



OM 371PWR

3 3/4 DIGIT PROGRAMMABLE

AC VOLTMETER/AMMETER
NETS ANALYSER
WATTMETER



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 OM371 series conform to the European regulation 89/336/EWG and the Ordinance 168/1997 Coll.

They are up to the following European standards:

EN 55 022, class B

EN 61000-4-2, -4, -5, -6, -8, -9, -10, -11

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

CONNECTION

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



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2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OM 371PWR model is a universal 4 digit panel wattmeter, with independent measurement of AC voltage/current, frequency, Power factor and other quantities.

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

Programmable display projection

Measured quantity voltage (V_{RMS})
 current (A_{RMS})
 real power (P)
 frequency (Hz)

with calculation reactive power (Q)
 apparent power (S)
 power factor ($\cos \varphi$)

Setting manual, for the maximum value of the input signal, in „CM“ it is possible to set arbitrary projection on the display, e.g.: 0...250 V/0...5 A \Rightarrow 0...1.250 kW

Projection -999...9999

Digital filters

Floating average 0/3/7 measurements
 Exponential average from 2...100 measurements
 n-th value from 2...100 measurements
 Radius of insens. band of suppressed change of measured value

Mathematic functions

Min/max. value registration of min./max. value achieved during the measurement
 Tare assigned to reset the display in case of non-zero input signal
 Round-off setting the projection step

External control

Hold display/instrument/Menu blocking
 Lock control keys locking

Output

Limits 2 relays with switching contact,
 Limits have both adjustable hysteresis and optional delay of the switch-on. Reaching the limits is signalled by LED and at the same time by the switch-on of the relevant relay.

CONTROL

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

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

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

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

The measured units may be projected on the display.

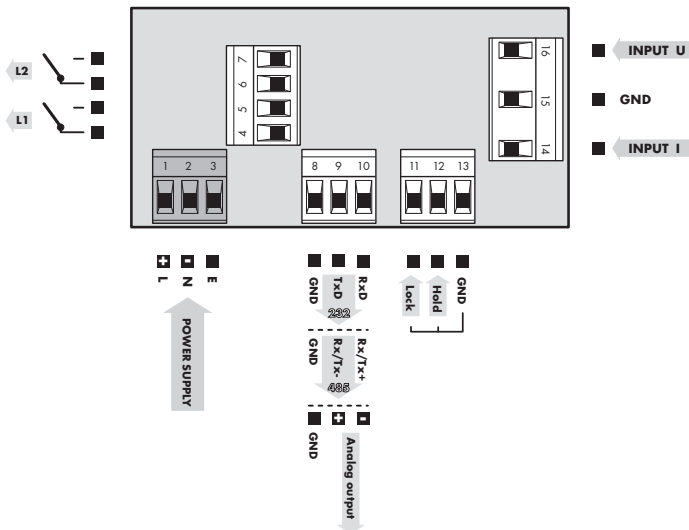
EXTENSION

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

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

3. CONNECTION

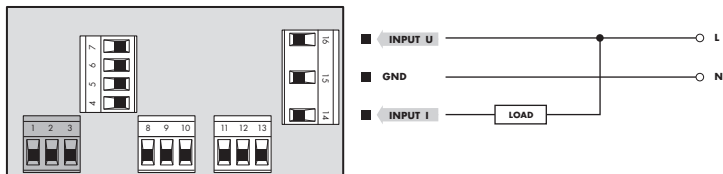
The supply lead for feeding the instrument should not be in the proximity of low-potential signals.
 Contactors, motors with larger input and other efficient elements should not be in the proximity of the instrument.
 The lead into the instrument input (the measured quantity) should be in sufficient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



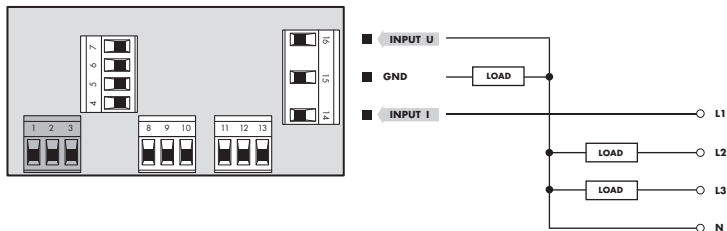
! Grounding on terminal „E“ must be connected at all times

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

CONNECTION FOR MEASUREMENTS ON ONE PHASE

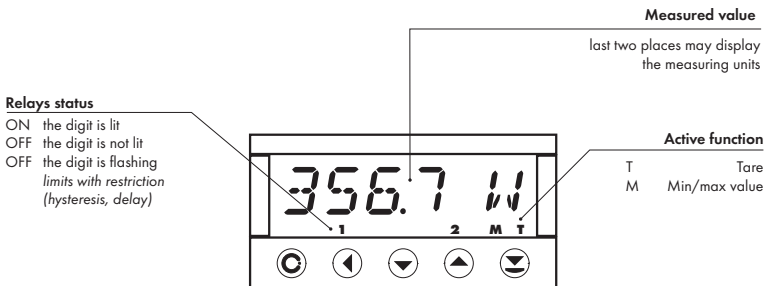


CONNECTION FOR MEASUREMENTS ON THREE PHASES



4. INSTRUMENT SETTING

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



CONFIGURATION MODE

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

USER MODE

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

SYMBOLS USED IN THE INSTRUCTIONS



DEF Indication of manufacture pre-setting

CONTROL KEYS FUNCTIONS



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

SETTING THE DECIMAL POINT AND THE MINUS SIGN

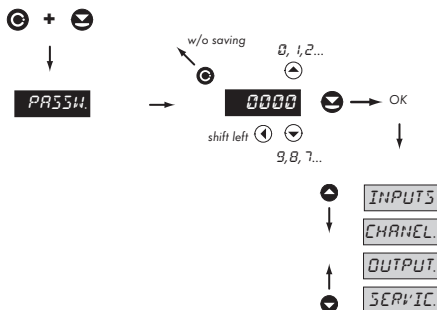
DECIMAL POINT


Its selection is performed for each quantity independently in the „Channels“ menu. Upon modification of the number to be adjusted transition behind the highest decade is performed by the control key , when the decimal point starts flashing. Positioning is performed by .

MINUS SIGN

Its selection is performed independently for every item. The sign is set on the highest decade by the control key  and it is placed between the digits „9“ and „0“. Confirmation is made by pressing .

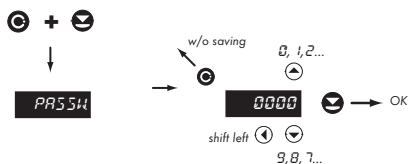
ACCESS INTO THE CONFIGURATION MODE



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

4.1 GUIDE THROUGH MINIMUM INSTRUMENT SETTING

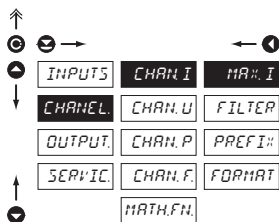
1 Access into the „Configuration menu“



PASSW Entering the introductory access password

0000 Standard manufacture setting of the access password

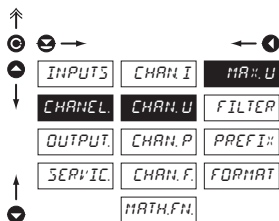
2 Setting display projection



CHAN I Setting the input parameters - Channel I

MA:: I Setting display projection for maximum value of input current

- range of the setting is ± 9999

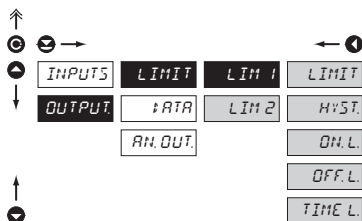


CHAN U Setting the input parameters - Channel U

MA:: U Setting display projection for maximum value of input voltage

- range of the setting is ± 9999

4.2.2 LIMITS - ENTERING THE VALUES



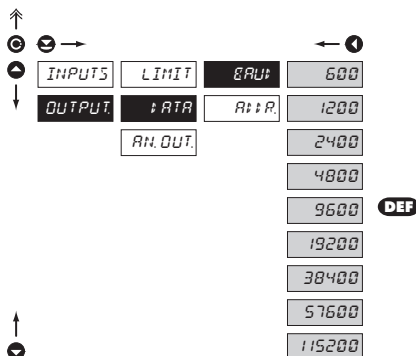
! The process of setting Limit 2 is identical with the setting for Limit 1

