WARRANTY 5 YEARS

OM 402PID

4 DIGIT PROGRAMMABLE UNIVERSAL PID REGULATOR

INPUT
DC/PM/OHM/PT/NI/TC/POTENTIOMETER

SAFETY INSTRUCTIONS

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

TECHNICAL DATA

Measuring instruments of the OM 402 series conform to the European regulation 89/336/EWG.

The instruments are up to the following European standards:
EN 61010-1 Electrical safety
EN 61326-1 Electronic measuring, control and laboratory devices – Requirements for EMC "Industrial use"

Seismic capacity:
IEC 980: 1993, čl. 6

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

CONNECTION

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

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2. INSTRUMENT DESCRIPTION

2.1 DESCRIPTION

OM 402PID is a 4-digit versatile panel mount PID regulator designed for maximum fl exibility and user comfort while maintaining a low price.

Type OM 402PID is a multifunction instrument with the option of confi guration for 8 various input options, easily confi gurable in the instrument menu. In its basic confi guration the OM 402PID has two regulatory relays and two relay alarm outputs. Desired value can either be constant, or defi ned by one of 14 programmes.

The instrument is based on a 8-bit microcontroller and a multichannel 24-bit sigma-delta converter, which secures high accuracy, stability and easy operation of the instrument.

MEASURING RANGES

UNI	DC:	0...60/150/300/1200 mV
	PM:	0...5 mA/0...20 mA/4...20 mA/±2 V/±5 V/±10 V/±40 V
	OHM:	0...100 Ω/0...1/10/100 kΩ
	RTD-Pt:	Pt 50/100/Pt 500/Pt 1000
	RTD-Cu:	Cu 50/Cu 100
	RTD-Ni:	Ni 1 000/Ni 10 000
	T/C:	J/K/T/E/B/S/R/N/L
	DU:	Linear potentiometer (min. 500 Ω)

PROGRAMMABLE PROJECTION

Selection:	of type of input and measuring range
Measuring range:	adjustable as fixed or with automatic change
Setting:	manual, optional projection on the display may be set in the menu for both limit values of the input signal, e.g. input 0...20 mA > 0...850,0
Projection:	-9999...9999

PID REGULATOR

Execution:	paralel PID, PI or proporcional
Relay output:	double, two-state, PWM
Analogue outpur:	electrically isolated, modes: heatinf, cooling, both
Required value:	set, from the analogue output, from program
Nr. of programs/steps:	14/64
Launching:	time - one off /weekly, by external input, by buttons

RELAY OUTPUTS

Type:	digital, settable in the menu
Outputs:	relays L1, L2 are alarm outputs, relays L3, L4 are intended as regulatory but can be also used as alarms

ANALOG OUTPUT

Usage:	where this type of signal is requested by action devices, or it can be used for processing of the measured value by external devices.
Type:	electrically isolated, programmable with a 12 bit D/A convertor. Functions, type and range of the output are seelctable in the instrument's menu

COMPENSATION

of conduct:	in the menu it is possible to perform compensation for 2-wire connection
of conduct in probe:	internal connection (conduct resistance in measuring head)
of CJC (T/C):	manual or automatic, in the menu it is possible to perform selection of the type of thermocouple and compensation of cold junctions, which is adjustable or automatic(temperature at the brackets)

* only for types DC, PM, DU

DIGITAL FILTERS

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

MATHEMATIC FUCTIONS

Min/max. value:	registration of min./max. value reached during measurement
Tare:	designed to reset display upon non-zero input signal
Peak value:	the display shows only max. or min. value
Linearization:*	by linear interpolation in 50 points (solely via OM Link)

MEASURED DATA RECORD

RTC: Internal fixed storage of data within a selected time period and recording frequency. The capacity is 256 000 values, each with a date and time stamp. Stored data can be transferred to a PC either via RS 232/485 or via the OM Link interface

2.2 OPERATION

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

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

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

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

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

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

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

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

2.3 OPTIONS

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

Input of required value is used for dependent control method. Current and voltage inputs are available

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

3. INSTRUMENT CONECTION

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

MEASURING RANGES

TYPE	INPUT I	INPUT U
DC		0...60/150/300/1 200 mV
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V
OHM	0...100 Ω/1 kΩ/10 kΩ/100 kΩ	
RTD-Pt	Pt 50/100/Pt 500/ Pt 1 000	
RTD-Cu	Cu 50/100	
RTD-Ni	Ni 1 000/10 000	
T/C	J/K/T/E/B/S/R/N/L	
DU	Linear potentiometer (min. 500 Ω)	

OPTION „A" - Setpoints

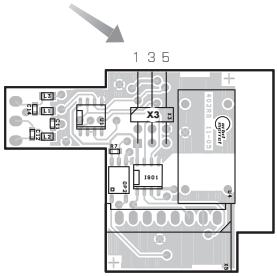
TYPE	INPUT I	INPUT U
PM	0...5/20 mA/4...20 mA	±2/±5/±10/±40 V

Termination of RS 485 communication line

X3 - Termination of commuication line RS 485

Full	Significance	Default	Recomendation
1-2	connect L+ to (+) source	terminalconnected	
3-4	termination of line 120 Ohm	disconnected	connect at the end of line
5-6	connect L- to (-) source	terminalconnected	do not disconnect

RS 485 line should have a linear structure - wires (ideally shielded and twisted) should lead from one device to another.



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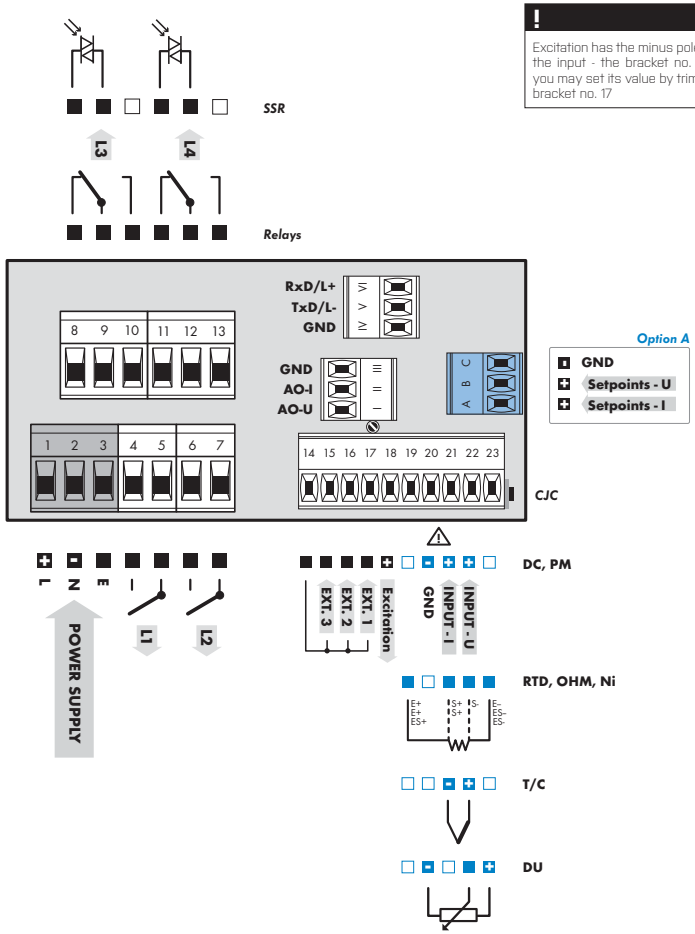
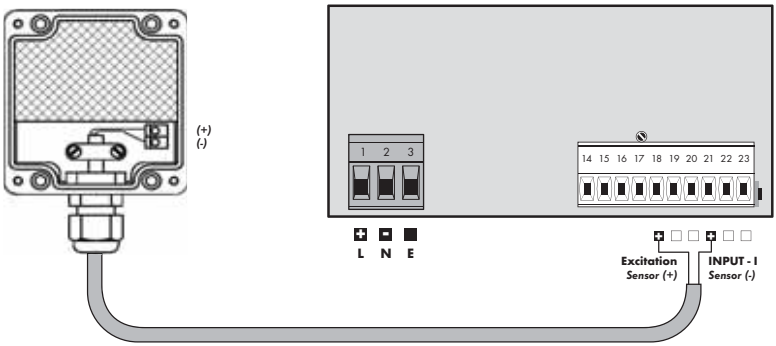
Excitation has the minus pole common with the input - the bracket no. 20 - GND and you may set its value by trimmer above the bracket no. 17

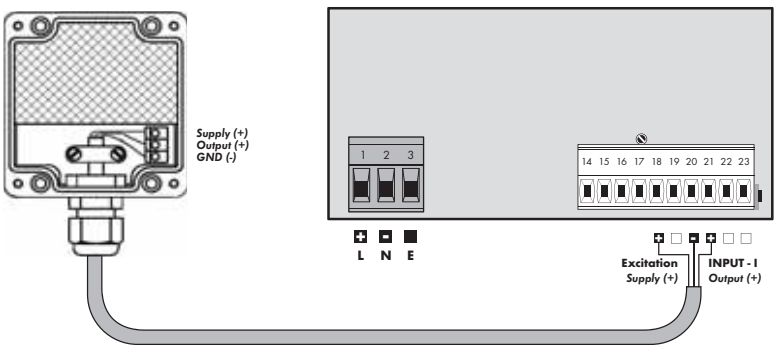


Maximum of 250 mA may be connected to "INPUT - I" (bracket no. 21) , i.e. 10-times range overload.
Mind the correct connection/mistaking of current - voltage input.
Destruction of measuring resistance in current input (15R) may occur.

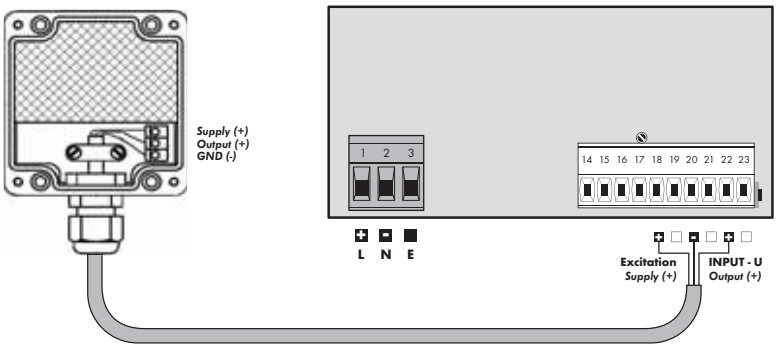
Example connection of a 2-wire sensor with current signal output powered by instrument's excitation



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

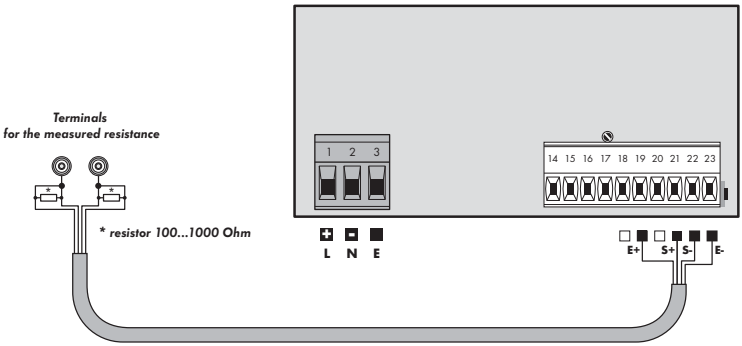


Example connection of 3-wire sensor with voltage signal output powered by instrument's excitation



Example connection of resistance measurement using 4 wires

By connecting resistor R* we elimintate error message **E. I.Ov.** (input overflow) when the measured resistance is disconnected



SETTING **PROFI**

For expert users
Complete instrument menu
Access is password protected
Possibility to arrange items of the **USER MENU**
Tree menu structure

SETTING **LIGHT**

For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

SETTING **USER**

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

4.1 SETTING

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

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

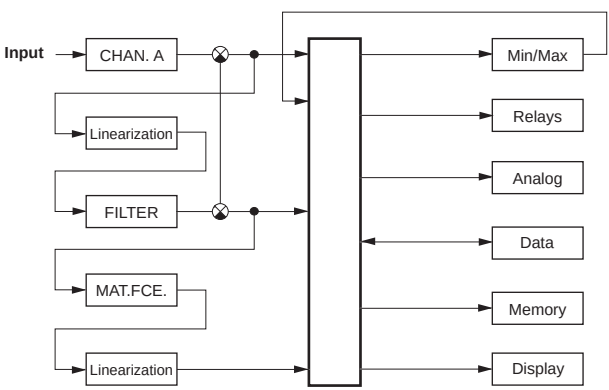
PROFI **Complete programming menu**
- contains complete instrument menu and is protected by optional number code

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

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

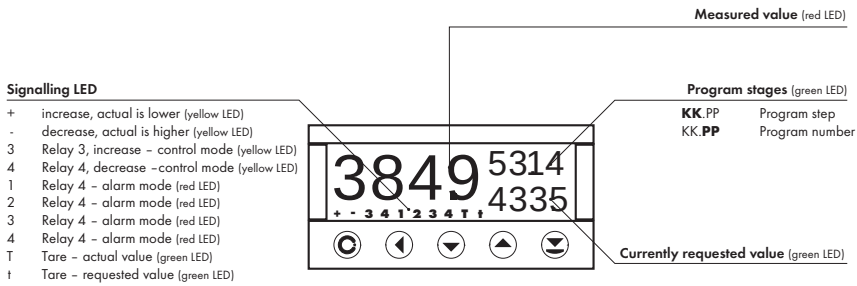
Complete instrument operation and setting may be performed via OM Link communication interface, which is a standard equipment of all instruments.
The operation program is freely accessible (www.orbit.merret.eu) and the only requirement is the purchase of OML cable to connect the instrument to PC. It is manufactured in version RS 232 and USB and is compatible with all ORBIT MERRET instruments.
Another option for connection is with the aid of data output RS 232 or RS 485 (without the need of the OML cable).

