USER MANUAL

OMX 103UNI

DUAL CHANEL USER-CONFIGURABLE UNIVERSAL SIGNAL CONVERTOR

DC VOLTMETER/AMMETER
PROCESS MONITOR
OHM METR
TEMPERATURE DISPLAY FOR Pt 100/500/1 000
TEMPERATURE DISPLAY FOR Ni 1 000/10 000
TEMPERATURE DISPLAY FOR THERMO COUPLES
DISPLAY FOR LINEAR POTENTIOMETERS

orbit merret

Outstanding Measurement Value

SAFETY INSTRUCTIONS

Please read and observe the enclosed safety instructions carefully!

Installation, all operations, maintenance and service must be carried out by qualified personnel only and in accordance with the enclosed information and safety regulations.

The manufacturer is not responsible for any damage caused by improper installation, configuration, maintenance and service of the device.

The device must be installed correctly according to the actual application. Improper installation may cause malfunction, which may result in damage to the unit or an accident.

The device uses dangerous voltage that can cause a fatal accident. The unit must be disconnected from the power supply before starting troubleshooting (in case of malfunction) or before dismantling the unit. For safety information, EN 61 010-1 + A2 must be observed.

When removing or inserting an electronics card, observe the safety instructions and follow the recommended procedures. Disconnect the unit from power supply before inserting / extracting any electronics cards.

Do not attempt to repair or modify the device yourself. In case of malfunction the device must be dismounted and submitted to the manufacturer for repair.

These devices should be protected by either individual or shared fuses (circuit breakers)!

The device is not intended for installation in explosive areas. Use the device only outside the explosive areas.

TECHNICAL SPECIFICATIONS

Instruments of the omx 103 series comply with the EU 2014/30/EU a 2014/35/EU directive and meet the following European standards:

EN 61010-1	Electrical safety
EN 61326-1	Electrical measuring, control and laboratory equipment - EMC requirements "Industrial Area"
IEC 980: 1993, c. 6	Seismic resistance

The device is suitable for unlimited use in agricultural and industrial areas.

⚠ DANGER ⚠	⚠ WARNING ⚠	⚠ ATTENTION
RISK OF ELECTRIC SHOCK - Disconnect all power supply and live wires before servicing.	**RISKS ASSOCIATED WITH USE** - Do not use this product in a safety critical system. - Do not disassemble, repair or modify the product. - Do not use the product outside the recommended operating conditions.	**RISKS ASSOCIATED WITH USE** - Install a 100 mA fuse
Failure to follow this instruction will result in death or serious injury.	**Failure to follow these instructions may result in death, serious injury, or damage to the equipment**	**Failure to observe this precaution could result in personal injury or equipment damage.**

This electrical equipment may be installed, operated and maintained only by qualified personnel.
ORBIT MERRET assumes no responsibility for any consequences arising from the use of this equipment.

1. CONTENTS 3

2. DEVICE DESCRIPTION 4

3. CONNCECTION 6

Device connection 6
OM Link connection via USB 8
Connection of individual terminals 9
Examples of sensor connection 12

4. DEVICE SETTING 14

Front panel layout 15
Symbols used in this user manual 16
Setting of decimal point and of negative sign (-) 16
Functions of keys 17

5. "LIGHT" MENU 18

5.0 "LIGHT" menu entry 20
Input setting - Type "DC" 22
Input setting - Type "PM" 24
Input setting - Type "OHM" 26
Input setting - Type "RTD - Pt" 28
Input setting - Type "RTD - Ni" 30
Input setting - Type "RTD - Cu 32
Input setting - Type "T/C" 34
Input setting - Type "DU" 36
Limits 38
Analogue output 40
Language selection 42
Access password 42
Device identification 43

6. "PROFI" MENU 44

6.0 "PROFI" menu entry 44
6.1 "PROFI" menu - INPUT
6.1.1 Reset of internal values 46
6.1.2 Input Configuration 47
6.1.3 Input 1 setting 50
6.1.4 Input 2 setting 58
6.1.5 Functionality of external control inputs 59
6.2 "PROFI" menu - CHANNELS
6.2.1 Channel 1 parameters (filters, decimal point, units) 61
6.2.2 Channel 2 parameters 65
6.2.3 Math functions 66
6.2.4 MIN/MAX value evaluation 70
6.3 "PROFI" menu - OUTPUT
6.3.1 Limits 72
6.3.2 Data output selection 76
6.3.3 Analogue output selesction 78
6.3.4 LCD bakclight option 79
6.4 "PROFI" menu - SERVICE
6.4.1 Real Time Clock setting (RTC) 80
6.4.2 Factory settings restoration 81
6.4.3 Language selection 82
6.4.4 New access password 83
6.4.5 Device identification 83

7. "USER" MENU 84

7.0 Configuration of "USER" menu 84

8. COLD JUNCTION COMPENSATION 86

9. DATA PROTOCOL 87

10. ERORR CODES 88

11. TABLE OF CHARACTERS 89

12. TECHNICAL DATA 90

13. DIMENSIONS AND MOUNTING INSTRUCTIONS 92

14. WARRANTY CERTIFICATE 93

2.1 Description

The OMX 103 series are DIN rail mountable programmable transducers designed for maximum convenience and user convenience. Available versions are UNI (universal), DC (DC current and voltage), PWR (power), UQC universal quadrature counter and T (load cell).

Type OMX 103UNI is a multifunctional dual-input device with the possibility of configuration for 8 different input variants easily configurable in the device menu.

The OMX 103 is based on a single-chip microcontroller with 24-bit A / D converter, which provides very good accuracy, stability and easy operation.

VERSIONS AND MEASURING RANGES

UNI	1 or 2 individual isolated inputs	
	DC	±30/±60/1000 mV; ±20/±40/±80 V; ±90/±180 mA
	PM	±5/±20 mA/4...20 mA; ±2/±5/±10 V
	OHM	0...10/30/150/300 Ω/0...1,5/3/15/30 kΩ
	Pt	Pt 50/100/500/1000
	Cu	Cu 50/100
	Ni	Ni 1 000/10 000
	T/C	J/K/T/E/B/S/R/N/L
	DU	Linear potentiometer (min. 500 Ω)

CONFIGURABLE PROJECTION

To be selected:	input type and measuring range
Configuration:	standard - projection setting for both endpoints of input range
	teach-in - projected endpoints of input range can be assigned to any two values of (unknown) input signal.
	manual - projection setting for both set endpoints of input range
Projection:	-99...999

ANALOGUE OUTPUT

Type:	isolated, user configurable, 16 bit resolution, rate < 1 ms
Quantity:	1...4
Ranges:	0...2/5/10 V, ±10 V, 0...5 mA, 0/4...20 mA

COMPENSATION

Leads (RTD, OHM):	2 -wire compensation can be realised in the device menu
Probe (RTD):	internal connection (resistance of leads inside the temperature probe)
Cold junction (T/C):	manual or automatic. Selection of thermocouples as well as the cold junction compensation can be made in the menu. This could be set by user, or be automatic (temperature of screw terminals)

LINEARIZATION

Linearization:*	linear interpolation in 177 points (possible only with Link SW)

DIGITAL FILTERS

Floating average:	from 2...30 measurements
Exponent. average:	from 2...100 measurements
Arithmetic average:	from 2...100 measurements
Rounding:	setting the rounding step for the display

** only for input types DC, PM, DU*

MATHEMATIC FUNCTIONS

Min/Max. vale:	preserves min./max. values reached during a measurement
Tare:	is used to reset the display to zero even when the input signal does not correspond to zero
Peak value:	display projects only max. or min. value
Math operations:	polynomial, 1/x, logarithmic, exponential, power, root, sin x and mathematic operations between inputs - sum, multiple and ratio

EXTERNAL CONTROLS

Lock:	front panel keys are blocked
Hold:	freezing the display/instrument
Tare:	applying tare/resetting tare
Resetting Min/Max:	resetting of Min/Max value

Controls

Device is controlled by two keys located on the front panel or by OM Link SW. Settings can be realised in three levels.

LIGHT **Simplified menu**
- contains only the most essential menu items that are necessary for setting up the device. It can be password protected.

PROFI **Complete menu**
- contains all menu items and it can be password protected

USER **User define menu**
- some menu item (LIGHT/PROFI) can be included into this menu. Access rights to each menu may be assigned (to view only, or to edit)
- no password access

All configuralbe parameters are stored in EEPROM memory (remain stored even after power off).

OMLINK All settings may be realised via PC' USB interface using our free to download SW called OM Link.

OM Link „Basic" provides for connection of 1 ORBIT MERRET device to 1 PC. OM Link also makes it possible for the measured values to be visualised and archived in the PC. „OM Link Standard" does exactly the sam without the number of OM devices being limited.

Options

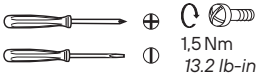
Comparators (in the form of relays or open collectors), are designed for monitoring one to six limit values. The user can select the limit mode: LIMIT / DOSE / FROM-TO. Limits have adjustable hysteresis in the full range of the displayed value and an optional switch-on delay in the range of 0... 99.9 s. Reaching the set limits is signalled by LEDs and at the same time by actuating the relevant relay.

Data outputs Due to their speed and accuracy, data outputs are suitable for transferring measured data to other displays, or directly to control systems. We offer isolated RS 232 and RS 485 data outputs with ASCII, DIN MessBus and MODBUS RTU protocol, Profibus DP communication card or Ethernet.

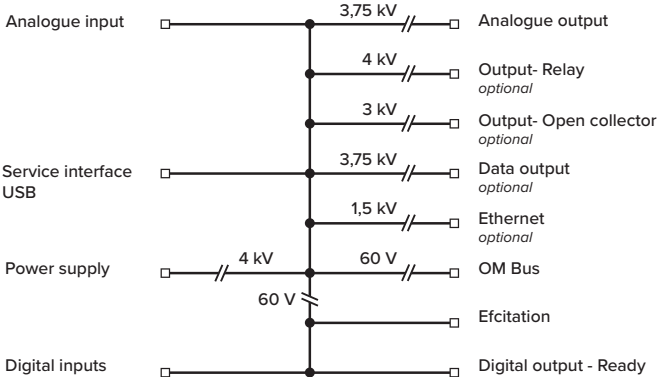
3.1 Connection

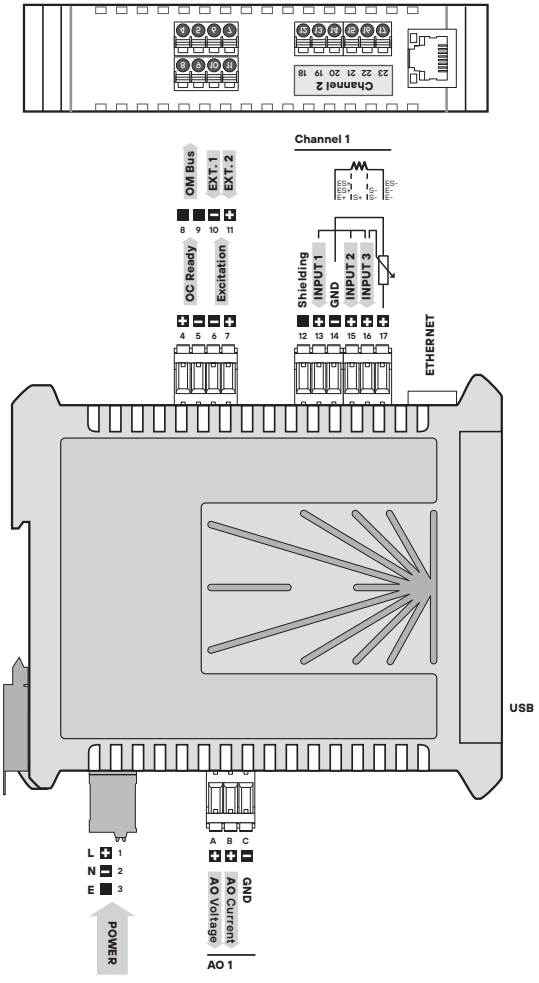
Power supply leads should not be in the vicinity of the low voltage input signals.
Contactors, high power motors and other power elements should not be in the vicinity of this device.
Input signal leads (measured value) should be sufficiently far away from all power lines and appliances. If this cannot be ensured, a grounded shielded cable (terminal E) must be used.
This device has successfully passed tests according to the industry standards, however we still recommend that you observe the above guidelines.

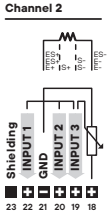
■ Leads connection

①	Connector pitch	3,5 mm	5 mm
②	mm *in*	mm *in.* 8 *0.32*	mm *in.* 8 *0.32*
	mm^2 / AWG	0,05...1,5 / 30...14	0,05...2,5 / 30...12
③	 1,5 Nm *13.2 lb-in*	Ø 2,5 mm *0.1 in*	Ø 3,5 mm *0.14 in*

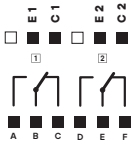
■ Galvanic isolation



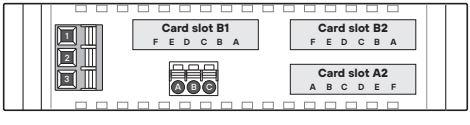




Limits



Data output



Marking of outputs in the menu	
A2	AV. 2 • RS. 1 • LIM. 1, 2
B1	AV. 3 • LIM. 3, 4
B2	AV. 4 • RS. 2 • LIM. 5, 6

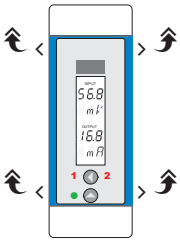
Setting via USB interface

Use of OM Link software is recommended for more convenient setting of the converter. Use a USB to micro USB cable to connect to your computer.

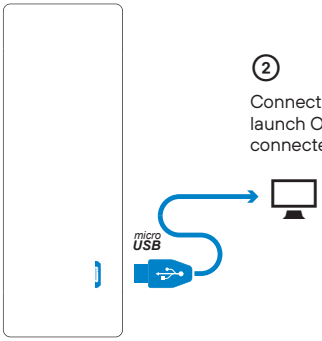
The OM Link SW can be downloaded free of charge at *www.merret.cz/produkty/software/om-link*

There is a microUSB connector located under the front cover. To access the connector, the cover needs to be removed.

USB cable connection



① Gently pry open the front cover in the areas indicated in the picture and remove it.



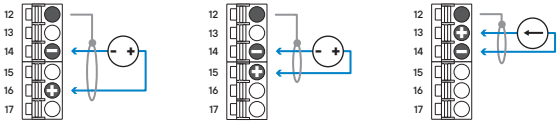
② Connect to PC using a USB to microUSB cable and launch OM Link SW. Make sure input signal is not connected!

