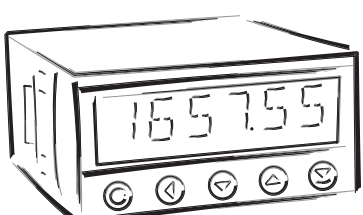
RusAutomation

GUARANTEE 5 YEARS

OM 602RS

6 DIGIT PROGRAMABLE INSTRUMENT

RS 232 /RS 485



SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OM 602 series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

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

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

CONNECTION

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

2.1 Description

The OM 602RS type is a 6 digit panel display device for data from serial lines of RS 232 and RS 485 standard. Communication with ASCII or MessBus protocol.
All ASCII symbols may be displayed which are usable for 14-segment display.

PROGRAMMABLE PROJECTION

Setting:	manual
Projection:	-99999...999999

LINEARIZATION

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

DIGITAL FILTERS

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

MATHEMATIC FUCTIONS

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

EXTERNAL CONTROL

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

2.2 Operation

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

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

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

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

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

OMLINK

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

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

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

2.3 Options

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

Comparators are assigned to monitor one, two, three or four limit values with relay output. The user may select limits regime: LIMIT/DOSING/FROM-TO. The limits have adjustable hysteresis within the full range of the display as well as selectable delay of the switch-on in the range of 0...99,9 s. Reaching the preset limits is signalled by LED and simultaneously by the switch-on of the relevant relay.

Data outputs are for their rate and accuracy suitable for transmission of the measured data for further projection or directly into the control systems. We offer an isolated RS232 and RS485 with the ASCII or DIN MessBus protocol.

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

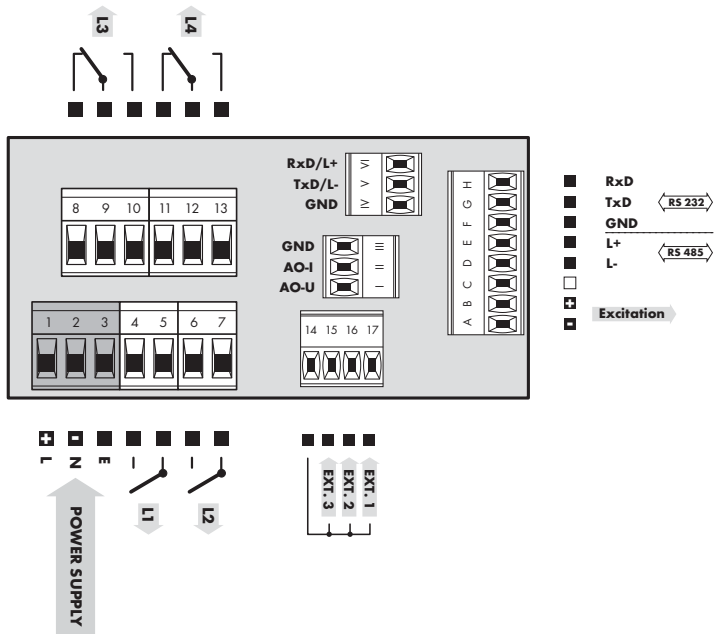
Measured data record is an internal time control of data collection. It is suitable where it is necessary to register measured values. Two modes may be used. FAST is designed for fast storage (40 records/s) of all measured values up to 8 000 records. Second mode is RTC, where data record is governed by Real Time with data storage in a selected time segment and cycle. Up to 250 000 values may be stored in the instrument memory. Data transmis sion into PC via serial interface RS232/485 and OM Link.

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.



Setting PROFI

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

Setting LIGHT

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

Setting USER

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

4.1 Setting

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

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- contains solely items necessary for instrument setting and is protected by optional number code

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

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

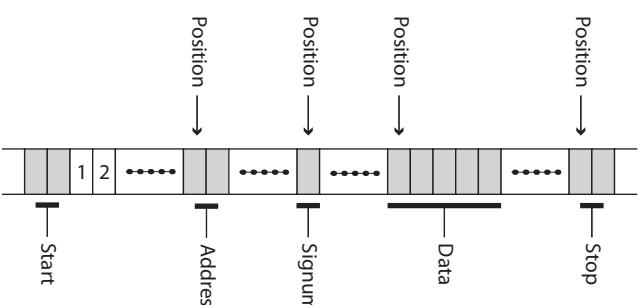
All programmable parameters are stored in the EEPROM memory (they hold even after the instrument is switched off).

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

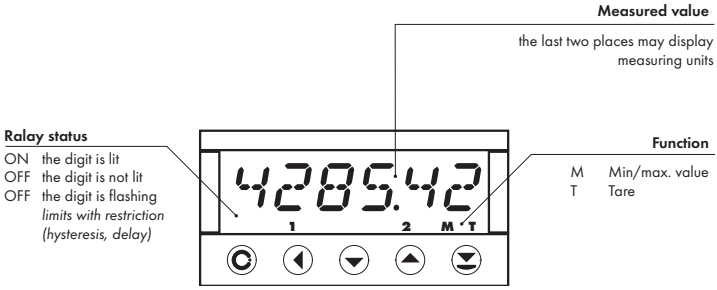
The operation program is freely accessible (www.orbit.merret.cz) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.

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

User data protocol



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



Symbols used in the instructions

DEF values preset from manufacture

symbol indicates a flashing light (symbol)

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

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

after pressing the key the set value will not be stored

after pressing the key the set value will be stored

30 continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT

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

THE MINUS SIGN

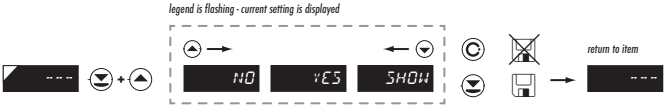
Setting the minus sign is performed by the key ▼ on higher decade. When editing the item substraction must be made from the current number (e.g..: 013 > ▼ , on class 100 > -87)

Control keys functions

Key	Measurement	Menu	Setting numbers/selection
C	access into USER menu	exit menu	quit editing
◀	programmable key function	back to previous level	move to higher decade
▼	programmable key function	move to previous item	move down
▲	programmable key function	move to next item	move up
▼▼	programmable key function	confirm selection	confirm setting/selection
▲ + ▼			numeric value is set to zero
C + ▼▼	access into LIGHT/PROFI menu		
C + ▼	direct access into PROFI menu		
▼▼ + ▲		configuration of an item for "USER" menu	
▼▼ + ▼		determine the sequence of items in "USER - LIGHT" menu	

Setting items into „USER“ menu

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



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

5.0 Setting "LIGHT"

LIGHT **Simple programming menu**

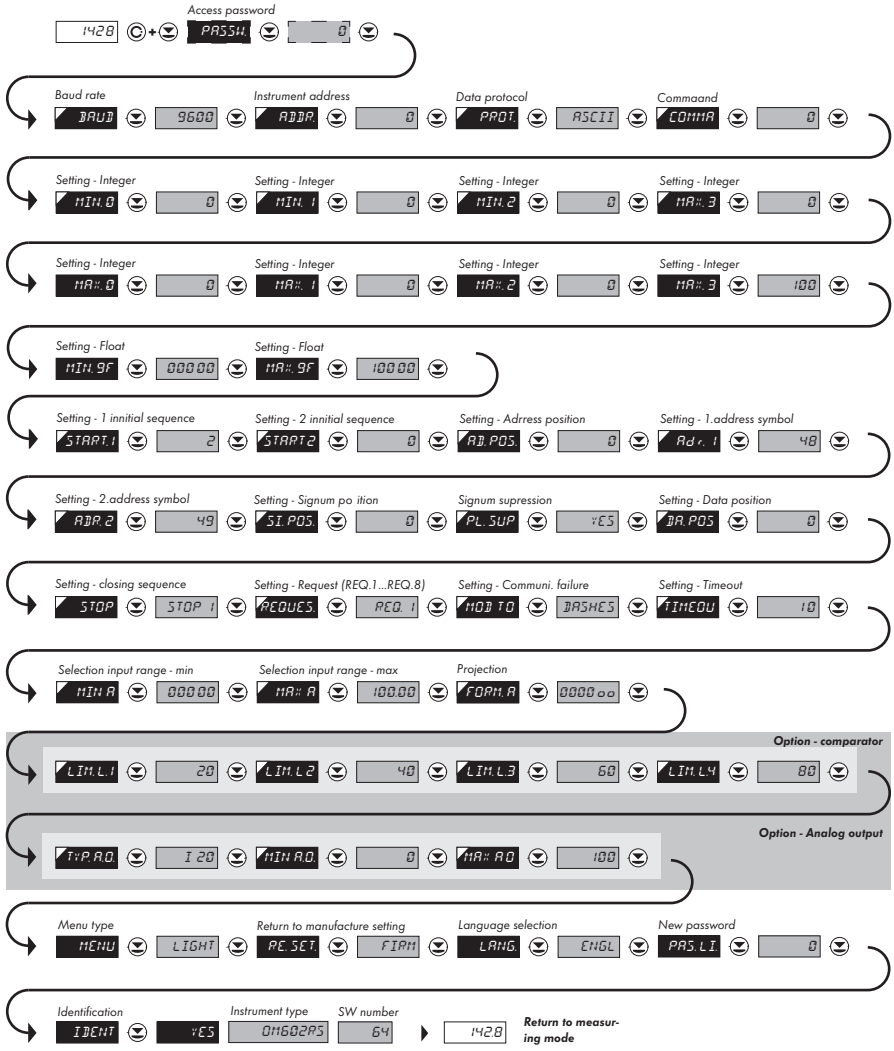
- contains only items necessary for instrument setting and is protected by optional number code

