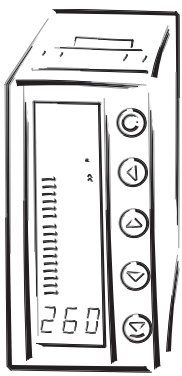
OMB 311

PROGRAMMABLE BARGRAPH

DC VOLTMETER/AMMETER
PROCESS MONITOR
OHMMETER
THERMOMETER FOR PT 100/500/1 000
THERMOMETER FOR NI 1 000/2 226/10 000
THERMOMETER FOR THERMOCOUPLES
DISPLAY INSTRUMENT FOR LIN.
POTENTIOMETERS



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 OMB 311 series conform to European regulation 89/336/EWG.

They 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

Power supply from the main line has to be isolated from the measuring leads.

CE

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1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OMB 311 model line are horizontal bargraphs with tri-color 25 LED with auxiliary 3-digit display, manufactured in the following alternatives:

OMB 311DC	DC voltmeter/ammeter
OMB 311PWR	*Nets analyser - AC voltmeter/ammeter/wattmeter
OMB 311PM	Process monitor
OMB 311RTD	Thermometer for Pt 100/500/1 000, Ni 1 000/2 226/10 000
OMB 311T/C	Thermometer for thermocouples
OMB 311DU	Display instrument for linear potentiometers
OMB 311OHM	Ohmmeter

The instruments are based on an 8-bit microcontroller with precise A/D converter, that secures high accuracy, stability and easy operation of the instrument.

Programmable projection of the display

Calibration	projection for the beginning and the end of the input range setting the type of input
Projection	25 LED with adjustable color of projection (red - green - orange) 3-digit auxiliary display

Digital filters

Radius of insensitiveness adjustable in process units

Mathematic functions

Tare	assigned to reset the display in case of non-zero input signal

External control

Hold	display/instrument blocking
Lock	locking the control keys or the access into Configuration menu

** These instruments have separate Instructions for use*

OPERATION

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

Configuration menu (hereinafter referred to as „CM") is protected by an optional numeric code and containis complete instrument setting

User menu may contain arbitrary programming setting defined in CM with another selective restriction (see, change)

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

EXTENSION

Excitation is suitable for feeding of sensors and converters. It has a galvanic isolation with continuously adjustable value in the range of 2...24 VDC.

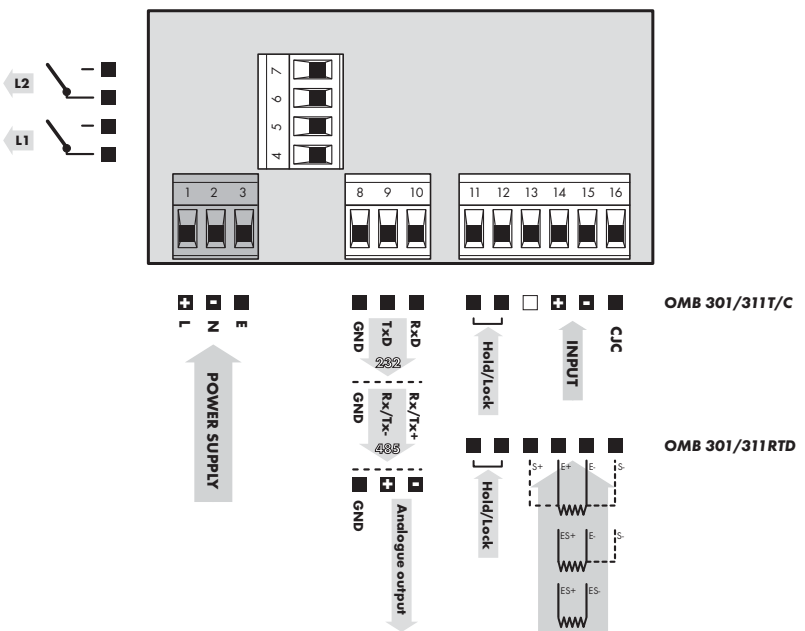
Dual comparator is designed to monitor two limit values with relay output. Limits have adjustable hysteresis as well as selectable delay of the switch-on. Reaching the preset limits is signalled by LED and at the same time by the switch-on of the relevant relay.

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

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

3. CONNECTION

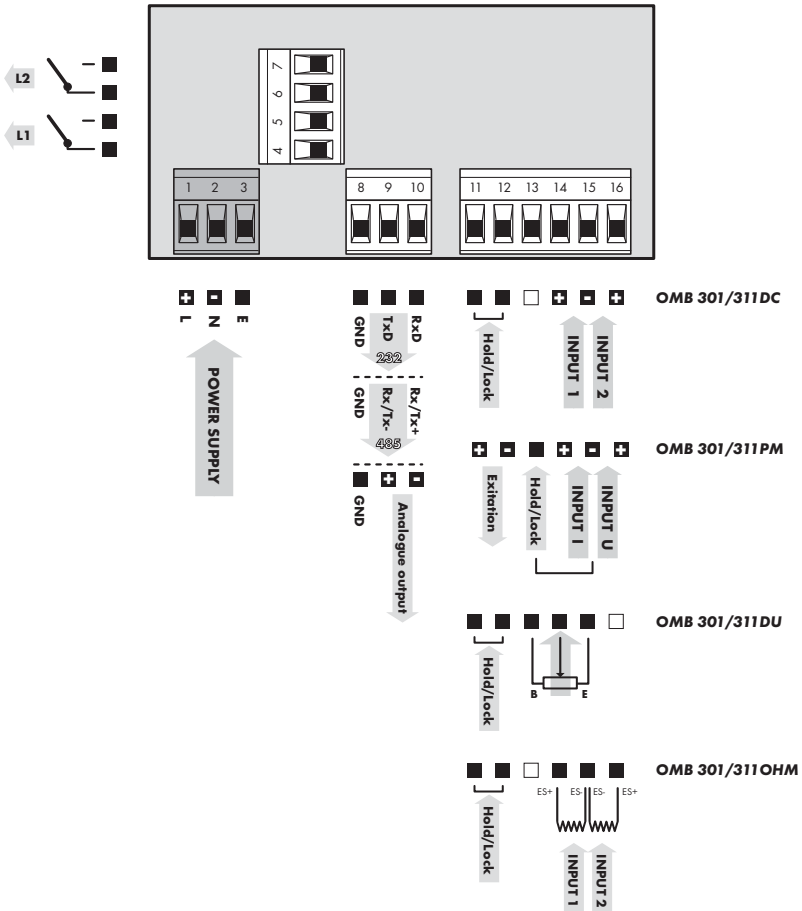
The supply lead for feeding the instrument should not be in the proximity of low-potential signals.
Contactors, motors with larger input and other efficient elements should not be in the proximity of the instrument.
The lead into the instrument input (the measured quantity) should be in sufficient distance from all power leads and appliances. Provided this cannot be secured, it is necessary to use shielded leads with connection to ground.
The instruments are tested in compliance with standards for use in industrial area, yet, we recommend to abide by the above mentioned principles.