Adjustable authorization of access into items, see page 37

LIM - Entering the limit values for status evaluations

- LIMIT** Setting the limit for relay switch-on
 - in full range of the display
- HYST** Setting hysteresis only in (+) values
 - in full range of the display
- ON.L** Setting the beginning of the range of the limit switch-on
 - in full range of the display
- OFF.L** Setting the end of the range of the limit switch-on
 - in full range of the display
- TIME.L** Setting the offset of the limit switch-on
 - in range 0...99,9 s

4.2.3 DATA OUTPUT - SETTING THE RATE

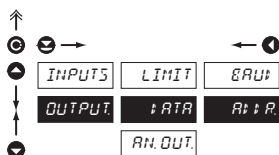


BAUD: Setting the data output rate (baud)

- 600** Rate - 600 Baud
- 1200** Rate - 1 200 Baud
- 2400** Rate - 2 400 Baud
- 4800** Rate - 4 800 Baud
- 9600** Rate - 9 600 Baud
- 19200** Rate - 19 200 Baud
- 38400** Rate - 38 400 Baud
- 57600** Rate - 57 600 Baud
- 115200** Rate - 115 200 Baud

Adjustable authorization of access into items, see page 37

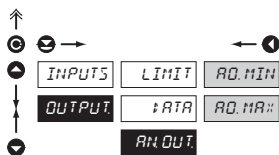
4.2.3.1 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS


R: :P Setting the instrument address

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

Adjustable authorization of access into items, see page 37

4.2.4 ANALOG OUTPUT - SETTING THE RANGE


RD. OUT. Setting the analog output range

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

RD. MIN Assigning the displayed value to the beginning of the AO range

- range of the setting is $\pm 50\ 000$

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

- range of the setting is $\pm 50\ 000$

Adjustable authorization of access into items, see page 37

4.3 CONFIGURATION MENU

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

23.6



PASSW.

0000

Entering the access password

! Upon delay longer than 15 s the programming mode is automatically discontinued and the instrument itself switches back to the measuring mode

INPUTS	CLEAR	CONFIG	AUX.IMP.
--------	-------	--------	----------

INPUTS

Setting the instrument input

Internal value
resettingSetting the
instrument
parametersSetting the
auxiliary
inputs

CHANNEL	CHAN. I	CHAN. U	CHAN. P	CHAN. F	MATH.FN.
---------	---------	---------	---------	---------	----------

CHANNEL

Setting the measuring channels

Setting the
measuring
channel - „I“Setting the
measuring
channel- „U“Setting the
measuring
channel- „P“Setting the
measuring
channel- „Fr“Mathematic
functions

OUTPUT	LIMIT	DATA	AN. OUT	DISP.
--------	-------	------	---------	-------

OUTPUT

Setting the instrument outputs

Setting the
limits, hystere-
sis and delaySetting the
data outputSetting the
analog outputSetting the
display
projection

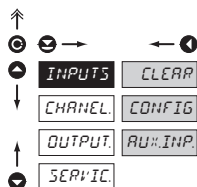
SERVIC.	ACCESS	RESTOR.	CALIB.	LANG.	N.PASS	IDENT.
---------	--------	---------	--------	-------	--------	--------

SERVIC.

Service functions

Setting the
access rights
into „UM“Return to
manufacture
calibration or
settingInstrument
calibrationSetting the lan-
guage version
of the menuChange of
the access
passwordInstrument
identification

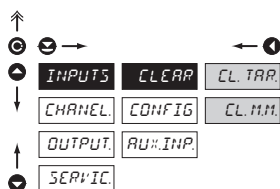
4.3.1 CONFIGURATION MODE - INPUTS



The basic instrument parameters are adjusted in this menu

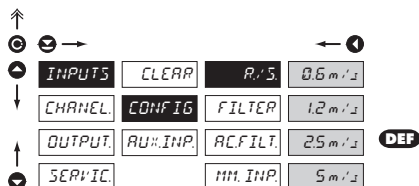
CLEAR	Resetting the internal values of the instrument
CONFIG	Basic instrument setting
AUX:INP	Setting the auxiliary input „Hold“

4.3.1.1 INTERNAL VALUES RESETTING



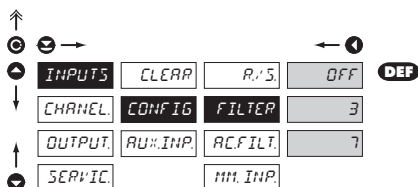
CL.TAR	Tare resetting
CL.MM	Resetting the min and max value of the measurement

4.3.1.2.1 SETTING THE MEASURING RATE



R/S	Setting the instrument measuring rate
0.6 m/s	Rate - 0,6 measurements/s
1.2 m/s	Rate - 1,2 measurements/s
2.5 m/s	Rate - 2,5 measurements/s
5 m/s	Rate - 5 measurements/s

4.3.1.2.2 SETTING THE INPUT FILTER

**FILTER** Setting the input filter

- floating filter with the option of setting the number of measurements

OFF	The function is off
3	Floating filter from 3 measurements
7	Floating filter from 7 measurements

4.3.1.2.3 SETTING THE INPUT AC FILTER

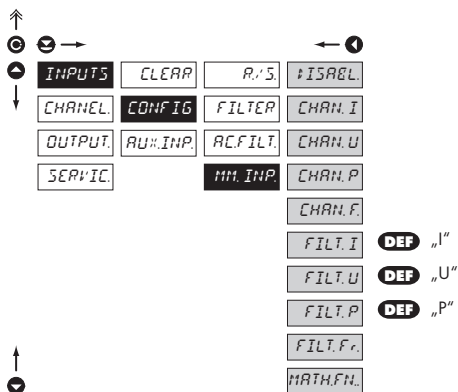
**AC.FILT.** Setting the input AC filter - suppressing the dc comp.

- allows for measurement of the alternating component of the input signal only

↑ISABL.	The function is off
ENABLE	The function is on

- measures only the alternating component of the input signal

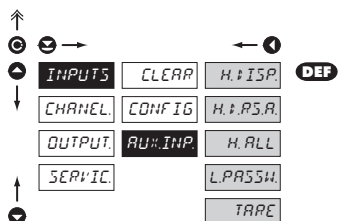
4.3.1.2.4 SETTING THE INPUT QUANTITIES FOR MIN/MAX VALUE EVALUATION

**MM.INP.** Setting for evaluation of the min/max value

- allows to assign the quantity from which the min/max value on the display is evaluated

↑ISABL.	The function is off
CHAN.I	Value from channel I „Current“
CHAN.U	Value from channel U „Voltage“
CHAN.P	Value from channel P „Power Output“
CHAN.F.	Value from channel Fr. - Frequency
FILT.I	Filtered value from channel I - „Current“
FILT.U	Filtered value from channel U - „Voltage“
FILT.P	Filtered value from channel P - „Power Output“
MATH.FN.	Mathematic functions