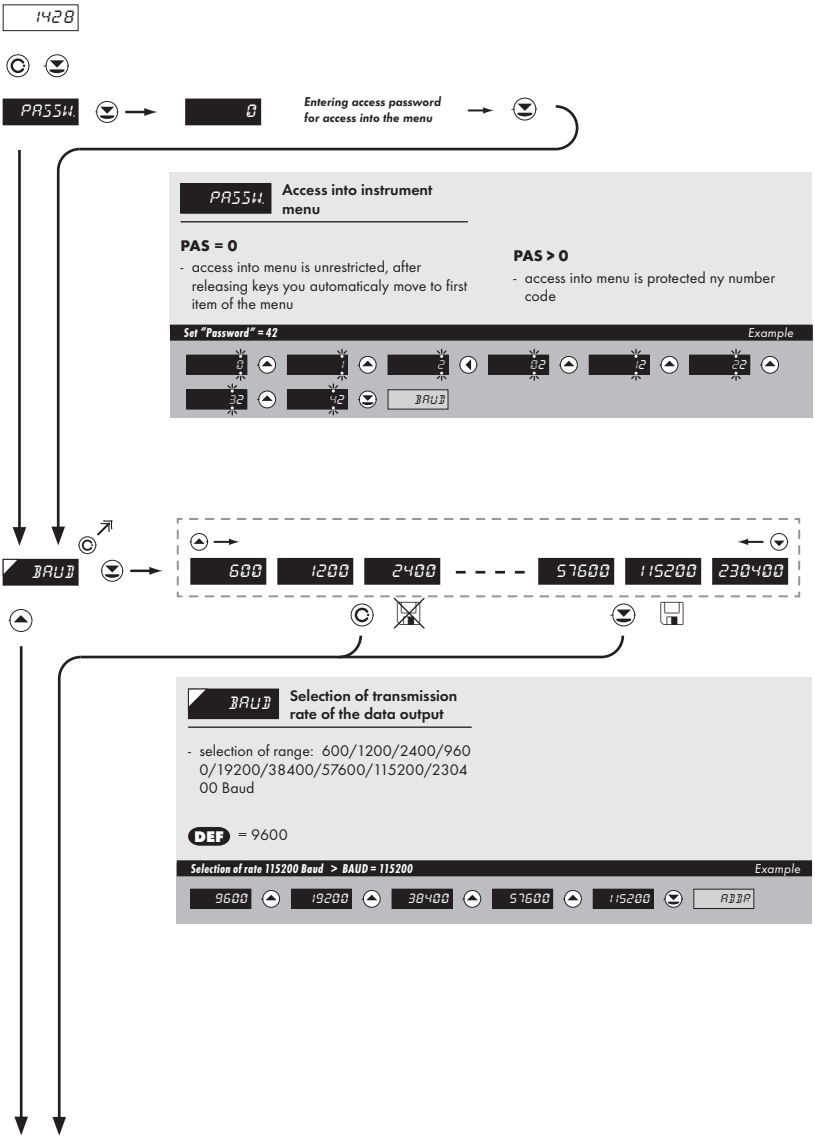
- **For capable users**
- **Only items necessary for instrument setting**
- **Access is password protected**
- **Possibility to arrange items of the „User" menu**
- **Linear menu structure**

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


Access password
1428
PASSW.
0
Baud rate
BAUD
9600
Instrument address
ADDR.
0
Data protocol
PROT.
ASCII
Commaand
COMMA
0
Setting - Integer
MIN.0
0
MIN. 1
0
MIN.2
0
MAX.3
0
Setting - Integer
MAX.0
0
MAX. 1
0
MAX.2
0
MAX.3
100
Setting - Float
MIN.9F
00000
MAX.9F
10000
Setting - 1 innitial sequence
START.1
2
Setting - 2 innitial sequence
START2
0
Setting - Adress position
ADD.POS.
0
Setting - 1.address symbol
Adr. 1
48
Setting - 2.address symbol
ADR.2
49
Setting - Signum po ition
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 TO
DASHES
Setting - Timeout
TIMEOU
10
Selection input range - min
MIN A
00000
Selection input range - max
MAX A
10000
Projection
FORM.A
0000oo
Option - comparator
LIM.L.1
20
LIM.L2
40
LIM.L3
60
LIM.L4
80
Option - Analog output
TYP.A.O.
I 20
MIN A.O.
0
MAX A.O
100
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
OM602RS
SW number
64
1428
Return to measuring mode


1428
PASSW.
0
Entering access password for access into the menu
PASSW.
Access into instrument menu
PAS = 0
- access into menu is unrestricted, after releasing keys you automaticaly move to first item of the menu
PAS > 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
- selection of range: 600/1200/2400/960 0/19200/38400/57600/115200/2304 00 Baud
DEF = 9600
Selection of rate 115200 Baud > BAUD = 115200
Example
9600
19200
38400
57600
115200
BAUD

ADDR. Setting instrument address

DEF = 0

Address 10 > ADDR. = 10 — *Example*

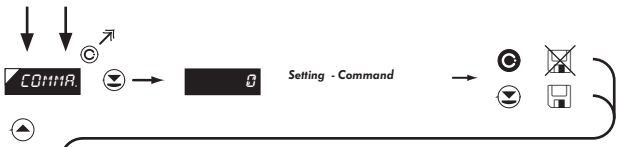
PROT. Selection of data protocol

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*



COMMA. Setting - Command

DEF = uu (two spaces)

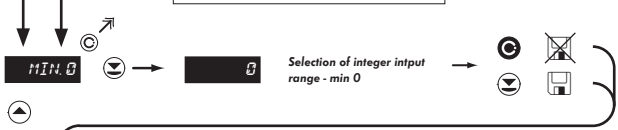
Command > uu *Example*

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>



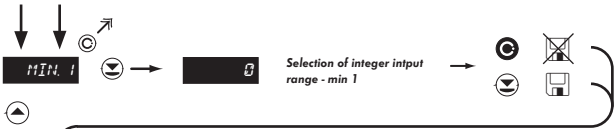
MIN.0 Selection integer input range - min - MSB

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

DEF = 0

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

0 → MIN 1



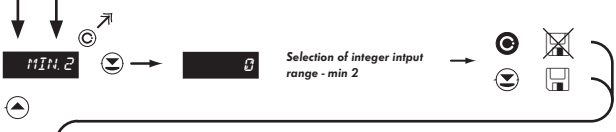
MIN. 1 **Selection of integer input range - min**

- 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...0x7FFFFFFF)

DEF = 0

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



MIN. 2 **Selection of float 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

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

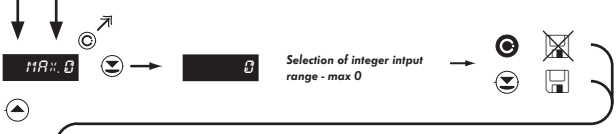
MIN. 3 Selection of integer input range - min - LSB

- 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...0x7FFFFFFF)

DEF = 0

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



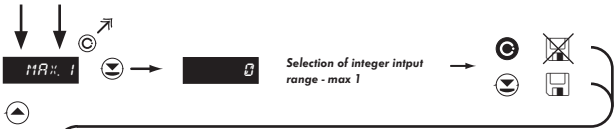
MAX. 0 Selection of integer input range - max - MSB

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



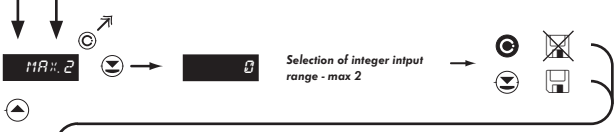
MAX. 1 Selection of integer input range - max

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



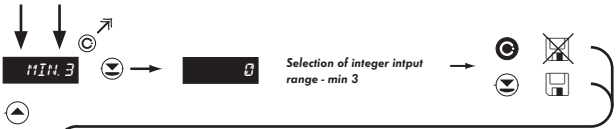
MAX. 2 Selection of integer input range - max

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



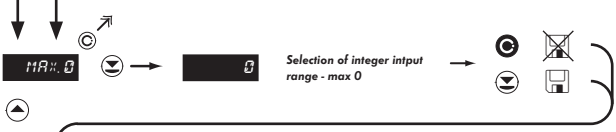
MIN. 3 Selection of integer input range - min - LSB

- 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...0x7FFFFFFF)

DEF = 0

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



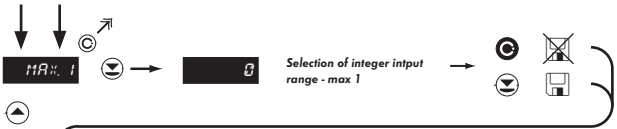
MAX. 0 Selection of integer input range - max - MSB

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



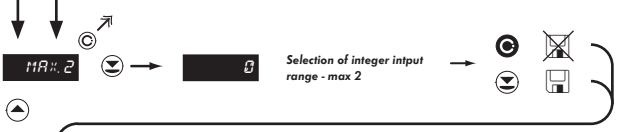
MAX. 1 **Selection of integer input range - max**

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

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

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

DEF = 2

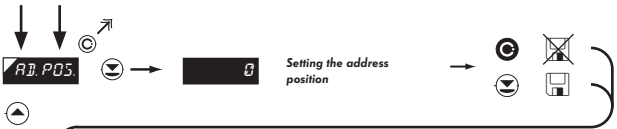
Setting 1.Start symbol > START. 1 = 2 *Example*

START2 **Setting the second intrductory symbol**

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

DEF = 0

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



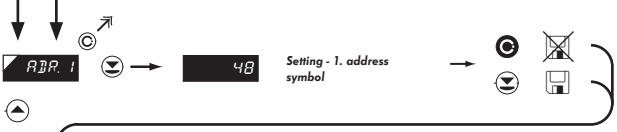
AD.POS. Setting the address position

- 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.

