OMLINK

OMX 100

PROGRAMMABLE TRANSMITTER

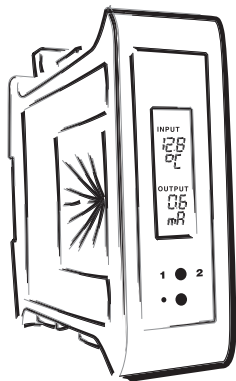DC VOLTMETER/AMMETER
AC VOLTMETER/AMMETER
PROCESS MONITOR
OHMMETER
THERMOMETER FOR PT 100/500/1 000
THERMOMETER FOR NI 1 000
THERMOMETER FOR THERMOCOUPLES
DISPLAY INSTR.FOR LIN.POTENTIOMETERS

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

Transmitters of the OMX 100 series conform to European regulation 89/336/EWG and the 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

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

ORBIT MERRET, spol. s r.o.
Vodnanská 675/30
198 00 Prague 9
Czech Republic

Tel: +420 - 281 040 200
Fax: +420 - 281 040 299
e-mail: orbit@merret.cz
www.orbit.merret.cz

1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OMX 100 model series are programmable transmitters to DIN rail manufactured in the following types:

OMX 100DC	DC voltmeter/ammeter
OMX 100PWR	AC voltmeter/ammeter, wattmetr
OMX 100PM	Process monitor
OMX 100RTD	Thermometer for Pt 100/500/1 000, Ni 1 000
OMX 100T/C	Thermometer for thermocouples
OMX 100DU	Display instrument for linear potentiometers
OMX 100OHM	Ohmmeter
OMX 100F	Frequency meter

The instruments are based on an 8-bit microcontroller with 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 input type
Projection	-99...999

Digital filters
Exponen. average	from 2...100 measurements
Rounding	setting the projection step for display

Mathematic functions
Tare*	assigned to reset display in case of non-zero input signal

External control
Hold	display/instrument blocking
Lock	locking the control keys for access into Configuration menu
Tare	tare activation
Resetting	counter resetting/preset

Output
Analog	programmable
	0...5 mA, 0...20 mA, 4...20 mA (with error statement evaluation 3 mA)
	0...2/5/10 V
	0,2...2 200 Hz

* only for type DC, PM, DU

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OPERATION

The transmitter is set by two control keys on the front panel or via data line RS 232/485.

A standard equipment is the OM Link interface, through which it is possible to modify and store all settings. The OM Link program is freely procurable, to be downloaded from the web site. For the connection an OM Link cable is necessary.

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

EXTENSION

Excitation is suitable for feeding sensors and converters. It has a galvanic isolation of 12...24 VDC.

Comparators are assigned to control two limit values with relay output. The limits have adjustbale hysteresis as well as selectable delay of the switch-on. 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 RS 232 and RS 485 with the ASCII protocol.

Real time is an internal time control of data collection. It is suitable everywhere where it is neccessary to register measured values in a given time segment. Up to 65 000 values may be stored in the instrument's memory. Data transmission into PC via serial interface RS232/485

FIRMWARE   *www.orbit.merret.cz/update*

With respect to the continuous development and innovation of our products it is now possible to download the most recent program version for every instrument directly from the web pages.

After connecting the instrument to PC and running the program the upgrade is performed automatically .

Number of the current program version in your instrument can be found in „Configuration menu - service - identification"

3. CONNECTION

The lead for feeding the instrument should not be in the proximity of the incoming low-potential signals.

Contactors, motors with larger input power and other efficient elements should not be in the proximity of the instrument.

The lead into the input of the instrument (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.

MEASURING RANGES

Type	Input 1	Input 2	Input 3
OMX 100 PWR	Input 1 > 0...60 mV * 0...150 mV * 0...300 mV * 0...1 A * 0...5 A		
OMX 100 PWR	Input 2 > 0...10 V * 0...100 V * 0...150 V * 0...250 V * 0...450 V		
OMX 100 DC	±4/±40 mA	±0,4/±4 V	±40/±400 V
OMX 100 DC	0...1/5 A	0...60/150 mV	
OMX 100 PM	0/4...20 mA	0...2 V	0...5/10 V
OMX 100 OHM	0...999 Ohm * 0...9,99 kOhm * 0...99,9 kOhm * 5...105 Ohm		
OMX 100 F	< 30 V	< 150 V	< 300 V

❗ Grounding on terminal „E" has to be connected at all times.

💡 Feeding of an open collector (OC) for frequency output max. 40 V, (internal resistance 5k6)

❗ Relay parameters listed in Technical data apply for resistance load. Upon connection of induction load we recommend fitting the leads to relay 1 A with a fuse for protection of maximum load.

❗ In RTD and OHM inputs it is necessary in 2 or 3-wire connection to link the unconnected inputs to terminal board.

POWER

L N E

AO - supply OC

AO - frequency

AO - voltage

AO - current

Hold/Lock

GND

INPUT 1

INPUT 2

INPUT 3

OMX 100DC, PM, F

OM Link

L1 L2

GND

TxD

RxD

232

GND

Rx/Tx−

Rx/Tx+

485

Exc.

OMX 100DU

B E

OMX 100PWR

GND

INPUT I

INPUT U

OMX 100RTD

Es− Es+

E− S− Es+

E− S− S+ E+

OMX 100T/C

GND

INPUT

CJC

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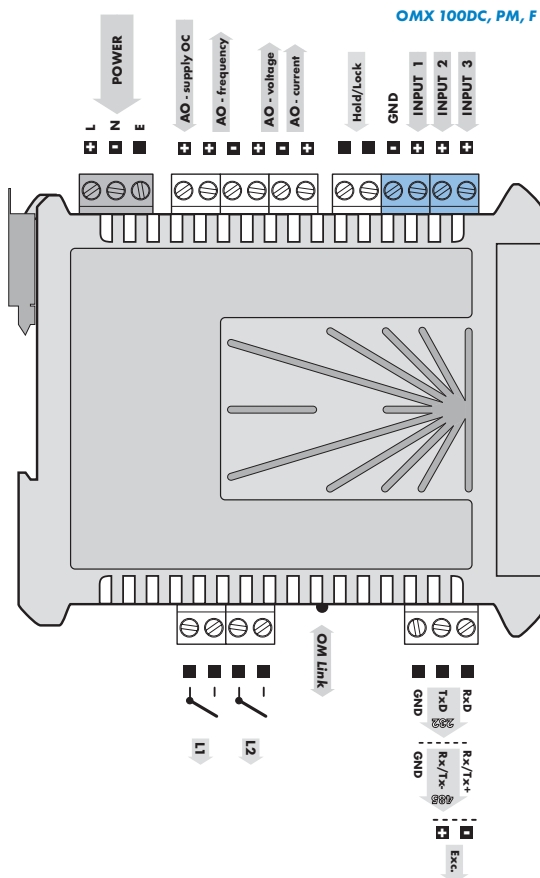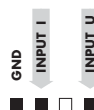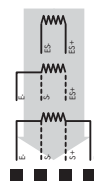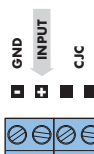
4. INSTRUMENT SETTING

