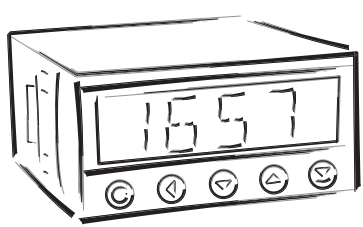
WARRANTY 5 YEARS

OM 602RS

6 DIGIT DATA DISPLAY

RS 232/485
ASCII/MESSBUS/PROFIBUS

DISPLAY 20 MM



SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OM 602 series conform to the European regulation 89/336/EWG.

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

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

CONNOCTION

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

CE

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2.1 DESCRIPTION

The OM 602RS type is a 4-digit panel display device for data from serial lines of RS 232 and RS 485 standard. Communication with ASCII or MessBus protocol.
All ASCII symbols may be displayed which are usable for 7-segment display.

PROGRAMMABLE PROJECTION

Setting:	input range - integer/float
Protocol:	ASCII/MESSBUS
	MODBUS - RTU*
	PROFIBUS DP
Projection:	-999...9999

LINEARIZATION

Linearization:	by linear interpolation in 50 points (solely via OM Link)

DIGITAL FILTERS

Floating average:	from 2...30 measurements
Exponen.average:	from 2...100 measurements
Rounding:	setting the projection step for display

MATHEMATIC FUCTIONS

Min/max. value:	registration of min./max. value reached during measurement
Tare:	designed to reset display upon non-zero input signal
Peak value:	the display shows only max. or min. value
Mat. operations:	polynome, 1/x, logarithm, exponential, power, root, sin x

EXTERNAL CONTROL

Lock:	control keys blocking
Hold:	display/instrument blocking
Tare:	tare activation/resetting tare to zero
Resetting MM:	resetting min/max value

*This protocol has separate instructions

2.2 OPERATION

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

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

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

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

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

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

The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments. Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

The program OM LINK in „Basic" version will enable you to connect one instrument with the option of visualization and archiving in PC. The OM Link „Standard" version has no limitation of the number of instruments connected.

2.3 OPTIONS

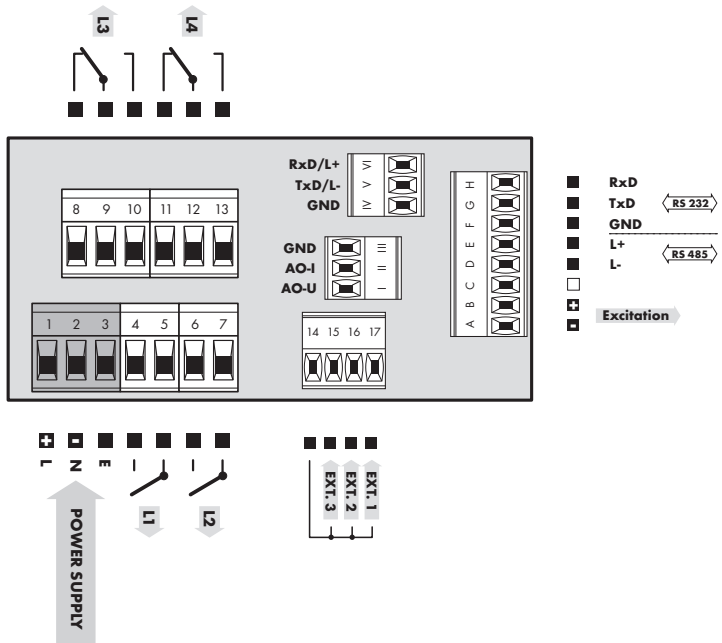
Excitation is suitable for supplying power to sensors and transmitters. It has a galvanic separation.

Comparators are assigned to monitor one, two, three or four limit values with relay output. The user may select limits regime: LIMIT/DOSING/FROM-TO. 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.

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.

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.



EXTERNAL INPUTS

	DESCRIPTION	CONTROL
EXT.	According to setting in Menu (see Menu > EXT. IN., page 46)	upon contact, bracket (No. 14 and 15/16/17)

SETTING **PROFI**

For expert users
Complete instrument menu
Access is password protected
Possibility to arrange items of the **USER MENU**
Tree menu structure

SETTING **LIGHT**

For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

SETTING **USER**

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

4.1 SETTING

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

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

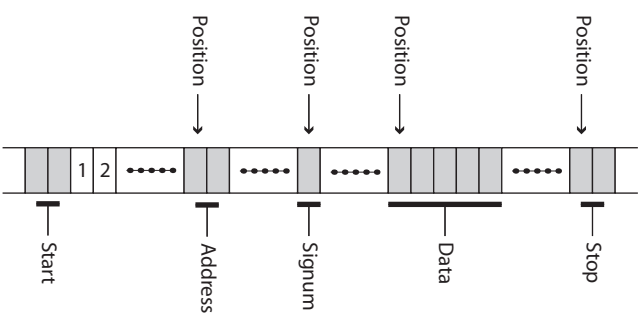
PROFI **Complete programming menu**
- contains complete instrument menu and is protected by optional number code

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).

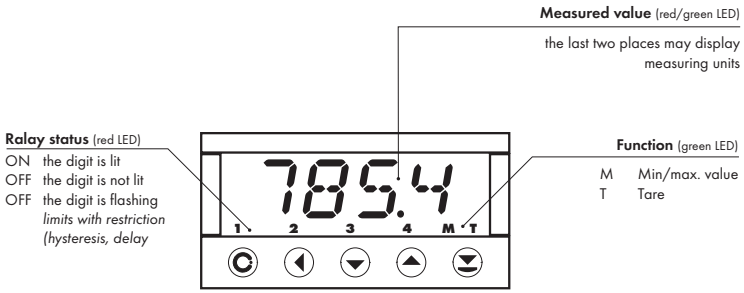
Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.
Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

User data protocol



4. INSTRUMENT SETTING

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



Symbols used in the instructions

DEF values preset from manufacture

symbol indicates a flashing light (symbol)

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

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

after pressing the key the set value will not be stored

after pressing the key the set value will be stored

30 continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT

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

THE MINUS SIGN

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

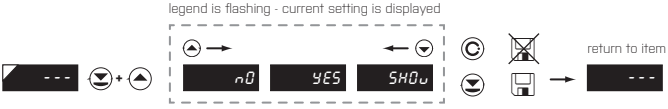
Control keys functions

KEY	MEASUREMENT	MENU	SETTING NUMBERS/SELECTION
C	access into USER menu	exit menu	quit editing
◀	programmable key function	back 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	confirm setting/selection
▲ + ▼			numeric value is set to zero
C + ▼▼	access into LIGHT/PROFI menu		
C + ▼	direct access into PROFI menu		
▼▼ + ▲		configuration of an item for "USER" menu	
▼▼ + ▼		determine the sequence of items in "USER - LIGHT" menu	

Setting items into „USER" menu

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

USER



nO item will not be displayed in USER menu

YES item will be displayed in USER menu with the option of setting

SHOu item will be solely displayed in USER menu

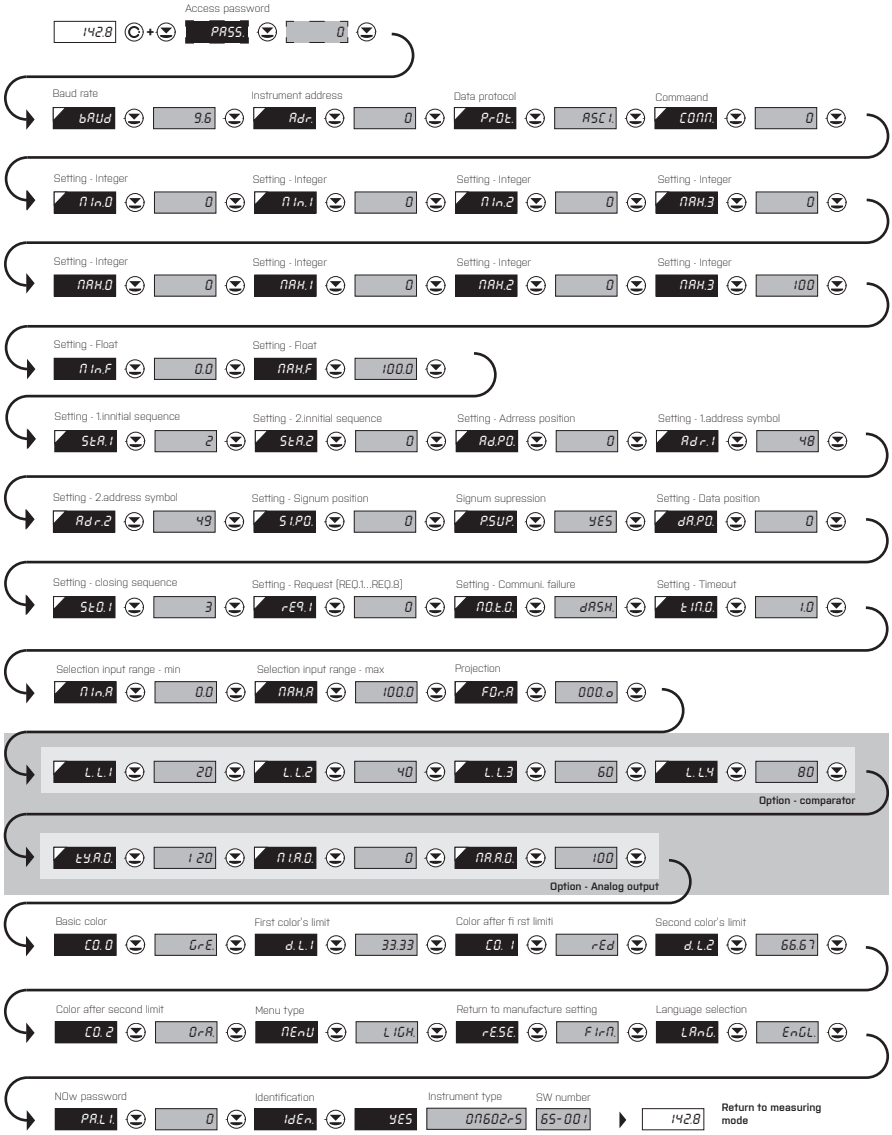
SETTING **LIGHT**

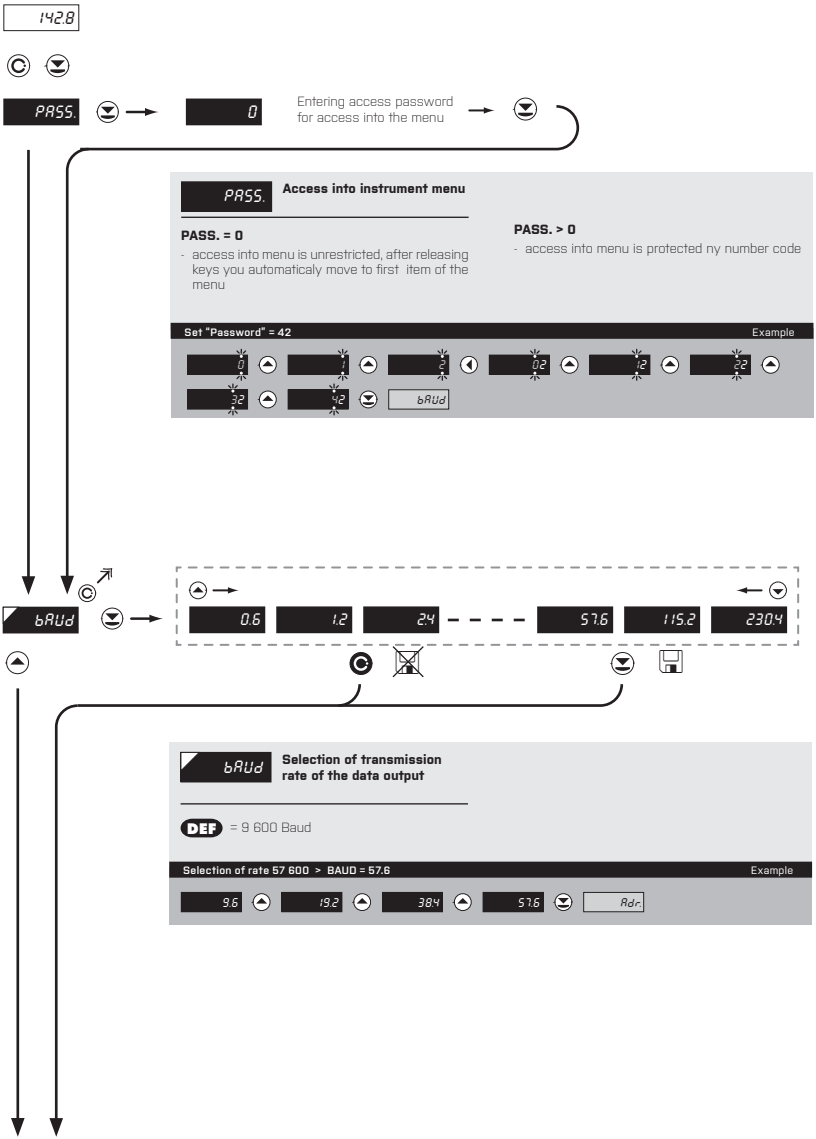
For traiNOd users
Only items NOcessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
LiNOar menu structure

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

!