! *Grounding on terminal „E" must be connected at all times*

! *In RTD input with 2- or 3-wire connection it is necessary to link the unconnected inputs (13/14 and 15/16 or 15/16)*

! *Relay parameters specified in the technical data apply for resistance load. Upon connection of the induction load we recommend to fit the leads to relay 1 A with a fuse for maximum load protection.*

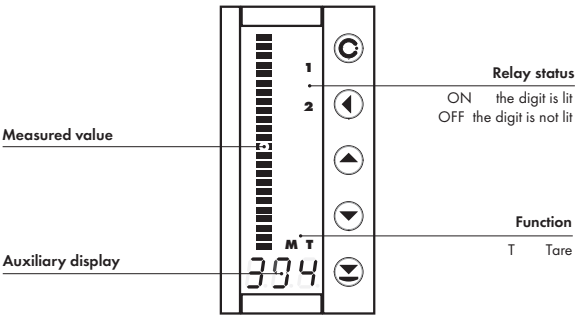


MEASURING RANGES

Type	Input 1 (I)	Input 2 (U)
OMB 311 DC - U	0...60/150/300 mV	0...4/40/400 V
OMB 311 DC - I	0...1/5 A	0...400 mA
OMB 311 PM	0/4...20 mA	0...2/5/10 V
OMB 311 OHM	0...0,4/4/40 kOhm	5...105 Ohm, (upon request 0...100 kOhm)

4. INSTRUMENT SETTING

The instrument is set and controlled by 5 control keys located on the front panel. By means of these control keys it is possible to browse through the operting program, to select and set the required values.



CONFIGURATION MODE

- designated for professional service and maintenance
- complete instrument setting
- access is password protected
- authorization for "User mode"

USER MODE

- designated for instrument service
- may contain setting the limits, analog and data output and brightness, with restriction as per the setting in "Configuration mode"

SYMBOLS USED IN THE INSTRUCTIONS

DC **PM** **DU** **OHM** **RTD** **T/C** Indicates the setting for given type of instrument

CONTROL KEYS FUNCTIONS

MENU	ENTER	LEFT	DOWN	UP
Measuring mode				
menu access	tare	tare projection		
Moving around in the menu				
exit the menu without saving	move to next level	back to previous level		move to enxt item
Setting/selecting - items				
cancel setting without saving	confirm selected item		move down	move up
Setting - numbers				
cancel setting without saving	cancel selected number	move to higher decade	change of current figure - down -	change of current figure - up -

SETTING THE DECIMAL POINT AND THE MINUS SIGN

DECIMAL POINT

Its selection in calibration modes, upon modification of the number to be adjusted is performed by the control key ◀ with transition behind the highest decade, when the decimal point starts flashing. Positioning is performed by ▲. Decimal point is set only in the item „Input - MIN"

MINUS SIGN

It is adjustable upon the shift of the decimal point accross all decades, back to the first one, at which the minus sign will light up. The setting is repeated, i.e. 1x around only positioning of the decimal point and upon next passage accross all decades the minus sign lights up and the decimal point is placed.

Setting

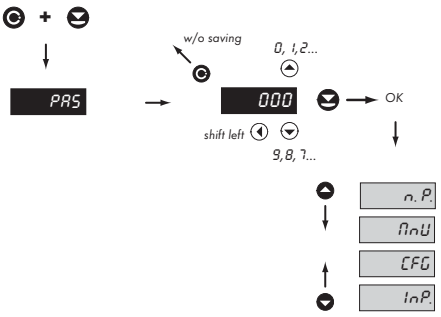
⇨ „Calibration mode" ⇨ Input ⇨ Minimum
⇨ InP ⇨ n In

⇨ after transition behind the highest decade ◀ the decimal point starts flashing

⇨ by pressing ▲ or ▼ you will place the decimal point and confirm it by ◉

! *In the MIN item the setting of the decimal point is determining for the entire instrument*

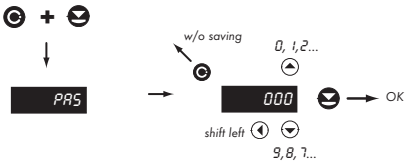
ACCESS INTO THE CONFIGURATION MODE



The code is always preset from manufacture to 000. In case of loss of access password it is possible to use universal access code "817"

4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

❶ Access into the „Configuration menu“

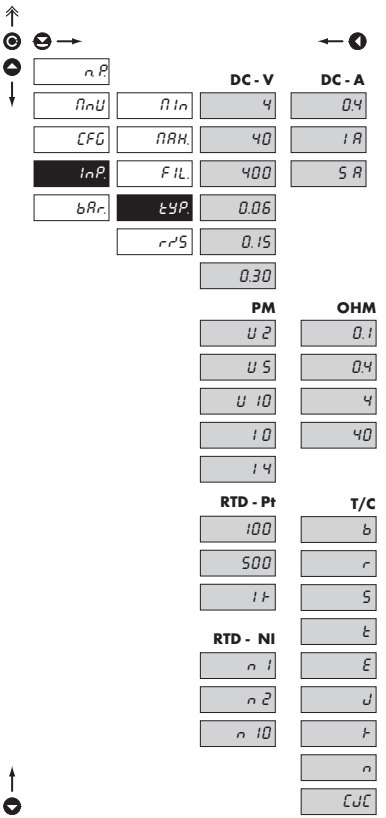


PAS **Entering the introductory access password**

000 Standard manufacture setting of the access password

❷ Selection of the meas. range/type of input

DC **PM** **OHM** **RTD** **T/C**



tYP. **Setting the instrument measuring range**

DC Input

- *ammeter and voltmeter are two independent instruments*

PM Input

- *setting the measuring range*

RTD Input

- *setting the type of sensor*
- *Pt 3850 ppm/°C EU, standard*
  Pt 3920 ppm/°C US, upon request
  Ni 5000 ppm/°C standard
  Ni 6180 ppm/°C upon request

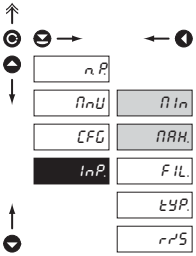
OHM Input

- *setting the measuring range*
- *0,1 5...105 Ohm*
  (100 request 0...100 kOhm), upon
  0,4 0...400 Ohm
  4 0...4 kOhm
  40 0...40 kOhm

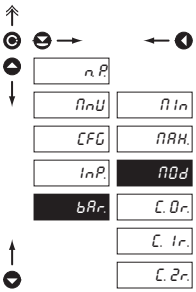
T/C Input

- *setting the type of thermocoupler*
- *B type B*
  R type R
  S type S
  T type T
  E type E
  J type J
  K type K
  N type N
  CJC the temperature of the cold junction