③ After disconnecting from PC reinstall the front cover

Both MicroUSB and OM Link connectors are galvanic connected to the input!
It is necessary to use an isolated USB cable if the input signal is connected
RISK OF COMPUTER DAMAGE

DC input signal connection

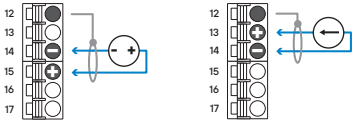
This input card can be inserted also into Channel 2 slot



Range		DC
±30 / ±60 / ±1000 mV	Input 3	14
±20 / ±40 / ±80 V	Input 2	13
±90 / ±180 mA	Input 1	11

Process Monitor (PM) input signal connection

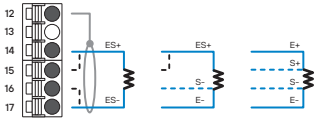
This input card can be inserted also into Channel 2 slot



Range		PM
±5 / ±20 / 4...20 mA	Input 1	11
±5 / ±10 V	Input 2	13

OHM, Pt, Ni, Cu input signal connection

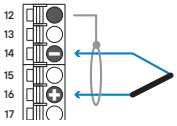
This input card can be inserted also into Channel 2 slot



In case of 2-wire or 3-wire connection it is essential to interconnect unconnected terminals (14+15/16+17 or 14+15).
This rule also applies to Channel 2

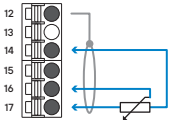
Thermocouple (T/C) input signal connection

This input card can be inserted also into Channel 2 slot



Linear potentiometer (DU) connection

This input card can be inserted also into Channel 2 slot



Linear potentiometer, R > 500 Ω

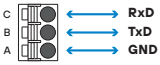
Analogue output connection

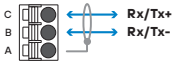
This output card can be inserted into A2 and B2 slots

Range	PM
0...5 mA	AO - Current **B**
0...20 mA	AO - Current **B**
4...20 mA	AO - Current **B**
0...2 V	AO - Voltage **A**
0...5 V	AO - Voltage **A**
0...10 V	AO - Voltage **A**
±10 V	AO - Voltage **A**

Data output connection

This output card can be inserted into A2 and B2 slots





RS 232

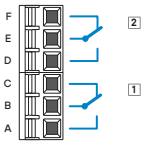
- One OMX 103 to one PC communication
- maximum cable length is not to exceed 15 m
- twisted cable AWG28 /0,08 mm^2 is recommended

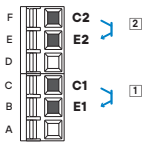
RS 485

- up to 32 OMX 103 can be connected to one PC
- maximum cable length is not to exceed 500 m
- twisted cable AWG28 /0,08 mm^2 is recommended
- the last device on the line must have a terminating resistor connected to the RS card, a shorting jumper must be fitted

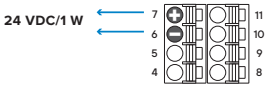
Relay output and Open collector output connection

This output card can be inserted into A2, B1 and B2 slots



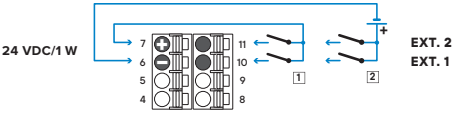


Sensor excitation connection



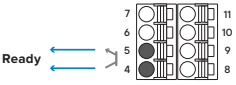
Sensor excitation is of fixed voltage. It is galvanic isolated.
For connection examples see page 12

External controls connection



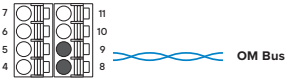
1 - inputs are controlled by dry contact
2 - inputs are controlled by 24 VDC

Connection of signal Ready



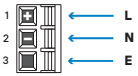
Output is active is the system is **ok**
(Open collector 30 VDC/100 mA)

Connection of OM Bus



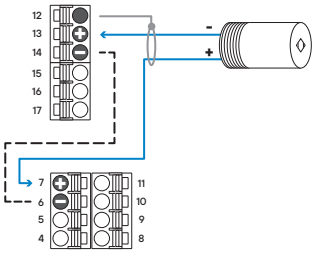
Wires are interchangeable, their polarity is unimportant

Power supply



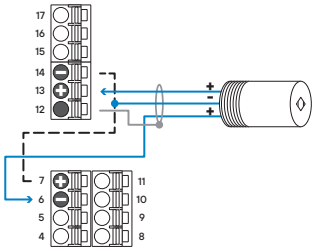
Voltage ranges are defined by hardware, not user selectable
Always check the device label for correct voltage before connecting the power supply.
Grounding wire must be connected to terminal "E" at all times.
RISK OF ELECTRIC SHOCK

■ Example connection of a 2-wire sensor with current signal output powered by instrument's excitation



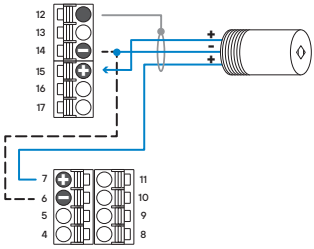
2-wire sensor with 4...20 mA output powered via the current loop by the convertor's own 24V sensor excitation

■ Example connection of a 3-wire sensor with current signal output powered by instrument's excitation



3-wire sensor with 4...20 mA output powered by the convertor's own 24V sensor excitation

■ Example connection of a 3-wire sensor with voltage signal output powered by instrument's excitation



3-wire sensor with 0...10 V output powered by the convertor's own 24V sensor excitation

SETTING **LIGHT**

For trained users
Contains items necessary for basic instrument setting
Password protected access
Items from LIGHT menu can be incorporated into **USER** menu
Linear menu structure

SETTING **PROFI**

For experienced users
Contains all menu items
Password protected access
Items from PROFI menu can be incorporated into **USER** menu
Tree menu structure

SETTING **USER**

To be used by machine operators
Menu items are selected by user (from Profi/Light menus) as needed
Access is not password protected
Optional menu structure either tree (PROFI) or linear (LIGHT)

4.1 Setting

Besides the possibility of configuration from PC via the microUSB interface, the OMX 103 can also be configured by two control keys located on the front panel. Configuration can be performed in one of these three modes

LIGHT **Basic programming menu**
- contains only menu items essential for basic settings and can be numeric password protected

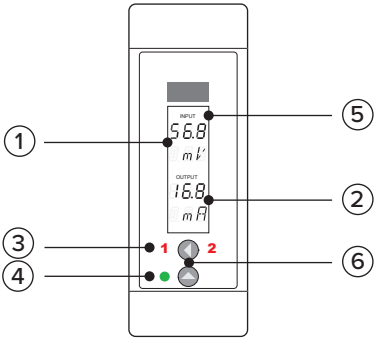
PROFI **Detailed programming menu**
- contains all menu items and can be protected by numeric password

USER **Customised programming menu**
- any menu item can be selected to form USER menu. These items can have different access rights (viewable or editable)
- no password protection

Complete device settings can be done via USB connection. The SW is freely available at www.orbit.merret.cz. Another possibility to connect to PC is via RS 232 or RS 485 data output card, provided the OMX 103 is fitted with one (optional).

Version „Basic" of OM Link SW enables you to connect one OMX103 to one PC. It is possible to visualise and also record measured data on PC. There is no quantity restriction on the number of OM devices connected to one PC in SW OM Link "Standard".

■ Description of the display and control buttons



① **Input value**
plus 3-characters used for displaing units

② **Output value**
plus 3-characters used for displaing units

③ **Comparator status - red LED**
ON digit is on
OFF digit is off
OFF digit is flashing, comprator action is restricted (time delay)

④ **Device status - green LED**
ON LED is on
ON LED is flasing - error message
OFF LED is off

⑤ **Tare indication - Tare**
when Tare is active, sign "INPUT" flashes

⑥ **Control keys**

Symbols used in this user manual

DC PM DU OHM RTD T/C	indicates settings for the given type of instrument
DEF	default settings
286	a taller and flashing digit indicates which position is being edited
MIN	inverted triangle indicates a menu item which can be included into USER menu
CON.	broken line indicates a dynamic menu item, i.e. it is available only in particular selection/version
	press both keys simultaneously
2s	press both keys simultaneously for more than 2 seconds
	if this key is pressed, the newly set parameter will NOT be stored
	if this key is pressed, the newly set parameter WILL be stored
30	continues on page 30 (go to page 30)

Decimal point and the negative sign

Decimal point

Position of the decimal point is edited by key ◀ When the highest decade is exceeded, the entire display starts to flash. Position is then determined by pressing the ◀ key.

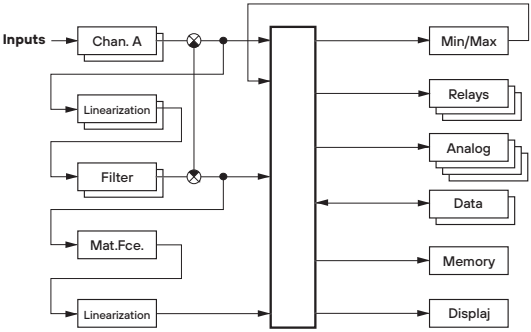
Negative sign

Setting of the negative sign is performed by key ◀ on the higher decade. When editing this item, figures change in a numeric sequence 0, 1, ..., 9, „-“, 0, 1

Functions of control keys

Key symbol	Measurement	Menu	Setting of number/selection
	switching inputs/outputs	back to previous level	go to higher decade
	access into USER menu	go to next item	go up
	access into LIGHT menu	confirm selection	confirm setting/selection
	access into PROFI menu		

Flow chart of measured signal



SETTING **LIGHT**

For trained users
Contains items necessary for basic instrument setting
Password protected access
Items from LIGHT menu can be incorporated into **USER** menu
Linear menu structure

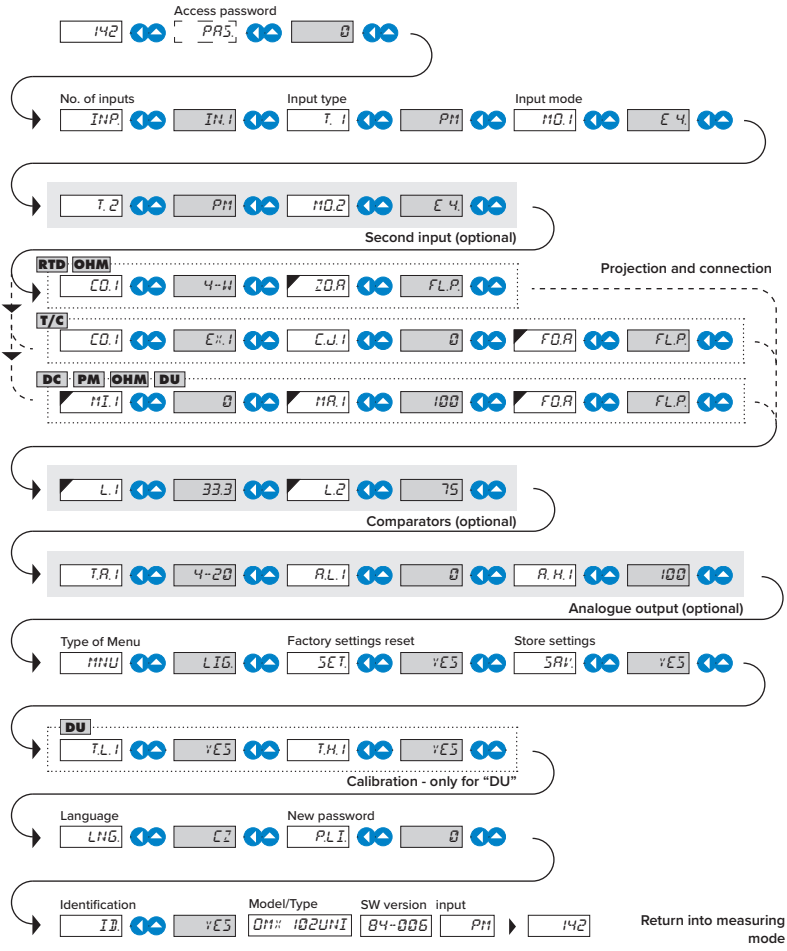
5.0 Setting "LIGHT"

LIGHT **Basic programming menu**

- contains menu items essential for basic instrument setting and is protected by user defined numeric password
- designed for trained users

■ Entry into "LIGHT" menu

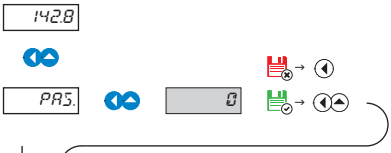
- entering **LIGHT** menu
- password protected access
- in case the access password in menu item ***SER. > C. M. > LIG.*** is set to **0**, access is granted without the need to enter any password. This is the default setting.



If there is a pause during configuration exceeding 60s, the device automatically exits configuration mode and returns into measuring mode.

DEF Default setting

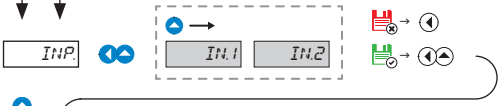
Password	0
Menu	LIGHT
USER menu	Off



Parameter	Display	User	Setting	Description
Password	PAS.		0 ... 999	Enter password to access menu
Access unrestricted	0		0	Free access to menu • Password item skipped. First menu item appears
Access protected by password	1		1 ... 999	Menu access is protected by numeric password

Example setting Password - 42 > **42**

0 › ▲ › 1 › ▲ › 2 › ◀ › 02 › ▲ › 12 › ▲ › 22 › ▲ › 32 › ▲ › 42 › ◀▲ › INP

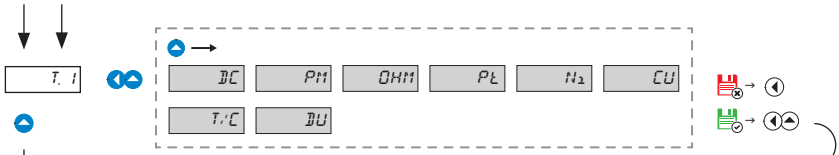


Parameter	Display	User	Description
Number of inputs	INP.		Number of active inputs
One input	IN.1		Input 1 active
▲ **Two inputs**	IN2		Inputs 1 and 2 active DEF

Example setting No. of inputs - 1 input > **IN.1**

IN2 › ▲ › IN.1 › ◀▲ › T. 1

This dynamic item only appears in the 2-input version



Parameter	Display	User	Description
Type	T. 1		Default setting
DC Voltmeter	DC		
Process monitor	PM	DEF	
Ohmmeter	OHM		
Thermometer Pt xxx	PŁ		
Thermometer Ni xxx	Ni		
Thermometer Cu xxx	CU		
Thermometer T/C	T/C		
Display for lin. potentiometer	DU		

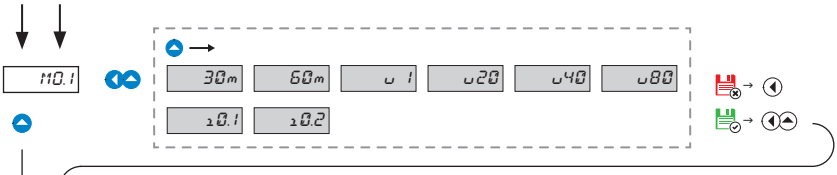
Example setting Type - Thermometer pro Pt 100 > **PT**

PM › ▲ › OHM › ▲ › PŁ › ◀▲ › MQ.1

There are dynamic menu items associated with various types of inputs. See the following pages:

DC	page 22
PM	page 24
OHM	page 26
Pt	page 28
Ni	page 30
Cu	page 32
T/C	page 34
Du	page 36

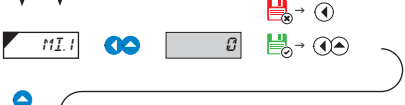
MEASURING MODE **DC**



Parameter	Display	User	Description
Measuring range	M0.1		Measuring range selection
±30 mV	30m		
±60 mV	60m		DEF
±1 V	u 1		
±20 V	u20		
±40 V	u40		
±80 V	u80		
±90 mA	i0.1		
±180 mA	i0.2		

Example setting Range ±40 V > **u40**

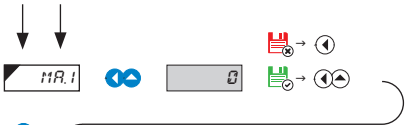
60m › ▲ › u 1 › ▲ › u20 › ▲ › u40 › ▲▼ › M1.1



Parameter	Display	User	Setting	Description
Display value corresponding to minimum input signal	M1.1		-99 ... 999	Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position . DEF 0

Example setting Minimum for 0 V, 0 > **0**

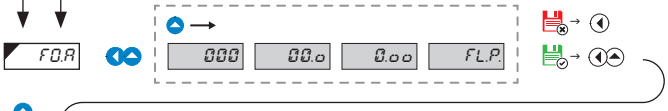
0 › ▲▼ › MA1



Parameter	Display	User	Setting	Description
Display value corresponding to maximum input signal	MA.1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position • DEF 100

Example setting Maximum for 40 V, 500 > **500**

100 › 180 › 200 › 300 › 400 › 500 › FOR



Parameter	Display	User	Description
Decimal point	FOR		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point DEF

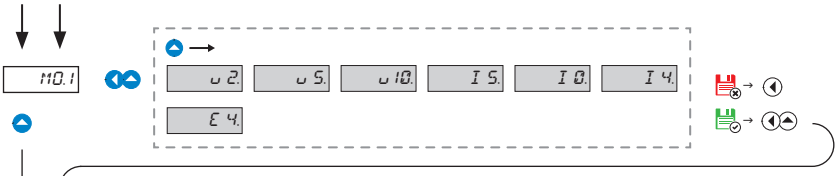
Example setting No decimal point > **000**

AUT › 000 › SET

** The following menu item is dynamic and it depends on options fitted*

38

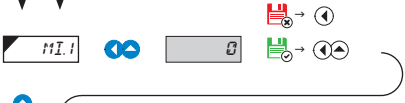
MEASURING MODE **PM**



Parameter	Display	User	Description
Measuring range	M0.1		Measuring range selection
±2 V	u 2.		
±5 V	u 5.		
±10 V	u 10.		
±5 mA	I 5.		
±20 mA	I 0.		
4...20 mA	I 4.	DEF	
4...20 mA	E 4.		With error message „underflow" when input signal is below 3,6 mA