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

Input value

+ 3 digit optional
projection of meas.unit

Output value

+ 3 digit optional
projection of meas.unit

Relay status - red LED

ON   number is alight
OFF   number is not alight
OFF   number is flashing
      limits w/restriction
      (hysteresis, delay)

Signalization - green LED

ON   LED is alight
ON   LED is flashing
      error statement
OFF   LED is not alight
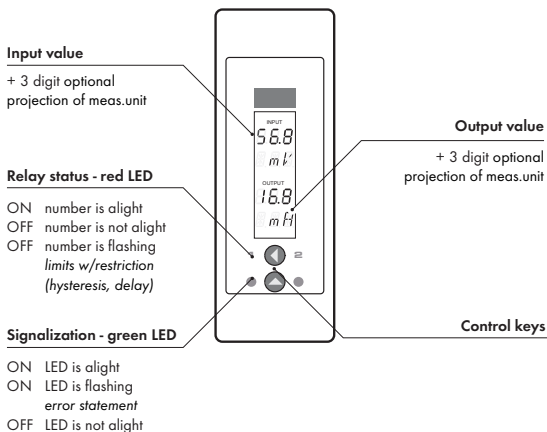
Control keys

SYMBOLS USED IN THE INSTRUCTIONS

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

CONTROL KEYS FUNCTIONS

UP*	LEFT*	UP + LEFT
Measuring mode		
tare/resetting	tare projection	access into menu
Moving around in the menu		
move to next item	return to previous level	confirm selected item
Setting/selection - items		
move up	move down	confirm selected item
Setting - numbers		
change of current figure - up -	move to higher decade	confirm selected number

* control keys react after being released

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SETTING THE DECIMAL POINT AND THE (-) SIGN

DECIMAL POINT

Its selection in the setting mode is performed by control key ◀ with transition behind the highest decade, when the data starts flashing. Positioning is performed by ◀.
For projection of value exceeding 999 the „k" suffix may be set up (display value is multiplied by 1000, only for frequency output).

MINUS SIGN

Setting the minus sign is performed by control key ◀ on the higher decade. When editing the item, figures change in numeric row 0,1...9,-,0,1

ACCESS INTO THE CONFIGURATION MODE
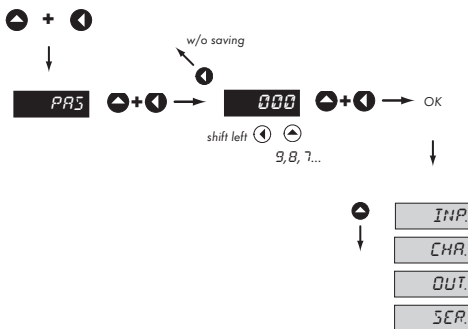
The code from manufacture is always preset to 000. In case of loss of access password it is possible to use the universal access code "177"

If the code is preset to 000 the access into the menu is free, i.e. without call for its setting

4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

❶ Access into the „Configuration menu""
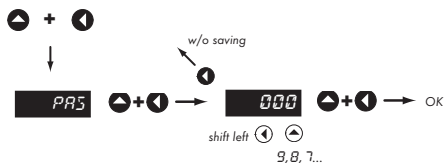
Entering the introductory access password

Standard manufacture setting of the access password

If the code is preset to 000 the access into „CM" is free, i.e. without call for its setting

❷ Selection of the measuring range/input type
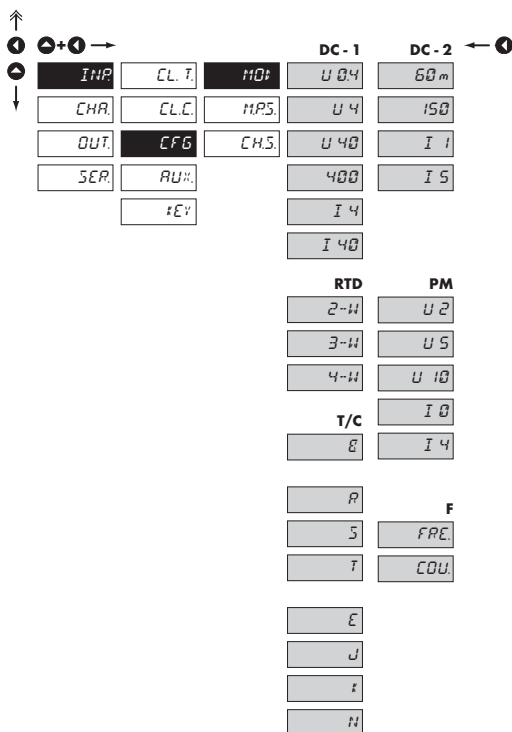
Setting the instrument measuring range

DC Input

- setting the input range is dependant on the ordered measuring range

PM Input

- setting the input range

RTD Input

- setting the type of connection
- in 2 or 3-wire connection it is necessary to link the unconnected inputs (see the connection)

T/C Input

- setting the type of thermocouple is dependant on the ordered measuring range

- B	type B	Range 1
- R	type R	Range 2
S	type S	
T	type T	
E	type E	Range 3
J	type J	
K	type K	
N	type N	

Input F

- setting the measuring mode
- FRE.   Frequency measurement
  COU.   Impulse counter

❸ Setting the display projection

| ↑ |
| ◐ ◑+◐ → | ← ◑ |

INP.	C. A.	SET	MIN
CHR.		FIL.	MAX
OUT.		FOR.	
SER.		‡ES.	

