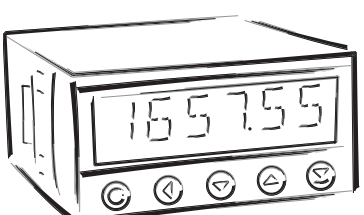
GUARANTEE 2 YEARS

OM 601RS

6 DIGIT PROGRAMMABLE

DATA DISPLAY
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 601 series conform to European regulation 89/336/EWG and Ordinance 168/1997 Coll.

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 OM 601RS model is a 6 digit panel display device for transmission of data from serial lines of standard RS 232 and RS 485. Communication runs via the ASCII protocol.

The display may project all ASCII characters employable for 14-segment display.

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

User mode 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).

The measured units may be projected on the display

OPTIONS

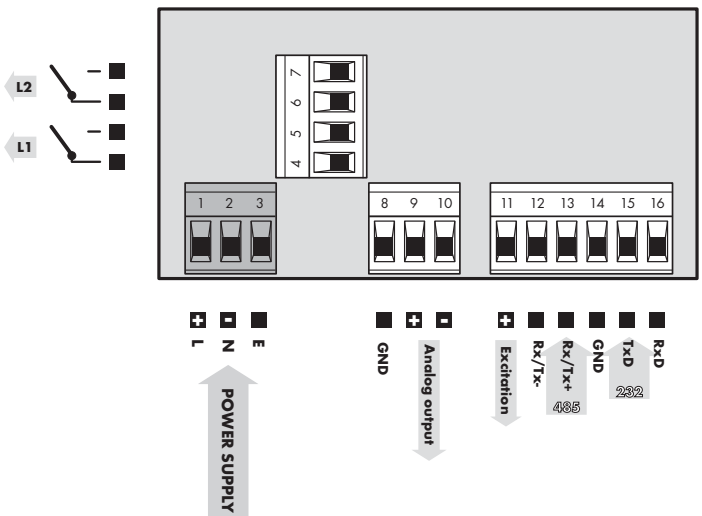
Excitation is suitable for feeding of sensors and converters. It has a galvanic isolation with continuously adjustable value in the range of 2...24 VDC

Comparators are assigned to control one or two limit values with relay output. The limits have adjustable hysteresis and delay. Reaching the preset limits is signalled by LED and simultaneously by the switch-on of the relevant relay.

Analog outputs will find their place in applications where further evaluating or processing of measured data 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*

! *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.*

3.1 CONFIGURATION OF THE JUMPERS

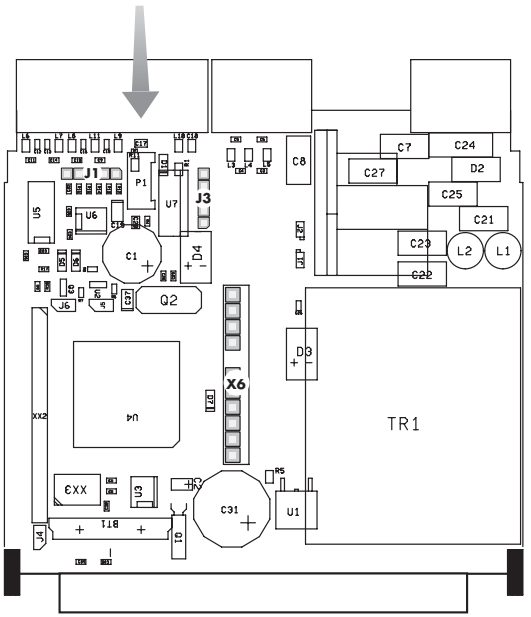
J1 - Termination RS 485

3 - 4	no
1 - 2, 3 - 4, 5 - 6	yes

J3 - Excitation

1 - 2, 3 - 4	< 9 V
2 - 3, 4 - 5	< 12 V
1 - 2, 4 - 5	> 12 V

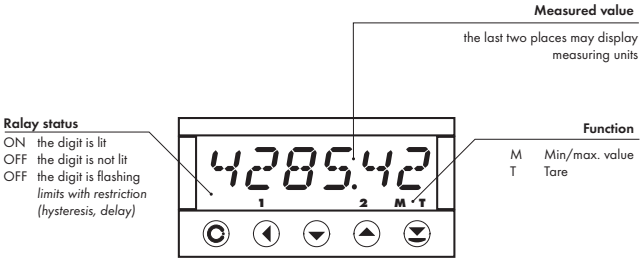
Excitation



For each jumper setting disconnect the instrument from the net

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 operating 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