4.3.1.3 AUXILIARY INPUTS

**AU::INP.** Setting the function „Hold“

H. I.S.P. The „Hold“ signal blocks the displayed value

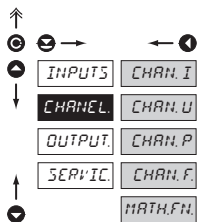
H. I.R.S.R. The „Hold“ signal blocks the displayed value, the data and analog output functions

H. ALL The „Hold“ signal blocs the entire instrument

L.PASSH. Blocking access into the Configuration menu

TARE Activation of the „Tare“ function

4.3.2 CONFIGURATION MODE - CHANNELS



The basic parameters of the instrument input values are adjusted in this menu

CHAN. I Setting the parameters and the range of the measuring channel I - „Current“

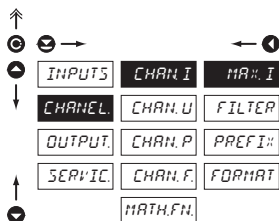
CHAN. U Setting the parameters and the range of the measuring channel U - „Voltage“

CHAN. P Setting the parameters and the range of the measuring channel P - „Power Output“

CHAN. F Setting the parameters and the range of the measuring channel Fr - „Frequency“

MAT. FCE Setting the instrument mathematic functions

4.3.2.1 SETTING THE MEASURING „CHANNEL I“

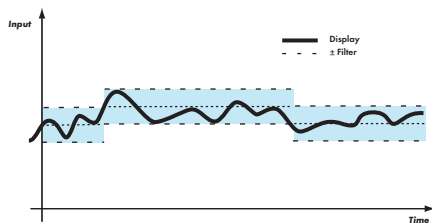
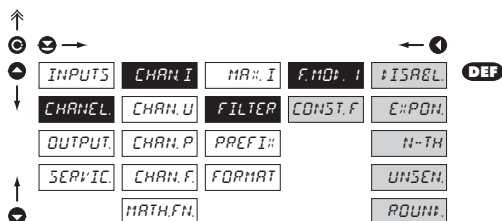


CHAN. I Setting the input parameters - Channel I

MA:: I Setting display projection for maximum value of the input signal

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

4.3.2.1.1 SETTING THE MEASURING „CHANNEL A“ - FILTERS

**F.MOD: 1** Setting the digital filters**CONST. 1** Setting the Filtration constants

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

±ISAE L Filters are off**E::PDN** Selection of the exponential filter

- calculation is from a selected number of measurements (range 2...100)

N-TH Selection of the n-th value

- this filter allows to drop n-1 values and for further processing use every n-th measured value (range 2...100 measurements)

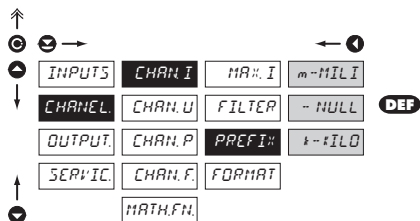
UNSEN. Selection of the band of insensitiveness

- this filter enables to stabilize the resulting value. The measurement result is understood as the previous value, provided the measured value is not higher than the previous + P or smaller than previous - P. The value „±P“ indicates the band of insensitiveness in which the measured value may change without affecting the result - the change of the displayed data (range 0,00001...100 000)

ROUND: Measured value round-off

- it is set by arbitrary number, which determines the step of projection (e.g., 2.5 - 0, 2.5, 5, 7.5, etc.)

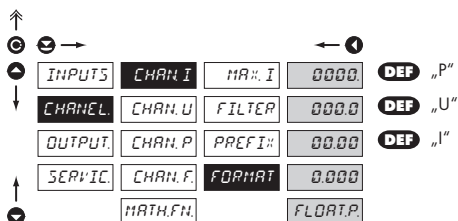
4.3.2.1.2 MULTIPLYING CONSTANT

**PREFI::** Multiplying constant

- the constant allows for another mathematic calculation with the option of extended projection of the measuring units

m-MILI Constant 0,001, description „m“**- NULL** Constant 1, w/o description**t-:ILO** Constant 1000, description „k“

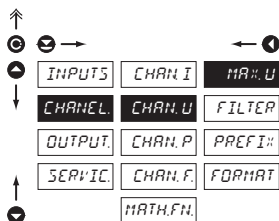
4.3.2.1.3 SETTING THE DECIMAL POINT



FORMAT Setting the decimal point

- the instrument allows for classic projection of a number with placement of the decimal point (0000/000,0/00,00/0,000) and projection with floating point, allowing to display the number in its most precise form „FLOAT.P.“

4.3.2.2 SETTING THE MEASURING „CHANNEL U“



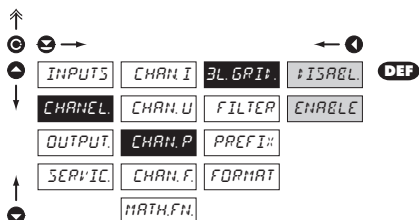
CHAN.U Setting the input parameters - Channel U

MA::U Setting display projection for maximum value of the input signal

- range of the setting is 999999

Further settings are identical with measuring channel „I“

4.3.2.3 SETTING THE MEASURING „CHANNEL P“



3L.GRIP Calculation of 3-phase power output

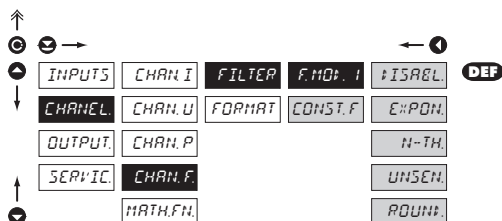
±ISABL The function is off

ENABLE Calculation of 3-phase power output is on

- the value is calculated with the assumption of a balanced demand in all phases
- for P, S Q the value is multiplied by 3

Further settings are identical with measuring channel „I“

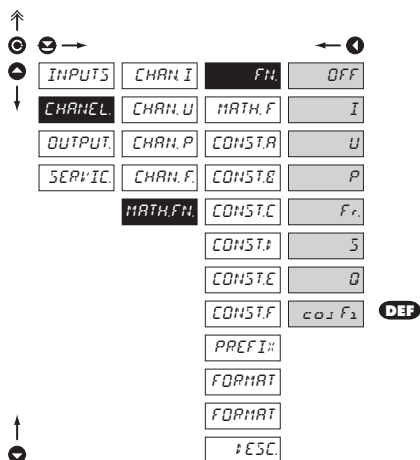
4.3.2.4 SETTING THE MEASURING „CHANNEL FR“



F.MOD: 1 Setting the digital filters

Further settings are identical with measuring channel „1“

4.3.2.5 MATHEMATIC FUNCTIONS



FN Selection of mathematic functions

- setting the input quantity for further processing by mathematic functions

OFF Mathematic functions are off

I Current

U Voltage

P Real power

F_r Frequency

S Apparent power

- preset description „VA“

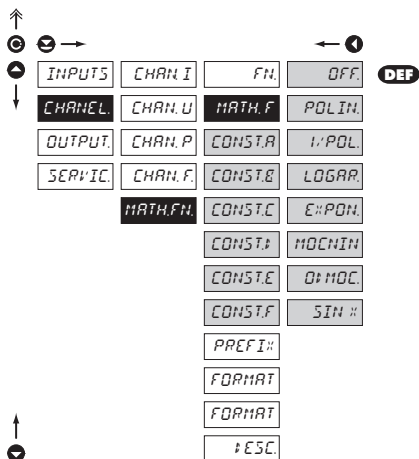
Q Reactive power

- preset description „VAR“

cos F₂ Power factor

- preset description „“

4.3.2.6 MATHEMATIC FUNCTIONS



MATH Selection of mathematic functions

CONST. - Setting the constants for calculation of mat.functions

- this menu is displayed always after selection of particular mathematic function with the option of entering constants A, B, C, D, E and F