Scheme of processing the measured signal



4. INSTRUMENT SETTING

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



Symbols used in the instructions

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

DEF — values preset from manufacture

42 — symbol indicates a flashing light (symbol)

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

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

after pressing the key the set value will not be stored

after pressing the key the set value will be stored

30 — continues on page 30

Setting the decimal point and the minus sign

DECIMAL POINT

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

THE MINUS SIGN

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

Control keys functions

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

Setting items into „USER" menu

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

USER

NO item will not be displayed in USER menu

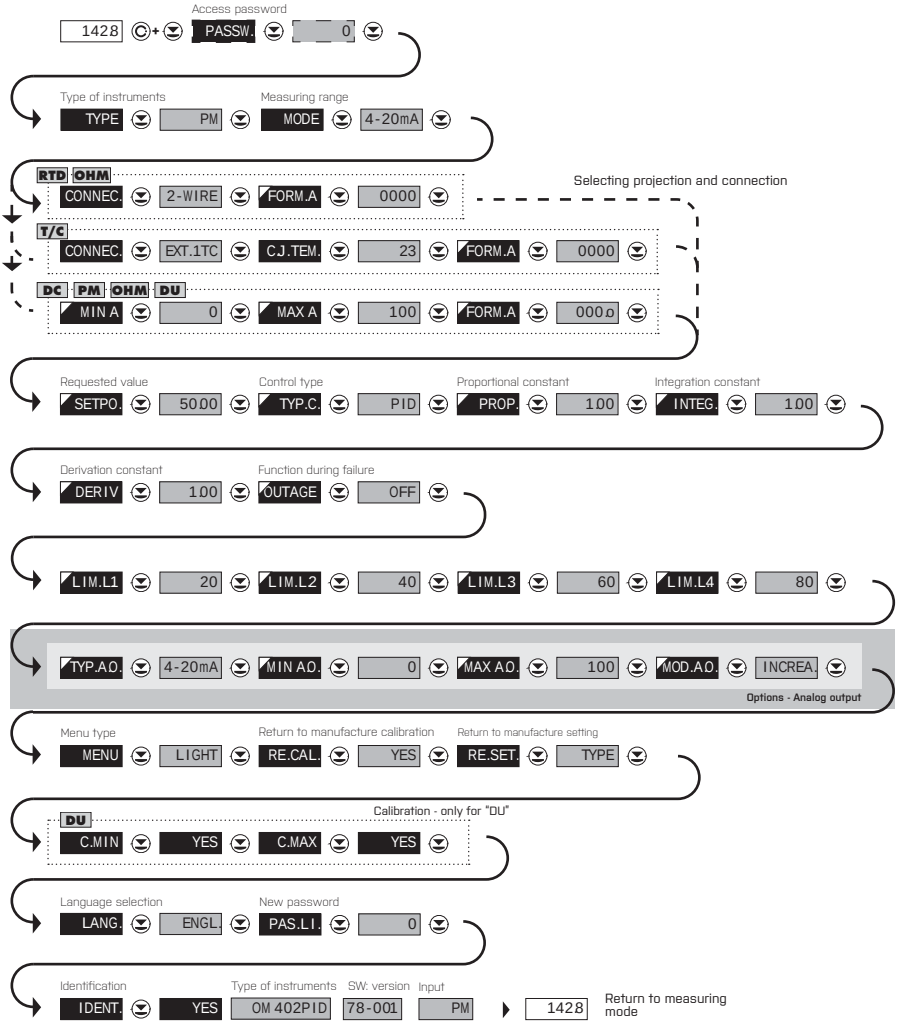
YES item will be displayed in USER menu with the option of setting

SHOW item will be solely displayed in USER menu

SETTING
LIGHT

For trained users
Only items necessary for instrument setting
Access is password protected
Possibility to arrange items of the **USER MENU**
Linear menu structure

Preset from manufacture	
Password	"0"
Menu	LIGHT
USER menu	off
Setting the items	DEF



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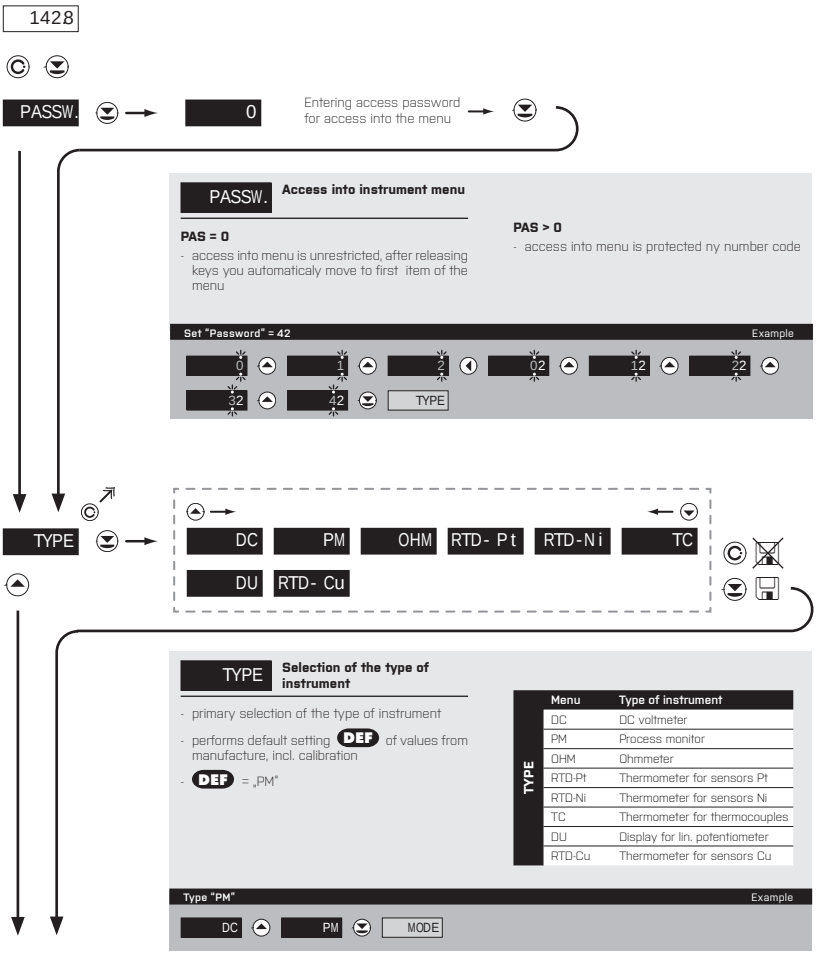
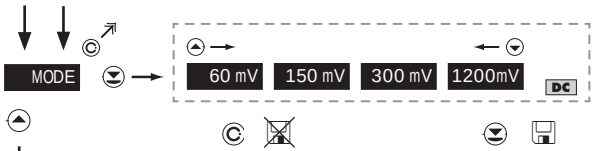
Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode





MODE **Selection of the instrument measuring range**

DEF = 60 mV

MODE	Menu	Measuring range
	60 mV	±60 mV
	150 mV	±150 mV
	300 mV	±300 mV
	1200mV	±1,2 V

Range ±150 mV Example

60 mV ▲ 150 mV ▼ MIN A

MIN A **Setting display projection for minimum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 mV > MIN A = 0 Example

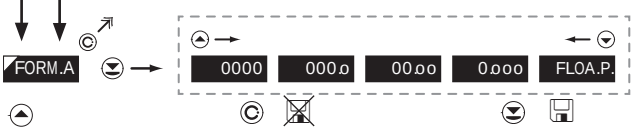
0 ▼ MAX A

MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 150 mV > MAX A = 3500 Example

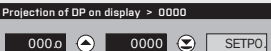


FORM.A **Setting projection of the decimal point**

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

DEF = 000.0

Projection of DP on display > 0000 Example



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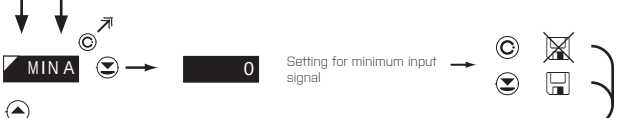
MODE **Selection of the instrument measuring range**

DEF = 4 - 20 mA

MODE	Menu	Range
	0-5mA	0...5 mA
	0-20mA	0...20 mA
	4-20mA	4...20 mA
	0-2 V	±2 V
	0-5 V	±5 V
	0-10 V	±10 V
	0-40 V	±40 V
	Er.4-20	4...20 mA, with error statement of „underfl ow" upon signal smaller than 3,36 mA

Range 0...20 mA Example



MIN A **Setting display projection for minimum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

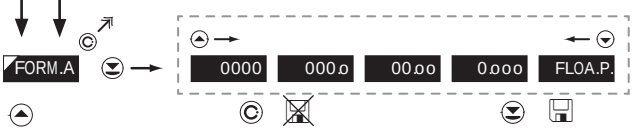
Projection for 0 mA > MIN A = -25 Example

MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 20 mA > MAX A = 2500 Example

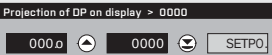


FORM.A **Setting projection of the decimal point**

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

DEF = 000.0

Projection of DP on display > 0000 Example



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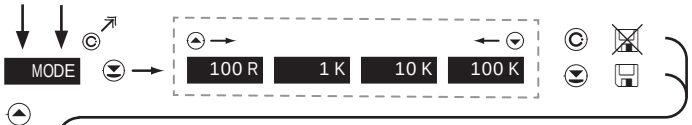


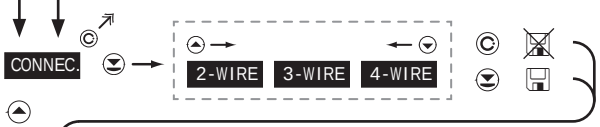
MODE **Selection of the instrument measuring range**

DEF = 100 Ω

MODE	Menu	Measuring range
	100 R	0...100 Ω
	1 k	0...1 kΩ
	10 k	0...10 kΩ
	100 k	0...100 kΩ

Range 0...10 kΩ Example

100 R ▲ 1 k ▲ 10 K ▼ CONNEC.



CONNEC. **Selection of the type of sensor connection**

DEF = 2- WIRE

CONNEC.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONNEC. = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ MIN A

MIN A **Setting display projection for minimum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for 0 Ohm > MIN A = 0 Example

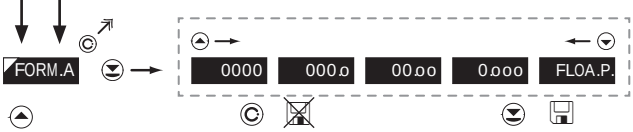
0 ▼ MAX A

MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for 10 kOhm > MAX A = 10000 Example

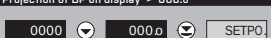


FORM.A **Setting projection of the decimal point**

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

DEF = 0000

Projection of DP on display > 000.0 Example



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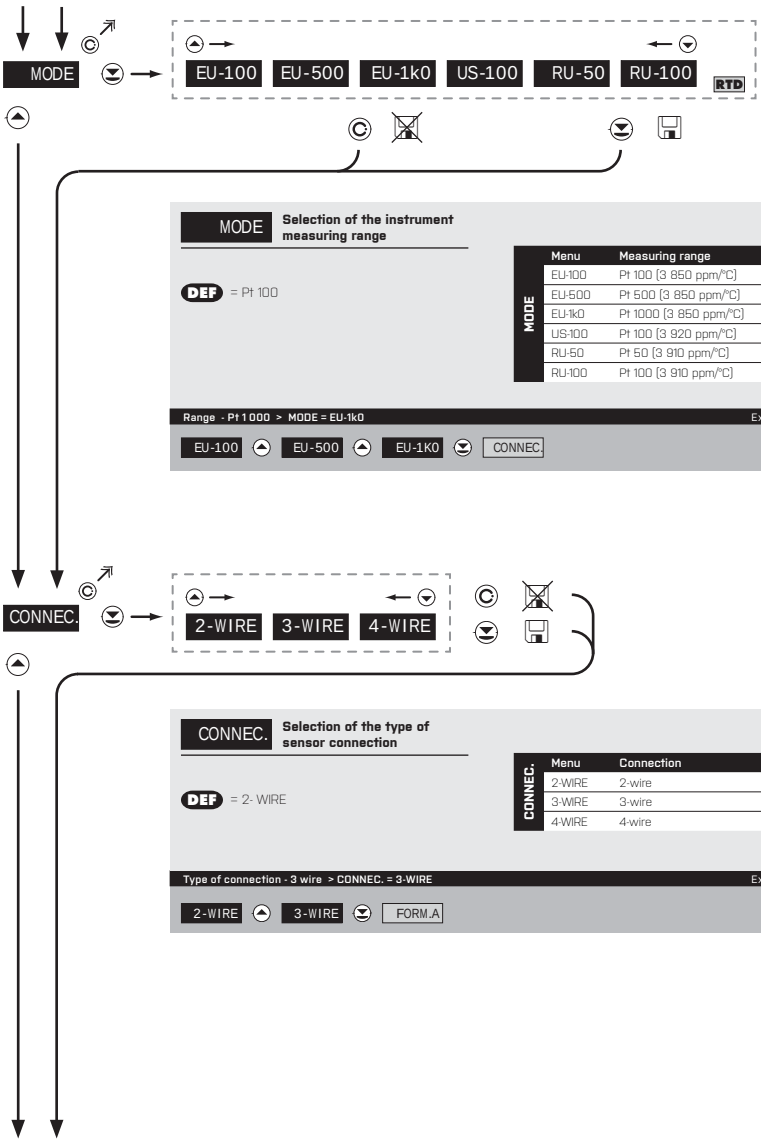


MODE **Selection of the instrument measuring range**

DEF = Pt 100

MODE	Menu	Measuring range
	EU-100	Pt 100 (3 850 ppm/°C)
	EU-500	Pt 500 (3 850 ppm/°C)
	EU-1k0	Pt 1000 (3 850 ppm/°C)
	US-100	Pt 100 (3 920 ppm/°C)
	RU-50	Pt 50 (3 910 ppm/°C)
	RU-100	Pt 100 (3 910 ppm/°C)

Range - Pt 1 000 > MODE = EU-1k0 Example

EU-100 ▲ EU-500 ▲ EU-1K0 ▼ CONNEC.

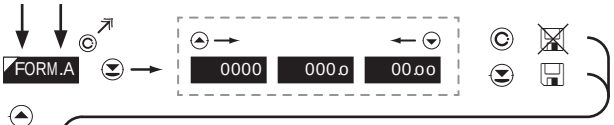
CONNEC. **Selection of the type of sensor connection**

DEF = 2- WIRE

CONNEC.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONNEC. = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ FORM.A



FORM.A **Setting projection of the decimal point**

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

DEF = 0000

Projection of DP on display > 000.0 Example

0000 000.0 SETPO

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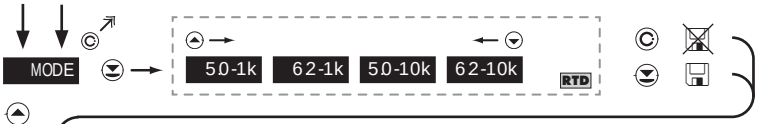


MODE **Selection of the instrument measuring range**

DEF = Ni 1 000 - 5 000 ppm/°C

MODE	Menu	Measuring range
	5.0-1k	Ni 1 000 (5 000 ppm/°C)
	6.2-1k	Ni 1 000 (6 180 ppm/°C)
	5.0-10k	Ni 10 000 (5 000 ppm/°C)
	6.2-10k	Ni 10 000 (6 180 ppm/°C)

Range - Ni 10 000, 5 000 ppm > MODE = 5.0-10k Example

5.0-1k ▲ 6.2-1k ▲ 5.0-10k ▼ CONNEC.

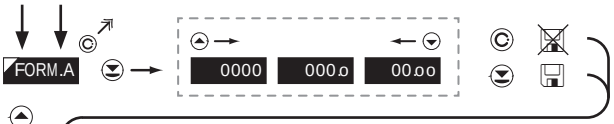
CONNEC. **Selection of the type of sensor connection**

DEF = 2- WIRE

CONNEC.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONNEC. = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ FORM.A



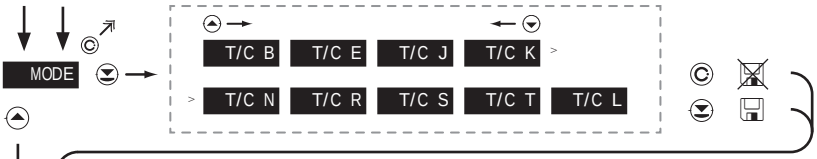
FORM.A **Setting projection of the decimal point**

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

DEF = 0000

Projection of DP on display > 000.0 Example

34



MODE **Selection of the type of thermocouple**

DEF = Type "J"

MODE	Menu	Type of thermocouple
	T/C B	B
	T/C E	E
	T/C J	J
	T/C K	K
	T/C N	N
	T/C R	R
	T/C S	S
	T/C T	T
	T/C L	L

Type of thermocouple "K" Example

J ▲ K ▼ CONNEC.

CONNEC. **Selection of the type of sensor connection**

DEF = EXT. 1TC

CONNEC.	Menu	Connection	Ref. T/C
	INT.1TC	measuring C.J. at instrument brackets	×
	INT.2TC	measuring C. J. at instrument brackets with anti-series connected ref. TC	✓
	EXT.1TC	the entire measuring set is working under invaried and constant temperature	×
	EXT.2TC	when using compensation box	✓

Selection of the type of sensor connection > CONNEC. = EXT. 2TC Example

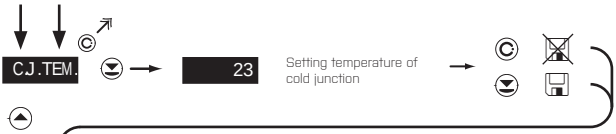
EXT1TC ▲ EXT2TC ▼ CJ.TEM.

!

For thermocouple type "**B**" the items **CONECT.** and **C.J. TEM.** are not available

!