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


Access password
1428
PASS.
0
Baud rate
bAUd
9.6
Instrument address
Adr.
0
Data protocol
Pr0t.
ASCI.
Commaand
COMM.
0
Setting - Integer
MIn.0
0
MIn.1
0
MIn.2
0
MAX.3
0
Setting - Integer
MAX.0
0
MAX.1
0
MAX.2
0
MAX.3
100
Setting - Float
MIn.F
0.0
MAX.F
100.0
Setting - 1.innitial sequence
StA.1
2
Setting - 2.innitial sequence
StA.2
0
Setting - Adress position
AdrP0.
0
Setting - 1.address symbol
Adr.1
48
Setting - 2.address symbol
Adr.2
49
Setting - Signum position
SIP0.
0
Signum supression
PSUP.
YES
Setting - Data position
dAP0.
0
Setting - closing sequence
StO.1
3
Setting - Request (REQ.1...REQ.8)
rEQ.1
0
Setting - Communi. failure
MOt.0.
dASH.
Setting - Timeout
t IM.0.
1.0
Selection input range - min
MIn.A
0.0
Selection input range - max
MAX.A
100.0
Projection
FOrA
000.o
L.L.1
20
L.L.2
40
L.L.3
60
L.L.4
80
Option - comparator
tYA.0.
1 20
MIA.0.
0
MAA.0.
100
Option - Analog output
Basic color
CO.0
GrE
First color's limit
d.L.1
33.33
Color after fi rst limiti
CO. 1
rEd
Second color's limit
d.L.2
66.67
Color after second limit
CO.2
OrA
Menu type
MEnU
LIGH.
Return to manufacture setting
rESE.
FIrM.
Language selection
LAnG.
EnGL
NOw password
PA.L1.
0
Identification
IdEn.
YES
Instrument type
ON602rS
SW number
65-001
1428
Return to measuring mode


142.8
PASS.
0
Entering access password for access into the menu
PASS.
Access into instrument menu
PASS. = 0
- access into menu is unrestricted, after releasing keys you automaticaly move to first item of the menu
PASS. > 0
- access into menu is protected ny number code
Set "Password" = 42
Example
0
1
2
42
bAUd
bAUd
0.6
1.2
2.4
57.6
115.2
230.4
bAUd
Selection of transmission rate of the data output
DEF = 9 600 Baud
Selection of rate 57 600 > BAUD = 57.6
Example
9.6
19.2
38.4
57.6
Adr

Adr. Setting instrument address

DEF = 0

Address 10 > ADR. = 10 Example

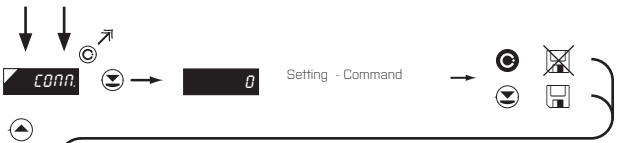
Prot. Selection of data protocol

DEF = ASCII

	Menu	Description
PROT.	ASCI.	Data protocol ASCII
	M.BUS	Data protocol DIM MessBus
	MAST.	Instrument solicits data from subordinate system - instrument controls data tansmission from subordinate system - "**COMM.**" may be used for selection of received data (for commands see data protocol) - instrument asks 10 questions/s, if no response arrives within 2 s the display shows " - - - -"
	SLAV.	Passive display - slave is used where there is communication of other isntruments or a computer in the "**MAST.**" mode. If "**COMM.**" is correctly received, the instrumetns will display the data.
	UNIV.	Universal protocol - in dynamic v dynamických items (Start, Adr-Un, Num Sign, Data, Stop, Request) cutom protocol can be set up.

Data protocol = ASCII > ASCI. Example

* subsequent item on the menu depends on instrument setting



COMM. **Setting - Command**

DEF = uu (two spaces)

COMM. > uu Example

* subsequent item on the menu depends on instrument setting

!

If is „**COMM.**" „uu" (two spaces) is broadcast query on data #AA<CR>.

Else #AA<<**COMM.**>><CR> will wait on confirmation „!AA" and after it will send out request about data #AA<CR>

Min.0 **Selection integer input range - min - MSB**

- setting minimum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MIN.0 = 0 Example

Min.1 **Selection integer input range - min "integer"**

- setting minimum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MIN.1 = 0 Example

Min.2 **Selection integer input range - min "integer"**

- setting minimum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MIN.2 = 0 Example

Selection integer input range - min "integer" - LSB

- setting minimum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MIN.3 = 0 Example

Selection of integer input range - max - MSB

- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MAX.0 = 0 Example

MAX.1 **Selection of integer input range - max**

- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MAX.1 = 0 Example

MAX.2 **Selection of integer input range - max**

- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MAX.2 = 0 Example

MAX.3 **Selection of integer input range - max - LSB**

- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

DEF = 0

Selection integer input range "integer" > MAX.3 = 0 Example

MIN.F **Selection of float input range - min.**

- input data format is float according to standard IEEE -754, 32 bits
- range: 0.3×10^{38} <= |x| <= 1.7×10^{38}

DEF = 0

Selection float input range > MIN.F =0 Example

MAX.F **Selection of float input range" - max**

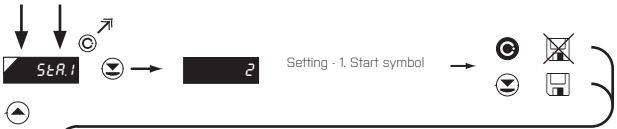
DEF = 100

- input data format is float according to standard IEEE -754, 32 bits
- range: 0.3×10^{-38} <= |x| <= 1.7×10^{38}

Selection float input range > MAX.F=100 Example

* subsequent item on the menu depends on instrument setting

30



StA.1 **Setting the first intrductory symbol**

- set directly in ASCII code
- range: 1...127

DEF = 2

Setting 1.Start symbol > STA.1 = 2 Example

StA.2 **Setting the second intrductory symbol**

- set directly in ASCII code
- range: 1...127
- if set to "0", it will not be used

DEF = 0

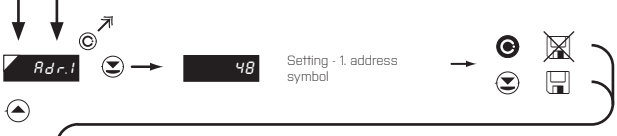
Setting 2.Start symbol > STA.2 = 0 Example

Ad.P0. Setting the address position

- Position of the address and other symbols which have to have a set value. If set to 0, the block will not be taken into account. The block can be anywhere in the message.
- range: 0...245

DEF = 0

Setting address position > Adr.1 = 0 Example



Adr.1 First address symbol

- set directly in ASCII code
- range: 0...127

DEF = 48

Setting 1.address symbol > Adr.1 = 48 Example

Adr.2 **Second address symbol**

- set directly in ASCII code
- range: 0...127
- if set to "0", it will not be used

DEF = 49

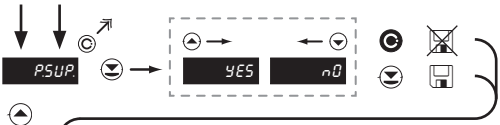
Setting 2. address symbol > Adr.2 = 49 Example

SI.PO. **Setting number sign position**

- Number sign position. If set to 0, it has to be part of the data. This symbol can appear anywhere within the message.
- range: 0...245

DEF = 0

Setting position > SI.PO. = 0 Example

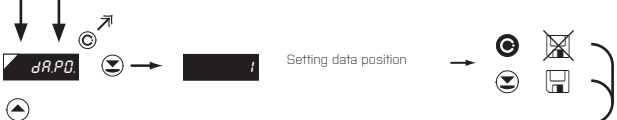


P.SUP. **„Plus" number sign supression**

- option "YES" > number sign "plus" will be replaced by space
- option "NO" > number sign "plus" will be displayed

DEF = YES

Sign supression **> P.SUP. = YES** Example



dA.P0. **Setting data position**

- Data position. This block can be anywhere within the message. If ending sequence is received sooner than the set number of symbols, it is considered a succcesful reception.
- range: 1...245

DEF = 1

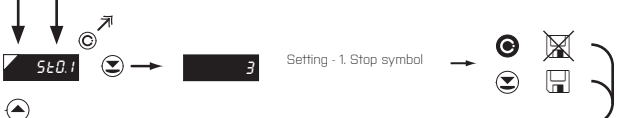
Setting data position > dA.P0. = 0 Example

dE.dE. Setting number of signs

- 7 symbols can be displayed only if there is no !minus" sign and one of the symbols is decimal point
- range: 1...7

DEF = 6

Setting number of signs > dA.DE. = 6 Example



St0.1 Setting the first closing symbol

- set directly in ASCII code
- range: 0...127
- If set to 0, the closing block will not be taken into account

DEF = 3

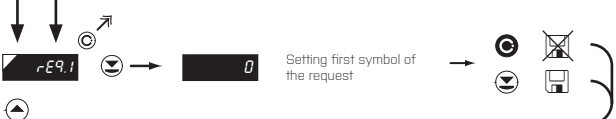
Setting - 1. Stop symbol > ST0.1 = 3 Example

St0.2 **Setting the second closing symbol**

- set directly in ASCII code
- range: 0...127
- If set to 0, the closing block will not be taken into account

DEF = 0

Setting - 2. Stop symbol > STO.2 = 0 Example



rE9.1 **First symbol of the request**

DEF = 0

- set directly in ASCII code
- range: 0...127
- If set to "0", request is not sent

Setting - 1. symbol > REQ.1 = 2 Example

*****

Same procedure for **REQ. 2**..**REQ. 8**

no.t.O. **Selecting display mode in case of communication failure**

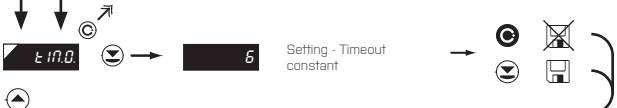
DEF = DASH.

MO.T.O.	Menu	Description
	NO	No reaction
	BLAN.	Display goes off
	FLAS..	Last displayed value starts flashing
	DASH.	Dash symbols displayed
	DOT	Decimal point is displayed

Selecton mode > **Dashes** Example

!

