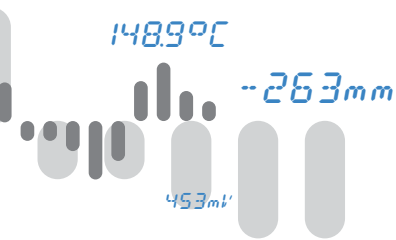
USER MANUAL
NÁVOD K OBSLUZE



OMD 202RS

4/6 DIGIT PROGRAMMABLE LARGE DISPLAY

DATA DISPLAY
RS 232/485
ASCII/MESSBUS/PROFIBUS

DIGITAL PANEL METERS
PANELOVÉ MĚŘÍCÍ PŘÍSTROJE

BARGRAPHS
SLOUPCOVÉ ZOBRAZOVAČE

LARGE DISPLAYS
VELKOPLOŠNÉ DISPLEJE

TRANSMITTERS TO DIN RAIL
PŘEVODNÍKY NA LIŠTU

PAPERLESS RECORDERS
BEZPAPÍROVÉ ZAPISOVAČE

PLC

WARRANTY 5 YEARS

orbit merret

SAFETY INSTRUCTIONS

Please read carefully the enclosed safety instructions and observe them!

Installation, all operational interventions, maintenance and service must be performed by a qualified personnel and in accordance with the attached information and safety regulations. The manufacturer is not liable for damage caused by improper installation, configuration, maintenance, and service.

The recorder must be installed according to the respective application. Incorrect installation can cause a malfunction, which can result in damage or accident.

The recorder uses dangerous voltages that can cause a fatal accident. Before you start solving problems (e.g. in case of failure or disassembly), the device must be disconnected from the power supply. For safety information the EN 61 010-1 + A2 standard must be observed.

When removing or inserting a card, observe the safety instructions and follow the recommended procedure. During any intervention the recorder must be disconnected from the power supply.

Do not attempt to repair or modify the device. A defective recorder must be sent for repair to the manufacturer.

These devices should be safeguarded by isolated or common fuses (breakers)!

The recorder is not designed for installation in potentially explosive surroundings (Ex). Use it only outside potentially explosive surroundings

TECHNICAL DATA

Measuring instruments of the OMD 202 series conform to the European regulation 2014/30/EU and 2014/35/EU

The instruments are up to the following European standards:

EN 61010-1 Electrical safety

EN 61326-1 Electronic measuring, control and laboratory devices – Requirements for EMC “Industrial use”

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

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2. INSTRUMENT DESCRIPTION

2.1 DESCRIPTION

The OMD 202 model series are 4/6 digit large panel programmable displays for the projection of data from data lines RS 232, RS 485 in protocoles ASCII/MESSBUS/MODBUS/PROFIBUS. The instrument can be supplied with either a 3-colour LED display (red/green/orange) or with hight intensity SMD LEDs (red or green with brightness of 1 300 mcd).

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

PROGRAMMABLE PROJECTION

Setting:	Selection of integer/float input range
Protocol:	ASCII/MESSBUS
	MODBUS - RTU
	PROFIBUS DP*
Projection:	-9999...9999 (-99999...999999)

DIGITAL FILTERS

Floating average:	from 2...30 measurements
Exponential average:	from 2...100 measurements
Arithmetic 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

* description is presented in a separate manual

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).

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

OMLINK The operation program is freely accessible (www.orbit.merret.eu) 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.

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.

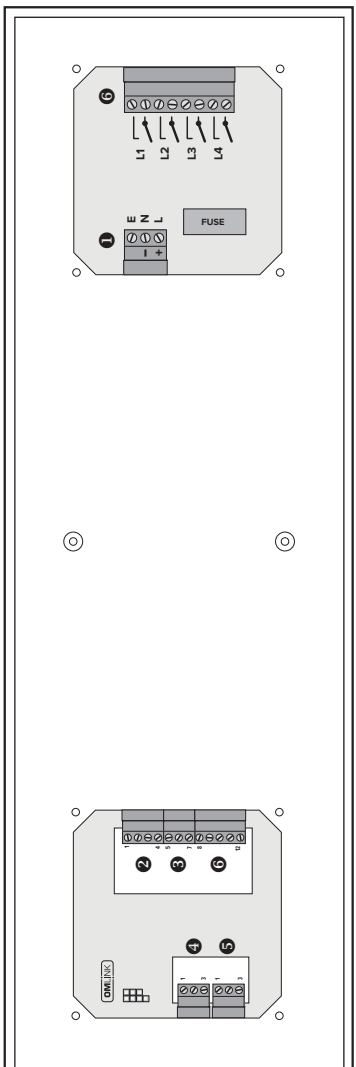
3. INSTRUMENT CONNECTION

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.


1 Power supply
E
N
L
FUSE
L1
L2
L3
L4
6 Relays*
2 External inputs
EXT.1
EXT.2
EXT.3
3 Excitation*
L-
L+
NC
4 Analogue output*
AO - U
AO - I
GND
5 Input - PROFIBUS*
B - Positive
A - Negative
GND
6 Input
L-
L+
RS 485
GND
TxD
RxD
RS 232
*Option

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

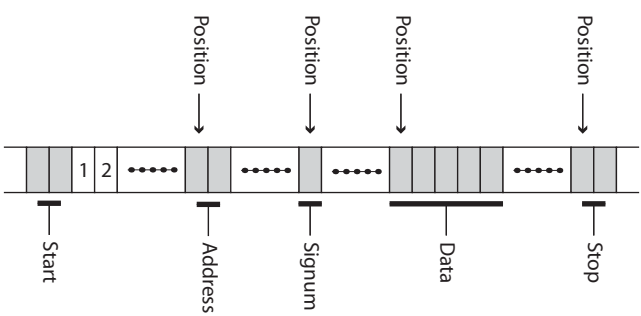
USER **User programming menu**
- may contain arbitrary items selected from the programming menu (LIGHT/PROFI), which determine the right (see or change)
- acces without password

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

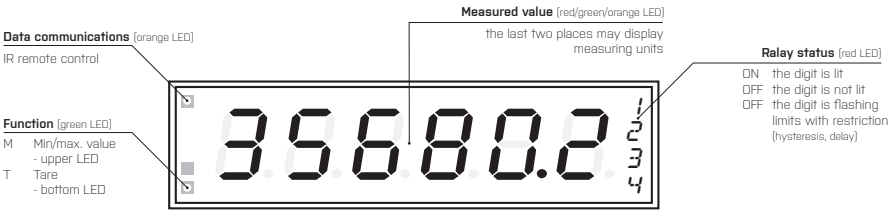
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.

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



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

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

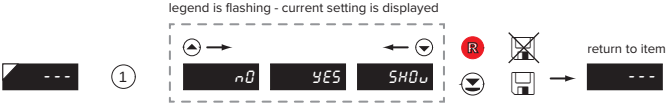
KEY	MEASUREMENT	MENU	SETTING NUMBERS/SELECTION
R	access into USER menu	exit menu	quit editing
◀	programmable key function	back to previous level	move to higher decade*
▼	programmable key function	move to previous item	move down*
▲	programmable key function	move to next item	move up*
▼▼	programmable key function	confirm selection	confirm setting/selection
G	access into LIGHT/PROFI menu		
>3 s G	direct access into PROFI menu		
1		configuration of an item for "USER" menu	
2		determine the sequence of items in "USER - LIGHT" menu	
●	cancelation of instrument's/controler's address		

* 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



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 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	off
Setting the items	DEF

!

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

142.8 → G → Access password: PASSw. 0

Baud rate: bAUd 9600 → Instrument address: Addr. 0 → Data protocol: Prot. ASCII → Command: COMMA. 0

Setting - Integer: MIn.0 0 → Setting - Integer: MIn.1 0 → Setting - Integer: MIn.2 0 → Setting - Integer: MIn.3 0

Setting - Integer: MAX.0 0 → Setting - Integer: MAX.1 0 → Setting - Integer: MAX.2 0 → Setting - Integer: MAX.3 100

Setting - Float: MIn.FL 000.00 → Setting - Float: MAX.FL 100.00

Setting - 1. innitial sequence: StArt.1 2 → Setting - 2. innitial sequence: StArt.2 0 → Setting - Adrress position: Ad.POS. 0 → Setting - 1. address symbol: Adr. 1 48

Setting - 2. address symbol: Adr.2 49 → Setting - Signum position: SI.POS. 0 → Signum supression: PL.SUP. YES → Setting - Data position: dA.POS. 0

Setting - closing sequence: StOP StOP 1 → Setting - Request (REQ.1...REQ.8): rEQUES. rEQ. 1 → Setting - Communi. failure: MOd.t.O. dASHES → Setting - Timeout: tIMEOU. 1.0

Selection input range - min: MIn A 000.00 → Selection input range - max: MAX A 100.00 → Projection: FOrM.A 0000.oo

Option - comparator

LIM.L.1 20 → LIM.L.2 40 → LIM.L.3 60 → LIM.L4 80

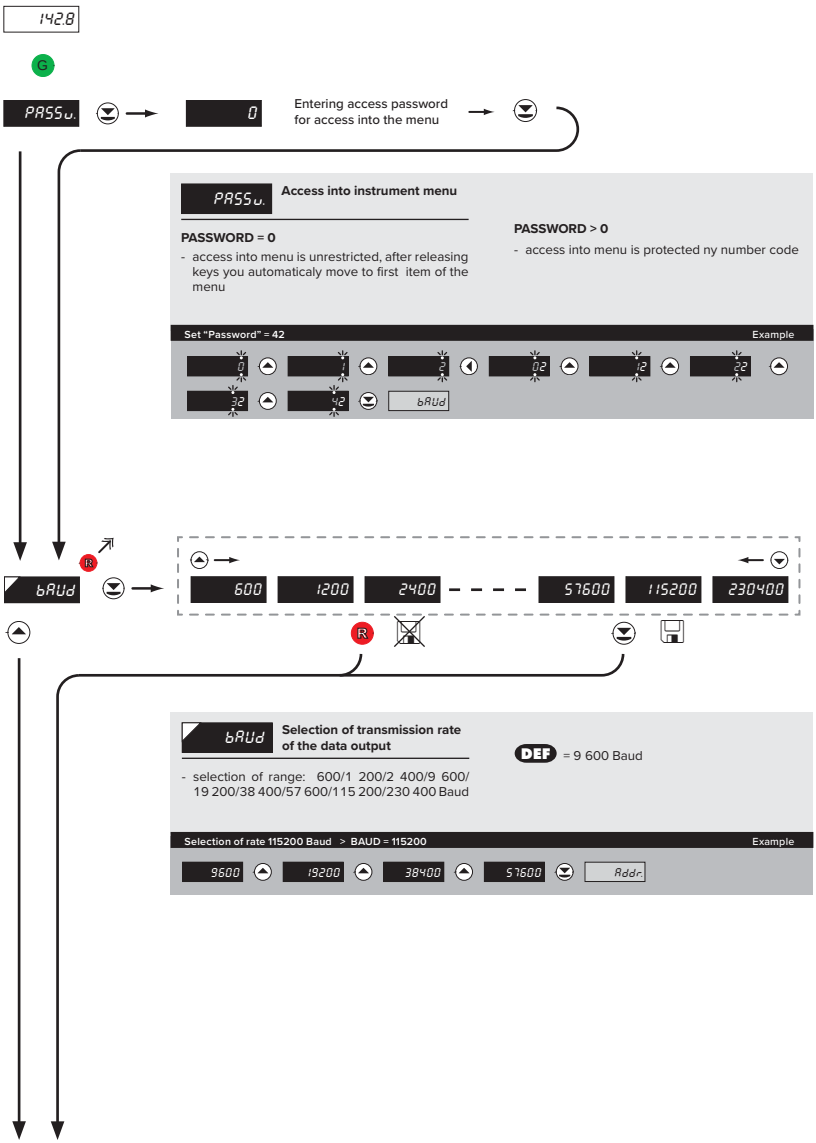
Option - Analog output

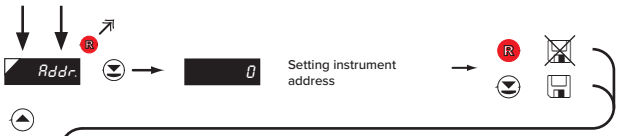
typ.A.O. I 20 → MIn A.O. 0 → MAX A.O. 100

Primary color: COL.0 GrEEn → First color limit: dIS.L.1 33.33 → Color beyond first limit: COL. 1 OrAnGE → Second color limit: dIS.L.2 66.67

Color beyond second limit: COL.2 rEd → Menu type: MEnU LIGHt → Return to manufacture setting: rE.SEt FIrM. → Language selection: LAnG. EnGL.