Method and procedure of setting the cold junctions is described in separate chapter on page 90

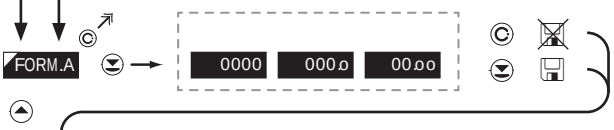


C.J.TEM. **Setting temperature of cold junction**

- range 0...99°C with compensation box

DEF = 23

Setting temperature of cold junction > C.J. TEM. = 35 Example

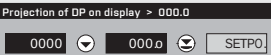


FORM.A **Setting projection of the decimal point**

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

DEF = 0000

Projection of DP on display > 000.0 Example



34

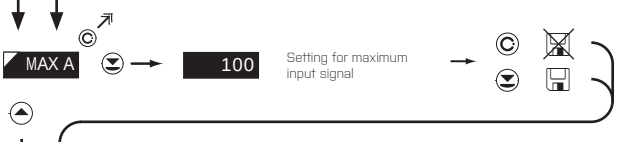
Typ "DU"

MIN A **Setting display projection for minimum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 0

Projection for the beginning > MIN A = 0 Example

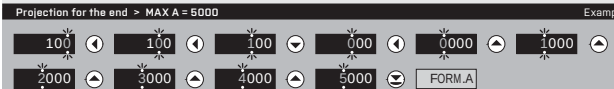


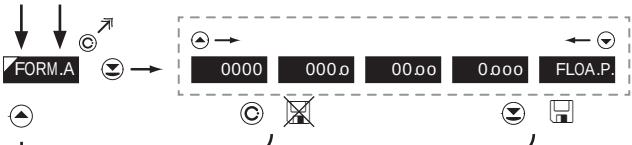
MAX A **Setting display projection for maximum value of input signal**

- range of the setting: -99999...999999
- position of the DP does not affect display projection
- the DP is automatically shifted after the value is confirmed

DEF = 100

Projection for the end > MAX A = 5000 Example





FORM.A **Setting projection of the decimal point**

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

DEF = 000.0

Projection of DP on display > 000.0 Example

000.0 SETPO.

34 Calibration of the beginning and the end of range of linear potentiometer is on page 43

MODE **Selection of the instrument measuring range**

DEF = 428 - 50

MOD	Menu	Measuring range
	428-50	Cu 50 (4 285 ppm/°C)
	428-100	Cu 100 (4 285 ppm/°C)
	426-50	Cu 50 (4 260 ppm/°C)
	426-100	Cu 100 (4 260 ppm/°C)

Range - Cu 50/4260 ppm > MODE = 426-50 Example

428-50 ▲ 428-01 ▲ 426-50 ▼ CONNEC.

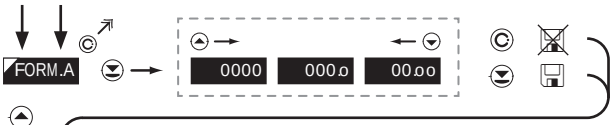
CONNEC. **Selection of the type of sensor connection**

DEF = 2- WIRE

CONNEC.	Menu	Connection
	2-WIRE	2-wire
	3-WIRE	3-wire
	4-WIRE	4-wire

Type of connection - 3 wire > CONNEC. = 3-WIRE Example

2-WIRE ▲ 3-WIRE ▼ FORM.A



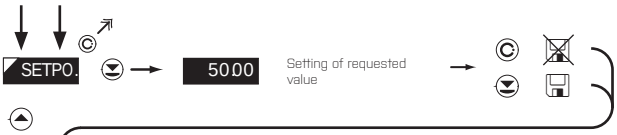
FORM.A **Setting projection of the decimal point**

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

DEF = 0000

Projection of DP on display > 000.0	Example
0000 ⏷ 000.0 ⏷ SETPO.	

34



SETP0. Setting of requested value

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

DEF = 50.00

Setting of requested value > ZADANA = 52 Example

TYP.C. Selecting a type of control

DEF = PID

TYP. C.	Menu	Controls
	PROP.	Proportional
	PI	Proportional - Integral
	PID	Proportional - Integral - Derivative

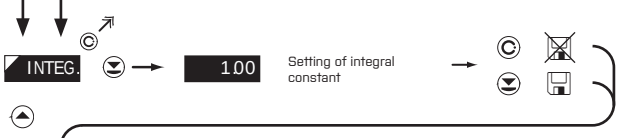
Selecting a type of control - PID > TYP. C. = PID Example

PROP. **Setting of proportional constant**

- range of the setting: 0...999999

DEF = 1.00

Setting of proportional constant > PROP. = 1.3 Example



INTEG. **Setting of integral constant**

range of the setting: 0,00001...999999

DEF = 1.00

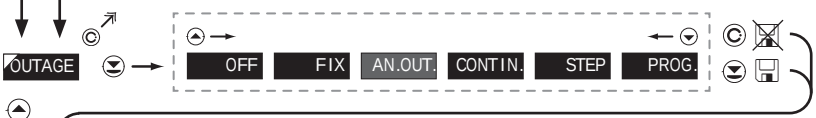
Setting of integral constant > INTEG. = 1.2 Example

DERIV. **Setting of derivative constant**

- range of the setting: 0...999999

DEF = 1.00

Setting of derivative constant > DERIV. = 1.3 Example



OUTAGE **Selection of function during a power failure**

DEF = OFF

Menu item „**ANALOG**" can be accessed only if the unit if fitted with input "Requested value"

OUTAGE	Menu	Function
	OFF	Control process switches off
	FIX	Control to a fixed value
	ANALOG.	Control process will be controlled by analogue input "Setpoint"
	CONTIN..	Control process will be resumed from the moment of power loos
	STEP	Control process will be resumed from the beginning of the last step
	PROG.	Control process will be resumed from the beginning of the last program

Selection of function during a power failure - | / OUTAGE = CONTIN. Example

38

LIM L1 — Setting boundary for limit 1

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 20

DEF „Hystresis"=0, „Delay"=0

Setting limit 1 > L 1 = 32 — Example

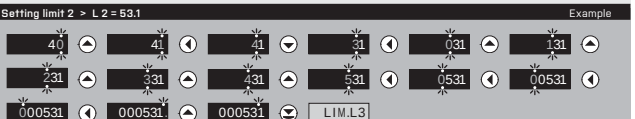
LIM L2 — Setting boundary for limit 2

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "PROFI" menu

DEF = 40

DEF „Hystresis"=0, „Delay"=0

Setting limit 2 > L 2 = 53.1 — Example



LIM L3 Setting boundary for limit 3

- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 60

DEF „Hystresis"=0, „Delay"=0

Setting limit 3 > L 3 = 85 Example

LIM L4 Setting boundary for limit 4

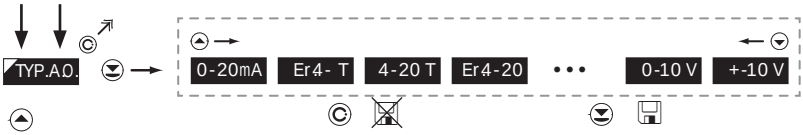
- range of the setting: -99999...999999
- contingent modification of hysteresis or delay may be performed in "**PROFI**" menu

DEF = 80

DEF „Hystresis"=0, „Delay"=0

Setting limit 4 > L 4 = 103 Example

* subsequent item on the menu depends on instrument equipment



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

TYP. A.O.	Menu	Range	Description
	0-20mA	0...20 mA	
	Er.4- T	4...20 mA	with error message indication and broken loop indication (<3,6 mA)
	4-20 T	4...20 mA	with broken loop indication (<3,6 mA)
	Er.4-20	4...20 mA	with indication of error statement (<3,6 mA)
	4-20mA	4...20 mA	
	0-5mA	0...5 mA	
	0-2 V	0...2 V	
	0-5 V	0...5 V	
	0-10 V	0...10 V	
	+-10 V	±10 V	

DEF = 4...20 mA

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

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

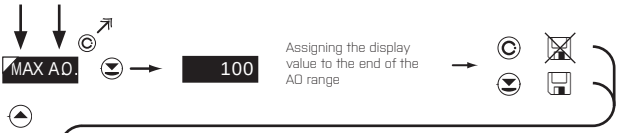
DEF = 0

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

Display value for the beginning of the AO range > MIN A.O. = 0 Example

!

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

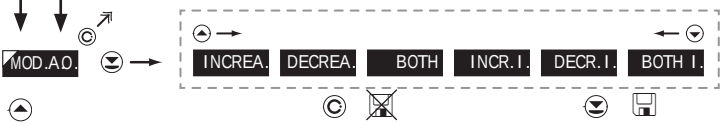


MAX AO. Assigning the display value to the end of the AO range

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

DEF = 100

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

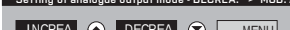


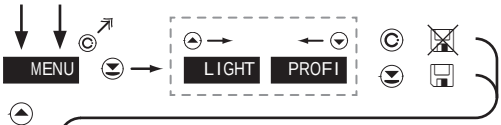
MOD.AO. Setting of analogue output mode

MOD. A.O.	Menu	Function
	INCREA.	Increase the controlled value
	DECREA.	Decrease the controlled value
	BOTH	Increase/decrease the controlled value, zero in the middle
	INCR. I.	Increase the controlled value, inverse output
	DECR. I.	Decrease the controlled value, inverse output
	OBOJ. I.	Increase/decrease the controlled value, zero in the middle, inverse output

DEF = INCREA.

Setting of analogue output mode - DECREA. > MOD. A.O. = DECREA. — Example





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

LIGHT > menu LIGHT, a simple menu, which contains only the most essential items necessary for instrument setting
> linear tree structure

PROFI > menu PROFI, a complete menu for complete instrument setting
> tree menu structure

DEF = LIGHT

Menu LIGHT > MENU = LIGHT Example

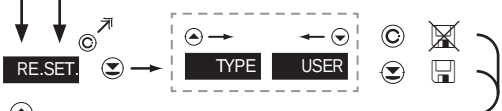
LIGHT ⏬ RE.CAL.

RE.CAL. **Restoration of manufacture calibration**

- in the event of error calibration it is feasible to restore manufacture calibration
- Prior to execution of any modifications you will be asked to confirm your selection (YES)

Restoration of manufacture calibration > RE. CAL. Example

RE.CAL. ⏫ YES ⏬ RE.SET.



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

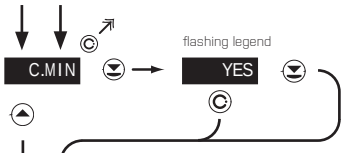
- in the event of error setting the manufacture setting may be restored
- restoration is performed for the currently selected type of the instrument input (select "TYPE")
- provided you stored your user setting in the "PROFI" menu, it may also be restored (select "USER")
- loading manufacture calibration and primary setting of items on the menu (DEF)

Restoration of manufacture setting > RE. SET. Example

RE.SET. ⏫ TYPE ⏬ LANG.

* subsequent item on the menu depends on instrument equipment

Type „DC"	44
Type "PM"	44
Type "OHM"	44
Type "RTD-Pt"	44
Type "RTD-Ni"	44
Type "T/C"	44
Type "DU"	43
Type "RTD-Cu"	44



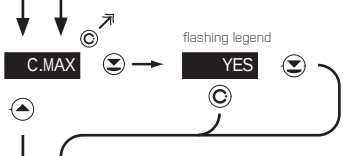
C.MIN **Calibration of input range - the potentiometer traveller in initial position**

Only for type "DU"

- prior confirming the flashing "YES" sign the potentiometer traveller has to be in given idle position

Calibration of the beginning of the range > C. MIN Example

YES C.MAX



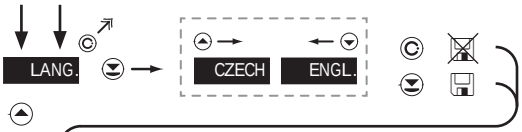
C.MAX **Calibration of input range - the potentiometer traveller in end position**

Only for type "DU"

- prior confirming the flashing "YES" sign the potentiometer traveller has to be in given idle position

Calibration of the end of the range > C. MAX Example

YES LANG.



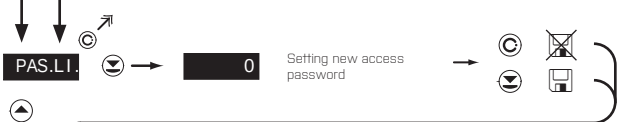
LANG. **Selection of language in instrument menu**

- selection of language version of the instrument menu

DEF = ENGL.

Language selection - ENGLISH > LANG. = ENGL. Example

ENGL. → PAS.LI.



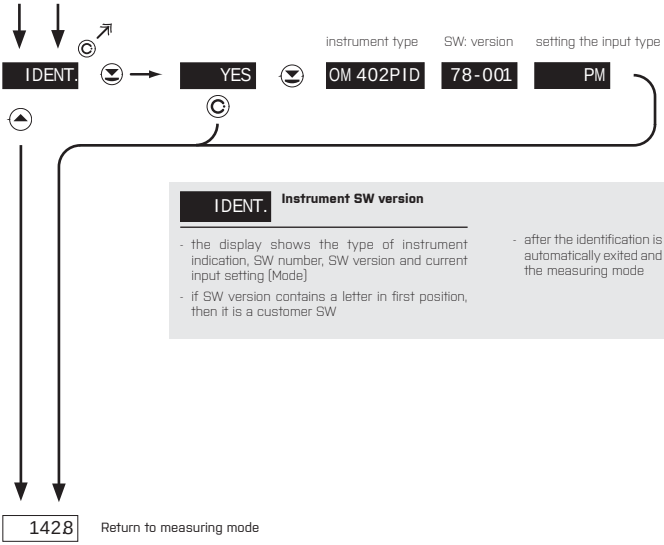
PAS.LI. **Setting new access password**

- access password for menu **LIGHT**
- range of the number code 0...9999
- upon setting the password to "**0000**" the access to menu **LIGHT** is free without prompt to enter it
- in case the password is lost, please contact the adminstrator of this device

DEF = 0

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

0 → 1 → 01 → 11 → 21 → 31 → 41 → 041 → 141 → 241 → 341 → IDENT.