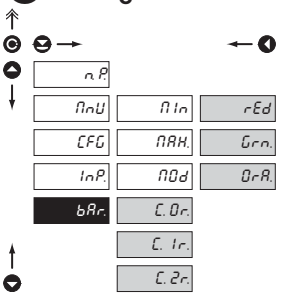
3 Setting projection on the display



4 Setting the projection mode



5 Setting the LED colours



inP. Setting the input parameters

Type of input	Displayed items of the menu
DC	MIN, MAX
PM	MIN, MAX
DU	MIN, MAX
OHM	MIN, MAX, *LEA.
RTD	*LEA., CON.
T/C	CJC, C.TC

** only for 2-wire*

MOd Setting the bargraph projection mode

- *to be set in the range of 0...6*

0 bargraph is off
1 single-colour column, colour is set in entry C. 0R
2 see 1, auxiliary display is off in the measuring mode
3 single-colour column with point identification of the limits, colour is set in the entry C. 0R (red or green colour only)
4 see 3, auxiliary display is off in the measuring mode
5 three-colour column - the colour is determined by th limit value
- *no limit* — colour is set in the entry C. 0R
- *one active limit* — colour is set in the entry C. 1R
- *two active limits* — colour is set in the entry C. 2R

6 see 5, auxiliary display is off in the measuring mode

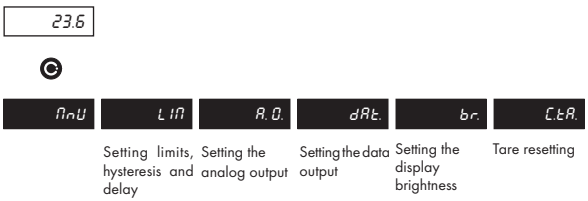
C. 0r. Setting the bargraph LED colours

- *setting the colour coloumn according to options in regime „MOD"*

RED red colour
GRN green colour
ORA. orange colour

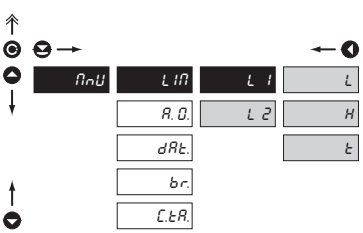
4.2 USER MENU

- designated for instrument service
- may contain setting the limits, analog/data output and brightness, with restriction as per the setting in "Configuration mode"



! *Projection of items and their accessibility depends on the setting of access rights in the „Configuration menu"*

4.2.1 LIMITS - ENTERING THE VALUES



LIM **Entering the limit values for status evaluations**

L 1 Setting for Limit 1

L 2 Setting for Limit 2

L Setting the limit for relay switch-on

- *in full range of the display*

H Setting hysteresis only in (+) values

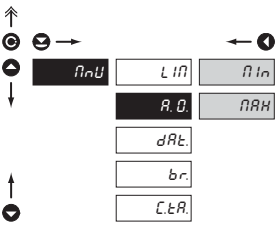
- *in 1/10 of the display range*

t Setting the delay of relay activation

- *in the range of 0...99,9 s*

Adjustable authorization of access into items, see page 19

4.2.2 ANALOG OUTPUT



Adjustable authorization of access nito items, see page 20

Analog and data outputs may not be fitted simultaneously in this instrument

A.O. Setting the analog output range

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

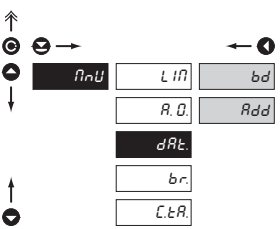
Min Assigning the displayed value to the beginning of the analog output range

- *range of the setting is -999...3999*

MAX Assigning the displayed value to the end of the analog output range

- *range of the setting is -999...3999*

4.2.3 DATA OUTPUT



Adjustable authorization of access into items, see page 21

dAt. Setting the data output parameters

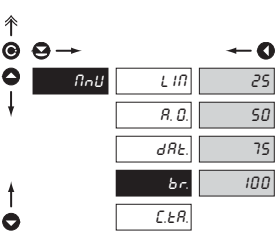
bd Setting the transmission rate (baud)

- *setting in the range of 150/300/600/1200/2400/4800/9600/19200/38400/57600/115200 Baud*

Add Setting the instrument address

- *setting in the range of 0...31*
- *manufacture setting 00* DEF

4.2.4 DISPLAY BRIGHTNESS

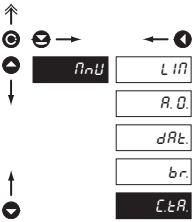


br. Setting the display brightness

- *by selecting the display brightness we may properly react to light conditions in place of location of the instrument*
- *brightness in the programming menu is always 80%*

Adjustable authorization of access into items, see page 21

4.2.5 TARE RESETTING



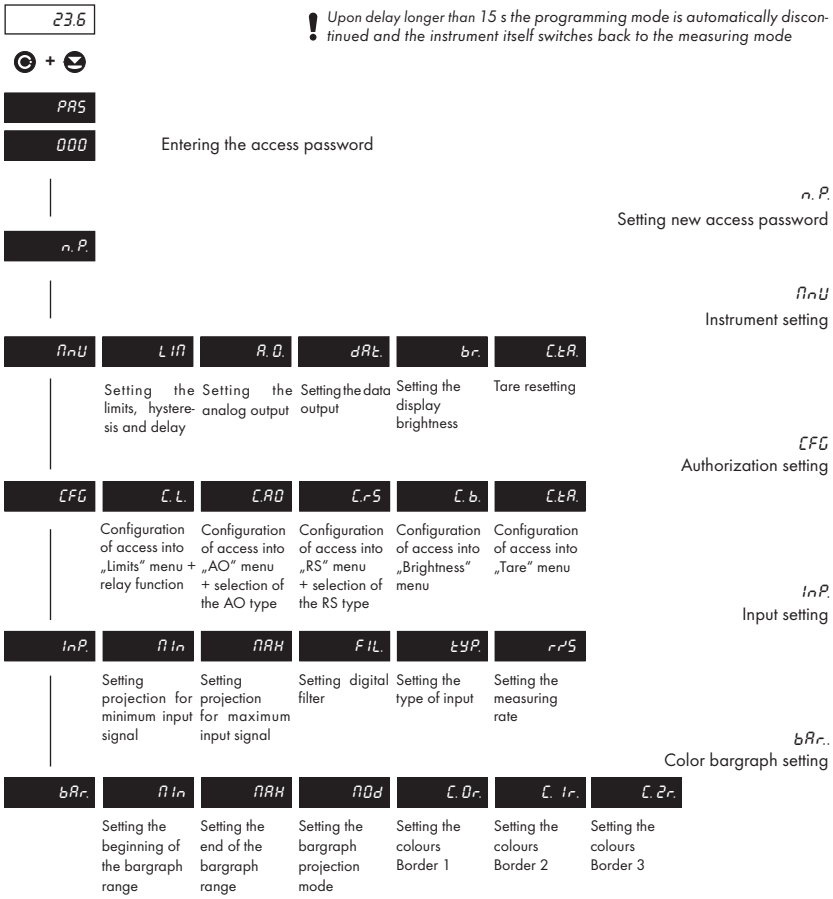
Adjustable authorization of access into items, see page 21