OFF Mathematic functions are off

POLIN Polynome

$$Ax^5 + Bx^4 + Cx^3 + Dx^2 + Ex + F$$

1/POL 1/x

$$\frac{A}{x^5} + \frac{B}{x^4} + \frac{C}{x^3} + \frac{D}{x^2} + \frac{E}{x} + F$$

LOGAR. Logarithm

$$A \times \ln \left(\frac{Bx + C}{Dx + E} \right) + F$$

E::PDN. Exponential

$$A \times e^{\left(\frac{Bx + C}{Dx + E} \right)} + F$$

MOCNIN. Power

$$A \times (Bx + C)^{(Dx + E)} + F$$

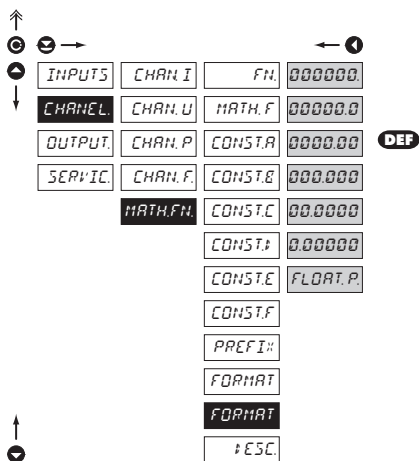
Q:MOD. Radical

$$A \times \sqrt{\frac{Bx + C}{Dx + E}} + F$$

SIN # Sin x

$$A \sin^5 x + B \sin^4 x + C \sin^3 x + D \sin^2 x + E \sin x + F$$

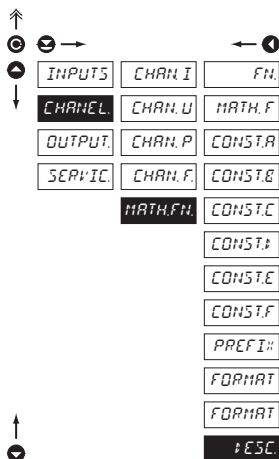
4.3.2.4 SETTING THE DECIMAL POINT


FORMAT Setting the decimal point

- the instrument allows for classic projection of a number with placement of the decimal point (0000/000,0/00,00/0,000) and projection with floating point, allowing to display the number in its most precise form „FLOAT.P.“

The menu is displayed only when „MATH.F“ are active or the inputs „FN.“ U, I or Fr. are selected

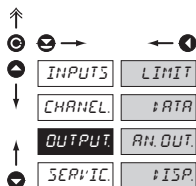
4.3.2.6.3 MATHEMATIC FUNCTIONS - DESCRIPTION ON THE DISPLAY


↑ESC. Setting the measuring units on the display upon projection of the mathematic functions

- in this menu we set individual projection of the symbol of mathematic function which is independent of the projection of the measured quantity description and it is displayed only with the given function

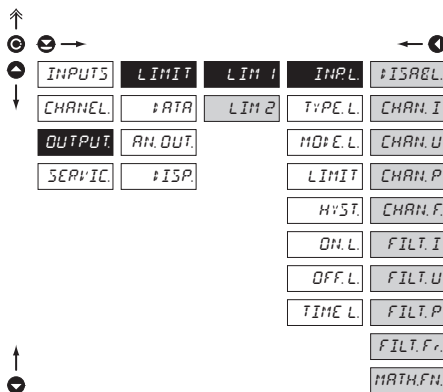
The menu is displayed only when „MATH.F“ are active or the inputs „FN.“ U, I or Fr. are selected

4.3.3 CONFIGURATION MODE - OUTPUT



LIMIT	Setting the function and type of the limits switch-on
IATA	Setting the data output type and parameters
AN.OUT	Setting the analog output type and parameters
IISP	Setting the permanent and temporary display projection and assignment of further projection of internal data to arbitrary instrument control keys

4.3.3.1.1 LIMITS - SETTING THE DATA FOR EVALUATION



INPL Setting the input „quantity“ for limits evaluation

IISABL	The limit will not be evaluated
CHAN.I	The limit will be evaluated from the output of „Channel I“
CHAN.U	The limit will be evaluated from the output of „Channel U“
CHAN.P	The limit will be evaluated from the output of „Channel P“
CHAN.F	The limit will be evaluated from the output of „Channel Fr.“
FILT.I	The limit will be evaluated from the output of „Channel I“ after modification by digital filters
FILT.U	The limit will be evaluated from the output of „Channel U“ after modification by digital filters
FILT.P	The limit will be evaluated from the output of „Channel P“ after modification by digital filters
FILT.Fr.	The limit will be evaluated from the output of „Channel Fr.“ after modification by digital filters
MATH.FN	The limit will be evaluated from the mathematic functions output

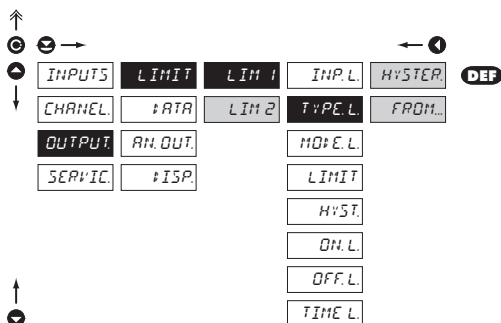
DEF „I“
DEF „U“
DEF „P“

! The setting for Limit 2 is identical with the setting for Limit 1

! The menu is dynamic, i.e. the items are displayed in dependence on the set type of limits.

HYSTER. ⇒ LIMIT + HYST. + TIME. L
FROM... ⇒ ON. L + OFF. L

4.3.3.1.2 LIMITS - SETTING THE TYPE OF LIMITS



TYPE.L Setting the type of limits

HYSTER. A limit has a boundary, hysteresis and delay

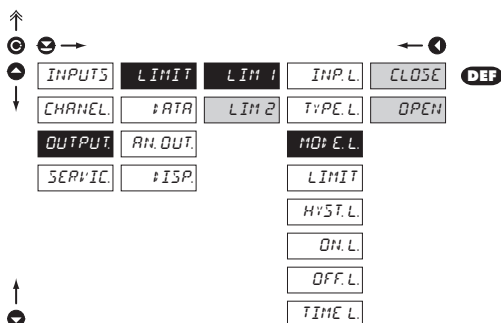
- for this regime the „LIMIT“ parameters are set, at which the limit shall react and is adjustable within full range of the display, „HYST.“ is an auxiliary parameter preventing oscillation at unsteady value, it is adjustable only in plus values. The limit parameter is „TIME.L.“ determining the offset of the relay switch-on from the time of exceeding the set limit in range 0,0... 99,9 s

FROM... Limit is in the regime switch-on „from - to“

- for this regime the parameters „ON.L.“ and „OFF.L.“ are entered between which the limit is to switch-on, they are adjustable within the full display range

! The setting for Limit 2 is identical with the setting for Limit 1

4.3.3.1.3 LIMITY - SETTING THE RELAY MODE



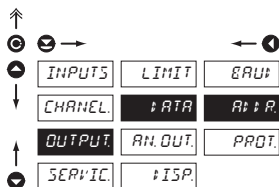
MOD.E.L Setting the switching mode of the relay

CLOSE Relay switches on when the condition is met

OPEN Relay switches off when the condition is met

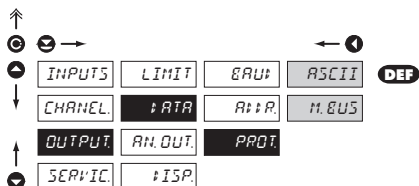
! The setting for Limit 2 is identical with the setting for Limit 1