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

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

MAX Setting the display projection for maximum value of the input signal

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

💡 *For type „F" the items „SCA" and „OFF" will be displayed*

❹ Setting the analog output type - U/I

| ↑ |
| ◐ ◑+◐ → | ← ◑ |

INP.	LIM	TYP	I 5
CHR.	‡AT.	MIN	I 4	**DEF**
OUT.	R.O.	MAX	E 4
SER.	‡IS.		I 20
			U 2
			U 10
			FRE.
			OFF

I 5 Type - 0...5 mA

I 4 Type - 4...20 mA

E 4 Type - 4...20 mA with error statement (3,0 mA)

I 20 Type - 0...20 mA

U 2 Type - 0...2 V

U 10 Type - 0...10 V

FRE. Type - 0,2...2 200 Hz

OFF The output is off

❺ Setting the analog output range - frequency

| ↑ |
| ◐ ◑+◐ → | ← ◑ |

INP.	LIM	TYP
CHR.	‡AT.	F.MI
OUT.	R.O.	F.MA
SER.	‡IS.	MIN
		MAX

F.MI Setting the beginning of the frequency range for item „MIN"

- *range of the setting is 0,2...2 200 Hz*

F.MA Setting the end of the frequency range for item „MAX"

- *range of the setting is 0,2...2 200 Hz*

MIN Assigning the display value to the beginning of the AO range

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

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

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

4.2 CONFIGURATION MENU

- designated for professional service and maintenance
- complete instrument setting
- access is protected by password or a shorting link on the input connector

| 23.6 |

⬆+⬅

Upon delay longer than 30 s the programming mode is automatically discontinued and the instrument itself switches back to measuring mode

| PR5 |

| 000 | Entering the access password

INP.
Instrument setting

| INP. | EL. T. | EL.E | EFG. | AUX. | KEY |

Resetting internal values | Counter resetting | Auxiliary input function | Auxiliary input function | Control key function

EHA
Instrument setting, calibration

| EHA. | 5ET | FIL. | FOR. |

Setting projection for min/max input signal | Setting the digital filters | Setting the decimal point

OUT.
Setting the outputs

| OUT. | LIM. | RAT. | A.O. | IS. |

Setting the limits, hysteresis and delay | Setting the data output | Setting the analog output | Mode of display projection

5ER.
Service functions, authorization, calibration

| 5ER. | PE5. | ERL | N.PA. | IL. |

Restoring manufacture setting/calibration | Instrument calibration | Setting new access password | Instrument identification

4.2.1 CONFIGURATION MODE - INPUT
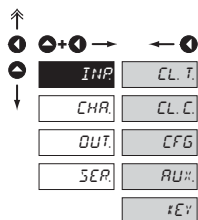
The basic instrument functions are set in this menu

CL. T. Internal values resetting

CL. C. Counter resetting
Type „F"

CFG Selecting the measuring range and measuring rate

AUX. Setting the external control input function

KEY Setting the control-key function

4.2.1.1 INTERNAL VALUES RESETTING
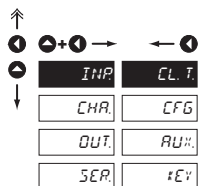
CL. T. **Tare resetting**

4.2.1.2 COUNTER RESETTING F
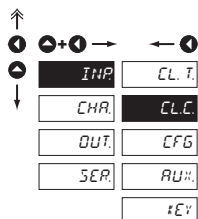
CL. C. **Counter resetting**

Holds valid for mode „Counter"

4.2.1.3.1 SETTING THE MEASURING RANGE

			DC - 1	DC - 2
INP.	CL. T.	MO:	U 0.4	60 m
CHR.	CL.C.	M.PS.	U 4	150
OUT.	CFG	CH.S.	U 40	I 1
SER.	AUX.		400	I 5
	:EY		I 4	
			I 40	

RTD / **PM**

RTD	PM
2-W	U 2
3-W	U 5
4-W	U 10
	I 0

T/C

T/C	F
B	I 4
R	
S	FRE.
T	COU.
E	
J	
K	
N	
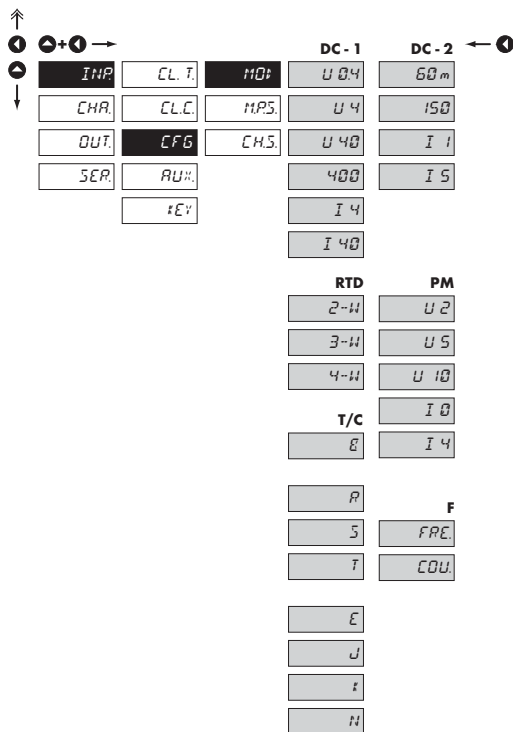
MO: Setting the instrument measuring range

DC Input

- setting the input range is dependant on the ordered measuring range
- U 0.4 ±0,4 V Range 1
- U 4 ±4 V
- U 40 ±40 V
- 400 ±400 V

- 60 m ±60 mV Range 2
- 150 ±150 mV
- I 1 ±1 A
- I 5 ±5 A

PM Input

- setting the input range

RTD Input

- setting the type of connection
- in 2 or 3-wire connection it is necessary to link the unconnected inputs (see connection)

T/C Input

- setting the type of thermocouple is dependant on the ordered measuring range
- B type B Range 1

- R type R Range 2
- S type S
- T type T

- E type E Range 3
- J type J
- K type K
- N type N

Input F

- setting the measuring mode
- FRE. Frequency measurement
- COU. Impulse counter

4.2.1.3.2 SHIFTING THE BEGINNING OF THE RANGE `RTD` `OHM`
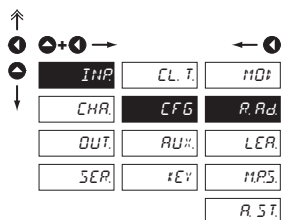
`R. Rd.`	**Shifting the beginning of the measuring range**

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

4.2.1.3.3 COMPENSATION OF 2-WIRE CONDUCT `RTD` `OHM`
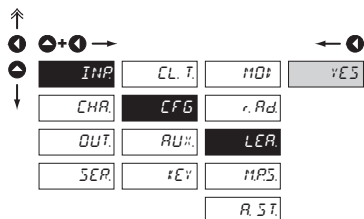
`LER.`	**Compensation of 2-wire conduct**

- *for measurement accuracy it is always necessary to perform compensation of the conduct 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"*

4.2.1.3.4 SETTING THE MODE OF ASSESSMENT OF CJC `T/C`
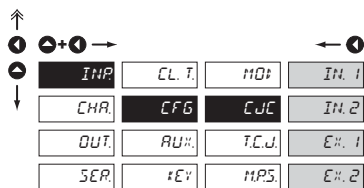
`C.J.C.`	**Mode of assessment of cold junction**

- *description of the mode of assessment of cold junction is in chapter 5, page 30*

