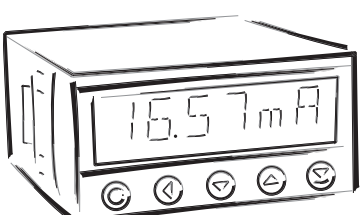
OM 371PWR

3 3/4 DIGIT PROGRAMMABLE

AC VOLTMETER/AMMETER
NETS ANALYSER
WATTMETER



SAFETY INSTRUCTIONS

Please, read the enclosed safety instructions carefully and observe them!
Thse 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.

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

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

1. CONTENTS

2. INSTRUMENT DESCRIPTION

DESCRIPTION

The OM 371PWR model is a universal 4 digit panel wattmeter, with independent measurement of AC voltage/ current, frequency, Power factoru 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 φ)
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 ⇨ 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 containis 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.

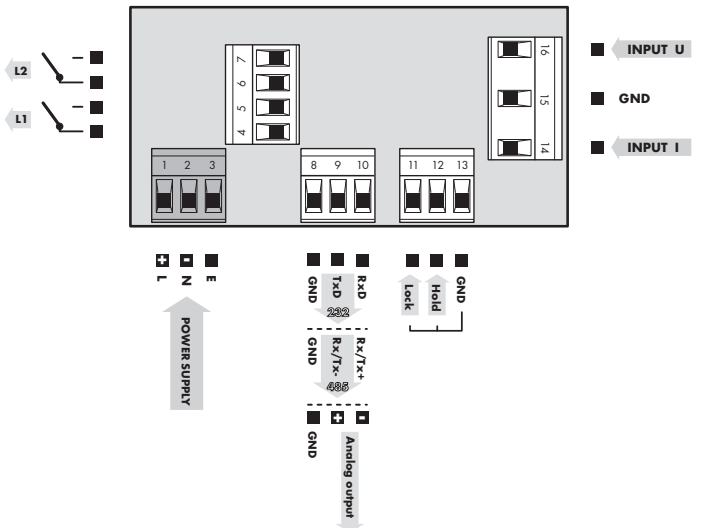
EXTENSION

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

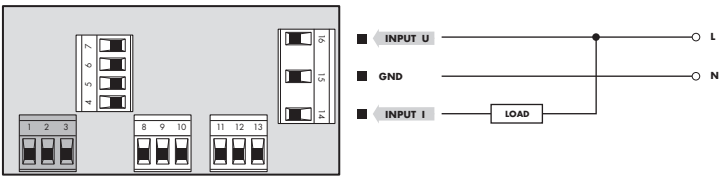
The supply lead for feeding the instrument should not be in the proximity of low-potential signals.
Contactors, motors with larger input and other efficient elements should not be in the proximity of the instrument.
The lead into the instrument input (the measured quantity) should be in sufficient distance 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.



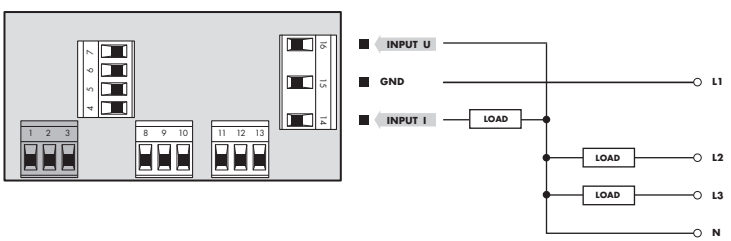
! *Grounding on terminal „E" must be connected at all times*

! *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

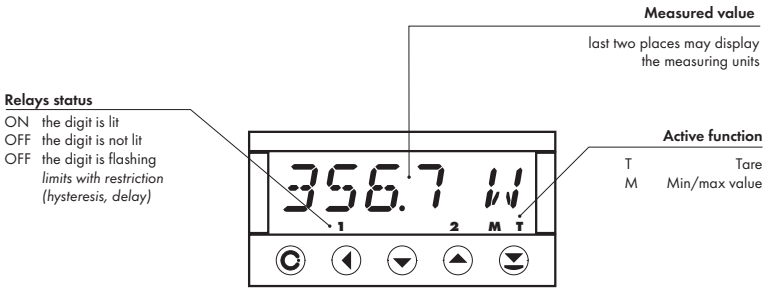


CONNECTION FOR MEASUREMENTS ON THREE PHASES



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 operting 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

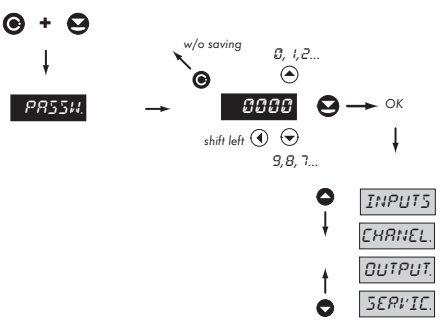
DECIMAL POINT

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 ▼.

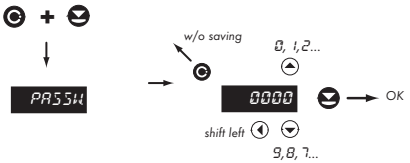
ACCESS INTO THE CONFIGURATION MODE



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

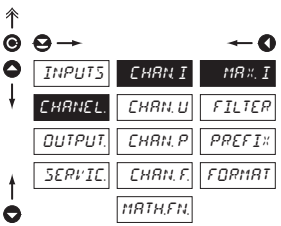
❶ Access into the „Configuration menu“



PASSW. **Entering the introductory access password**

0000 Standard manufacture setting of the access password

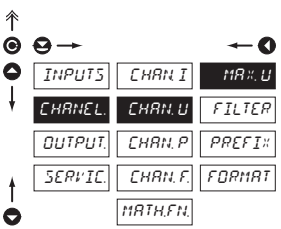
❷ Setting display projection



CHAN.I **Setting the input parameters - Channel I**

MAX. I Setting display projection for maximum value of input current

- *range of the setting is* ±9999



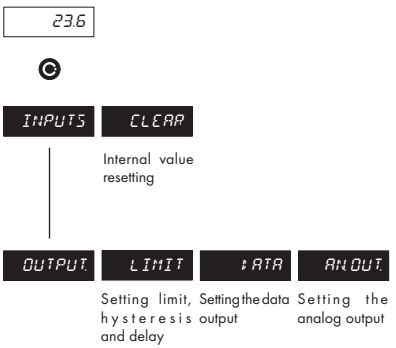
CHAN.U **Setting the input parameters - Channel U**