DEF Items indicated this way are preset from manufacture

CONTROL KEYS FUNCTIONS

MENU	ENTER	LEFT	DOWN	UP
Measuring mode				
menu access				
Moving around in the menu				
exit the menu without saving	move to next level	back to previous level		move to next 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

Upon modification of the edited number in the menu the decimal point is set by key ◀ with transition beyond the highest decade, when the decimal point starts flashing. Positioning is performed by ▲, and confirmation by ▼ with return into number editing.

Decimal point for display projection is set in item „CHAN. A - FORMAT" and „CHAN. B - FORMAT" by selection from preset values.

MINUS SIGN

Setting the minus sign is performed on the highest valid degree by key ▲/▼.

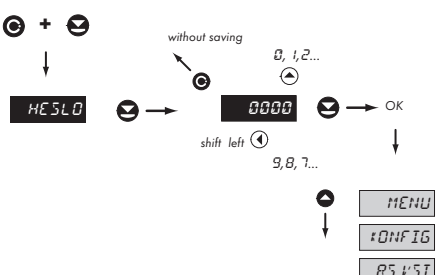
The minus sign is in numeric row (0, 1, 2, 3...9, –).

Setting

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

⇨ by pressing ▲ you will place the DP and you confirm it by ▼

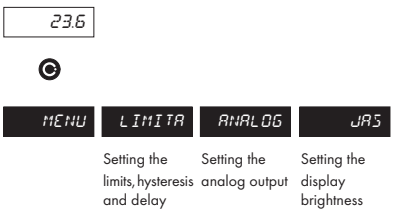
ACCESS INTO THE CONFIGURATION MODE



The code is always preset from manufacture to 0000. In case of loss of access password it is possible to use universal access code "8177"

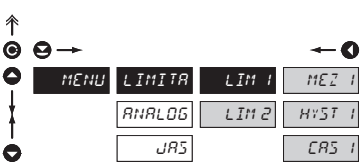
4.1 USER MODE

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



MENU
Setting the instrument outputs

4.1.1 LIMITS - SETTING THE BOUNDARIES



Adjustable authorization of access into items, see page 16

LIM - **Setting the values for limits evaluation**

MEZ 1 Setting limit for relay switch on

- *in full display range*

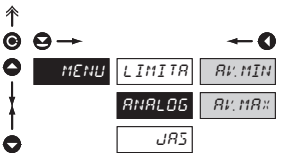
HYST 1 Setting hysteresis only in (+) values

- *in 1/10 of the display range*

CAS 1 Setting the delay of the limit switch-on

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

4.1.2 ANALOG OUTPUT - SETTING THE RANGE



Adjustable authorization of access into items, see page 17

ANALOG **Setting the range of the analog output**

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

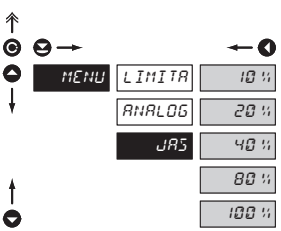
A.O.MIN Assigning the display value to the beginning of the range of the analog output