- range: 0...245

DEF = 0

Setting address position > Ad. POS. = 0 *Example*

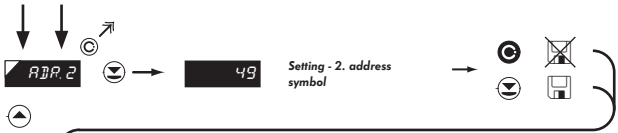


Adr. 1 First address symbol

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

DEF = 48

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

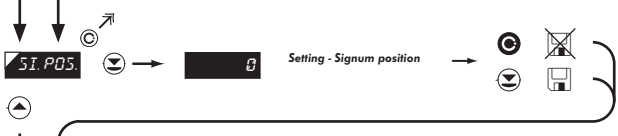


Adr.2 Second address symbol

- 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*

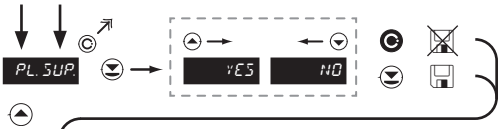


SI.POS. Setting number sign position

- 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*

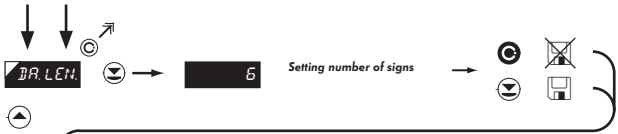
DA. POS. **Setting data position**

- 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 succesful 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. LEN. = 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

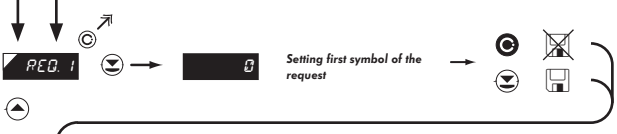
Setting 1. Stop symbol > STOP 1 = 3 *Example*

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 = 3 — *Example*



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

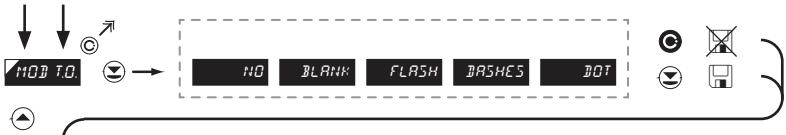
- set directly in ASCII code
- range: 0...127
- If set to "0", request is not sent

DEF = 0

Setting - 1. symbol > REQ. 1 = 0 — *Example*

*

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



MOD 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

TIMEOU. 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

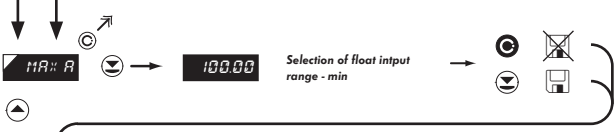
30

MIN 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 = 0.00

Projection for min > MIN A = 0.00 *Example*

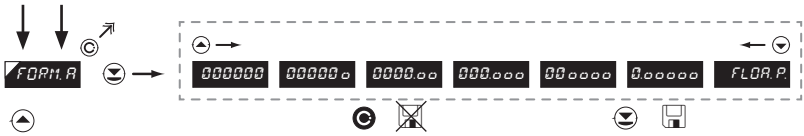


MAX A Selection of float input range - min

- 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 = 100.00

Projection for max > MAX A = 100.00 *Example*



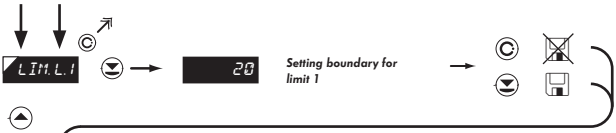
FORM.A Setting projection of the decimal point

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

DEF = 0000.oo

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

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



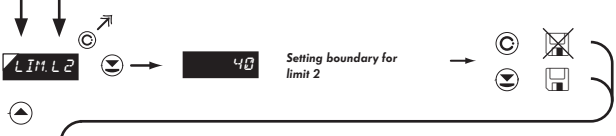
LIM.L.1 **Setting boundary for limit 1**

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

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

DEF = 20

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



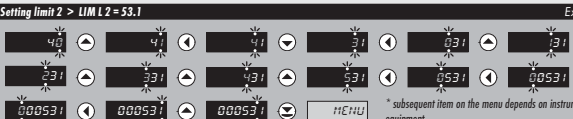
LIM.L2 **Setting boundary for limit 2**

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

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

DEF = 40

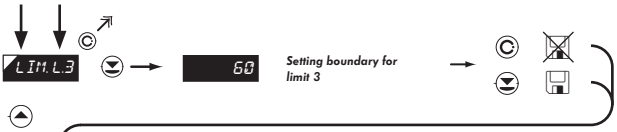
Setting limit 2 > LIM L 2 = 53.1 *Example*



* subsequent item on the menu depends on instrument equipment

!

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



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

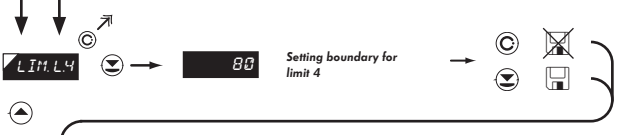
- range of the setting is -99999...999999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 60

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

* subsequent item on the menu depends on instrument equipment



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

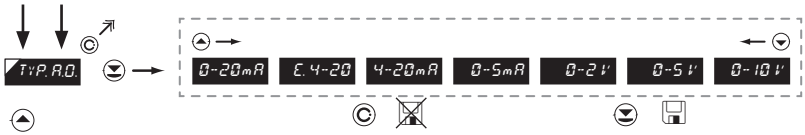
- range of the setting is -99999...999999
- default "Hysteresis"=0 "Delay"=0

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

DEF = 80

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

* subsequent item on the menu depends on instrument equipment

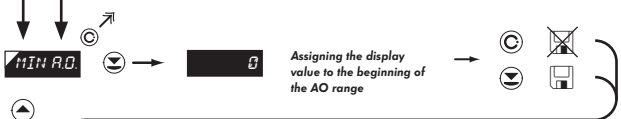


TYP. A.O. Setting the type of analog output

Menu	Range	Description
0-20mA	0...20 mA	
E. 4-20mA	4...20 mA	with indication of error statement (<3,6 mA)
4-20mA	4...20 mA	
0-5mA	0...5 mA	
0-2 V	0...2 V	
0-5 V	0...5 V	
0-10 V	0...10 V	

DEF = 4...20 mA

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



Assigning the display value to the beginning of the AO range

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

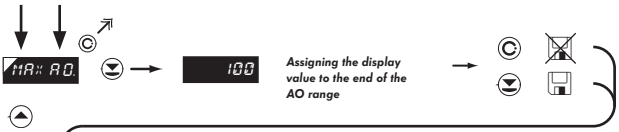
DEF = 0

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

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.

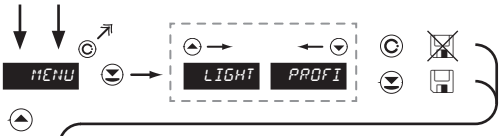


MAX A.O. **Assigning the display value to the end of the AO range**

DEF = 100

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

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



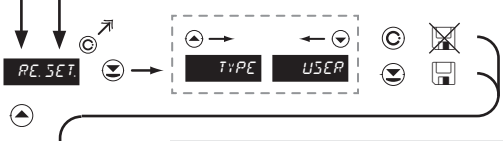
MENU **Setting the menu type LIGHT/PROFI**

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

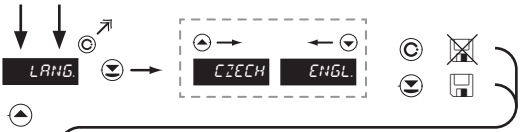
Menu LIGHT > MENU = LIGHT *Example*



RE.SET. **Restoration of manufacture instrument setting**

- in the event of error setting the manufacture setting may be restored
- restoration is performed for the currently selected type of the instrument input (select "TYPE")
- provided you stored your user setting in the "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 > RE. SET. *Example*



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

- selection of language version of the instrument menu

DEF = ENGL.