C.tA. **Tare resetting**

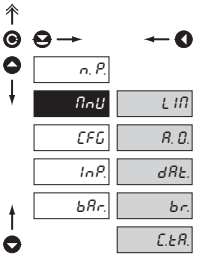
- after confirmation the tare will be reset to zero and the LED „T" will turn off

4.3 CONFIGURATION MENU

- designated for professional service and maintenance
- complete instrument setting
- the access is protected by a password or a jumper on the input connector
- authorization for "User mode"



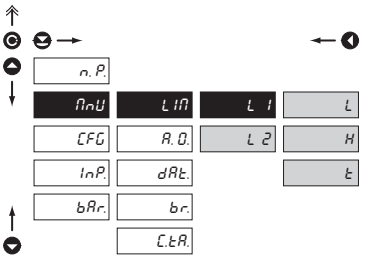
4.3.1 CONFIGURATION MODE - MENU



The basic instrument parameters are adjusted in this menu

LIn	Setting the limit values for status evaluation
A. O.	Setting the analog output range
dAt.	Setting the data output parameters
br.	Setting the display brightness
C.tA.	Tare resetting

4.3.1.1 LIMITS



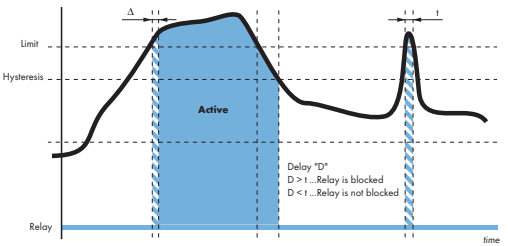
The procedure of setting the limit 2 is identical as for limit 1

LIn	**Entering the limit values for status evaluation**
L 1	Setting for Limit 1
L 2	Setting for Limit 2
L	Setting the limit for relay switch-on
H	Setting hysteresis only in (+) values
t	Setting the delay for relay activation

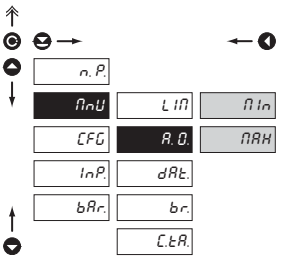
- in full range of the display

- in 1/10 of the display range

- in the range of 0...99,9 s



4.3.1.2 ANALOG OUTPUT



A. O. Setting the analog output range

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

Min Assigning the displayed value to the beginning of the AO range

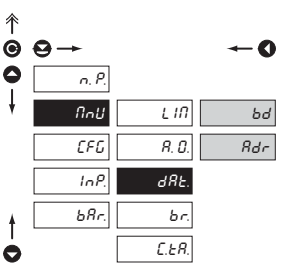
- *range of the setting is -999...3999*

MAX Assigning the displayed value to the end of the AO range

- *range of the setting is -999...3999*

! *Analog and data outputs may not be fitted simultaneously in this instrument*

4.3.1.3 DATA OUTPUT



dAt. Setting the data output parameters

bd Setting the transmission rate (baud)

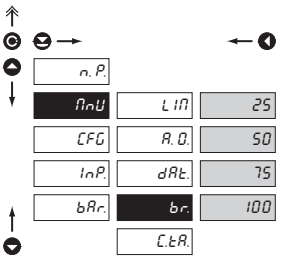
- *setting in the range of 150/300/600/1200/ 2400/4800/9600/19200/38400/57600/ 115200 Baud*

Adr Setting the instrument address

- *setting in the range of 0...31*
- *manufacture setting 00* **DEF**

! *Analog and data outputs may not be fitted simultaneously in this instrument*

4.3.1.4 DISPLAY BRIGHTNESS



br. **Setting the display brightness**

- *by selectiung the display brightness we may react properly to light conditions in place of location of the instrument*
- *brightness in the programming menu is always 100%*

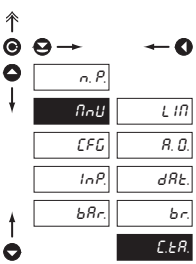
25 Display brightness = 25%

50 Display brightness = 50%

75 Display brightness = 75%

100 Display brightness = 100%

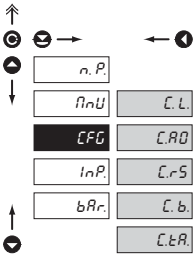
4.3.1.5 TARE RESETTING

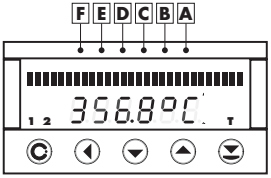


C.tA. **Tare resetting**

- *after confirmation the tare will be reset to zero and the LED „T" will turn off*

4.3.2 CONFIGURATION MODE - CONFIG





The configuration code may consist of up to 6 numbers, which determine the operational setting of the instrument. Individual meaning and setting of the numbers are described in relevant chapters of the configuration mode.

CFG Setting the access rights to individual options for „User mode“

- *one of the prime merits of this function is the feasibility to assign authorization for access and modification of parameters in individual steps of the "User mode". This setting will facilitate the instrument service staff easy operation and prevent unauthorized interference into the setting of vital functions.*

C. L. Configuration of the access into „Limits“ menu and relay function

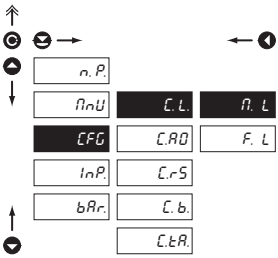
C.A0 Configuration of the access into „AO“ menu and selection of the AO type

C.rS Configuration ot the access into „RS“ menu

C. b. Configuration of the access into „Brightness“ menu

C. tA. Configuration of the access into „Tare“ menu

4.3.2.1.1 SETTING ACCESS INTO THE LIMITS MENU



C. L. Configuration of the access into „Limits“ menu and relay function

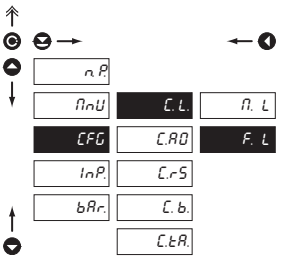
A. L Setting the access rights

- *selection of the access rights for „User mode“*

A - Limit 1, B - Limit 2

Rights	Limits	Hyst.	Time	BA
Prohibited	✗	✗	✗	0
Projection	✓	✗	✗	1
	✓	✓	✗	2
	✓	✓	✓	3
Change of setting	✓	✗	✗	4
	✓	✓	✗	5
	✓	✓	✓	6