- *range of the setting is -99 999...100 000*

A.O.MAX Assigning the display value to the end of the range of the analog output

- *range of the setting is -99 999...100 000*

4.1.3 SETTING THE DISPLAY BRIGHTNESS



Adjustable authorization of access into items, see page 18

JAS **Setting the display brightness**

10 % Brightness 10 %

20 % Brightness 20 %

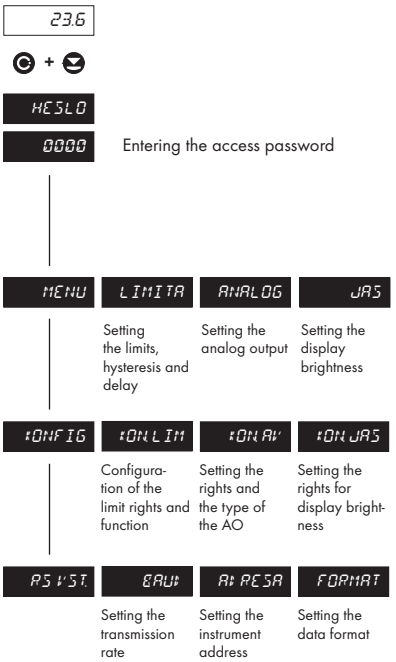
40 % Brightness 40 %

80 % Brightness 80 %

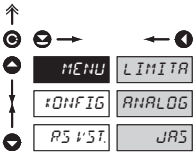
100 % Brightness 100 %

4.2 CONFIGURATION MODE

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



4.2.1 CONFIGURATION MODE - MENU



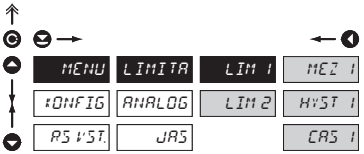
Setting the parameters for instrument outputs is performed in this menu

LIMITA — Setting the functions and the type of limits switch-on

ANALOG — Setting the AO's type and parameters

JAS — Setting the display brightness

4.2.1.1 LIMITS - SETTING THE BOUNDARIES



LIM - **Setting the values for limits evaluation**

MEZ 1 — Setting the limit for relay switch on

- *in full display range*

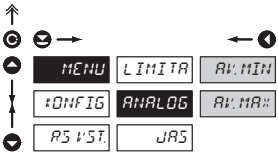
HYST 1 — Setting hysteresis only in (+) values

- *in 1/10 of the display range*

CAS 1 — Setting the delay of limit switch-on

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

4.2.1.2 ANALOG OUTPUT - SETTING THE RANGE



ANALOG **Setting the range of the analog output**

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

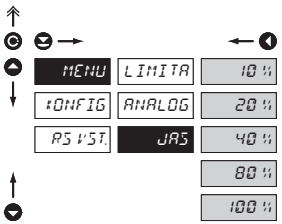
A.O.MIN — Assigning the display value to the beginning of the range of the analog output

- *range of the setting is -99 999...100 000*

A.O.MAX — Assigning the display value to the end of the range of the analog output

- *range of the setting is -99 999...100 000*

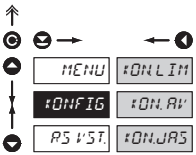
4.2.1.3 SETTING THE DISPLAY BRIGHTNESS



DAS **Setting the display brightness**

- **10 %** Brightness 10%
- **20 %** Brightness 20%
- **40 %** Brightness 40%
- **80 %** Brightness 80%
- **100 %** Brightness 100%

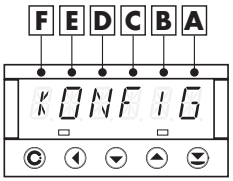
4.2.2 CONFIGURATION MODE - CONFIG



Setting of the access rights (into the User mode) and types of instrument outputs is performed here

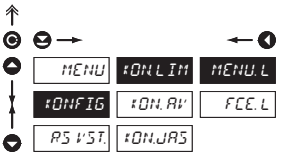
CON.LIM	Setting the limits, hysteresis and delay
CON.AV	Setting the analog output range
CON.JAS	Setting the display brightness

One of the major advantages of the function is the opportunity to assign authorization for access and modification of parameters in individual steps of the "User mode". This setting will facilitate the service staff of the instrument easy operation and shall prevent unauthorized interference with the setting of important functions.



A configuration code may consist of up to 6 figures, which define the operating setting of the instrument.
Individual significance and setting of the figures are described in respective chapters of the configuration mode.

