1 YEAR WARRANTY

CE

User's Guide

PX762 SERIES
Industrial Pressure Transmitters

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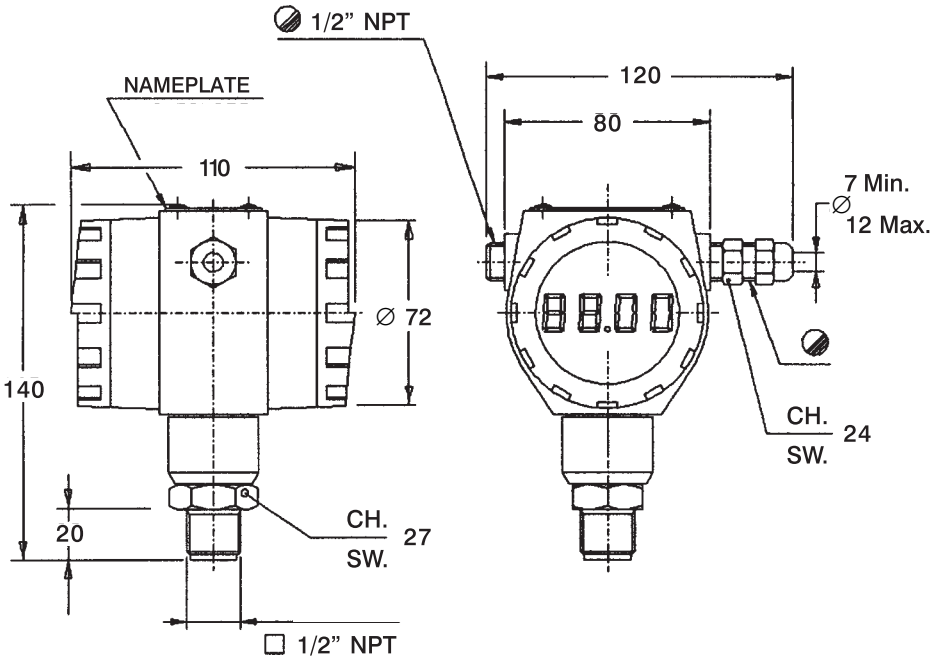
INDEX

MAIN DATA: DIMENSIONS (mm) AND SENSOR'S RANGES

MODEL NO.	CALIBRATED RANGE (psi)	NOMINAL RANGE (Bar)	SPAN min/max (Bar)	RANGE LIMITS (Bar)	PROOF PRESSURE (Bar)
GAUGE PRESSURE					
PX762-030GI	0-30	0-2	0.2/3.3	-1/2.3	7
PX762-075GI	0-75	0-5	0.5/6.75	-1/5.75	12
PX762-150GI	0-150	0-10	1/12.5	-1/11.5	25
PX762-300GI	0-300	0-20	2/24	-1/23	50
PX762-750GI	0-750	0-50	5/58.5	-1/57.5	120
PX762-1500GI	0-1500	0-100	10/116	-1/115	250
PX762-3000GI	0-3000	0-200	20/231	-1/230	500
PX762-6000GI	0-6000	0-400	40/461	-1/460	600
ABSOLUTE PRESSURE					
PX762-030AI	0-30	0-2	0.2/2.3	0/2.3	7
PX762-075AI	0-75	0-5	0.5/5.75	0/5.75	12
PX762-150AI	0-150	0-10	1/11.5	0/11.5	25

* 100 mm CLEARANCE TO REMOVE COVER (BOTH ENDS)



1 - PRODUCT SHEET

GENERAL

The PX762 is a series of two-wire microprocessor-based, 4-20 mA, instruments with ceramic sensor.
This transmitter measures and locally displays gauge pressure from 0,2 to 460 bar or absolute from 0,2 to 11,5 bar; temperature compensation, software linearization and displays the sensor temperature.
Parameters can be adjusted digitally. The 4 digit LCD indicator, displays the measured reading, either in engineering units or percentage.

1.1 - FUNCTIONAL DATA

With reference to the following, please note these definitions:
Nominal range: (referred to the sensor mounted on the instrument) the pressure range (included between a minimum and a maximum values) to measure which the sensor has been designed.
Nominal span: the pressure interval between the minimum and maximum values of the sensor nominal range. The span is a number.
Measuring range: the pressure range between minimum and maximum for which the transmitter has been calibrated.
Measuring span: the pressure interval between minimum and maximum values of the measuring range.
Initial value or Low Range Value (LRV): minimum pressure value included in the measuring range.
Full Scale Value or Upper Range value (URV): maximum value of pressure included in the measuring range.