Item will not appear in "**MAST.**" protocol



t IM.O. **Setting the time constant for Timeout**

- setting the time delay after which the indication of interrupted communication will appear on the display in the mode of "**Mo.t.O.**"
- range: 0...99,9 s

- DEF = 1.0 s

Setting - Constant > tIM.O. = 1 Example

!

Item will not appear in "**MAST.**" protocol and when "**MO.t.O.**" is disabled

30

MIn.A **Selection of integer input range - min**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0.0

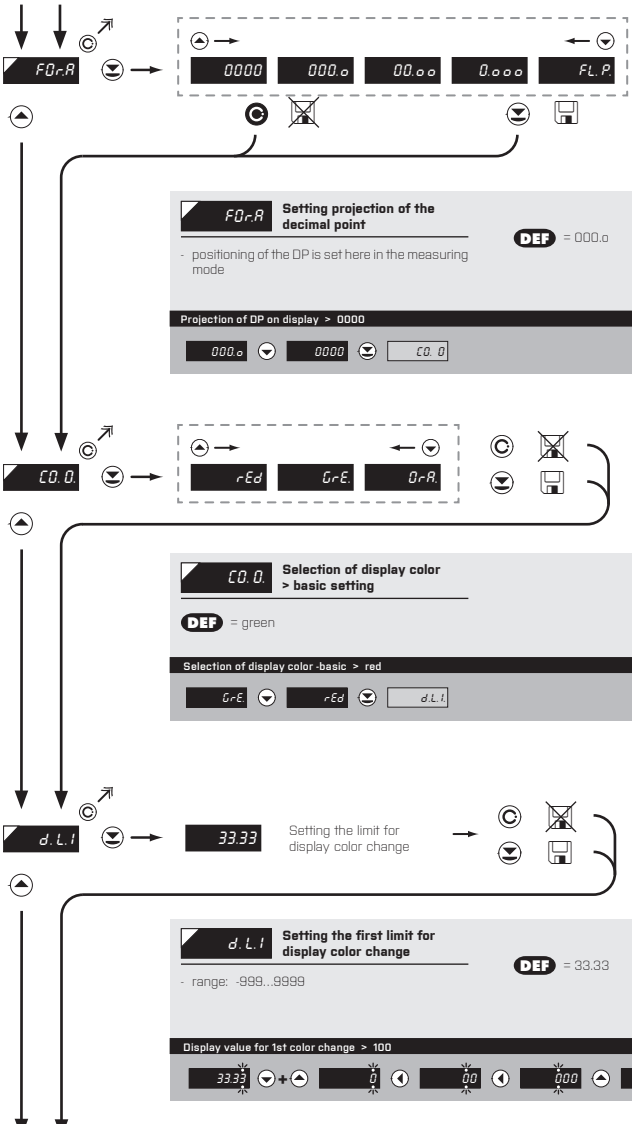
Projection for min > MIN.A = 0.0 Example

MAX.A **Selection of float input range - max**

- range of the setting is -999...9999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100.0

Projection for max > MAX.A = 100.0 Example


FOr.A
0000
000.o
00.oo
0.ooo
FL.P.
FOr.A
Setting projection of the decimal point
DEF = 000.o
- positioning of the DP is set here in the measuring mode
Projection of DP on display > 0000
Example
000.o
0000
CO. O
CO. O.
rEd
GrE.
OrA.
CO. O.
Selection of display color > basic setting
DEF = green
Selection of display color -basic > red
Example
GrE
rEd
d.L.1
d.L.1
33.33
Setting the limit for display color change
d.L.1
Setting the first limit for display color change
DEF = 33.33
- range: -999...9999
Display value for 1st color change > 100
Example
33.33
0
00
000
100
CO. 1

CO. 1. **Selection of display color > for crossing the d. L.1**

- selection of display color is governed by the setting under item d. L.1
- the color changes if the display value exceeds the value set under d. L.1

DEF = orange

Selection of display color if the value is > d. L.1 > green Example

d.L.2. **Setting the second limit for display color change**

- range: -999...9999

DEF = 66.67

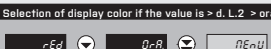
Setting display for 2nd color change > 400 Example

CO. 2. **Selection of display color > for crossing the d. L.2**

- selection of display color is governed by the setting under item d. L.2
- the color changes if the display value exceeds the value set under d. L.2

DEF = red

Selection of display color if the value is > d. L.2 > orange Example



*subsequent item on the menu depends on instrument equipment

DISPLAYED ONLY WITH OPTIONS > **COMPARATORS**

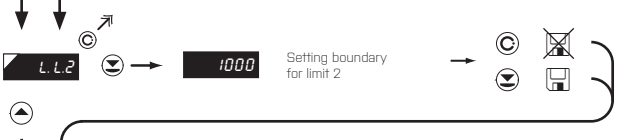
L.L.1 **Setting boundary for limit 1**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 500

DEF „Hystresis"=0, „Delay"=0

Setting limit 1 > M. L.1 = 512 Example



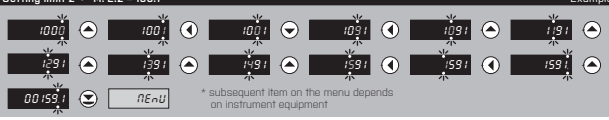
L.L.2 **Setting boundary for limit 2**

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 1000

DEF „Hystresis"=0, „Delay"=0

Setting limit 2 > M. L.2 = 159.1 Example



* subsequent item on the menu depends on instrument equipment

!

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

L.L3 Setting boundary for limit 3

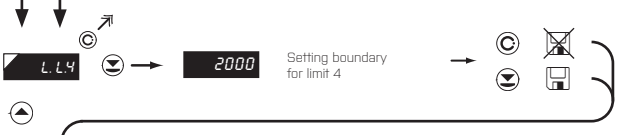
- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 1500

DEF „Hystresis"=0, „Delay"=0

Setting limit 3 > M. L 3 = 1525 Example

* subsequent item on the menu depends on instrument equipment



L.L4 Setting boundary for limit 4

- range of the setting: -999...9999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

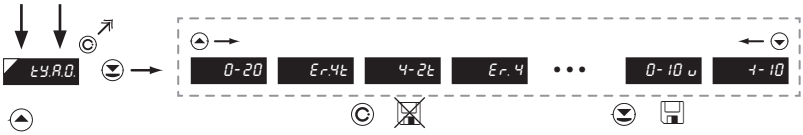
DEF = 2000

DEF „Hystresis"=0, „Delay"=0

Setting limit 4 > M. L 4 = 2123 Example

* subsequent item on the menu depends on instrument equipment

DISPLAYED ONLY WITH OPTIONS > **ANALOG OUTPUT**



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

TY.A.O.	Menu	Range	Description
	0-20mA	0...20 mA	
	Er.4t	4...20 mA	with error message indication and broken loop indication (<3,6 mA)
	4-2t	4...20 mA	with broken loop indication (<3,6 mA)
	Er.4	4...20 mA	with indication of error statement (<3,6 mA)
	4-20	4...20 mA	
	i0-5	0...5 mA	
	u0-2	0...2 V	
	u0-5	0...5 V	
	0-10	0...10 V	
	+-10	±10 V	

DEF = 4...20 mA

Type of analog output - 0...10 V > TY.A.O. = 0-10 Example

MI.A.O. **Assigning the display value to the beginning of the AO range**

- range: -999...9999

DEF = 0

Display value for the beginning of the AO range > MI.A.O. = 0 Example

!

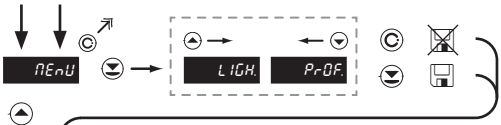
Items for "**Limits**" and "**Analog output**" are accessible only if incorporated in the instrument.

MA.A.O. **Assigning the display value to the end of the AO range**

- range: -999...9999

DEF = 1000

Display value for the end of the AO range > MA.A.V. = 1020 Example



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

LIGH. > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting

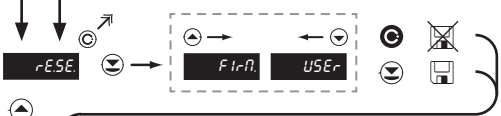
> linear tree structure

PROF. > menu PROFI, a complete menu for complete instrument setting

> tree menu structure

DEF = LIGHT

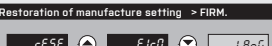
Menu LIGHT > MENU = LIGH. Example

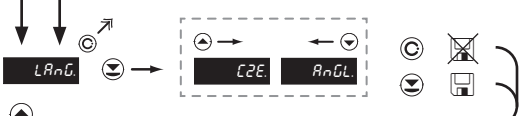


rESE. **Restoration of manufacture instrument setting**

- in the event of error setting the manufacture setting may be restored
- restoration is performed for the currently selected type of the instrument input (select "TYPE")
- provided you stored your user setting in the "**PROF.**" menu, it may also be restored (select "USER")
- loading manufacture calibration and primary setting of items on the menu (DEF)

Restoration of manufacture setting > FIRM. Example



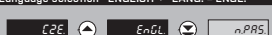


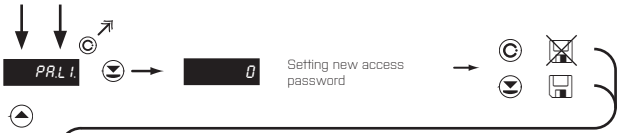
LANG. **Selection of language in instrument menu**

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL. Example

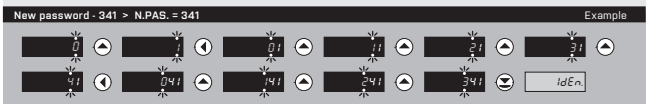


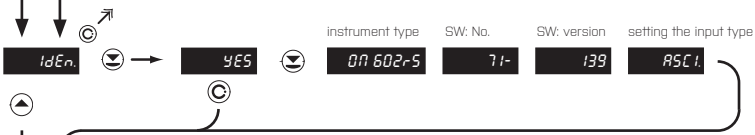


PAL1. Setting new access password

- 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 adminstrator of this device

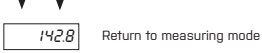
DEF = 0





idEn. 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



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**

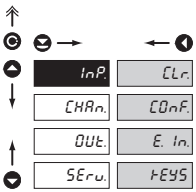
- contains complete instrument menu and is protected by optional number code
- designed for expert users
- preset from manufacture is menu **LIGHT**

Switching over to "PROFI" menu

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

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

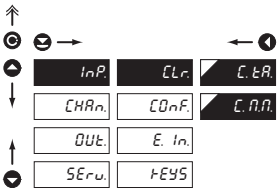
6.1 SETTING "PROFI" - INPUT



The primary instrument parameters are set in this menu

CLr.	Resetting internal values
COnF.	Selection of measuring range and parameters
E. In.	Setting external inputs functions
KEYS	Assigning further functions to keys on the instrument

6.1.1 RESETTING INTERNAL VALUES

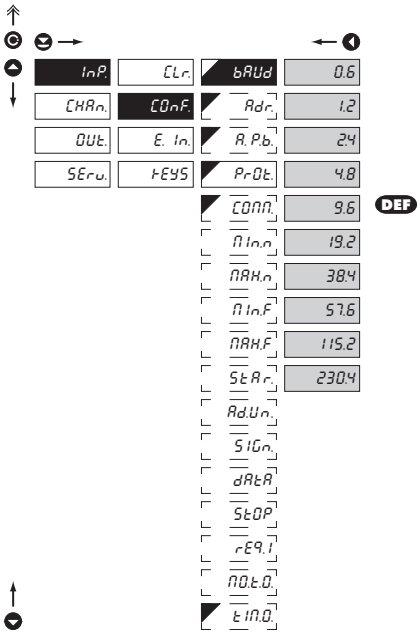


CLr. Resetting internal values

C.tA.	Tare resetting
C.M.M.	Resetting min/max value

- resetting memory for the storage of minimum and maximum value achieved during measurement