4.3.3.2.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS


Rt:P. Setting the instrument address

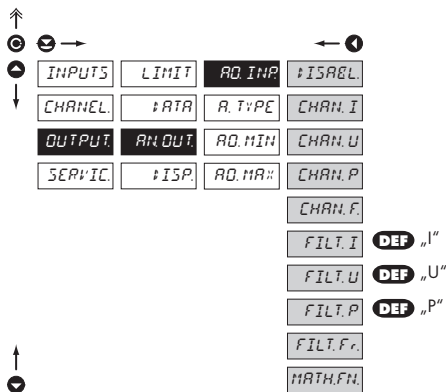
- setting in range 0...31
- manufacture setting 00 **DEF**

4.3.3.2.3 DATA OUTPUT - SETTING THE DATA PROTOCOL


PRDT. Setting typu datového protokolu

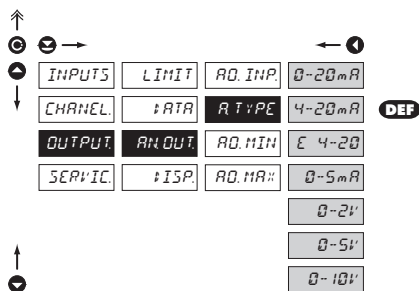
- ASCII** ASCII protocol
- PRDT.** DIN MessBus protocol

4.3.3.3.1 ANALOG OUTPUT - SETTING THE DATA FOR EVALUATION


RO.INP. Setting the input „quantity“ for evaluation of analog output

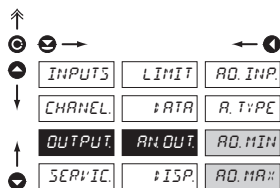
- :ISABEL.** AO nebude vyhodnocována
- CHAN.I** AO will be evaluated from output of „Channel I“
- CHAN.U** AO will be evaluated from output of „Channel U“
- CHAN.P** AO will be evaluated from output of „Channel P“
- CHAN.F.** AO will be evaluated from output of „Channel Fr.“
- FILT.I** AO will be evaluated from FILTER.value of „Channel I“
- FILT.U** AO will be evaluated from FILTER.value of „Channel U“
- FILT.P** AO will be evaluated from FILTER.value of „Channel P“
- FILT.Fr.** AO will be evaluated from FILTER.value of „Channel Fr.“
- MATH.FN.** AO will be evaluated from the math.functions output

4.3.3.3.2 ANALOG OUTPUT - SETTING THE TYPE

**R.TYPE** Setting the type of analog output

- | | |
|---|---|
| 0-20 mA | Type - 0...20 mA |
| 4-20 mA | Type - 4...20 mA |
| E 4-20 | Type - 4...20 mA with indication of error statement |
| - upon error statement the output value is < 3,6 mA | |
| 0-5 mA | Type - 0...5 mA |
| 0-2 V | Type - 0...2 V |
| 0-5 V | Type - 0...5 V |
| 0-10 V | Type - 0...10 V |

4.3.3.3.3 ANALOG OUTPUT - SETTING THE RANGE

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

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

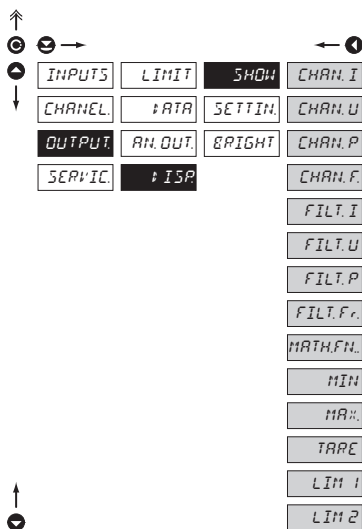
RD.MIN Assigning the displayed value to the beginning of the AO range

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

RD.MA:: Assigning the displayed value to the end of the AO range

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

4.3.3.4 DISPLAY PROJECTION



SHOW In this menu item the following data may be displayed

CHAN. I	Value of „Channel I“
CHAN. U	Value of „Channel U“
CHAN. P	Value of „Channel P“
CHAN. F.	Value of „Channel Fr.“
FILT. I	Value of „Channel I“ after Filtration
FILT. U	Value of „Channel U“ after Filtration
FILT. P	Value of „Channel P“ after Filtration
FILT. Fr.	Value of „Channel I“ after Filtration
MATH.FN.	Value of the „Mathematic function“
MIN	Value of the „Minimum measuring value“
MAX	Value of the „Maximum measuring value“
TARE	Tare value
LIM 1	Value of „Limit 1“
LIM 2	Value of „Limit 2“

4.3.3.4.1 DISPLAY PROJECTION - PERMANENT

The screenshot shows a grid of menu options. The 'FOREV' option is highlighted in black. Navigation arrows are shown around the screen: up, down, left, right, and a central arrow pointing to the selected option.

INPUTS	LIMIT	SHOW	FOREV	CHAN. I
CHANCL.	DATA	SETTIN	LEFT	CHAN. U
OUTPUT	AN. OUT.	BRIGHT	TEMPOR.	CHAN. P
SERVIC.	ISP		MENU	CHAN. F.
			UP	FILT. I
			DOWN	FILT. U
			ENTER	FILT. P
				FILT. Fr.
				MATH.FN.
				MIN
				MAX

FOREV Selection of values for permanent projection on the instrument display

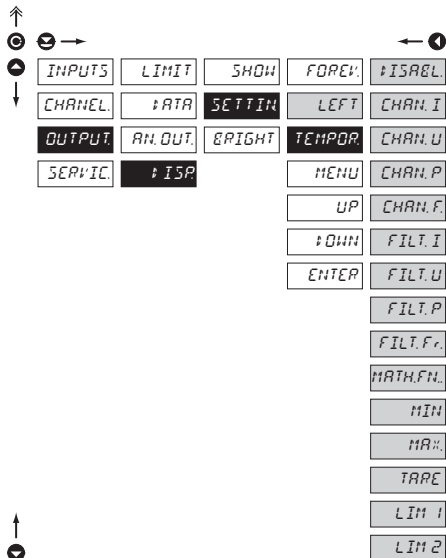
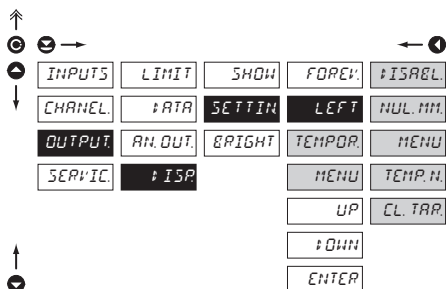
CHAN. I	Value of „Channel I“
CHAN. U	Value of „Channel U“
CHAN. P	Value of „Channel P“
CHAN. F.	Value of „Channel Fr.“
FILT. I	Value of „Channel I“ after Filtration
FILT. U	Value of „Channel U“ after Filtration
FILT. P	Value of „Channel P“ after Filtration
FILT. Fr.	Value of „Channel I“ after Filtration
MATH.FN.	Value of the „Mathematic function“
MIN	Value of the „Minimum measuring value“
MAX	Value of the „Maximum measuring value“

DEF „I“

DEF „U“

DEF „P“

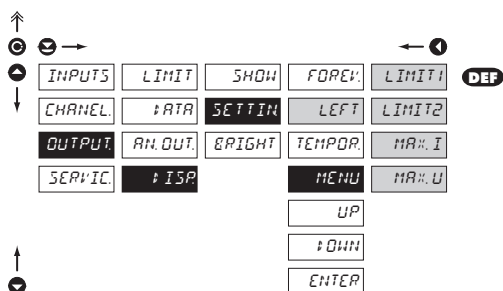
4.3.3.4.2 DISPLAY PROJECTION - AFTER PRESSING „LEFT“