4.3.2.1.2 SETTING THE RELAY FUNCTION

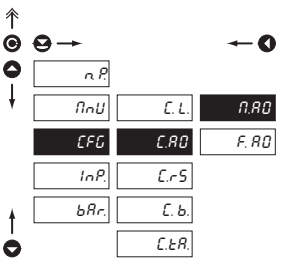


F. L Relay configuration

A - Limit 1
B - Limit 2

Relay fuunction		BA
Relay	switch-on	0
	switch-off	1

4.3.2.2.1 SETTING ACCESS INTO THE ANALOG OUTPUT MENU



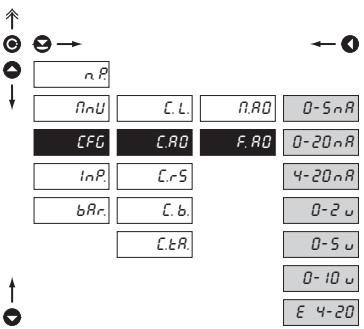
C.AO **Configuration of the access into „AO" menu and selection of the AO type**

n.AO Setting the access rights

- *selection of the access rights for „User mode"*

Rigts	A
Prohibited	0
Projection	1
Change of setting	2

4.3.2.2.2 SETTING THE TYPE OF THE ANALOG OUTPUT

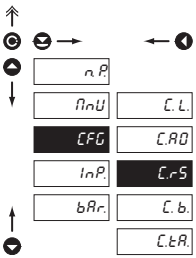


F.AO **Setting the type of the analog output**

0 5	Range - 0...5 mA
0 4	Range - 0...20 mA
4 0	Range - 4...20 mA
U 2	Range - 0...2 V
U 5	Range - 0...5 V
U 10	Range - 0...10 V
E 4	Range - 4...20 mA with indication „ERROR"

- *upon error statement the value on the output is < 3,6 mA*

4.3.2.3 SETTING ACCESS INTO THE DATA OUTPUT MENU

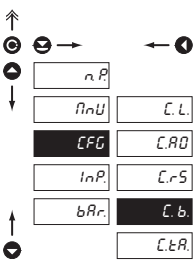


C.rS **Setting the access rights**

- *selection of the access rights for the „User mode"*

Rights	A
Prohibited	0
Projection	1
Change of setting	2

4.3.2.4 SETTING ACCESS INTO THE MENU OF BRIGHTNESS SETTING

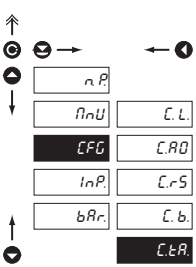


C.b. **Configuration of the access into „Brightness" menu**

- *selection of access rights for the „User mode"*

Rights	A
Prohibited	0
Projection	1
Change of setting	2

4.3.2.5 SETTING ACCESS INTO THE MENU OF TARE RESETTING

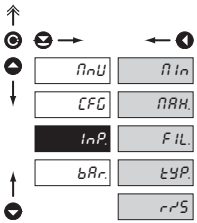


C.tA. **Configuration of the access into tare resetting**

- *selection of access rights for the „User mode"*

Rights	A
Prohibited, the function is off	0
Projection	1
Resetting to zero permitted	2

4.3.3 CONFIGURATION MODE - INPUT



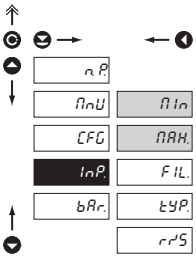
InP. Setting the input parameters

- **Min** Setting display projection for minimum value of the input signal ❶
- **MAX** Setting display projection for maximum value of the input signal ❷
- **FIL.** Setting the digital filter ❸
- **OFS** Shift of the beginning of the measuring range ❹
- **LEA.** Compensation of 2-wire conduct ❺
- **typ.** Setting the instrument meas. range and connection ❻
- **Con.** Setting the type of input connection ❼
- **rrS** Setting the instrument measuring rate ❽
- **CuC** Setting the temperature of the cold junction ❾
- **C.tC** Method of measurement of the cold junction ❿

Input type	Setting options
DC	① ② ③ ⑥ ⑧
PM	① ② ③ ⑥ ⑧
DU	① ② ③ ⑧
OHM	① ② ③ ⑤ ⑧
RTD	③ ④ ⑤ ⑥ ⑦ ⑧
T/C.	③ ⑥ ⑧ ⑨ ⑩

4.3.3.1 PROJECTION ON THE DISPLAY

DC PM DU OHM



MIn. Setting display projection for minimum value of the input signal

- *range of the setting is -999...3999*
- *positioning of the decimal point in this item is determining for the entire instrument*

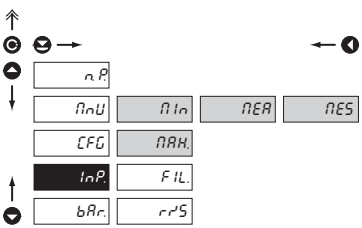
MAX Setting display projectionfor maximum value of the input signal

- *range of the setting is -999...3999*

! *Setting of the decimal point in the MIN item is determining for the entire instrument*

SETTING FOR LINEAR POTENTIOMETER

DU



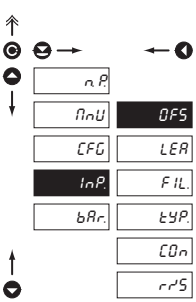
MEA Call to place the potentiometer traveller into initial position

- *in the MIN and MAX items enter the required projection and confirm by pressing „Enter"*
- *before confirming the sign „MEA" by „Enter" the potentiometer traveller has to be positioned and stabilized at the beginning of the measuring range*
- *the „MES" sign indicates automatic calibration of the measuring range, the potentiometer traveller has to be at rest*

! *Calibration for second position is identical with setting of the beginning*

4.3.3.2 SHIFTING THE BEGINNING OF THE RANGE

RTD

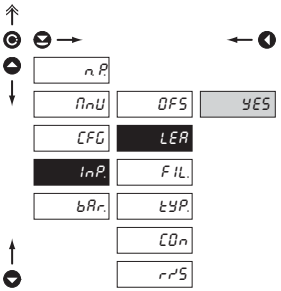


OFS Shifting the beginning of the range

- *in cases when it is necessary to shift the beginning of the range by certain value, e.g. when sensor is used in a measuring head*
- *entered directly in Ohm*

4.3.3.3 COMPENSATION OF 2-WIRE CONDUCT

OHM RTD



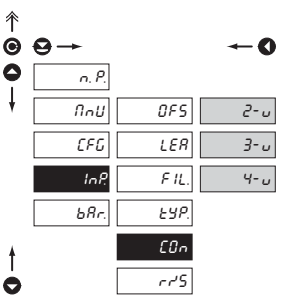
LEA **Compensation of 2-wire conduct**

- *for measurement accuracy it is necessary to perform compensation of the conduct always in case of 2-wire connection*
- *entered directly in Ohm*
- *prior to confirmation of the displayed challenge „YES" it is necessary to substitute the sensor at the end of the conduct by a short circuit*
- *preset from manufacture to „0"*

! *The items are visible at all times but the active only upon set 2-wire connection*