`IN. 1`	Measurement without reference thermocouple

- *CJC measurement on the instrument brackets*

`IN. 2`	Measurement with reference thermocouple

- *cold junction measurement on the instrument brackets with anti-series connection of ref. thermocouple*

`Eʰ. 1`	Measurement without reference thermocouple

- *whole measuring system operates under identical and constant temperature*

`Eʰ. 2`	Measurement with reference thermocouple

- *when using compensation box*

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4.2.1.3.5 SETTING THE TEMPERATURE OF CJC `T/C`

INP.	CL. T.	MOᵗ
CHR.	CFG	CJC
OUT.	AUᵡ.	T.C.J.
SER.	ᵗEⱽ	M.P.S.
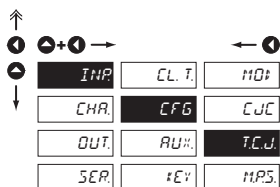
T.C.J. **Setting the temperature of CJC**

- range 0...60 °C with compensation box

☀ Method and process of the setting of CJC is described in separate chapter on page 31

4.2.1.3.6 SETTING THE TIME BASE `F`

INP.	CL. T.	MOᵗ	0.1
CHR.	CL. t.	M. T.	0.5
OUT.	CFG	FIL.	1 **DEF**
SER.	AUᵡ.	ERC	5
	ᵗEⱽ	R. S T.	10

☀ Valid for the „Frequency" mode
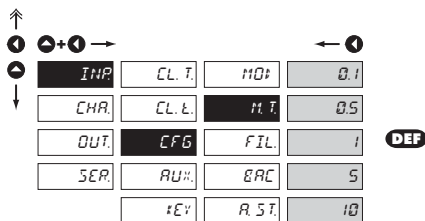
M. T. **Setting the measuring time - time base**

- if you set the time of measurement e.g to 1s, the measuring time is approximately from 1s to 2s (1 s + maximum one period of measured signal). If no impulse comes within 2 s , it is understood that the signal has zero frequency
- range of the setting of the time base is 0,5 s to 10 s
- in the „RTC" regime with projection of date the set time determines the period of switching between time/date, min. is 5 s, the date is displayed for approximately 2,5

4.2.1.3.7 SETTING THE INPUT FILTER PARAMETERS `F`

INP.	CL. T.	MOᵗ	OFF
CHR.	CL. t.	M.T.	200 **DEF**
OUT.	CFG	FIL.	100
SER.	AUᵡ.	ERC	40
	ᵗEⱽ	R. S T.	5
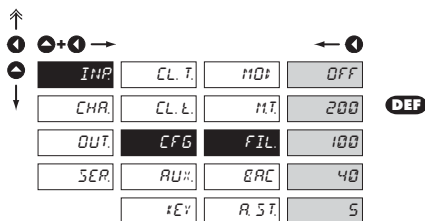
FIL. **Setting the digital input filter**

- through digital filter we may suppress undesirable interfering impulses (e.g. relay back-swings) on the input signal. The set parameter indicates maximum possible instrument frequency (Hz), which the instrument may process without restriction

☀ Valid for the „Counter" mode

☀ When entering the contact and if we know the maximum input frequency we recommend using the filter

4.2.1.3.8 SETTING THE DISPLAY STATUS BACKUP **F**

| | `ERC.` | Setting the display status backup |

- *setting the restoration of display value after power outage or instrument switchoff*

| `↑IS.` | After switch-on instrument resets itself to zero |

| `ENE.` | After switch-on instrument reads the display status from its memory |

Valid for the „Counter" mode

4.2.1.3.9 SETTING THE INSTRUMENT MEASURING RATE

| `M.PS.` | Setting the measuring rate |

`0.5`	Rate - 0,5 measurements/s
`1.2`	Rate - 1,2 measurements/s
`2.5`	Rate - 2,5 measurements/s
`5.0`	Rate - 5 measurements/s
`10.0`	Rate - 10 measurements/s
`20.0`	Rate - 20 measurements/s
`40.0`	Rate - 40 measurements/s
`80.0`	Rate - 80 measurements/s

4.2.1.3.10 SELECTION OF AUTOMATIC MENU PRESETTING   DC PM OHM F

INP.	CL. T.	MO⁝	ENR. DEF
CHR.	CFG	M.P.S.	⁝IS.
OUT.	RU⁝.	R ST
SER.	⁝EY
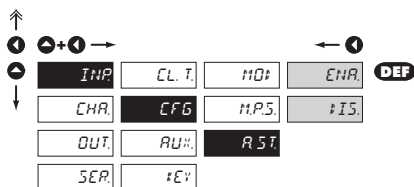
CH.S.	**Menu presetting**
ENR.	Enable

- *depending on the set input the following items will be preset automatically:*
  - *CHANNELS: MIN/MAX, FOR, DES*
  - *OUT: A.O. > MIN/MAX*
- *aut. preset items will disappear from the menu and reappear again after setting „MAN"*
- *example for input 4-20mA (PM): MIN/MAX > 4-20; FOR > 00.0; DES > mA; A.O. MIN/MAX > 4-20*

⁝IS.	Disable

- *as a standard, according to individual items on the menu*

💡 *When selecting „AUT." in type „F" the decimal point and description are preset in the range of 0,01 Hz...50,0 kHz. Limits and AO are set in kHz!*

4.2.1.4   SELECTION OF EXTERNAL INPUT FUNCTION
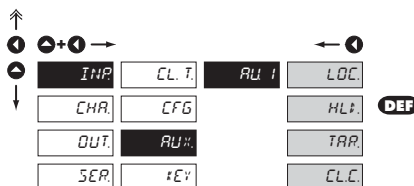
INP.	CL. T.	RU ⁝	LOC.
CHR.	CFG		HL⁝. DEF
OUT.	RU⁝.		TRR.
SER.	⁝EY		CL.C.