**LEFT** Assigning function to the control key „LEFT“

- ↑ISREL** The control key has no function
- NUL.MM** Resetting the min/max. value
- MENU** Direct access to selected menu item
- see setting „MENU“
- TEMP.N** Projection of temporary value
- after pressing the selected value will be displayed with flashing DP for approx. 2 s
- CL.TAR** Tare resetting

TEMPOR After selection of item „TEMP. N.“ from menu „LEFT“ the following options are available

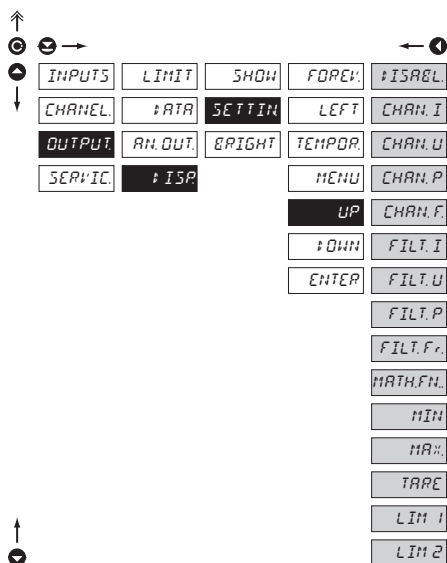
- in this menu we may select value for temporary display projection (after pressing ↻), which will be projected for approx 2s with flashing DP
- CHAN.I** Value of „Channel I“
- CHAN.U** Value of „Channel U“
- CHAN.P** Value of „Channel P“
- CHAN.F** Value of „Channel Fr.“
- FILT.I** Value of „Channel I“ after Filtration
- FILT.U** Value of „Channel U“ after Filtration
- FILT.P** Value of „Channel I“ after Filtration
- FILT.Fr** Value of „Channel I“ after Filtration
- MATH.FN** Value of the „Mathematic function“
- MIN** Value of the „Minimum measuring value“
- MAX** Value of the „Maximum measuring value“
- TARE** Tare value
- LIM 1** Value of „Limit 1“
- LIM 2** Value of „Limit 2“



MENU After selecting „MENU“ item from the menu „LEFT“ these options are available

LIMIT 1	Direct access into menu „Limit 1 - MEZ 1“
LIMIT 2	„Direct access into menu „Limit 2 - MEZ 2“
MAX. I	„Direct access into menu „Channel I - Max. I“
MAX. U	„Direct access into menu „Channel U - Max. U“

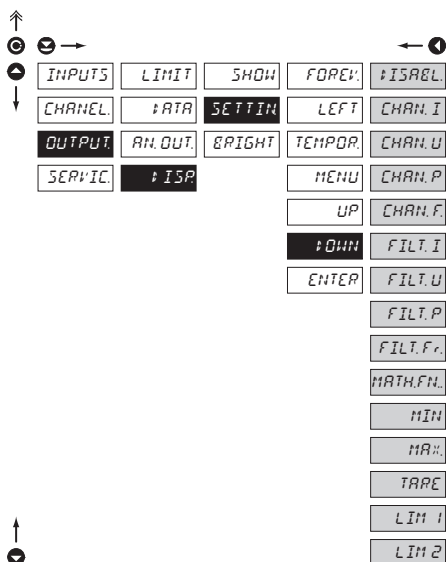
4.3.3.4.3 DISPLAY PROJECTION - AFTER PRESSING „UP“



UP Assigning function to the control key „UP“

ISP	The control key has no function
CHAN. I	Value of „Channel I“
CHAN. U	Value of „Channel U“
CHAN. P	Value of „Channel P“
CHAN. F	Value of „Channel Fr.“
FILT. I	Value of „Channel I“ after Filtration
FILT. U	Value of „Channel I“ after Filtration
FILT. P	Value of „Channel I“ after Filtration
FILT. Fr.	Value of „Channel I“ after Filtration
MATH.FN.	Value of the „Mathematic function“
MIN	Value of the „Minimum measuring value“
MAX.	Value of the „Maximum measuring value“
TARE	Tare value
LIM 1	Value of „Limit 1“
LIM 2	Value of „Limit 2“

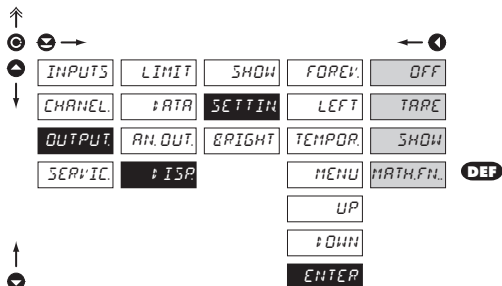
4.3.3.4.4 DISPLAY PROJECTION - AFTER PRESSING „DOWN“



↓ DOWN Assigning function to the control key „DOWN“

↑ ISREL	The control key has no function
CHAN. I	Value of „Channel I“
CHAN. U	Value of „Channel U“
CHAN. P	Value of „Channel P“
CHAN. F.	Value of „Channel Fr.“
FILT. I	Value of „Channel I“ after Filtration
FILT. U	Value of „Channel I“ after Filtration
FILT. P	Value of „Channel I“ after Filtration
FILT. F.	Value of „Channel I“ after Filtration
MATH.FN.	Value of the „Mathematic function“
MIN	Value of the „Minimum measuring value“
MAX.	Value of the „Maximum measuring value“
TARE	Tare value
LIM 1	Value of „Limit 1“
LIM 2	Value of „Limit 2“

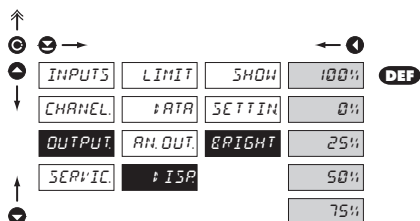
4.3.3.4.5 DISPLAY PROJECTION - AFTER PRESSING „ENTER“



ENTER Assigning function to the control key „ENTER“

OFF	The control key has no function
TARE	Display taring
SHOW	Projection of selected values
MATH.FN.	Value of the „Mathematic function“

4.3.3.4.6 DISPLAY PROJECTION - BRIGHTNESS

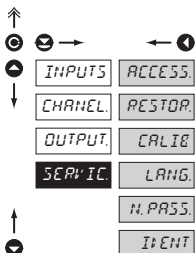
**BRIGHT** Setting the display brightness

- 100% Brightness 100%
- 0% Brightness 0%, display is off

- the display switches off after approx. 10 s and it lights up after pressing any key

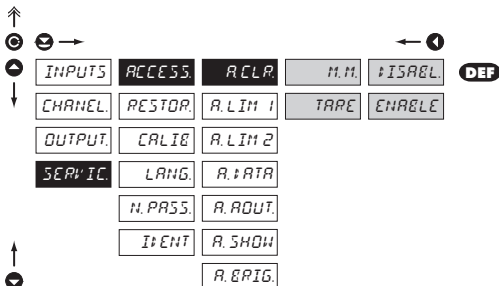
- 25% Brightness 25%
- 50% Brightness 50%
- 75% Brightness 75%

4.3.4 CALIBRATION MODE - SERVICE



ACCESS	Setting the access rights for „User mode“
RESTOR	Restoration of the manufacture calibration or setting
CALIB	Instrument calibration
LANG	Setting the language version
N.PASS	Change of the access password
IDENT	Instrument identification

4.3.4.1.1 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - RESETTING TO ZERO



RCLP Authorization for the instrument internal values resetting

M.M. Authorization for item „N. MM“, permitted resetting of the Min/max. value

TARE Authorization for item „N. TARE“, permitted resetting of the tare

The following parameters may be selected in all items

ISABEL The item is not displayed in „UM“

ENABLE The item has full access in „UM“

4.3.4.1.2 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - LIMITS

INPUTS	ACCESS	R.CL.P.	LIMIT	!ISABL	DEF
CHANNEL	RESTOR.	R.LIMIT 1	HYST.	SHOW	
OUTPUT	CALIB	R.LIMIT 2	ON.L.	EDIT	
SERV.IC.	LANG.	R.DATA	OFF.L.		
	N.PASS.	R.AN.OUT.	TIME.L.		
	I.FEED	R.SHOW			
		R.EPIG.			