4.3.3.4 SETTING THE TYPE OF CONNECTION

RTD

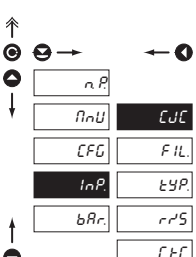


tYP. **Setting the type of connection**

2-u	2-wire input connection
3-u	3-wire input connection
4-u	4-wire input connection

4.3.3.5 SETTING THE COLD JUNCTION

T/C

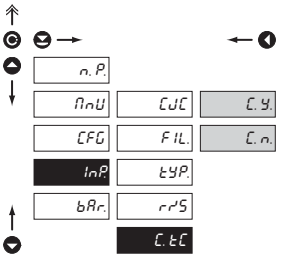


CJC **Setting the temperature of the cold junction**

- *range of 0...98 °C with compensation box*
- *99 °C without compensation box, with/ without reference thermocouple, temperature of the cold junction is measured at the input brackets of the instrument*

Method and procedure of the setting of the cold junctions are described in a separate chapter on page 32

4.3.3.6 SETTING THE METHOD OF MEASUREMENT OF THE COLD JUNCTION T/C



CONF.tC **Setting the method of measurement of the cold junction**

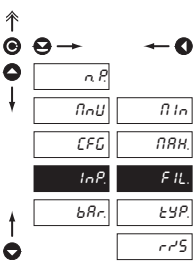
- *measurement with/without reference thermocouple*

C. Y. Measurement with reference thermocouple (antiserially)

C. n. Measurement without reference thermocouple

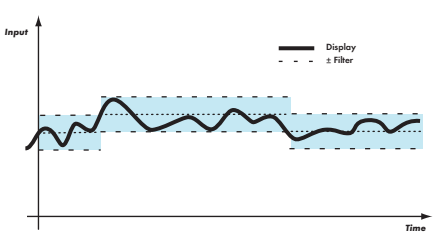
Method and procedure of setting of the cold junctions are described in a separate chapter on page 32

4.3.3.7 DIGITAL FILTER



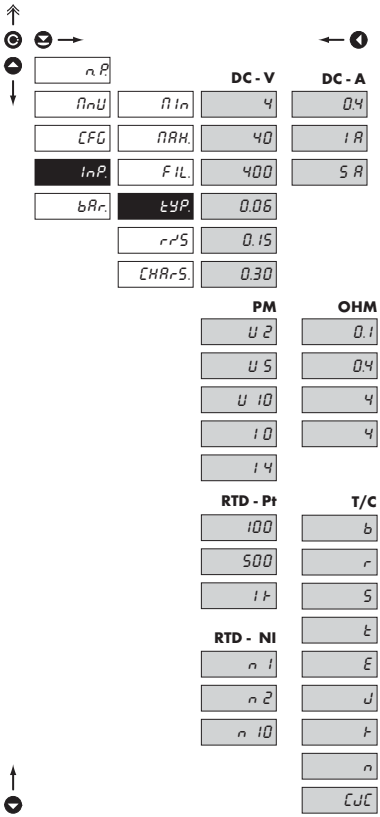
FIL. **Setting the digital filter**

- *use of the digital filter will find its place in applications where the change of projection on the display (by given value) interferes or is not substantial in the measuring regime*
- *it is entered directly in digits and is valid symetrically*



4.3.3.8 SETTING THE MEASURING RANGE

DC PM RTD OHM T/C



! *Upon a change of the range check also the necessary jumper settings (page 30) and connection of given input (page 7)*

tYP. Setting the measuring range of the instrument

DC Input

- *ammeter and voltmeter are two independent instruments*
- *4* — *0...4 V*
  40 — *0...40 V*
  400 — *0...400 V*
  0.06 — *0...60 mV*
  0.15 — *0...150 mV*
  0.30 — *0...300 mV*
- *0.4* — *0...400 mA*
  1 A — *0...1 A*
  5 A — *0...5 A*

PM Input

- *setting the measuring range*
- *U 2* — *0...2 V*
  U 5 — *0...5 V*
  U 10 — *0...10 V*
  I 0 — *0...20 mA*
  I 4 — *4...20 mA*

RTD Input

- *setting the type of sensor*
- *100* — *Pt 100*
  500 — *Pt 500*
  1 k — *Pt 1 000*
- *N 1* — *Ni 1 000*
  N 2 — *Ni 2 226*
  N 10 — *Ni 10 000*

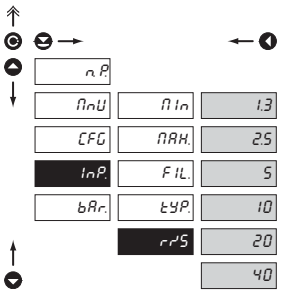
OHM Input

- *setting the measuring range*
- *0.1* — *5...105 Ohm*
  (100 — *0...100 kOhm), upon request*
  0.4 — *0...400 Ohm*
  4 — *0...4 kOhm*
  40 — *0...40 kOhm*

T/C Input

- *setting the type of thermocouple*
- *B* — *type B*
  R — *type R*
  S — *type S*
  T — *type T*
  E — *type E*
  J — *type J*
  K — *type K*
  N — *type N*
  CJC — *the temperature of the cold junction*

4.3.3.9 SETTING THE MEASURING RATE

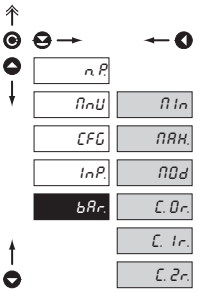


rrS **Setting the measuring rate**

- *setting the measuring rate is associated with the rate of response to evaluation of the relay status and analog output*

1.3	Rate - 1,3 measurements/s
2.5	Rate - 2,5 measurements/s
5	Rate - 5 measurements/s
10	Rate - 10 measurements/s
20	Rate - 20 measurements/s
40	Rate - 40 measurements/s

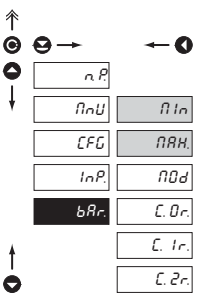
4.3.4 CONFIGURATION MODE - BARGR.



bAr. **Nastavení parametrů bargrafu**

- **Min** Setting the beginning of the bargraph range
- **MAX** Setting the end of the bargraph range
- **MOd** Setting the bargraph projection mode
- **C.0r.** Setting the colours Border 1
- **C. 1r.** Setting the colours Border 2
- **C.2r.** Setting the colours Border 3

4.3.4.1 BARGRAPH PROJECTION DISPLAY



Min Setting the beginning of the bargraph range

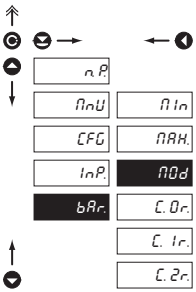
- *in this programming step we may set the display value which correspons with the minimum bargraph projection*

MAX Setting the end of the bargraph range

- *in this programming step we may set the display value which correspons with the miaximum bargraph projection*

If Min > Max is entered, then the projection on the bargraph is becoming shorter with the increasing display value