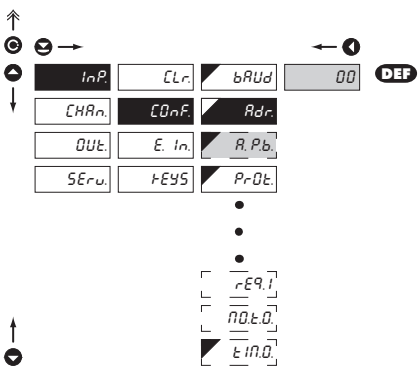
6.1.2a SELECTION OF DATA BAUD RATE



bAUd **Selection of data baud rate**

0.6	Rate - 600 Baud
1.2	Rate - 1 200 Baud
2.4	Rate - 2 400 Baud
4.8	Rate - 4 800 Baud
9.6	Rych - 9 600 Baud
19.2	Rate - 19 200 Baud
38.4	Rate - 38 400 Baud
57.6	Rate - 57 600 Baud
115.2	Rate - 115 200 Baud
230.4	Rate - 230 400 Baud

6.1.2b SETTING INSTRUMENT ADDRESS



Adr. **Setting instrument address**

- range: 0...31
- DEF = 00

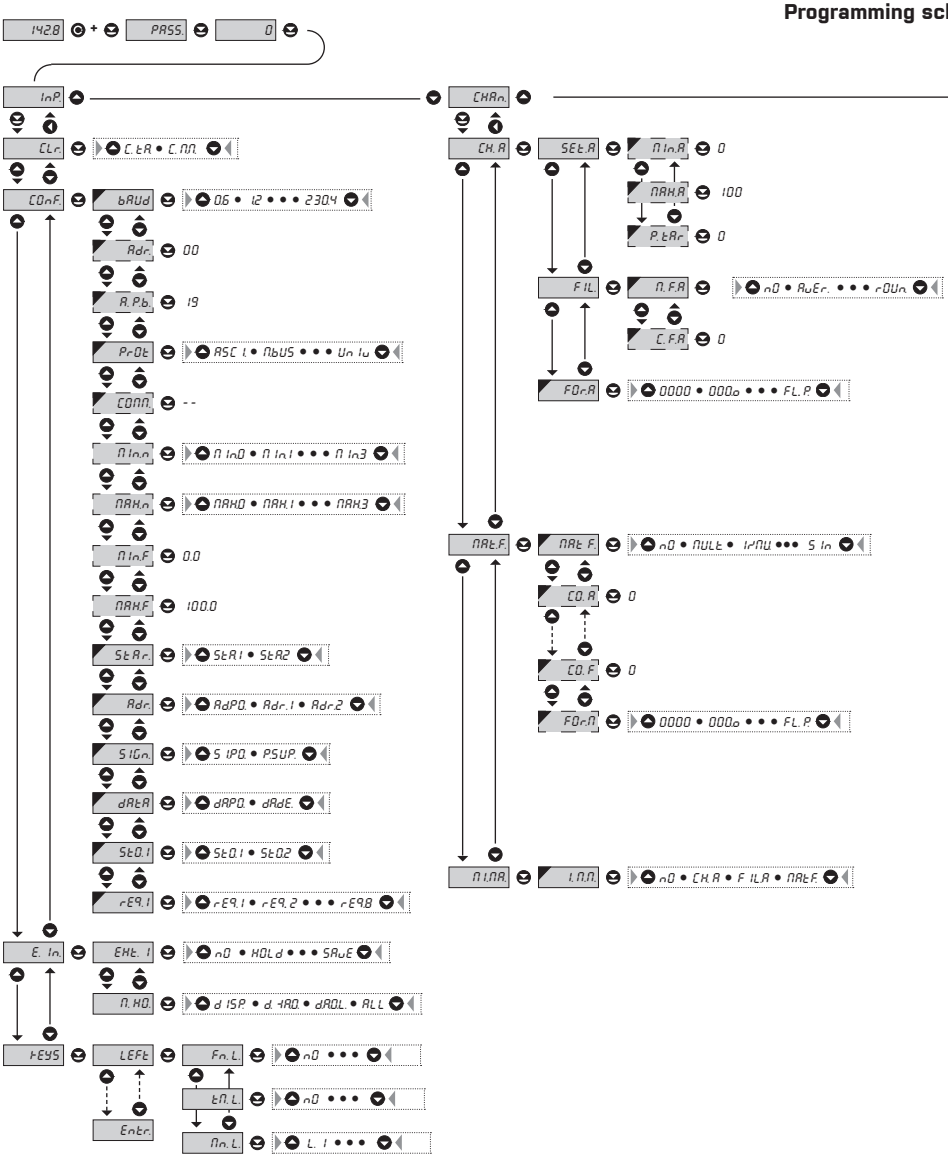
A. P.b. **Setting instrument address - PROFIBUS**

- range: 0...125
- DEF = 19

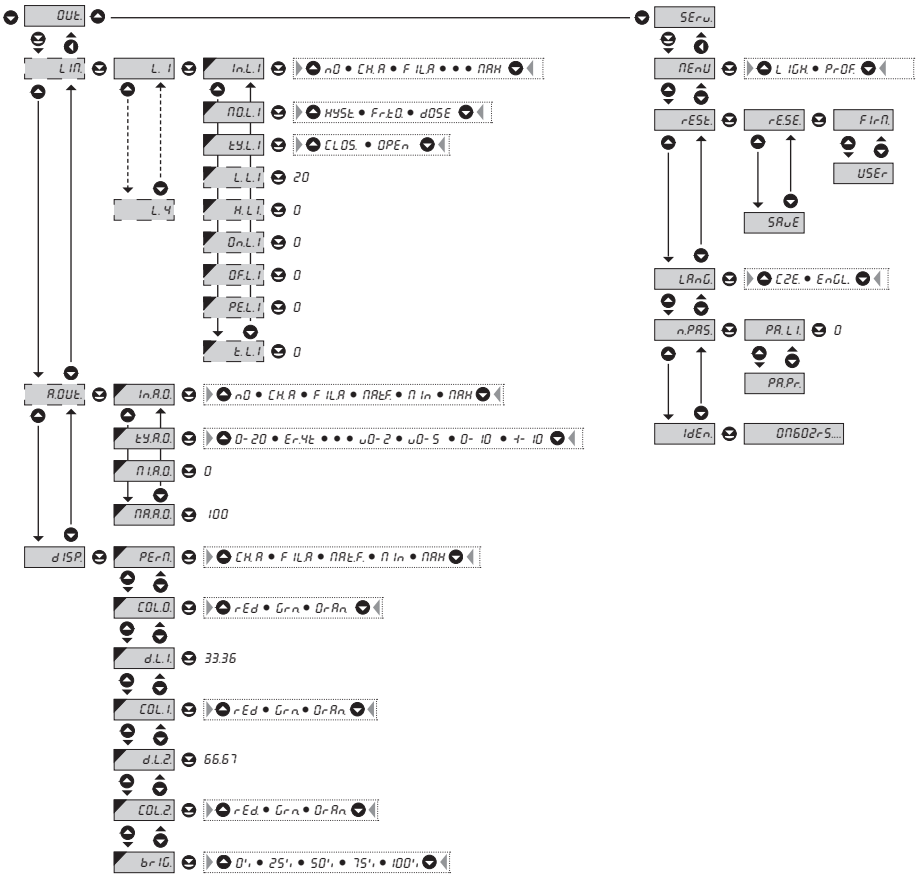
!

When selecting the "**UNI**" protocol, the address is set in "**Ad.Un.**"

Programming sch



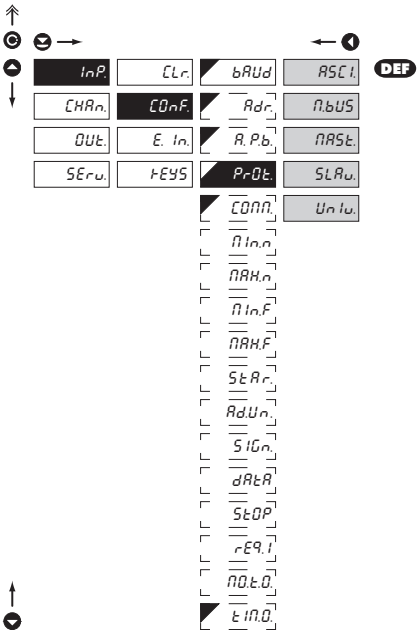
eme PROFI MENU



!

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

6.1.2c SELECTION OF DATA PROTOCOL



Prot. **Selection of data protocol**

ASCI. Data protocol ASCII

n.bUS Data protocol DIN MessBus

MASt. Instrument solicits data from subordinate system

- instrument controls data tansmission from subordinate system
- "**COMM.**" may be used for selection of received data (for commands see data protocol)
- instrument asks 10 questions/s, if no response arrives within 2 s the display shows " - - - - "

SLAv. Passive Display - Slave

- passive display - slave is used where there is communication of other isntruments or a computer in the "**MAST.**" mode. If "**COMM.**" is correctly received, the instrumetns will display the data.

Univ. Universal protocol

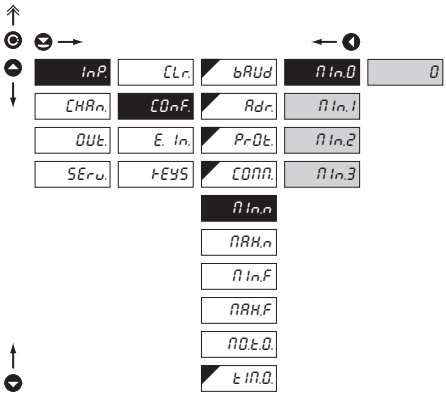
- in dynamic v dynamických items (Start, Adr-Un, Num Sign, Data, Stop, Request) cutom protocol can be set up.

!

If is „**COMM.**" „uu" (two spaces) is broadcast query on data #AA<CR>.

Else #AA<<**COMM.**>><CR> will wait on confirmation „IAA" and after it will send out request about data #AA<CR>

6.1.2d SELECTION OF INTEGER INPUT RANGE - MINIMUM — ASCII, MESSBUS



MIn.n **Selection of integer input range - Min**

- setting minimum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)
- DEF = 0

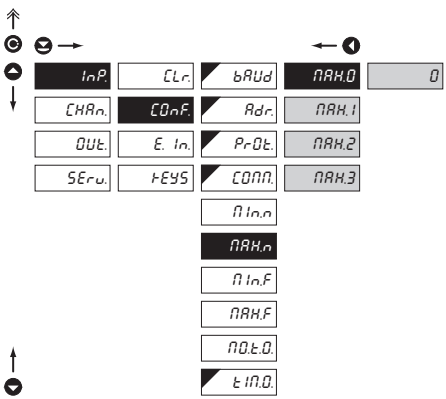
MIn.0 Most significant byte "MSB" - min. 0

MIn.1 Selection of input range - min. 1

MIn.2 Selection of input range - min. 2

MIn.3 Least significant byte "LSB" - min. 3

6.1.2e SELECTION OF INTEGER INPUT RANGE - MAXIMUM — ASCII, MESSBUS



MAX.n **Selection of integer input range - Max**

- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits
- range: -2147483648...2147483647 (0x80000000...0x7FFFFFFF)