4.2.2.1a SETTING THE PROJECTION OF LIMITS IN "USER MODE"

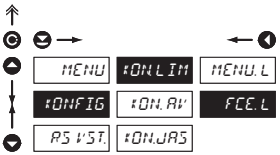


MENU.L **Setting the access rights for the "Limits"**

- *for option see table*
- *A > Limit 1, B > Limit 2*

Rights for the "Limits"	Limits	Hysteresis	Delay	BA
not displayed in the "UM"				0
only displayed in the "UM"	yes			1
	yes	yes		2
	yes	yes	yes	3
displayed and set in the "UM"	yes			4
	yes	yes		5
	yes	yes	yes	6

4.2.2.1b LIMITS - SETTING THE RELAY MODE

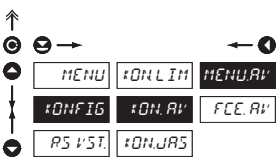


FCE.L **Setting the relay switching mode**

- *for option see table*
- *A > Limit 1, B > Limit 2*

Configuration of relay function		BA
Relay	switch-on	0
	switch-off	1

4.2.2.2a SETTING PROJECTION OF THE ANALOG IN "USER MODE"

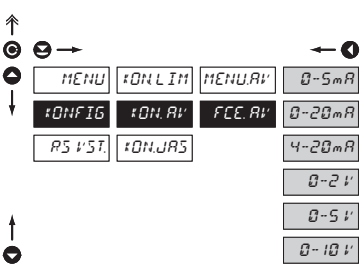


MENU.AV **Setting the access rights for the "Limits"**

- *for option see table*
- *A > Limit 1, B > Limit 2*

Rights for the "Analog output"	A
not displayed in the "UM"	0
only displayed in the "UM"	1
displayed and set in the "UM"	2

4.2.2.2b ANALOG OUTPUT - SETTING THE TYPE



FCE.AV **Setting the type of analog output**

0-5mA	Output: 0...5 mA
0-20mA	Output: 0...20 mA
4-20mA	Output: 4...20 mA
0-2 V	Output: 0...2 V
0-5 V	Output: 0...5 V
0-10 V	Output: 0...10

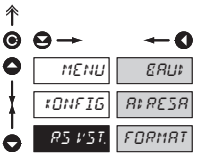
4.2.2.3 SETTING THE PROJECTION OF BRIGHTNESS IN “USER MODE”

Setting the access rights for the “Limits”

- *for option see table*

Rights for the “Brightness”	**A**
not displayed in the “UM”	0
only displayed in the “UM”	1
displayed and set in the “UM”	2

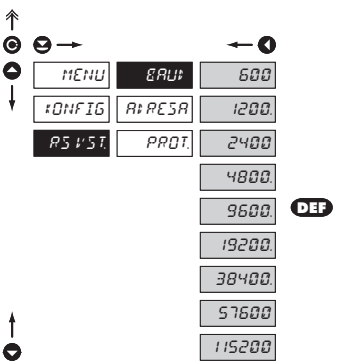
4.2.3 CONFIGURATION MODE - RS INPUT



Input parameters are set in this menu

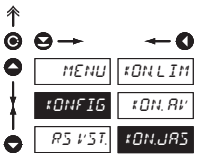
EAU	Setting the limits, hysteresis and delay
AI PESA	Setting the analog output range
FORMAT	Setting the display brightness

4.2.3.1 DATA OUTPUT - SETTING THE TRANSMISSION RATE



EAU	**Setting the rate of data output (baud)**
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

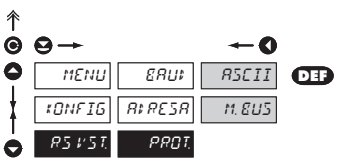
4.2.3.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS



ADRESS **Setting the instrument address**

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

4.2.3.3 DATA OUTPUT - SETTING THE DATA PROTOCOL



PROT. **Setting the type of the data protocol**

ASCII ASCII protocol

PROT. DIN MessBus protocol

5. TABLE OF SYMBOLS

The instrument allows to add two descriptive characters to the classic numeric formats (at the expense of the number 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	{	|	}	~	

6. DATA PROTOCOL

The instruments communicate via serial line RS232 or RS485. For communication they use either ASCII protocol or DIN MessBus protocol. The communication is running in the following format:

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

Transmission rate is adjustable in the instrument menu and depends on the used control processor. The instrument address is in the instrument menu in the range of 0...31. Manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. Type of line used - RS232 / RS485 - is determined by exchangeable card automatically identified by the instrument.