New password: PAS.LI 0 → Identification: IdEnt. YES → Instrument type: OMd202rS → SW number: 78 → 142.8 Return to measuring mode

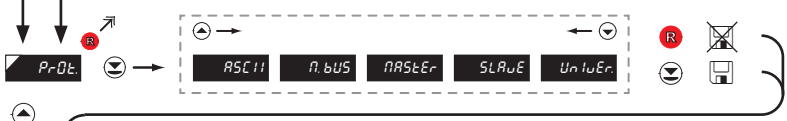

1428
PASSw.
0
Entering access password for access into the menu
PASSw.
Access into instrument menu
PASSWORD = 0
- access into menu is unrestricted, after releasing keys you automaticaly move to first item of the menu
PASSWORD > 0
- access into menu is protected ny number code
Set "Password" = 42
Example
0
1
2
02
12
22
32
42
bAUd
bAUd
600
1200
2400
57600
115200
230400
bAUd
Selection of transmission rate of the data output
DEF = 9 600 Baud
- selection of range: 600/1 200/2 400/9 600/ 19 200/38 400/57 600/115 200/230 400 Baud
Selection of rate 115200 Baud > BAUD = 115200
Example
9600
19200
38400
57600
Addr.



Addr. **Setting instrument address**

DEF = 0

Address 10 > ADDR. = 10	Example



Prot. **Selection of data protocol**

DEF = ASCII

PROT.	Menu	Description
	ASCII	Data protocol ASCII
	M. BUS	Data protocol DIM MessBus
	MASTER	Instrument solicits data from subordinate system - instrument controls data tansmission from subordinate system - "COMMAN" 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 " - - - -"
	SLAVE	Passive display - slave is used where there is communication of other isntruments or a computer in the "MASTER" mode. If "COMMAND" is correctly received, the instrumetns will display the data.
	UNIVER.	Universal protocol - in dynamic v dynamických items (Start, Adr-Un, Num Sign, Data, Stop, Request) cutom protocol can be set up

Data protocol = ASCII > ASCII	Example

* subsequent item on the menu depends on instrument setting

Setting - Command

DEF = uu (two spaces)

Command > uu	Example
uu → Min.0	* subsequent item on the menu depends on instrument setting

!

If is „COMMAND" „uu" (two spaces) is broadcast query on data #AA<CR>.
Else #AA<<COMMAND>><CR> will wait on confirmation „!AA" and after it will send out request about data #AA<CR>

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 min. input range > MIN.0 = 0	Example
0 → Min. 1	

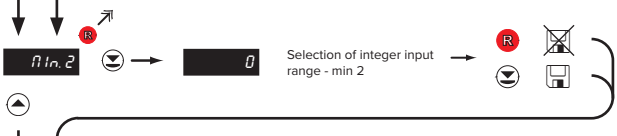
Min. 1 **Selection of integer input range - min**

- 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...0x7FFFFFF

DEF = 0

Selection integer min. input range > MIN.1 = 0 — Example



Min. 2 **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...0x7FFFFFF)

DEF = 0

Selection integer min. input range > MIN.2 = 0 — Example

MIn. 3 **Selection of integer input range - min - 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...0x7FFFFFF

DEF = 0

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

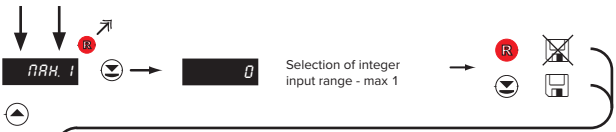
MAX. 0 **Selection of integer input range - max - MSB**

- 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 max. input range > MAX. 0 = 0 Example



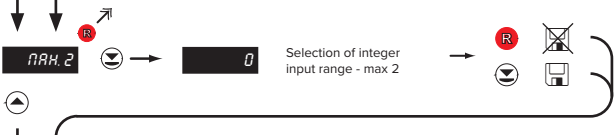
MAX. 1 **Selection of integer input range - max**

- 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 max. input range > **MAX. 1 = 0** Example



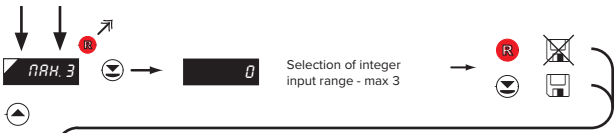
MAX. 2 **Selection of integer input range - max**

- 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 max. input range > **MAX. 2 = 0** Example



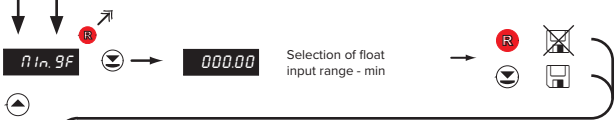
- setting maximum value of input data, it is entered by individual bytes in range 0...255
- the input data format is sign integer 32 bits

(0x80000000...0x7FFFFFFF)

DEF = 0

- range: -2147483648...2147483647

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



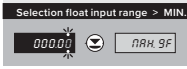
MIN. 9F **Selection of float input range - min**

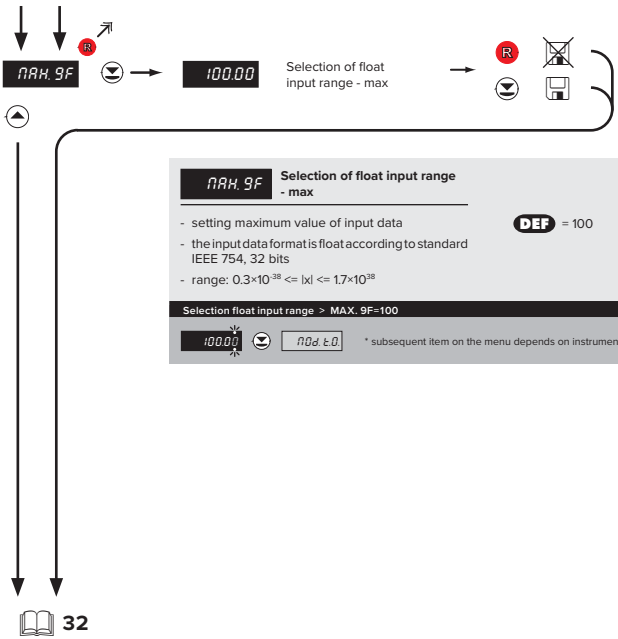
- setting minimum value of input data
- the input data format is float according to standard IEEE 754, 32 bits

- range: 0.3×10^{38} <= |x| <= 1.7×10^{38}

DEF = 0

Selection float input range > MIN. 9F =0 Example





MAX. 9F **Selection of float input range - max**

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

DEF = 100

Selection float input range > MAX. 9F=100 — Example

100.00 → MOd.bU.

* subsequent item on the menu depends on instrument setting

32

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

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

DEF = 2

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

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

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

DEF = 0

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

Ad. POS. 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
- rozsah: 0...245

DEF = 0

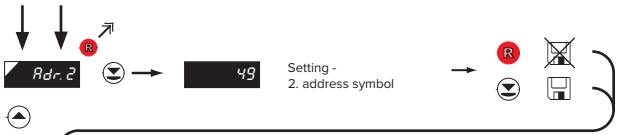
Setting address position > Ad. POS. = 0 Example

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

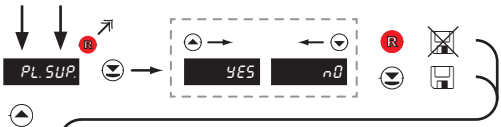
Setting 2. address symbol > Adr. 2 = 49 Example

SI. POS. **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. POS. = 0 Example



PL. SUP. „Plus“ number sign supression

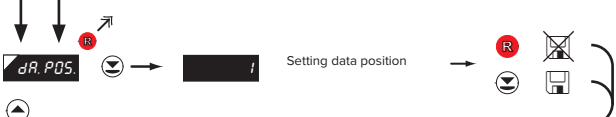
-

option “YES” > number sign “plus” will be replaced by space

- option “NO” > number sign “plus” will be displayed

DEF = YES

Sign supression > PL. SUP. = YES Example



dA. POS. 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. POS. = 0 Example

dA. LEn. **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. DEL. = 6 Example

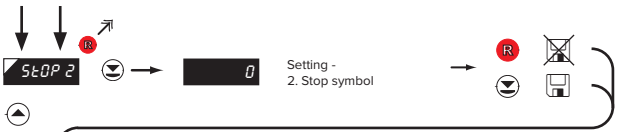
StOP 1 **Setting the first closing symbol**

-
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 > STOP = 3 Example

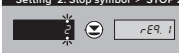


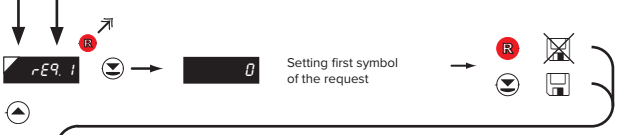
StOP 2 **Setting the second closing symbol**

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

DEF = 0

Setting 2. Stop symbol > STOP 2 = 0 — Example





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

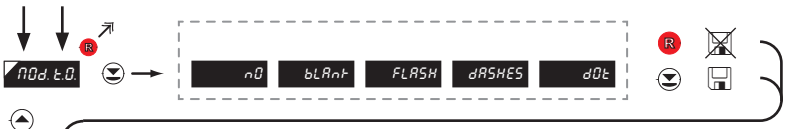
- set directly in ASCII code
- range: 0...127
- If set to "0", request is not sent

DEF = 0

Setting - 1. symbol > START. 1 = 2 — Example

*

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



nOd. t.O. **Selecting display mode in case of communication failure**

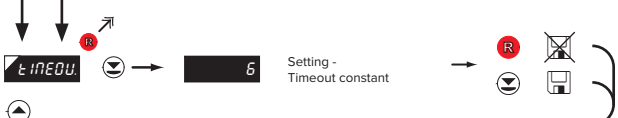
DEF = DASHES

MOD. T.O.	Menu	Description
	NO	No reaction
	BLANK	Display goes off
	FLASH	Last displayed value starts flashing
	DASHES	Dash symbols displayed
	DOT	Decimal point is displayed

Selecton mode > Dashes — Example

!

Item will not appear in "**MASTER**" protocol



t IMEOU. **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 "**Mod. t.0.**"
- range: 0...99,9 s

DEF = 1.0 s

Setting - Constant > tIMEOU. = 1 — Example

!