RU ⁝	**Selection of external input function**
LOC.	LOCK, locking the control keys on the instrument
HL⁝.	HOLD, stop measuring of the entire instrument
TRR.	TARE - Tare* activation
CL.C.	Counter resetting only for type „F", mode „COU"

4.2.1.5   SETTING ANOTHER FUNCTION OF THE CONTROL KEY „ENTER"

INP.	CL. T.	RLL	ENⱻ. DEF
CHR.	CFG		⁝IS.
OUT.	RU⁝.		
SER.	⁝EY		
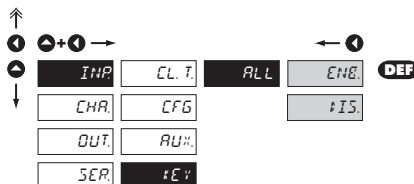
RLL	**Setting another function of the control key ◐**
⁝IS.	Without function
ENⱻ.	Activation of keys for Tare* projection, in type „F" in mode „COU" > resetting to zero

* only for type DC, PM, DU, F

4.2.2 CONFIGURATION MODE - CHANNELS

In this menu instrument parameters are set

`5E7`	Setting the display projection for minimum/ maximum value of the input signal ❶
`FIL.`	Setting the digital filters ❷
`FOR.`	Setting the decimal point ❸
`iE5.`	Setting the measuring units ❹

Input type	Setting options
DC	① ② ③ ④
AC	① ② ③ ④
PM	① ② ③ ④
DU	① ② ③ ④
OHM	① ② ③ ④
RTD	② ③
T/C	②
F	① ② ③ ④

! *Items „MIN" and „MAX" resp. „SCA" and „OFF" are displayed only when the menu is set to „Manual"*
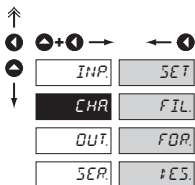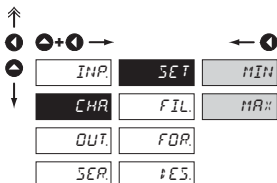*INP > CFG > CH.S > MAN*

4.2.2.1 DISPLAY PROJECTION   `DC` `PM` `DU` `OHM` `F`

`MIN.`	Setting the display projection for minimum value of the input signal

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

`MAX`	Setting display projection for maximum value of the input signal

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

`5CA`	Setting the calibration constant

- *calibration constant is for the conversion of input value to required display value*
- *by setting the minus value the direction of counting changes, i.e. we count down*
- *range: -0,00001...999999, **DEF** = 1*

Only for type „F"

`OFF`	Setting the additive constant „PRESET"

- *shifting the beginning of measurement by a set value which will always be read upon resetting the instrument to zero*
- *range: -99999...999999, **DEF** = 0*

4.2.2.2 SETTING THE DIGITAL FILTERS
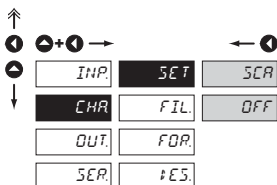
INP.	SET	MOﬗ	OFF
CHR	FIL.	CON.	EﬗP.
OUT.	FOR.		RNﬗ.
SER.	ﬗES.		
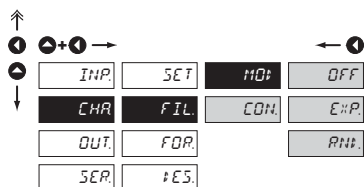
FIL. — **Setting the digital filters**

CON. — Setting the filtration constant

- *this menu is always displayed after selection of a particular type of filter*

OFF — Filters are off

EﬗP — Selection of exponential filter

- *the value is calculated from a number of measurements selected in „CON"*

- *range 2...100*

RNﬗ. — Rounding the measured value

- *it is set by an optional number which determines the projection step (e.g. step 2,5 - 0, 2.5, 5, 7.5, etc.)*

4.2.2.3 SETTING THE DECIMAL POINT

DC **PM** **DU** **OHM** **F**

INP.	SET	000.
CHR	FIL	00.0
OUT.	FOR.	0.00
SER.	ﬗES.	FL.P
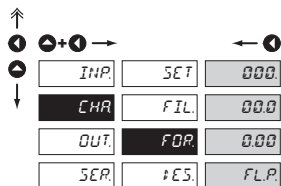
FOR. — **Setting the decimal point**

- *the instrument allows classic projection of a number with placement of the decimal point as well as projection with floating point, allowing to display the number in its most precise form „FL.P."*

000. — Setting the DP

00.0 — Setting the DP

0.00 — Setting the DP

FL.P. — Setting the DP

4.2.2.4 SETTING THE MEASURING UNITS DESCRIPTION   `DC` `PM` `DU` `OHM`   `F`

INP.   SET
CHR   FIL.
OUT.   FOR.
SER.   ꞈE5.
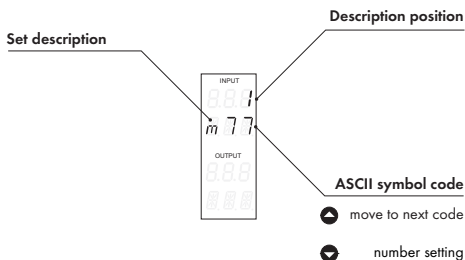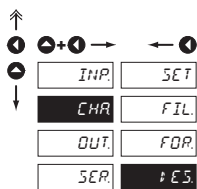
ꞈE5.   **Setting the projection of measuring units on the display**

- the instrument allows to add three symbols to classic numeric formats. The setting is performed by means of shifted ASCII code. Upon the setting the upper number indicates the symbol position, the lower line displays entered symbol on the first position and on the last two positions the code of the relevant symbol from 0 to 95.

  Description is cancelled by entering symbols 00

- instruments with input for temperature measurement display °C as a standard

In „COU" mode in type „F" the projection in format 000000 is divided in two parts, first line (upper) thousands and next line units to hundreds

Description position

Set description

INPUT

m 7 7

OUTPUT

ASCII symbol code

⬆ move to next code

⬇ number setting

Table of symbols is on page 30

4.2.3 CONFIGURATION MODE - OUTPUTS
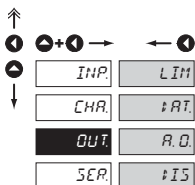
In this menu it is possible to set parameters of the instrument output signals

`LIM`	Setting the type and the switching of limits
`¹AT.`	Setting the type and the parameters of data output
`A.O.`	Setting the type and the parameters of analog output
`¹IS.`	Display projection mode

4.2.3.1.1 LIMITS - TYPE OF RELAY SWITCHING
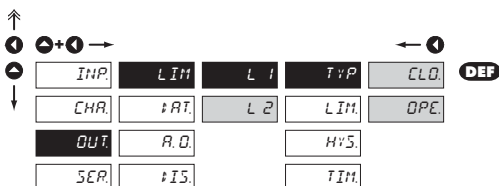
`TYP`	**Setting the type of relay evaluation**
`CLO.`	Relay switches on when condition is met
`OPE.`	Rely switches off when condition is met

! *The process of setting the limit 2 is identical with the setting for Limit 1*

4.2.3.1.2 LIMITS - SETTING THE BOUNDS
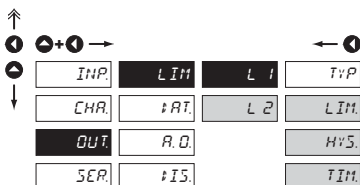
`LIM.`	Setting the bounds for relay switch-on
	- within full display rangee
`HYS.`	Setting hysteresis only in (+) values
	- within full display rangee
`TIM.`	Setting the offset of the limit switch-on
	- in range 0...99,9 s

! *The process of setting the limit 2 is identical with the setting for Limit 1*

4.2.3.2.1 DATA OUTPUT - RATE

INP.	LIM	b t	1.2
CHR.	b RT.	Ab R.	2.4
OUT.	R. O.		4.8
SER.	b IS.		9.6 **DEF**
			19.2
			38.4

	Setting the data output rate
b t	
1.2	Rate - 1 200 Baud
2.4	Rate - 2 400 Baud
4.8	Rate - 4 800 Baud
9.6	Rate - 9 600 Baud
19.2	Rate - 19 200 Baud
38.4	Rate - 38 400 Baud

4.2.3.2.2 DATA OUTPUT - ADDRESS

INP.	LIM	b t	
CHR.	b RT.	Ab R.	
OUT.	R. O.		
SER.	b IS.		