COMMANDS FOR INSTRUMENT OPERATION

The commands are described in the description which can be found at **www.orbit.merret.cz/rs**.
The command consists of a couple number-letter, where the letter size is of importance.

Data format
- 8 bit, no parity, w/o BCC

Transmission of data to the display
Query #AA 9 dddd <CR>

Legend

#	23_H	beginning of the command
AA	$00_D \div 31_D$	two characters (figures), instrument address
dddd		text to be displayed, max. 6 characters + 6 DP
<CR>	$0D_H$	carriage return, end of command

7. ERROR STATEMENTS

ERROR	REASON	ELIMINATION
EMat	mathematic error, range of projection is out of display	change the set projection
EdataE	violation of data integrity in EEPROM, error upon data storaget	in case of recurring report send the instrument for repair
EPam.	EEPROM error	the „Def" values will be used in emergency, instrument needs to be sent for repair

8. TECHNICAL DATA

INPUT

Protocols:	DIN MESSBUS; ASCII
Data format:	7 bit + even parity + 1 stop bit (DIN MESSBUS) 8 bit + no parity + 1 stop bit (ASCII)
Rate:	1 200...115 200 Baud
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)

PROJECTION

Display:	999999, intensive red or green 14-segment LED, digit height 14 mm
Projection:	-99999...999999
Brightness.:	adjustable - in programming mode

INSTRUMENT ACCURACY

Temp. coefficient:	100 ppm/°C
Watch-dog:	reset after 1,2 s
Calibration:	at 25°C and 40 % r.h.

COMPARATOR

Type:	digital, adjustable in menu
Limits:	-99999...99999
Hysteresis:	0...99999
Delay:	0...99,9 s
Output:	2x relays with switching contact (Form A) (230 VAC/30 VDC, 3 A)*
Relays:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

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

Adjustable:	2...9/9...12/12...24 VDC/80 mA, isolated

POWER SUPPLY

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

** values apply for resistance load*

MECHANIC PROPERTIES

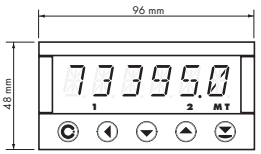
Material:	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions:	96 x 48 x 120 mm
Panel cut-out:	90,5 x 45 mm

OPERATING CONDITIONS

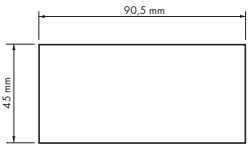
Connection:	connector terminal board, conductor cross section up to 2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temp.:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage categ.:	EN 61010-1, A2 III. - instrument power 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

9. INSTRUMENT DIMENSIONS AND INSTAL.

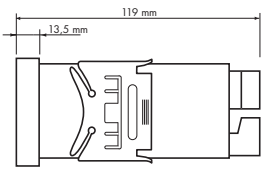
Front view



Panel cut



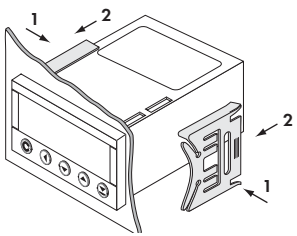
Side view

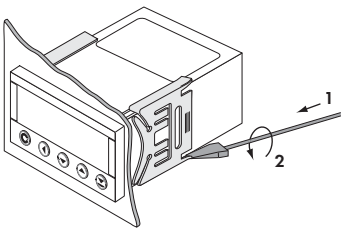


Panel thickness: 0,5...20 mm

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. CERTIFICATE OF GUARANTEE

Product	**OM 601RS**
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 occurring 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

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:	6 -digit programmable panel instrument
Type:	OM 601URS
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