4.3.4.2 SETTING THE PROJECTION MODE



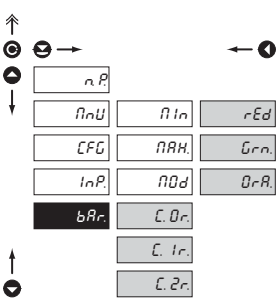
Limits are accessible in the „Configuration menu" even if the relays in the instrument are not fitted

MOd **Setting the bargraph projection mode**

- *to be set in the range of 0...6*

0 *bargraph is off*
1 *single-colour column, colour is set in entry C. 0R*
2 *see 1, auxiliary display is off in the measuring mode*
3 *single-colour column with point identification of the limits, colour is set in the entry C. 0R (red or green colour only)*
4 *see 3, auxiliary display is off in the measuring mode*
5 *three-colour column - the colour is determined by th limit value*
   no limit — *colour is set in the entry C. 0R*
   one active limit — *colour is set in the entry C. 1R*
   two active limits — *colour is set in the entry C. 2R*
6 *see 5, auxiliary display is off in the measuring mode*

4.3.4.3 SETTING THE LED COLOURS



C. 0r. **Setting the bargraph LED colours**

- *setting the colour coloumn according to options in regime „MOd"*

RED *red colour*
GRN *green colour*
ORA *orange colour*

Setting in menu „Bar. 1r" a „Bar. 2r." is the same

5. CONFIGURATION INPUT

Jumpers are accessible after the instrument is opened

INPUT "2" (DC)		60 mV	150 mV	300 mV
J7	*Not*	×	✓	✓
	Yes	✓	×	×
J8	*Not*	×	×	×
	Yes	×	×	×

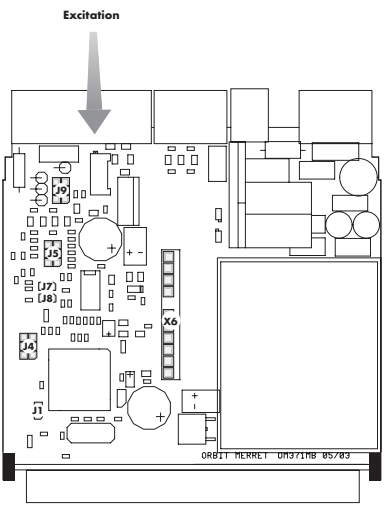
FUNKTIONS		Hold	Lock
J1	*Not*	✓	×
	Yes	×	✓

INPUT "2", "U"		DC	PM
J9	*5 - 6*	0...4 V	0...2 V
	3 - 4	0...40 V	0...5 V
	1 - 2	0...400 V	0...10 V

INPUT (T/C)		E, J, K, N	T, R, S	B
J7	*Not*	✓	✓	×
	Yes	×	×	✓
J8	*Not*	✓	×	×
	Yes	×	✓	✓

INPUT		RTD
J4	*5 - 6*	Pt 100/Ni 1 000
	3 - 4	Pt 500/Ni 2 226
	1 - 2	Pt 1 000/Ni 10 000

INPUT		OHM - Input 1
J5	*5 - 6*	0...400 Ohm
	3 - 4	0...4 kOhm
	1 - 2	0...40 kOhm



! *For every jumper setting disconnect the instrument from the mains*

6. TABLE OF SYMBOLS

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.

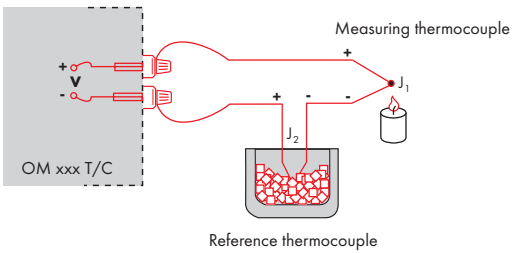
Description is cancelled by entering characters with code 00

	0	1	2	3	4	5	6	7
0		¡	"	ß	ß	'	ß	'
8	ß	ß	ß	ß	,	-		ß
16	ß	ß	ß	ß	ß	ß	ß	ß
24	ß	ß	=	ß	ß	ß	ß	ß
32	ß	ß	ß	ß	ß	ß	ß	ß
40	ß	ß	ß	ß	ß	ß	ß	ß
48	ß	ß	ß	ß	ß	ß	ß	ß
56	ß	ß	ß	ß	ß	ß	ß	_
64	'	ß	ß	ß	ß	ß	ß	ß
72	ß	ß	ß	ß	ß	ß	ß	ß
80	ß	ß	ß	ß	ß	ß	ß	ß
88	ß	ß	ß	ß	ß	ß	°	

	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	{	|	}	~	

7. METHOD OF MEAS. OF THE COLD JUNCTION

An instrument with input for temperature measurement with thermocouple allows for setting of two types of measurement of the cold junction.



WITH REFERENCE THERMOCOUPLE

- a reference thermocouple may be located in the same place as the measuring instrument or in place with stable temperature/compensation box
- when measuring with reference thermocouple set CtC in the instrument menu to C. y
- when using a thermostat (a compensation box or environment with constant temperature) set CJC. in the instrument menu to its temperature
- if the reference thermocouple is located in the same environment as the measuring instrument then set CJC in the instrument menu to number 99. Based on this selection the measurement of the surrounding temperature is performed by a sensor located in the instrument terminal board.

WITHOUT REFERENCE THERMOCOUPLE

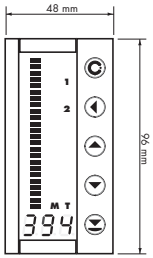
- innacuracy originating from the creation of dissimilar thermocouples on the transition point terminal-conductor of the thermocouple is not compensated for in the instrument
- when measuring without reference thermocouple set CtC. in the instrument menu to C. n
- when measuring temperature without reference thermocouple the error in measured data maybe even 10°C

8. ERROR STATEMENTS

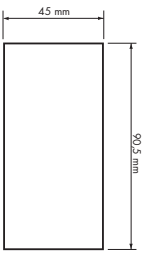
ERROR	REASON	ELIMINATION
E. Un	range underflow (A/D converter)	change the input signal value or change display projection
E. Ou	range overflow (A/D converter)	change the input signal value or change display projection
E. n	mathematic error, range of projection is out of display	change the set projection
E.d	violation of data integrity in EEPROM, error upon data storage	in case of recurring report send the instrument for repair
E. n.	EEPROM error	the „Def" values will be used in emergency, instrument needs to be sent for repair
E.C	calibration error, loss of calibration data	instrument needs to be sent for repair