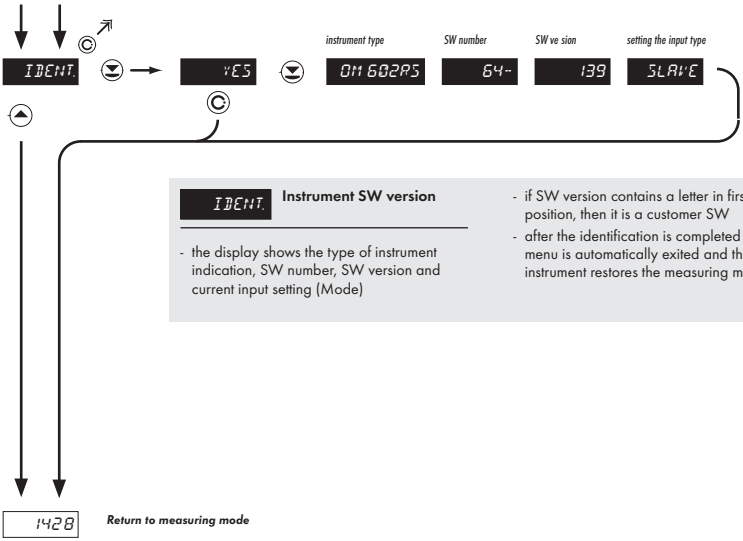
Language selection - ENGLISH > LANG. = ENGL. *Example*

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
- in the event of loss universal password "8177" may be used

DEF = 0

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



IDENT. Instrument SW version

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

6.0 Setting "PROFI"

PROFI **Complete programming menu**

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

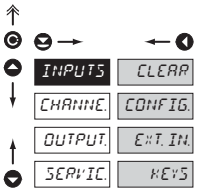
- **For expert users**
- **Complete instrument menu**
- **Access is password protected**
- **Possibility to arrange items of the „User" menu**
- **Tree menu structure**

Switching over to "PROFI" menu

- temporary switch-over to **PROFI** menu, which is suitable to edit a few items
- after quitting **PROFI** menu the instrument automatically switches to **LIGHT** menu
- access is password protected (if it was not set under item N. PASS. =0)

- access into **LIGHT** menu and transition to item „MENU" with subsequent selection of „PROFI" and confirmation
- after re-entering the menu the **PROFI** type is active
- access is password protected (if it was not set under item N. PASS. =0)

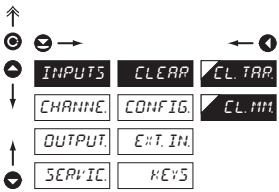
6.1 Setting "PROFI" - INPUT



The primary instrument parameters are set in this menu

- CLEAR — Resetting internal values
- CONFIG. — Selection of measuring range and parameters
- EXT. IN. — Setting external inputs functions
- KEYS — Assigning further functions to keys on the instrument

6.1.1 Resetting internal values

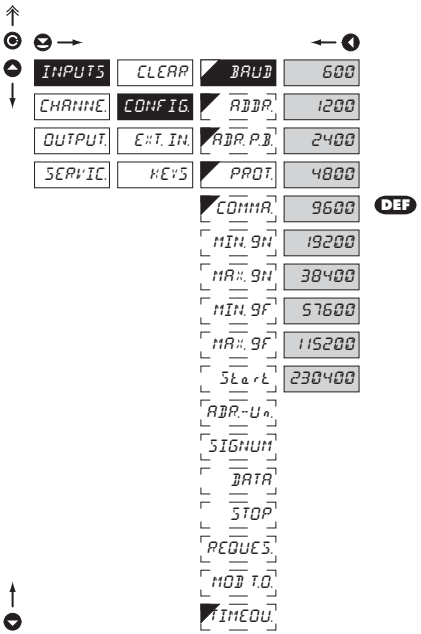


CLEAR — **Resetting internal values**

- CL. TAR. — Tare resetting
- CL. MM. — Resetting min/max value

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

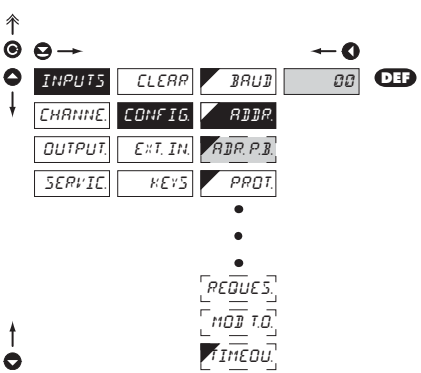
6.1.2a Selection of data baud rate



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

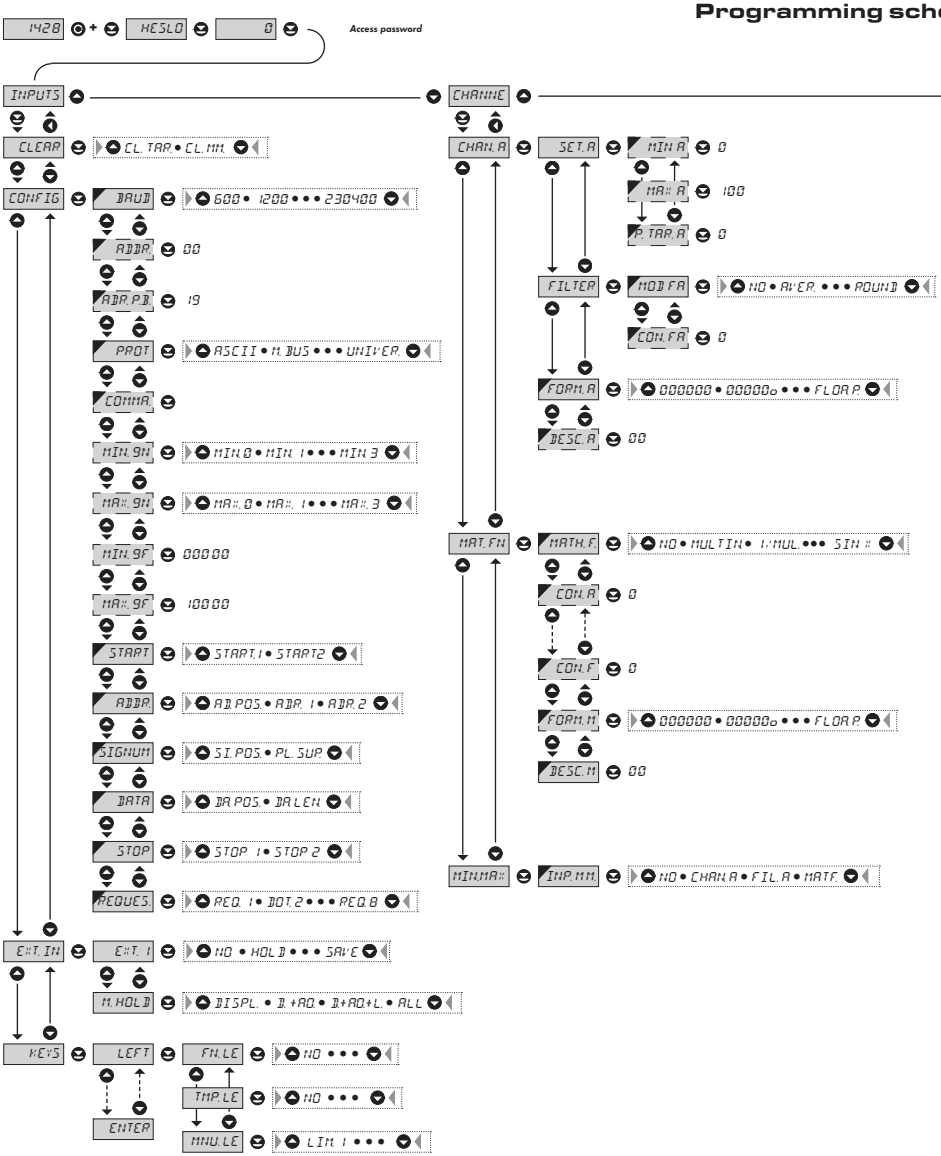
ADR.P.B. — **Setting instrument address - PROFIBUS**

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

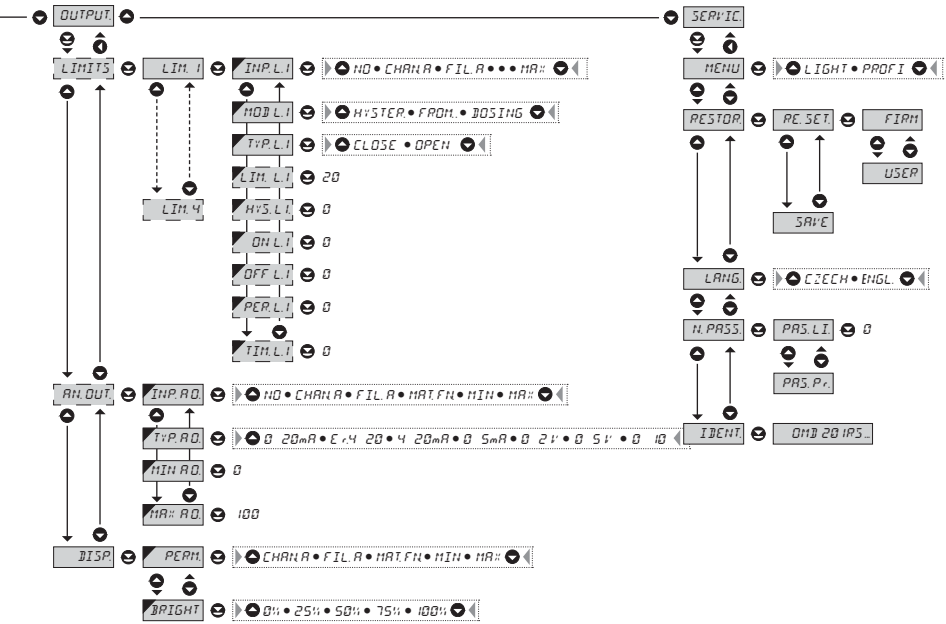
!