Example setting Range 4...20 mA with error message > **E. 4**

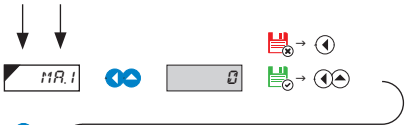
I 4 › ▲ › E 4 › ◀▲ › M1.1



Parameter	Display	User	Setting	Description
Display value corresponding to minimum input signal	M1.1		-99 ... 999	Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position • DEF 0

Example setting Minimum for 0 mA, -25 > **-25**

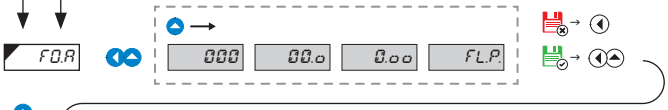
0 › ▲ › 1 › ▲ › 2 › ▲ › 3 › ▲ › 4 › ▲ › 5 › ◀ › 0.5 › 1.5 › ▲ › 2.5 › ◀ › 0.25 › ▲ › 1.25 › ▲ › 2.25 › ▲ › 3.25 › ▲ › 4.25 › ▲ › 5.25 › ▲ › 6.25 › ▲ › 7.25 › ▲ › 8.25 › ▲ › 9.25 › ▲ › -.25 › ◀▲ › MR1



Parameter	Display	User	Setting	Description
Display value corresponding to maximum input signal	MA.1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position • DEF 100

Example setting Maximum for 20 mA - 250 > **250**

100 › 100 › 110 › 120 › 130 › 140 › 150 › 150 › 250 › FOA



Parameter	Display	User	Description
Decimal point	FOA		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point DEF

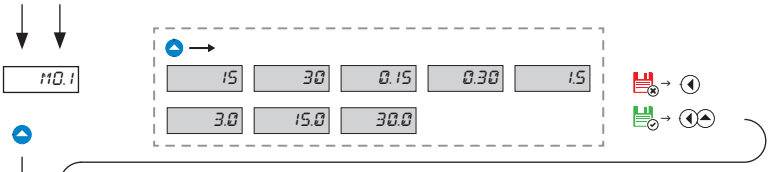
Example setting No decimal point > **000**

AUT › 000 › SET

** The following menu item is dynamic and it depends on options fitted*

38

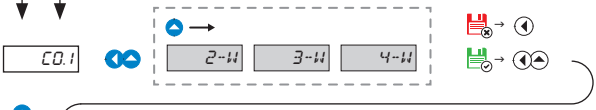
MEASURING MODE **OHM**



Parameter	Display	User	Description
Measuring range	M0.1		Measuring range selection
15 Ω	15		DEF
30 Ω	30		
150 Ω	0.15		
300 Ω	0.30		
1,5 kΩ	1.5		
3,0 kΩ	3.0		
15,0 kΩ	15.0		
30 kΩ	30.0		

Example setting Range 300 Ω > **0.3**

0.1 › ▲ › 0.3 › ◀▲ › C0.1



Parameter	Display	User	Description
Type of connection	C0.1		Selecting the type of sensor connection
2-wire	2-W		DEF
3-wire	3-W		
4-wire	4-W		

Example setting Connection - 3-wire > **3-W**

2-W › ▲ › 3-W › ◀▲ › M1.1

Parameter	Display	User	Setting	Description
Dispaly value corresponding to minimum input signal	MI.1		-99 ... 999	Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position . DEF 0

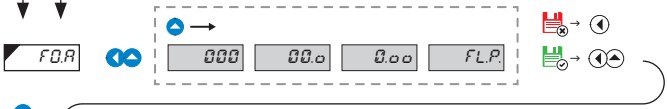
Example setting Minimum for 0 Ω > **0**

0 › ◀▲ › MA.1

Parameter	Display	User	Setting	Description
Dispaly value corresponding to maximum input signal	MA.1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position . DEF 100

Example setting Maximum for 300 Ω > **320**

100 › ◀ › 100 › ▲ › 110 › ▲ › 120 › ◀ › 120 › ▲ › 220 › ▲ › 320 › ▲ › ◀▲ › FOR



Parameter	Display	User	Description
Decimal point	FOR		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
▲ 00,0	00.0		One decimal place
▲ 0,00	0.00		Two decimal places
▲ **Floating decimal point**	FLP		Floating decimal point DEF

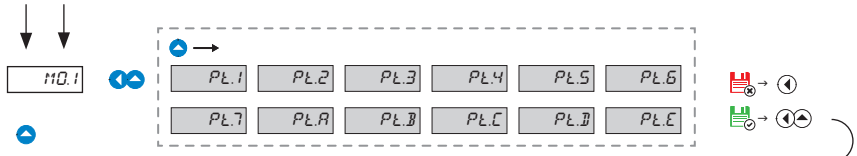
Example setting No decimal point > **000**

AUT › ▲ › 000 › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

38

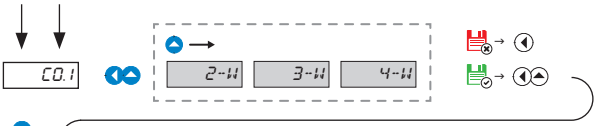
MEASURING MODE **Pt**



Parameter	Display	User	Description		
Measuring range	M0.1		Measuring range selection		
	EU - Pt 100 130°C	Pt1	-50°...130°C	Pt 100, 3 850 ppm/°C	DEF
▲	**EU - Pt 100** 560°C	Pt2	-50°...560°C	Pt 100, 3 850 ppm/°C	
▲	**EU - Pt 500** 560°C	Pt3	-50°...560°C	Pt 500, 3 850 ppm/°C	
▲	**EU - Pt 1000** 130°C	Pt4	-50°...130°C	Pt 1000, 3 850 ppm/°C	
▲	**EU - Pt 1000** 560°C	Pt5	-50°...560°C	Pt 1000, 3 850 ppm/°C	
▲	**US - Pt 100** 130°C	Pt6	-50°...130°C	Pt 100, 3 920 ppm/°C	
▲	**US - Pt 100** 450°C	Pt7	-50°...450°C	Pt 100, 3 920 ppm/°C	
▲	**RU - Pt 50** 550°C	PtA	-200°...550°C	Pt 50, 3 9 10 ppm/°C	
▲	**RU - Pt 50** 1100°C	PtB	-200°...1100°C	Pt 50, 3 910 ppm/°C	
▲	**RU - Pt 50** 130°C	PtC	-200°...130°C	Pt 100, 3 910 ppm/°C	
▲	**RU - Pt 100** 550°C	PtD	-200°...550°C	Pt 100, 3 910 ppm/°C	
▲	**RU - Pt 100** 1100°C	PtE	-200°...1100°C	Pt 100, 3 910 ppm/°C	

Example setting Range - EU, Pt 100, 130°C > **Pt.1**

Pt.1 › ▲▼ › C0.1

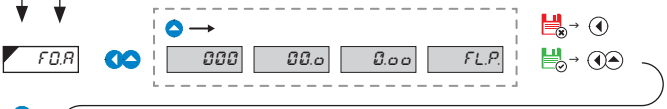


Parameter	Display	User	Description
Type of connection	CO.1		Selecting the type of sensor connection
2-wire	2-W	DEF	
3-wire	3-W		
4-wire	4-W		

Example setting Connection - 3-wire > **3-W**

2-W › ▲ › 3-W › ◀▲ › FOR

Compensation of a 2-wire connection can be performed in PROFI menu, see page 53



Parameter	Display	User	Description
Decimal point	FOR		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point DEF

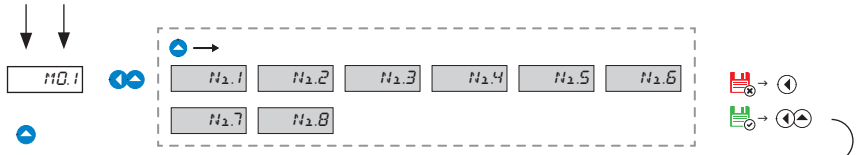
Example setting With one decimal place > **00.0**

FLP› ▲ › AUT› ▲ › 000 › ▲ › 00.0 › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

38

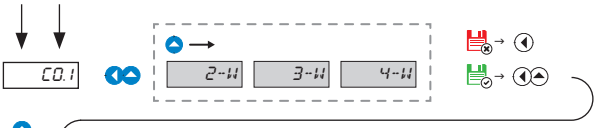
MEASURING MODE **Ni**



Parameter	Display	User	Description		
Measuring range	M0.1		Measuring range selection		
Ni 1000 - 5000 100°C	N1.1		-50°...100°C	Ni 1 000, 5 000 ppm/°C	DEF
Ni 1000 - 5000 250°C	N1.2		-50°...250°C	Ni 1 000, 5 000 ppm/°C	
Ni 1000 - 6180 80°C	N1.3		-50°...80°C	Ni 1 000, 6 180 ppm/°C	
Ni 1000 - 6180 250°C	N1.4		-50°...250°C	Ni 1 000, 6 180 ppm/°C	
Ni 10000 - 5000 100°C	N1.5		-50°...100°C	Ni 10 000, 5 000 ppm/°C	
Ni 10000 - 5000 250°C	N1.6		-50°...250°C	Ni 10 000, 5 000 ppm/°C	
Ni 10000 - 6180 80°C	N1.7		-50°...80°C	Ni 10 000, 6 180 ppm/°C	
Ni 10000 - 6180 250°C	N1.8		-50°...250°C	Ni 10 000, 6 180 ppm/°C	

Example setting Range - Ni 10 000, 5000 ppm, 100°C > **Ni.5**

N1.1 › ▲ › N1.2 › ▲ › N1.3 › ▲ › N1.4 › ▲ › N1.5 › ◀▲ › C0.1

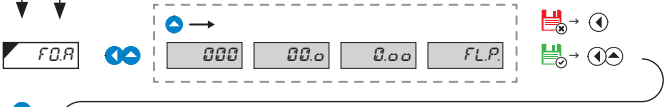


Parameter	Display	User	Description
Type of connection	CO.1		Selecting the type of sensor connection
2-wire	2-W	DEF	
3-wire	3-W		
4-wire	4-W		

Example setting Connection - 3-wire > **3-W**

2-W › ▲ › 3-W › ◀▲ › FOR

Compensation of a 2-wire connection can be performed in PROFI menu, see page 53



Parameter	Display	User	Description
Decimal point	FOR		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point DEF

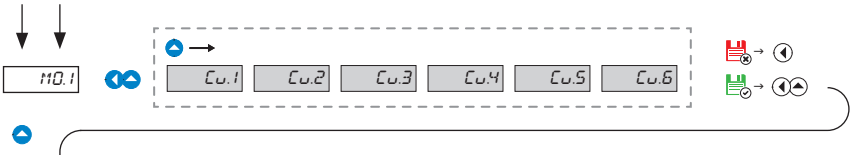
Example setting With one decimal place > **00.0**

FLP › ▲ › AUT › ▲ › 000 › ▲ › 00.0 › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

38

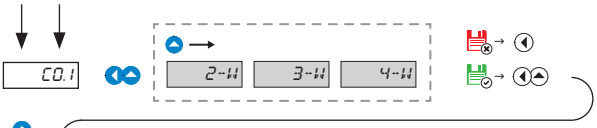
MEASURING MODE **Cu**



Parameter	Display	User	Description		
Measuring range	M0.1		Measuring range selection		
Cu 50 - 4280 200°C	Cu1		-200°...200°C	Cu 50, 4 280 ppm/°C	DEF
Cu 50 - 4260 200°C	Cu2		-50°...200°C	Cu 50, 4 260 ppm/°C	
Cu 100 - 4280 117°C	Cu3		-200°...117°C	Cu 100, 4 280 ppm/°C	
Cu 100 - 4280 200°C	Cu4		-50°...250°C	Cu 100, 4 280 ppm/°C	
Ni 10000 - 5000 117°C	Cu5		-50°...117°C	Cu 100, 4 260 ppm/°C	
Ni 10000 - 6180 200°C	Cu6		-50°...200°C	Cu 100, 4 260 ppm/°C	

Example setting Range - Cu 100, 4 280 ppm, 200°C > **Cu.4**

Cu1 › ▲ › Cu2 › ▲ › Cu3 › ▲ › Cu4 › ◀▲ › C0.1

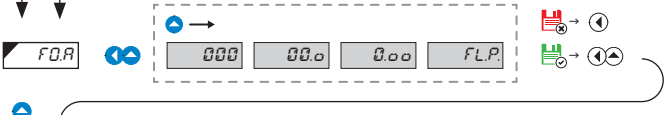


Parameter	Display	User	Description
Type of connection	CO.1		Selecting the type of sensor connection
2-wire	2-W	DEF	
3-wire	3-W		
4-wire	4-W		

Example setting Connection - 3-wire > **3-W**

2-W › ▲ › 3-W › ◀▲ › FOR

Compensation of a 2-wire connection can be performed in PROFI menu, see page 53



Parameter	Display	User	Description
Decimal point	FOR		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point DEF

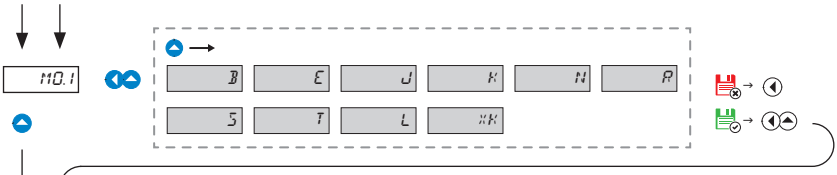
Example setting With one decimal place > **00.0**

FLP › ▲ › AUT › ▲ › 000 › ▲ › 00.0 › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

38

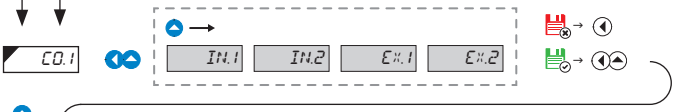
MEASURING MODE T/C



Parameter	Display	User	Description
Measuring range	M0.1		Measuring range selection
B	B		Thermocouple B (PtRh30-PtRh6)
E	E		Thermocouple E (NiCr-CuNi)
J	J		Thermocouple J (Fe-CuNi)
K	K		Thermocouple K (NiCr-Ni) DEF
N	N		Thermocouple N (Omegalloy)
R	R		Thermocouple R (Pt13Rh-Pt)
S	S		Thermocouple S (PtRh10-Pt)
T	T		Thermocouple T (Cu-CuNi)
L	L		Thermocouple L (Fe-CuNi)
XK	XK		Thermocouple Chromel-Copel

Example setting Thermocouple N > **N**

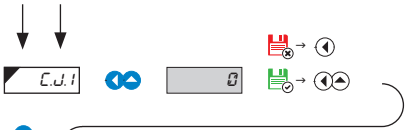
K › ▲ › N › ▲▲ › C0.1



Parameter	Display	User	Description
Cold junction	C0.1		**Cold junction compensation** (CJC)
On terminals	IN.1		Measurement without a referential thermocouple • measurement of cold junction on connector terminals DEF
On terminals with ref. T/C	IN2		Measurement with a referential thermocouple • CJC is measured on device's connector terminals with a referential thermocouple in antiserial connection
Without referential T/C	EX.1		Measurement without a referential thermocouple • entire set up is operated in homogenous and constant temperature
Compensation box	EX.2		Measurement with a referential thermocouple • when **Compensation box is used**

Example setting Connection with referential thermocouple > **IN.2**

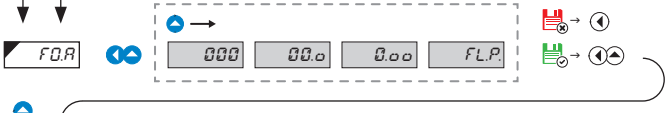
IN.1 › ▲ › IN2 › ▲▲ › CJ.1



Parameter	Display User	Setting	Description
Temperature of cold junction	C.J.1	-20 ... 99	Setting of cold junction temperature • Range: -20...99°C • DEF 0

Example setting Temperature of cold junction 12°C > **12**

0 › ▲ › 1 › ▲ › 2 › ◀ › 02 › ▲ › 12 › ◀▲ › FOR



Parameter	Display User	Description	
Decimal point	FOR	Setting of decimal point. It can be either fixed, or floating (most accurate projection format)	
000	000	Integer	
▲ **00,0**	00.0	One decimal place	
▲ **0,00**	0.00	Two decimal places	
▲ **Floating decimal point**	FLP	Floating decimal point	DEF

