16 49 10 <sub>H</sub> 31 <sub>H</sub>	Confirm correct statement
<NAK>	21 15 <sub>H</sub>	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 #A6X <CR>.

The instrument immediately returns the value in the format >HH <CR>, where HH is value in HEX format and range 00<sub>H</sub>...FF<sub>H</sub>. The lowest bit stands for „Relay 1“, the highest for „Relay 8“

## 9. ERROR STATEMENTS



ERROR	CAUSE	ELIMINATION
CH.DPo.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
CH.DPr.	Number is too large to be displayed	change DP setting, channel constant setting
CH.TPo.	Number is outside the table range	increase table values, change input setting (channel constant setting)
CH.TPr.	Number is outside the table range	increase table values, change input setting (channel constant setting)
CH.WPo.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
CH.WPr.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
CH. HW.	A part of the instrument does not work properly	send the instrument for repair
CH. EE	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
CH.NAS.	Data in EEPROM outside the range	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
CH.SMA.	Memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
CH.VYS.	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	1	2	3	4	5	6	7		
0		!	"	#	\$	%	&	'	0	!	"	#	\$	%	&	'			
8	[	]	H	I	,	-	.	/	8	(	)	*	+	,	-	.	/		
16	0	1	2	3	4	5	6	7	16	0	1	2	3	4	5	6	7		
24	8	9	=	.	:	;	<	=	>	?	24	8	9	:	;	<	=	>	?
32	J	R	b	c	d	E	F	G	32	@	A	B	C	D	E	F	G		
40	H	I	J	K	L	M	N	O	40	H	I	J	K	L	M	N	O		
48	P	Q	R	S	T	U	V	W	48	P	Q	R	S	T	U	V	W		
56	X	Y	Z	[	\	]	^	_	56	X	Y	Z	[	\	]	^	_		
64	`	a	b	c	d	e	f	g	64	`	a	b	c	d	e	f	g		
72	h	i	j	k	l	m	n	o	72	h	i	j	k	l	m	n	o		
80	p	q	r	s	t	u	v	w	80	p	q	r	s	t	u	v	w		
88	X	Y	Z	{		}	~		88	x	y	z	{		}	~			

## 11. TECHNICAL DATA



### INPUT

Number:	1 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
Input frequency:	0,001..1 MHz [< 100 kHz for duty cycle measurement]
Voltage levels:	10 mV - 0,8 V (amplified - only input A1, [B1]) 0,8 V - 60 V
Reaction time:	inputs react approx 3 s after instrument's switch-on

### ZOBRAZENÍ

Display:	999999, digit height 57, 100 or 125 mm - 3-colour 7 segment LED display - red/green/orange - high brightness LEDs, red or green (1300 mcd) - 999...9999 or -99999...999999
Projection:	
Decimal point:	adjustable - in menu
Brightness:	adjustable - in menu

### INSTRUMENT ACCURACY

TC:	50 ppm/°C
Accuracy:	±0,01% of range + 1 digit [Frequency]
Time base:	0,05 s...15 min.
Multiplication const.:	99999...999999
Division constant:	-99999...999999
Filtration constant:	-function RPM measurement in mode „Frequency“ 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.

### COMPARATORS

Type:	digital, adjustable in menu
Contact switch:	< 10 ms < 50 µs [without filtration]
Mode:	Hysteresis, From, Dose, C-Puls, Run
Limita:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Výstupy:	4x relé se spínacím kontaktem [Form A] [250 VAC/30 VDC, 3 A]*
Relé:	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:	0,1% of range
TC:	100 ppm/°C
Rate:	response to change of value < 1 ms
Voltage:	0...2 V/5 V/10 V/±10V
Current:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ohm/12 V or 1 000 Ohm/24 V - broken loop detection

### EXCITATION

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

\* values apply for resistance load

**POWER SUPPLY**

Options:	10...30 V AC/DC, 27 VA, isolated
	PF $\geq$ 0,4, $I_{\text{trp}} > 75$ A/2 ms
	fuse inside [T 4000 mA]
	80...250 V AC/DC, 27 VA, isolated
	PF $\geq$ 0,4, $I_{\text{trp}} > 45$ A/2 ms
	fuse inside [T 630 mA]

**MECHANICAL PROPERTIES**

Material:	anodized aluminum, black
Dimensions:	see chapter 13
Panel cut-out:	see chapter 13

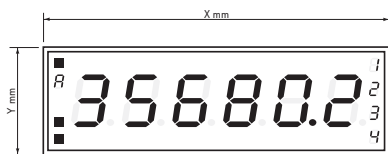
**OPERATING CONDITIONS**

Connection:	connector terminal board, conductor cross-section $<1,5$ mm <sup>2</sup> / $<2,5$ mm <sup>2</sup>
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP64
Construction:	safety class I
Overvoltage cat.:	EN 61010-1, A2
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
Insulation resistan.:	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

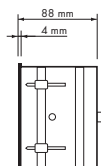
## 12. INSTR. DIMENSIONS AND INSTALLATION



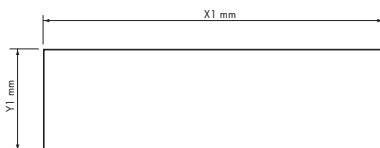
**Front view**



**Side view**



**Panel cutout**

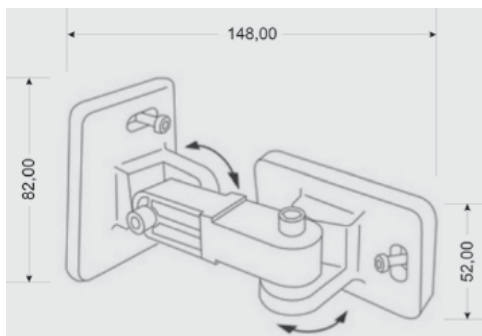


Panel thickness: 0,5 ... 50 mm

Height	X	Y	X1	Y1
<b>57-6</b>	375	119	367	111
<b>100-4</b>	465	181	457	173
<b>100-6</b>	651	181	643	173
<b>125-4</b>	539	237	531	228
<b>125-6</b>	754	237	746	228

### Wall mounting

As a standard, large displays are designed for panel installation. Upon request we may also supply a holder for wall mounting, see picture.



Product **OMD 202UQC**  
 Type .....  
 Manufacturing No. ....  
 Date of sale .....

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

For 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.

Stamp, signature

**Y E A R S**

NOTE





NOTE



**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:** Programmable panel instrument

**Type:** **OMD 202**

**Version:** UNI, PWR, UQC

**This has 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, chap. 14 and chap. 15, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11, EN 61000-3-2, EN 61000-3-3, EN 55022, chap. 5 and chap. 6

The product is furnished with CE label issued in 2001.

**As documentation serve the protocols of authorized and accredited organizations:**

EMC MD CR, Prague, Testing institute of technical devices, protocol no.: 08-041/2001 of 24/11/2001  
MD CR, Vyskov, Testing institute of technical devices, protocol no.: 730-325/2001 of 02/05/2001  
MD CR, Vyskov, Testing institute of technical devices, protocol no.: 730-350/2001 of 07/05/2001  
MD CR, Vyskov, Testing institute of technical devices, protocol no.: 730-372/2001 of 02/05/2001  
MD CR, Vyskov, Testing institute of technical devices, protocol no.: 730-934/2001 of 20/11/2001

Place and date of issue: Prague, 19. Juli 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

TECHBOOK - OMD 202UQC - 2012 - 3V1 - en