MAX.0 Most significant byte "MSB" - max. 0

- DEF = 0

MAX.1 Selection of input range - max. 1

- DEF = 0

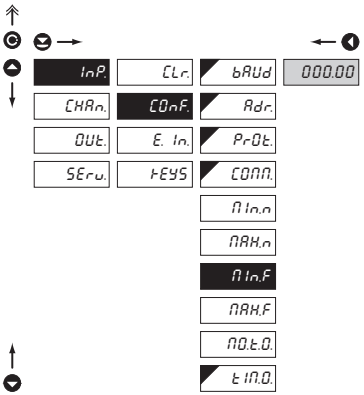
MAX.2 Selection of input range - max. 2

- DEF = 0

MAX.3 Least significant byte "LSB" - max. 3

- DEF = 100

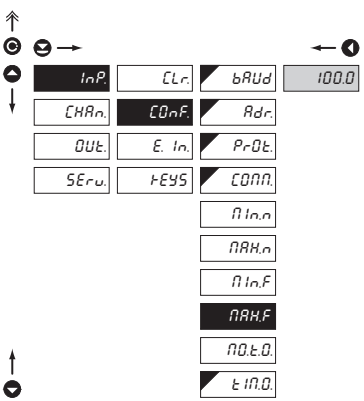
6.1.2f SELECTION OF FLOAT INPUT RANGE - MINIMUM



Min.F **Selection of float input range - min.**

- setting minimum value of input data
- input data format is float according to standard IEEE -754, 32 bits
- range: $0.3\times10^{38} <= |x| <= 1.7\times10^{38}$
- **DEF** = 0

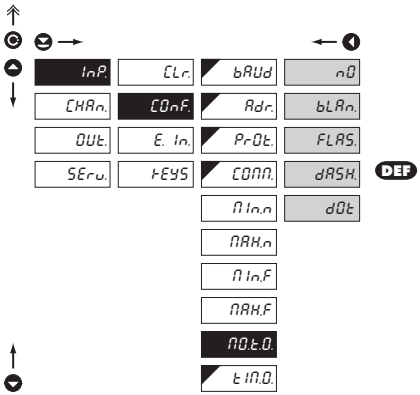
6.1.2g SELECTION OF FLOAT INPUT RANGE - MAXIMUM



MAX.F **Selection of float input range - max**

- setting maximum value of input data
- input data format is float according to standard IEEE -754, 32 bits
- range: $0.3\times10^{38} <= |x| <= 1.7\times10^{38}$
- **DEF** = 100

6.1.2h SELECTING DISPLAY MODE IN CASE OF COMMUNICATION FAILURE



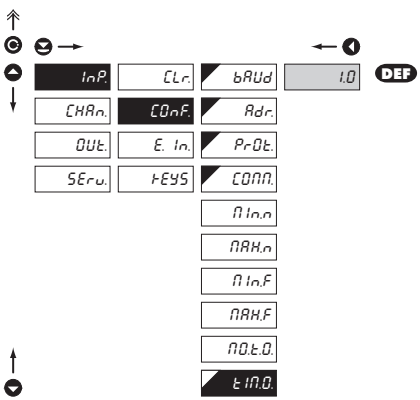
MO.t.O. Selecting display mode in case of communication failure

nO	No reaction
bLAn.	Displey goes off
FLAS.	Last displayed value starts flashing
dASH.	Dash sy mbols displayed
dOt	Decimal point is displayed

!

Item will not appear in "MAST." protocol

6.1.2i SETTING THE TIME CONSTANT FOR TIMEOUT



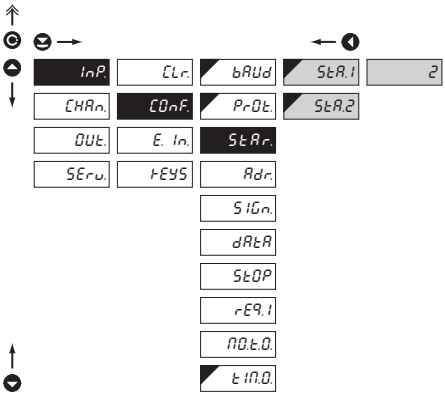
t IN.O. Setting the time constant for Timeout

- setting the time delay after which the indication of interrupted communication will appear on the display in the mode of "MO.t.O."
- range: 0...99,9 s
- DEF = 1.0 s

!

Item will not appear in "MAST." protocol and when "MO.t.O." is disabled

6.1.2j SETTING INNITIAL TWO-SYMBOL SEQUENCE — PROTOCOL "UNIVERSAL"

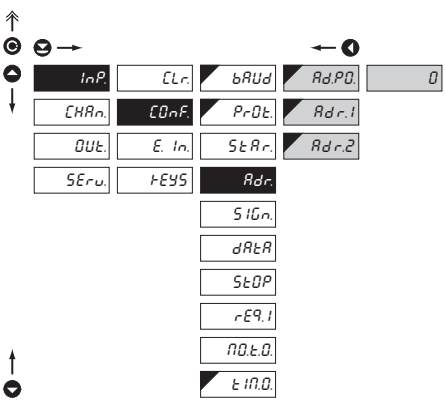


StAr. Setting innitial two-symbol sequence

StA.1 Setting the first intrductory symbol
- set directly in ASCII code
- range: 1...127
- DEF = 2

StA.2 Setting the second introductory symbol
- set directly in ASCII code
- range: 0...127
- if set to "0", it will not be used
- DEF = 0

6.1.2k SETING THE INSTRUMENT ADDRESS — PROTOCOL "UNIVERSAL"



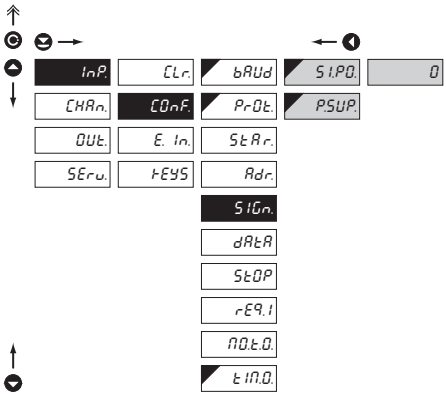
Adr. Setting the instrument address
- either address in universal protocol or one (or two) symbols of fixed value

Ad.P0. Setting the address position
- Position of the address and other symbols which have to have a set value. If set to 0, the block will not be taken into account. The block can be anywhere in the message.
- range: 0...245
- DEF = 0

Adr.1 First address symbol
- set directly in ASCII code
- range: 0...127
- DEF = 48

Adr.2 Second address symbol
- set directly in ASCII code
- range: 0...127
- if set to "0", it will not be used
- DEF = 49

6.1.2l SETTING NUMBER SIGN — PROTOCOL "UNIVERSAL"



SIGn. Nastavení obsluhy znaménka

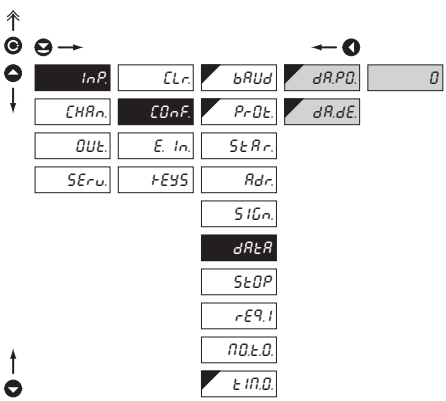
SI.PO. Setting number sign position

- Number sign position. If set to 0, it has to be part of the data. This symbol can appear anywhere within the message.
- range: 0...245
- DEF = 0

P.SUP. „Plus" number sign supression

- option "YES" > number sign "plus" will be replaced by space
- option "NO" > number sign "plus" will be displayed
- DEF = YES

6.1.2m SETTING DATA FORMAT — PROTOCOL "UNIVERSAL"



dAtA Setting data format

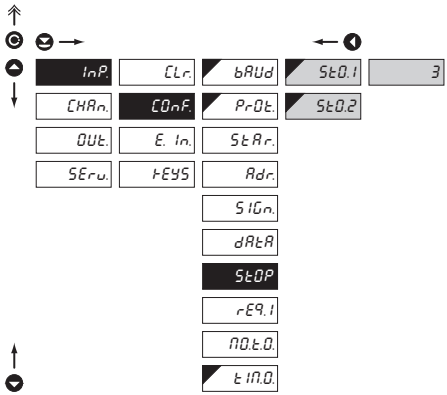
dA.PO. Setting data position

- Data position. This block can be anywhere within the message. If ending sequence is received sooner than the set number of symbols, it is considered a succcesful reception.
- range: 1...245
- DEF = 1

dA.dE. Settin number of signs

- 7 symbols can be displayed only if there is no !minus" sign and one of the symbols is decimal point
- range: 1...7
- DEF = 6

6.1.2n SETTING OF CLOSING TWO-SYMBOL SEQUENCE — PROTOCOL "UNIVERSAL"



StOP **Setting of closing two-symbol sequence**

- Closing sequence. None, one or two symbols. If both symbols are "**0**", data will be displayed after their reception

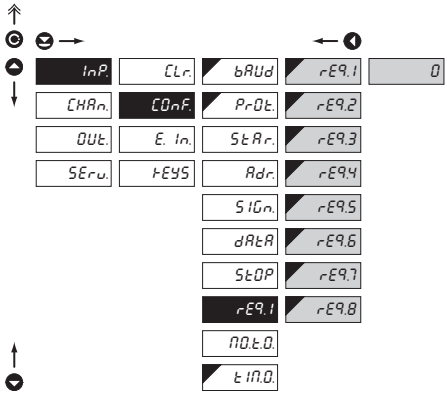
StO.1 Setting the first closing symbol

- set directly in ASCII code
- range: 0...127
- If set to "**0**", the closing block will not be taken into account
- **DEF** = 3

StO.2 Setting the second closing symbol

- set directly in ASCII code
- range: 0...127
- If set to "**0**", the block will not be taken into account.
- **DEF** = 0

6.1.2o SETTING OF THE REQUEST TO RECEIVE DATA — PROTOCOL "UNIVERSAL"



rE9.1 **Setting of the request to receive data**

rE9.1 First symbol of the request

- set directly in ASCII code
- range: 0...127
- If set to "**0**", request is not sent
- **DEF** = 0

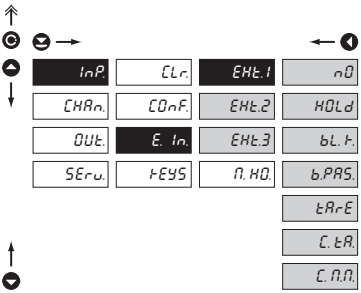
*****

Same procedure for **REQ. 2**...**REQ. 8**

!

How to set items "**Mo.t.O.**" and "**tIMEOU.**" see page 49

6.1.3a EXTERNAL INPUT FUNCTION SELECTION

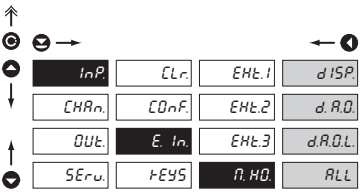


E. In. — External input function selection

- **nO** — Input is off
- **HOLd** — Activation of HOLD
- **bL. h.** — Locking keys on the instrument
- **b.PAS.** — Activation of locking access into programming menu LIGHT/PROFI
- **tArE** — Tare activation
- **C. tA.** — Tare resetting
- **C. n.n.** — Resetting min/max value

- DEF EXT. 1 > HOLD
- DEF EXT. 2 > BL. K.
- DEF EXT. 3 > TARE

6.1.3b SELECTION OF FUNCTION "HOLD"



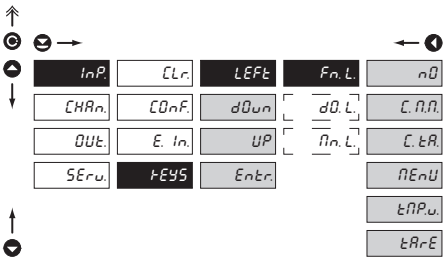
n. nO. — Selection of function "HOLD"

- **d iSP.** — "HOLD" locks only the value displayed
- **d. A.O.** — "HOLD" locks the value displayed and on AO
- **d.A.O.L.** — "HOLD" locks the value displayed, on AO and limit evaluation
- **ALL** — "HOLD" locks the entire instrument

*****

Setting procedure is identical for **EXT. 2** and **EXT. 3**

6.1.4a OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS



Fn.L. Assigning further functions to instrument keys

- „FN. L." > executive functions
- „TM. L." > temporary projection of selected values
- „MN. L." > direct access into menu on selected item

nO Key has no further function

C.Mn. Resetting min/max value

C.tA. Tare resetting

MEnU Direct access into menu on selected item

- after confirmation of this selection the "MN. L." item is displayed on superior menu level, where required selection is performed

tMPu. Temporary projection of selected values

- after confirmation of this selection the item "TM. L." is displayed on superior menu level, whererequired selection is performed

tArE Tare function activation

!