Example setting With a floating decimal point > **FLP.**

FLP. › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

38

Menu items "**CO.1**" and "**C.J.1**" are not available for T/C type "B".
The methodology and procedure for setting the cold junction is described in a separate chapter. page <?>

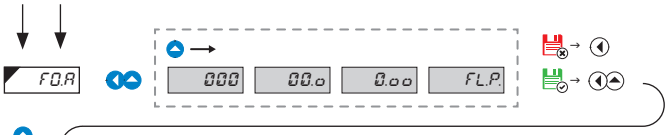
MEASURING MODE **DU**

Parameter	Display	User	Setting	Description
Dispaly value corresponding to minimum input signal	MI.1		-99 ... 999	Setting of a display projection corresponding to the min. mechanical position of a potentiometer • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position . DEF 0

Example setting Projection for the min. mechanical travel > **0**

Parameter	Display	User	Setting	Description
Dispaly value corresponding to maximum input signal	MA.1		-99 ... 999	Setting of a display projection corresponding to the max. mechanical position of a potentiometer • Range: -99...999 • When the value is confirmed, the decimal point is moved automatically to the set position . DEF 100

Example setting Projection for the max. mechanical travel > **250**



Parameter	Display User	Description
Decimal point	FOA	Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000	Integer
00,0	00.0	One decimal place
0,00	0.00	Two decimal places
Floating decimal point	FLP	Floating decimal point DEF

Example setting Floating decimal point > **FL.P.**

FLP› ‹ › SET

** The following menu item is dynamic and it depends on options fitted*

38

Description of a linear potentiometer calibration can be found on page 56

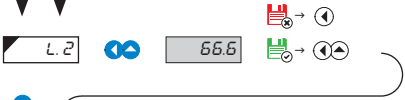
AVAILABLE ONLY WITH OPTION **COMPARATORS**

Parameter	Display	User	Setting	Description
Limit 1	L. 1		-99 ... 999	**Setting of limit 1** • Range: -99...999 • DEF 33,3 • DEF Hysteresis =0, Delay =0 • Hysteresis, activation delay and type of limit (NO/NC) can be configured in the PROFI menu

Example setting Limit 1 > **34.8**

33.3 › ▲ › 33.4 › ▲ › 33.6 › ▲ › 33.7 › ▲ › 33.8 › ◀ › 33.8 › ▲ › 34.8 › ▲▲ › L. 1

** The following menu item is dynamic and it depends on options fitted*



Parameter	Display	User	Setting	Description
Limit 2	L. 2		-99 ... 999	**Setting of limit 2** • Range: -99...999 • DEF 66,6 • DEF Hysteresis =0, Delay =0 • Hysteresis, activation delay and type of limit (NO/NC) can be configured in the PROFI menu

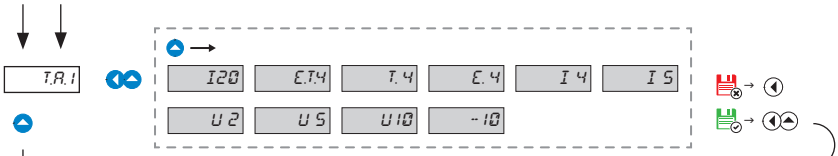
Example setting Limit 2 > **80.0**

66.6 › ◀ › 66.7 › ▲ › 66.8 › ▲ › 66.9 › ▲ › 66.0 › ▲ › 66.0 › ▲ › 67.0 › ◀ › 68.0 › ▲ › 69.0 › ▲ › 60.0 › ▲ › 600 › ▲ › 700 › ◀ › 800 › ▲▲ › SET

** The following menu item is dynamic and it depends on options fitted*

Menu items related to limit configuration only become available when the device contains optional modules with limit functionality. Depending on configuration it is possible to set limits L. 1, L. 2, L. 3, L. 4, L. 5 or L. 6 in menu LIGHT.

AVAILABLE ONLY WITH OPTION **ANALOGUE OUTPUT**



Parameter	Display	User	Description
Range of AO signal	tA.1		Selection of analogue output type
0...20 mA	I20		
4...20 mA	E.t4		indication of a broken input signal loop with an error message • 3 mA DEF
4...20 mA	t.4		indication of a broken input signal loop • 3 mA
4...20 mA	E.4		with an error message • 3 mA
4...20 mA	I 4		
0...5 mA	I 5		
0...2 V	U 2		
0...5 V	U 5		
0...10 V	U 10		
±10 V	-10		

Example setting Range ±10 V > **U 10**

E.t4 › ▲ › t.4 › ▲ › E.4 › ▲ › I 4 › ▲ › I 5 › ▲ › U 2 › ▲ › U 5 › ▲ › U 10 › ▲▼ › AL.1

AVAILABLE ONLY WITH OPTION **ANALOGUE OUTPUT**

Parameter	Display	User	Setting	Description
Low End of AO	AL.1		-99 ... 999	Assigning a projected display value to the analogue output's Low End • Range: -99...999 . DEF 0

Example setting AO Low End > **0**

0 › ◀▲ › AL.1

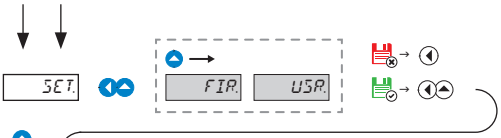
Parameter	Display	User	Setting	Description
High End of AO	AH.1		-99 ... 999	Assigning a projected display value to the analogue output's High End • Range: -99...999 . DEF 100

Example setting AO High End > **380**

100 › ◀ › 100 › ▲ › 110 › ▲ › 120 › ▲ › 130 › ▲ › 140 › ▲ › 150 › ▲ › 160 › ▲ › 170 › ▲ › 180 › ◀ › 180 › ▲ › 280 › ▲ › 380 › ◀▲ › SET

** The following menu item is dynamic and it depends on options fitted*

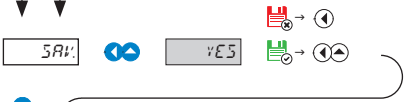
Menu items related to analogue output configuration only become available when the device contains optional modules with analogue output functionality. Depending on configuration it is possible in LIGHT menu to set analogue outputs AV.1, AV. 2, AV. 3 and AV. 4



Parameter	Display	User	Description
Facotry reset	SET.		Reset to factory default
Factory defrault	FIR.		Reset to factory default • Device will be reset to the original factory default settings. These menu Items are marked with DEF symbol in this user manual.
User settings	USR.		Reset to User settings • Restores the last saved configuration set by user and stored in menu item **SAV.**

Example setting **Reset to factory default** > **FIR.**

FIR › ▲▼ › SAV.



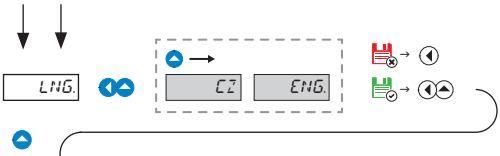
Parameter	Display	User	Description
Store configuration	SAV.		Stores user defined configuration • This customised setting stored in the unit can always be easily resored.
Confirmn your selection	YES		You will be prompted to confirm your selectionbefore cahnges are executed. **YES**

Example setting Restore to factory default > **FIR.**

YES › ▲▼ › LNG.

Changes will be applied next time you enter the menu

5. MENU **LIGHT**



Parameter	Display	User	Description	
Language Menu	LNG.		Language selection	
Czech	CZ		Menu is in Czech	
English	ENG.		Menu is in English	DEF

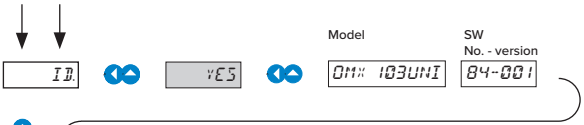
Example setting Czech menu > **CZ**

ENG. › ◀▲ › C. M.

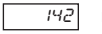
Parameter	Display	User	Setting	Description
New password	C. M.		0 ... 999	Setting of password for LIGHT menu • Universal password is 177 • Range: 0...999

Example setting New password > **341**

0 › ▲ › 1 › ◀ › 01 › ▲ › 0 1 › ▲ › 1 1 › ▲ › 2 1 › ▲ › 3 1 › ▲ › 4 1 › ◀ › 04 1 › ▲ › 14 1 › ▲ › 24 1 › ▲ › 34 1 › ◀▲ › 11



Parameter	Display	User	Description
Identification	ID.		The displeji shows the model, SW number, SW version and the curetly selected input (Mode) If the SW identification contains a letter, it is a customised SW *Example* **OMX 103UNI** **84-006** Model SW No.-version



Return into measuring mode

SETTING **PROFI**

For experienced users
Contains all menu items
Password protected access
Items from PROFI menu can be incorporated into U**SER** menu
Tree menu structure

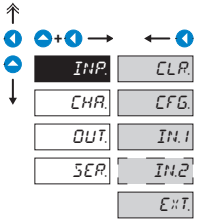
6.0 Setting "PROFI"

PROFI **Detailed programming menu**
- contains all menu items and can be protected by numeric password
- designed for experts

■ Entry into "PROFI" menu

- entry into the **PROFI** menu
- access is password protected
- in case the access password in menu item ***SER.*** > ***C. M.*** > ***PRO.*** is set to ***0***, access is granted without the need to enter any password.

6.1 Setting - INPUT



The primary instrument parameters are set in this menu

CLR.	Reset of internal values
CFG.	Configuration of active inputs
IN.1	Input 1 configuration
IN.2	Input 2 configuration
EXT.	External input configuration

6.1.1 Reset of internal values

2s › *INP.* › › *CLR.* ›

CLR.

Parameter	Display	User	Description
Reset of values	CLR.		Reset of internal values • menus items shown depend on device configuration
Tare reset Channel A	C.TA		Reset of Tare in Channel A
Tare reset Channel B	C.TB		Reset of Tare in Channel **B**
Tare reset Channel A+B	CAT.		Reset of Tare in Channel A and B simultaneously
Reset of min/ max vale	CMM.		Reset of memory which stores both the minimum a maximum value registered automatically since last reset
Memory reset	CME.		Reset of built-in memory which stores measured values in modes **FAST** or **RTC** • this built-in memory is optional, not default. Refer to order code.

6.1.2a Rate of masurement

2s › *INP.* › › › *CFG.* › › *M.P.S* ›

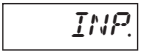
M.P.S.

Parameter	Display	User	Setting	Description
Measurement rate	40		0.1 › 0.5 › 1.2 › 2.5 › 5.0 › 10 › 20 › 40 › 80 › 160	0,5 ...160 measurements/s
			. DEF	5 measurements/s

→ → →

6.1.2b Number of active inputs

2s › *INP.* › › › *CFG.* › › › *INP.* ›



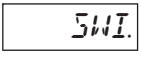
INP.

Parameter	Display	User	Description
Number of inputs	INP.		This menus item is available only in a 2-input version
One input	IN1		Active input 1
Two inputs	IN2		Active input 1 i 2 DEF

→ → →

6.1.2c Switching between inputs

2s › *INP.* › › › *CFG.* › › › › *SWI.* ›

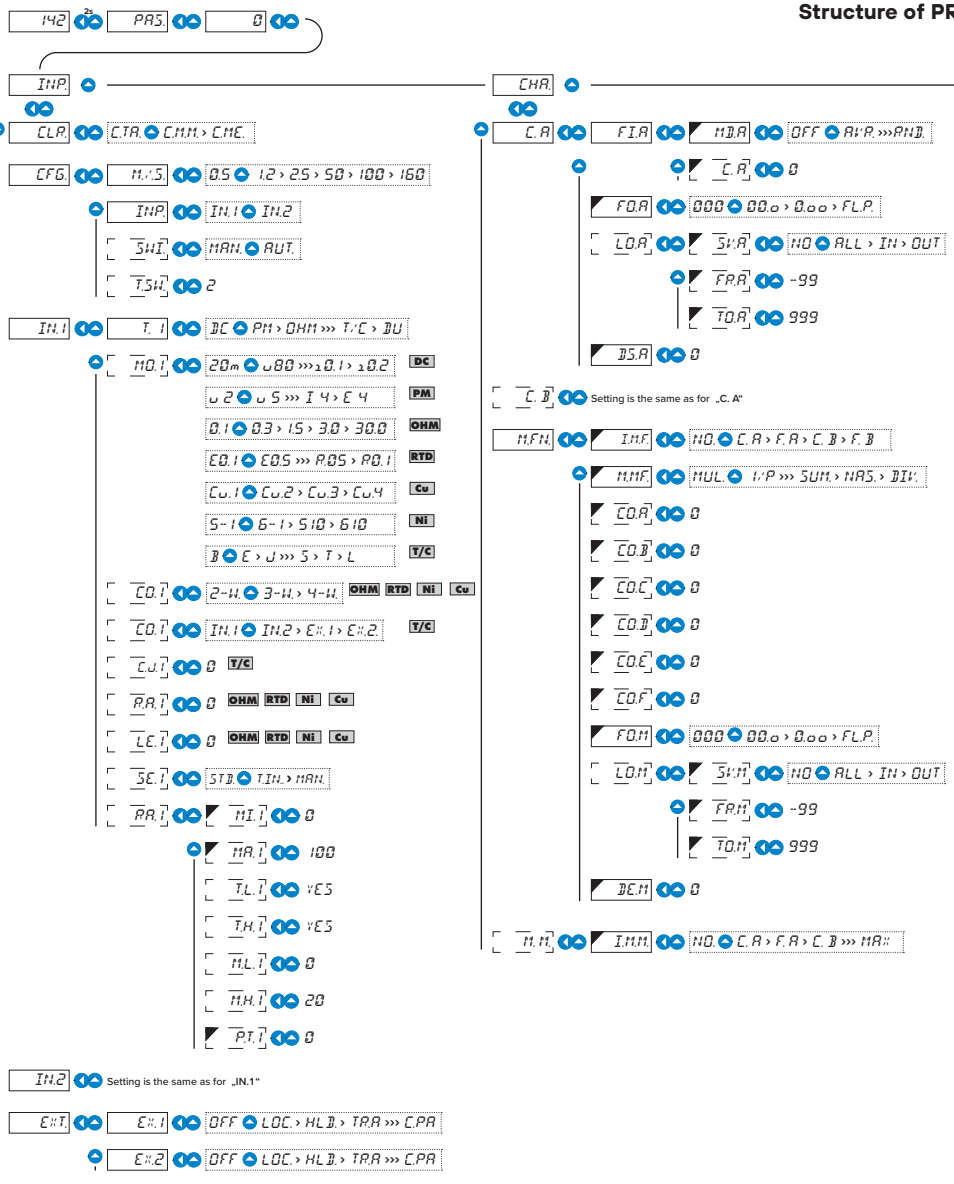


SWI.