MAX. U Setting display projection for maximum value of input voltage

- *range of the setting is* ±9999

4.2 USER MENU

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

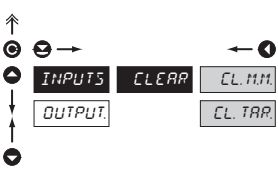


INPUTS
Setting the instrument input

OUTPUT.
Setting the instrument outputs

Projection of items and their accessibility depends on the setting in „Configuration menu", items „RIGHTS"

4.2.1 USER MENU - INTERNAL VALUES RESETTING



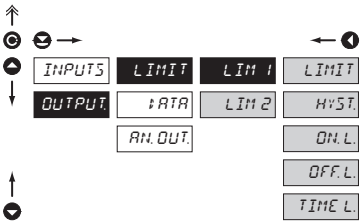
CLEAR **Instrument internal values resetting**

CL.M.M. Resetting the minimum and maximum values, measurements

CL.TAR. Tare resetting

Adjustable authorization of access into items *see page 36*

4.2.2 LIMITS - ENTERING THE VALUES



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*

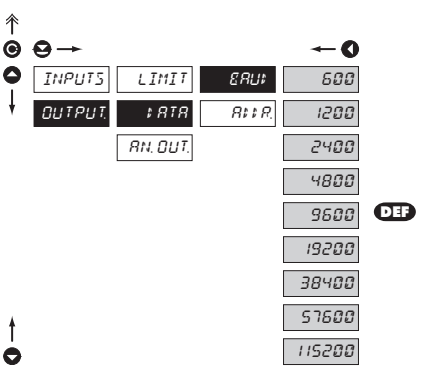
TIME. L Setting the offset of the limit switch-on

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

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

Adjustable authorization of access into items, see page 37

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

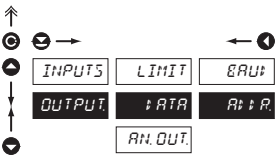
38400 Rate - 38 400 Baud

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

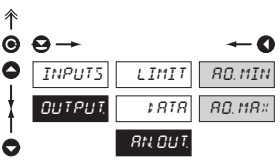


ADDR **Setting the instrument address**

- *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



AN.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*

AO.MIN Assigining the displayed value to the beginning of the AO range

- *range of the setting is* ±50 000

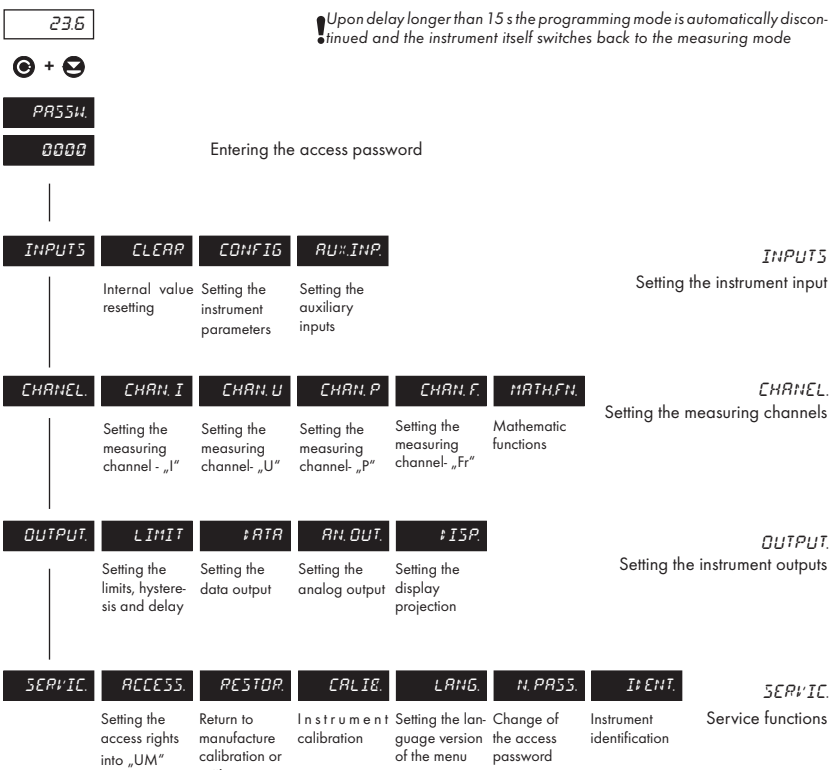
AO.MAX Assigining the displayed value to the end of the AO range

- *range of the setting is* ±50 000

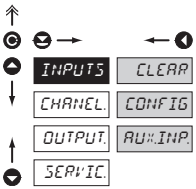
Adjustable authorization of access into items, see page 37

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"



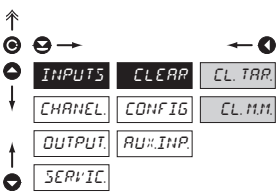
4.3.1 CONFIGURATION MODE - INPUTS



The basic instrument parameters are adjusted in this menu

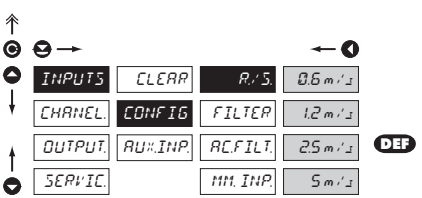
CLEAR	Resetting the internal values of the instrument
CONFIG	Basic instrument setting
AU⁻.INP.	Setting the auxiliary input „Hold"

4.3.1.1 INTERNAL VALUES RESETTING



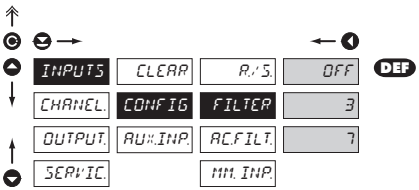
CL. TAR.	Tare resetting
CL. M.M.	Resetting the min and max value of the measurement