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

Programming sch



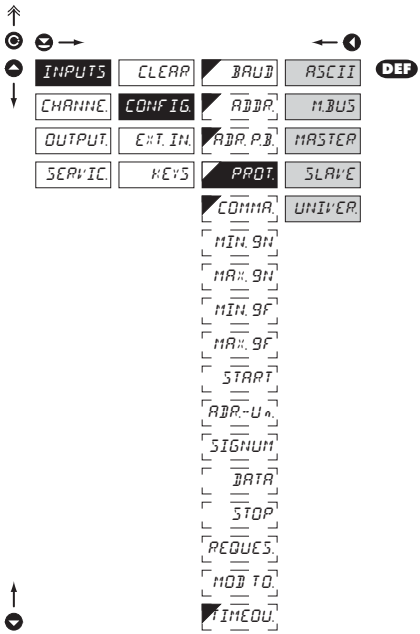
eme PROFI MENU



!

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

6.1.2c Selection of data protocol



PROT. Selection of data protocol

ASCII Data protocol ASCII

M.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.

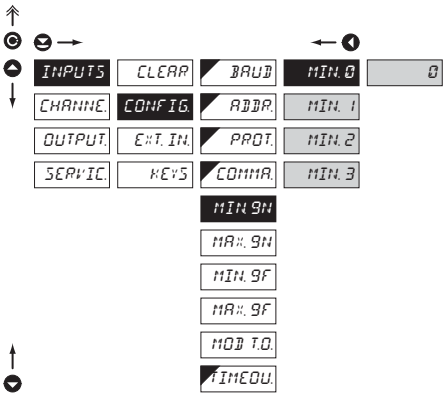
UNIVER. Universal protocol

- 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 on confi mation „!AA" and after it will send out request about data #AA<CR>

6.1.2d Selection of integer input range - minimum — ASCII, MESSBUS



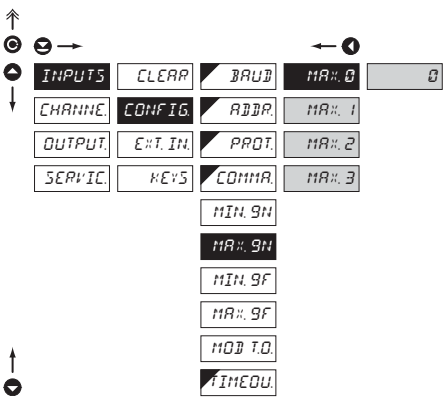
MIN.GN **Selection of integer input range - min**

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

MIN.0 Most significant byte - "MSB"

MIN.3 Least significant byte - "LSB"

6.1.2e Selection of integer input range - maximum — ASCII, MESSBUS



MAX.GN **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)

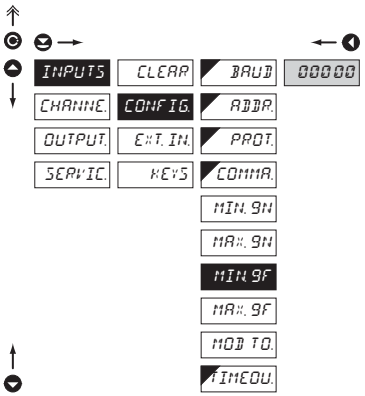
MAX.0 Most significant byte - "MSB"

- DEF = 100

MAX.3 Least significant byte - "LSB"

- DEF = 100

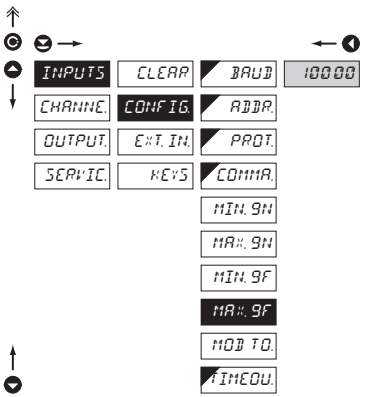
6.1.2f Selection of float input range - minimum



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

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

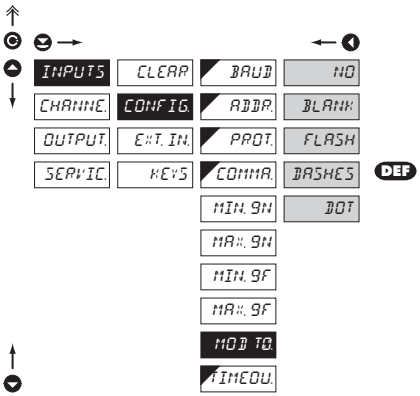
6.1.2g Selection of float input range - maximum



MAX. 9F Selection of float input range - max

- 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



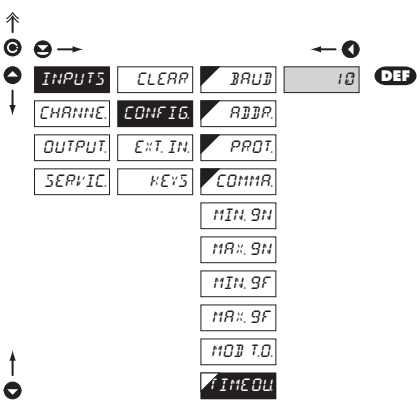
MOD T.O. Selecting display mode in case of communication failure

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



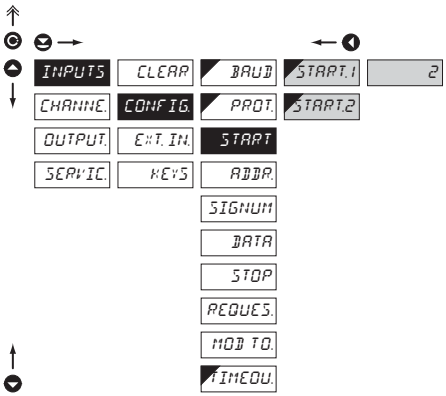
TIMEOU. Setting the time constant for Timeout

- 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

!

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

6.1.2j Setting innitial two-symbol sequence — Protocol "UNIVERSAL"

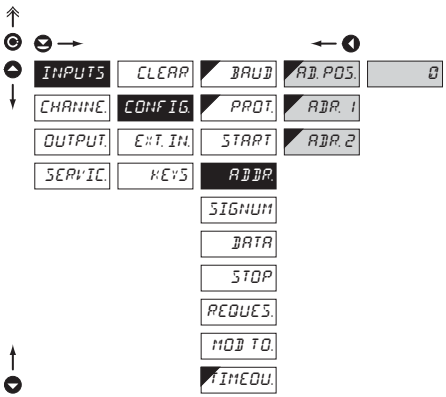


START — Setting innitial two-symbol sequence

START.1 Setting the first intrductory 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"



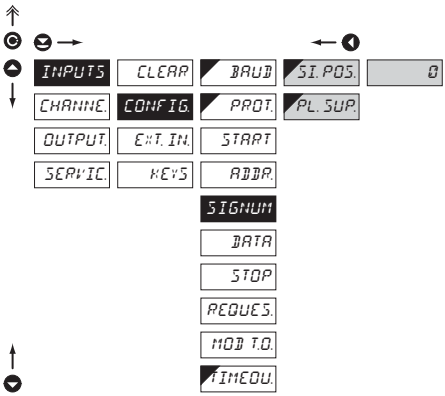
ADDR. — Setting the instrument address
- either address in universal protocol or one (or two) symbols of fixed value

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"



SIGNUM **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

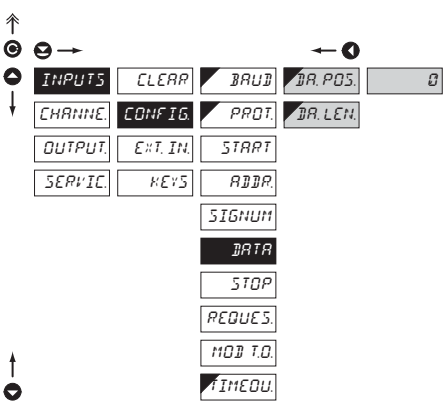
PL.SUP. „Plus" number sign supression

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

!

Dispaled data will be one position short when the number sign is displayed.

6.1.2m Setting data format — Protocol "UNIVERSAL"



DATA **Setting data format**

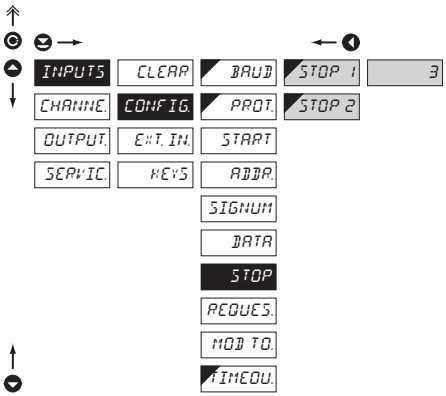
DA.POS. Setting data position

- 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 succesful 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.

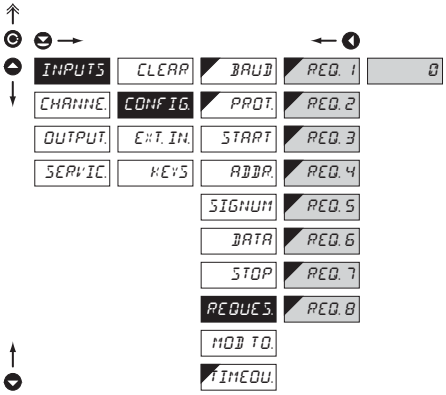
STOP 1 Setting the first closing symbol

- 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

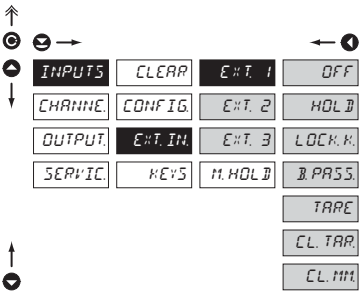
*****

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

!