The parameters that are available for display and setting are:
F1 - Memorisation of predispositions and of parameters inside the eeprom memory.
F2 - Zero and full scale displaying (measuring range).
F3 - Digital control of zero value (measuring range).
F4 - Digital control of full scale value (measuring range).
F5 - Displaying and modifying filter damping.
F6 - Fixing zero/full scale span with dragging of the span (measuring range).
F7 - Fixing zero/full scale span with span modification (measuring range).
F8 - Fixing zero pressure reference.
F9 - Selection bar or psi.
F10 - Fail mode selection.
F11 - Output action selection.

PHYSICAL CHARACTERISTICS

Power supply: 11,1 - 30 V d.c. with no load.
Relation between supply voltage and permissible load with Imax 22,4 mA:
- 0/250 ohm for 16,7 V d.c.
- 0/576 ohm for 24 V d.c.
- 0/844 ohm for 30 V d.c.

Output signal: 4/20 mA - 2 wire system.
LCD display reading: -10 to + 65°.
4 digits LCD display, 5 symbols (bar, mbar, psi, %, sec).
Settling time: 150 ms (at 27°C).

1.2 - OPERATING CONDITIONS

Temperature.
Housing: - 20 to + 80°C.
Process fluid: -20 to + 80°C.
Handling and storage: -20 to + 90°C.
Relative humidity: 0 to 100%.

PERFORMANCES

Unless otherwise stated performance specifications are given at following conditions: ambient temperature = 20°C nominal range.
Unless otherwise stated, all errors are gives as percentages of nominal range.

Accuracy rating
Non linearity: ≤ ± 0,15%.
Repeatability: <0,10%.
Hysteresis: <0,10%.

1.3 - OPERATING INFLUENCES

Thermal drift: it is referred to 0 to +60° C range.
Zero: ± 0,1%/10°C. Span: ± 0,1%/10°C at nominal range.
Power supply effect:
Negligible between 11,1 and 30 V d.c.

1.4 - PHYSICAL SPECIFICATIONS

Materials.
Housing: Die cast aluminium alloy AL UNI 4514 finished with epoxy resin powder (RAL 5014).
Covers: Reinforced technopolymer
Covers O-ring: Buna N.
Identification tags: SS permanently mounted on the instrument.
Wetted parts: alumina oxide, AISI 316, Viton/kalrez.

Environmental protection
The transmitter is dust and sand tight and protected against sea waves effects as defined by IEC IP 66 - Suitable for tropical climate operation as defined in DIN 50.015.

Process connections
1/2 NPT Male

Electrical connections
Two cable entries on electronic housing 1/2" NPT and cable gland PG 13.5 for 7 to 12 mm diameter cable.

Terminal board
Standard: two terminals for signal wiring up to 1.5 mm^2 - 14 AWG. Earth connection for shield of cable.

Mounting
Direct on pressure connection.

Net weight: 0,85 Kg.

1.5 - EXPLOSION PROTECTION

EQUIPMENTS AND PROTECTION SYSTEMS ATEX 94/9/CE
Intrinsic safety EExia IIB T6/T5/T4.
Amb. temp. °C: -20 to +40 (T6) / +55 (T5) / +80 (T4).

Group II class 1G suitable for zone 0,1,2 - EN 60079-10
EC type-examination certificate CESI 07 ATEX 001.

Power supply parameters:
Ui = 30 V; Ii = 152 mA; Pi = 0,95 W; Li = 135 µH; Ci = 10 nF.