4.3.1.2.1 SETTING THE MEASURING RATE



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

4.3.1.2.2 SETTING THE INPUT FILTER

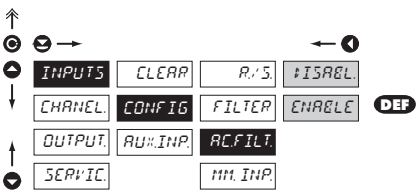


FILTER **Setting the input filter**

- *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



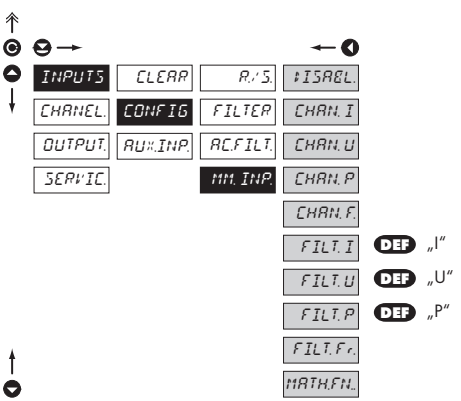
AC.FILT. **Setting the input AC filter - suppressing the dc comp.**

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

DISABL.	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

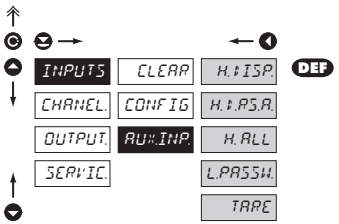


MM. INP. **Setting for evaluation of the min/max value**

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

DISABL.	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

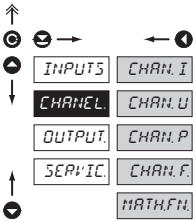
4.3.1.3 AUXILIARY INPUTS



AUX.INP. Setting the function „Hold"

H.DISP.	The „Hold" signal blocks the displayed value
H.D.PS.A.	The „Hold" signal blocks the displayed value, the data and analog output functions
H.ALL	The „Hold" sgnal blocs the entire instrument
L.PASSW.	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"

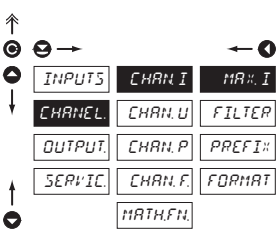
CHAN.U Setting the parameters and the range of the measuring channel U - „Voltage"

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"

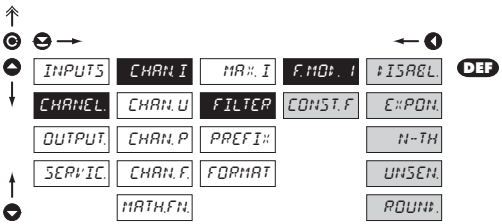


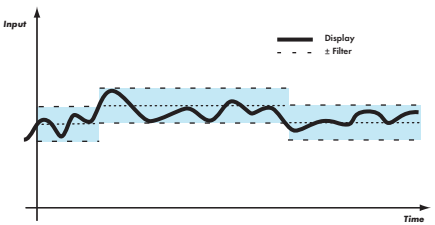
CHAN.I Setting the input parameters - Channel I

MAX.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*

DISABL. Filters are off

EXPON 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)*

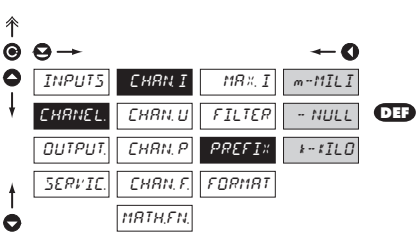
UNSEN. Selection of the band of insensitiveness

- *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



PREFIX **Multiplying constant**

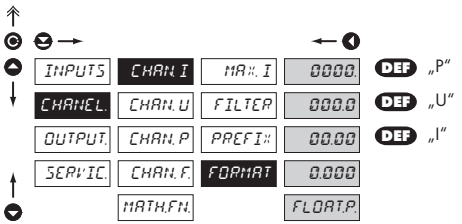
- *the constant allows for another mathematic calculation with the option of extended projection of the measuring units*

m-MILI Constant 0,001, description „m"

- NULL Constant 1, w/o description

k-KILO Constant 1000, description „k"

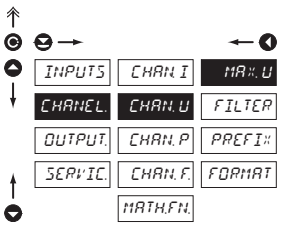
4.3.2.1.3 SETTING THE DECIMAL POINT



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"



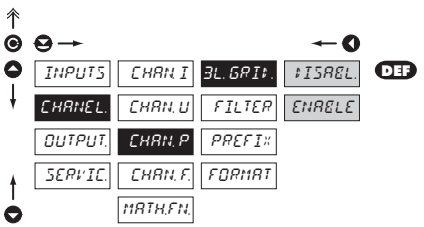
CHAN.U **Setting the input parameters - Channel U**

MAX. 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.GRID. **Calculation of 3-phase power output**

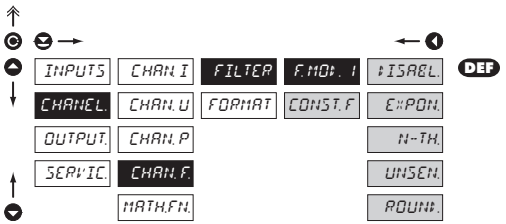
DISABL. The function is off

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"

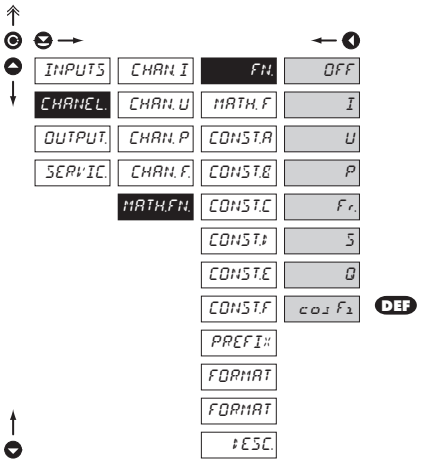
4.3.2.4 SETTING THE MEASURING „CHANNEL FR“