	Setting the instrument address
Ab R.	

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

4.2.3.3.1 ANALOG OUTPUT - TYPE

INP.	LIM	T v P	I 5
CHR.	b RT.	MIN	I 4 **DEF**
OUT.	R. O.	MR x	E 4
SER.	b IS.		I 20
			U 2
			U 10
			FRE.
			OFF

	Setting the analog output type
T v P	
I 5	Type - 0...5 mA
I 4	Type - 4...20 mA
E 0	Type - 4...20 mA with error statement (3,0 mA)
I 20	Type - 0...20 mA
U 2	Type - 0...2 V
U 10	Type - 0...10 V
FRE.	Type - 0,2...2 200 Hz
OFF	The output is off

4.2.3.3.2 ANALOG OUTPUT - RANGE

INP.	LIM	TyP
CHR.	↑AT.	F.MI
OUT.	A.O.	F.MA
SER.	↑IS.	MIN
		MAX
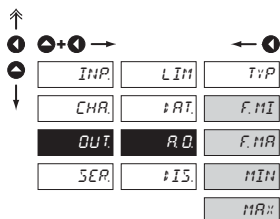
A.O. **Setting the analog output range**

- *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*

F.MI Setting the beginning of the frequency range for item „MIN"

- *range of the setting is 0,2...2 200 Hz*

F.MA Setting the end of the frequency range for item „MAX"

- *range of the setting is 0,2...2 200 Hz*

MIN Assigning the display value to the beginning of the AO range

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

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

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

4.2.3.4   DISPLAY PROJECTION

INP.	LIM	REF.	MAX
CHR.	↑AT.		I ⌐
OUT.	A.O.		OFF
SER.	↑IS.		
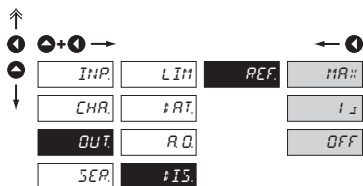
↑IS. **Display projection mode**

REF **Display refresh**

MAX Display value is changing at maximum rate

- *it burdens the processor performance, i.e. in fully equipped transmitter the arithmetic operation may be slowed down*

I ⌐ Display value is being restored 1x per second

OFF Display is off

- *after pressing the control key the display is active after 60 s at max. projection rate*

4.2.4 CONFIGURATION MODE - SERVICE
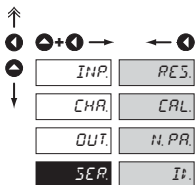
The instrument's service functions are set in this menu

`RES.` Restoration of the manufacture setting and instrument calibration

`CAL.` Input range calibration for „DU" version

`N.PA.` Setting new access password

`Id.` Instrument identification

4.2.4.1 RESTORATION OF MANUFACTURE SETTING
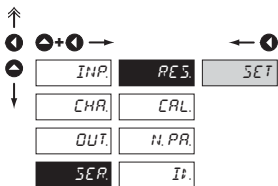
`RES.` **Restoration of the instrument manufacture setting**

- *in case of incorrect setting or calibration it is possible to return to manufacture setting. Prior execution of the changes you will be asked to confirm your selection „YES"*

- *reading the manufacture calibration and original setting of items in the menu (DEF)*

4.2.4.2 INPUT RANGE CALIBRATION `DU`

`INP.`	`RES.`	`MIN`
`CHR.`	`CAL.`	`MAX`
`OUT.`	`N.PA.`	
`SER.`	`It.`	
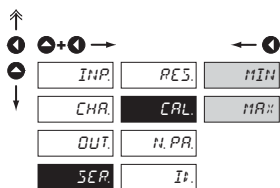
`CAL.` **Input range calibration**

- when MIN is displayed move the potentiometer runner into required minimum position and confirm by „Enter", calibration is confirmed by the „OK" notice
- when MAX is displayed move the potentiometer runner into required maximum position and confirm by „Enter", calibration is confirmed by the „OK" notice

! Before pressing „ENTER" the potentiometer runner has to be at rest

4.2.4.3 SETTING NEW ACCESS PASSWORD

`INP.`	`RES.`
`CHR.`	`CAL.`
`OUT.`	`N.PA.`
`SER.`	`It.`
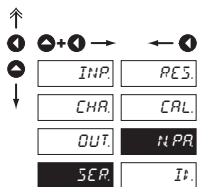
`N.PA` **Setting new access password for „Configuration menu"**

- this option allows to change the numeric code which blocks the access into the instrument „Configuration mode". The range of the numeric code is 0...999

If the code is preset to 000 the access into the menu is free, i.e. without call for its setting

4.2.4.4 INSTRUMENT IDENTIFICATION

`INP.`	`RES.`
`CHR.`	`CAL.`
`OUT.`	`N.PA.`
`SER.`	`It.`
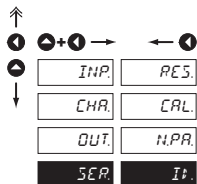
`It.` **Projection of the instrument version**

- the display shows the type identification of the instrument with the number of revision
- instrument name - program version - SW date e.g.: OMX, 100, PM2, 003, 000,

5.   TABLE OF SYMBOLS

The instrument allows to add two descriptive symbols to classic numeric formats (at the expense of the number of displayed places). The setting is performed by means of shifted ASCII code. Upon modification the first two places display the entered symbols and the last two places the code of the relevant symbol from 0 to 95. Numeric value of given symbol 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	1	2	3	4	5	6	7
0		⁊	ʼʼ	¼	⅚	¼	ⅾ	'	0		!	"	#	$	%	&	'
8	᾿	᾿	⁂	✝	'	‥		⁒	8	(	)	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7	16	0	1	2	3	4	5	6	7
24	8	9	ᵛ	⸍	᾿	᾿	‥	7.	24	8	9	:	;	<	=	>	?
32	C	A	B	C	♭	E	F	G	32	@	A	B	C	D	E	F	G
40	H	I	J	K	L	M	N	O	40	H	I	J	K	L	M	N	O
48	P	Q	R	S	T	U	V	W	48	P	Q	R	S	T	U	V	W
56	X	Y	Z	C	\	⅃	⌐	_	56	X	Y	Z	[	\	]	^	_
64	'	a	b	c	d	e	F	G	64	`	a	b	c	d	e	f	g
72	h	ᵹ	ப	k	l	m	n	o	72	h	i	j	k	l	m	n	o
80	P	G	r	⌐	t	ப	v	ʍ	80	p	q	r	s	t	u	v	w
88	ᵡ	ᵞ	z	⸍	┆	⋗	ᵒ		88	x	y	z	{			}	~	