1.6 - ELECTROMAGNETIC COMPATABILITY

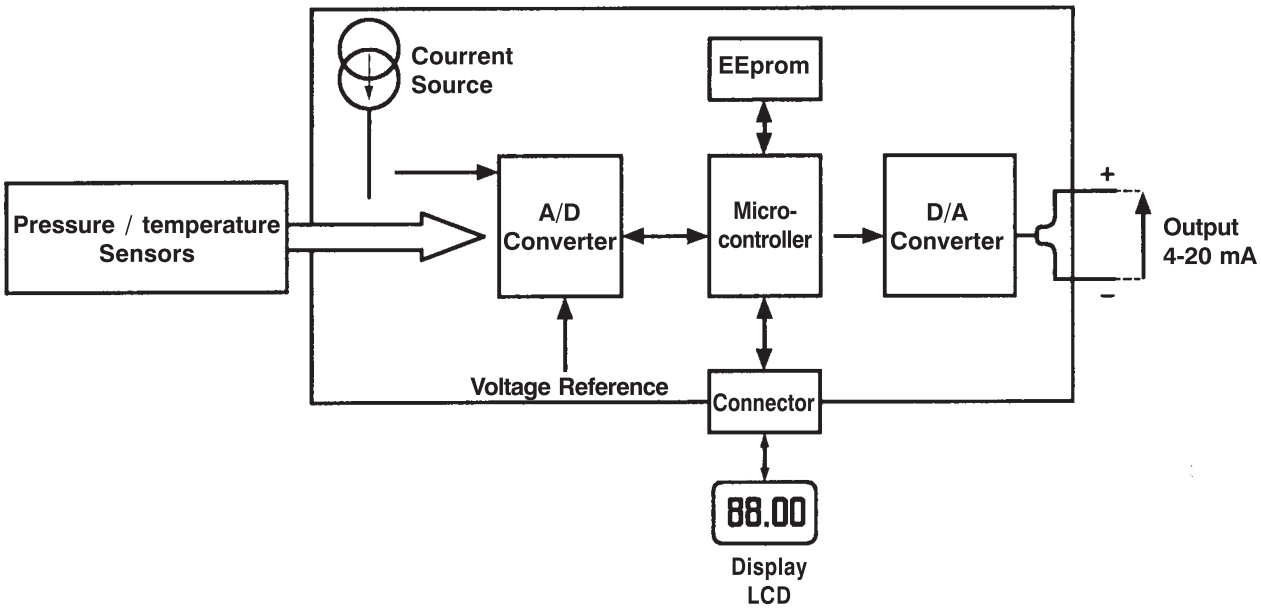
Conforms to the standard EM 50081-2, EM 50082-2 in accordance 89/336/EEC and following modifications.

2 - THEORY OF OPERATION

2.1 - BASIC OPERATION

The functional block diaphragm of the transmitter is shown in the figure below:

Fig. 2.1.1



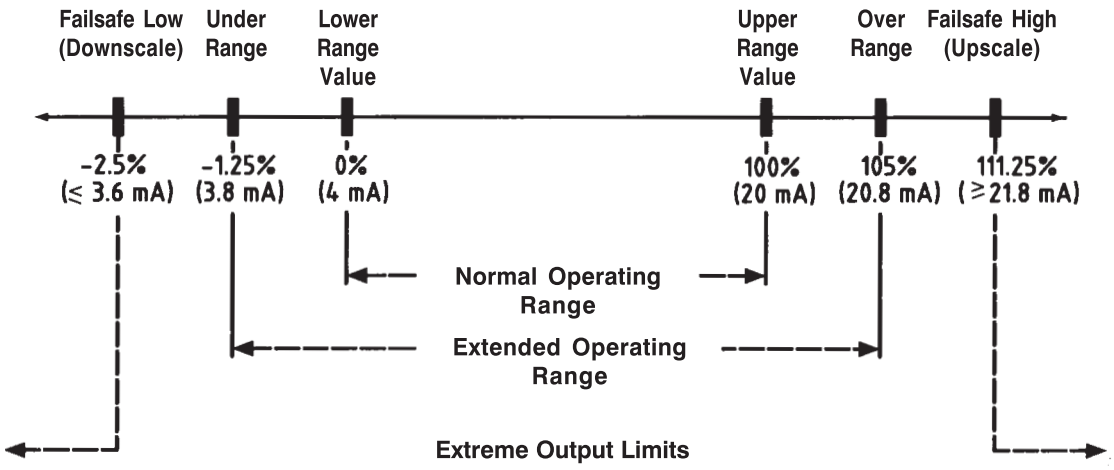
Inputs are sampled and digitized by the “analog to digital” converter (ADC). The sensor signal integrity is checked by a diagnostic routine. Digital data is linearised and converted to the selected engineering units e.g. bar. The measurement is then ranged to the lower and upper range values. This value is finally converted to a 4-20 mA analog output signal. The configuration is held in a non volatile memory (not lost in case of power failure).

The transmitter configuration can be changed by using several functions through the push buttons on the LCD display.

The transmitter continuosly performs internal diagnostics to give maximum reliability and help the user to identify any problems. Any critical condition will drive the output to the selected failsafe direction (Hi/Lo).