9. INSTRUMENT DIMENSIONS AND INSTAL.

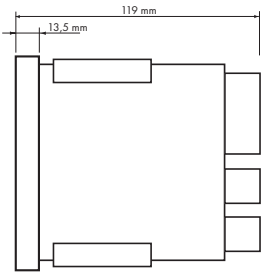
Front view



Panel cut



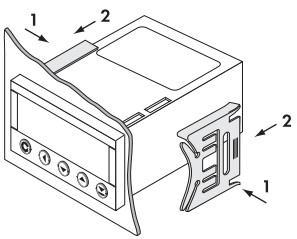
Side view

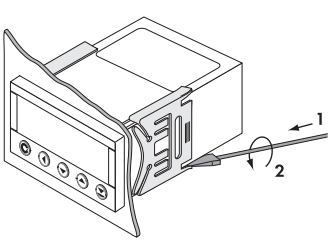


Panel thickness: 0,5...20 mm

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

10. TECHNICAL DATA

INPUT

selectable in configurationm menu — ***DC***

0...4 V	1 MOhm	Input 2
0...40 V	1 MOhm	Input 2
0...400 V	1 MOhm	Input 2
0...60 mV	1 MOhm	Input 1
0...150 mV	1 MOhm	Input 1
0...300 mV	1 MOhm	Input 1
0...400 mA	< 60 mV	Input 2
0...1 A	< 60 mV	Input 1
0...5 A	< 60 mV	Input 1

selectable in configurationm menu — ***PM***

0/4...20 mA	< 400 mV	Input I
0...2 V	1 MOhm	Input U
0...5 V	1 MOhm	Input U
0...10 V	1 MOhm	Input U

selectable in configurationm menu — ***OHM***

0...400 Ohm		Input 1
0...4 Ohm		Input 1
0...40 kOhm		Input 1
5...105 Ohm		Input 2
0...100,0 kOhm	(upon request)	Input 2

Connection: 2 wire

RTD

Pt xxxx -99,9°...399,9°C
Ni xxxx -30,0°...250,0°C
Type Pt: 100/500/1 000 Ohm, platinum couple
s α=0,003850hm/Ohm/°C
Type Ni: Ni 1 000/2 226/10 000, 5000 ppm/6180 ppm
Connection: 2, 3 or 4 wire

selectable in configurationm menu — ***T/C***

Type:	J (Fe-CuNi)	0°...900°C
	K (NiCr-Ni)	0°...1 300°C
	T (Cu-CuNi)	0°...400°C
	E (NiCr-CuNi)	0°...690°C
	B (PtRh30-PtRh6)	300°...1 820°C
	S (PtRh10-Pt)	0°...1 760°C
	R (Pt13Rh-Pt)	0°...1 740°C
	N (Omegalloy)	0°...1 300°C

- The instrument evaluates only temperatures higher than the temperature of the cold junction (C JC)

DU

Lin. pot.supply 2,5 VDC/6 mA
min. potentiometer resistance is 500 Ohm

PROJECTION

Bargraph 25 LED - tricolours
Display, 3 digit intesive red or green LED,
digit height 9 mm
Projection: -999...3999
Decimal point: adjustable - in programming mode
BRIGHT.: adjustable - in programming mode

INSTRUMENT ACCURACY

Temperature coef.: 100 ppm/°C
Accuracy: ±0,15 % of the range ***DC/PM/DU***
±0,25 % of the range (for 60/150/300 mV) ***DC***
±0,5 % of the range ***A C***
±0,2 % of the range ***OHM/RTD/TC***
Resolution: 0,1° ***RTD***
1°C ***T/C***
Rate: 1,3 - 2,5 - 5 - 10 - 20 - 40 measurements/s
Overload capacity: 10x (t < 100 ms), 2x (long-term)
Digital filter adjustable in configuration menu
Comp.of conduct: max. 40 Ohm ***RTD***
Comp. of cold junct.: adjustable ***T/C***
0°...98°Cor automatic (99)
Functions: Tare - display resetting
Hold - stop measuring (upon contact)
Projection of measured units
Watch-dog: reset after 1,2 s
Calibration: at 25°C and 40 % r.h.

COMPARATOR

Type: digital, adjustable in the menu
Limits: -999...3999
Hysteresis: 0...999
Delay: 0...99,9 s
Outputs: 2x relays with switch-on contact
(230 VAC/30 VDC, 3 A)*
Relay: 1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

DATA OUTPUTS

Protocols: ASCII
Data format: 8 bit + no parity + 1 stop bit (ASCII)
Rate: 150...115 200 Baud
RS 232: isolated, two-way communication
RS 485: isolated, two-way communication,
addressing (max. 31 instruments)

** values apply for resistance load*

ANALOG OUTPUTS

Type:	isolated, programmable with resolution of max. 10 000 points, analog output corresponds with the displayed data, type and range are adjustable
Non-linearity:	0,2 % of the range
TC:	100 ppm/°C
Rate:	response to change of value < 100 ms
Voltage:	0...2 V/5 V/10 V
Current:	0...5/20 mA/4...20 mA - compensation of conduct up to 600 Ohm

EXCITATION ***PM***

Adjustable:	2...24 VDC/50 mA, isolated

POWER SUPPLY

Options:	24/110/230 VAC, 50/60 Hz, ±10 %, 5 VA 10...30 VDC/max. 300 mA, isolated
Protection:	by a fuse inside the instrument VAC (T 80 mA), VDC (T 630 mA)

MECHANIC PROPERTIES

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

OPERATING CONDITIONS

Connection:	connector terminal board, conductor section up to 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 cat.:	EN 61010-1, A2 III. - instrument power supply (300 V) II. - input, output, excitation (300 V) for pollution degree II
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11; EN 550222, A1, A2

11. DECLARATION OF CONFORMITY

Company:	ORBIT MERRET, spol.s r.o. (Ltd.) Klánova 81/141 142 00 Prague 4 Czech Republic IDNo: 00551309
Manufactured:	ORBIT MERRET, spol.s r.o. (Ltd.) 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:	Programmable Bargraph
Type:	OMB 311, in versions: DC, PM, DU, PWR, OHM, RTD, T/C
Mode of asses. of conformity:	§12, par. 4 b, d of Act No.22/1997 Sb.

Conformity is assessed pursuant to the following standards::

Electrical safety:	EN 61010-1
EMC:	EN 50131-1, par. 14 and par. 15 EN 55022 EN 61000-3-2 + A12, Cor. 1, change A1, change A2 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

and government ordinance:

Electrical safety:	No. 168/1997 Sb.
EMC:	No. 169/1997 Sb.

The evidence are the protocols of authorized and accredited organization:

VTÚE Praha, experimental laboratory No. 1158 accredited by ČIA, o.p.s. with EN ISO/IEC 17025

Place and date of issue: Prague, 21. november 2001

Miroslav Hackl
Company representative

12. CERTIFICATE OF GUARANTEE

Product	**OMB 311 DC PWR PM DU RTD T/C OHM**
Type	. . . . .
Manufacturing No.	. . . . .
Date of sale	. . . . .

A guarantee period of 24 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 instrument quality, function and construction the guarantee shall apply provided that the instrument was connected and used in compliance with the instruction for use.

The guarantee shall not apply for defects caused by:

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

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

Stamp, signature

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