IDENT. **Instrument SW version**

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

SETTING
PROFI

For expert users
Complete instrument menu
Access is password protected
Possibility to arrange items of the **USER MENU**
Tree menu structure

6.0 SETTING "PROFI"

PROFI **Complete programming menu**

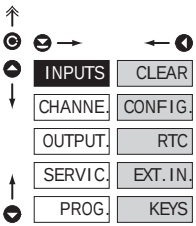
- contains complete instrument menu and is protected by optional number code
- designed for expert users
- preset from manufacture is menu **LIGHT**

Switching over to "PROFI" menu

C + ▼
- access to **PROFI** menu
- authorization for access to **PROFI** menu does not depend on setting under item SERVIC. > MENU
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > PROFI =0)

C + ▼
- access to menu selected under item SERVIC. > MENU > **LIGHT**/**PROFI**
- password protected access (unless set as follows under the item SERVIC. > N. PASS. > LIGHT =0)
- for access to **LIGHT** menu passwords for **LIGHT** and **PROFI** menu may be used

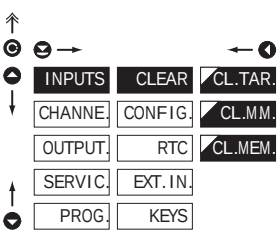
6.1 SETTING "PROFI" - INPUT



The primary instrument parameters are set in this menu

CLEAR	Resetting internal values
CONFIG.	Selection of measuring range and parameters
RTC	Setting date and time for option with RTC
EXT. IN.	Setting external inputs functions
KEYS	Assigning further functions to keys on the instrument

6.1.1 RESETTING INTERNAL VALUES



CLEAR **Resetting internal values**

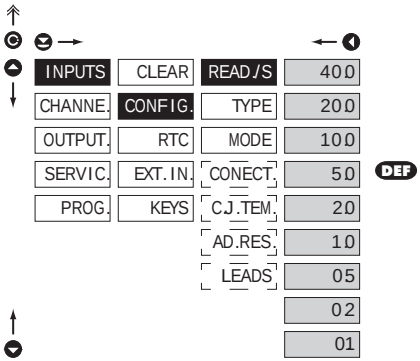
CL.TAR.	Tare resetting
CL.MM.	Resetting min/max value

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

CL.MEM.	Resetting the instrument memory

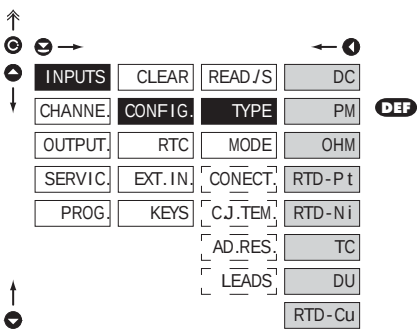
- resetting memory with data measured in the "RTC" mode

6.1.2a SELECTION OF MEASURING RATE



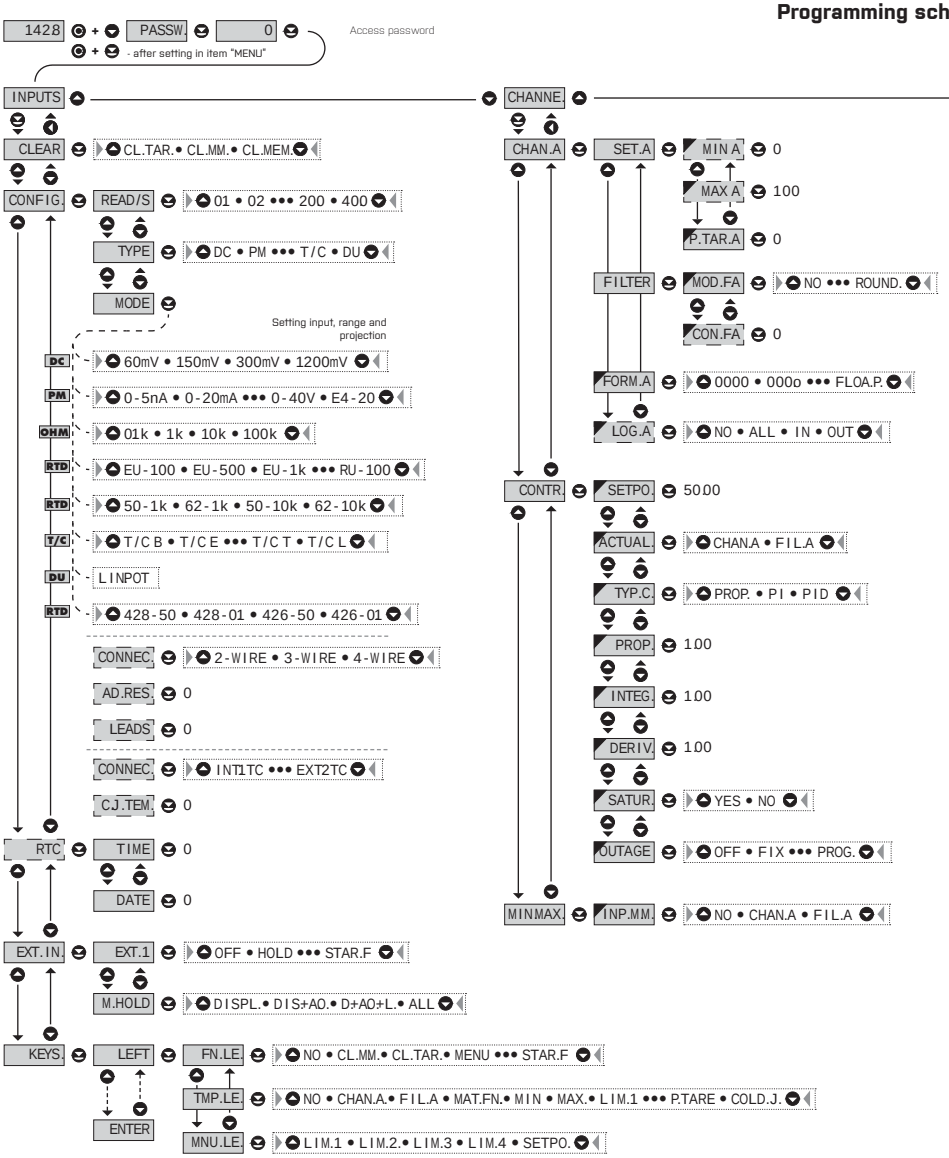
READ/S	Selection of measuring rate
40.0	40,0 measurements/s
20.0	20,0 measurements/s
10.0	10,0 measurements/s
5.0	5,0 measurements/s
2.0	2,0 measurements/s
1.0	1,0 measurement/s
0.5	0,5 measurements/s
0.2	0,2 measurements/s
0.1	0,1 measurements/s

6.1.2b SELECTION OF „INSTRUMENT" TYPE

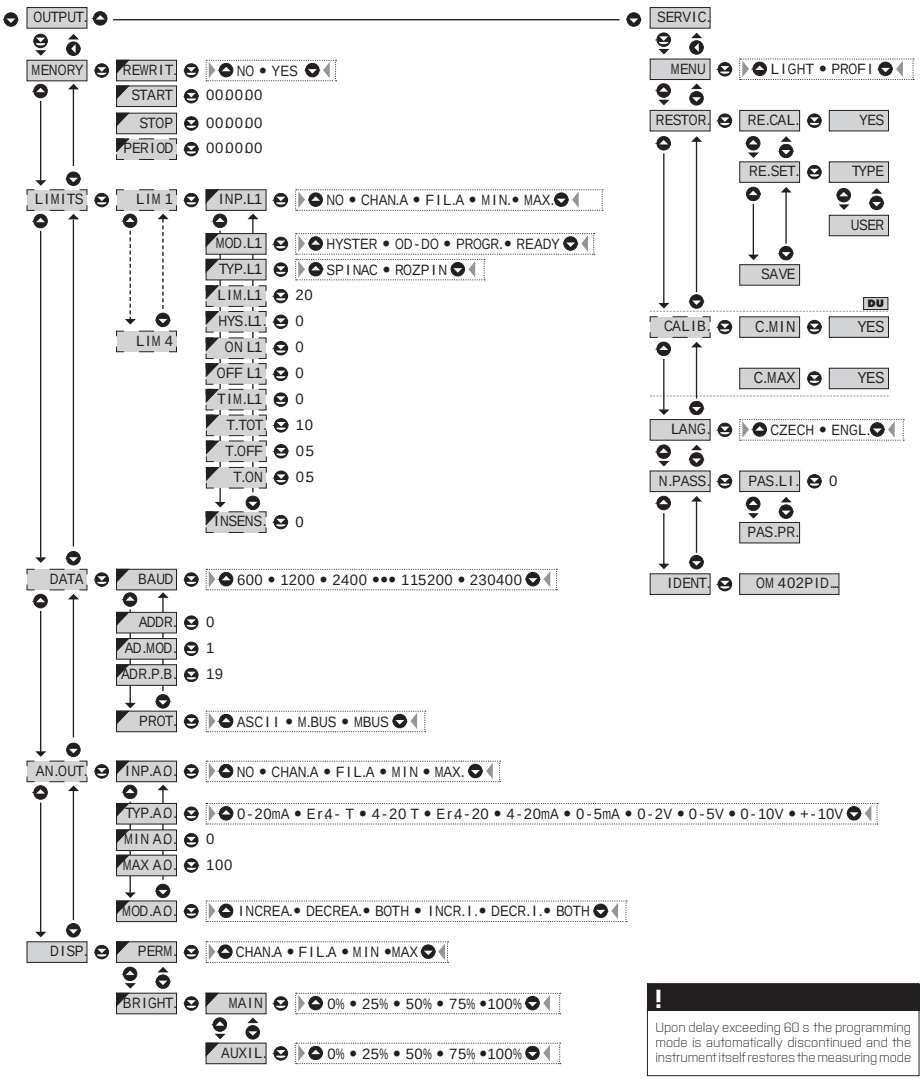


TYPE	Selection of „instrument" type
	- selection of particular type of "instrument" is bound to relevant dynamic items
DC	DC voltmeter
PM	Process monitor
OHM	Ohmmeter
RTD-Pt	Thermometer for Pt xxx
RTD-Ni	Thermometer for Ni xxxx
TC	Thermometer pro thermocouples
DU	Display for linear potentiometers
RTD-Cu	Thermometer for Cu xxx

Programming sch



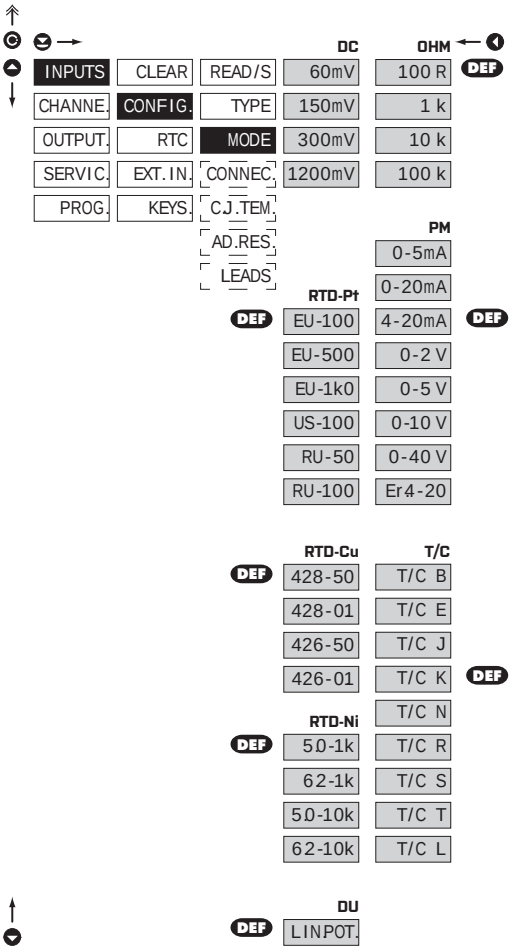
eme PROFI MENU



!

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

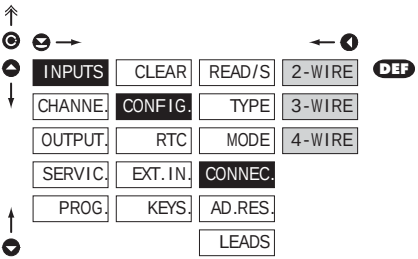
6.1.2c SELECTION OF MEASURING RANGE

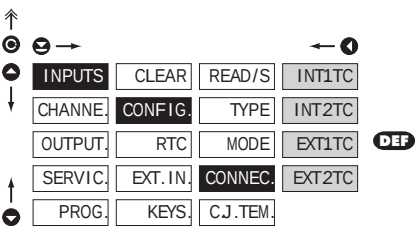


MODE **Selection of the instrument measuring range**

	Menu	Measuring range
DC	60 mV	±60 mV
	150 mV	±150 mV
	300 mV	±300 mV
	1200mV	±1,2 V
PM	0-5mA	0...5 mA
	0-20mA	0...20 mA
	4-20mA	4...20 mA
	0-2 V	±2 V
	0-5 V	±5 V
	0-10 V	±10 V
	0-40 V	±40 V
	Er.4-20	4...20 mA, with error statement of „underfl ow" upon signal smaller than 3,36 mA
OHM	100 R	0...100 Ω
	1 k	0...1 kΩ
	10 k	0...10 kΩ
	100 k	0...100 kΩ
RTD-PT	EU-100	Pt 100 (3 850 ppm/°C)
	EU-500	Pt 500 (3 850 ppm/°C)
	EU-1k0	Pt 1000 (3 850 ppm/°C)
	US-100	Pt 100 (3 920 ppm/°C)
	RU-50	Pt 50 (3 910 ppm/°C)
	RU-100	Pt 100 (3 910 ppm/°C)
RTD-NI	5.0-1k	Ni 1 000 (5 000 ppm/°C)
	6.2-1k	Ni 1 000 (6 180 ppm/°C)
	5.0-10k	Ni 10 000 (5 000 ppm/°C)
	6.2-10k	Ni 10 000 (6 180 ppm/°C)
RTD-CU	428-50	Cu 50 (4 280 ppm/°C)
	428-0.1	Cu 1 00 (4 280 ppm/°C)
	426-50	Cu 50 (4 260 ppm/°C)
	426-0.1	Cu 100 (4 260 ppm/°C)
T/C	T/C B	B
	T/C E	E
	T/C J	J
	T/C K	K
	T/C N	N
	T/C R	R
	T/C S	S
	T/C T	T
	T/C L	L

6.1.2d SELECTION OF TYPE OF SENSOR CONNECTION **RTD** **OHM** **T/C**





CONECT. **Selection of type of sensor connection**

RTD **OHM**

2-WIRE 2-wire connection

3-WIRE 3-wire connection

4-WIRE 4-wire connection

T/C

INT1TC Measurement without reference thermocouple

- measuring cold junction at instrument brackets

INT2TC Measurement with reference thermocouple

- measuring cold junction at instrument brackets with anti-series connected reference thermocouple

EXT1TC Measurement without reference thermocouple

- the entire measuring set is working under invaried and constant temperature

EXT2TC Measurement with reference thermocouple

- when using compensation box

!

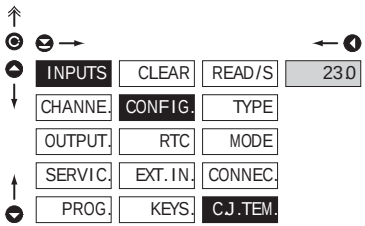
Method and procedure of setting the cold junctions is described in separate chapter on page 90

!

For thermocoule type "B" the items **CONECT.** and **C.J. TEM.** are not available

6.1.2e SETTING TEMPERATURE OF COLD JUNCTION

T/C

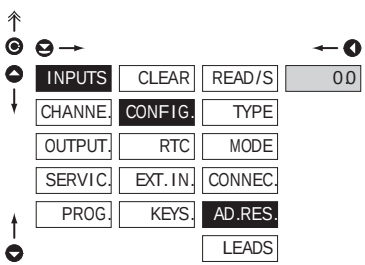


CJ.TEM. **Setting temperature of cold junction**

- range 0...99°C with compensation box
- **DEF** = 23°C

6.1.2f ZERO OFFSET OF THE MEASUREMENT RANGE

RTD OHM

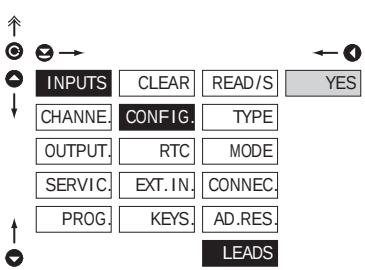


AD.RES. **Offset of the beginning of the measuring range**

- in cases when it is necessary to offset the beginning of the range by certain value, e.g. while using sensor in measuring head
- entered directly in Ohm (0...9999)
- **DEF** = 0

6.1.2g COMPENSATION OF 2-WIRE CONDUCT

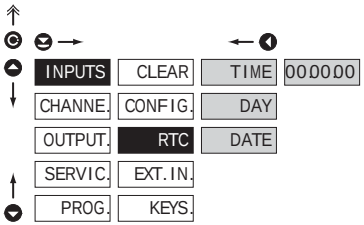
RTD OHM



LEADS **Compensation of 2-wire conduct**

- for measurement accuracy it is necessary to perform compensation of conduct always in case of 2-wire connection
- prior confirmation of the displayed prompt "YES" it is necessary to substitute the sensor at the end of the conduct by a short-circuit
- **DEF** = 0

6.1.3 SETTING THE REAL TIME CLOCK



RTC **Setting the real time clock (RTC)**

TIME Time setting

- format 23.59.59

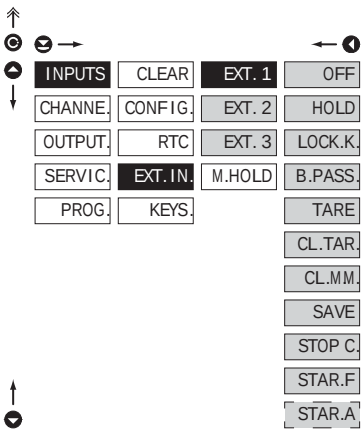
DAY Setting the day of the week

- format Dx (x = 1 - Monday ... 7 - Sunday)

DATE Date setting

- format DD.MM.RR

6.1.4a EXTERNAL INPUT FUNCTION SELECTION



EXT. IN. **External input function selection**

OFF Input is off

HOLD Activation of HOLD

LOCK K. Locking keys on the instrument

B.PASS. Activation of locking access into programming menu LIGHT/PROFI

TARE Tare activation

CL.TAR. Tare resetting

CL.MM. Resetting min/max value

SAVE Activation of measured data record in instrument memory

- switching on an external input saves the requested value into the memory

STOP C. End of control process

STAR.F Launch of control process to fixed input value

STAR.A Launch of control process to input "Setpoint"

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

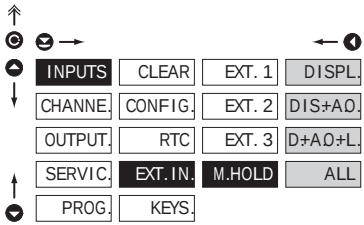
!