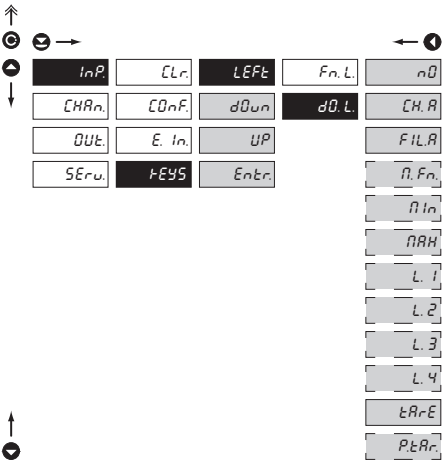
Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

!

Preset values of the control keys **DEF**:

LEFT	Show Tare
UP	Show Max. value
DOWN	Show Min. value
ENTER	w/o functione

6.1.4b OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION



dU.L. Temporary projection of selected item

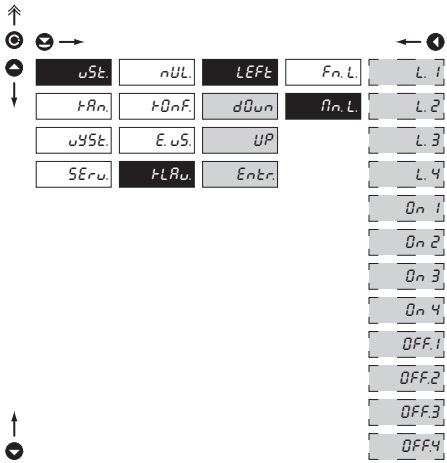
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing + "Selected key", this holds until the stroke of any key

nO	Temporary projection is off
CH.A	Temporary projection of "Channel A" value
FILA	Temporary projection of "Channel A" value after processing digital filters
n.Fn.	Temporary projection of "Mathematic functions" value
n.In	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
L. 1	Temporary projection of "Limit 1" value
L. 2	Temporary projection of "Limit 2" value
L. 3	Temporary projection of "Limit 3" value
L. 4	Temporary projection of "Limit 4" value
tArE	Temporary projection of "TARE" value
PtAr.	Temporary projection of "P. TARE" value

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.1.4c OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - DIRECT ACCESS TO ITEM



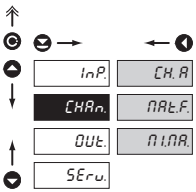
An.L. Assigning access to selected menu item

- **L. 1** Direct access to item "Limit 1"
- **L. 2** Direct access to item "Limit 2"
- **L. 3** Direct access to item "Limit 3"
- **L. 4** Direct access to item "Limit 4"
- **On 1** Direct access to item "ON 1"
- **On 2** Direct access to item "ON 2"
- **On 3** Direct access to item "ON 3"
- **On 4** Direct access to item "ON 4"
- **OFF.1** Direct access to item "OFF 1"
- **OFF.2** Direct access to item "OFF 2"
- **OFF.3** Direct access to item "OFF 3"
- **OFF4** Direct access to item "OFF 4"

!

Setting is identical for LEFT, DOWN, UP and ENTER

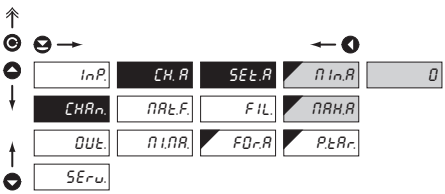
6.2 SETTING "PROFI" - CHANNEL



The primary instrument parameters are set in this menu

- CH.A — Setting parameters of measuring "Channel"
- nAt.F. — Setting parameters of mathematic functions
- MI.MA. — Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION



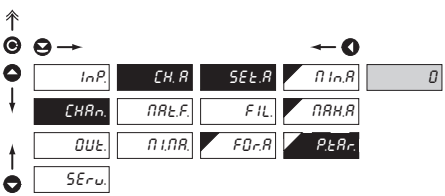
SEt.A **Setting display projection**

- MIn.A — Setting display projection for minimum value of input signal
  - range: -999...9999
  - DEF = 0
- MAX.A — Setting display projection for maximum value of input signal
  - range: -999...9999
  - DEF = 100

!

This setting is only for ASCII protocol using commands **9N** and **9F**

6.2.1b SETTING FIXED TARE



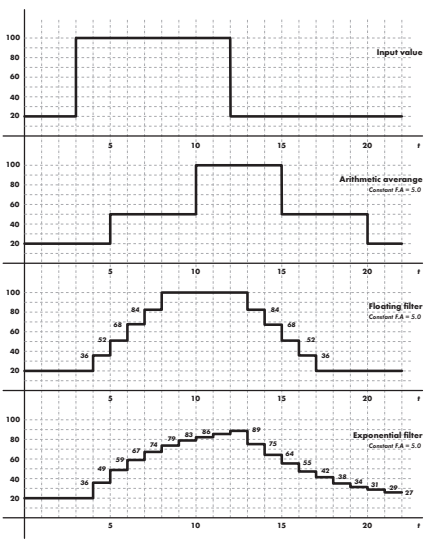
P.tAr. **Setting "Fixed tare" value**

- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting [**P. TAR.** > 0] display shows "**T**" symbol
- range: 0...999999
- DEF = 0

!

This setting is only for ASCII protocol using commands **9N** and **9F**

6.2.1c DIGITAL FILTERS



n.F.A **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

AuEr. Measured data average

- arithmetic average from given number („C. F.A") of measured values
- range: 2...100

FLOA. Selection of floating filter

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

EHP. Selection of exponential filter

- integration filter of first prvního grade with time constant („C. F.A") measurement
- range: 2...100

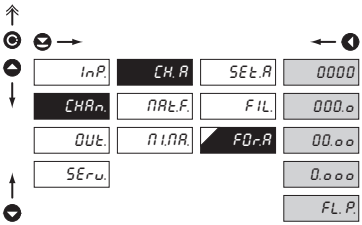
rOUn. Measured value rounding

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

C.F.A Setting constants

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

6.2.1d PROJECTION FORMAT - POSITIONING OF DECIMAL POINT

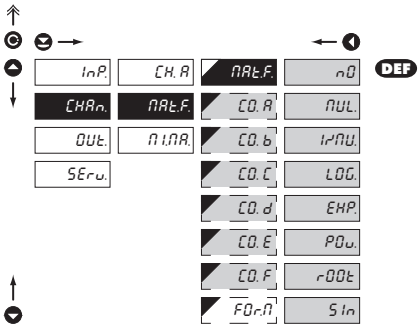


FOr.A **Selection of decimal point**

- the instrument allows for classic projection of a number with positioning of the DP as well as projection with floating DP, allowing to display a number in its most exact form „FL. P."

0000	Setting DP - XXXXXX
DEF	
000.o	Setting DP - XXXXX.x
00.oo	Setting DP - XXXX.xx
0.ooo	Setting DP - XXX.xxx
FL.P.	Floating DP

6.2.2a MATHEMATIC FUNCTIONS



MAt.F. **Selection of mathematic functions**

nO Mathematic functions are off

MULt.. Multinominal

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

1/nU. 1/x

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

LOG. Logarithm

$A \square \ln \frac{\square Bx \square C \square}{\square Dx \square E \square} \square F$

EXP. Exponential

$A \square e^{\frac{\square Bx \square C \square}{\square Dx \square E \square}} \square F$

POW. Power

$A \square \square Bx \square C \square^{\square Dx \square E \square} \square F$

rOOt Root

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

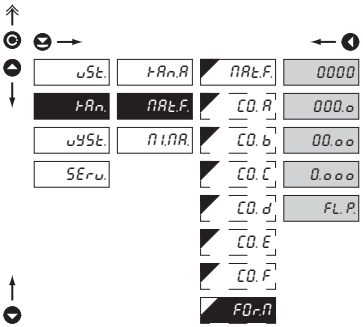
SIn Sin x

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

CO.- Setting constants for calculation of mat.functions

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

6.2.2b MATHEMATIC FUNCTIONS - DECIMAL POINT



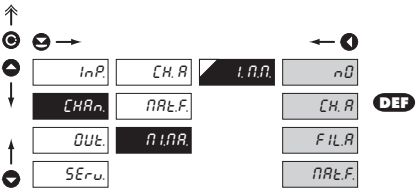
FOr.n **Selection of decimal point**

- the instrument allows for classic projection of a number with positioning of the DP as well as projection with floating DP, allowing to display a number in its most exact form „FL. P."

000000	Setting DP - XXXXXX
00000.o	Setting DP - XXXXX.x
0000.oo	Setting DP - XXXX.xx
000.ooo	Setting DP - XXX.xxx
FL.P.	Floating DP

- **DEF**

6.2.3 SELECTION OF EVALUATION OF MIN/MAX VALUE

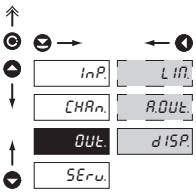


I.N.N. Selection of evaluation of min/max value

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

nO	Evaluation of min/max value is off
CH. A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
MAt.F.	From "Mathematic functions"

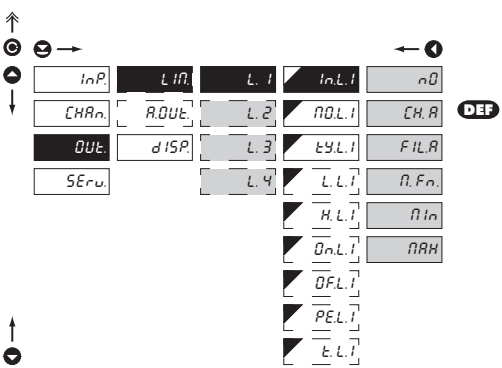
6.3 SETTING „PROFI" - OUTPUTS



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

- LIM. — Setting type and parameters of limits
- A.OUt. — Setting type and parameters of analog output
- diSP. — Setting display projection and brightness