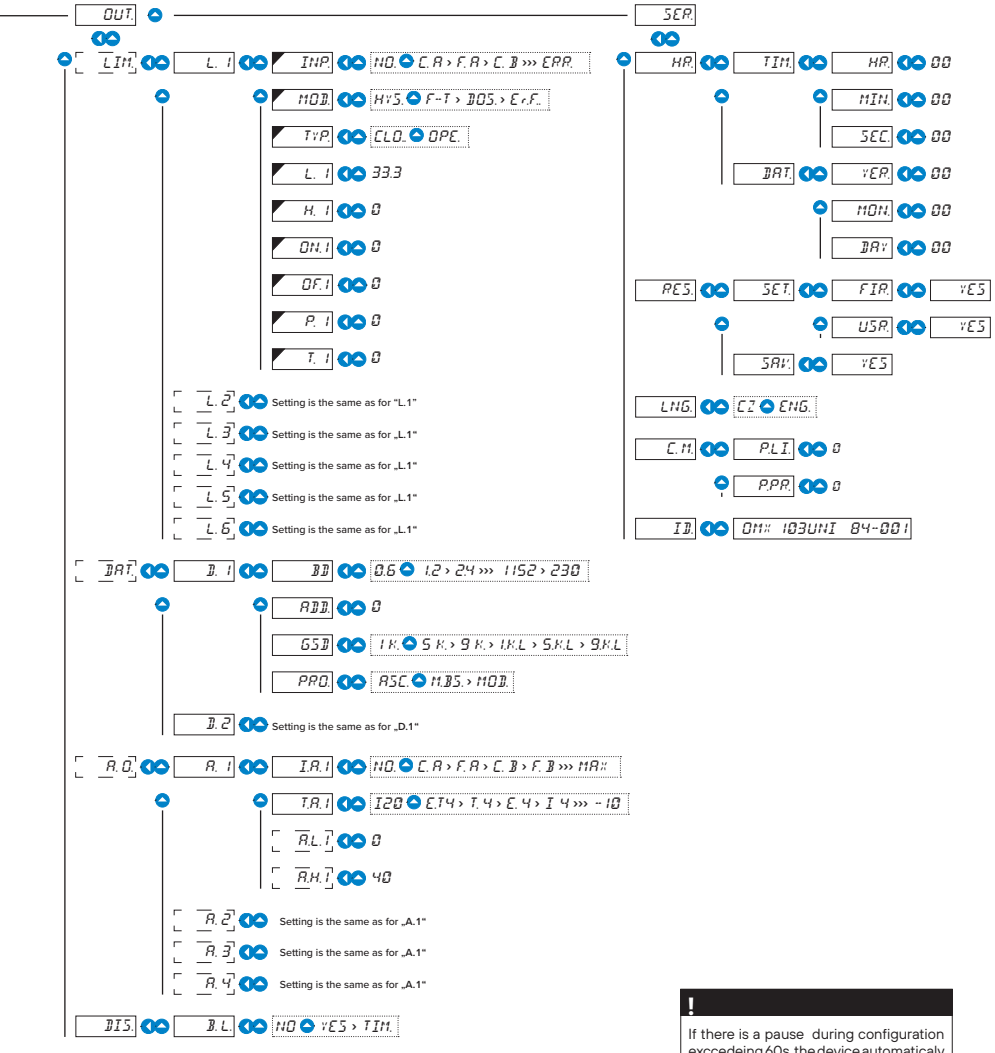
Parameter	Display	User	Description
Input switching	SWI.		This menus item is available only in a two-input version
Manual	MAN		Switching between inputs is controled by a front panel key or by a user selected external logic input DEF
Automatic	AUT.		Switching between inputs is automatic. Time period can be set in **T.SW.**

→ → →

Structure of PR



of PROFI MENU

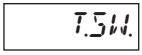


!

If there is a pause during configuration exccedeing 60s, the device automaticaly exits configuration mode and returns into measuring mode.

6.1.2d Input switching period

2s › *INP.* › › › *CFG.* › › › › › *T.SW.* ›



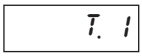
T.SW.

Parameter	Display	User	Setting	Description
Period of switching	2.0		0.5 ... 99.5	Setting of time period for input switching in automatic mode **FL.P.** • Range: 0,5...99,5 s (increment 0,5) . DEF 2,0 s

→ → →

6.1.3a Selecting Type of input for Input 1

2s › *INP.* › › › › *IN.1.* › › *T. 1* ›



T. 1

Parameter	Display	User	Description
Type	T. 1		There are dynamic menu items associated with various types of inputs
DC Volt meter	DC		
Process monitor	PM		DEF
Ohmmeter	OHM		
Thermometer Pt xxx	PT		
Thermometer Ni xxx	NI		
Thermometer Cu xxx	CU		
Thermometer T/C	T/C		
Display for lin. potentiometer	DU		

→ → →

6.1.3b Selecting measuring range for Input 1

2s › *INP.* › › › › *IN.1.* › › › *MO.1* ›

MO.1

Parameter	Display	User Setting		Description	
Measuring range	MO.1			Measuring ranges related to individual Types of input listed in menu item **T.1**	
DC Voltmeter **DC**	60m	▲	30m	±30 mV	DEF
			60m	±60 mV	
			U 1.	±1 V	
			U20.	±20 V	
			U40.	±40 V	
			U80.	±80 V	
			20.1	±90 mA	
			20.2	±180 mA	
Process monitor **PM**	I 4.	▲	U 2.	±2 V	
			U 5.	±5 V	
			U10.	±10 V	
			I 5.	±5 mA	
			I 0.	±20 mA	
			I 4.	4...20 mA	DEF
			E 4	4...20 mA, with error message „underflow", < 3,36 mA	
Ohmmeter **OHM**	0.1	▲	15	0...15 Ω	
			30	0...30 Ω	
			0.1	0...150 Ω	DEF
			0.3	0...300 Ω	
			1.5	0...1,5 kΩ	
			3.0	0...3 kΩ	
			15.0	0...15 kΩ	
			30.0	0...30 kΩ	
Thermometer Pt xxx **Pt**	Pt.1	▲	Pt.1	Pt 100, 3 850 ppm/°C -50°...130°C	DEF
			Pt.2	Pt 100, 3 850 ppm/°C -50°...560°C	
			Pt.3	Pt 500, 3 850 ppm/°C -50°...560°C	
			Pt.4	Pt 1 000, 3 850 ppm/°C -50°...130°C	
			Pt.5	Pt 1 000, 3 850 ppm/°C -50°...560°C	
			Pt.6	Pt 100, 3 920 ppm/°C -50°...130°C	
			Pt.7	Pt 100, 3 920 ppm/°C -50°...457°C	
			Pt.A	Pt 50, 3 910 ppm/°C -200°...550°C	
			Pt.B	Pt 50, 3 910 ppm/°C -200°...1 100°C	
			Pt.C	Pt 100, 3 910 ppm/°C -200°...130°C	
			Pt.D	Pt 100, 3 910 ppm/°C -200°...550°C	
			Pt.E	Pt 100, 3 910 ppm/°C -200°...1 100°C	
Thermometer Ni xxx **Ni**	Ni.1	▲	Ni.1	Ni 1 000, 5 000 ppm/°C -50°...100°C	DEF
			Ni.2	Ni 1 000, 5 000 ppm/°C -50°...250°C	
			Ni.3	Ni 1 000, 6 180 ppm/°C -50°...80°C	
			Ni.4	Ni 1 000, 6 180 ppm/°C -50°...250°C	
			Ni.5	Ni 10 000, 5 000 ppm/°C -50°...100°C	
			Ni.6	Ni 10 000, 5 000 ppm/°C -50°...250°C	
			Ni.7	Ni 10 000, 6 180 ppm/°C -50°...80°C	
			Ni.8	Ni 10 000, 6 180 ppm/°C -50°...250°C	

→ → →

Parameter	Display	User	Setting	Description		
Measuring range	MO.1			Measuring ranges related to individual Types of input listed in menu item **T.1**		
Thermometer Cu xxx Cu	Cu.1		Cu.1	Cu 50, 4 280 ppm/°C	-200°...200°C	DEF
			Cu.2	Cu 50, 4 260 ppm/°C	-50°...200°C	
			Cu.3	Cu 100, 4 280 ppm/°C	-200°...117°C	
			Cu.4	Cu 100, 4 280 ppm/°C	-200°...200°C	
			Cu.5	Cu 100, 4 260 ppm/°C	-50°...118°C	
			Cu.6	Cu 100, 4 260 ppm/°C	-50°...200°C	
Thermometer T/C T/C	K		B	B (PtRh30-PtRh6)	300°...1 820°C	
			E	E (NiCr-CuNi)	-200°...690°C	
			J	J (Fe-CuNi)	-200°...900°C	
			K	K (NiCr-Ni)	-200°...1 300°C	DEF
			N	N (Omegalloy)	-200°...1 300°C	
			R	R (Pt13Rh-Pt)	-50°...1 740°C	
			S	S (PtRh10-Pt)	-50°...1 760°C	
			T	T (Cu-CuNi)	-200°...400°C	
			L	L (Fe-CuNi)	-200°...900°C	
			XK	Chromel-Copel	-200°...800°C	

6.1.3c Type of connection for input 1

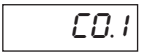
RTD OHM T/C

2s › INP. › › › › IN.1 › › › › CO.1 ›

CO.1

Parameter	Display	User	Description
Type of connection	CO.1		**Type of connection configuration** (OHM, Pt, Ni, Cu) • When T. 1 > OHM, Pt, Ni, Cu
2wire	2-W		2-wire connection DEF
3wire	3-W		3-wire connection
4wire	4-W		4-wire connection

2s › *INP.* › › › › *IN.1* › › › › *CO.1* ›



CO.1

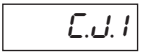
Parameter	Display	User	Description
Cold junction	CO.1		**Cold junction compensation** (CJC) • when T. 1 > T/C
On terminals	IN.1		Measurement without a referential thermocouple • measurement of cold junction on connector terminals DEF → →
On terminals with ref. T/C	IN.2		Measurement with a referential thermocouple • CJC is measured on device's connector terminals with a referential thermocouple in antiserial connection → →
Without ref. T/C	EX.1		Measurement without a referential thermocouple • entire set up is operated in homogenous and constant temperature → →
Compensation box	EX.2		Measurement with a referential thermocouple • when Compensation box is used

→ →

There is more inofrmation on CJC configuration in the chapter dedicated to CJC on page 86
For T/C type "**B**" menu items **CO.1** and **C.J.1** are NOT accessible

6.1.3d Cold junction compensation for input 1 T/C

2s › *INP.* › › › › *IN.1.* › › › › › *C.J.1* ›



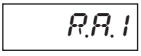
C.J.1

Parameter	Display	User	Setting	Description
Cold junction compensation	0		-20 ... 99	Same CJC configuration applies to Channel 1 and Channel 2 • Range: -20...99°C . DEF 0°C

→ →

6.1.3e Additional resistance for input 1 RTD OHM

2s › *INP.* › › › › *IN.1* › › › › › *R.A.1* ›



R.A.1

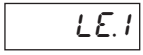
Parameter	Display	User	Setting	Description
Additional resistance **OHM, RTD**	0		0 ... 999	when it is necessary to offset the beginning of the range by certain value, e.g. while using sensor in measuring head to compensate for leads' resistance • Range: 0...999 Ω . DEF 0 Ω

→ →

6.1.3f Compensation of 2-wire connection input 1

RTD OHM

2s › *INP.* › › › › *IN.1.* › › › › › › › *LE.1* ›



LE.1

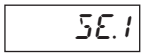
Parameter	Display	User	Setting	Description
Compensation of 2-wire connection **OHM, RTD**	YES			To get an accurate reading when using a 2-wire connection, the leads' resistance has to be compensated for • Before confirming the YES prompt on the display, create a short circuit at the far end of the leads. The OMX will efectively measure the leads' resistance and compensate for it

→ → →

6.1.3g Selecting projection mode for input 1

DC PM DU OHM

2s › *INP.* › › › › *IN.1* › › › › › › › *SE.1* ›



SE.1

Parameter	Display	User	Description
Projection mode	SE.1		Selecting projection mode when setting the min/max. values to be shown on the display relevant for input 1
Standard	STD.		Standard setting. The min. and max. values to be displayed are linked through the menu to the min and max values of input signal. • Items **MI.1** and **MA.1** DEF Example Input 4...20 mA > projection 0...250 Setting > MI.1 = 0, Ma.1 = 250
Teach-in	TIN		Teach-in mode is used with sensors that are not used in their full span and their narrowed-down electrical range range is therefore unknown. • OMX 103UNI measures the range by itself when prompted. • This mode is used primarily with linpot sensors in **DU** range • Items **T.L.1** and **T.H.1** Example Input 4...20 mA with desired projection 0...250 T.L.1 = 0 > move signal input to its minimum > YES T.H.1 = 250 > move signal input to its maximum > YES
Manual	MAN		Manual mode is suited for sensors that do not output signal in its full range, however their (narrowed-down) signal range is known. • Values of the range are entered manually. • Items **R.L.1** a **R.H.1** Example Input 4...20 mA with manual correction of range > projection 0...250 R.L.1 = 0 > correction of range to 4,15 mA > YES R.H.1 = 250 > correction of range to 18,6 mA > YES

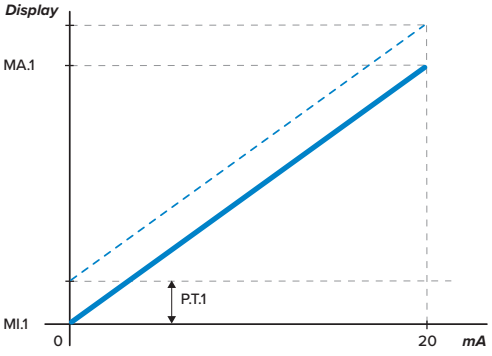
→ → →

6.1.3h Setting of display projection for input 1 in mode "Standard"

2s › *INP.* › › › › *IN.1* › › › › › › › › › *RA.1* ›

RA.1

Parameter	Display	User	Setting	Description
Projection setting	RA1			Setting of display projection for input 1 in mode STD.
For mode SE.1 > STD				
Min value	MI.1		-99 ... 999	Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 • DEF 0 → →
Max value	MA1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 • DEF 100 → →
Fixed Tare	P.T.1		-99 ... 999	This setting is used when the beginning of the range needs to be off-set by a known value • In setting (**P.T.1** ≠ 0) the symbol **INPUT** on the display is off • Range: -99...999 • DEF 0 → →

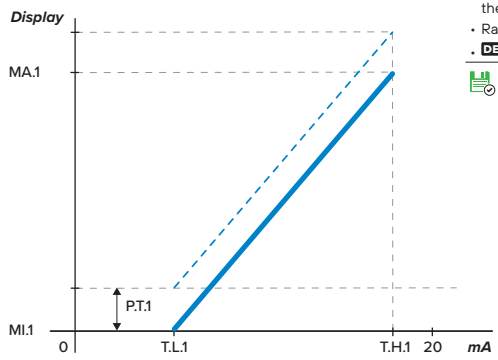


6.1.3i Setting of display projection for input 1 in mode "Teach-in"

2s › *INP.* › › › › *IN.1* › › › › › › › › › *RA.1* ›

RA.1

Parameter	Display	User	Setting	Description
Projection setting	RA.1			Setting of display projection for input 1 in mode T.IN.
For mode SP.1 > T.IN.				
Min value	MI.1		-99 ... 999	Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 . DEF 0 → →
Max value	MA.1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 . DEF 100 → →
Measurement of Min signal	TL.1			Connect input signal and set it to its minimum level. In case of a moving sensor move it to its low end position • When the display value is stable, confirm by **YES** → →
Measurement of Max signal	TH.1			Connect input signal and set it to its maximum level. In case of a moving sensor move it to its high end position • When the display value is stable, confirm by **YES** → →
Fixed Tare	PT.1		-99 ... 999	This setting is used when the beginning of the range needs to be off-set by a known value • In setting (**P.T.1** ≠ 0) the symbol **INPUT** on the display is off • Range: -99...999 . DEF 0 → →

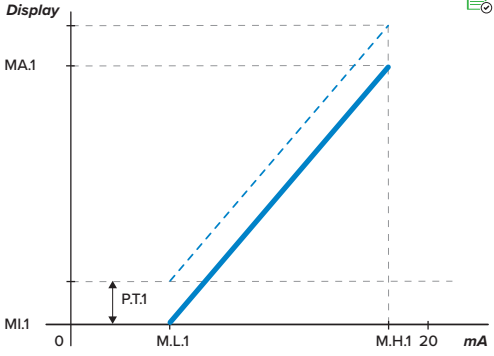


6.1.3j Setting of display projection for input 1 in mode "Manual"

2s › *INP.* › › › › *IN.1* › › › › › › › › *RA.1* ›

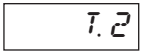
RA.1

Parameter	Display	User	Setting	Description
Projection setting	RA.1			Setting of display projection for input 1 in mode MAN.
For mode SP.1 > MAN.				
Min value	MI.1		-99 ... 999	• Setting of display projection that corresponds to the minimum level of input signal • Range: -99...999 . DEF 0 → →
Max value	MA.1		-99 ... 999	Setting of display projection that corresponds to the maximum level of input signal • Range: -99...999 . DEF 100 → →
Setting of sinal min	AL.1		-99 ... 999	Enter the value of minimum signal • Range: -99...999 → →
Setting of sinal max	AH.1		-99 ... 999	Enter the value of maximum signal • Range: -99...999 → →
Fixed tare	PT.1		-99 ... 999	This setting is used when the beginning of the range needs to be off-set by a known value • In setting (**P.T.1** ≠ 0) the symbol **INPUT** on the display is off • Range: -99...999 . DEF 0 → →



6.1.4a Selecting Type of input for Input 2

2s › *INP.* › › › › › *IN.2* › › *T. 2* ›



T. 2

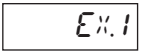
Parameter	Display	User	Description
Type	T. 2		There are dynamic menu items associated with various types of inputs
DC Volt meter	DC		
Process monitor	PM	DEF	
Ohmmeter	OHM		
Temperature display Pt xxx	PT		
Thermometer Ni xxx	NI		
Thermometer Cu xxx	CU		
Thermometer T/C	T./C		First thermocouple must always be connected to Input 1, because that is where the referential temperature is taken for Cold Junction Compensation • If thermocouple is connected also to Input 2, referential temperature for CJC is adopted from Input 1
Display for lin. potentiometer	PU		

→ → →

Further settings are identical as those described in **IN.1**

6.1.4a External logic input functions

2s › *INP.* › › › › › › › *EXT.* › › *EX.1* ›

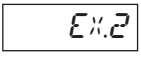


EX.1

Parameter	Display	User	Description
Function of input 1	EX.1		There are dynamic menu items associated with various types of input modes
Function not assigned	OFF		Input is deactivated
Hold	HLD		HOLD function is activated DEF
Menu access blocked	LPW		When activated, access to LIGHT/PROFI menu is blocked
Tare Input 1	TRA		Activation of Tare for Input 1
Tare Input 2	TRB		Activation of Tare for Input 2
Reset Tare Input 1	CTA		Reset of Tare for Input 1
Reset Tare Input 2	CTB		Reset of Tare for Input 2
Reset Min/Max Values	CMM		Reset of Min. and Max. values
Recording active	SAV		Recording of measured values into internal memory is activated • Only when options FAST/RTC are present in the device
Records erased	CM		All records of measured values are erased from the device memory • Only when options FAST/RTC are present in the device

→ → →

2s › *INP.* › › › › › › › *EXT.* › › › *EX.2* ›



EX.2

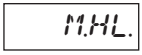
Parameter	Display	User	Description
Function of input 2	EX.2		There are dynamic menu items associated with various types of input modes
Menu access blocked	LPW		When activated, access to LIGHT/PROFI menu is blocked DEF

→ → →

Further settings of menu item EX.2 are identical to those described in EX.1

6.1.4b Hold function

2s › *INP.* › › › › › › *EXT.* › › › › *M.HL.* ›

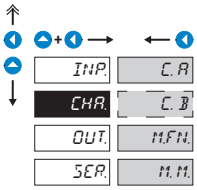


M.HL.