How to set items "Mod. t.O." and "tIMEOU." *see p. 49*

6.1.3a External input function selection



EXT. 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. M.M.	Resetting min/max value

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

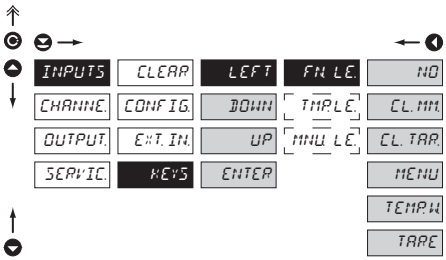
*****

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

6.1.3b Selection of function "HOLD"

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

6.1.4a Optional accessory functions of the keys



FN. LE. Assigning further functions to instrument keys

- *„FN. LE."* > executive functions
- *„TMP. LE."* > temporary projection of selected values
- *„MNU. LE."* > direct access into menu on selected item

NO Key has no further function

CL.MM. 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. V. 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

!

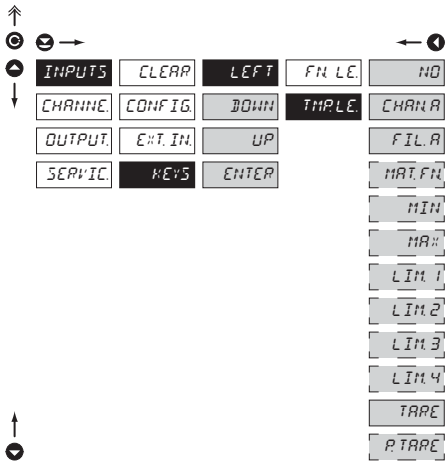
Preset values of the control keys **DEF**:

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

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.1.4b Optional accessory functions of the keys - Temporary projection



TMP.LE. Temporary projection of selected item

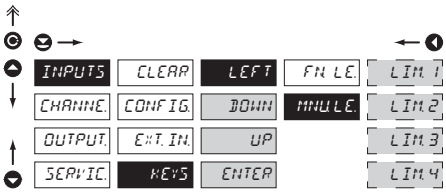
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing C + "Selected key", this holds until the stroke of any key

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
MAT.FN.	Temporary projection of "Mathematic functions" value
MIN	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
LIM 1	Temporary projection of "Limit 1" value
LIM 2	Temporary projection of "Limit 2" value
LIM. 3	Temporary projection of "Limit 3" value
LIM. 4	Temporary projection of "Limit 4" value
TIME	Temporary projection of "TIME" value
DATE	Temporary projection of "DATE" value
TARE	Temporary projection of "TARE" 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



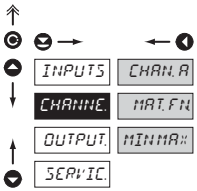
MNU. LE. **Assigning access to selected menu item**

- LIM 1 — Direct access to item "LIM 1"
- LIM 2 — Direct access to item "LIM 2"
- LIM 3 — Direct access to item "LIM 3"
- LIM 4 — Direct access to item "LIM 4"

!

Setting is identical for LEFT, DOWN, UP and ENTER

6.2 Setting "PROFI" - CHANNEL



The primary instrument parameters are set in this menu

CHAN. A — Setting parameters of measuring "Channel"

MAT. FN. — Setting parameters of mathematic functions

MINMAX — Selection of access and evaluation of Min/max value

6.2.1a Display projection

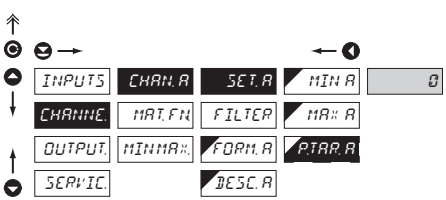
SET. A — Setting display projection

MIN A — Setting display projection for minimum value of input signal
- range of the setting is -99999...999999
- DEF = 0

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

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

6.2.1b Setting fixed tare

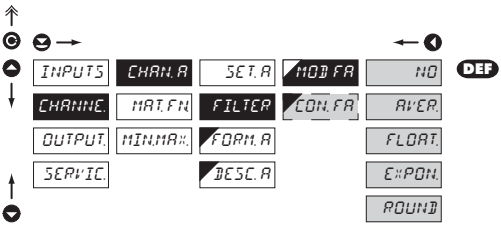


P. TAR. A — Setting "Fixed tare" value

- 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 is 0...999999
- DEF = 0

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

6.2.1b Digital filters



MOD.FA **Selection of digital filters**

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

NO Filters are off

AVER. Measured data average

- arithmetic average from given number („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

EXPON. Selection of exponential filter

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

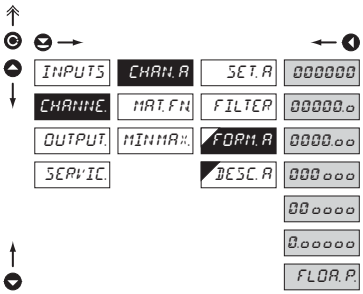
ROUND Measured value rounding

- 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



FORM.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.

00000.0 Setting DP - XXXXX.x

0000.00 Setting DP - XXXX.xx

000.000 Setting DP - XXX.xxx

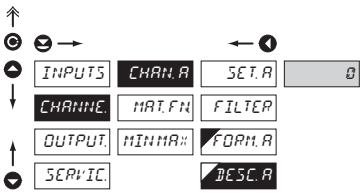
- DEF

00.0000 Setting DP - XX.xxxx

0.00000 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"

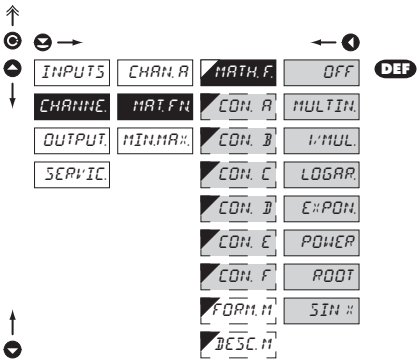
- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by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

- DEF = no description

!

Table of signs on page 81

6.2.2a Mathematic functions



MATH.F. Selection of mathematic functions

OFF — Mathematic functions are off

MULTIN. — Polynome

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

1/MUL. — 1/x

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

LOGAR. — Logarithm

$$A \times \ln\left(\frac{Bx + C}{Dx + E}\right) + F$$

EXPON. — Exponential

$$A \times e^{\left(\frac{Bx+C}{Dx+E}\right)} + F$$

POWER — Power

$$A \times (Bx + C)^{(Dx+E)} + F$$

ROOT — Root

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

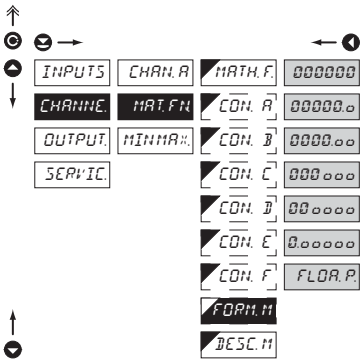
SIN X — Sin x

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

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



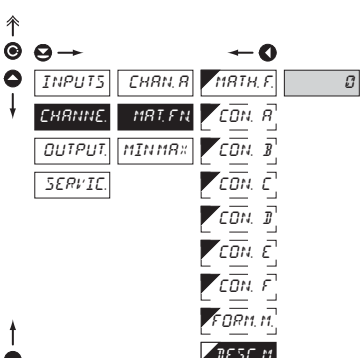
FORM.M **Selection of decimal point**

- 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.
00000.0	Setting DP - XXXXX.x
0000.00	Setting DP - XXXX.xx
000.000	Setting DP - XXX.xxx
00.0000	Setting DP - XX.xxxx
0.00000	Setting DP - X.xxxxx
FLOA.P.	Floating DP

- **DEF**

6.2.2c Mathematic functions - measuring units



DESC.M **Setting projection of description for "MATH.F."**

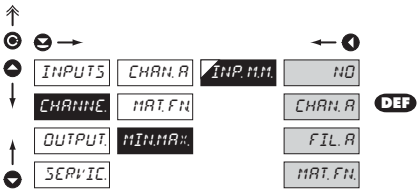
- projection of mesured data may be extended (at the expense of the number of displayed places) by two characters for description
- description is set by shifted ASCII code, when two first places show the set description and two last characters their code in period 0...95
- description is cancelled by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

- **DEF** = no description

!