6.   METHOD OF MEASURING OF CJC

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

Measuring thermocouple

OM xxx T/C

Reference thermocouple
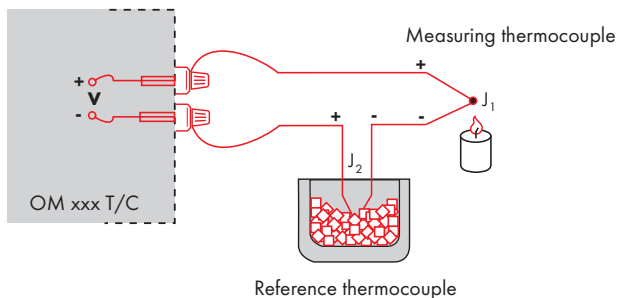
WITH REFERENCE THERMOCOUPLE

■ 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 CJC in the instrument menu to $\mathit{IN\ 2}$ or $\mathit{EX.\ 2}$

■ when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu $\mathit{TCJ.}$ its temperature (applies for setting CJC to $\mathit{EX.\ 2}$)

■ if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CJC to $\mathit{IN\ 2}$. Based on this selection the measurement of the surrounding temperature is performed by a sensor located in the instrument terminal board.

WITHOUT REFERENCE THERMOCOUPLE

■ inaccuracy 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 CJC in the instrument menu to $\mathit{IN\ 1}$ or $\mathit{EX.\ 1}$

■ when measuring temperature without reference thermocouple the error in the measured data may be even 10°C (applies for setting CJC to $\mathit{EX.\ 1}$)

7. DATA PROTOCOL

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

ASCII: 8 bit, no parity, one stop bit

The transfer rate is adjustable in the instrument menu and depends on the control processor used. 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 exchangeable card automatically identified by the instrument.

COMMANDS FOR INSTRUMENT OPERATION

The commands are described in specification you can find at **www.orbit.merret.cz/rs**.
A command consists of a number and a letter, where the letter size is of significance.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

Activity	Type	Protocol		Data transferred								
Data solicitation (PC)	232	ASCII	#	A	A	<CR>						
	485	ASCII	#	A	A	<CR>						
Data transfer (Instrument)	232	ASCII	>	R	SP	D	D	D	D	D	(D)	(D)	<CR>
	485	ASCII	>	R	SP	D	D	D	D	D	(D)	(D)	<CR>
Command tranfer (Instrument) - identi-fication	232	ASCII	#	A	A	1	Y	<CR>				
	485	ASCII	#	A	A	1	Y	<CR>				
Command confirma-tion (Instrument)	232	ASCII	ok	!	A	A	<CR>					
			bad	?	A	A	<CR>					
	485	ASCII	ok	!	A	A	<CR>					
			bad	?	A	A	<CR>					

Legend			
#	35	23H	Beginning of the command
A A		0...31	Two signs of the inst. address (sent in ASCII - decades and units, ex."01")
<CR>	13	0DH	Carriage return
<SP>	32	20H	Space
N P			Number and command - command code
D			Data - usually signs "0"..."9","-","." ; (D) - dp. and (-) may prolong data
R	30H...3FH		Relay status; zero bit corresponds with 1st relay, 1st bit with 2nd relay, etc.
!	33	21H	Positive command confirmation (ok)
?	63	3FH	Negative command confirmation (bad)
>	62	3EH	Beginning of the transmitted data

8. ERROR STATEMENTS

ERROR	CAUSE	ELIMINATION
E. ɒ .U.	display underflow *number is too small (large negative) to be displayed*	change display projection
E. ɒ .O.	display overflow *number is too large to be displayed*	change display projection
E. T.U.	table underflow *number outside tablerange*	change display projection or table range
E. T.O.	table overflow *number outside tablerange*	change display projection or table range
E. I.U.	range underflow (A/D converter) *input signal is smaller than the one allowed by instruments range*	change input signal value
E.I.O.	range overflow (A/D converter) *input signal is larger than the one allowed by instruments range*	change input signal value
E.HW.	some part of the instruments does not function properly	when reported repeatedly send the instrument for repair
E.E.E.	EEPROM error *damaged data in EEPROM*	when reported repeatedly send the instrument for repair
E.ɒ .T.	DATA error *data in EEPROM outside the range*	information about performed automatic data correction in EEPROM
E.C.L.	EEPROM error *memory is blank („DEF" values presetting has initialized)*	„Def" values will be used in emergency but calibration data will be impaired > send for repair

9. TECHNICAL DATA

INPUT

selectable in configuration menu			**DC**
DC 1	±4 mA	< 200 mV	Input 1
	±40 mA	< 200 mV	Input 1
	±400 mV	100 kOhm	Input 2
	±4 V	100 kOhm	Input 2
	±40 V	10 MOhm	Input 3
	±400 V	10 MOhm	Input 3
DC 2	±1 A	< 150 mV	Input 1
	±5 A	< 150 mV	Input 1
	±60 mV	100 kOhm	Input 2
	±150 mV	100 kOhm	Input 2

range is fixed, as per order			**PWR**
Range U:	0...10 V	100 kOhm	Input 2
	0...100 V	10 MOhm	Input 2
	0...150 V	10 MOhm	Input 2
	0...250 V	10 MOhm	Input 2
	0...450 V	10 MOhm	Input 2
Range I:	0...60 mV	100 kOhm	Input 1
	0...150 mV	100 kOhm	Input 1
	0...300 mV	100 kOhm	Input 1
	0...1 A	< 150 mV	Input 1
	0...5 A	< 150 mV	Input 1

selectable in configuration menu			**PM**
	0/4...20 mA	< 400 mV	Input 1
	0...2 V	1 MOhm	Input 2
	0...5 V	1 MOhm	Input 3
	0...10 V	1 MOhm	Input 3

range is fixed, as per order		**OHM**
	0...999 Ohm	
	0...9,99 kOhm	
	0...99,9 kOhm	
	5...105 Ohm	
Connection:	2, 3 or 4 wire	