! The menu is dynamic, i.e. the items are displayed in dependence on the set type of limits.

HYSTER ⇒ LIMIT + HYST. + TIME. L

FROM... ⇒ ON. L + OFF. L

R.LIMIT - Setting the access rights into limits in „UM“

LIMIT	Authorization for item „LIMIT“, setting the boundary
HYST.	Authorization for item „HYST.“, setting hysteresis
ON.L.	Authorization for item „ON.L.“, setting the beginning of the switch-on (from-to)
OFF.L.	Authorization for item „OFF.L.“, setting the end of the switch-on (from-to)
TIME.L.	Authorization for item „TIME.L.“, setting the offset of the switch-on

The following parameters may be selected in all items

!ISABL	The item is not displayed in „UM“
SHOW	The item is displayed in „UM“ but cannot be changed
EDIT	The item has full access in „UM“, including editing

4.3.4.1.3 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - OUTPUTS

INPUTS	ACCESS	R.CL.P.	!ISABL	DEF
CHANNEL	RESTOR.	R.LIMIT 1	SHOW	
OUTPUT	CALIB	R.LIMIT 2	EDIT	
SERV.IC.	LANG.	R.DATA		
	N.PASS.	R.AN.OUT.		
	I.FEED	R.SHOW		
		R.EPIG.		

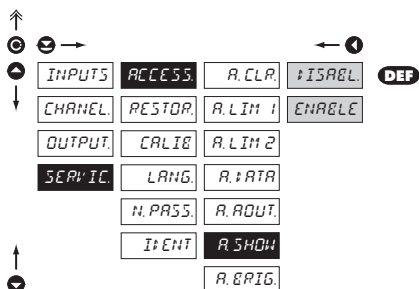
R.DATA - Authorization for item „DATA“, setting the data output

R.AN.OUT. - Authorization for item „AN. OUT.“, setting the analog output

The following parameters may be selected in all items

!ISABL	The item is not displayed in „UM“
SHOW	The item is displayed in „UM“ but cannot be changed
EDIT	The item has full access in „UM“, including editing

4.3.4.1.4 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - PROJECTION



R.SHOW Authorization for temporary projection of internal values „SHOW“ from menu „OUTPUT. - DISP“

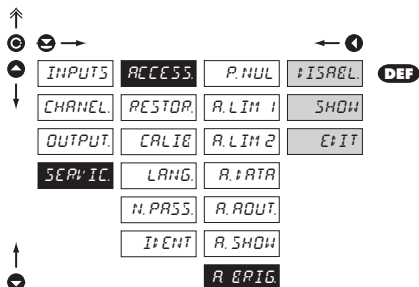
- it sets authorization for temporary projection of the instrument internal values

The following parameters may be selected in this item

!ISABL. The item is not displayed in „UM“

ENABLE The item has full access in „UM“

4.3.4.1.5 SETTING THE ACCESS RIGHTS FOR „USER MODE“ - BRIGHTNESS



R.BRIG. Authorization for item „BRIGHT“, setting the display brightness

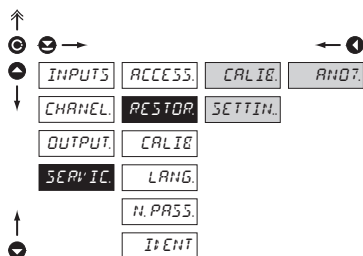
The following parameters may be selected in this item

!ISABL. The item is not displayed in „UM“

SHOW The item is displayed in „UM“ but cannot be changed

E:IT The item has full access in „UM“, including editing

4.3.4.2 RESTORATION OF MANUFACTURE CALIBRATION/SETTING


RESTOR. Restoration of manufacture calibration or instrument setting

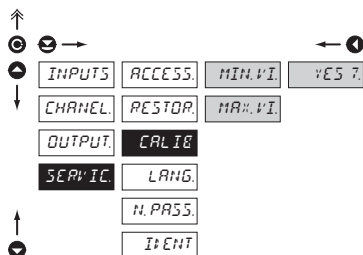
- in case of incorrect setting or calibration it is possible to return to manufacture setting. Prior execution of the changes you will be asked to confirm your selection „YES“?

CALIB. Restoration of manufacture calibration of the instrument

SETTIN. Restoration of manufacture setting and calibration

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

4.3.4.3 INSTRUMENT CALIBRATION


CALIB Instrument calibration

- in this menu instrument calibration may be performed. Prior execution of the changes you will be asked to confirm your selection and choose the calibration range „YES“?

MIN.VI. Entering and connecting reference signals for minimum input value

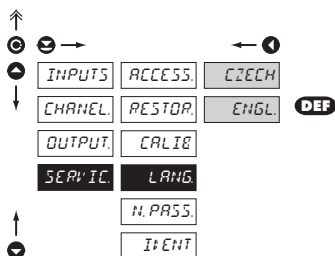
- prior confirmation of the selection both reference signals must already be connected

MAX.VI. Entering and connecting reference signals for maximum input value

- prior confirmation of the selection both reference signals must already be connected

! Projection values for „MAX I“ and „MAX U“ are entered to the respective channel

4.3.4.4 LANGUAGE VERSION FOR THE INSTRUMENT MENU

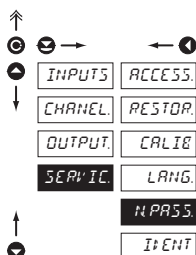


LANG Setting the language version of the instrument menu

CZECH The instrument menu is in Czech


ENGL The instrument menu is in English

4.3.4.5 SETTING NEW ACCESS PASSWORD

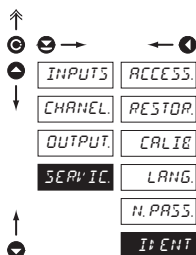


N.PASS Setting new access password for the „Configuration menu“

- this option allows to change the numeric code which blocks the access into the instrument „Configuration mode“. Range of the numeric code is 0...9999

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

4.3.4.6 INSTRUMENT IDENTIFICATION



I+ENT Projection of the instrument version

- the display shows the type identification of the instrument with the number of revision
 - instrument name - input - program version - date SW (MM/DD/YY),
 e.g.: OM371-POWER > 041-16 > 170603

5. TABLE OF SYMBOLS

The instrument allows to add two descriptive characters to the classic numeric formats (at the expense of the number of displayed places). The setting is performed by means of a shifted ASCII code. Upon modification the first two places display the entered characters and the last two places the code of the relevant symbol from 0 to 95. Numeric value of given character equals the sum of the numbers on both axes of the table.

Description is cancelled by entering characters with code 00

	0	1	2	3	4	5	6	7		0	1	2	3	4	5	6	7
0		Q	"	#	\$	%	&	'	0	!	"	#	\$	%	&	'	
8	:	;	#	+	,	-	.	/	8	()	*	+	,	-	.	/
16	0	1	2	3	4	5	6	7	16	0	1	2	3	4	5	6	7
24	8	9	:	;	<	=	>	?	24	8	9	:	;	<	=	>	?
32	P	A	B	C	D	E	F	G	32	@	A	B	C	D	E	F	G
40	H	I	J	K	L	M	N	O	40	H	I	J	K	L	M	N	O
48	P	Q	R	S	T	U	V	W	48	P	Q	R	S	T	U	V	W
56	X	Y	Z	[\]	^	_	56	X	Y	Z	[\]	^	_
64	`	a	b	c	d	e	f	g	64	`	a	b	c	d	e	f	g
72	h	i	j	k	l	m	n	o	72	h	i	j	k	l	m	n	o
80	p	q	r	s	t	u	v	w	80	p	q	r	s	t	u	v	w
88	x	y	z	{		}	~		88	x	y	z	{		}	~	

6. DATA PROTOCOL

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

ASCII: 8 bit, no parity, one stop bit

Both the transmission rate and the address are adjustable in the instrument menu. Manufacture setting always presets the ASCII protocol, rate of 9600 Baud, address 00.