6.3.1a SELECTION OF INPUT FOR LIMITS EVALUATION



In.L.1 — Selection evaluation of limits

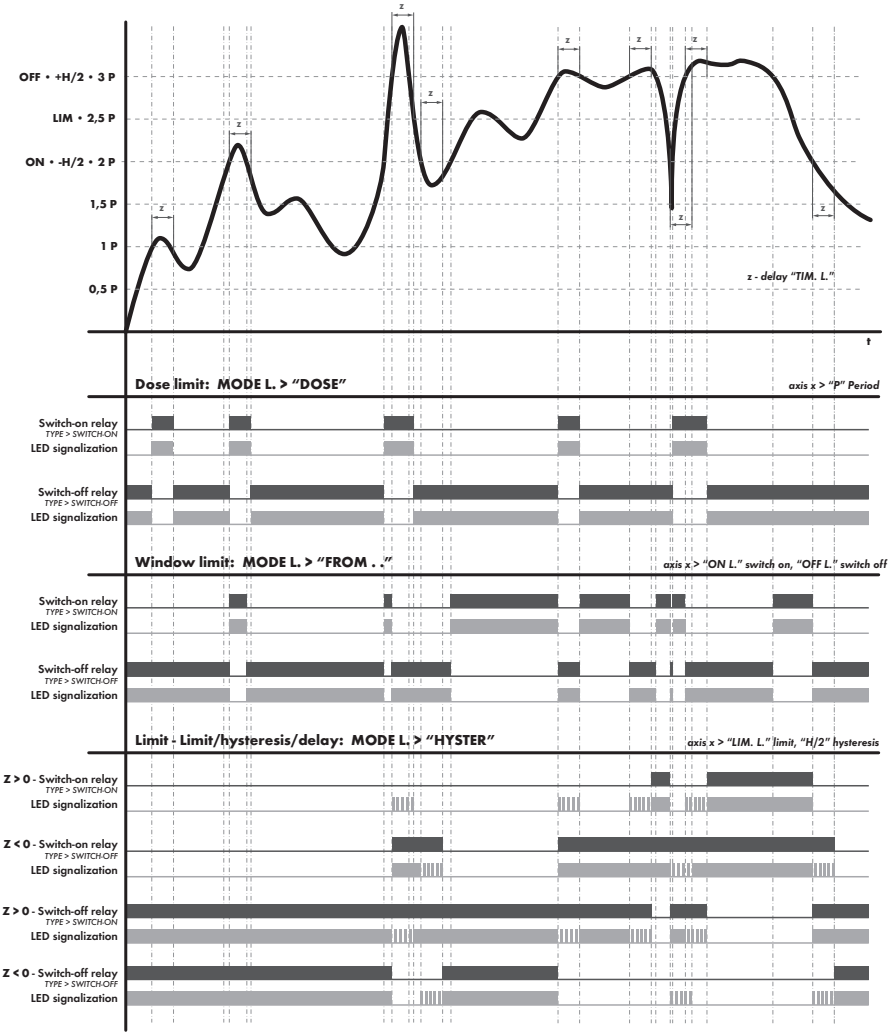
- selection of value from which the limit will be evaluated

- nO — Limit evaluation is off
- CH.A — Limit evaluation from "Channel A"
- FILA — Limit evaluation from "Channel A" after digital filters processing
- n.Fn. — Limit evaluation from "Mathematic functions"
- Min — Limit evaluation from "Min. value"
- MAX — Limit evaluation from "Max. value"

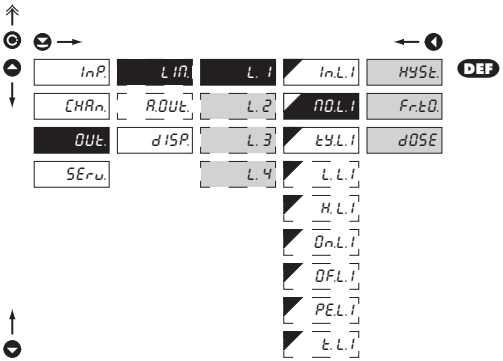
!

Setting is identical for L. 1, L. 2, L. 3 and L. 4

DESCRIPTION OF RELAY FUNCTION



6.3.1b SELECTION THE TYPE OF LIMIT



NO.L.1 **Selection the type of limit**

HYSt. Limit is in mode "Limit, hysteresis, delay"

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

Fr.tO. Frame limit

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

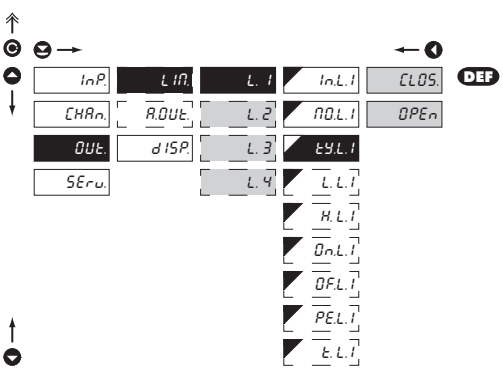
dOSE Dose limit (periodic)

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

!

Setting is identical for L. 1, L. 2, L. 3 and L. 4

6.3.1c SELECTION OF TYPE OF OUTPUT



tYP.L.1 **Selection of type of output**

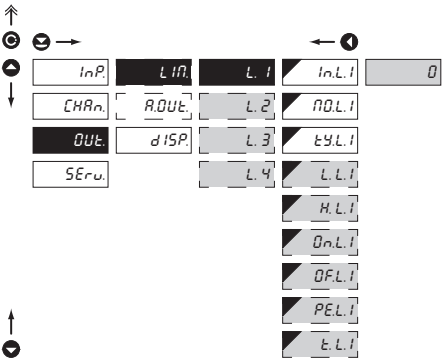
CLOS. Output switches on when condition is met

OPEn Output switches off when condition is met

!

Setting is identical for L. 1, L. 2, L. 3 and L. 4

6.3.1d SETTING VALUES FOR LIMITS EVALUATION



L. L.1 Setting limit for switch-on

- for type "**HYST.**"

H. L.1 Setting hysteresis

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

On.L.1 Setting the outset of the interval of limit switch-on

- for type "**FR.TO**"

OF.L.1 Setting the end of the interval of limit switch-on

- for type "**FR.TO**"

PE.L.1 Setting the period of limit switch-on

- for type "**DOSE**"

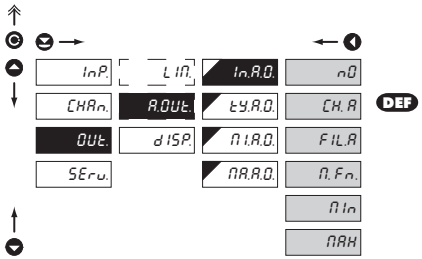
t. L.1 Setting the time switch-on of the limit

- for types "**HYST.**" and "**DOSE**"
- setting within the range: ±99,9 s
- positive time > relay switches on after crossing the limit (**L. L.1**) and the set time (**T. L.1**)
- negative time > relay switches off after crossing the limit (**L. L.1**) and the set negative time (**T. L.1**)

!

Setting is identical for **L. 1**, **L. 2**, **L. 3** and **L. 4**

6.3.2a SELECTION OF INPUT FOR ANALOG OUTPUT

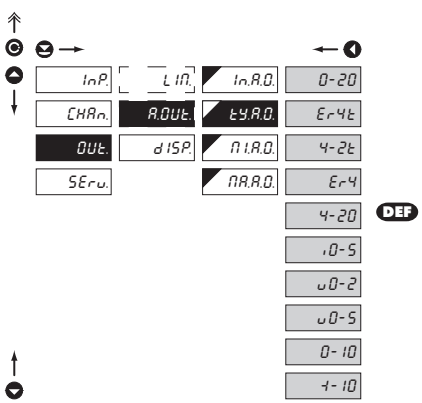


in.A.O. Selection evaluation analog output

- selection of value from which the analog output will be evaluated

nO	AO evaluation is off
CH.A	AO evaluation from "Channel A"
FIL.A	AO evaluation from "Channel A" after digital filters processing
n.Fn.	AO evaluation from "Math. functions"
nIn	AO evaluation from "Min. value"
nAX	AO evaluation from "Max. value"

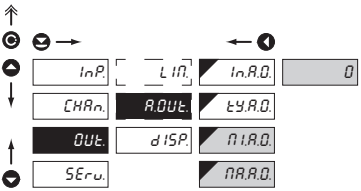
6.3.2b SELECTION OF THE TYPE OF ANALOG OUTPUT



Ey.A.O. Selection of the type of analog output

0-20	Type: 0...20 mA
Er4t	Type: 4...20 mA, with broken loop detection and indication of error statement (< 3,0 mA)
4-2t	Type: 4...20 mA, with broken loop detection (< 3,0 mA)
Er4	Type: 4...20 mA, with indic. of error statement (< 3,0 mA)
4-20	Type: 4...20 mA
0-5	Type: 0...5 mA
0-2	Type: 0...2 V
0-5	Type: 0...5 V
0-10	Type: 0...10 V
4-10	Type: ±10 V

6.3.2c SETTING THE ANALOG OUTPUT RANGE



A.OUt. Setting the analog output range

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

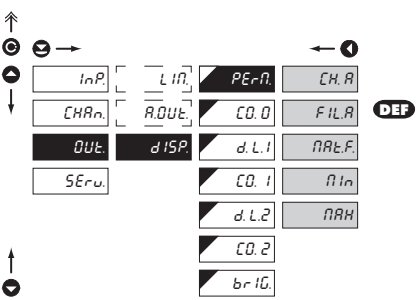
A1.A.0. Assigning the display value to the beginning of the AO range

- range: -999...9999
- DEF = 0

AA.A.0. Assigning the display value to the end of the AO range

- range: -999...9999
- DEF = 100

6.3.3a SELECTION OF INPUT FOR DISPLAY PROJECTION



PErn. Selection display projection

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

CH.A Projection of values from "Channel A"

- „raw" data will be projected on the display in the format they have been received by the instrument

FIL.A Projection of values from "Channel A" after digital filters processing

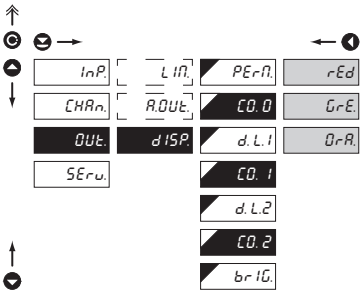
- data which have been succesfully converted to numbers will be projected

MAt.F. Projection of values from "Math.functions"

Min Projection of values from "Min.value"

MAX Projection of values from "Max.value"

6.3.5b SELECTION OF DISPLAY COLOR



CO.- Selection of display color

- the color selection is governed by setting under items "D. L.1" and "D. L.2"

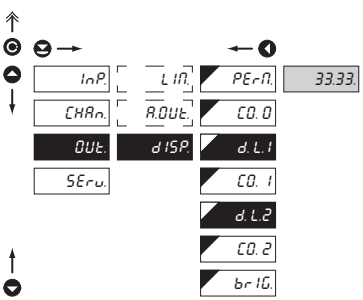
rEd Red color

GrE. Green color

OrA. Orange color

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

6.3.5c SELECTION OF DISPLAY COLOR CHANGE

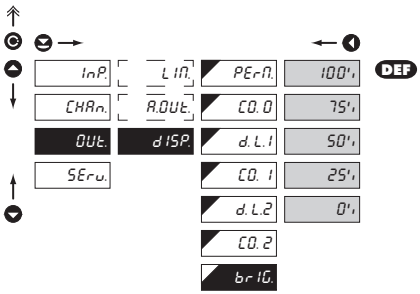


d.L.- Selection of display color change

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

- "d. L.1." **DEF** = 33.33
- "d. L.2." **DEF** = 66.67

6.3.5b SELECTION OF DISPLAY BRIGHTNESS



brIG. Selection of display brightness

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

0' Display is off

- after keystroke display turns on for 10 s

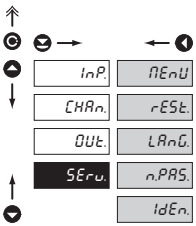
25' Display brightness - 25%

50' Display brightness - 50%

75' Display brightness - 75%

100' Display brightness - 100%

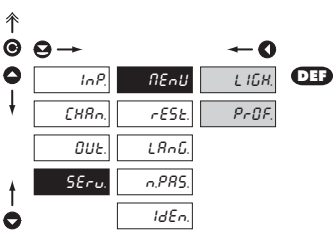
6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

- `MEnU` Selection of menu type LIGHT/PROFI
- `rESt.` Restore instrument manufacture setting and calibration
- `LAnG.` Language version of instrument menu
- `n.PAS.` Setting new access password
- `IdEn.` Instrument identification