Item will not appear in "**MASTER**" protocol and when "**MOD t.0.**" is disabled

32

Selection of integer input range - min

- range of the setting is -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0.00

Projection for min > MIN A = 0.00 Example

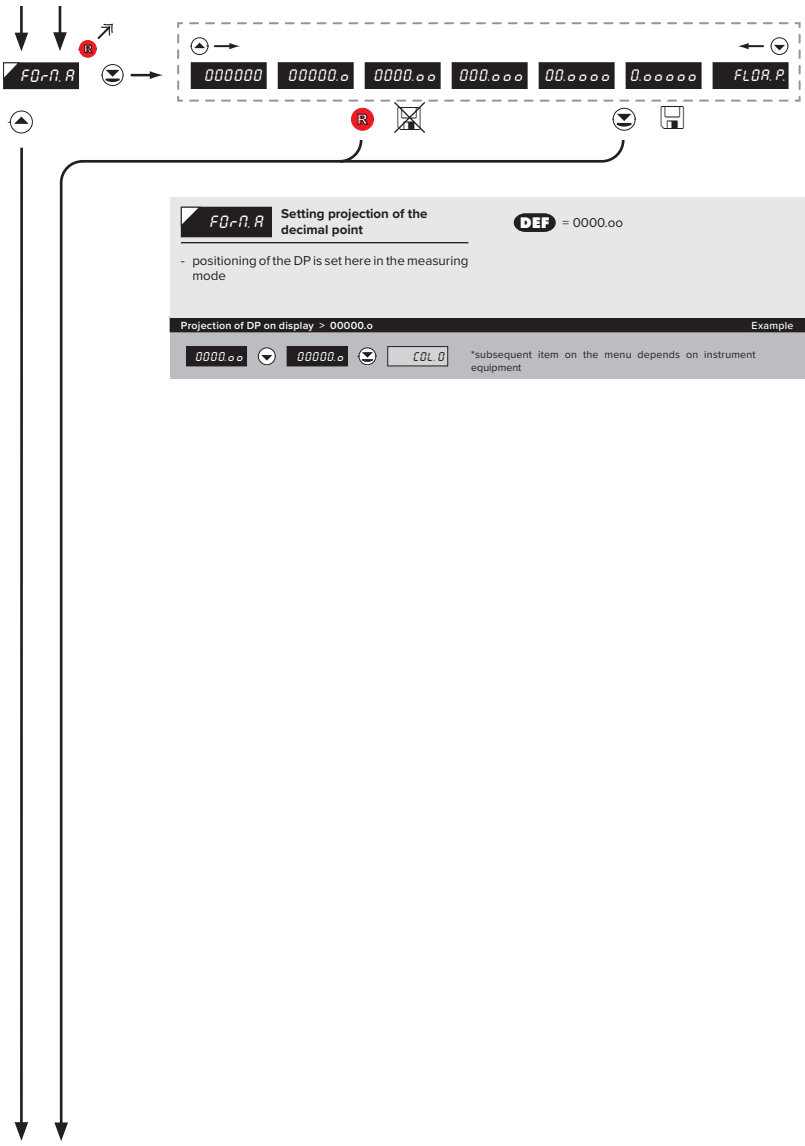
Selection of integer input range - max

MAX A **Selection of integer input range - max**

- range of the setting is -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100.00

Projection for max > MAX A = 100.00 Example



FOrN.A **Setting projection of the decimal point**

DEF = 0000.oo

- positioning of the DP is set here in the measuring mode

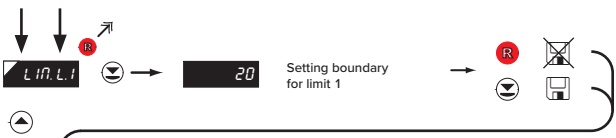
Projection of DP on display > 00000.o **Example**

0000.oo → 00000.o → COL.0

*subsequent item on the menu depends on instrument equipment


1489°C
-263mm
453mi

DISPLAYED ONLY WITH OPTIONS > **COMPARATORS**

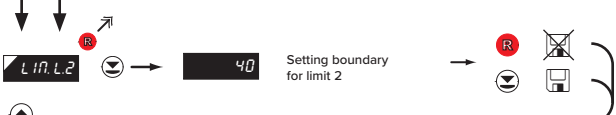


- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 20

DEF „Hysteresis"=0, „Delay"=0

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

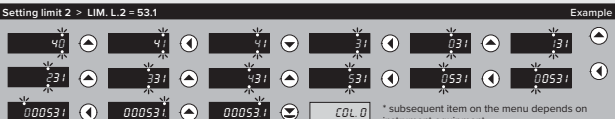


- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 40

DEF „Hysteresis"=0, „Delay"=0

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

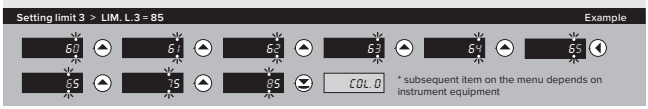


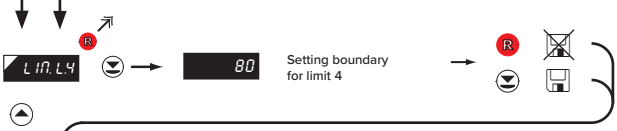
Items for "Limits" and "Analog output" are accessible only if incorporated in the instrument.

DISPLAYED ONLY WITH OPTIONS

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

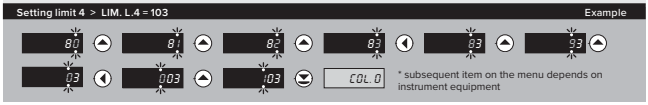
DEF = 60
DEF „Hysteresis"=0, „Delay"=0





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

DEF = 80
DEF „Hysteresis"=0, „Delay"=0



DISPLAYED ONLY WITH OPTIONS > **ANALOG OUTPUT**

Menu	Range	Description
0-20mA	0...20 mA	
Er.4- T	4...20 mA	signaling interrupted current loop and displaying an error message (< 3,0 mA)
4-20 T	4...20 mA	signaling broken current loop (< 3,0 mA)
Er.4-20mA	4...20 mA	with indication of error statement (< 3,0 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

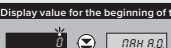
Type of analog output - 0...10 V > TYP A.V. = U 10 Example

Assigning the display value to the beginning of the AO range

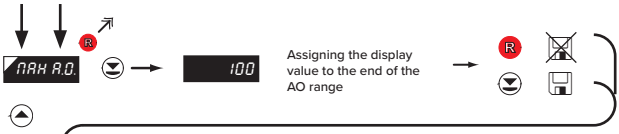
- range of the setting: -99999...999999

DEF = 0

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



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



- range of the setting: -99999...999999

DEF = 100

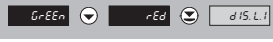
Display value for the end of the AO range > MAX A.O. = 120 Example

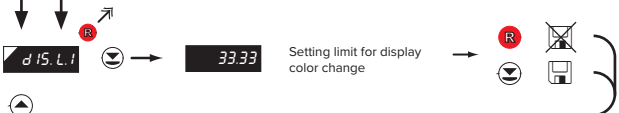
APLICABLE ONLY TO 3-COLOUR DISPLAY

COL. 0 **Selection of display color > primary setting**

DEF = Green

Selection of display color - primary > red > COL. 0 = red — Example





dIS. L.1 **Setting first value for color display change**

DEF = 33.33

- range of setting: -99999...999999

Display value for 1st color change > DIS. L.1 = 100 — Example

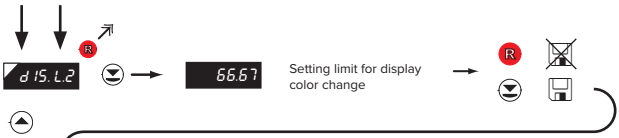
COL. 1 **Selection of display color > after exceeding dIS. L.1**

DEF = Orange

- selection of display color is governed by setting under item **dIS. L.1**
- the color changes if the displayed value is higher than the value set in **dIS. L.1**

Selection of display color if the data is > COL. 1 = green — Example

APLICABLE ONLY TO 3-COLOUR DISPLAY



- range of setting: -99999...999999

DEF = 66.67

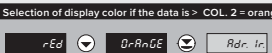
Display value for 1st color change > DIS. L.2 = 400 Example

COL. 2 Selection of display color > after exceeding dIS. L.2

- selection of display color is governed by setting under item dIS. L.2
- the color changes if the displayed value is higher than the value set in dIS. L.2

DEF = red

Selection of display color if the data is > COL. 2 = orange Example



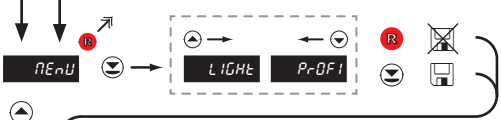
5. SETTING **LIGHT**

Adr. Ir. **Setting the address of the Remote Controler**

- setting the address of the IR Remote Controler is needed only when more than one OMD 202 are within the controler's reach
- range of settung: 0...99
- possible cancelation of address is done by pressing the RC's blue button

DEF = 0

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



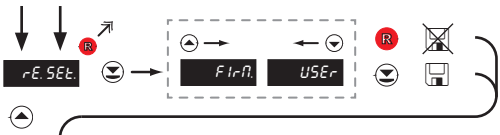
MENU **Setting the menu type LIGHT/PROFI**

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

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

DEF = LIGHT

Menu LIGHT > MENU = LIGHT — Example



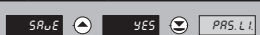
- in the event of error setting the manufacture setting may be restored
- provided you stored your user setting in the "PROFI" menu, it may also be restored (select "USER")
- loading manufacture calibration and primary setting of items on the menu (DEF)

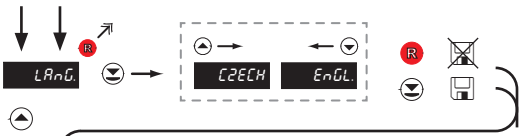
Restoration of manufacture setting > FIRM. Example

SAvE **Saving the user setting**

- by saving the user user setting it is possible to recall it later without the need of going through the customisation process again

Saving the user setting > SAVE Example



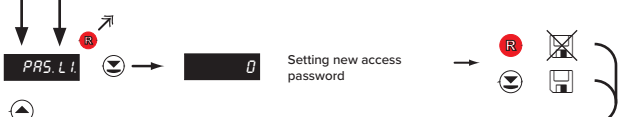


LAnG. **Selection of language in instrument menu**

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL. Example



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

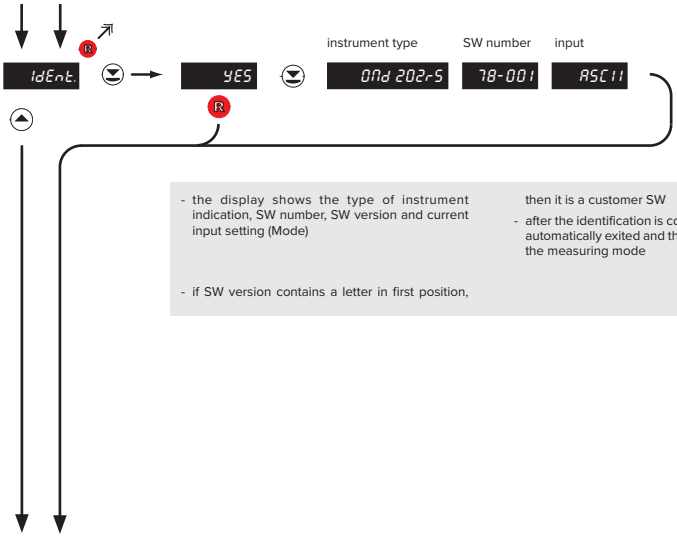
-

access password for menu LIGHT

- range of the number code 0...9999
- upon setting the password to “000” the access to menu LIGHT is free without prompt to enter it
- if you forget your password, please contact your instrument's administrator