F.MOD. 1 **Setting the digital filters**

Further settings are identical with measuring channel „I“

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
Fr	Frequency
S	Apparent power

- *preset description „VA“*

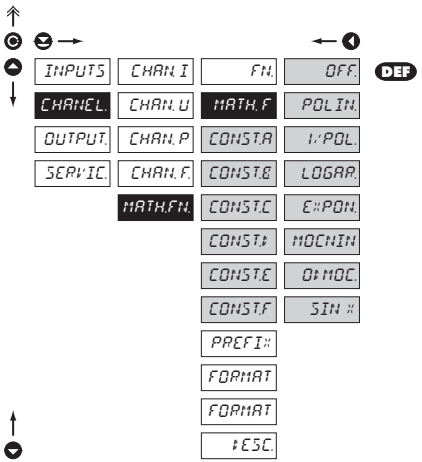
Q	Reactive power

- *preset description „VAR“*

cos F1	Power factor

- *preset description „-“*

4.3.2.6 MATHEMATIC FUNCTIONS



MAT.F — Selection of mathematic functions

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

- *thismenu 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

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

EXPON. Exponential

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

MOCNIN. Power

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

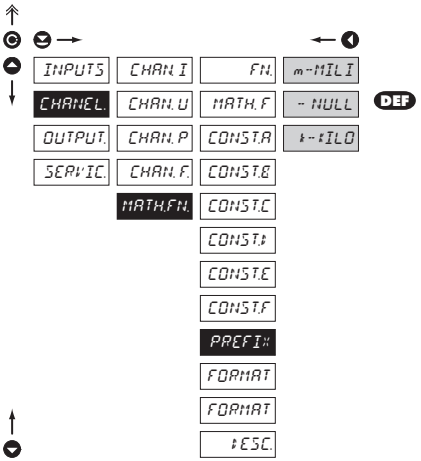
OTMOC. Radical

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

SIN X Sin x

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

4.3.2.3 MATHEMATIC FUNCTIONS - MULTIPLYING CONSTANT



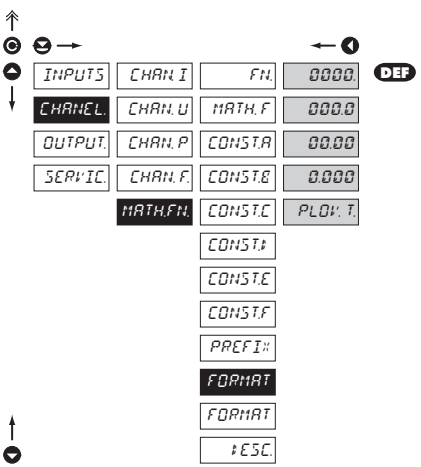
PREFIX **Multiplying constant**

- *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
k-KILO	Constant 1000, description „k"

! *This menu item is displayed only when the options S, Q, cos Fi are selected in the „FUNCTIONS" item and the mathematic functions (MAT. F) are not active*

4.3.2.4 SETTING THE DECIMAL POINT

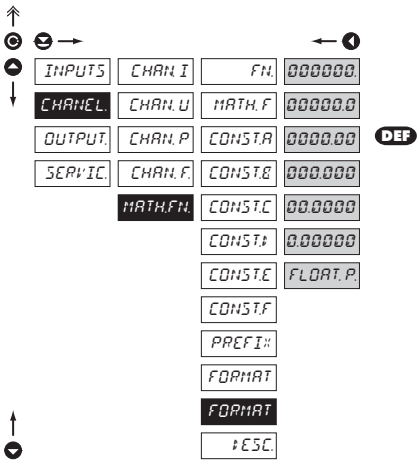


FORMAT **Setting the decimal point**

- *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 „PLOV. t"*

! *This menu item is displayed only when the options S, Q, cos Fi are selected in the „FN." item and the mathematic functions (MATH. F) are not active*

4.3.2.4 SETTING THE DECIMAL POINT

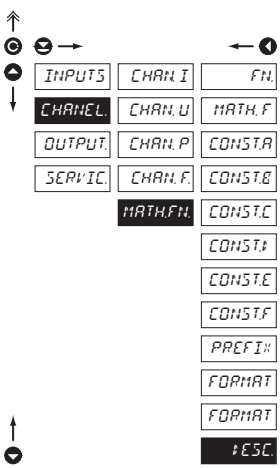


FORMAT **Setting the decimal point**

- *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

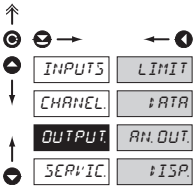


ESC. **Setting the measuring units on the display upon projection of the mathematic functions**

- *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*

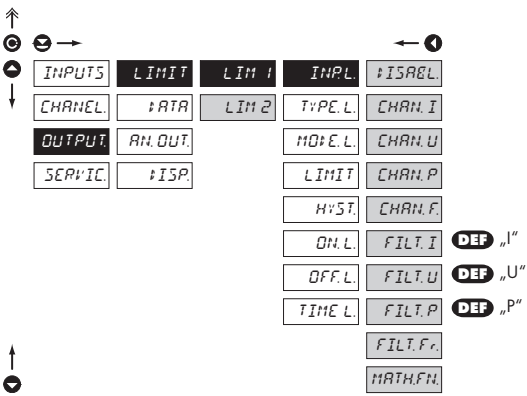
The menu is displayed only when „MATH.F" are active or the inputs „FN." U, I or Fr. are selected

4.3.3 CONFIGURATION MODE - OUTPUT



LIMIT	Setting the function and type of the limits switch-on
DATA	Setting the data output type and parameters
AN. OUT.	Setting the analog output type and parameters
DISP.	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