2.2 - TRANSMITTER OUTPUT LEVELS

Fig. 2.2.1 - Output levels



3 - INSTALLATION

3.1 - INSTRUMENT IDENTIFICATION

Instrument data can be found on the nameplate fixed to the top of transmitter housing. The Serial Number that must be quoted at the occurence of specific requests to the manufacturer.
Fig. 3.1.1 shows both sides of the housing with covers removed.

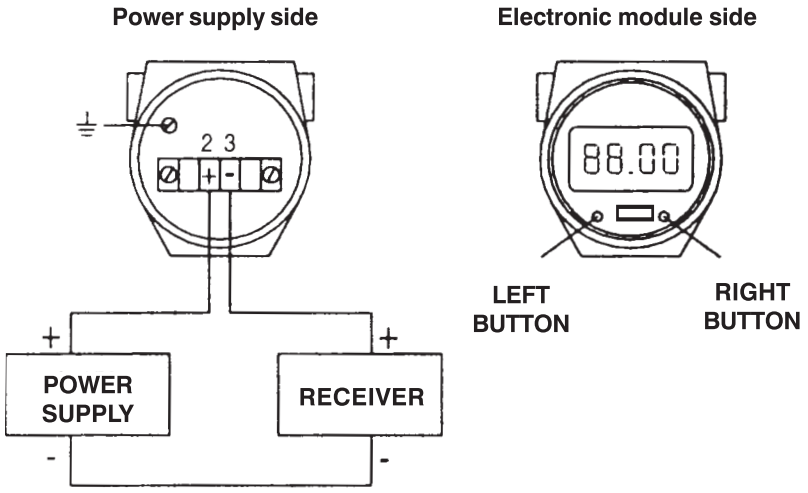
3.2 - TRANSMITTERS MOUNTING

The transmitter is supplied for direct mounting. Refer to dimensional drawing for details and clearances. The housing position does not affect the instrument operation.

3.3 - PRESSURE MEASUREMENT

The PX762 transmitter may be used for pressure and, in the lower ranges.
On Fig. 3.3.1 and Fig. 3.3.2 it is shown the simplest mounting, direct on piping.

Fig. 3.1.1 - **TRANSMITTER INSTALLATION**



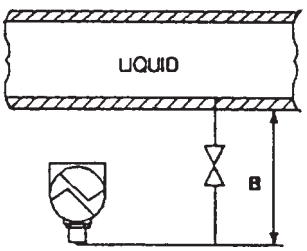


Fig. 3.3.1

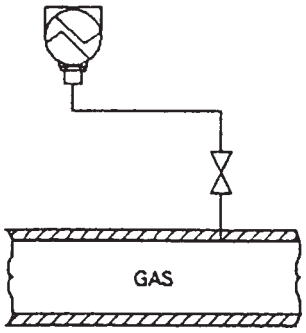


Fig. 3.3.2

Pressure measurement

3.4 - TRANSMITTER WIRING

Remove the cover of terminal compartment for access to terminals "+, "–" and ground (earth). Insert the power supply cable through one of the two 1/2" NPT openings.
As shown in Fig. 3.1.1 connect terminal "+" to "+" power supply, "–" to "+" receiver.
In the case of reversed polarity, the instrument will not operate; however in this case the instrument will not be damaged.
See Fig. 3.4 for a typical connection.

A 2-core cable (section 0,5 mm^2 or greater) may be used for connection.
Twisted wires are better protected from electrical noise. Some applications may require shielded cables; earth the shield at the power supply ground only.
Avoid locating cables near a.c. power cables such as mains supply.
Connect the earth screw to a ground, preferably the same ground used in the measuring circuit.
Cabling may be up to 3 km long.
Reinstall the removed cover.

3.5 - POWER SUPPLY

To guarantee a 4 to 22,4 mA output signal, the minimum supply voltage must be calculated. It is a function of the total resistive load (output load).
This value is the sum of the resistances of each component in the circuit, excluding the transmitter.
The graf shown in Fig. 3.4 gives the minimum supply voltage required. The value can also be obtained from the following formula:

$$Vcc = 0{,}0224 \times R + 11{,}1$$

where: R = output load.

See example on Fig. 3.4. For a total circuit resistance of 576 Ohm, the minimum supply voltage must be 24 V c.c. The power unit must be able to supply a minimum 25 mA for standard operation of the current loop.