Table of signs on page 81

6.2.3 Selection of evaluation of min/max value

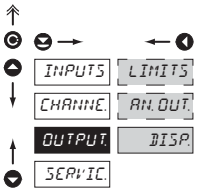


INP.M.M. Selection of evaluation of min/max value

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

NO	Evaluation of min/max value is off
CHAN.A	From "Channel A"
FIL.A	From "Channel A" after digital filters processing
MAT.FN.	From "Mathematic functions"

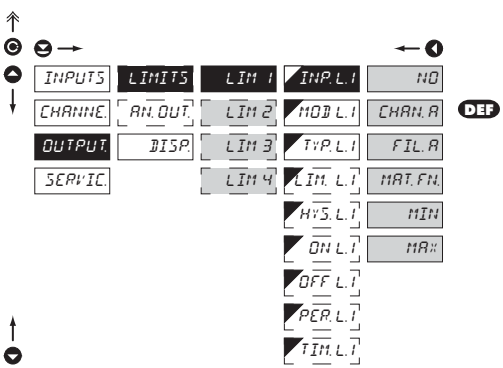
6.3 Setting „PROFI“ - OUTPUTS



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

- LIMITS — Setting type and parameters of limits
- AN.OUT. — Setting type and parameters of analog output
- DISP. — Setting display projection and brightness

6.3.1a Selection of input for limits evaluation



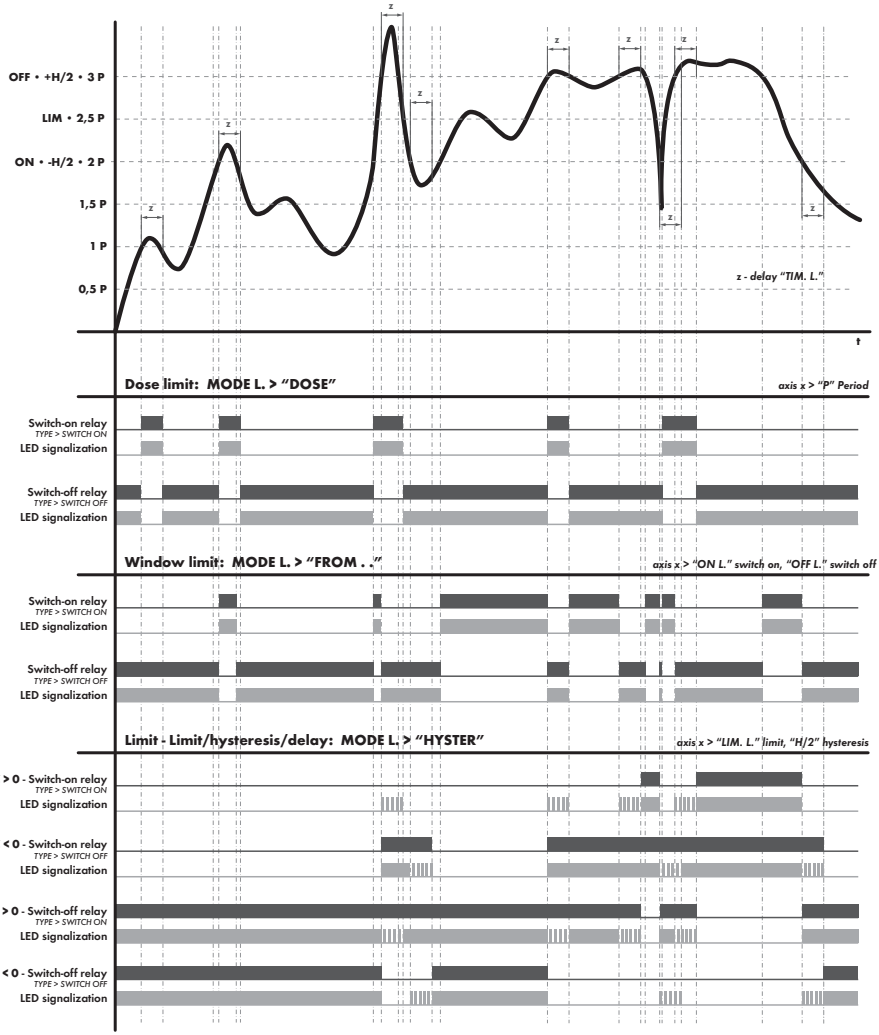
INP.L.1 Selection evaluation of limits

- selection of value from which the limit will be evaluated

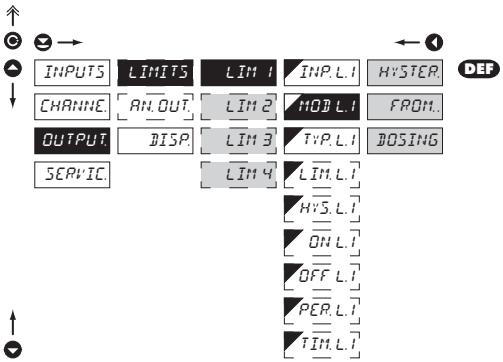
- NO — Limit evaluation is off
- CHAN.A — Limit evaluation from “Channel A”
- FIL.A — Limit evaluation from “Channel A” after digital filters processing
- MAT.FN. — Limit evaluation from “Mathematic functions”
- MIN — Limit evaluation from “Min.value”
- MAX — Limit evaluation from “Max.value”

!

Setting is identical for LIM 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
Switch-on relay
TYPE > SWITCH ON
LED signalization
Switch-off relay
TYPE > SWITCH OFF
LED signalization
Limit - Limit/hysteresis/delay: MODE L. > "HYSTER"
axis x > "LIM. L." limit, "H/2" hysteresis
Z > 0 - Switch-on relay
TYPE > SWITCH ON
LED signalization
Z < 0 - Switch-on relay
TYPE > SWITCH OFF
LED signalization
Z > 0 - Switch-off relay
TYPE > SWITCH ON
LED signalization
Z < 0 - Switch-off relay
TYPE > SWITCH OFF
LED signalization

6.3.1b Volba typu limit



!

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

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

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

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

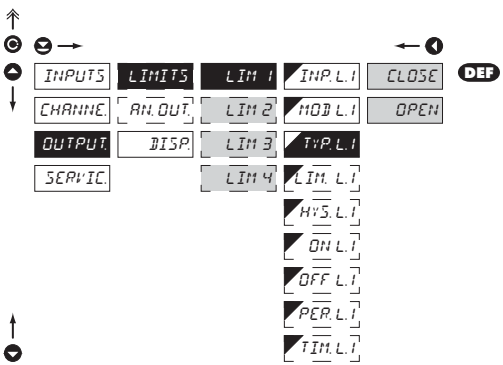
FROM.. Frame limit

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

DOSING Dose limit (periodic)

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

6.3.1c Selection of type of output



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

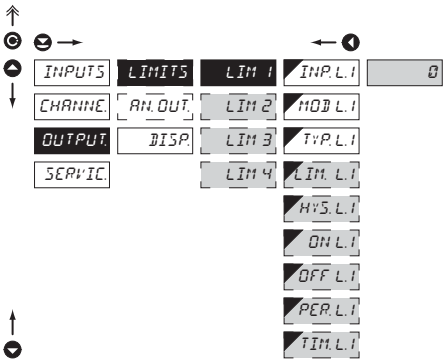
CLOSE. Output switches on when condition is met

OPEN Output switches off when condition is met

!

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

6.3.1d Setting values for limits evaluation



!

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

LIM.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.)

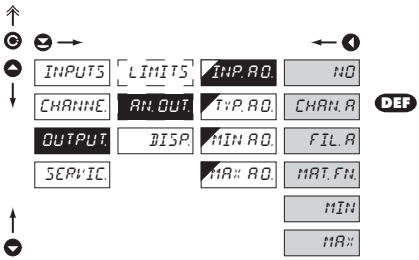
ON.L.1 Setting the outset of the interval of limit switch-on
- for type *"FROM"*

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 *"DOSE"*

TIM.L.1 Setting the time switch-on of the limit
- for type *"HYSTER"* and *"DOSE"*

6.3.2a Selection of input for analog output

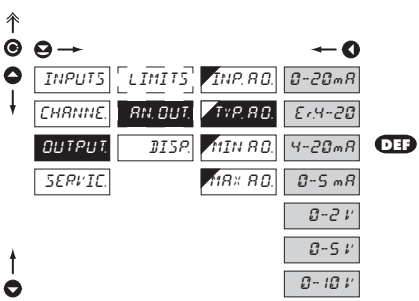


INP.AO. Selection evaluation analog output

- 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"

6.3.2b Selection of the type of analog output



TYP.AO. Selection of the type of analog output

0-20mA	Type - 0...20 mA
E 4-20	Type - 4...20 mA

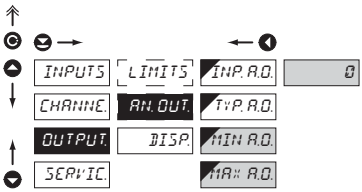
- with indication of error statement (< 3,0 mA)

4-20mA	Type - 4...20 mA
0-5mA	Type - 0...5 mA
0-2V	Type - 0...2 V
0-5V	Type - 0...5 V
0-10V	Type - 0...10 V

!