Parameter	Display	User	Description
Functionality of HOLD	M.HL.		Selecting which functions will be affected by the HOLD function when this function is activated through a logical input
Display	DIS.		The value on the display is frozen DEF
Display + AO	DAOM.		Display value and analogue output signal are frozen
Display + AO + Limits	DAL.		Display value and analogue output signal and limits are frozen
Entire device	ALL		The entire is device is frozen and does not respond to input signal

→ → →

6.2 Setting - CHANNELS



Input parametrs are set in this menu

- C.A — Setting the parameters of "Channel A"
- C.B — Setting the parameters of "Channel B"
- M.FN. — Setting the parameters of math functions
- M.M. — Selecting the channel from which Min/Max values will be evaluated

6.2.1a Setting filters in channel A

2s › › CHA. › › C. A › › FI.A › › MD.A › ›

MD.A

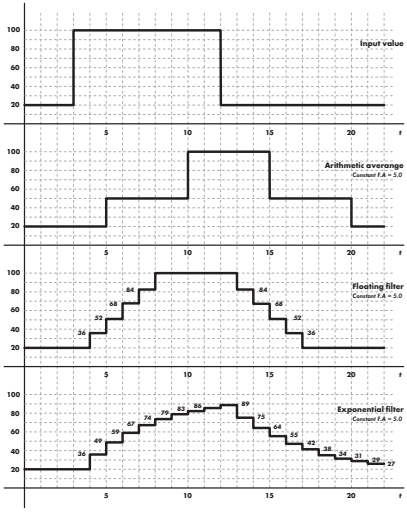
Parameter	Display	User	Setting	Description
Selecting filters for input 1	MD.A			Sometimes it may be desirable to appropriately mathematically adjust the measured data before displaying it. The following filters are designed to do just that.
Not applied	OFF			Filter is disabled DEF
▲ **Average**	AV.A.		2 ... 100	**Average calculated from measured values** • arithmetic average calculated from a specified number of samples taken from **C. A** • Range: 2...100
▲ **Floating filter**	FLO.		2 ...30	**Floating filter** • floating arithmetic average calculated from a specified number of samples taken from **C. A** recalculated with every new incoming sample • Range: 2...30
▲ **Exponential filter**	EXP.		2 ... 100	**Exponential filter** • First order integration filter with time constant **C. A** measurement • Range: 2...100
▲ **Rounding**	RND.		2 ... 100	**Rounding of the measured value** • it is set by any K. number which determines the display step • e.g: **C. A** = 2,5 > display 0, 2.5, 5,... • Range: 0...999

→ → →

2s › CHA. › C. A › FI.A › C. A

C. A

Parameter	Display	User	Setting	Description
Filtration constant	C. A		2 ... 100	This menu item appears always after a specific filter had been selected . DEF 2



6.2.1b Position of decimal point for channel A

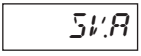
2s › CHA. › C. A › FO.A

FO.A

Parameter	Display	User	Description
Decimal point	FOA		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer DEF
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point

6.2.1c Recording of data into device memory for channel A

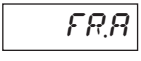
2s › › *CHA.* › › *C. A* › › › › *LO.A* › › *SV.A* › ›



Parameter	Display	User	Description
Recording of measured values	SV.A		This menu item allows you to record values into to the device built-in memory. Further settings in TX. > PAM. This menu item is dynamic and becomes available only when the device is fitted with Data recording option (part of the order code)
No recording	NO		Measured data is not recorded DEF
All data	ALL		All measured data is recorded
Data inside interval	IN		Only data measured inside a set value interval is recorded into the memory
Data outside interval	OUT		Only data measured outside of a set value interval is recorded into the memory

→ → →

2s › › *CHA.* › › *C. A* › › › › *SV.A* › › › *FR.A* › ›



Parameter	Display	User	Setting	Description
Start of interval	FRA		-99 ... 999	Setting the interval's start value • Range: -99...999 • DEF -99
				→ →
End of interval	TOA		-99 ... 999	Setting the interval's end value • Range: -99...999 • DEF 999

→ → →

6.2.1d Description of measured values for input 1

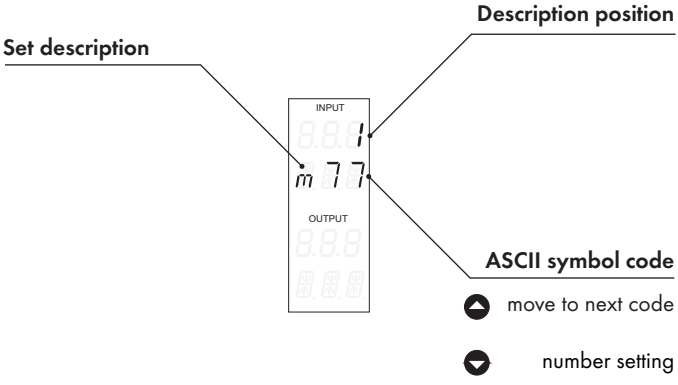
2s › › CHA. › › C. A › › › › DS.A › ›

DS.A

Parameter	Display	User	Setting	Description
Description of measured values	000		0 ... 95	Besides a standard numeric value this device also offers the possibility of displaying 3 characters representing the measured value The characters are set via a shifted ASCII code. The upper line on the LCD represents the character being set and the bottom line is used for setting the number that represents the character. The numeric interval is 0...95. • Description is cancelled by setting 00 • Range: 0...95 . RTD T/C DEF °C . DC PM DU OHM DEF no characters (00)

→ → →

See table of characters on page 89



6.2.2a Setting filters in channel B

2s › › CHA. › › › C. B › › FI.B › › MD.B › ›

MD.B

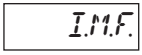
Parameter	Display	User	Setting	Description
Selecting filters for input 2	MD.B			Sometimes it may be desirable to appropriately mathematically adjust the measured data before displaying it. The following filters are designed to do just that.
Not applied	OFF			Filter is disabled DEF
Average	AV.A.		2 ... 100	**Average calculated from measured values** • arithmetic average calculated from a specified number of samples taken from **C. A** • Range: 2...100
Floating filter	FLO.		2 ...30	**Floating filter** • floating arithmetic average calculated from a specified number of samples taken from **C. A** recalculated with every new incoming sample • Range: 2...30
Exponential filter	EXP.		2 ... 100	**Exponential filter** • First order integration filter with time constant **C. A** measurement • Range: 2...100
Rounding	RND.		2 ... 100	**Rounding of the measured value** • it is set by any K. number which determines the display step • e.g: **C. A** = 2,5 > display 0, 2.5, 5,... • Range: 0...999

→ → →

Setting of Channel **B** is identical with Channel **A**

6.2.3a Math functions - selection of input

2s › › CHA. › › › M.FN › › I.M.F. › ›



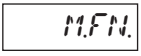
I.M.F.

Parameter	Display	User	Description
Input for math function	I.M.F.		Selecting the source of data to be mathematically processed
Not applied	NO.		Integer DEF
Channel A	C. A		Calculated from Channel A
Channel A with filter applied	F. A		Calculated from Channel A after being processed by a digital filter
Channel B	C. B		Calculated from Channel B
Channel B with filter applied	F. B		Calculated from Channel B after being processed by a digital filter
Channel A+B	V. K.		Calculated from Channel A and Channel B • This menu item is available only in a 2-input version
Channel A+B with filter applied	V. F.		Calculated from Channel A and Channel B after being processed by a digital filter • This menu item is available only in a 2-input version
Minimum	MIN		Calculated from value Min
Maximum	MAX		Calculated from value Max

→ → →

6.2.3b Math functions

2s › › *CHA.* › › › › *M.FN* › › › *M.FN.* ›



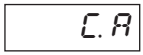
M.FN.

Parameter	Display	User	Description
Math functions	M.FN.		Selection of math functions or of an operation performed on a selected input value/channel
Polynomial	MUL.		$4x^5 \square Bx^4 \square Cx^3 \square Dx^2 \square Ex \square F$
1/x	1/M.		$\frac{A}{x^5} \square \frac{B}{x^4} \square \frac{C}{x^3} \square \frac{D}{x^2} \square \frac{E}{x} \square F$
Logarithm	LOG.		$A \square \ln \frac{\square Bx \square C \square}{\square Dx \square E \square} \square \square F$
Exponential	EXP.		$A \square e^{\frac{\square Bx \square C}{\square Dx \square E \square} \square} \square F$
Power	POW.		$A \square \square Bx \square C^{\square Dx \square E \square} \square F$
Root	RT.		$A \square \sqrt{\frac{Bx \square C}{Dx \square E}} \square F$
Sin x	SIN.		$A \sin^5 x \square B \sin^4 x \square C \sin^3 x \square D \sin^2 x \square E \sin x \square F$
Applies only to the 2-input version and to setting Channel A + Channel B in menu item V. MF.			
Sum of channel values	SUM		(A x Ch.A2 + B x Ch. B2 + C x Ch.A + D x Ch.B) x E + F
Multiplication of channel values	MUL.		(A x Ch.A x Ch. B + B) / (C x Ch.A + D x Ch.B + E) + F
Division of channel values	DIV.		(A x Ch.A + B x Ch. B) / (C x Ch.A + D x Ch.B) x E x F

→ → →

6.2.3c Math functions - setting of constants

2s › › *CHA.* › › › › *M.FN* › › › *C. A* ›



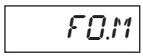
C. A

Parameter	Display	User	Setting	Description
Constant A	C0A		-99 ... 999	Setting of constant A • Range: -99...999 → →
Constant B	C0B		-99 ... 999	Setting of constant B • Range: -99...999 → →
Constant C	C0C		-99 ... 999	Setting of constant C • Range: -99...999 → →
Constant D	C0D		-99 ... 999	Setting of constant D • Range: -99...999 → →
Constant E	C0E		-99 ... 999	Setting of constant E • Range: -99...999 → →
Constant F	C0F		-99 ... 999	Setting of constant F • Range: -99...999 → →

→ →

6.2.3d Math functions - setting of decimal point position

2s › › *CHA.* › › › › *M.FN* › › › › *FO.M* ›



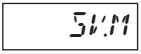
FO.M

Parameter	Display	User	Description
Decimal point	FOM		Setting of decimal point. It can be either fixed, or floating (most accurate projection format)
000	000		Integer DEF
00,0	00.0		One decimal place
0,00	0.00		Two decimal places
Floating decimal point	FLP		Floating decimal point

→ →

6.2.1e Math functions - recording of data into device memory

2s › CHA. › › › M.FN › › › › LO.M › › SV.M › ›

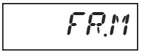


SV.M

Parameter	Display	User	Description
Recording of measured values	SVM		This menu item allows you to record values into to the device built-in memory. Further settings in **OUT.**> PAM. This menu item is dynamic and becomes available only when the device is fitted with Data recording option (part of the order code)
▲ **No recording**	NO		Measured data is not recorded DEF
▲ **All data**	ALL		All measured data is recorded
▲ **Data inside interval**	IN		Only data measured inside a set value interval is recorded into the memory
▲ **Data outside interval**	OUT		Only data measured outside of a set value interval is recorded into the memory

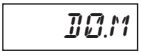
→ → →

2s › CHA. › › › M.FN › › › › LO.M › › › FR.M › ›



FR.M

Parameter	Display	User	Setting	Description
Start of interval	FRM		-99 ... 999	Setting the interval's start value • Range: -99...999 • DEF -99
				→ →
▲ **End of interval**	TOM		-99 ... 999	Setting the interval's end value • Range: -99...999 • DEF 999

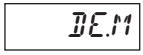


TO.M

→ → →

6.2.3f Math functions - description of measured values

2s › › CHA. › › › › M.FN › › › › › DE.M › ›



DE.M

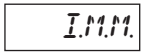
Parameter	Display	User	Setting	Description
Description of measured values	000		0 ... 95	Besides a standard numeric value this device also offers the possibility of displaying 3 characters representing the measured value The characters are set via a shifted ASCII code. The upper line on the LCD represents the character being set and the bottom line is used for setting the number that represents the character. The numeric interval is 0...95. • Description is cancelled by setting 00 • Range: 0...95 . RTD T/C DEF °C . DC PM DU OHM DEF no characters (00)

→ →

See table of characters on page 89

6.2.4 Min/Max value

2s › › CHA. › › › › M.M. › › I.M.M. › ›

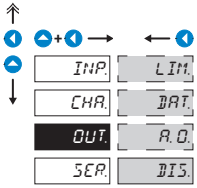


I.M.M.