A start of the program can be executed simultaneously with the function entered here, see chapter 6.5

*****

Procedure identical for **EXT. 2** and **EXT. 3**

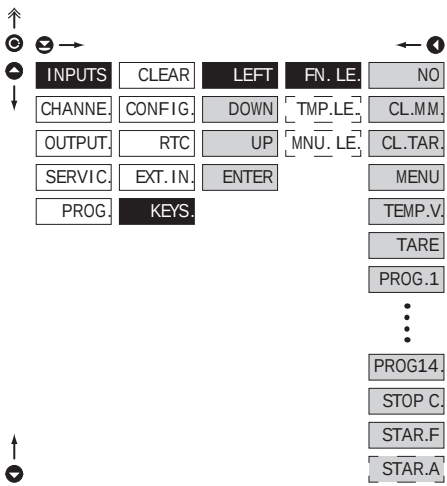
6.1.4b SELECTION OF FUNCTION "HOLD"



M.HOLD — **Selection of function "HOLD"**

- **DISPL.** — "HOLD" locks only the value displayed
- **DIS+AO.** — "HOLD" locks the value displayed and on AO
- **D+AO+L.** — "HOLD" locks the value displayed, on AO and limit evaluation
- **ALL** — "HOLD" locks the entire instrument

6.1.5a OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS



FN. LE. — **Assigning further functions to instrument keys**

- „FN. LE." > executive functions

- **NO** — Key has no further function
- **CL.MM.** — Resetting min/max value
- **CL.TAR.** — Tare resetting
- **MENU** — Direct access into menu on selected item
  - after confirmation of this selection the "MNU. LE." item is displayed on superior menu level, where required selection is performed
- **TEMP. V.** — Temporary projection of selected values
  - after confirmation of this selection the item "TMP. LE." is displayed on superior menu level, whererequired selection is performed
- **TARE** — Tare function activation
- **PROG.-** — Start of program
  - selecting from programs 1...14
- **STOP C.** — End of control process
- **STAR.F** — Launch of control process to fixed input value
- **STAR.A** — Launch of control process to input "Setpoint"

!

A start of the program can be executed simultaneously with the function entered here, see chapter 6.5

!

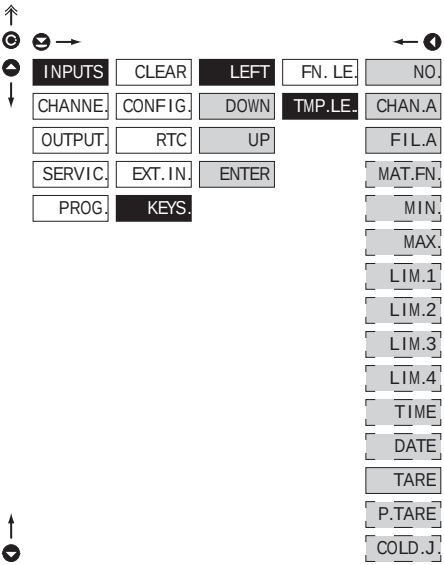
Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

!

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

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

6.1.5b OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - TEMPORARY PROJECTION



TMP. LE. **Temporary projection of selected item**

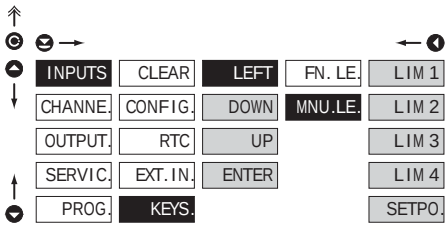
- „TMP. LE." > temporary projection of selected values
- "Temporary" projection of selected value is displayed for the time of keystroke
- "Temporary" projection may be switched to permanent by pressing ⊙ + "Selected key", this holds until the stroke of any key

NO	Temporary projection is off
CHAN.A	Temporary projection of "Channel A" value
FIL.A	Temporary projection of "Channel A" value after processing digital filters
MAT.FN.	Temporary projection of "Mathematic functions" value
MIN	Temporary projection of "Min. value"
MAX	Temporary projection of "Max. value"
LIM 1	Temporary projection of "Limit 1" value
LIM 2	Temporary projection of "Limit 2" value
LIM.3	Temporary projection of "Limit 3" value
LIM.4	Temporary projection of "Limit 4" value
TIME	Temporary projection of "TIME" value
DATE	Temporary projection of "DATE" value
TARE	Temporary projection of "TARE" value
P.TARE	Temporary projection of "P. TARE" value
COLD.J.	Temporary projection of "CJC" value

!

Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

6.1.5c OPTIONAL ACCESSORY FUNCTIONS OF THE KEYS - DIRECT ACCESS TO ITEM



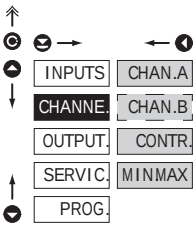
MNU.LE. **Assigning access to selected menu item**

LIM 1	Direct access to item "LIM 1"
LIM 2	Direct access to item "LIM 2"
LIM 3	Direct access to item "LIM 3"
LIM 4	Direct access to item "LIM 4"
SETPO.	Direct access to item "SETPO."

!

Setting is identical for **LEFT**, **DOWN**, **UP** and **ENTER**

6.2 SETTING "PROFI" - CHANNELS

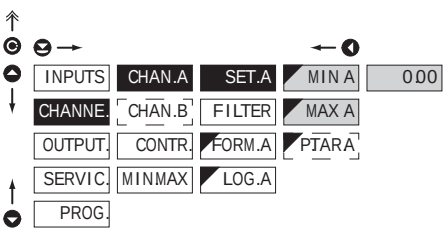


The primary instrument parameters are set in this menu

- CHAN.A — Setting parameters of measuring "Channel A"
- CHAN.B — Setting parameters of measuring inputs „Setpoint"
- CONTR. — Setting of PID control parameters
- MINMAX — Selection of access and evaluation of Min/max value

6.2.1a DISPLAY PROJECTION

DC PM DU OHM



SET.A — **Setting display projection**

MIN A — Setting display projection for minimum value of input signal

- range of the setting: -99999...999999
- DEF = 0.0

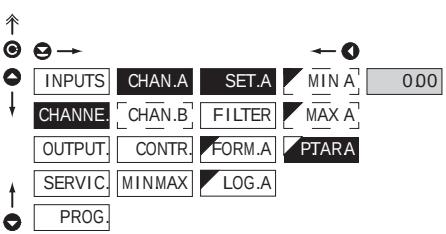
MAX A — Setting display projection for maximum value of input signal

- range of the setting: -99999...999999
- DEF = 100.0

!

Setting is identical for CHAN. A and CHAN.B

6.2.1b SETTING FIXED TARE



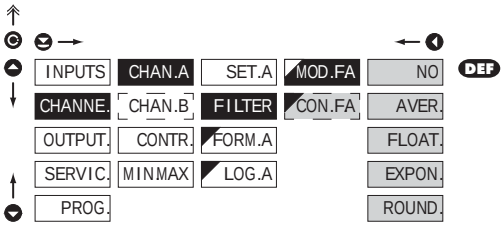
P.TAR.A — **Setting "Fixed tare" value**

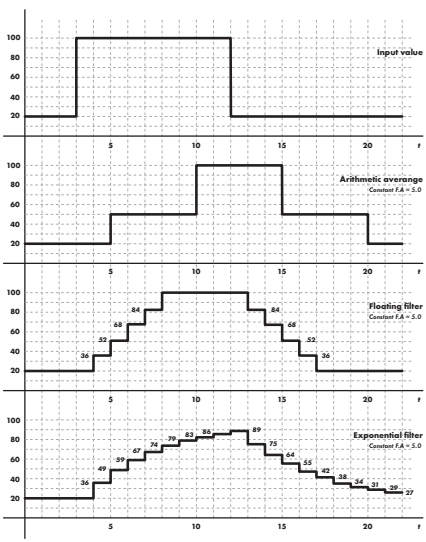
- setting is designed for the event when it is necessary to firmly shift the beginning of the range by known size
- when setting [P. TAR. A≠ 0] is in effect, display does not show the "T" symbol
- range of the setting: -99999...999999
- DEF = 0

!

Setting is identical for CHAN. A and CHAN.B

6.2.1c DIGITAL FILTERS





MOD.FA **Selection of digital filters**

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

NO Filters are off

AVER. Measured data average

- arithmetic average from given number („CON. F.A") of measured values
- range 2...100

FLOAT. Selection of floating filter

- floating arithmetic average from given number („CON. F.A") of measured data and updates with each measured value
- range 2...30

EXPON. Selection of exponential filter

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

ROUND Measured value rounding

- is entered by any number, which determines the projection step (e.g: „CON. F.A" = 2,5 > display 0, 2.5, 5,...)

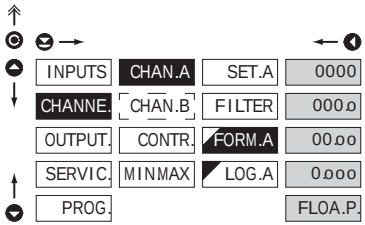
CON.FA Setting constants

- this menu item is always displayed after selection of particular type of filter
- DEF = 2

!

Setting is identical for CHAN. A and CHAN.B

6.2.1d PROJECTION FORMAT - POSITIONING OF DECIMAL POINT



!

Setting is identical for **CHAN. A** and **CHAN.B**

FORM.A **Selection of decimal point**

- the instrument allows for classic projection of a number with positioning of the DP as well as projection with floating DP, allowing to display a number in its most exact form „FLOAT. P."

0000 Setting DP - XXXX

- **DEF** > **T/C** | **RTD**

000.0 Setting DP - XXX.x

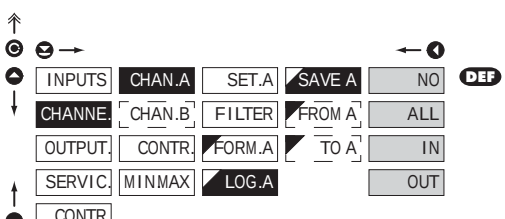
- **DEF** > **DC** **PM** **DU** **OHM**

00.00 Setting DP - XX.xx

0.000 Setting DP - X.xxx

FLOA.P. Floating DP

6.2.1e SELECTION OF STORING DATA INTO INSTRUMENT MEMORY



!

Setting is identical for **CHAN. A** and **CHAN.B**

LOG.A **Selection of storing data into instrument memory**

- by selection in this item you allow to register values into instrument memory
- another setting in item "**OUTPUT. > MEMORY**"

NO Measured data is not stored

ALL Measured data is stored in memory

IN Only data measured within the set interval is stored in memory

OUT Only data measured outside the set interval is stored in memory

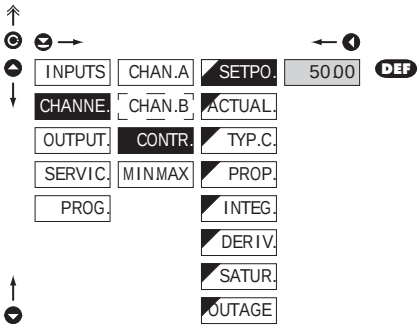
FROM A Setting the initial interval value

- setting range: -99999...999999

TO A Setting the final interval value

- setting range: -99999...999999

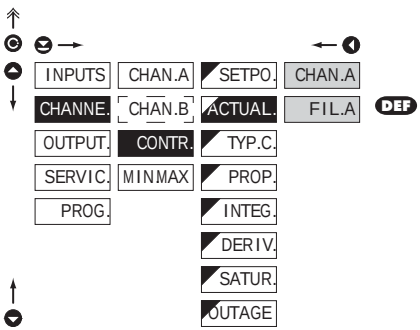
6.2.2a SETTING OF REQUESTED VALUE



SETPO. **Setting of requested value**

- setting range: -99999...999999
- DEF = 50.00

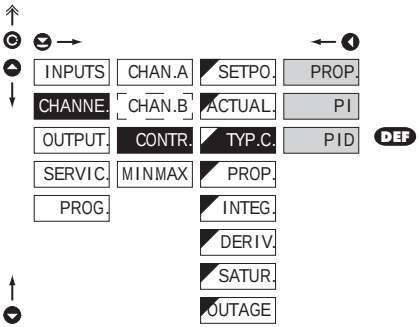
6.2.2b SELECTION OF REAL VALUE INPUT



ACTUAL. **Selection of real value input**

- selection of input, from which the real value will be evaluated

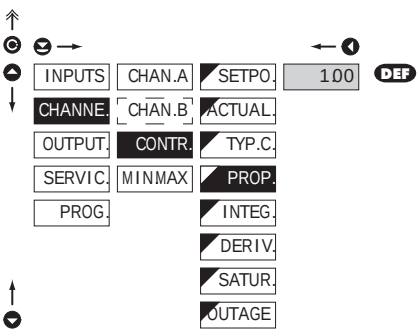
6.2.2c SELECTING A TYPE OF CONTROL



TYP.C. **Selecting a type of control**

- **PROP.** Proportional control
- **PI** Proportional - Integral control
- **PID** Proportional - Integral - Derivative control

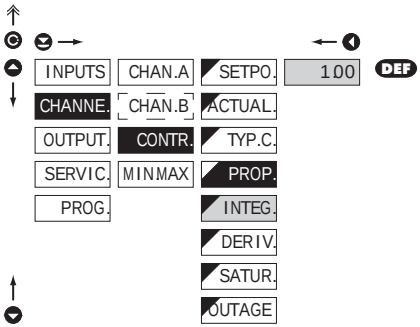
6.2.2d SETTING OF PROPORTIONAL CONSTANT



PROP. **Setting of proportional constant**

- setting range: 0...999999
- **DEF** = 1.00

6.2.2e SETTING OF PROPORTIONAL - INTEGRAL CONSTANT



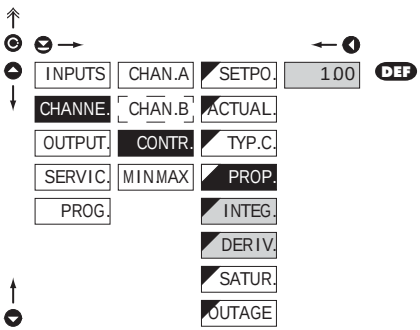
PROP. **Setting of proportional constant**

- setting range: 0...999999
- DEF = 1.00

INTEG. **Setting of integral constant**

- setting range: 0,00001...999999
- DEF = 1.00

6.2.2f SETTING OF PROPORTIONAL - INTEGRAL - DERIVATIVE - CONSTANT



PROP. **Setting of proportional constant**

- setting range: 0...999999
- DEF = 1.00

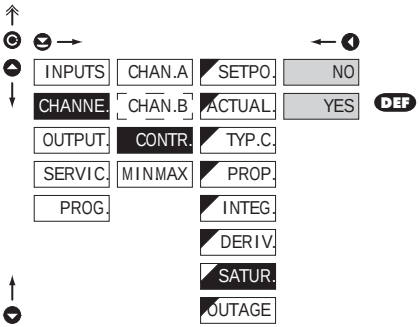
INTEG. **Setting of integral constant**

- setting range: 0,00001...999999
- DEF = 1.00

DERIV. **Setting of derivative constant**

- setting range: 0...999999
- DEF = 1.00

6.2.2g SATURATION OF INTEGRAL COMPONENT

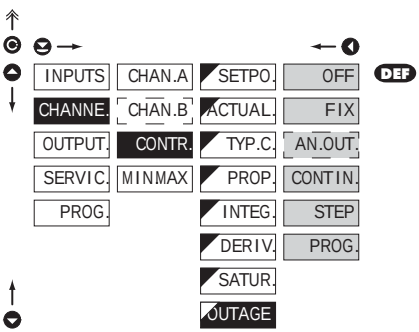


PROP. Saturation of integral component

NO	Saturation is disabled
YES	Saturation is enabled

- If saturation is enabled, it prevents an excessive increase of the integral component in case of major fluctuations of the controlled value. This speeds up the process of control.