INP. L **Setting the input „quantity" for limits evaluation**

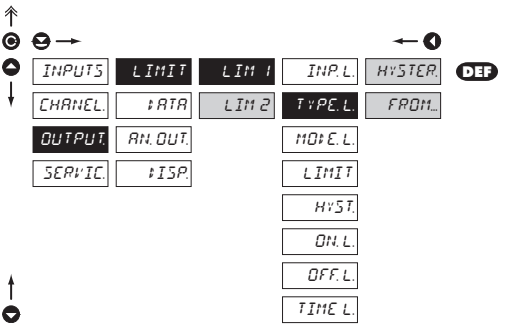
DISABL.	The limit will not be evaluated
CHAN. I	The limit will be evaluated from the output of „Channel I"
CHAN. U	The limit will be evaluated from the output of „Channel U"
CHAN. P	The limit will be evaluated from the output of „Channel P"
CHAN. F.	The limit will be evaluated from the output of „Channel 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

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

The menu is dynamic, i.e. the items are displayed in dependance 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

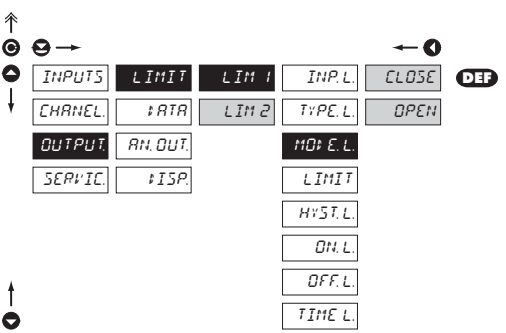
- *for this regime the „LIMIT" parameters are set, at which the limit shall react and is adjustable within full range of the display, „HYST.." is an auxiliary parameter preventing oscillation at unsteady value, it is adjustable only in plus values. The limit parameter is „TIME L." determining the offset 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



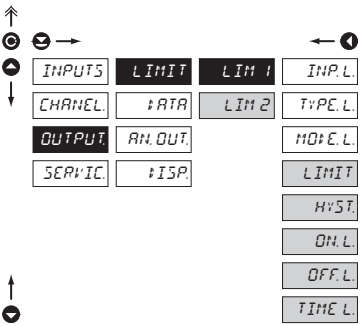
MODE. L **Setting the switching mode of the relay**

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

4.3.3.1.4 LIMITY - SETTING THE BOUNDARIES



LIM - **Setting hodnot pro vyhodnocení limit**

LIMIT Setting the boundary for relay switch-on

- *in full range of the display*

HYST. Setting hysteresis only in (+) values

- *within 1/10 of the display range*

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

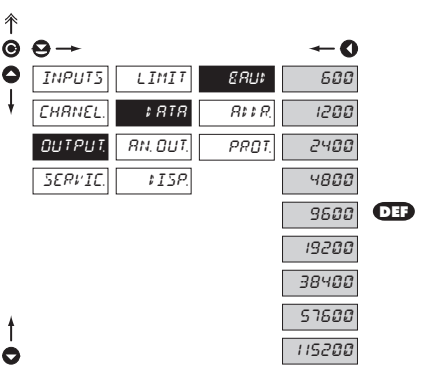
- *in full range of the display*

TIME.L Setting the offset of the imit switch-on

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

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

4.3.3.2.1 DATA OUTPUT - SETTING THE TRANSMISSION RATE



BAUD **Setting the transmission 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

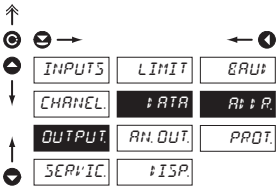
19200 Rate - 19 200 Baud

38400 Rate - 38 400 Baud

57600 Rate - 57 600 Baud

115200 Rate - 115 200 Baud

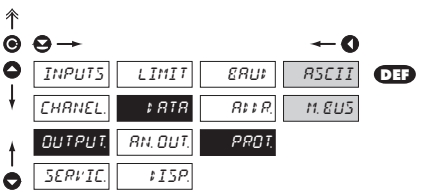
4.3.3.2.2 DATA OUTPUT - SETTING THE INSTRUMENT ADDRESS



ADDR. Setting the instrument address

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

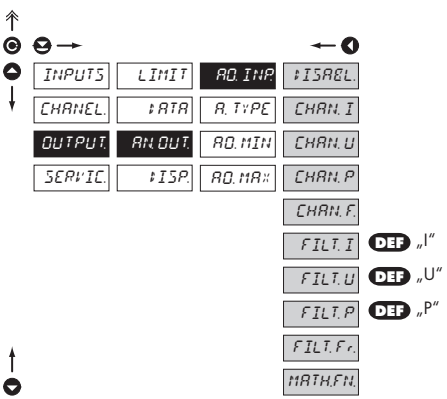
4.3.3.2.3 DATA OUTPUT - SETTING THE DATA PROTOCOL



PROT. Setting typu datového protocolu

ASCII	ASCII protocol
PROT.	DIN MessBus protocol

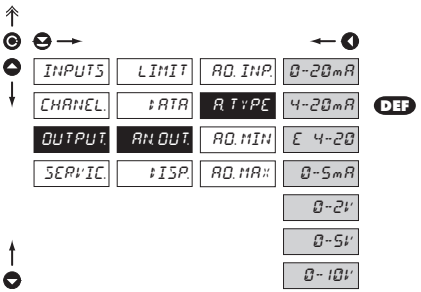
4.3.3.3.1 ANALOG OUTPUT - SETTING THE DATA FOR EVALUATION



AO.INP. Setting the input „quantity" for evaluation of analog output

DISABL.	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



A. 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

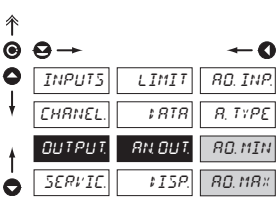
0-5 mA Type - 0...5 mA

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 pointsof the entire measuring range*

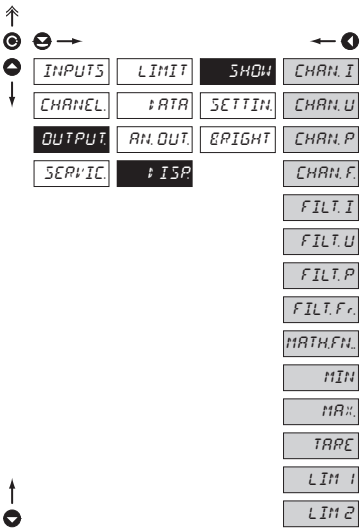
AO. MIN Assigning the displayed value to the beginning of the AO range