COMMANDS FOR INSTRUMENT OPERATION

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

Symbol	Meaning	Symbol	Meaning
⊕	Send unit value	Ⓒ	Complete number
⊕	Set unit value	⒱	Selection = complete number
Ⓚ	Perform relevant action	Ⓓ	Decimal number
		Ⓣ	Text - printable ASCII characters
		ⓗ	Intel HEX format

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

7. ERROR STATEMENTS

ERROR	REASON	ELIMINATION
<i>EU n d e.</i>	range underflow (A/D transducer)	change the input signal value or change display projection
<i>EO, e r.</i>	range overflow (A/D transducer)	change the input signal value or change display projection
<i>EA: C</i>	A/D transmission error	upon repeated error statement send the instrument for repair
<i>Ed a t a E</i>	distrupted data integrity in EEPROM, error upon data storage	upon repeated error statement send the instrument for repair
<i>ESHOW</i>	projection error, setting the DP and description at the same time	change of setting
<i>EMEM</i>	EEPROM memory error	„Def“ values will be used in emergency, needs to be sent for repair
<i>ELoPWR</i>	value cannot be measured (only for Power factor)	input signal control (input brackets have zero value of voltage/current)

8. TECHNICAL DATA

INPUT

range is fixed, as per order

Voltage:	0...10 V	1 MOhm
	0...30 V	1 MOhm
	0...60 V	1 MOhm
	0...100 V	1 MOhm
	0...150 V	1 MOhm
	0...250 V	1 MOhm
	0...450 V	1 MOhm

Current:	0...60 mV	1 MOhm
	0...150 mV	1 MOhm
	0...300 mV	1 MOhm
	0...40 mA	< 60 mV
	0...400 mA	< 60 mV
	0...1 A	< 60 mV
	0...5 A	< 60 mV

Input frequency: 0...400 Hz

Measured quantities Voltage (V_{RMS})Current (A_{RMS})

Active power (P)

Frequency (Hz)

with calculation

Reactive power (Q)

Apparent power (S)

Power factor ($\cos \phi$)

PROJECTION

Display: 999999, intensive red or green 14-segment LED, digit height 14 mm

Projection: -99999...999999

Decimal point: adjustable - in Configuration mode

Brightness: adjustable - in programming mode

INSTRUMENT ACCURACY

Temp. coefficient: 100 ppm/°C

Accuracy: $\pm 0,2\%$ of range

Rate: 0,6 - 1,2 - 2,5 - 5 measurements/s

Overload capacity: 10x (t < 100 ms), 2x (long-term)

Digital filter exponential, N-th value, radius of insensitiveness, round-off

Functions: Tare - display resetting

Hold - stop measuring (upon contact)

Blocking keyboard (upon contact)

Blocking the access into „CM“

Min/max. value resetting

Projection of measured units

Math. functions: see documentation

Watch-dog: reset after 1,2 s

Calibration: at 25°C and 40 % r.h.

COMPARATOR

Type: digital, adjustable in the menu

Limits: -999...3999

Hysteresis: 0...999

Delay: 0...99,9 s

Reaction: < 30 ms

Outputs: 2x relays with switching contact (230 VAC/30 VDC, 3 A)*

Relay: 1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

DATA OUTPUTS

Data format: 8 bit + no parity + 1 stop bit (ASCII)

Rate: 600...115 200 Baud

RS 232: isolated

RS 485: isolated, addressing (max. 31 instruments)

ANALOG OUTPUTS

Type: isolated, programmable with resolution of max. 10 000 points, analog output corresponds with the displayed data, type and range are adjustable

Non-linearity: 0,2 % of range

TC: 100 ppm/°C

Rate: response to change of value < 100 ms

Voltage: 0...2 V/5 V/10 V

Current: 0...5/20 mA/4...200 mA (compensation up to 600 Ohm)

POWER SUPPLY

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

MECHANIC PROPERTIES

Material: Noryl GFN2 SE1, incombustible UL 94 V-I

Dimensions: 96 x 48 x 120 mm

Panel cut-out: 90,5 x 45 mm

OPERATING CONDITIONS

Connection: connector terminal board, conductor sec. up to 2,5 mm²

Stabilization period: within 15 minutes after switch-on

Working temp.: 0°...60°C

Storage temp.: -10°...85°C

Cover: IP65 (front panel only)

Construction: safety class I

Overvoltage cat.: EN 61010-1, A2; for pollution degree II

III. - instrument power supply (300 V)

II. - input, output, excitation (300 V)

EMC: EN 61000-3-2+A12; EN 61000-4-2, 3, 4, 5, 6, 8, 11;

EN 55022, A1, A2

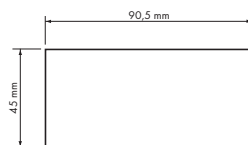
* the values apply for resistance load

9. INSTRUMENT DIM. AND INSTALLATION

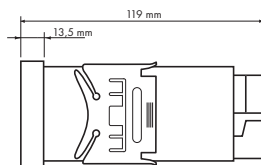
Front view



Panel cut



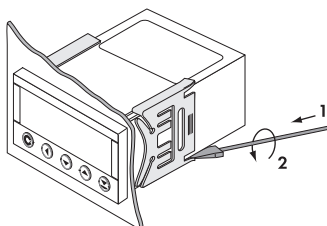
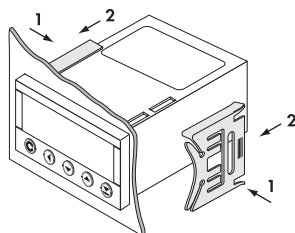
Side view



Panel thickness: 0,5...20 mm

Instrument installation

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



Instrument disassembly

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

10. CERTIFICATE OF GUARANTEE

Výrobek **OM 371PWR**
Type
Manufacturing No.
Date of sale

GUARANTEE

A guarantee period of 24 months from the date of sale to the user applies to this instrument.

Defects occurring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

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

The guarantee shall not apply for defects caused by:

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

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

Stamp, signature

Y E R S

11. DECLARATION OF CONFORMITY

Company: ORBIT MERRET, spol.s r.o.
 Klánova 81/141
 142 00 Prague 4
 Czech Republic
 Trade licence No.: 00551309

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

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

Product: 3 ¾ digit panel programmable instrument

Type: OM 371, in versions: DC, PM, DU, PWR, OHM, RTD, T/C

Mode of assess. of conformity: §12, par. 4 b, d of Act No. 22/1997 Coll.

Conformity is assessed pursuant to the following standards:

el. safety: EN 61010-1
 EMC: EN 50131-1, čl. 14 a čl. 15
 EN 55022
 EN 61000-3-2 + A12, Cor. 1, change A1, change A2
 EN 61000-4-2
 EN 61000-4-3
 EN 61000-4-4
 EN 61000-4-5
 EN 61000-4-6
 EN 61000-4-8
 EN 61000-4-11

and statutory orders:

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

As supporting documentation serve the protocols of authorised and accredited organizations:

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

Place and date of issuance: Prague, November 21, 2001

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