DEF = 0

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



- 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

>3 s
G

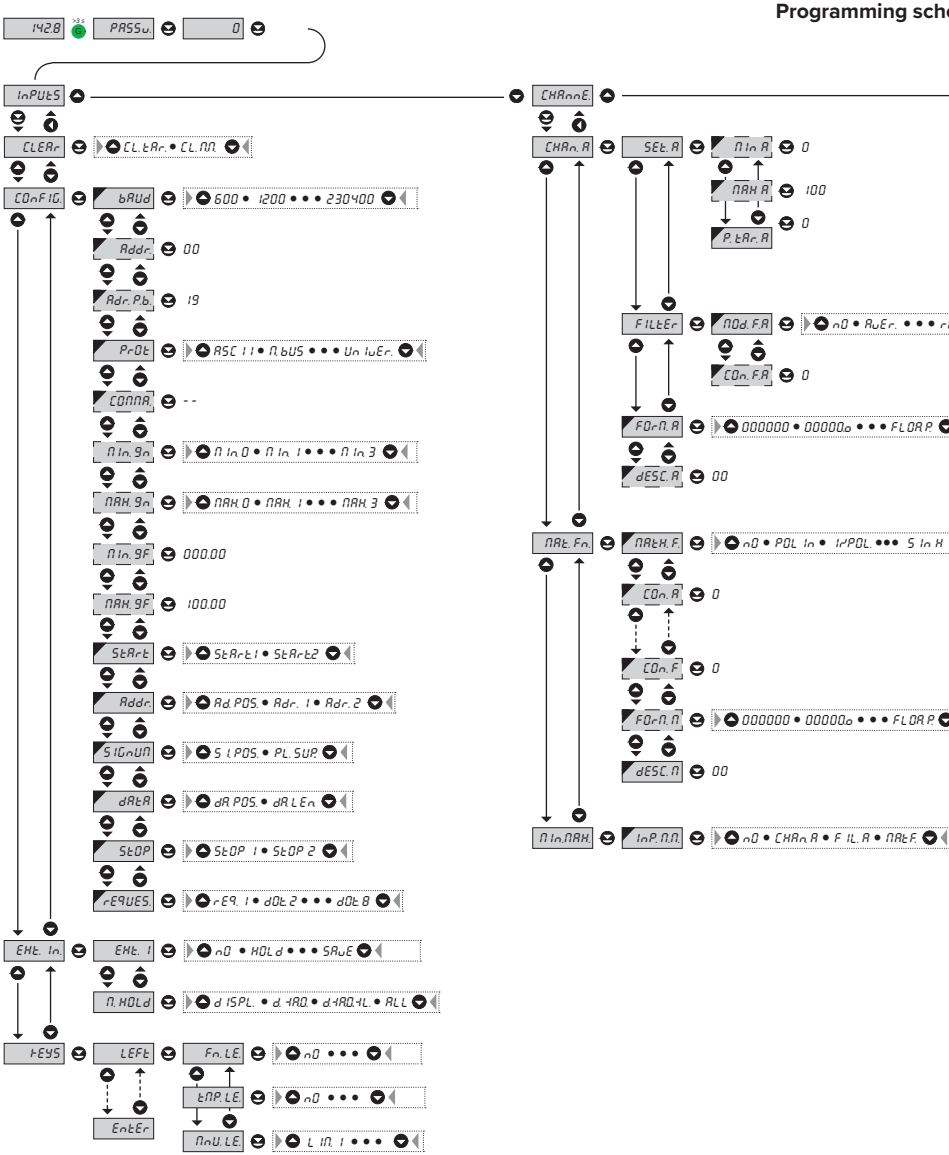
- access to **PROFI** menu
- authorization for access to **PROFI** menu does not depend on setting under item SERVIC. > MENU
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > **PROFI** =0)

G

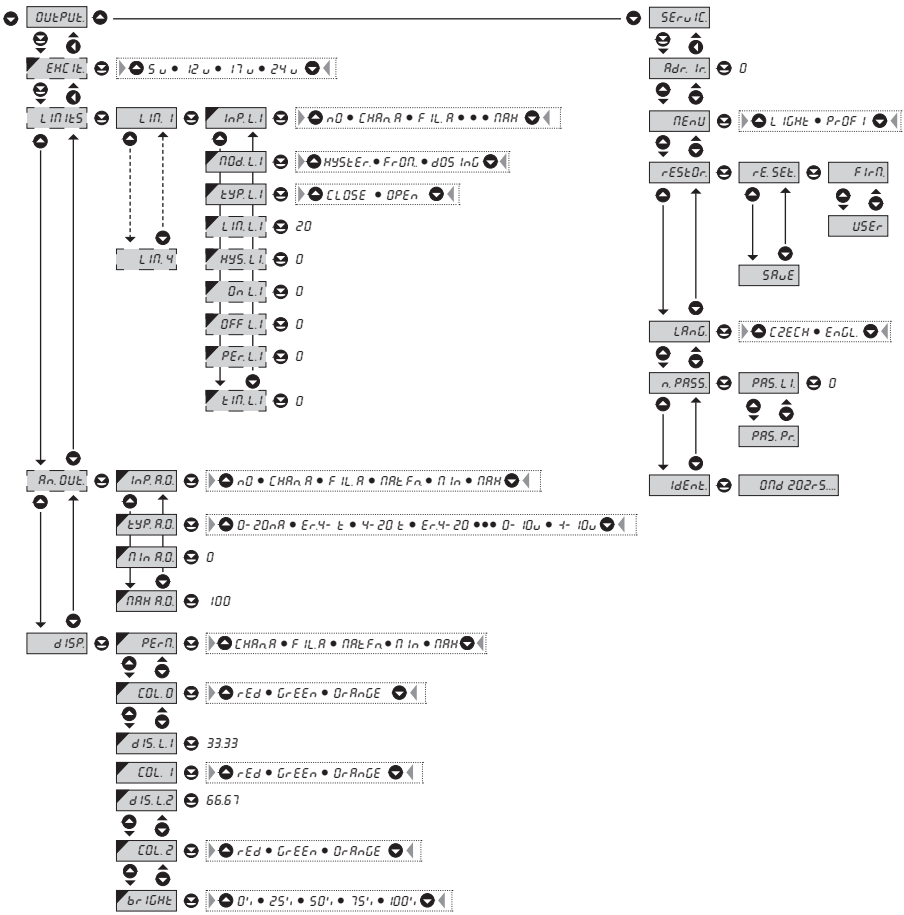
- access to menu selected under item SERVIC. > MENU > LIGHT/PROFI
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > **LIGHT** =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used


1489°C
263mm

Programming sch



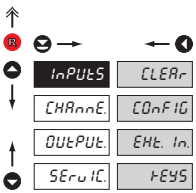
eme PROFI MENU



!

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

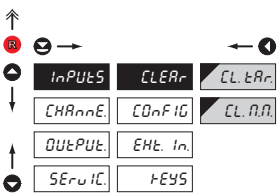
6.1 SETTING "PROFI" - INPUT



The primary instrument parameters are set in this menu

CLEAr	Resetting internal values
CONFIG.	Selection of measuring range and parameters
EHt. In.	Setting external inputs functions
tEYS	Assigning further functions to keys on the instrumenti

6.1.1 RESETTING INTERNAL VALUES

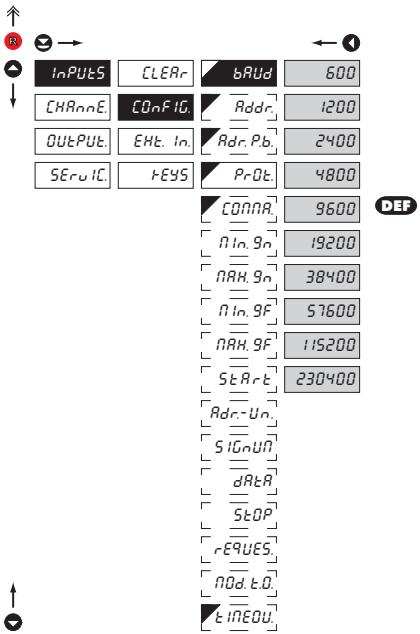


CLEAr **Resetting internal values**

CL. tAr.	Tare resetting
CL. M.M.	Resetting min/max value

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

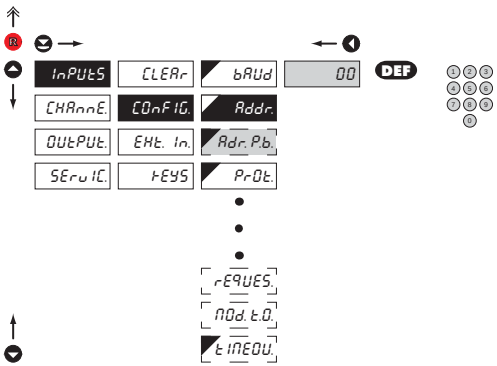
6.1.2a SELECTION OF DATA BAUD RATE



bAUd **Selection of data baud rate**

600	Rate - 600 Baud
1200	Rate - 1 200 Baud
2400	Rate - 2 400 Baud
4800	Rate - 4 800 Baud
9600	Rate - 9 600 Baud
19200	Rate - 19 200 Baud
38400	Rate - 38 400 Baud
57600	Rate - 57 600 Baud
115200	Rate - 115 200 Baud
230400	Rate - 230 400 Baud

6.1.2b SETTING INSTRUMENT ADDRESS



Addr. **Setting instrument address**

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

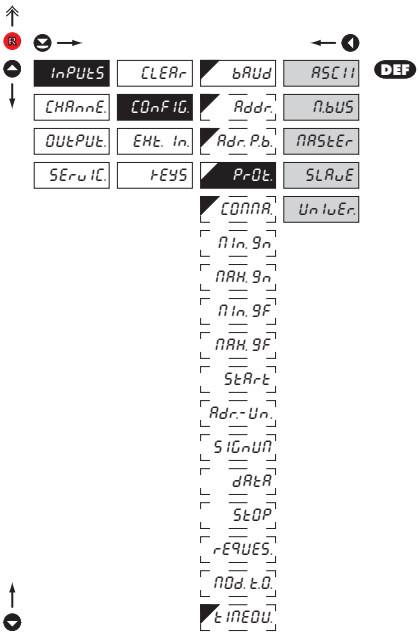
Adr.Pb. **Nastavení adresy přístroje - PROFIBUS**

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

!