6.2.2h SELECTION OF FUNCTION DURING A POWER FAILURE



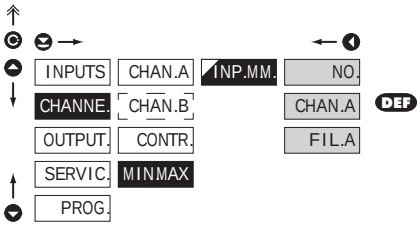
OUTAGE Selection of function during a power failure

OFF	Control process switches off
FIX	Control to a fixed value
AN.OUT.	Control process will be controlled by analogue input "Setpoint"

- not included in the instrument's standard equipment

CONTIN.	Control process will be resumed from the moment of power loss
STEP	Control process will be resumed from the beginning of the last step
PROG.	Control process will be resumed from the beginning of the last program

6.2.3 SELECTION OF EVALUATION OF MIN/MAX VALUE

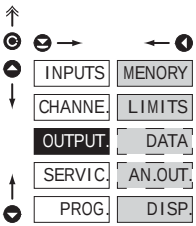


INP.MM. Selection of evaluation of min/max value

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

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

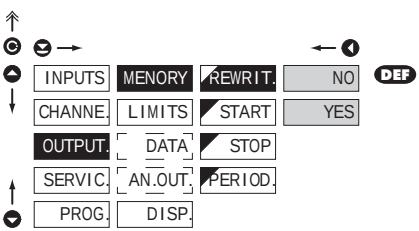
6.3 SETTING „PROFI" - OUTPUTS



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

MEMORY	Setting data logging into memory
LIMITS	Setting type and parameters of limits
DATA	Setting type and parameters of data output
AN.OUT.	Setting type and parameters of analog output
DISP.	Setting display projection and brightness

6.3.1a SELECTION OF MODE OF DATA LOGGING INTO INSTRUMENT MEMORY

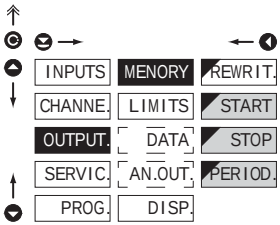


REWRIT. Selection of the mode of data logging

- selection of the mode in the event of full instrument memory

NO	Rewriting values prohibited
YES	Rewriting values permitted, the oldest get rewritten by the latest

6.3.1b SETTING DATA LOGGING INTO INSTRUMENT MEMORY - RTC



START Start of data logging into instrument memory

- time format HH.MM.SS

STOP Stop data logging into instrument memory

- time format HH.MM.SS

PERIOD. Period of data logging into instrument memory

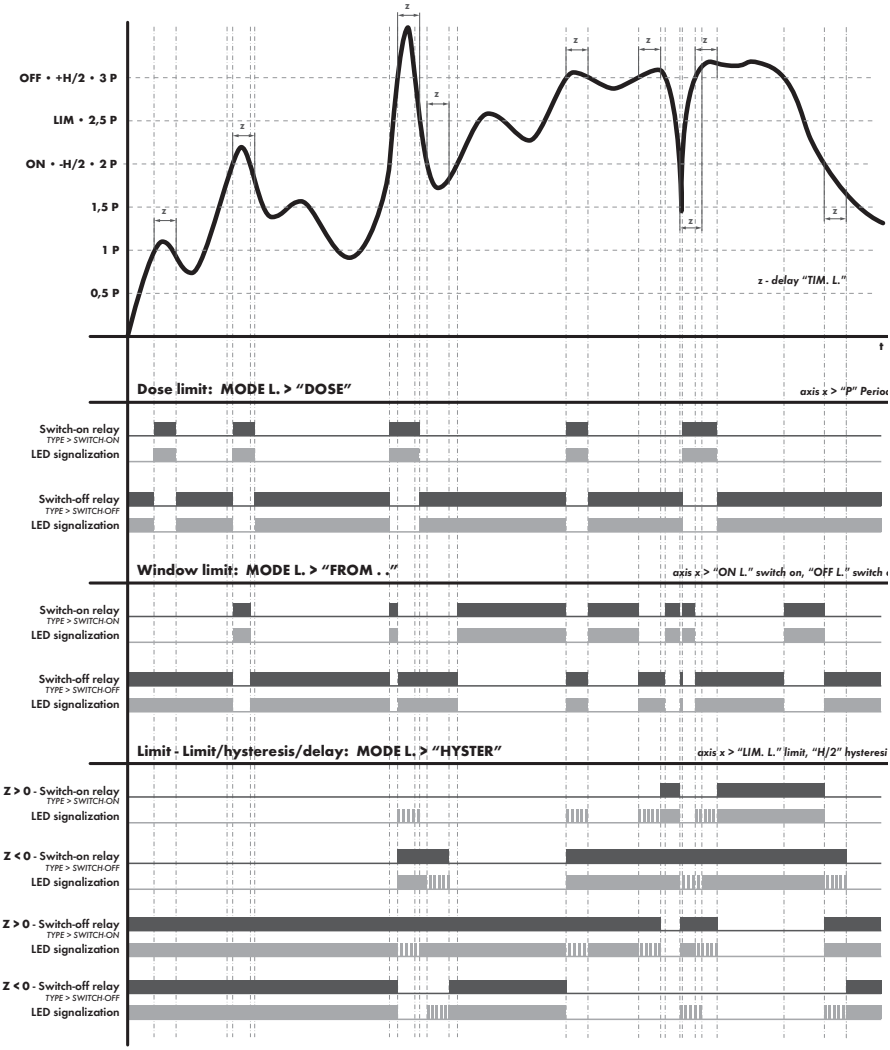
- determines the period in which values will be logged in an interval delimited by the time set under items **START** and **STOP**
- time format HH.MM.SS
- records are made on a daily basis in selected interval and period
- item not displayed if "**SAVE**" is selected in menu (**INPUT > EXT. IN.**)

RTC

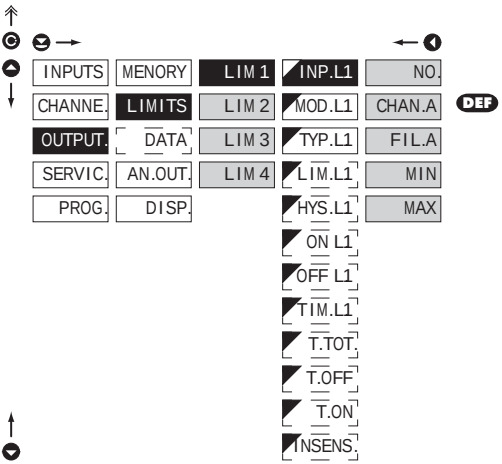
The lowest recording rate possible is once a day, the highest is every second. Under exceptional circumstances it is possible to set the rate to 8 times per second by entering the recording period as 00:00:00. However, this mode is not recommended due to the memory overload. Recordings are realised in a timeframe of one day and are repeated periodically every following day. Recordings can take place either inside or outside of selected time intervals. The duration of re-writing can be determined by the number of channels recorded as well as by the recording rate.

DESCRIPTION OF RELAY FUNCTION

MODE > HYSTER • FROM - TO • DOSING



6.3.2a SELECTION OF INPUT FOR LIMITS EVALUATION



INP.L1 **Selection evaluation of limits**

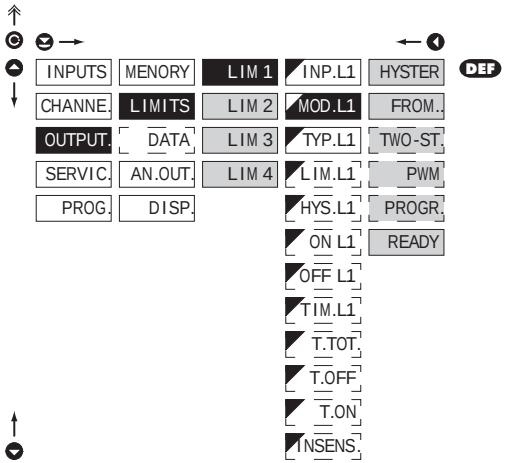
- selection of value from which the limit will be evaluated

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

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2b SELECTION OF TYPE OF LIMIT



MOD.L1 **Selection the type of limit**

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

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

FROM.. Frame limit

- for this mode the parameters are set for interval "**ON. L.1**" the relay switch-on and "**OFF. L.1**" the relay switch-off

TWO-ST. Dvoustavový výstup (Only LIM 3 and LIM 4)

- If deviation is negative (**INCREASE**), L3 switches on.
- If deviation is positive, (**DECREASE**) L4 switches on

PWM Pulse width modulation (Only LIM 3 and LIM 4)

- If deviation is negative (**INCREASE**), L3 switches on
- If deviation is positive, (**DECREASE**) L4 switches on

PROGR. indicates the running of the program (Only LIM 2)

- relay is activated permanently after the completion of the program if the time is set to "**0**", otherwise it is activated for a period specified in "**TIM. L.2**"

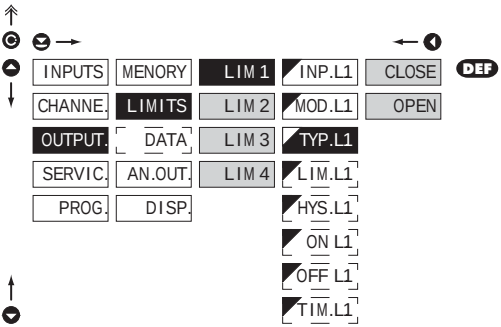
READY Behavior of relay when the requested value is reached (Only Lim 1)

- relay is engaged when the requested value is reached for the first time, it disengages when the requested value changes
- relay is activated permanently after reaching the requested value if the time is set to "**0**", otherwise it is activated for a period specified in "**TIM. L.1**"

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2c SELECTION OF TYPE OF OUTPUT



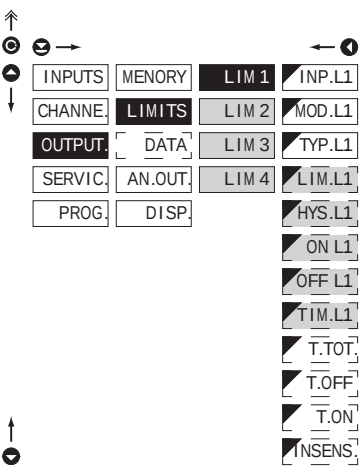
TYP.L1 **Selection of type of output**

CLOSE	Output switches on when condition is met
OPEN	Output switches off when condition is met

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2d SETTING VALUES FOR LIMITS EVALUATION



LIM.L1 Setting limit for switch-on

- for type "**HYSTER**"

HYS.L1 Setting hysteresis

- for type "**HYSTER**"
- indicates the range around the limit (in both directions, LIM. ±1/2 HYS.)

ON L1 Setting the outset of the interval of limit switch-on

- for type "**FROM..**"

OFF L1 Setting the end of the interval of limit switch-on

- for type "**FROM..**"

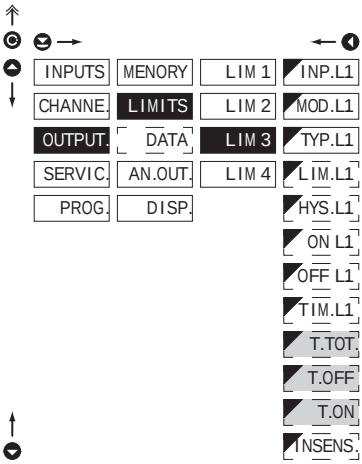
TIM.L1 Nastavení časového sepnutí limity

- for type "**HYSTER.**", "**PROG.**" and "**READY**"
- setting within the range: ±0...99,9 s
- only for type "**HYSTER.**"
  - positive time > relay switches on after crossing the limit (**LIM. L.1**) and the set time (**TIM. L.1**)
  - negative time > relay switches off after crossing the limit (**LIM. L.1**) and the set negative time (**TIM. L.1**)

!

Setting is identical for **LIM 1**, **LIM 2**, **LIM 3** and **LIM 4**

6.3.2d SETTING OF LIMIT 3 - OUTPUT, PWM



T.TOT. Period of PWM output

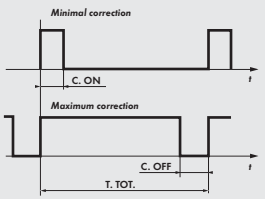
- setting in range: 1...99,9 s

T.OFF Minimum time of switch-off

- setting in range: 0...99,9 s

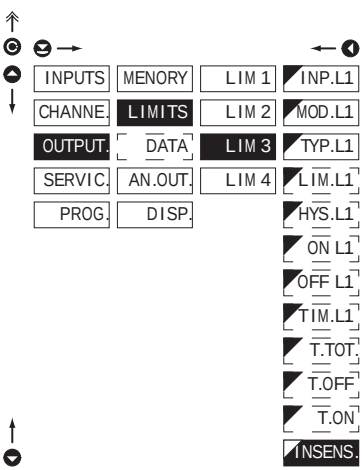
T.ON Maximum time of switch-on

- setting in range: 0...99,9 s



- if the calculated correction is smaller than the preset minimum, the relay remains in the off position. If it is greater than the preset maximum, relay remains in the on position

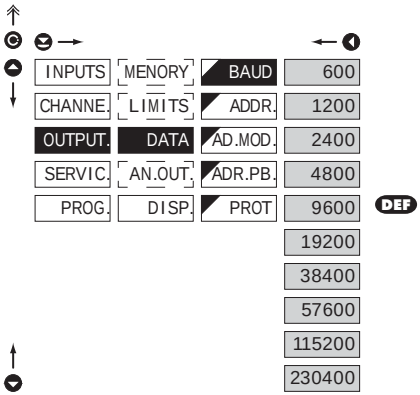
6.3.2e SETTING INSENSITIVITY OF THE BISTABLE OUTPUT



INSENS. **Setting insensitivity of the bistable output**

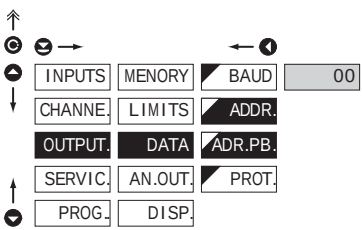
- If the deviation from the controlled value is greater than the set insensitivity, relay 3 or 4 switches on

6.3.3a SELECTION OF DATA OUTPUT BAUD RATE



BAUD	**Selection of data output baud rate**
600	Rate - 600 Baud
1200	Rate - 1 200 Baud
2400	Rate - 2 400 Baud
4800	Rate - 4 800 Baud
9600	Rate - 9 600 Baud
19200	Rate - 19 200 Baud
38400	Rate - 38 400 Baud
57600	Rate - 57 600 Baud
115200	Rate - 115 200 Baud
230400	Rate - 230 400 Baud

6.3.3b SETTING INSTRUMENT ADDRESS



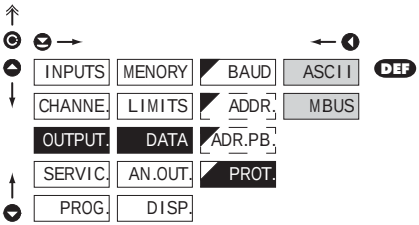
ADDR. **Setting instrument address**

- setting in range 0...31
- DEF = 00

ADR.PB. **Setting instrument address - PROFIBUS**

- setting in range 1...127
- DEF = 19

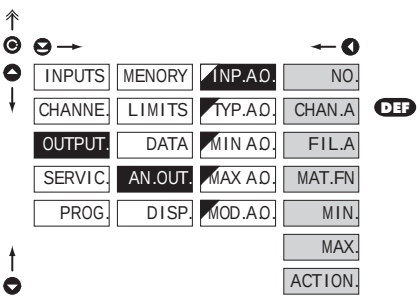
6.3.3c SELECTION OF DATA OUTPUT PROTOCOL