6.4.1 SELECTION OF TYPE OF PROGRAMMING MENU



`MEnU` Selection of menu type - LIGHT/PROFI

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

`LIGH.` Active LIGHT menu

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

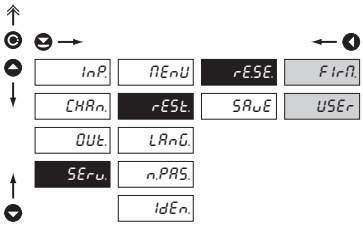
`PrOF.` Active PROFI menu

- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.2 RESTORATION OF MANUFACTURE SETTING



rESE. Return to manufacture setting of the instrument

FIrM. Return to manufacture setting of the instrument

- reading the primary setting of items in menu (DEF)

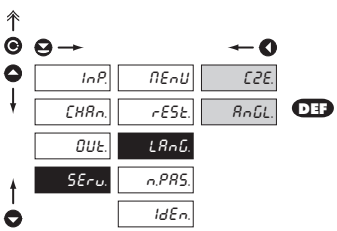
USEr Restore user setting of the instrument

- reading user setting of the instrument, i.e. setting stored under SERV./REST./SAVE

ULO2 Save user setting of the instrument

- saving the setting allows the operator its future contingent restoration

6.4.3 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION

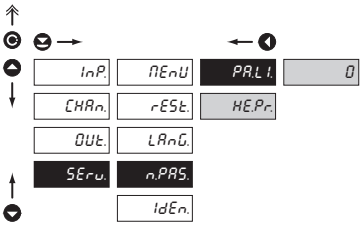


LAnG. Selection of instrument menu language version

CZE. Instrument menu is in Czech

AnGL. Instrument menu is in English

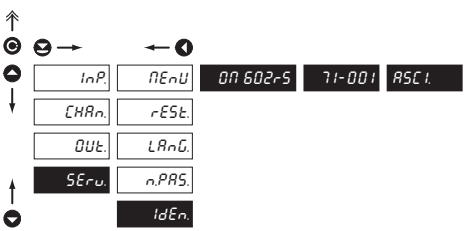
6.4.4 SETTING NEW ACCESS PASSWORD



n.PAS. Setting new passwordfor access to LIGHT and PROFI menu

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

6.4.5 INSTRUMENT IDENTIFICATION



IdEn. Zobrazení SW verze přístroje

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

IDEN.	Blok	Description
	1.	instrument
	2.	no. of SW version
	3.	type/input mode

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

Setting

 item will not be displayed in USER menu

 item will be displayed in USER menu with editing option

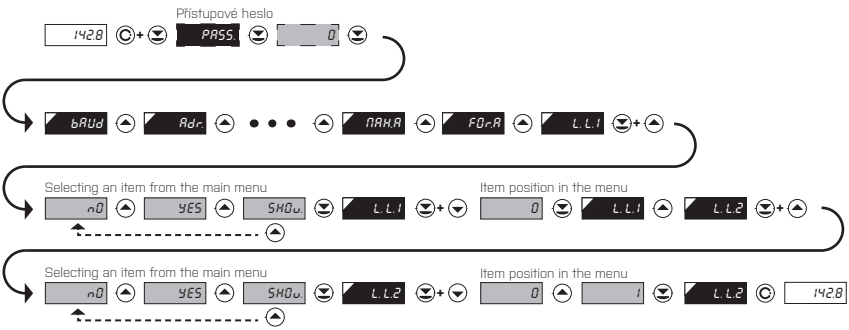
 item will be solely displayed in USER menu

Setting sequence of items in "USER" menu

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

Example 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 equaly be used in the Profi menu).



The result of this setting is that when the © button is pressed, the display will read „L. 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 „L. 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 © 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 presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232/ RS485 - is determined by an output board automatically identified by the instrument.
The commands are described in specifications you can find at www.orbit.merret.cz

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

EVENT	TYPE	PROTOCOL		TRANSMITTED DATA														
Data solicitation (PC)	232	ASCII		#	A	A	<CR>											
		MessBus		No - data is transmitted permanently														
	485	ASCII		#	A	A	<CR>											
		MessBus		<SADR>	<ENQ>													
Data transmission (instrument)	232	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>			
		MessBus		<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
	485	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>			
		MessBus		<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
Confirmation of data acceptannce (PC) - OK	485	MessBus		<DLE>	1													
Confirmation of data acceptance (PC) - Bad				<NAK>														
Sending address (PC) prior command				<EADR>	<ENQ>													
Confirmation of address (instrument)				<SADR>	<ENQ>													
Command transmission (PC)	232	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
	485	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
Command confirmation (instrument)	232	ASCII	OK	!	A	A	<CR>											
			Bad	?	A	A	<CR>											
		Messbus		No - data is transmitted permanently														
	485	ASCII	OK	!	A	A	<CR>											
			Bad	?	A	A	<CR>											
		Mess-Bus	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

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

RELAY, TARE

SIGN	RELAY 1	RELAY 2	TARE	CHANGE RELAY 3/4
P	0	0	0	0
Q	1	0	0	0
R	0	1	0	0
S	1	1	0	0
T	0	0	1	0
U	1	0	1	0
V	0	1	1	0
W	1	1	1	0
p	0	0	0	1
q	1	0	0	1
r	0	1	0	1
s	1	1	0	1
t	0	0	1	1
u	1	0	1	1
v	0	1	1	1
w	1	1	1	1

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

COMMANDS RS MONITORS

#AA**9**dddddd<CR> Reception of alpha-numerical data
- dddddd is data which is to be displayed
- maximum of 6 symbols and 2 decimal points

#AA**9N**HHHHHHHH<CR> Selection of integer input range
- hexa number in sign long integer format (signed long integer)
- range: -2147483648...2147483647 (0x80000000...0x00000000...0x7FFFFFFF)

#AA**9F**HHHHHHHH<CR> Selection of float input range
- hexa number, corresponding binary presentation of number with floating DP according to standard IEEE-754 (single/short float)
- significance of individual bites
  SEEEEEEE EMMMMMMM MMMMMMMM MMMMMMMM
  where: S ... signum (1 bit)
  E ... exponent, incl. the signum (8 bitů)
  M ... mantissa (23 bits)
- rozsah: 0.3×10^{-38} <= |x| <= 1.7×10^{38}

For both commands applies the rule:
If less data is sent out, they are supplemented from the right with zeros to full length. It enables contingent acceleration of ccommunication. E.g.: #009F4<CR> is identical as #009F40000000<CR>. They both send away number 2,0.

Protocol DIN MessBus
<EADR><ENQ> >>> answer OK .... <DLE> 1
<STX>S9 dddddd <ETX><BCC>

!

If channel Mathematical Functions (MF) is active, the first symbol must not be "x". This symbol is not supported.

9. ERROR STATEMENTS

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

Table ASCII

0	1	2	3	4	5	6	7		9	10	11	12	13	14	15	16	17	18	19
NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI	DLE	DC1	DC2	DC3

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
DC4	NAC	SYN	ETB	CAN	EM	SUB	ESC	FS	CS	RS	US	SP	!	„	#	$	%	&	‚

40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;

60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O

80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c

100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w

120	121	122	123	124	125	126	127
x	y	z	{	|	}	~	DEL

11. TECHNICAL DATA

INPUT

Protocol:	ASCII, MessBuss
Data format:	8 bit + no parity + 1 stop bit (ASCII) 7 bit + even parity + 1 stop bit (MessBus) Universal protocol
Rate:	600...230 400 Baud 9 600 Baud...12 Mbaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (in range 1...247)

PROJECTION

Display:	9999, intensive red or green 7 segment LED, digit height 14 mm
Projection:	-999...9999
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

Linearisation:	by linear interpolation in 38 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
OM Link:	company communication interface for setting, operation and update of instrument SW
Watch-dog:	reset after 400 ms
Calibration:	at 25°C and 40% of r.h.

COMPARATOR

Type:	digital, adjustable in menu
Mode:	Hysteresis, From, Dosing
Limita:	-999...9999
Hysteresis:	0...9999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)* 2x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)* 2x SSR (250 VAC/ 1 A)* 2x/4x open collector (30 VDC/100 mA) 2x bistabil relays (250 VAC/250 VDC, 3 A/0,3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

ANALOG OUTPUTS

Type:	isolated, programmable with 12 bits D/A convertor, analogoutput corresponds with displayed data, type and range are adjustable
Non-linearity:	0,1% of range
TC:	15 ppm/°C
Rate:	response to change of value < 1 ms
Voltage:	0...2 V/5 V/10 V/±10 V
Curernt:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ω/12 V or 1 000 Ω/24 V

EXCITATION

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

POWER SUPPLY

Option:	10...30 V AC/DC, max. 13,5 VA, isolated PF ≥ 0,4, I_{STP} > 40 A/1 ms fuse inside (T 4000) 80...250 V AC/DC, max. 13,5 VA, isolated PF ≥ 0,4, I_{STP} > 40 A/1 ms fuse inside (T 630)

MECHANIC PROPERTIES

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

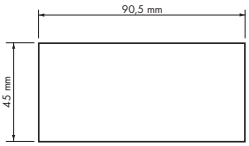
OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section <1,5 mm² /<2,5 mm²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Dielectric strength:	4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and data/ analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between supply and data/ analog output
Overvoltage cat.:	EN 61010-1, A2
Insulation resist.:	for pollution degree II, measurement cat. III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61326-1

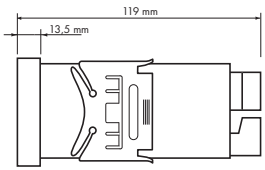
* values apply for resistance load

Front view

Panel cut



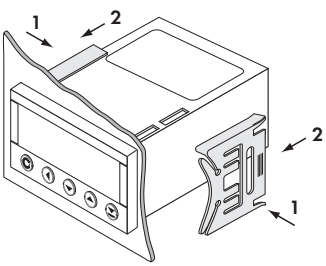
Side view

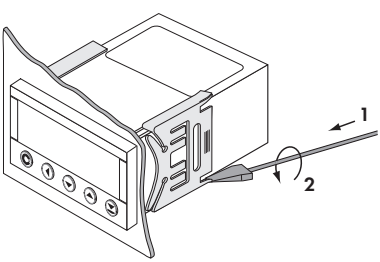


Panel thickness: 0,5...20 mm

INSTRUMENT INSTALLATION

1. insert the instrument into the panel cut-out
2. fit both travellers on the box
3. press the travellers close to the panel





INSTRUMENT DISASSEMBLY

1. slide a screw driver under the traveller wing
2. turn the screw driver and remove the traveller
3. take the instrument out of the panel

Product **OM 602RS**

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

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

The guarantee shall not apply to defects caused by:

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

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

Stamp, signature

ES DECLARATION OF CONFORMITY

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

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

declares at its explicit responsibility that the product presented hereunder meets all technical requirements, is safe for use when utilised under the terms and conditions determined by ORBIT MERRET, spol.s r.o. and that our company has taken all measures to ensure conformity of all products of the types referred-to hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant Czech statutory orders.

Product: Programmable panel instrument

Type: **OM 602**

Version: AV, RS, UQC

Thas been designed and manufactured in line with requirements of:

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

The product qualities are in conformity with harmonized standard:

El. safety: EN 61010-1

EMC: EN 61326-1

Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"

EN 50131-1, chap. 14 and chap. 15, EN 50130-4, chap. 7, EN 50130-4, chap. 8, (EN 61000-4-11, ed. 2), EN 50130-4, chap. 9 (EN 61000-4-2), EN 50130-4, chap. 10, (EN 61000-4-3, ed. 2), EN 50130-4, chap. 11 (EN 61000-4-6), EN 50130-4, chap. 12, (EN 61000-4-4, ed. 2), EN 50130-4, chap. 13 (EN 61000-4-5), EN 61000-4-8, EN 61000-4-9, EN 61000-6-1, EN 61000-6-2, EN 55022, chap. 5 and chap. 6

The product is furnished with CE label issued in 2007.

As documentation serve the protocoles of authorized and accredited organizations:

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

Place and date of issue: Prague, 19. Juli 2009

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