When selecting the "**UNIVER.**" protocol, the address is set in "**Adr-Un.**"

6.1.2c SELECTION OF DATA PROTOCOL



PrOt. **Selection of data protocol**

ASCII Data protocol ASCII

n.bUS Data protocol DIN MessBus

MASter Instrument solicits data from subordinate system

- instrument controls data tansmission from subordinate system
- "**COMMAN**" 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 " - - - -

SLAvE Passive Display - Slave

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

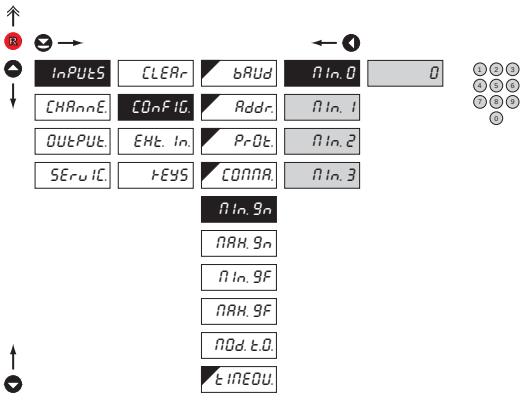
UnIvEr. Universal protocol

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

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

Else #AA<<COMMAND>><CR> will wait onconfirmation „!AA" and after it will send out request about data #AA<CR>

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

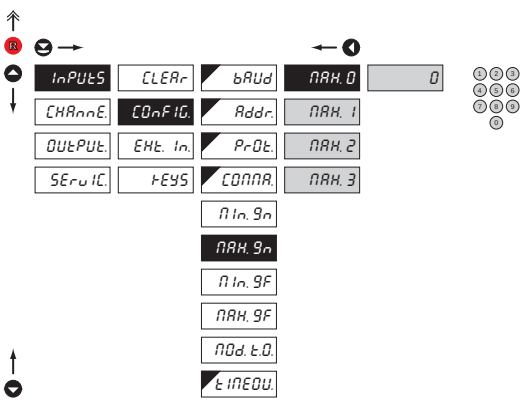


Min.Sn **Selection of integer input range - min**

- 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 - min. 0
Min.1	Most significant byte - min. 1
Min.2	Most significant byte - min. 2
Min.3	Most significant byte - min. 3

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

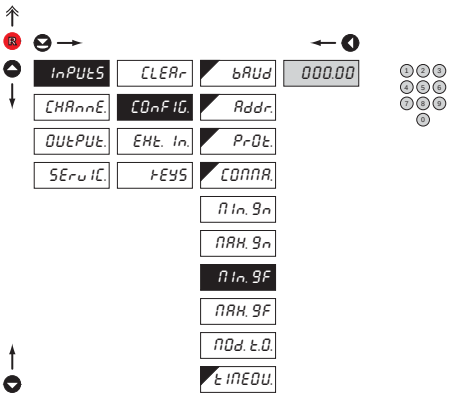


MAX.Sn **Selection of integer input range - max**

- 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)

MAX.0	Most significant byte - max. 0
DEF = 0	
MAX.1	Most significant byte - max. 1
DEF = 0	
MAX.2	Most significant byte - max. 2
DEF = 0	
MAX.3	Most significant byte - max. 3
DEF = 100	

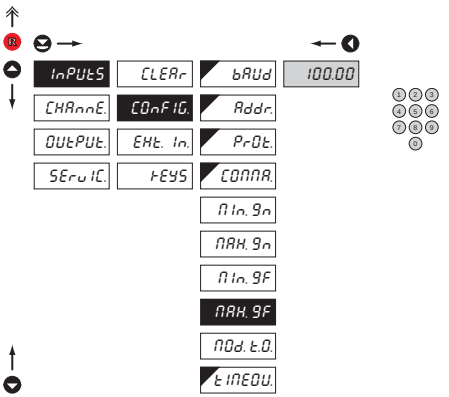
6.1.2f SELECTION OF FLOAT INPUT RANGE - MINIMUM



Min. 9F **Selection of float input range - minimum**

- setting minimum value of input data
- input data format is float according to standard IEEE 754, 32 bits
- range: 0.3×10^{-38} <= |x| <= 1.7×10^{38}
- DEF = 0

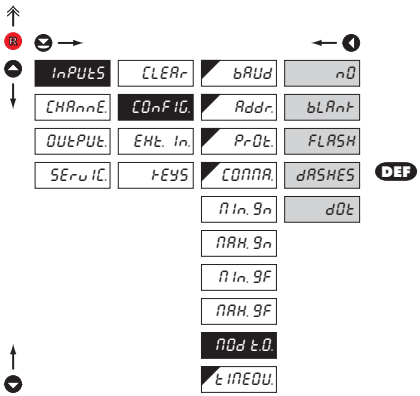
6.1.2g SELECTION OF FLOAT INPUT RANGE - MAXIMUM



MAX. 9F **Selection of float input range - maximum**

- setting minimum value of input data
- input data format is float according to standard IEEE 754, 32 bits
- range: 0.3×10^{-38} <= |x| <= 1.7×10^{38}
- DEF = 100

6.1.2h SELECTING DISPLAY MODE IN CASE OF COMMUNICATION FAILURE



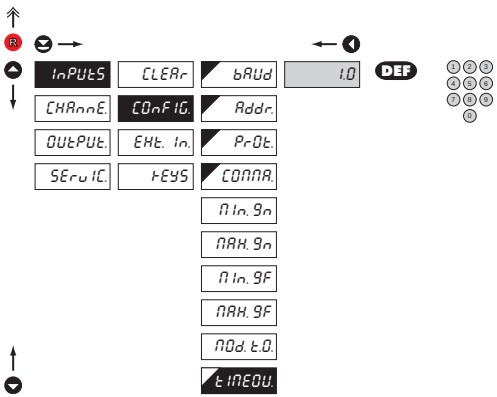
nOd t.O. **Selecting display mode in case of communication failure**

nO	No reaction
bLAnk	Displey goes off
FLASH	Last displayed value starts flashing
dASHES	Dash symbols displayed
dOt	Decimal point is displayed

!

Item will not appear in “**MASTER**” protocol

6.1.2i SETTING THE TIME CONSTANT FOR TIMEOUT



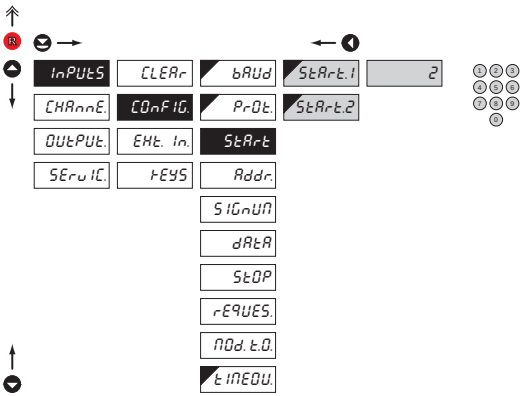
t IMEOU. **Setting the time constant for timeout**

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

!

Item will not appear in “**MASTER**” protocol and when “**MOD t.O.**” is disabled

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



StArt **Setting innitial two-symbol sequence**

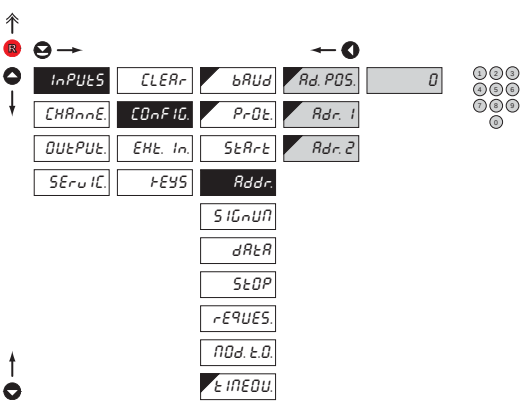
StArt.1 Setting the first introductory symbol

- set directly in ASCII code
- range: 1...127
- DEF = 2

StArt.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"



- either address in universal protocol or one (or two) symbols of fixed value

Ad. POS. 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

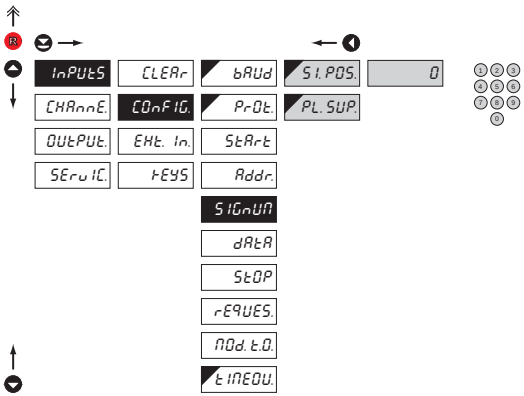
Adr. 1 First address symbol

- 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"



SIGnUn **Setting number sign**

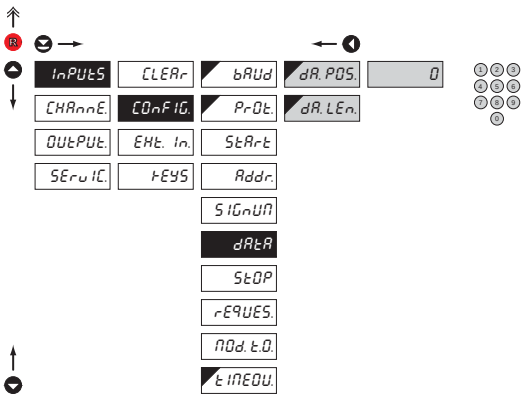
SI.POS. Setting number sign position

- 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

PL.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**

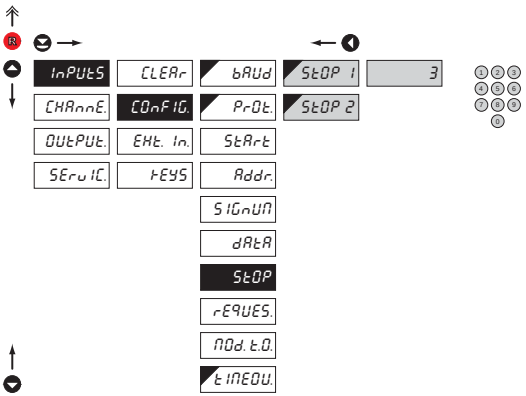
dA.POS. Setting data position

- 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.LEn. 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.

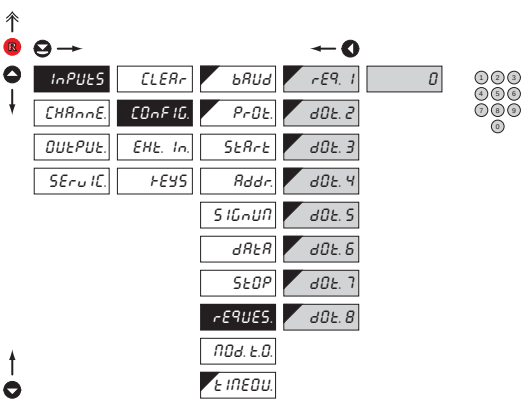
StOP 1 Setting the first closing symbol

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

StOP 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"



rEQUES. **Setting of the request to receive data**

rEQ. 1 First symbol of the request

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

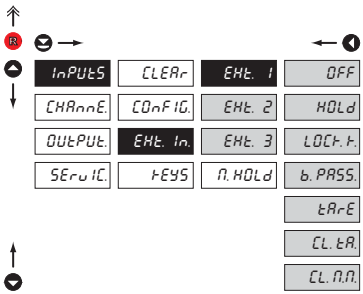
*****

Same procedure for **Dot. 2**...**Dot. 8**

!

How to set items "**Mod. t.O.**" and "**tIMEOU.**" see page 51

6.1.3a EXTERNAL INPUT FUNCTION SELECTION



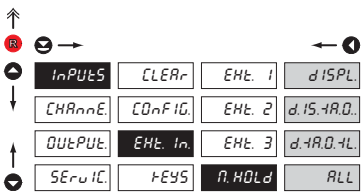
EHt. In.	**External input function selection**
OFF	Input is off
HOLd	Activation of HOLD
LOCK.K.	Locking keys on the instrument
b.PASS.	Activation of locking access into programming menu LIGHT/PROFI
tArE	Tare activation
CL.tAr.	Tare resetting
CL.n.n.	Resetting min/max value

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

*

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

6.1.3b SELECTION OF FUNCTION "HOLD"

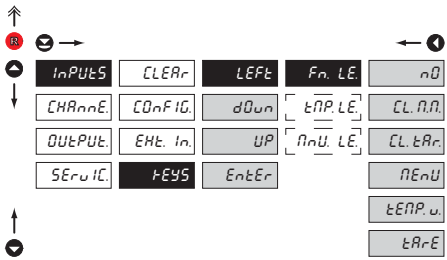


n.HOLd	**Selection of function "HOLD"**
dISPL.	"HOLD" locks only the value displayed
dIS.tA.O.	"HOLD" locks the value displayed and on AO
d.tA.O.tL.	"HOLD" locks the value displayed, on AO and limit evaluation
ALL	"HOLD" locks the entire instrument

*

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

6.1.4a OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS



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

- „**FN. LE.**“ > executive functions

nO	Key has no further function
CL. M.M.	Resetting min/max value
CL. tAr.	Tare resetting
MEnU	Direct access into menu on selected item

- after confirmation of this selection the “**MNU. LE.**”, item is displayed on superior menu level, where required selection is performed

tEMP. U.	Temporary projection of selected values

- after confirmation of this selection the item “**TMP. LE.**”, is displayed on superior menu level, whererequired selection is performed

tArE	Tare function activation

!