PROT. **Selection of the type of analog output**

ASCII	Data protocol ASCII
M.BUS	Data protocol DIN MessBus

6.3.4a SELECTION OF INPUT FOR ANALOG OUTPUT

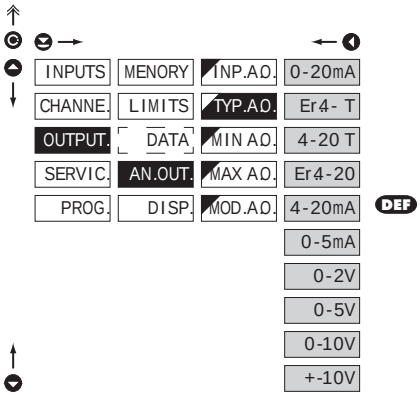


INP.AO. **Selection evaluation analog output**

- selection of value from which the analog output will be evaluated

NO	AO evaluation is off
CHAN.A	AO evaluation from "Channel A"
FIL.A	AO evaluation from "Channel A" after digital filters processing
MAT.FN.	AO evaluation from "Math. functions"
MIN	AO evaluation from "Min. value"
MAX	AO evaluation from "Max. value"
ACTION.	Analogue output is controlled by controller's output

6.3.4b SELECTION OF THE TYPE OF ANALOG OUTPUT



TYP. AO. **Selection of the type of analog output**

0-20mA Type - 0...20 mA

Er4- T Type: 4...20 mA with indication

- with broken loop detection and indication of error statement (< 3,6 mA)

4-20 T Type: 4...20 mA with indication

- with broken loop detection (< 3,6 mA)

Er4-20 Type: 4...20 mA with indication

- with indic. of error statement (< 3,6 mA)

4-20mA Type - 4...20 mA

0-5mA Type - 0...5 mA

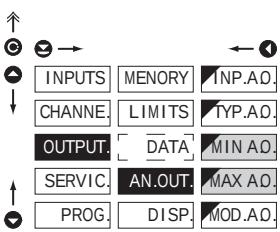
0-2V Type - 0...2 V

0-5V Type - 0...5 V

0-10V Type - 0...10 V

+-10V Type - ±10 V

6.3.4c SETTING THE ANALOG OUTPUT RANGE



AN.OUT. **Setting the analog output range**

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

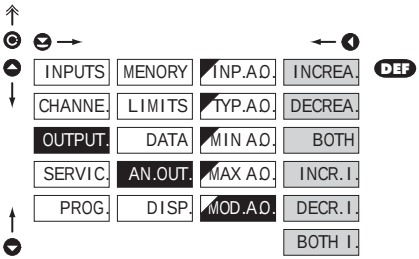
MIN AO. Assigning the display value to the beginning of the AO range

- range of the setting: -99999...999999
- DEF = 0

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

- range of the setting: -99999...999999
- DEF = 100

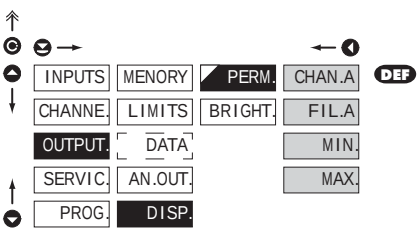
6.3.4d SETTING OF ANALOGUE OUTPUT MODE



MOD.AO. Setting of analogue output mode

- **INCREA.** Signal for actuator, increases the controlled value
- **DECREA.** Signal for actuator, decreases the controlled value
- **BOTH** Signal for actuator, both increases and decreases the controlled value. Range with zero in the middle
- **INCR. I.** Signal for actuator, increases the controlled value, inverted output - maximum value for minimal action
- **DECR. I.** Signal for actuator, decreases the controlled value, inverted output - maximum value for minimal action
- **BOTH I.** Signal for actuator, both increases and decreases the controlled value, inverted range with zero in the middle

6.3.5a SELECTION OF INPUT FOR DISPLAY PROJECTION

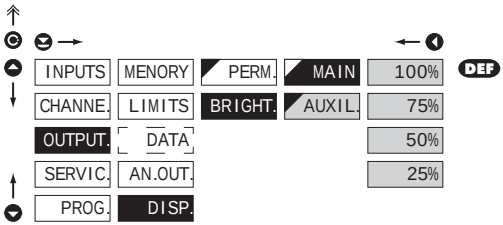


PERM. Selection display projection

- selection of value which will be shown on the instrument display

- **CHAN.A** Projection of values from "Channel A"
- **FIL.A** Projection of values from "Channel A" after digital filters processing
- **MIN** Projection of values from "Min. value"
- **MAX** Projection of values from "Max. value"

6.3.5b SELECTION OF DISPLAY BRIGHTNESS



BRIGHT **Selection of display brightness**

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

MAIN Selection of the larger display brightness

- red LED

AUXIL. Selection of the two small displays' brightness

- green LED

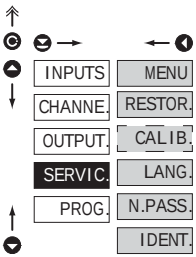
25% Display brightness - 25%

50% Display brightness - 50%

75% Display brightness - 75%

100% Display brightness - 100%

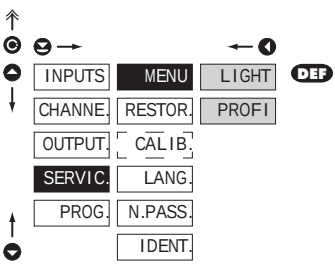
6.4 SETTING "PROFI" - SERVICE



The instrument service functions are set in this menu

MENU	Selection of menu type LIGHT/PROFI
RESTOR.	Restore instrument manufacture setting and calibration
CALIB	Input range calibration for „DU" version
LANG.	Language version of instrument menu
N.PASS.	Setting new access password
IDENT.	Instru

6.4.1 SELECTION OF TYPE OF PROGRAMMING MENU



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

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

LIGHT Active LIGHT menu

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

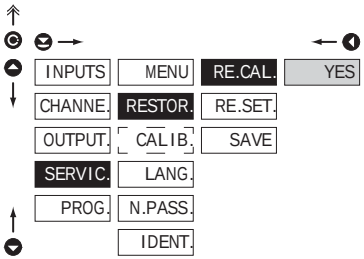
PROFI Active PROFI menu

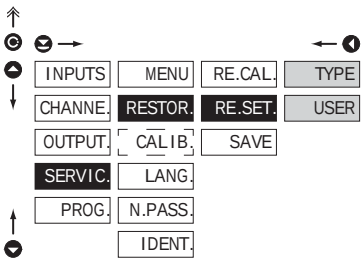
- complete programming menu for expert users
- tree menu

!

Change of setting is valid upon next access into menu

6.4.2 RESTORATION OF MANUFACTURE SETTING





RESTOR. **Restoration of manufacture setting**

- in the event of error setting or calibration, manufacture setting may be restored

RE.CAL. Restoration of manufacture calibration of the instrument

- prior executing the changes you will be asked to confirm you selection „YES"

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

TYPE Restoration of instrument manufacture setting

- generating the manufacture setting for currently selected type of instrument (items marked DEF)

USER Restoration of instrument user setting

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

SAVE Save instrument user setting

- storing the user setting allows the operator to restore it in future if needed

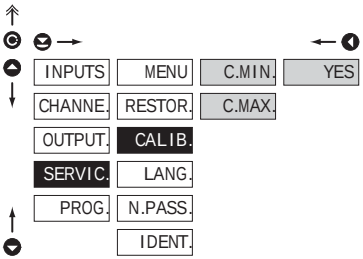
!

After restoration the instrument switches off for couple seconds

JOBS PERFORMED	RESTORE	
	CALIBRATION	SETTING
cancels USER menu rights	✓	✓
deletes table of items order in USER - LIGHT menu	✓	✓
adds items from manufcture to LIGHT menu	✓	✓
deletes data stored in FLASH	✓	✓
cancels or linearization tables	✓	✓
clears tare	✓	✓
restore manufacture calibration	✓	×
restore manufacture setting	×	✓

6.4.3 CALIBRATION - INPUT RANGE

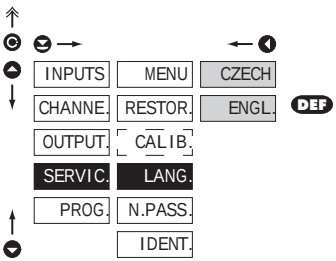
DU



CALIB. **Input range calibration**

- when "C. MIN" is displayed, move the potentiometer traveller to the required minimum position and confirm by „Enter", calibration is confirmed by "YES"
- when "C. MAX" is displayed, move the potentiometer traveller to required maximum position and confirm by „Enter", calibration is confirmed by "YES"

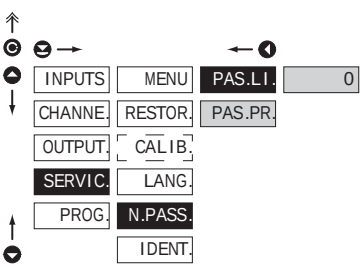
6.4.4 SELECTION OF INSTRUMENT MENU LANGUAGE VERSION



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

CZECH	Instrument menu is in Czech
ENGL.	Instrument menu is in English

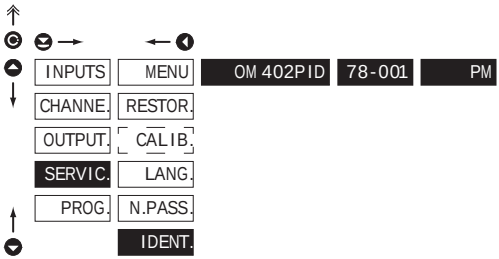
6.4.5 SETTING NEW ACCESS PASSWORD



N.PASS. **Setting new password for access to LIGHT and PROFI menu**

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

6.4.6 INSTRUMENT IDENTIFICATION



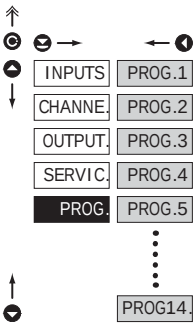
IDENT. **Projection of instrument SW version**

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

IDENT.

Pos.	Description
1.	type of instrument
2.	SW: number - version
3.	the input type

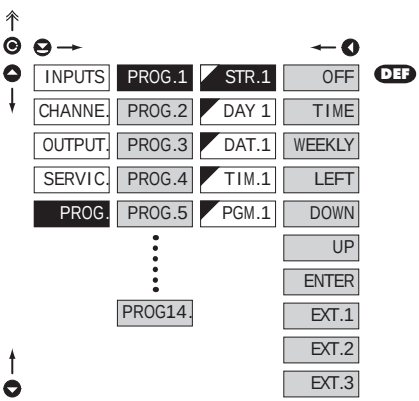
6.5 SETTING "PROFI" - PROGRAM



In this menu, programs for PID control are set. It is possible to set up to 14 different programs, each of which can have 64 steps. Programs can be stringed together.

PROG.- Program for controlling of the set value

6.5.1 PROGRAM LAUNCH



STR.1 Program launch

OFF Launch is disabled

- program can be launched by the instrument's front push button (selection **PROG.** see chapter 6.1.5a)

TIME Launch at a preset time

- program will be launched when date ("**DAT. 1**") and time ("**TIM. 1**") is reached.

WEEKLY Launch at a preset day and time

- program will be launched when date ("**DAY. 1**") and time ("**TIM. 1**") is reached
- (**D.1** - Monday, ..., **D.7** - Sunday)

LEFT Program launch by an assigned push button

- this setting is identical for all push button (Enter, Down, Left, Enter)

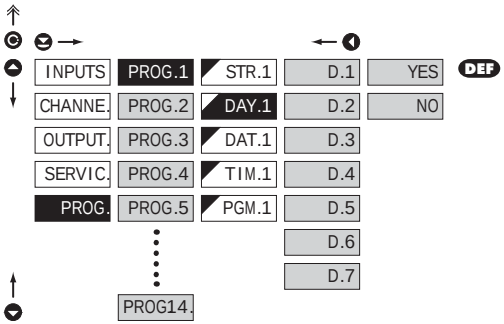
EXT.- Program launch activated by an external contact closure

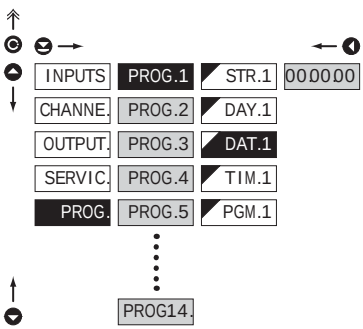
- this setting is identical for all external inputs (1...3)

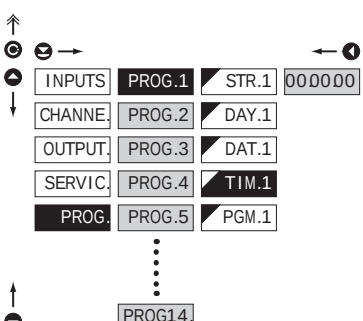
!

If another function is assigned to either a front panel button or the external input, it will also be executed (chapter 6.1.5a/6.1.4a)

6.5.2 PROGRAM LAUNCH PARAMETERS







DAY.1 **Selecting the day of the week when the program is to be launched**

D.1	Monday
D.2	Tuesday
D.3	Wednesday
D.4	Thursday
D.5	Friday
D.6	Saturday
D.7	Sunday

- after the selection is made and confirmed, in the next step there either "YES" or "NO" depending on the last setting. To change this, press either the **UP** or **DOWN** button and confirm by pressing **ENTER**. This will take you to the next day setting.

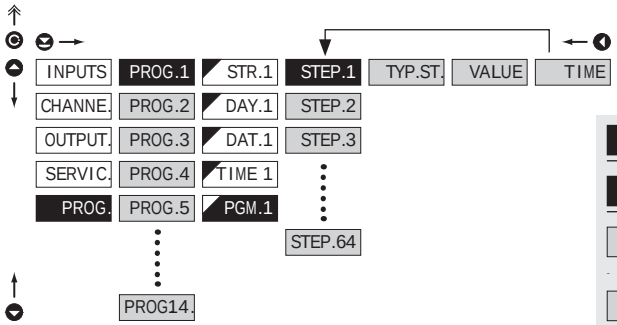
DAT.1 **Setting the date when the program is to be launched**

- setting in range: 01.01.00...31.12.99

TIM.1 **Setting the time when the program is to be launched**

- setting in range: 00.00.00...23.59.59

6.5.3 SETTING OF PROGRAMMING STEPS



STEP.1 **Setting of step "1"**

TYP.ST. **Selecting the type of the step**

OFF Ending the control process

- without the setting of "VALUE" and "TIME"

FIX Switches over to the control to the set

- set value is set in menu CHANNE. > CONTR. > SETPO.
- without the setting of "VALUE" and "TIME"

JUMP Rapid change

- set value is set under "VALUE" If it is not reached within "TIME" an error message "Err.P" is displayed.