Parameter	Display	User	Description
Input for Min/Max	I.M.M.		Selecting the source of data from which Min/Max values will be calculated
Inactive	NO.		Not processed DEF
Channel A	C. A		Min/Max calculated from channel A
Channel A with filter applied	F. A		Min/Max calculated from channel A after being processed by a digital filter
Channel B	C. B		Min/Max calculated from channel B
Channel B with filter applied	F. B		Min/Max calculated from channel B after being processed by a digital filter
Math functions	M.F.N.		Min/Max calculated from Math functions

→ →

6.3 Setting - OUTPUTS



Output signal parameters are set in this section of the menu

- LIM. — Limits
- BAT. — Data
- A.O. — Analogue output
- DIS. — Display backlight

6.3.1a Selecting the parameter limit 1 responds to

2s › › › OUT. › › LIM. › › L. 1 › › INP. › ›

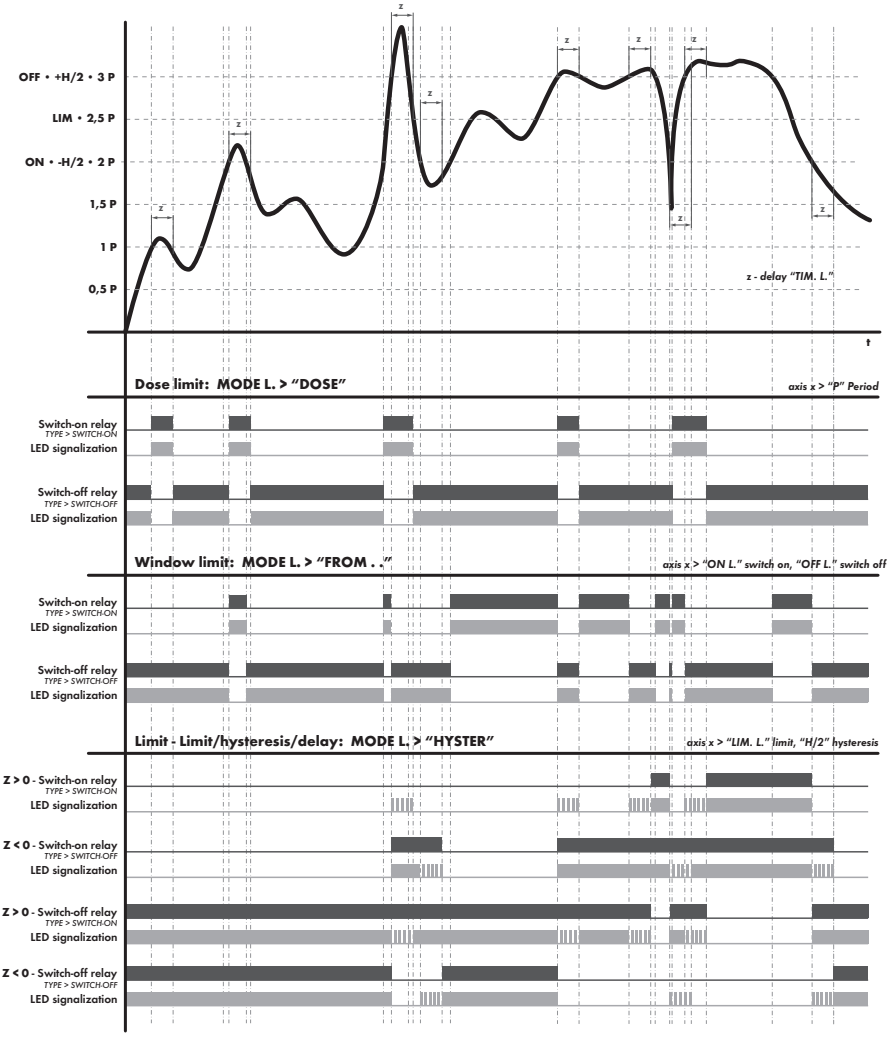
INP.

Parameter	Display	User	Description
Parameter selection	INP.		Selection of data source for limit evaluation
Inactive	NO.		Limit evaluation is disabled
Channel A	C. A		Channel A is evaluated
Channel A with filter applied	F. A		Channel A after being processed by a digital filter is evaluated
Channel B	C. B		Channel B is evaluated DEF
Channel B with filter applied	F. B		Channel B after being processed by a digital filter is evaluated
Math function	MFN.		Result of the math function is evaluated
Value Min.	MIN.		**Value Min. is evaluated**
Value Max.	MAX.		**Value Max. is evaluated**
Error	ERR.		Presence of an error message is evaluated. Output is active when there is an active error message

→ → →

Limits 2...6 setting is the same as this Limit 1 setting

DESCRIPTION OF RELAY FUNCTION



6.3.1b Limit 1 setting

2s › › › *OUT.* › › *LIM.* › › *L. 1* › › › *MOD.* › ›

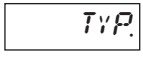
MOD.

Parameter	Display	User	Description
Type of limit	MOD.		Setting the type of limit
Hysteresis	HYS.		Snandard limit - Value, hysteresis, delay • In this mode the following parameters are set: **L. 1** is the value at which the limit will be activated when value is reached, **H. 1** is the hysteresis band around the value (Value ±1/2 HYS) ant time **T. 1** which defines the time after which the limit will be activated.
Window	F--T		Window limit • Two parameters are set in this mode. **ON.1** for activation of the limit and **OF.1** for its deactivation. The limt output is activated inside this interval, according to the selected setting.
Batch	BOS.		Batch/Period limit • In this mode, two parameters are set **P. 1** specifies the limit value and its multiples at which the output is active . **T. 1** specifies the time during which the output is active.
Error	Err.		Error limit - input range • Parameters **ON.1** and **OF.1**, which represent the measuring range, are set in this mode. Above and below the set values the instrument displays an error message, underflow / overflow of the input range.

→ → →

6.3.1c Setting the type of limit 1

2s › › › *OUT.* › › *LIM.* › › *L. 1* › › › › *TYP.* › ›



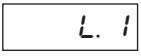
TYP.

Parameter	Display	User	Description
Type of output	TYP.		Selection of output type
Normally open	CLO.		The output closes when the condition is met
Normally closed	OPE.		The output opens when the condition is met

→ → →

6.3.1d Setting Values for Limit 1 Evaluation

2s › › › *OUT.* › › *LIM.* › › *L. 1* › › › › › *L. 1* › ›



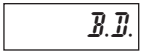
L. 1

Parameter	Display	User Setting	Description
Aplicable only for limit mode Hysteresis ***HYS.***			
Setting limit L. 1 values	L. 1	-99 ... 999	Setting Limit 1 values • Range: : -99...999 . DEF 33,3 → →
Setting limit L. 1 hysteresis	H. 1	-99 ... 999	Setting Limit 1 hysteresis • Specifies the band around the limit symmetrically, **LIM.** ± ½ **HYS.** • Range: -99...999 . DEF 0,0 → →
Setting Limit L.1 delay	C. 1	-99 ... 99.9	Setting limit 1 delay • Positive time > limit output closes when limit value **L.1** is exceeded and the set time **C.1** expires • Negative time > limit output opens when limit value **L.1** is exceeded and the set time **C.1** expires • Range: -99...99,9 s . DEF 0,0 → →
Aplicable only for limit mode From-To ***F-T.***			
Setting L. 1 interval Beginning	ON. 1	-99 ... 999	Setting the beginning of the interval for switching on the Limit 1 • Range: -99...999 → →
Setting L. 1 interval End	OF. 1	-99 ... 999	Setting the end of the interval for switching on the Limit 1 • Range: -99...999 → →
Aplicable only for limit mode Batch ***DOS.***			
Setting L.1 period	P. 1	-99 ... 999	Setting the period (duration) of switching on Limits 1 • Range: -99...999 → →
Setting Limit L.1 delay	C. 1	-99 ... 99.9	Setting limit 1 delay • Positive time > limit output closes when limit value **L.1** is exceeded and the set time **C.1** expires • Negative time > limit output opens when limit value **L.1** is exceeded and the set time **C.1** expires • Range: -99...99,9 s . DEF 0,0

→ → →

6.3.2a Baud rate setting of data output 1

2s › › › *OUT.* › › › *DAT.* › › *D. 1* › › *B.D.* ›



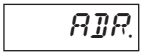
B.D.

Parameter	Display	User	Description
Baud rate	B.D.		Setting the data output baud rate
600 Baud	0.6		
1200 Baud	1.2		
2400 Baud	2.4		
4800 Baud	4.8		
9600 Baud	9.6		DEF
19200 Baud	19.2		
38400 Baud	38.4		
57600 Baud	57.6		
115200 Baud	115		
230400 Baud	230		

→ → →

6.3.2b Setting of data output 1 address

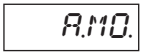
2s › › › *OUT.* › › › *DAT.* › › *D. 1* › › › *ADR.* ›



ADR.

Parameter	Display	User	Setting	Description
Device address	00		0 ... 31	Setting of device address on RS485 com. line • Range: 0...31, DEF 00

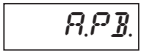
→ → →



A.MO.

Parameter	Display	User	Setting	Description
Device MODBUS address	01		1 ... 247	Setting of device address for MODBUS • Range: 1...247, DEF 01

→ → →



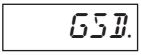
A.PB.

Parameter	Display	User	Setting	Description
Device PROFIBUS address	19		1 ... 127	Setting of device address for PROFIBUS • Range: 1...127, DEF 19

→ → →

6.3.2c Selection of GSD file format of data output 1

2s › › › *OUT.* › › › *DAT.* › › *D. 1* › › › › *GSD.* ›



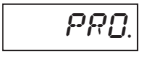
GSD.

Parameter	Display	User	Description	
GSD format	GSD.		Selection of GSD file format for PROFIBUS	
1 channel	1K.			DEF
5 channels	5K.			
9 channels	9K.			
1 channel + limit	1KL.			
5 channels + limit	5KL.			
9 channels + limit	9KL.			

→ → →

6.3.2d Selection of communication protocol of data output 1

2s › › › *OUT.* › › › *DAT.* › › *D. 1* › › › › › *PRO.* ›



PRO.

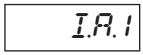
Parameter	Display	User	Description	
Data format	PRO.		Data protocol selection	
ASCII	ASC.		Data protocol ASCII	DEF
Messbus	MBS.		Data protocol DIN Messbus	
MODBUS	MOD.		Data protocol MODBUS - RTU	

→ → →

Setting of data ouput **D. 2** is the same as D. 1 setting

6.3.3a Selection of input for analogue output 1

2s › › › *OUT.* › › › › *A. O.* › › *A. 1* › › *I.A.1* › ›



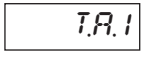
I.A.1

Parameter	Display	User	Description
Input selection	IA.1		**Selecting the source of data from which analogue output 1 will be calculated**
Off	NO.		Analogue ouput is disabled
Channel A	C.A		Analogue ouput is based on **Channel A** DEF
Channel A with filter	F.A		Analogue ouput is based on **Channel A** after being processed by digital filter
Channel B	C.B		Analogue ouput is based on **Channel B**
Channel B with filter	F.B		Analogue ouput is based on **Channel B** after being processed by digital filter
Math function	MFN		Analogue ouput is based on Math function
Value Min.	MIN		Analogue ouput is based on **Value Min**
Value Max.	MAX.		Analogue ouput is based on **Value Max.**

→ →

6.3.3b Selection of analogue output 1 type

2s › › › *OUT.* › › › › *A. O.* › › *A. 1* › › › *T.A.1* › ›



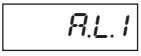
T.A.1

Parameter	Display	User	Description
Selection of type	TA.1		Selection of analogue output 1
0...20 mA	I.20		
4...20 mA with indication	E.4T		Indication of a broken current loop and an error message (3 mA) DEF
4...20 mA with indication	4 T		Indication of a broken current loop (3 mA)
4...20 mA with indication	E. 4		Error message (3 mA)
4...20 mA	I. 4		
0...5 mA	I. 5		
0...2 V	U 2		
0...5 V	U 5		
0...10 V	U 10		
±10 V	-- 10		

→ →

6.3.3c Setting the range of analoge output 1

2s › › › *OUT.* › › › › *A. O.* › › *A. 1* › › › › *A.L.1* › ›



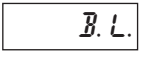
A.L.1

Parameter	Display	User	Setting	Description
				Analogue output is isolated and its value carresponds to the value on the display readout. • setting allows its two endpoints to be assigned to any two points of the whole measuring range (of display)
Beginning of range of AO	AL.1		-99 ... 999	Assigning the display value to the beginning of range of analoge output 1 • Range: -99...999 • DEF 0
				→ ↑ → ←
End of range of AO	AH.1		-99 ... 999	• Assigning the display value to the end of range of analoge output 1 • Range: -99...999 • DEF 100
				→ ↑ → ←

Setting of analogue outputs **A. 2, A. 2** i **A. 3 is identical** to the setting of output A. 1

6.3.4a Display backlight

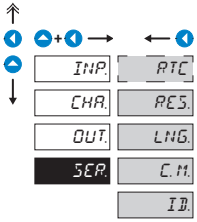
2s › › › *OUT.* › › › › › *DIS.* › › *B. L.* › ›



B. L.

Parameter	Display	User	Description
Backlight	B. L.		Backlight setting
Off	NO		Backlight is off
On	YES		Backlight is on
On with timeout	TIM.		Backlight is time limited DEF • It is activated by a key stroke for 60 seconds • It is activated automatically every time there is an error message and it is accompanied by green LED flashing
			→ ↑ → ←

6.4 Setting - SERVICE



Service functions are set in this section of the menu

RTC	Setting of RTC
RES.	Factory reset. Restoration of factory calibration
LNG.	Language version
C.M.	Setting of new password
ID.	Device identification

6.4.1 Setting of Real Time Clock - RTC

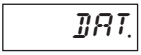
2s › › › › SER. › › HR. › › TIM. › › RTC › ›

RTC

RTC

Parameter	Display	User	Setting	Description
Setting of time	RTC			Setting of time for RTC
Hours	HR.		0 ... 23	Setting of hours • Range: 0...99
				→ →
Minutes	MIN		0 ... 59	Setting of minutes • Range: 0...59
				→ →
Seconds	SEC.		0 ... 59	Setting of seconds • Range: 0...59
				→ →

2s › › › › SER. › › RTC › › › DAT. › › YER. › ›



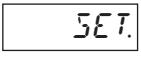
DAT.

Parameter	Display	User	Setting	Description
Setting of date	DAT.			Setting of date for RTC
Year	YER.		0 ... 99	Setting of year • Range: 0...99 → →
Month	MON		0 ... 12	Setting of month • Range: 0...12 → →
Day	DAY		0 ... 31	Setting of day • Range: 0...31

→ → →

6.4.2 Factory reset

2s › › › › SER. › › › RES. › › SET. › ›

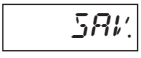


SET.

Parameter	Display	User	Description
Reset	SET.		Factory reset
Factory reset	FIR.		Restoration of factory settings • Restores default factory settings relevant to the presently selected Type of input signal, menu items marked with DEF
User reset	USR.		Restoration of user settings • Restoration of last saved setting that was stored in menu item SER./RES./SAV.

→ → →

2s › › › › SER. › › › RES. › › › SAV. › ›



SAV.

Parameter	Display	User	Description
Save settings	SAV.		Save user settings • By saving this customised setting, this setting can easily be restored in the future
Confirm selection	YES		**You will be prompted to confirm your selection before making any changes YES**

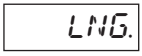
→ → →

Change of settings will take effect the next time the menu is entered

actions performed	restoration	
	Calibration	Setting
cancels USER menu rights	✓	✓
deletes the table of order of items in the USER - LIGHT menu	✓	✓
performs LIGHT menu factory reset	✓	✓
deletes data stored in FLASH	✓	✓
cancels all linearization tables	✓	✓
cancels all tares	✓	✓
factory calibration reset	✓	×
factory setting reset	×	✓

6.4.3 Language selection

2s › › › › *SER.* › › › › *LNG.* ›



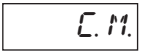
LNG.

Parameter	Display	User	Description
Language menu	LNG.		Language selection
Czech	CZ		Instrument menu is in Czech
English	ENG.		Instrument menu is in English DEF

→ →

6.4.4 New access pasword

2s › › › › › *SER.* › › › › › › *C. M.* › ›



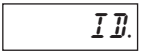
C. M.

Parameter	Display	User	Setting	Description
Setting of new password	C. M.			Enables the change of a numeric password which prevents unauthorised user access into LIGHT and PROFI menu When the password is set to 000 (factory default) user is not prompted to enter an access password
Password for LIGHT	PA I.		0 ... 999	**Setting of new password for LIGHT menu** • Universal passvord is **177** • Range: 0...999
Password for PROFI	PPR.		0 ... 999	**Setting of new password for PROFI menu** • Universal passvord is **915** • Range: 0...999

→ → →

6.4.5 Device identification

2s › › › › › *SER.* › › › › › › › *ID.* › › *YES* › ›



ID.