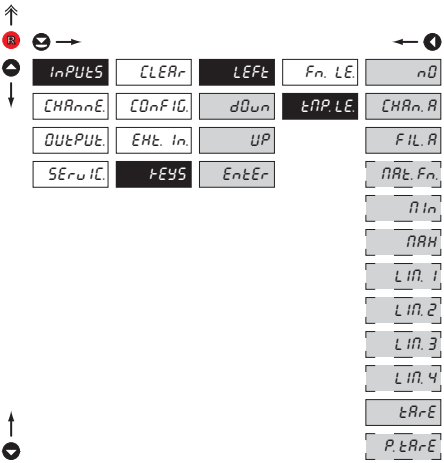
Setting is identical for LEFT, DOWN, UP and ENTER

!

Preset values of the control keys DEF:

LEFT	Show Tare
UP	Show max. value
DOWN	Show min. value
ENTER	w/o function

6.1.4b OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION



tMP.LE. **Temporary projection of selected item**

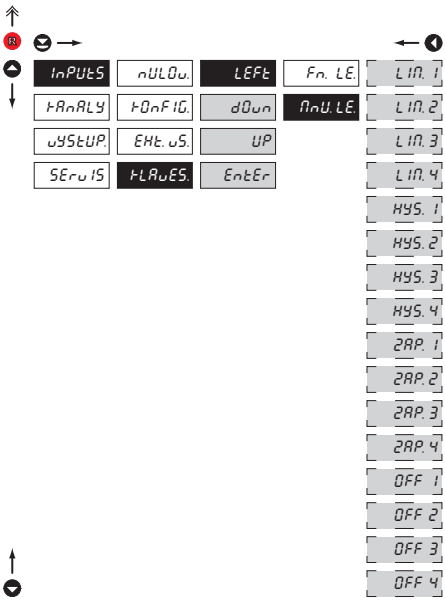
- „TMP. LE." > temporary projection of selected values
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing ⊙ + "Selected key", this holds until the stroke of any key

nO	Temporary projection is off
CHAn.A	Temporary projection of "Channel A" value
FIL.A	Temporary projection of "Channel A" value after processing digital filters
nAt.Fn.	Temporary projection of "Mathematic functions" value
Min	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
LIn.1	Temporary projection of "Limit 1" value
LIn.2	Temporary projection of "Limit 2" value
LIn.3	Temporary projection of "Limit 3" value
LIn.4	Temporary projection of "Limit 4" value
tArE	Temporary projection of "TARE" value
P.tArE	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



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

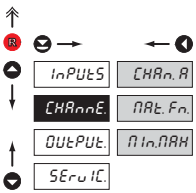
LIN. 1	Direct access to item “LIM 1”
LIN. 2	Direct access to item “LIM 2”
LIN. 3	Direct access to item “LIM 3”
LIN. 4	Direct access to item “LIM 4”
HYS. 1	Direct access to item “HYS. L.1”
HYS. 2	Direct access to item “HYS. L.2”
HYS. 3	Direct access to item “HYS. L.3”
HYS. 4	Direct access to item “HYS. L.4”
On 1	Direct access to item “ON L.1”
On 2	Direct access to item “ON L.2”
On 3	Direct access to item “ON L.3”
On 4	Direct access to item “ON L.4”
OFF 1	Direct access to item “OFF L.1”
OFF 2	Direct access to item “OFF L.2”
OFF 3	Direct access to item “OFF L.3”
OFF 4	Direct access to item “OFF L.4”

!

Setting is identical for LEFT, DOWN, UP and ENTER


1489°C
-263mm

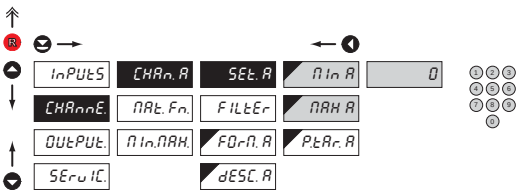
6.2 SETTING "PROFI" - CHANNEL



The primary instrument parameters are set in this menu

- CHAn.A — Setting parameters of measuring "Channel"
- MAt.Fn. — Setting parameters of mathematic functions
- MIn.MAX — Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION



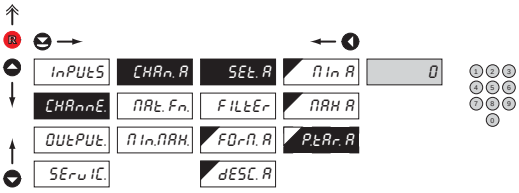
Setting display projection

- MIn A — Setting display projection for minimum value of input signal
  - range of the setting: -99999...999999
  - DEF = 0
- MAX A — Setting display projection for maximum value of input signal
  - range of the setting: -99999...999999
  - DEF = 100

!

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

6.2.1b SETTING FIXED TARE



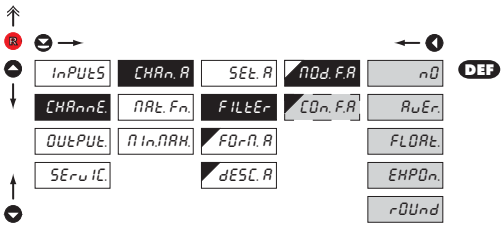
Setting "Fixed tare" value

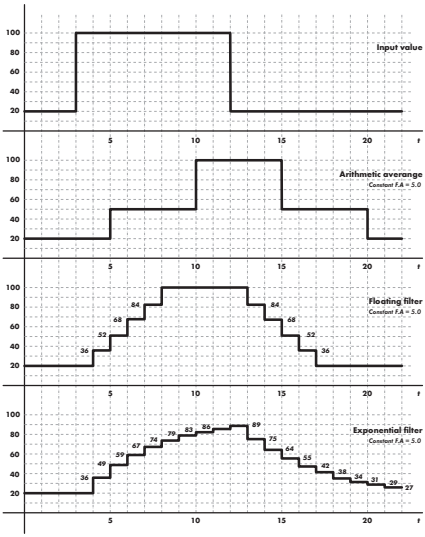
- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting (P. TAR.A ≠ 0) display shows "T" symbol
- range of the setting: -99999...999999
- DEF = 0

!

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

6.2.1c 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 („CON.F. A“) of measured values
- range: 2...100

FLOAt. Selection of floating filter

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

EHPOn. Selection of exponential filter

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

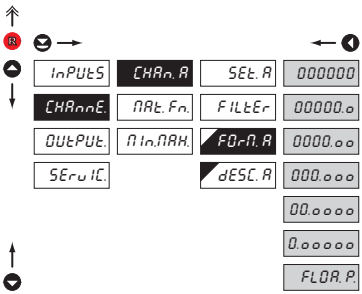
rOUnd Measured value rounding

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

CON.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



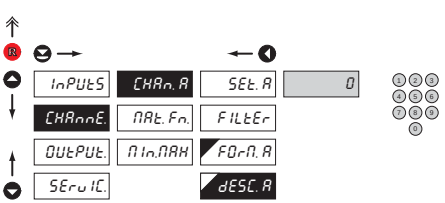
FOrn.A **Selection of decimal point**

-

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 „FLOA. P."

- 000000 Setting DP - XXXXXX
- **DEF**
- 00000.o Setting DP - XXXXX.x
- 0000.oo Setting DP - XXXX.xx
- 000.ooo Setting DP - XXX.xxx
- 00.oooo Setting DP - XX.xxxx
- 0.ooooo Setting DP - X.xxxxx
- FLOA.P. Floating DP

6.2.1e PROJECTION OF DESCRIPTION - THE MEASURING UNITS



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

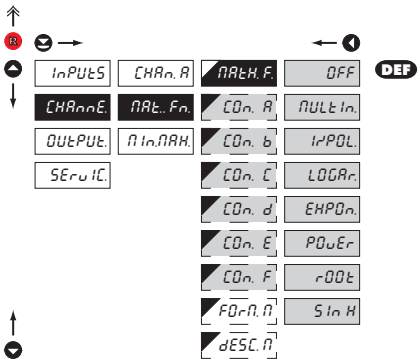
- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by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

- **DEF** = no description

!

Table of signs on page 83

6.2.2a MATHEMATIC FUNCTIONS



nAtH.F. Selection of mathematic functions

OFF Mathematic functions are off

nULtIn. Polynome

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

InPOL. 1/x

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

LOGAr. Logarithm

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

EHPOn. Exponenciál

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

POuEr Power

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

rOOt Root

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

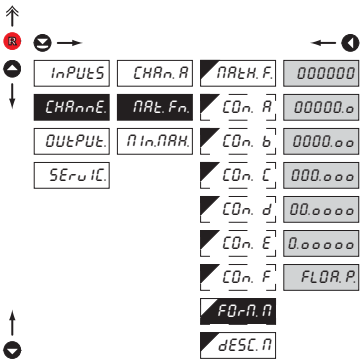
SInH Sin x

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

Con. - 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



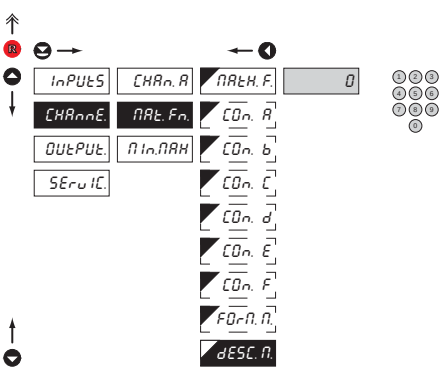
FOrn. n **Selection of decimal point**

- 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 „FLOA. P."

000000	Setting DP - XXXXXX
00000.o	Setting DP - XXXXX.x
0000.oo	Setting DP - XXXX.xx
000.ooo	Setting DP - XXX.xxx
00.oooo	Setting DP - XX.xxxx
0.ooooo	Setting DP - X.xxxxx
FLOA. P.	Floating DP

- DEF

6.2.2c MATHEMATIC FUNCTIONS - MEASURING UNITS



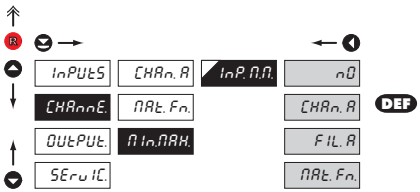
dESC. n **Setting projection of description for "MATH. F."**

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

!