⚠ 3.6 - SAFETY INSTRUCTIONS FOR THE EMPLOYEMENT IN AREAS WITH PRESENCE OF POTENTIALLY EXPLOSIVE ATMOSPHERES

3.6.1 - PREMISE

These safety instructions are referred to the installation, use and maintenance of series PX762 transmitters, for the employment in areas with presence of potentially explosive atmospheres.

The transmitters object of the present instructions are characterized by the following methods of protection:

EEx ia II B T6 for Tamb –20 ÷ +40 °C
EEx ia II B T5 for Tamb –20 ÷ +55 °C
EEx ia II B T4 for Tamb –20 ÷ +80 °C

The indications contained in the present safety instructions must be observed together with the instructions brought in the operator manual.

3.6.2 - GENERAL

Instruments of the PX762 series are Transmitters of relative and absolute pressure. They are devices with solid state electronics whose operation is based on thick film ceramic sensors.
They measure pressures of liquids, gas and vapours with nominal ranges from 2 to 400 bar and transmit an current output signal 4-20 mA proportional to the measured pressure. They can also be used to measure level in open or closed tanks.

3.6.3 - INSTALLATION

3.6.3.1 - FITNESS OF THE TRANSMITTER FOR THE INSTALLATION AREA

In case of use in areas with danger of explosion, it must be verified that the identified type of transmitter fits for the classification of the zone and for the presence of flammable substances in the plant.
The safety essential requisite against the risk of explosion in the classified areas are fixed from the European Directives 94/9/CE of March 23 rd 1994 (as far as it concerns the apparatus) and 1999/92/CE of December 16 th 1999 (as far as it concerns the plant).
The criterions for the classification of the areas with risk of explosion are given from the standard EN60079-10.
The technical requisite of the electric fittings in the classified areas are given from the standard EN60079-14.
On the plate, besides the functional data, the references of the notified body undertaken for the certification are also pointed out .

3.6.3.2 - SAFETY DATA DEFINITIONS

II 1 G	Transmitter for surface plants with presence of gas or vapours, Group II, category 1, fit for zone 0 and with redundancy for zone 1 and 2
EEx ia	Intrisically Safe transmitter, category “ia”
IIB	Group IIB apparatus, fit for substances (gas) of group IIB
T6, T5, T4	Temperature Class of the transmitter (maximum temperature)
CE	Conformity mark to European Directives applicable to the apparatus
	Conformity marking to 94/9/CE Directive and technical rules
CESI 07 ATEX 001	Name of the laboratory that released the EC type-examination certificate; **07**=Year; **001**=certificate number
0722	Identifying Number of the notified body (CESI) that assess the quality system of the manufacturer
T. amb.	Ambient minimum and maximum temperature
Ui, Ii, Pi, Ci, Li	Maximum Input parameters of the apparatus (related to intrinsic safety)

Note:

a) the transmitters for the group IIB also fit for gas group IIA;
b) the transmitters with class of temperature T6 also fit for all the substances with higher class of temperature (T5, T4, T3, T2, T1);
c) the transmitters with class of temperature T5 also fit for all the substances with higher class of temperature (T4, T3, T2, T1);
d) the transmitters with class of temperature T4 also fit for all the substances with higher class of temperature (T3, T2, T1);
e) the choice of the associated apparatus must be made on the base of the maximum input parameters of the transmitter.

3.6.3.3 - ADDITIONAL WARNINGS FOR INSTALLATION

For the correct installation refer to the chapters operator manual and to sketches brought there.
The process connection must be realized in such a way that guarantees the hold at the maximum working pressure and temperature.
Do not overcome the maximum pressure and temperatures indicated in the technical data sheet of the selected model.
When the device is connected to the process it can be submitted to high pressures and temperatures. To avoid accidents subsequent to sudden discharge of pressure and/or to contact with dangerous or flammable fluids it is necessary to take the maximum attention when the device is taken off, heated or repaired, verifying that it is isolated from the process and is not submitted to pressure and/or temperature.

3.6.3.4 - ELECTRICAL CONNECTIONS

For the electrical connections please follow the instructions brought in the operator manuals taking care that for the use in classified areas it is necessary to foresee the use of associated apparatuses (e.g. safety barriers), certified according to the standard EN 50020, with output electrical characteristics compatible with the maximum input parameters (brought on the plate) of the certified transmitter.
The evaluation of the system constituted by the associated apparatus, the transmitter and the cables of connection must be done by experienced personnel only and must match the requisite of the standard EN 50039 relative to the intrinsically safe systems.
For the correct installation it is necessary to follow the safety instructions of the selected associated apparatus.