STEADY Maintaining the value

- for the duration specified by "TIME" the output value is controlled to "VALUE"

RAMP. Value increasing over time

- value is corrected automatically so it reaches preset "VALUE" over "TIME"

GO TO Jump within program

- v menu "CAS" lze nastavit skok v programu na žádanou pozici Hodiny = číslo kroku, Minuty = číslo programu, Sekundy jsou bez významu
- in menu "TIME" it is possible to set a jump in the program to desired position Hours = number of a step, minutes = number of a program, seconds have no significance
- without the setting of "VALUE"

DAT.1 **Setting the date when the program is to be launched**

- setting in range: 01.01.00...31.12.99

TIM.1 **Setting the time when the program is to be launched**

- setting in range: 00.00.00...23.59.59

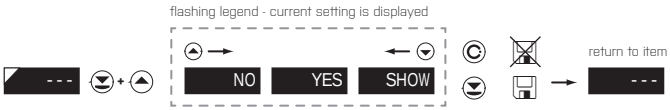
SETTING
USER

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

7.0 SETTING ITEMS INTO "USER" MENU

- **USER** menu is designed for users who need to change only several items of the setting without the option to change the primary instrument setting (e.g. repeated change of limit setting)
- there are no items from manufacture permitted in **USER** menu
- on items indicated by inverse triangle LIM 1
- setting may be performed in **LIGHT** or **PROFI** menu, with the **USER** menu then overtaking the given menu structure

Setting



NO item will not be displayed in USER menu

YES item will be displayed in USER menu with editing option

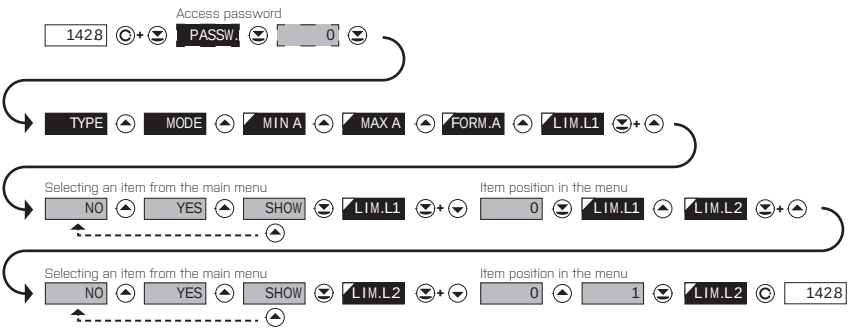
SHOW item will be solely displayed in USER menu

Setting sequence of items in "USER" menu

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

Example of ranking the order of menu items in the "USER" menu

In this example we want to have a direct access to menu items Limit 1 and Limit 2 (example show is for the Light menu, but can equaly be used in the Profi menu).

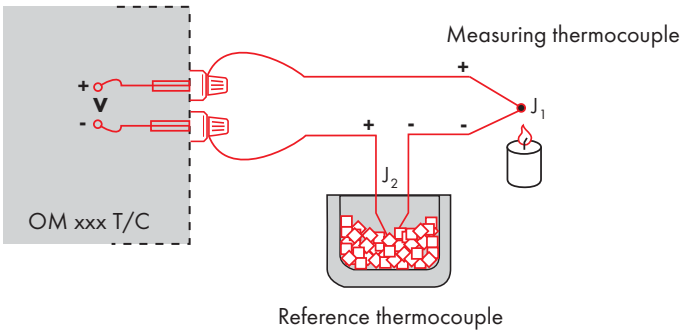


The result of this setting is that when the © button is pressed, the display will read „**LIM L.1**". By pressing ⏬ button you confirm your selection and then you can set the desired limit value, or by pressing the ⏫ button you can go to setting of „**LIM. L.2**" where you can proceed identically as with Limit one.

You can exit the setting by pressing the ⏬ button by which you store the latest setting and pressing the © button will take you back to the measuring mode

8. METHOD OF MEASURING THE CJC

Instrument with input for temperature measurement with thermocouple allows to set two types of measurement of cold junction.



WITH REFERENCE THERMOCOUPLE

- a reference thermocouple may be located in the same place as the measuring instrument or in place with stable temperature/ compensation box
- when measuring with reference thermocouple set CONECT.in the instrument menu to INT2TC or EXT2TC
- when using a thermostat (a compensation box or environment with constant temperature) set in the instrument menu CJCTEM. its temperature (applies for setting CONECT. to EXT2TC)
- if the reference thermocouple is located in the same environment as the measuring instrument then set in the instrument menu CONECT. to INT2TC.Based on this selection the measurement of the ambient temperatureis performed by a sensor located in the instrument terminal board

WITHOUT REFERENCE THERMOCOUPLE

- inaccuracy originating from the creation of dissimilar thermocouples on the transition point terminal/conductor of the thermocouple is not compensated for in the instrument
- when measuring without reference thermocouple set CONECT. in the instrument menu to INT1TC or EXT1TC
- when measuring temperature without reference thermocouple the error in measured data may be as much as 10°C (applies for setting CONECT. to EXT1TC)

ERROR	CAUSE	ELIMINATION
E.d.Un.	Number is too small (large negative) to be displayed	change DP setting, channel constant setting
E.d.Ow.	Number is too large to be displayed	change DP setting, channel constant setting
E. t.Un.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. t.Ow.	Number is outside the table range	increase table values, change input setting (channel constant setting)
E. I .Un.	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E. I .Ow.	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.Hw.	A part of the instrument does not work properly	send the instrument for repair
E.EE	Data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.SET.	Data in EEPROM outside the range	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.CLR	Memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
E.OUT.	Analogue output current loop disconnected	check wire connection

10. DATA PROTOCOL

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

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

The transfer rate is adjustable in the instrument menu. The instrument address is set in the instrument menu in the range of 0 ÷ 31. The manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00. The type of line used - RS232 / RS485 - is determined by an output board automatically identified by the instrument.
The commands are described in specifications you can find at www.orbit.merret.eu or SW OM Link.

DETAILED DESCRIPTION OF COMMUNICATION VIA SERIAL LINE

EVENT	TYPE	PROTOCOL		TRANSMITTED DATA													
Data solicitation (PC)	232	ASCII		#	A	A	<CR>										
		MessBus		No - data is transmitted permanently													
	485	ASCII		#	A	A	<CR>										
		MessBus		<SADR>	<ENQ>												
Data transmission (instrument)	232	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus		<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
	485	ASCII		>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>		
		MessBus		<STX>	D	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
Confirmation of data acceptannce (PC) - OK	485	MessBus		<DLE>	1												
Confirmation of data acceptance (PC) - Bad				<NAK>													
Sending address (PC) prior command				<EADR>	<ENQ>												
Confirmation of address (instrument)				<SADR>	<ENQ>												
Command transmission (PC)	232	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
	485	ASCII		#	A	A	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<CR>	
		MessBus		<STX>	$	N	P	(D)	(D)	(D)	(D)	(D)	(D)	(D)	<ETX>	<BCC>	
Command confirmation (instrument)	232	ASCII	OK	!	A	A	<CR>										
			Bad	?	A	A	<CR>										
		Messbus		No - data is transmitted permanently													
	485	ASCII	OK	!	A	A	<CR>										
			Bad	?	A	A	<CR>										
		Mess-Bus	OK	<DLE>	1												
			Bad	<NAK>													
Instrument identification				#	A	A	1	Y	<CR>								
HW identification				#	A	A	1	Z	<CR>								
One-time transmission				#	A	A	7	X	<CR>								
Repeated transmission				#	A	A	8	X	<CR>								

LEGEND

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

RELAY, TARE

SIGN	RELAY 1	RELAY 2	TARE	CHANGE RELAY 3/4
P	0	0	0	0
Q	1	0	0	0
R	0	1	0	0
S	1	1	0	0
T	0	0	1	0
U	1	0	1	0
V	0	1	1	0
W	1	1	1	0
p	0	0	0	1
q	1	0	0	1
r	0	1	0	1
s	1	1	0	1
t	0	0	1	1
u	1	0	1	1
v	0	1	1	1
w	1	1	1	1

Relay status is generated by command #AA6X <CR>.

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

INPUT

range is adjustbale			**DC**
	±60 mV	>100 MΩ	Input U
	±150 mV	>100 MΩ	Input U
	±300 mV	>100 MΩ	Input U
	±1200 mV	>100 MΩ	Input U
range is adjustbale			**PM**
	0/4...20 mA	< 400 mV	Input I
	±2 V	1 MΩ	Input U
	±5 V	1 MΩ	Input U
	±10 V	1 MΩ	Input U
	±40 V	1 MΩ	Input U

range is adjustbale		**OHM**
	0...100 Ω	
	0...1 kΩ	
	0...10 kΩ	
	0...100 kΩ	
Connection:	2, 3 or 4 wire	

Pt xxxx	-200°...850°C	**RTD**
Pt xxxx/3910 ppm	-200°...1 100°C	
Ni xxxx	-50°..250°C	
Cu/4260 ppm	-50°...200°C	
Cu/4280 ppm	-200°...200°C	
Type Pt:	EU > 100/500/1 000 Ω, with 3 850 ppm/°C	
	US > 100 Ω, with 3 920 ppm/°C	
	RU > 50/100 Ω, with 3 910 ppm/°C	
Type Ni:	Ni 1 000/ Ni 10 000 with 5 000/6 180 ppm/°C	
Type Cu:	Cu 50/Cu 100 with 4 260/4 280 ppm/°C	
Connection:	2, 3 or 4 wire	

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

Voltage of lin. pot.	2,5 VDC/6 mA	**DU**
	min. potentiometer resistance is 500 Ω	

PROJECTION

Main display:	-999...9999, intensive red 14 seg. LED, digit height 14 mm
Auxliary displays:	2x -999...9999, intensive green 7 seg. LED, digit height 9 mm upper display shows the number of program/ step, lower display shows the requested
Signalling LED:	yellow (controls) - „+", „-", „3", „4" red (Alarm) - „1", „2", „3", „4" green (Tare) - „T", „1"
Decimal point:	adjustable - in menu
Brightness:	adjustbale - in menu

INSTRUMENT ACCURACY

TC:	50 ppm/°C	
Accuracy:	±0,1% of range + 1 digit	
	±0,15% of range + 1 digit	**RTD, T/C**
	Above accuracies apply for projection 9999	
Resolution:	0,01°/0,1°/1°	**RTD**
Rate:	0,1...40 measurements/s**	
Overload capacity:	10x (t < 100 ms), 2x (long-term)	
Linearisation:	by linear interpolation in 38 points - solely via OM Link	
Digital filters:	Averaging, Floating average, Exponential filter, Rounding	
Comp. of conduct:	max. 40 Ω/100 Ω	**RTD**
Comp. of cold junc.:	adjustable	**T/C**
	0°...99°C or automatic	
Functions:	Tare - display resetting Hold - stop measuring (at contact) Lock - control key locking MM - min/max value Mathematic functions	
OM Link:	company communication interface for setting, operation and update of instrument SW	
Watch-dog:	reset after 400 ms	
Calibration:	at 25°C and 40% of r.h.	

COMPARATOR

Type:	digital, adjustable in menu
Mode:	Hysteresis, From, Two-St., PWM, Progr., Ready
Limita:	-99999...999999
Hysteresis:	0...999999
Delay:	0...99,9 s
Outputs:	2x relays with switch-on contact (Form A) (230 VAC/30 VDC, 3 A)* 2x relays with switch-off contact (Form C) (250 VAC/50 VDC, 5 A)* or 2x SSR (250 VAC/ 1 A)*
Relay:	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

* values apply for resistance load

DATA OUTPUTS

Protocols:	ASCII, DIN MessBus, MODBUS, PROBUS
Data format:	8 bit + no parity + 1 stop bit (ASCII) 7 bit + even parity + 1 stop bit (MessBus)
Rate:	600...230 400 Baud 9 600 Baud...12 Mbaud (PROFIBUS)
RS 232:	isolated, two-way communication
RS 485:	isolated, two-way communication, addressing (max. 31 instruments)
PROFIBUS	Data protocol SIEMENS

ANALOG OUTPUTS

Type:	isolated, programmable with 16 bits D/A convertor, analogoutput corresponds with displayed data, type and range are adjustable
Non-linearity:	0,1% of range
TC:	15 ppm/°C
Rate:	response to change of value < 1 ms
Voltage:	0...2 V/5 V/10 V/±10 V
Curernt:	0...5/20 mA/4...20 mA - compensation of conduct to 500 Ω/12 V or 1 000 Ω/24 V

MEASURED DATA RECORD

Type RTC:	time-controlled logging of measured data into instrument memory, allows to log up to 250 000 values
Transmission:	via data output RS 232/485 or via OM Link

EXCITATION

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

POWER SUPPLY

Options:	10...30 V AC/DC, max. 8 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 4000 mA)
	80...250 V AC/DC, max. 8 VA, PF ≥ 0,4, I_{STP}< 40 A/1 ms, isolated - fuse inside (T 630 mA)

MECHANIC PROPERTIES

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

OPERATING CONDITIONS

Connection:	connector terminal board, conductor cross-section <1,5 mm^2 /<2,5 mm^2
Stabilisation period:	within 15 minutes after switch-on
Working temp.:	-20°...60°C
Storage temp.:	-20°...85°C
Cover:	IP64 (front panel only)
Construction:	safety class I
Dielectric strength:	4 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and data/ analog output 4 kVAC after 1 min between supply and relay output 2,5 kVAC after 1 min between supply and data/ analog output
Overvoltage cat.:	EN 61010-1, A2
Insulation resist.:	for pollution degree II, measurement cat. III instrum.power supply > 670 V (PI), 300 V (DI) Input/output > 300 V (PI), 150 (DI)
EMC:	EN 61326-1
Seismic resistance:	IEC 980: 1993, par. 6

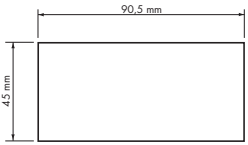
**Table of rate of measurement in relation to number of inputs

Channels/Rate	40	20	10	5	2	1	0,5	0,2	0,1
No.of channels: 1 (Type: DC, PM, DU)	40,00	20,00	10,00	5,00	2,00	1,00	0,50	0,20	0,10
No.of channels: 2	5,00	2,50	1,25	1,00	0,62	0,38	0,22	0,09	0,05
No.of channels: 1 (Type: OHM, RTD, T/C)	5,00	2,50	1,25	1,00	0,62	0,38	0,22	0,09	0,05
No.of channels: 2	3,33	1,066	0,83	0,66	0,42	0,26	0,14	0,06	0,03

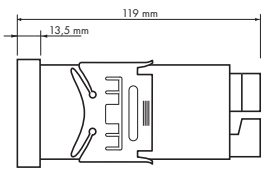
PI - Primary insulation, DI - Double insulation

Front view

Panel cut



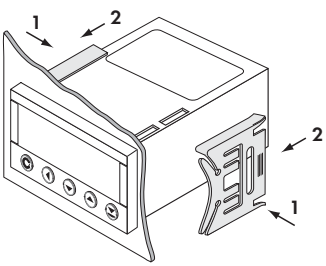
Side view

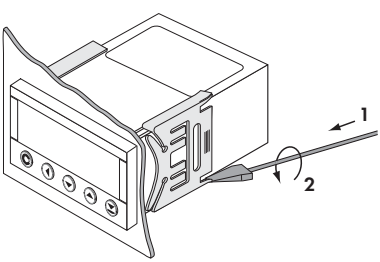


Panel thickness: 0,5...20 mm

INSTRUMENT INSTALLATION

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





INSTRUMENT DISASSEMBLY

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

Product	**OM 402PID**
Type	*information is presented on the delivery note*
Manufacturing No.	*information is presented on the delivery note*
Date of sale	*information is presented on the delivery note*

WARRANTY

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

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

The guarantee shall not apply to defects caused by:

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

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

YEARS

ES DECLARATION OF CONFORMITY

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

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

declares at its 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: Programmable panel instrument

Type **OM 402**

Version: UNI, PID, PWR

Thas been designed and manufactured in line with requirements of:

Statutory order no. 17/2003 Coll., on low-voltage electrical equipment (directive no. 73/23/EHS)
Statutory order no. 616/2006 Coll., on electromagnetic compatibility (directive no. 2004/108/EHS)

The product qualities are in conformity with harmonized standard:

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

Seismic resistance: IEC 980: 1993, par. 6

The product is furnished with CE label issued in 2006

As documentation serve the protocoles of authorized and accredited organizations:

EMC MO CR, Testing institute of technical devices, protocol no. 80/6-46/2006 of 03/03/2006
MO CR, Testing institute of technical devices, protocol no. EMI.80/6-333/2006 of 15/01/2007
Seismic resistance VOP-026 Stemberk, protocol no.: 6430-16/2007 of 07/02/2007

Place and date of issue: Prague, 19. Juli 2010

Miroslav Hackl
Company representative

Assessment of conformity pursuant to §22 of Act no. 22/1997 Coll. and changes as amended by Act no.71/2000 Coll. and 205/2002 Coll