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

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

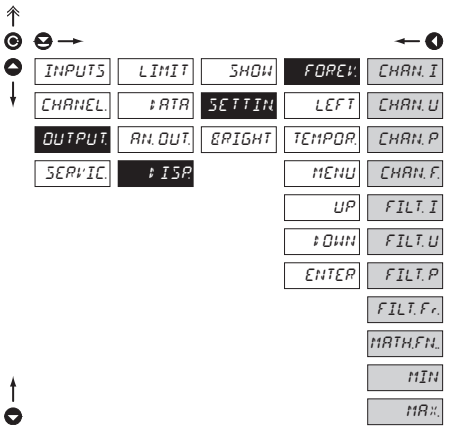
- *range of the setting is -99999...999999*

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 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“

4.3.3.4.1 DISPLAY PROJECTION - PERMANENT

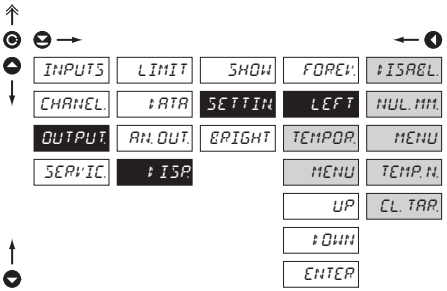


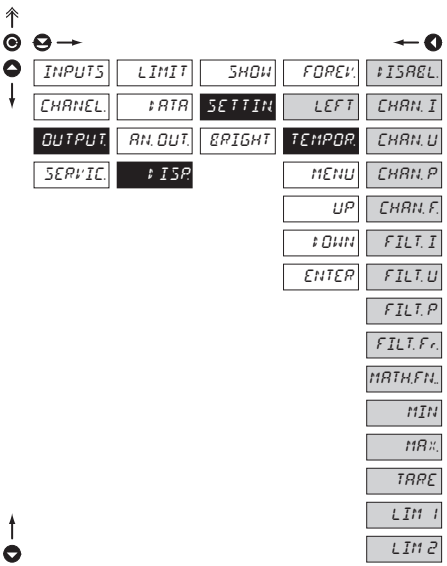
DEF „I"
DEF „U"
DEF „P"

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 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"

4.3.3.4.2 DISPLAY PROJECTION - AFTER PRESSING „LEFT“





LEFT — Assigning function to the control key „LEFT“

- DISABL. — 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

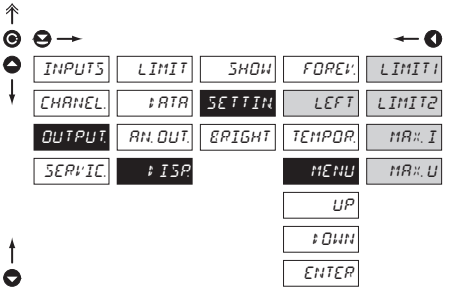
- *after pressing the selected value will be displayed with flashing DP for approx. 2 s*

- 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*

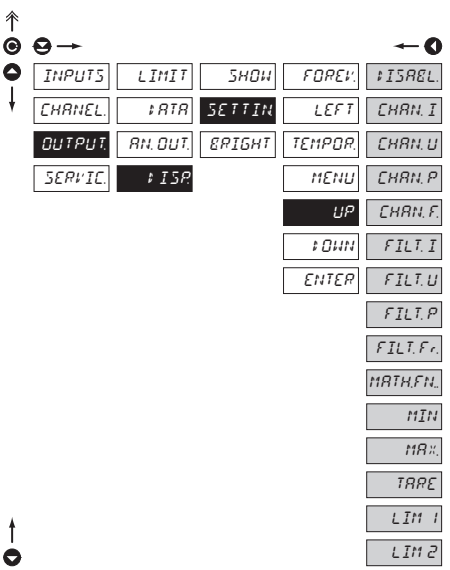
- CHAN. I — Value of „Channel I“
- CHAN. U — Value of „Channel U“
- CHAN. P — Value of „Channel P“
- CHAN. F. — Value of „Channel Fr.“
- FILT. I — Value of „Channel I“ after Filtration
- FILT. U — Value of „Channel I“ after Filtration
- FILT. P — Value of „Channel I“ after Filtration
- FILT. Fr. — Value 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“



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"

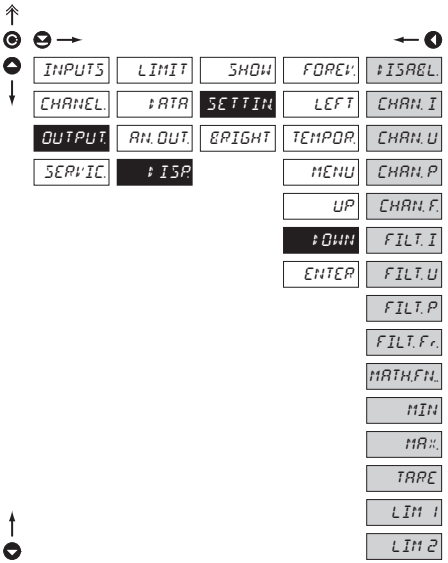
4.3.3.4.3 DISPLAY PROJECTION - AFTER PRESSING „UP"



UP **Assigning function to the control key „UP"**

DISABL.	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"

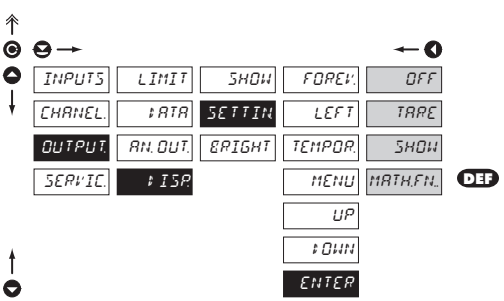
4.3.3.4.4 DISPLAY PROJECTION - AFTER PRESSING „DOWN“