Parameter	Display	User	Description
Self identification	ID.		The device display reads the Device type, SW number, SW version and currently selected input mode • if the SW version starts with a letter instead of a number, it is a customised SW version Example **OMX 103 UNI** **84-006** • Device type SW number-version

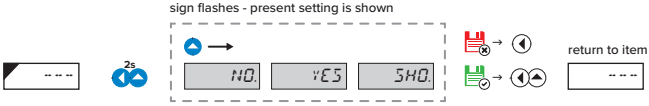
→ → →

SETTING
USER

Designed for machine operators
Items are adopted from Profi/Light menu and compiled as needed
Access is not password protected
Structure can be tree like (PROFI) or linear (LIGHT)

7.0 Selecting items into "USER" menu

- **USER** menu is designed to be used by an operator who only needs to access quickly few selected menu items (i.e. to set the limit value) while the remaining menu items are inacessible. This way the basic configuration of the device cannot be altered either knowingly or unknowingly.
- as a default, USER menu contains no items
- menu items marked by **USER** or by inverted triangle
- configuration can be done in either **LIGHT** or **PROFI** menu. **USER** menu adopts the structure of the menu it was created in



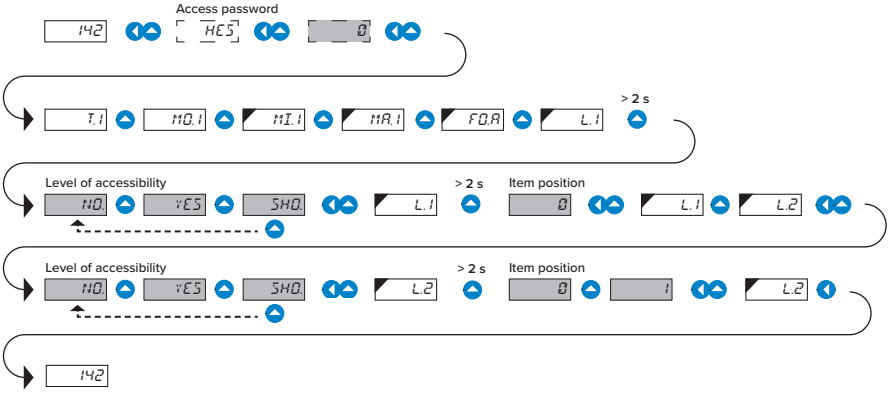
NO.	item will not be shown in USER menu
YES	item will be shown in USER menu and can be modified
SHO.	item will be shown in USER menu but cannot be modified

Organising items in “USER” menu

When compiling USER menu out of active LIGHT menu, it is possible to organise the items (max. 10) into an order in which they will be listed in the menu.

Example of setting the order of items in “USER” menu

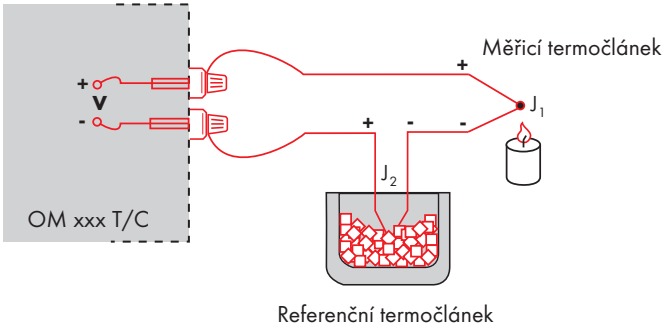
Direct access to setting of Limit 1 and Limit 2 from USER menu
(Example is given for LIGHT menu, but the same procedure can be used also in PROFI menu).



The result of the above sample configuration is that after pressing key ▲ the display will read „**L.1**“. Confirm your selection by pressing ◀+▲ and set the desired limit value, or by pressing key ▲ you are taken to „**L.2**“ setting, where you follow the same procedure of setting the desired limit value.
Configuration is finalised by bressing keys ◀+▲. This way the latest setting is storred. Return to the measuring mode is by pressing ◀.

8. 1 Connecting a thermocouple

When the signal convertor is set to measure temperature using a thermocouple, it offers two different ways of reference junctions' temperature measurement.



With reference thermocouple

- reference thermocouple may be placed in the same location as the signal convertor or at a place with a stable temperature / in a compensation box
- when using a fererence thermocouple, set CO.1 in the device's menu to IN2 or to E x.2
- when using a thermostat (a compensation box or a place with a stable temperature), enter into the menu item C.J.1 its temperature (applicable to setting CO.1 in E x.2)
- if the reference thermocouple is in the same environment as the signal convertor, set CO.1 to IN2. When using this method, the measurement of of ambinet temperature is done by the means of a sensor that is located in the convertor's terminal block.

Without reference thermocouple

- inaccuracy caused by the formation of different thermocouples at the terminal / wire junction of the thermocouple is not compensated
- when using this method, set CO.1 in the device menu to IN.1 or to E x.1
- when a reference thermocouple is not used, the innacuracy can reach up to 10°C (applicable to setting CO.1 in E x.1)

This device can communicate via serial line RS232 or RS485. ASCII protocol is used. Communication is carried out in the following format:

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

Baud rate can be set in the device menu. Also the device address can be set in the device menu in the range 0...31. The default setting is: ASCII protocol, rate of 9600 Baud, address 00. The type of serial communication line - RS232 / RS485 - is defined by an output card, which is detected by the device automatically.

You can find the list of commands at www.orbit.merret.cz/rs

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

Action	Transmitted data										
Data solicitation (PC)	#	A	A	<CR>							
Data transmission (instrument)	>	R	<SP>	D	D	D	D	D	(D)	(D)	<CR>
Confirmation of command (instrument) - OK	!	A	A	<CR>							
Confirmation of command (instrument) - Bad	?	A	A	<CR>							
Instrument identification	#	A	A	1Y	<CR>						
HW identification	#	A	A	1Z	<CR>						

LEGEND

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

RELAY, TARE

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

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

10.1 Table of error statements

Error Code	Cause	Remedy
E.2	Number is too small (large negative) to be displayed	change setting of decimal point, setting of channel constant
E.3	Number is too large to be displayed	change setting of decimal point, setting of channel constant
E.4	Number is outside the table range (low end)	create a new entry for a value lower than the current lowest entry, change input setting (of channel constant)
E.5	Number is outside the table range (high end)	create a new entry for a value higher than the current highest entry, change input setting (of channel constant)
E.6	Input signal is lower than the permitted input range	change input signal value or input range setting
E.7	Input signal is higher than the permitted input range	change input signal value or input range setting
E.8	Hardware error. A part of the instrument is not working properly	send the instrument for repair
E.9	Data in EEPROM corrupted	perform factory reset. If this message keeps coming up, send the unit for repair
E.10	Change of associated item in the menu, EEPROM data out of range	change setting of associated items (where change in one creates changes in others), perform factory reset, if problem persists, send back for repair
E.11	Memory was empty (presetting had been implemented)	If this message keeps coming up, send the unit for repair. Factory calibrations may be corrupt
E.12	Input circuit disconnected DC-U, PM-4/20, T/C, DU	check wire connection
E.13	Output current loop disconnected	check wire connection

11.1 Table of characters

The instrument allows to add two descriptive characters to the standard numeric formats (at the expense of the number of displayed digits). The setting is performed by means of a shifted ASCII code. Numeric value of the character equals the

sum of the numbers on both axes of the table.

Description is cancelled by entering characters with code 00

Example: How to set "mA": Locate lower case "m". It is where axis leading to 72 a 5 intersect. 72 + 5 = 77. Enter 77. Similarly, enter 33 for "A". For space " ", enter 00.

	0	1	2	3	4	5	6	7
0		!	"	#	$	%	&	'
8	(	)	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7
24	8	9	VA	Vr	<	=	>	?
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	{	|	}	~	

Examples:

mA	**77 33**
kg	**75 71**
°C	**94 35**

12. TECHNICAL DATA

INPUT

No. of inputs	1 or 2, isolated		
			DC
Range	±90 mA	< 200 mV	Input 1
	±180 mA	< 200 mV	Input 1
	±30 mV	> 10 MΩ	Input 3
	±60 mV	> 10 MΩ	Input 3
	±1000 mV	> 10 MΩ	Input 3
	±20 V	1,25 MΩ	Input 2
	±40 V	1,25 MΩ	Input 2
	±80 V	1,25 MΩ	Input 2
			PM
Range	±5 mA	< 200 mV	Input 1
	±20 mA	< 200 mV	Input 1
	4...20 mA	< 200 mV	Input 1
	±2 V	1 MΩ	Input 2
	±5 V	1 MΩ	Input 2
	±10 V	1 MΩ	Input 2
			OHM
Range	0...15 Ω		
	0...30 Ω		
	0...150 Ω		
	0...300 Ω		
	0...1 kΩ		
	0...3 kΩ		
	0...15 kΩ		
	0...30,0 kΩ (only for 2 or 4-wire connection)		
Connection	2, 3 or 4 wire		
			RTD
Type Pt	EU > 100/500/1 000 Ω, with 3 850 ppm/°C		
	Pt xxx		-50°...450°C
	US > 100 Ω, with 3 920 ppm/°C		
	Pt 100		-50°...450°C
	RU > 50/100 Ω with 3 910 ppm/°C		
	Pt 50		-200°...1 100°C
	Pt 100		-50°...450°C
Type Ni	Ni 1 000/ Ni 10 000 with 5 000/6 180 ppm/°C		
	Ni xxx		-50°...250°C
Type Cu	Cu 50/Cu 100 with 4 260/4 280 ppm/°C		
	Cu 100/4280		-200°...200°C
	Cu 100/4260		-50°...200°C
Connection	2, 3 or 4 wire		
			T/C
Type	J (Fe-CuNi)		-100°...900°C
	K (NiCr-Ni)		-100°...1 300°C
	T (Cu-CuNi)		-200°...400°C
	E (NiCr-CuNi)		-100°...800°C
	B (PtRh30-PtRh6)		700°...1 820°C
	S (PtRh10-Pt)		100°...1 760°C
	R (Pt13Rh-Pt)		100°...1 760°C
	N (Omegalloy)		-0°...1 300°C
	L (Fe-CuNi)		-100°...900°C
	Chromel-Copel		-100°...800°C
			DU
Suuply for lin. pot.	2,5 VDC/6 mA min. R of potentiometer is 500 Ohm		

PROJECTION

Display	LCD with backlight, 2x 3 characters + 2x description (3 characters)	
Format	-99...999	
Decimal point	configurable in the menu	

ACCURACY

TC	50 ppm/°C	
Accuracy	±0,15 % of full scale + 1 digit	
	±0,25 % of full scale + 1 digit	**Ni 10 000**
	±0,3 % of full scale + 1 digit	**T/C**
Accuracy of CJC	±1,5°C	
Rate	0,5...200 masurements/s	
Overload	10x (t < 100 ms),	2x (long term)
Linearization	by linear interpolation in 177 points - can be set only using free OM Link SW	
Digital filters	Averaging, Floating average, Exponential filter, Rounding	
Comp. of leads R	max. 30 Ω	**RTD**
CJC	configurable -20°...99°C or automatic	**T/C**
Functions	Tare - display reset Hold - measurement suspended (at contact) Lock - control keys disabled MM - Min/Max value, Math functions	
OM Link	company communication SW for setting, operation and update of instrument's FW	
Watch-dog	reset after 400 ms	
Calibration	at 25°C and 40 % r.h.	

COMPARATOR

No. of outputs	1 to 6
Type	digital, configurable in the menu, contact closure < 50 ms
Mode	Hysteresis, From-To, Batch, Error
Limits	-99 ... 999
Hysteresis	0...999
Delay	-99 ... 99,9 s
Outputs	1...6x relay with NO contact (Form A)
Relay	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

DATA OUTPUTS

No. of outputs	1 to 2
Protocols	ASCII, MESSBUS, MODBUS - RTU, PROFIBUS
Data format	8 bit + no parity + 1 stop bit (ASCII)
Rate	600...230 400 Baud 9 600 Baud...12 Mbaud (PROFIBUS)
RS 232	isolated, 2-way communication
RS 485	isolated, 2-way communication, address can be asigned (max. 31 devices)
PROFIBUS	SIEMENS data protocol
Ethernet	10/100BaseT, secure communication, TCP/IP Modbus (Slave)

** values applicable to resistor load*

ANALOGUE OUTPUTS

No. of outputs	1 to 4
Type	isolated, configurable with16 bit D/A converter, type and range are selectable in the menu
Non-linearity	0,1 % of FS
TC	15 ppm/°C
Speed	response to change of value < 1 ms
Voltage ranges	0...2/5/10 V, ±10 V
Current ranges	0...5/20 mA/4...20 mA - compensation of leads' resist. up to 600 Ω

EXCITATION

Fixed voltage	24 VDC/max. 1 W, isolated

POWER SUPPLY

Options	10...30 V AC/DC, max. 5 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 4000 mA) 80...250 V AC/DC, max. 5 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 630 mA)

MECHANICAL PROPERTIES

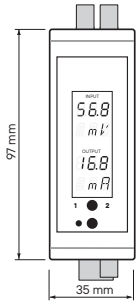
Material	PA 66, incombustible UL 94 V-I, blue
Dimensions	113 x 98 x 35 mm
Installation	to DIN rail 35 mm wide

OPERATING CONDITIONS

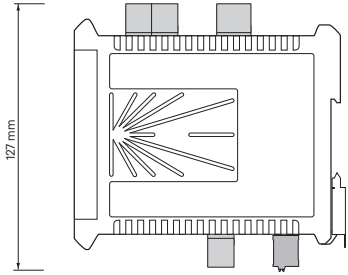
Connection	connector terminal board, conductor cross-section <1,5 mm2 /<2,5 mm2
Stabilisation period	within 5 minutes after power-on
Operating temp.	-20°...60°C
Storage temp.	-20°...85°C
Protection	IP20
Construction	safety class I
Overvoltage cat.	EN 61010-1, A2
Dielectric strength	4 kVAC over 1 min between supply and input 4 kVAC over 1 min. between supply and data/analogue output 4 kVAC over 1 min. between input and relay output 2,5 kVAC over 1 min. between input and data/analogue output 2,5 kVAC over 1 min. between inputs
Insulation resist.	for pollution degree II, measurement cat. III power supply > 600 V (BI), 300 V (DI) Input/Output > 600 V (BI), 300 V (DI)
EMC	EN 61326-1
Seismic resistance	IEC 980: 1993, par. 6

BI - Basic isolation, DI - Double Isolation

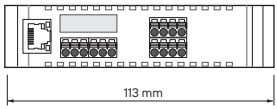
Front view



Side view



Top view



Installation to DIN rail of 35 mm width

It is strongly recommended to install the device in such a way, which will allow for unobstructed airflow along both side walls of the housing. Danger of overheating!

Product	**OMX 103UNI**
Type	.....
Serial number	.....
Date od sale	.....

A warranty period of 60 months from the date of sale to the user applies to this instrument.
Defects occuring during this period due to a component failure or poor workmanship shall be eliminated free of charge.

This warranty is valid only if the device was connected and used in accordance witht this user manual.

Warranty doe s not cover defects caused by:

- mechanical damage
- transportation
- intervention of unqualified personel incl. the user
- force majeure
- any other unprofessional interventions

Both warranty and post warranty service is to be performed by the manufacturer unless stated otherwice.

Stamp, signature

ES ES DECLARATION OF CONFORMITY

Company **ORBIT MERRET, spol. s r.o.**
Klanova 81/141, 142 00 Prague 4, Czech Republic, VAT No: CZ00551309

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

declares at its explicit responsibility that the product presented hereunder meets all technical requirements, is safe for use when utilised under the terms and conditions determined by ORBIT MERRET, spol.s r.o. and that our company has taken all measures to ensure conformity of all products of the types referred-to hereunder, which are being brought out to the market, with technical documentation and requirements of the appurtenant Czech statutory orders.

Product: DIN-rail mounted signal convertor

Type: **OMX 103**

Version: UNI, PWR, DC, UQC

The above have listed device and its versions are designed and manufactured in line with requirements of:

Statutory order no. 118/2016 Coll., on low-voltage electrical equipment (directive no. 2014/35/EU)
Statutory order no. 117/2016 Sb., on electromagnetic compatibility (directive no. 2014/30/EU)

The product qualities are in conformity with harmonized standards:

El. safety: EN 61010-1
EMC: EN 61326-1
Electronic measuring, control and laboratory devices
– Requirements for EMC "Industrial use"
EN 50131-1, chap. 14 and chap. 15, EN 50130-4, chap. 7, EN 50130-4, chap. 8(EN 61000-4-11, ed. 2), EN 50130-4, chap. 9 (EN 61000-4-2), EN 50130-4, chap. 10 (EN 61000-4-3, ed. 2) EN 50130-4, chap. 11 (EN 61000-4-6), EN 50130-4, chap. 12 (EN 61000-4-4, ed. 2) EN 50130-4, chap. 13 (EN 61000-4-5), EN 61000-4-8, EN 61000-4-9, EN 61000-6-1, EN 61000-6-2, EN 55022, chap. 5 and chap. 6

The product is furnished with CE label issued in 2020

As evidence serve the protocoles by the authorized and accredited organizations:
EMC EUROSIGNAL, Laboratory No.. L1663, protocol no: 286-LAB-20, 30/10/2020

Place and date of issue: Prague, 1. October 2020

Miroslav Hackl
Company Director

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