Table of signs on page 83

6.2.3 SELECTION OF EVALUATION OF MIN/MAX VALUE

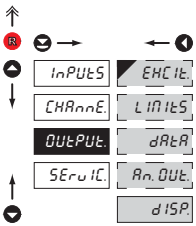


InP. n.n. Selection of evaluation of min/max value

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

n0	Evaluation of min/max value is off
CHAn. A	From "Channel A"
FIL. A	From "Channel A" after digital filters processing
nAt. Fn.	From "Mathematic functions"

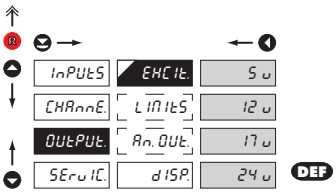
6.3 SETTING „PROFI“ - OUTPUTS



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

- **EXC It.** Volba výstupního napětí pomocného zdroje
- **LIMItS** Setting type and parameters of limits
- **An. OUt.** Setting type and parameters of analog output
- **dISP.** Setting display projection and brightness

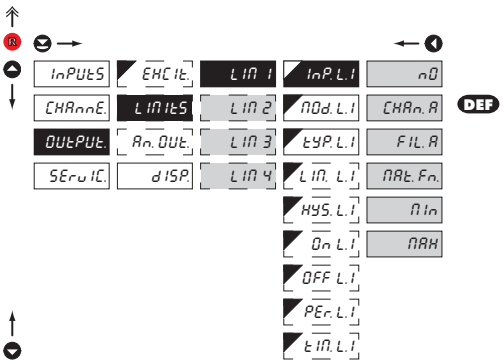
6.3.1 SELECTION OF SENSOR EXCITATION VOLTAGE



EXC It. **Selection of sensor excitation voltage (aux. power supply)**

- **5 u** 5 VDC, max. 2,5 W
- **12 u** 12 VDC, max. 2,5 W
- **17 u** 17 VDC, max. 2,5 W
- **24 u** 24 VDC, max. 2,5 W

6.3.2a SELECTION OF INPUT FOR LIMITS EVALUATION



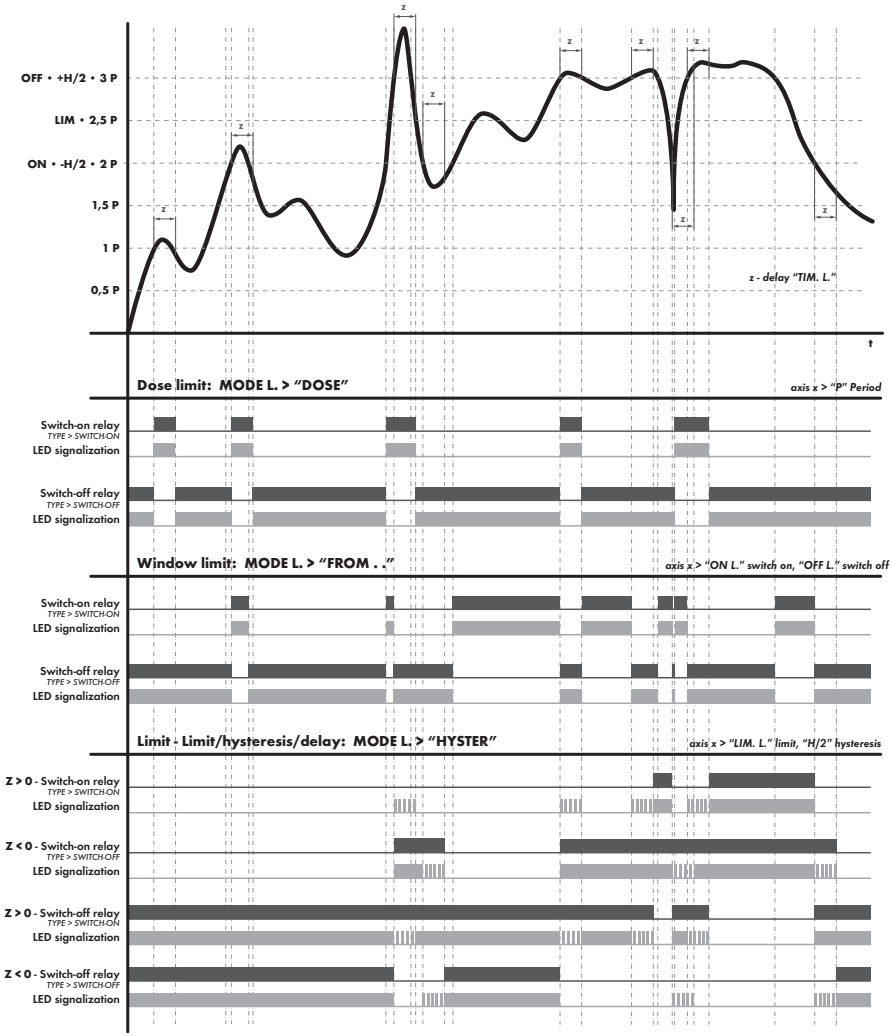
InP. L.1 **Selection evaluation of limits**

- selection of value from which the limit will be evaluated

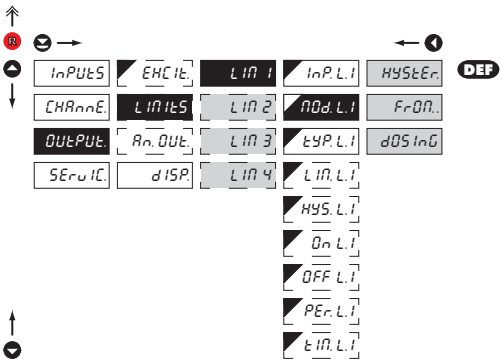
- **nO** Limit evaluation is off
- **CHAn. A** Limit evaluation from “Channel A”
- **FIL. A** Limit evaluation from “Channel A” after digital filters processing
- **MAt. Fn.** Limit evaluation from “Mathematic functions”
- **MIn** Limit evaluation from “Min.value”
- **MAX** Limit evaluation from “Max. value”

!

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


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

6.3.2b SELECTION THE TYPE OF LIMIT



nOd.L.1 **Selection the type of limit**

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

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

FrOn.. Frame limit

- for this mode the parameters are set for interval "**ON. L.1**" the relay switch-on and "**OFF. L.1**" the relay switch-off

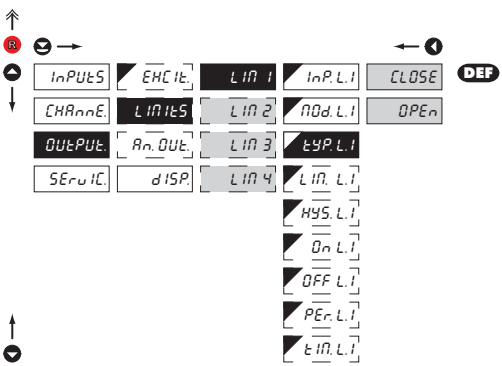
dOSInG Dose limit (periodic)

- for this mode the parameters are set for "**PER. L.1**" determining the limit value as well as its multiples at which the output is active and "**TIM. L.1**" indicating the time during which is the output active

!

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

6.3.2c SELECTION OF TYPE OF OUTPUT



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

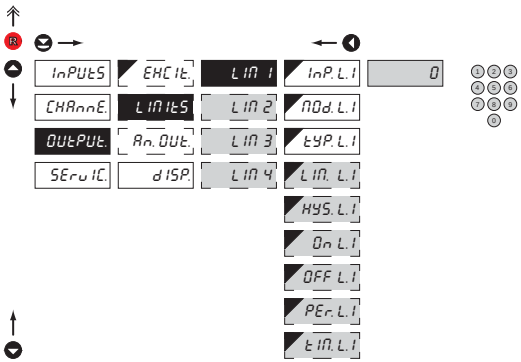
CLOSE Output switches on when condition is met

OPEn Output switches off when condition is met

!

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

6.3.2d SETTING VALUES FOR LIMITS EVALUATION



LIn. L.1 Setting limit for switch-on

- for type "**HYSTER.**"

HYS. L.1 Setting hysteresis

- for type "**HYSTER.**"
- 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 "**FROM..**"

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

- for type "**FROM..**"

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

- for type "**DOSING**"

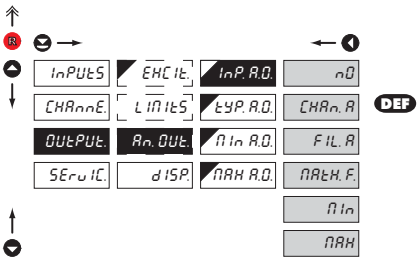
tIn. L.1 Setting the time switch-on of the limit

- for type "**HYSTER.**" and "**DOSING**"
- setting within the range: ±99,9 s
- positive time > relay switches on after crossing the limit (**LIM. L.1**) and the set time (**TIM. L.1**)
- negative time > relay switches off after crossing the limit (**LIM. L.1**) and the set negative time (**TIM. L.1**)

!

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

6.3.3a SELECTION OF INPUT FOR ANALOG OUTPUT

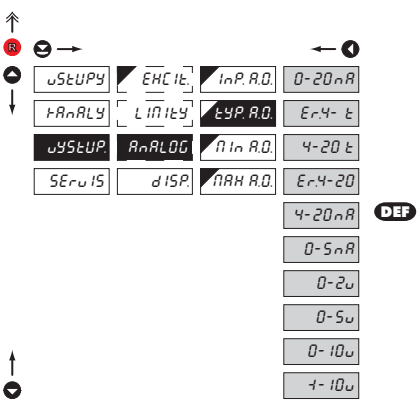


InP.A.O. Selection evaluation analog output

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

nO	AO evaluation is off
CHAn.A	AO evaluation from "Channel A"
FIL.A	AO evaluation from "Channel A" after digital filters processing
MAt.Fn.	AO evaluation from "Math. functions"
MIn	AO evaluation from "Min. value"
MAX	AO evaluation from "Max. value"

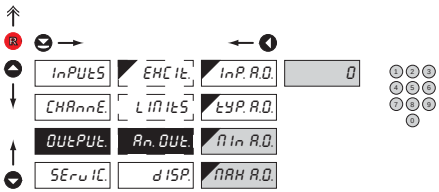
6.3.3b SELECTION OF THE TYPE OF ANALOG OUTPUT



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

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

6.3.3c SETTING THE ANALOG OUTPUT RANGE



An. OUt. Setting the analog output range

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

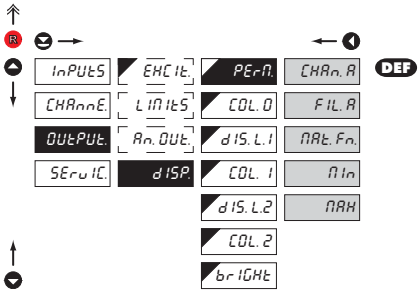
MIn A.0. Assigning the display value to the beginning of the AO range

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

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

- range of the setting: -99999...999999
- DEF = 100

6.3.4a SELECTION OF INPUT FOR DISPLAY PROJECTION



PErM. Selection display projection

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

CHAn. 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

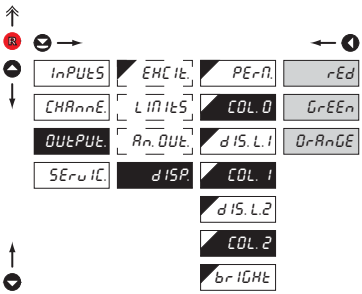
- data which have been succesfully converted to numbers will be projected

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

MIn Projection of values from "Min. value"

MAX Projection of values from "Max. value"

6.3.4b SELECTION OF DISPLAY COLOR



COL. - Selection of display color

- the color selection is governed by setting under items “DIS. L.1” and “DIS. L.2”

rEd — Red color

GrEEn — Green color

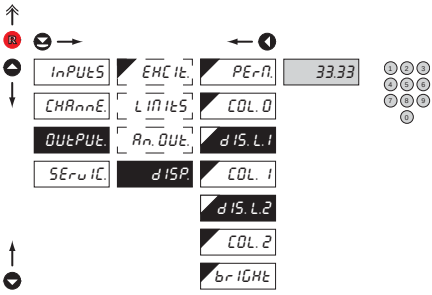
OrAnGE — Orange color

- “COL. 0” **DEF** = Green
- “COL. 1” **DEF** = Orange
- “COL. 2” **DEF** = Red

!