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

DISABL.	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“

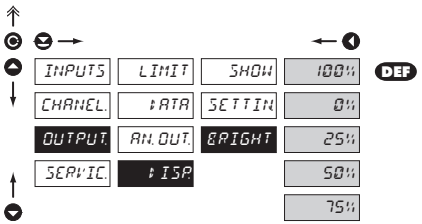
4.3.3.4.5 DISPLAY PROJECTION - AFTER PRESSING „ENTER“



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



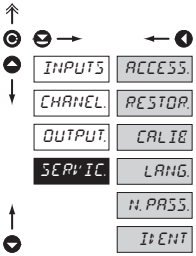
BRIGHT **Setting the display brightness**

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

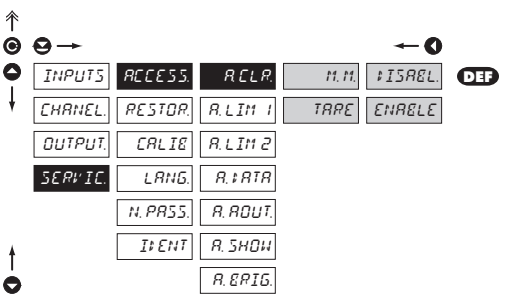
CALIB Instrument calibration

LANG. Setting the language version

N.PASS. Change of the access password

I▸ENT Instrument identification

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



A.CLR. Authorization for the instrument internal values resetting

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

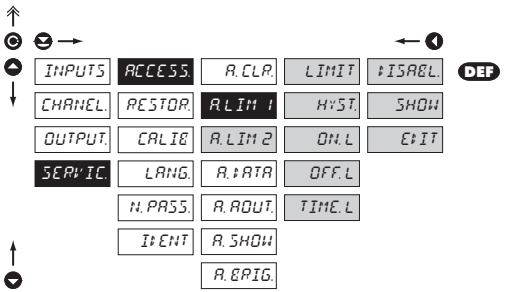
TARE Authorization for item „N. TARE“, permitted resetting of the tare

The following parameters may be selected in all items

▸ISABL. 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



A.LIM - **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“

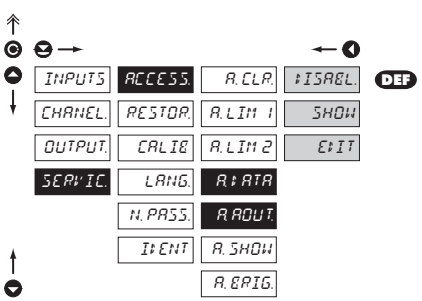
SHOW The item is displayed in „UM“ but cannot be changed

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

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

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

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



A▷ATA **Authorization for item „DATA“, setting the data output**

A.AOUT. **Authorization for item „AN. OUT.“, setting the analog output**

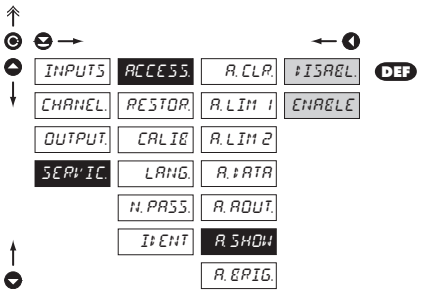
The following parameters may be selected in all items

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

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

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

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



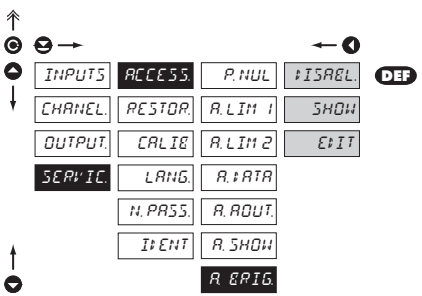
A.SHOW **Authorization for temporary projection of internal values „SHOW“ from menu „OUTPUT. - DISP“**

- *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

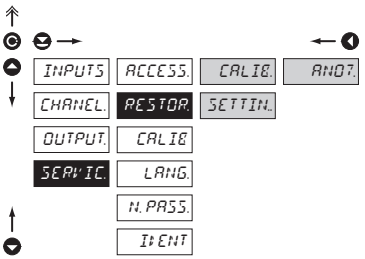


A.BRIG. **Authorization for item „BRIGHT“, setting the display brightness**

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
EDIT	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

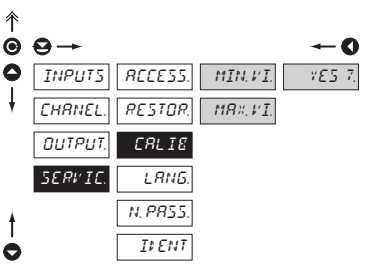
- *in case of incorrect setting or calibration it is possible to return to manufacture setting. Prior execution of the changes you will be asked to confirm your selection „YES"?*

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

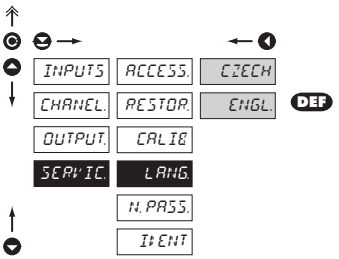
- *prior confirmation of the selection both reference signals must already be connected*

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

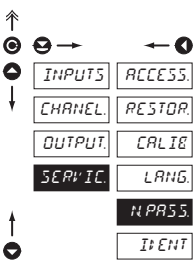


LANG. **Setting the language version of the instrument menu**

CZECH — The instrument menu is in Czech

ENGL. — The instrument menu is in in English

4.3.4.5 SETTING NEW ACCESS PASSWORD

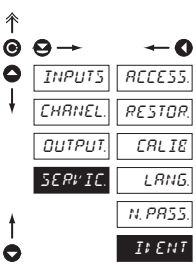


N.PASS. **Setting new access password for the „Configuration menu“**

- *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



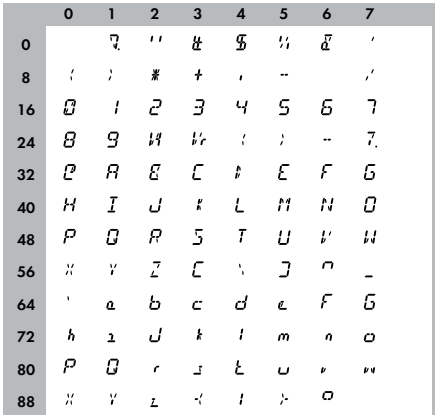
INFENT **Projection of the instrument version**