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

6.3.2c Setting the analog output range



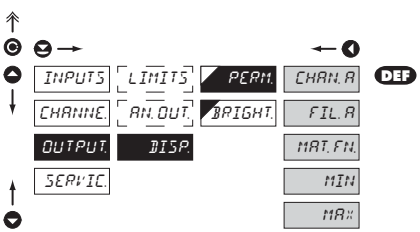
AN.OUT. Setting the analog output range

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

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

6.3.3a 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"

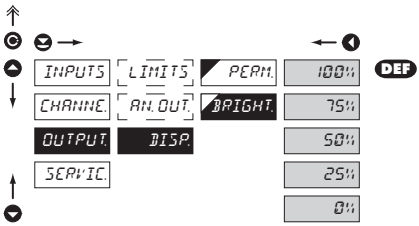
FIL.A Projection of values from "Channel A" after digital filters processing

MAT.FN. Projection of values from "Math.functions"

MIN. Projection of values from "Min.value"

MAX Projection of values from "Max.value"

6.3.3b Selection of display brightness



BRIGHT. Selection of display brightness

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

0% Display is off

- after keystroke display turns on for 10 s

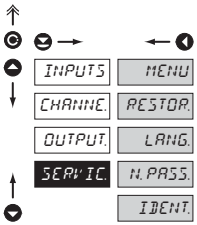
25% Display brightness - 25 %

50% Display brightness - 50 %

75% Display brightness - 75 %

100% Display brightness - 100 %

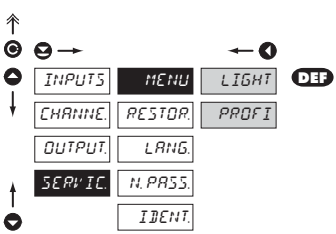
6.4 Setting "PROFI" - SERVICE



The instrument service functions are set in this menu

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

6.4.1 Selection of type of programming menu



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

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

LIGHT Active LIGHT menu

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

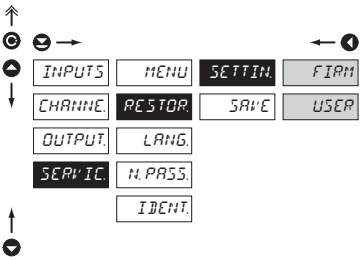
PROFI Active PROFI menu

- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.2 Restoration of manufacture setting



SETTIN. Return to manufacture setting of the instrument

FIRM Return to manufacture setting of the instrument

- provided you stored your user setting in the "PROFI" menu it is possible to restore it (option "USER")
- reading the primary setting of items in menu (DEF)

USER Restore user setting of the instrument

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

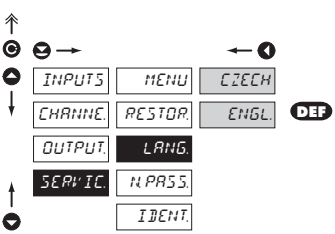
SAVE Save user setting of the instrument

- saving the setting allows the operator its future contingent restoration

!

After restoration the instrument switches off for couple seconds

6.4.3 Selection of instrument menu language version

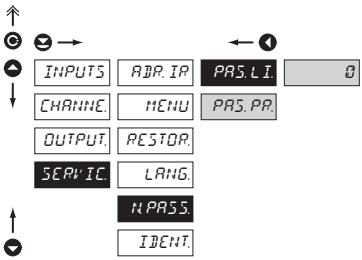


LANG. Selection of instrument menu language version

CZECH Instrument menu is in Czech

ENGL. Instrument menu is in English

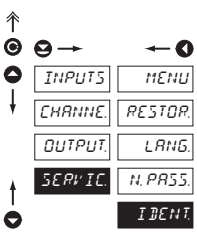
6.4.4 Setting new access password



N.PASS. Setting new passwordfor access to LIGHT and PROFI menu

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

6.4.5 Instrument identification



IDENT. Projection of instrument SW version

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

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

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

Setting

item will not be displayed in USER menu

item will be displayed in USER menu with editing option

item will be solely displayed in USER menu

Setting sequence of items in "USER" menu

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

Example:

Into USER menu were selected these items

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

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

Upon entering USER menu

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

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

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

The transfer rate is adjustable in the instrument menu. The instrument address is set in the instrument menu in the range of 0 ÷ 31. The manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232 / RS485 - is determined by an output board automatically identified by the instrument.

The commands are described in specifications you can find at 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		<SADR>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>
	485	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus		<SADR>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>
Confirmation of data acceptannce (PC) - OK	485	MessBus		<DLE>	1											
Confirmation of data acceptance (PC) - Bad				<NAK>												
Sending address (PC) prior command				<EADR>	<ENQ>											
Confirmation of address (instrument)				<SADR>	<ENQ>											
Command transmission (PC)	232	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
	485	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>
		MessBus		<SADR>	$	N	P	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>		
Command confirmation (instrument)	232	ASCII	OK	!	A	A	<CR>									
			Bad	?	A	A	<CR>									
		Messbus		No - data is transmitted permanently												
	485	ASCII	OK	!	A	A	<CR>									
			Bad	?	A	A	<CR>									
		MessBus	OK	<DLE>	1											
			Bad	<NAK>												
Command confirmation (inst.) - OK	485	MessBus		!	A	A	<CR>									
Command confirmati (instrument) - Bad				?	A	A	<CR>									
Instrument identification				#	A	A	1Y	<CR>								
HW identification				#	A	A	1Z	<CR>								
One-time transmission				#	A	A	7X	<CR>								
Repeated transmission				#	A	A	8X	<CR>								

LEGEND

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

RELAY, TARE

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

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

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: 0.3×10-38 <= |x| <= 1.7×1038

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.

ERROR	CAUSE	ELIMINATION
E. D.Un.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E. D.Ov.	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.Ov.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. I.Un.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E. I.Ov.	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. DATA	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

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								
24								
32								
40								
48								
56								
64								
72								
80								
88								

	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

INPUT

Protocol:	ASCII, MessBuss
Data format:	8 bit + no parity + 1 stop bit (ASCII) 7 bit + even parity + 1 stop bit (MessBus) Universal protocol
Rate:	600...230 400 Baud 9 600...12 000 KBaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (in range 1...247)

PROJECTION

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

INSTRUMENT ACCURACY

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, Dose
Limita:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)* 2x relays with switch-off contact (Form C) (230 VAC/50 VDC, 3 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

ANALOGO OUTPUTS

Type:	isolated, programmable with resolution of max.10 000 points, analog output corresponds with displayed data, type and range are adjustable
Non-linearity:	0,2 % of range
TC:	100 ppm/°C
Rate:	response to change of value < 40 ms
Voltage:	0...2 V/5 V/10 V
Curernt:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ohm

EXCITATION

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

POWER SUPPLY

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

MECHANIC PROPERTIES

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

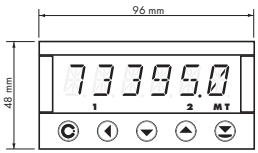
OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section <1,5 mm^2 /<2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temp.:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage category:	EN 61010-1, A2
Dielectric strength:	4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and data/analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between supply and data/analog output
Insulation resistance:	for pollution degree II, measurement category III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11; EN 550222, A1, A2

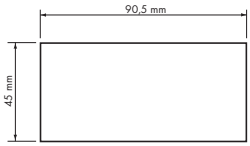
** values apply for resistance load*

PI - Primary insulation, DI - Double insulation

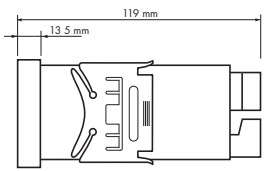
Front view



Panel cut



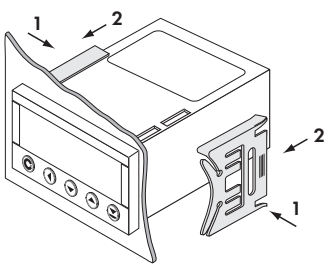
Side view

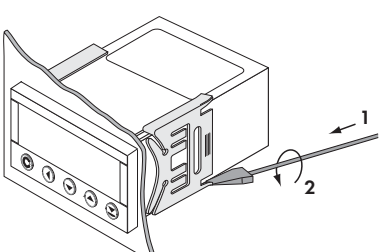


Panel thickness: 0,5...20 mm

Instrument installation

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





Instrument disassembly

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

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

GUARANTEE

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

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

The guarantee shall not apply to defects caused by:

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

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

Stamp, signature

5 YEARS

ООО “РусАвтоматизация”
454010 г. Челябинск, ул. Гагарина 5, оф. 507
тел. 8-800-775-09-57 (звонок бесплатный), +7(351)799-54-26, тел./факс +7(351)211-64-57
info@rusautomation.ru; русавтоматизация.рф; www.rusautomation.ru

DECLARATION OF CONFORMITY

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

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

declares at its full 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 type listed hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant statutory orders.

Product: 6-digit programmable panel instrument

Type: **OM 602**

Version: UQC, AV, RS

Conformity is assessed pursuant to the following standards:

El. safety:	EN 61010-1	
EMC:	EN 50131-1, chapter 14 and chapter 15	
	EN 50130-4, chapter 7	EN 61000-4-11
	EN 50130-4, chapter 8	EN 61000-4-11
	EN 50130-4, chapter 9	EN 61000-4-2
	EN 50130-4, chapter 10	EN 61000-4-3
	EN 50130-4, chapter 11	EN 61000-4-6
	EN 50130-4, chapter 12	EN 61000-4-4
	EN 50130-4, chapter 13	EN 61000-4-5
	EN 50130-5, chapter 20	
	prEN 50131-2-1, par. 9.3.1	
	EN 61000-4-8	
	EN 61000-4-9	
	EN 61000-3-2 ed. 2:2001	
	EN 61000-3-3: 1997, Cor. 1:1998, Z1:2002	
	EN 55022, chapter 5 and chapter 6	

and Ordinance on:

El. safety:	No. 168/1997 Coll.
EMC:	No. 169/1997 Coll.

The evidence are the protocols of authorized and accredited organizations:
VTÚE Praha, experimental laboratory No. 1158, accredited by ČIA
VTÚPV Vyškov, experimental laboratory No. 1103, accredited by ČIA

Place and date of issue: Prague, 18. March 2006

Miroslav Hackl v.r.
Company representative

Mode of asses. of conformity §12, par. 4 b, d Act No. 22/1997 Coll.