Not aplicable to the version with monocolur high brightness LED display

6.3.4c SELECTION OF DISPLAY COLOR CHANGE



dIS. L. - Selection of display color change

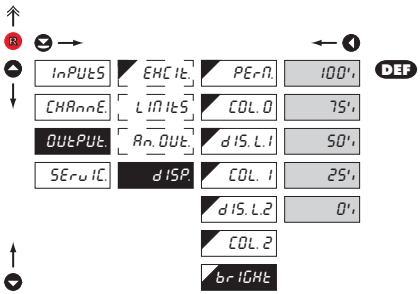
- under items “DIS. L.1” and “DIS. L.2” the limit is set for the time when the display color shall change

- “DIS. L.1” **DEF** = 33.33
- “DIS. L.2” **DEF** = 66.67

!

Not aplicable to the version with monocolur high brightness LED display

6.3.4d SELECTION OF DISPLAY BRIGHTNESS



br IGHt **Selection of display brightness**

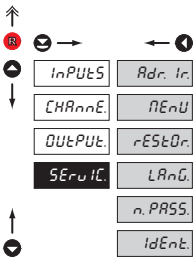
- by selecting display brightness we may appropriately react to light conditions in place of instrument location

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 %

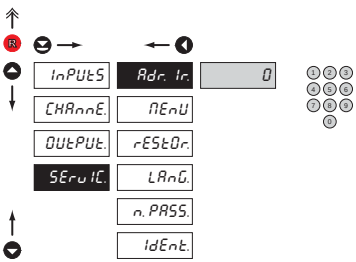
6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

Adr. Ir.	Setting the address of IR control
MEnU	Selection of menu type LIGHT/PROFI
rESt0r.	Restore instrument manufacture setting and calibration
LAnG.	Language version of instrument menu
n. PASS.	Setting new access password
IdEnt.	Instrument identification

6.4.1 SETTING THE ADDRESS OF IR REMOTE CONTROL



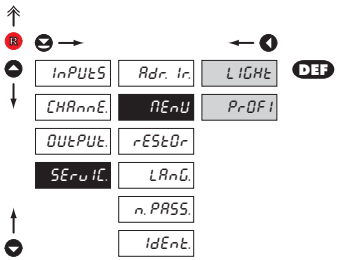
Adr. Ir. Setting the address of IR remote control

- 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 setting: 0...99
- DEF = 0

Controlling addressed instrument

- if the OMD has an address different than „0"
- press the green button and key in the address of the controlled device
- after establishing communication a yellow signalling LED lights up on the display
- then you can control the dispaly in the standard way in LIGHT/PROFI/USER menu
- if needed, the address can cancelled by pressing the blue button of the remote

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

LIGHt Active LIGHT menu

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

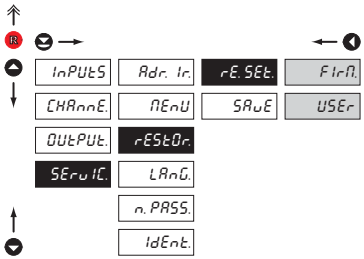
PrOFI Active PROFI menu

- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.3 RESTORATION OF MANUFACTURE SETTING



rE.SEt. **Restoration of manufacture setting**

FIrM. Return to manufacture setting of the instrument

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

USEr Restoration of instrument user setting

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

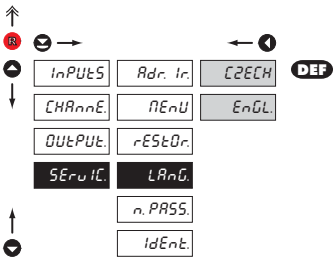
SAvE Save instrument user setting

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

!

After restoration the instrument switches off for couple seconds

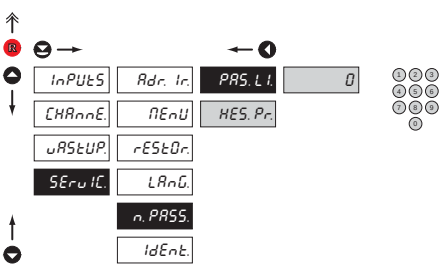
6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION



LAnG. Selection of instrument menu language version

- CZECH — Instrument menu is in Czech
- EnGL. — Instrument menu is in English

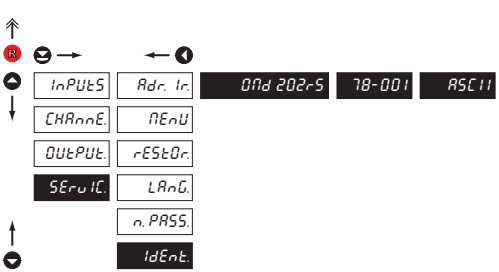
6.4.5 SETTING NEW ACCESS PASSWORD



n. PASS. Setting new password for access to LIGHT and 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**“

6.4.6 INSTRUMENT IDENTIFICATION



- 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

IDENT.	Blok	Description
	1.	Instrument
	2.	no. of SW version
	3.	type/input mode


1489°C
-263mm

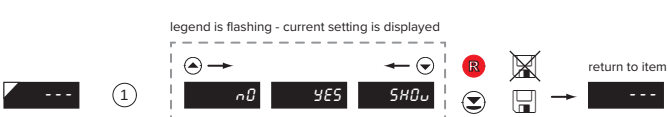
SETTING **USER**

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



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

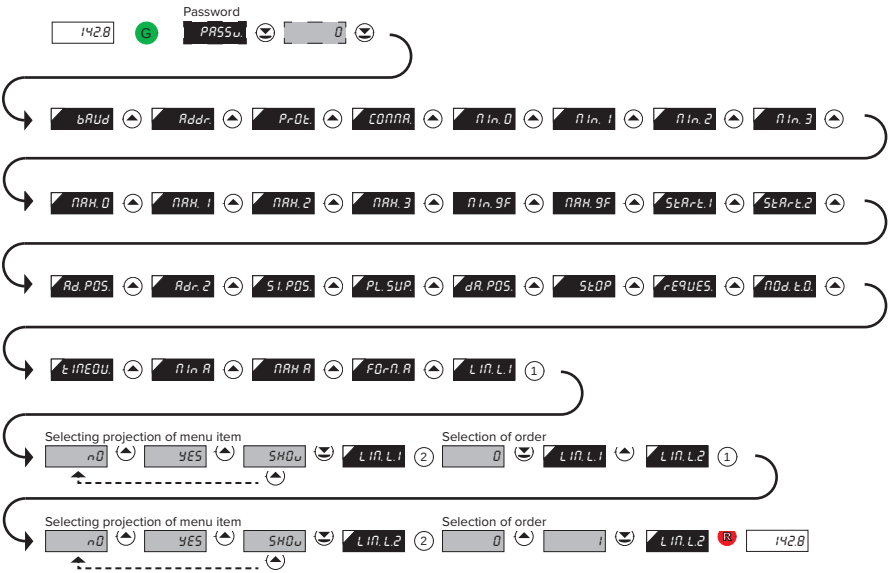
Setting items into „USER“ menu

When setting up the USER menu out of active LIGHT menu it is possible to rank the menu items (max. 10) in the order we want them to appear in the menu.

Setting up the ranking order

Example of setting up menu items into “USER” menu

As an example we are going to use a direct access into manu items Limit1 and Limit2 (the given example is for Light menu but can be applied also in Profi menu).



The resulting setting is as follows: After pressing button R **„LIM L.1 “**is projected. By pressing ⏬ you confirm this and you set the desired limit value, alternatively by pressing button ⏫ you can go over to setting of **„LIM. L.2“** where you repeat the procedure. You can finish the setting up by pressing the ⏬ button, by which you save the latest setting and by pressing the R you return to the operating 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 na www.orbit.merret.cz/rs or in the OM Link program.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

EVENT	TYPE	PROTOCOL		TRANSMITTED DATA														
Data solicitation (PC)	232	ASCII		#	A	A	<CR>											
		MessBus		No - data is transmitted permanently														
	485	ASCII		#	A	A	<CR>											
		MessBus		<SADR>	<ENQ>													
Data transmission (instrument)	232	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>			
		MessBus		<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

SIGN	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

RELAYS, 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 00H...FFH. 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)

- range: $0.3\times10^{-38} <= |x| <= 1.7\times10^{38}$

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>$9 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

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

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

Description is cancelled by entering characters with code 00

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

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, MessBus, Modbus RTU, PROFIBUS DP
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...12 000 KBaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (in range 1...247)

PROJECTION

Display:	999999, 4 (100/125 mm) or 6 digit (57/100/125 mm) Three-color 7 segment LED - red/green/orange High bright singles LED - red or green (1300 mcd)
Projection:	-999...9999 or -99999...999999
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

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
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:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Outputs:	4x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)* 4x open collectors (30 VDC/100 mA)
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

ANALOG OUTPUT

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
Current:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ω /12 V or 1 000 Ω/24 V

EXCITATION

Adjustbale:	5/12/17/24 VDC/max. 2,5 W, isolated

POWER SUPPLY

Options:	10...30 V AC/DC, max. 27 VA, isolated PF ≥ 0,4, I_{STP}> 75 A/2 ms fuse inside (T 4A) 80...250 V AC/DC, max. 27 VA, isolated PF ≥ 0,4, I_{STP}> 475 A/2 ms fuse inside (T 4A)

MECHANIC PROPERTIES

Material:	anodized aluminum, black
Dimensions:	see chapter 12
Panel cut-out:	see chapter 12

OPERATING CONDITIONS

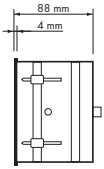
Connection:	through cable bushings to terminal boards inside the instrument, conductore section up to < 1,5 mm² /< 2,5 mm²
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP64
Construction:	safety class I
Overvoltage cat.:	EN 61010-1, A2
Dielectric strength:	4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between supply and analog output
Insulation resist.:	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

* values apply for resistance load

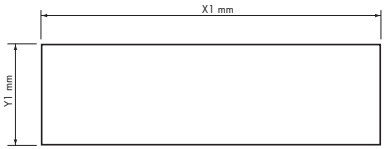
PI - Primary insulation, DI - Double insulation

Front view

Side view



Panel cutout

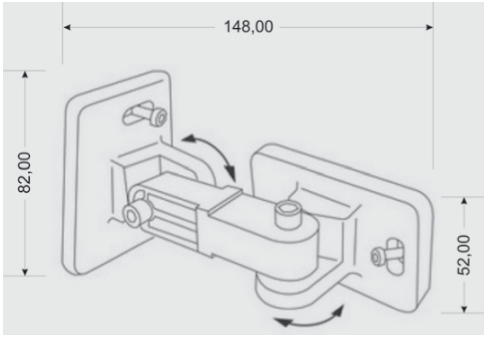


Panel thickness: 0,5 ... 50 mm

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

Wall mounting

Our large displays are supplied along with a wall mount holder as shown in the the drawing.



13. CERTIFICATE OF GUARANTEE

Product	**OMD 202RS**
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

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 4/6-digit programmable large display

Type OMD 202

Version UNI, PWR, UQC, RS

Thas been designed and manufactured in line with requirements of

Low-voltage electrical equipment (directive no. 2014/35/EU)
Electromagnetic compatibility (directive no. 2014/30/EU)

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, cap. 14 and cap. 15, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11, EN 61000-3-2, EN 61000-3-3, EN 55022, cap. 5 and cap. 6

The product is furnished with CE label issued in 2001.

As documentation serve the protocoles of authorized and accredited organizations

EMC VTÚE Praha, experimental laboratory No. 1158, protocol No. 08-041/2001 of 24/11/2001
VTÚPV Vyškov, experimental laboratory No. 1103, protocol No. 730-325/2001 of 02/05/2001
VTÚPV Vyškov, experimental laboratory No. 1103, protocol No. 730-350/2001 of 07/05/2001
VTÚPV Vyškov, experimental laboratory No. 1103, protocol No. 730-372/2001 of 02/05/2001
VTÚPV Vyškov, experimental laboratory No. 1103, protocol No. 730-934/2001 of 20/11/2001

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

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