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

6. DATA PROTOCOL

The instruments communicate via serial line RS232 or RS485. For communication they use either ASCII protocol 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	C	Complete number
⇇	Set unit value	V	Selection = complete number
■	Perform relevant action	D	Decimal number
		T	Text - printable ASCII characters
		H	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
E.Unde.	range underflow (A/D transducer)	change the input signal value or change display projection
E.Over.	range overflow (A/D transducer)	change the input signal value or change display projection
EADC	A/D transmission error	upon repeated error statement send the instrument for repair
EdatE	distrupted data integrity in EEPROM, error upon data storage	upon repeated error statement send the instrument for repair
E.SHOW	projection error, setting the DP and description at the same time	change of setting
EMEM	EEPROM memory error	„Def" values will be used in emergency, needs to be sent for repair
EL.oPWR	value cannot be measured (only for Power factor)	input signal control (input brackets have zero value of voltage/current)

8. TECHNICAL DATA

INPUT

range jis 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 φ)	

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:	±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 vlaue < 100 ms
Voltage:	0...2 V/5 V/10 V
Current:	0...5/20 mA/4...20 mA (compensation up to 600 Ohm)

POWER SUPPLY

Options:	24/110/230 VAC, 50/60 Hz, ±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

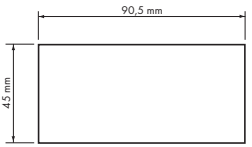
Connection:	connector terminal board, conductor sec. up to 2,5 mm^2
Stabilization period:	within 15 minutes after switch-on
Working temp.:	0°...60°C
Storage temp.:	-10°...85°C
Cover:	IP65 (front panel only)
Construction:	safety class I
Overvoltage cat.:	EN 61010-1, A2; for pollution degree II
	III. - 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*

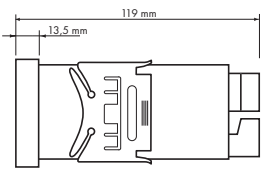
9. INSTRUMENT DIM. AND INSTALLATION

Front view

Panel cut



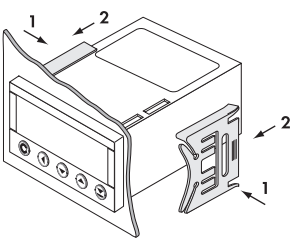
Side view

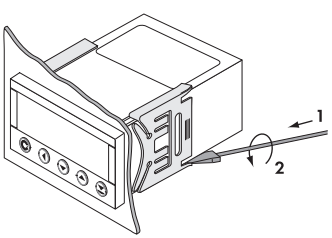


Panel thickness: 0,5...20 mm

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 scre-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	. . . . .

A guarantee period of 24 months from the date of sale to the user applies to this instrument.
Defects occuring during this period due to manufacture error or due to material faults shall be eliminated free of charge.

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

The guarantee shall not apply for defects caused by:

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

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

Stamp, signature

DECLARATION OF CONFORMITY

Mode of asses. of conformity §12, par. 4 b, d of Act No.22/1997 Sb.

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

Product: 3 ¾ digit panel programmable instrument

Type: **OM 371**

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

Conformity is assessed pursuant to the following standards:

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

Miroslav Hackl v.r.
General Manager

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

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

Austria
ING.E.GRUBER GmbH
Edu. Kittenberger Gasse 97 Top2
A-1230 Wien
tel: +43 - 1 - 869 23 39-0
fax: +43 - 1 - 865 18 75
e-mail: office@gruber-components.at
www.gruber-components.at

Germany
MEGATRON Elektronik AG & Co.
Hermann-Oberth-Str. 7
85640 Putzbrunn/München
tel: +49 - 89 - 460 94 - 0
fax: +49 - 89 - 460 941 01
e-mail: sales@megatron.de
www.megatron.de

Lithuania
RIFAS UAB
Tinklu g. 29a
LT-5300 Panevėžys
tel: +370 - 5 - 510 400
fax: +370 - 5 - 582 729
e-mail: sales@metrix1.com
www.metrix1.com

The Netherlands
AE SENSORS B.V.
J. Valsterweg 92
3301 AB Dordrecht
tel: +31 - 78 - 621 31 52
fax: +31 - 78 - 621 31 46
e-mail: aesensors@aesensors.nl
www.aesensors.nl

Russian Federation
PO <ORBIT MERRET>
Россия, 125993, ГСП-3, Москва
ул. Смольная д.14, офис 907
тел.: +7 - 095 - 454-83-00
факс: +7 - 095 - 454-83-00
e-mail: orbit@merret.ru
www.orbit.merret.ru

Slovakia
TECHREG, s.r.o.
Dukelských hrdinov 2
984 22 Lučenec
tel: +421 - 47 - 433 15 92
fax: +421 - 47 - 433 15 92
e-mail: techreg@bb.psg.sk
www.techreg.sk

Switzerland
ORBIT CONTROLS AG
Zürcherstrasse 137
8952 Schlieren
tel: +41 - 1 - 730 27 53
fax: +41 - 1 - 730 27 83
e-mail: info@orbitcontrols.ch
www.orbitcontrols.ch

Turkey
ALFA ELEKTRONIK Ltd.
Baglarbasi Mah. Ergenekon No: 33
TR - 81540 Maltepe - ISTANBUL
tel: +90 - 216 - 442 39 49
fax: +90 - 219 - 305 54 50
e-mail: sb@elmak.com.tr
www.alfa-technik.com

Ukraine
OOO <KOTRIS>
Nesterova 3, Office 907
030 57 Kyjev
tel: +44 - 446 - 21 42
fax: +44 - 446 - 21 42
e-mail: metrix-ua@svitonline.com

USA
METRIX Instruments Co.
1711 Townhurst Dr.
Houston, Texas 77043-2899
tel: +1 - 713 - 461 21 31
fax: +1 - 713 - 461 82 83
e-mail: sales@metrix1.com
www.metrix1.com