		RTD
Pt xxxx	-50°...450°C	
Ni xxxx	-50°...250°C	
Type Pt:	100/500/1 000 Ohm, platinum couple s α=0,003850hm/Ohm/°C	
Type Ni:	Ni 1 000/10 000, 5000 ppm/6180 ppm	
Connection:	2, 3 or 4 wire	

selectable in configuration menu		**T/C**
Type:	J (Fe-CuNi)	-200°...900°C
	K (NiCr-Ni)	-200°...1 300°C
	T (Cu-CuNi)	-200°...400°C
	E (NiCr-CuNi)	-200°...690°C
	B (PtRh30-PtRh6)	300°...1 820°C
	S (PtRh10-Pt)	-50°...1 760°C
	R (Pt13Rh-Pt)	-50°...1 740°C
	N (Omegalloy)	-200°...1 300°C

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

		F
Range:	0,02...50 kHz	
Input:	upon contact, TTL, PNP/NPN	
Measuring mode:	counter/frequency	
Function:	data backup, time backup, Preset	
Filtration constant:	0/5/10/100/200 Hz	
Time base:	0,1/0,5/1/5/10 s	
Calibrat. coefficient:	0,01...9999 Hz	
Preset:	0...9999	

PROJECTION

Display:	LCD with blue illumination,
	2x 3 symbols + 2x description (3 symbols)
Projection:	-99...999
DP:	adjustable - in programming mode

INSTRUMENT ACURACY

TC:	100 ppm/°C	
Accuracy:	±0,2 % of range + 1 digit	
	±0,3 % of range + 1 digit	**T/C, PWR**
	±0,05 % of range + 1 digit	**F**
Resolution:	0,1°/1°C	**RTD**
	1°C	**T/C**
Rate:	0,5 - 1,2 - 2,5 - 5 - 10 - 20 - 40 - 80 measurements/s	
Overload capacity:	10x (t < 100 ms), 2x (long-term)	
Digital filter	adjustable in configuration menu	
Compensation of conduct: max. 20 Ohm		**RTD**
Comp.of CJC:	adjustable	**T/C**
	0°...98°C or automatic (99)	
Functions:	Tare - display resetting	
	Hold - stop measuring (upon contact)	
	Lock - control keys locking	
OM Link:	Company communication interface for operation, setting and update of instrument SW	
Watch-dog:	reset after 25 ms	
Calibration:	at 25°C and 40 % r.h.	

* values apply for resistance load

OUTPUTS

Analog:	isolated,
	programmable w/ resolution of max. 12 bit
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, on request ±5 V/±10 V
Current:	0...5/20 mA/4...20 mA, on request ±20 mA
	- compensation of conduct up to 450 Ohm
Corrugation:	5 mV of residual corrugation at output voltage 10 V
Frequency:	0,2...2 200 Hz
	isolated, programmable, open collector with the option of external supply (max. 40 V) vie intervnal resistance (5k6)

COMPARATOR

Type:	digital, adjustable in menu
Limits:	-99...999
Hysteresis:	0...999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact
	(230 VAC/30 VDC, 3 A)*
	contact switching on < 50 ms
Relays:	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:	1 200...38 400 Baud
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication,
	addressing (max. 31 instrument)

EXCITATION

Adjustable:	12...24 VDC/20 mA, isolated

 - cannot be combined with data output

POWER SUPPLY

Options:	24/110/230 VAC, 50/60 Hz, ±10 %, 5 VA
	10...30 VDC/max. 150 mA, isolated
Protection:	melting fuse inside the instrument
	VAC (T 80 mA), VDC (T 630 mA)

MECHANIC PROPERTIES

|	
Material:	PP 66 (UL 94 -V0), blue
Dimensions:	113 x 98 x 35 mm
Installation:	to DIN rail, width 35 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
Protection:	IP20
Overvoltage categ.:	EN 61010-1, A2
Insulation resist.:**	for pollution degree II, cat. measuring III.
	AC power supply > 600 V (BI), 300 V (DI)
	DC power supply > 500 V (BI), 250 V (DI)
EMC:	EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 8, 11;
	EN 550222, A1, A2

*** BI - Basic insulation, DI - Dual insulation*

10. INST.DIMENSIONS AND INSTALLATION

Front view

Side view

97 mm
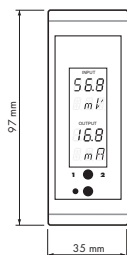
35 mm

Installation to DIN rail of 35 mm width

113 mm
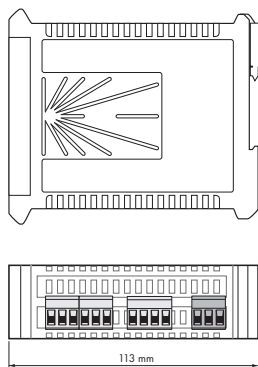
11. CERTIFICATE OF GUARANTEE

Product	**OMX 100**	**DC**	**PWR**	**PM**	**DU**	**RTD**	**T/C**	**OHM**	**F**

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 guarantee and post-guarantee repairs unless provided for otherwise.

Stamp, signature

DECLARATION OF CONFORMITY

Assessment of conformity pursuant to Section 12, par. 4 b, d of Act No. 22/1997 Coll.

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

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

The manufacturer declares at its full responsibility that the product presented hereunder meets all technical requirements, is safe for use when used under the terms and conditions determined by Orbit Merret, spol.s r.o., and that our company has taken all steps to ensure conformity of all products of the type referred to below, which are being brought out to the market, with technical documentation and requirements of the appurtenant Ordinance.

Product: Digital transmitter to DIN rail

Type: **OMX 100**

Version: DC, PM, PWR, RTD, T/C, DU, OHM, F

Conformity is assessed pursuant to the following standards:

Electr. safety:	EN 61010-1

EMC: EN 50131-1, chapt. 14 and chapt. 15
EN 50130-4, chapt. 7   EN 61000-4-11
EN 50130-4, chapt. 8   EN 61000-4-11
EN 50130-4, chapt. 9   EN 61000-4-2
EN 50130-4, chapt. 10   EN 61000-4-3
EN 50130-4, chapt. 11   EN 61000-4-6
EN 50130-4, chapt. 12   EN 61000-4-4
EN 50130-4, chapt. 13   EN 61000-4-5
EN 50130-5, chapt. 20
prEN 50131-2-1, article 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, chapt. 5 and chapt. 6.

As evidence serve the protocols of authorised and accredited organisations:
VTÚE Praha, examination laboratory No. 1158, accredited by ČIA
VTÚPV Vyškov, examination laboratory No. 1103, accredited by ČIA

Prague, 18. 12. 2003   Miroslav Hackl v.r.
                                                                      General manager