Electrical parameters related to Intrinsic Safety

Parameter	Value
Maximum input voltage **Ui**	30 V
Maximum input current **Ii**	152 mA
Maximum input power **Pi**	0,95 W
Maximum internal capacitance **Ci**	10 nF
Maximum internal inductance **Li**	135 mH

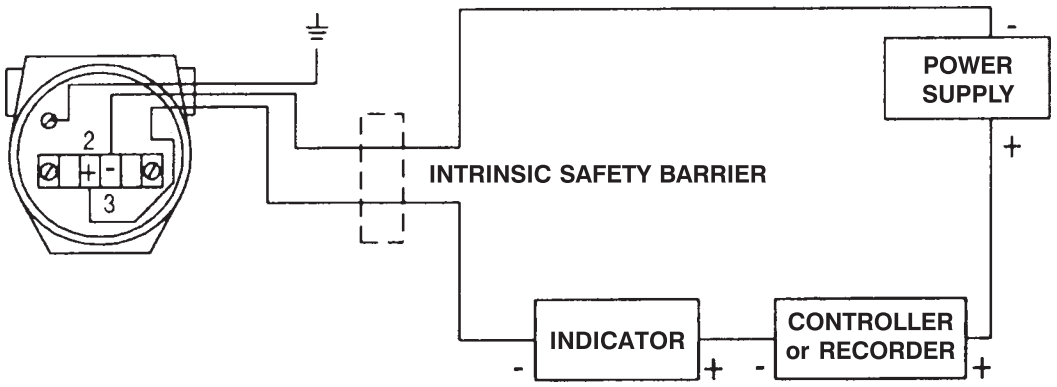
3.6.4 - VERIFICATION AND MAINTENANCE

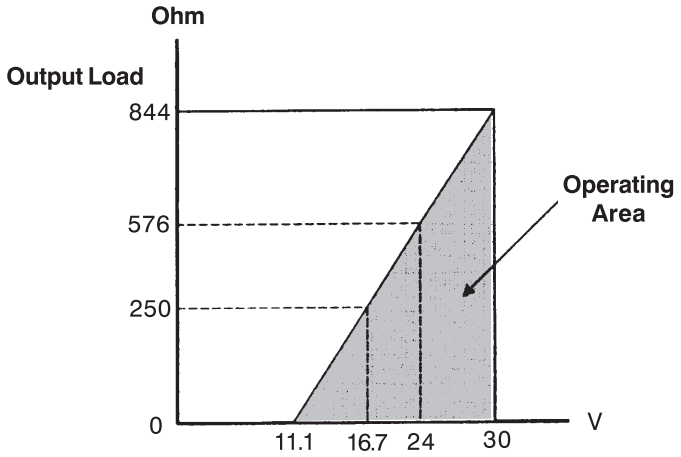
The verifications and the maintenances of the transmitters must be done according to the criterions of the standard EN60079-17.

3.6.5 - INSTRUMENT SERVICE

In case of malfunction or damage it is advised to contact the Customer Service Department of OMEGA Engineering.

Fig. 3.4





4 - CALIBRATION

4.1 - BOARD AND DISPLAY

Switching on the power supply, the instrument shows a pre-established sequence about 6 sec. long. this procedure allows both to test all the LCD segments, both to adjust the temperature of the sensor before showing the effective measurement.
The following phases will appear:
a) View of the implemented SW version (for instance 0,7).
b) All symbols lighting (sign, bar, mbar, %, sec.).
c) Complete lighting of LCD (sign, bar, mbar, %, sec. with 7-segments numbers).

At the end of the lighting phase the display shows the measure of actual pressure standing in the showing modality memorised in the eeprom memory.

4.2 - DISPLAY MODALITY

We call “commands’ stand-by-position” the position in which one of the possible displaying modality is active.

The following symbols mean:
LB = left button.
RB = right button.
LB+RB = both buttons are pushed at the same time.
LB <or> RB = one of the two buttons.
LB&RB = first press **LB**, then keeping **LB** pushed, press **RB**.
RB&LB = first press **RB**, then keeping **RB** pushed, press **LB**.
The commands’ stand-by-position allows 7 different displaying modalities of the actual measure and of other parameters of the instrument.
These parameters belong to two “families”:

FAMILY1: the measure of pressure is displayed in bar (or mbar) - or psi - or as a % relative to the settled zero/span (for selection bar or psi see function F9).
FAMILY2: secondary parameters such as temperature, pressure, as % nominal range of the instruments’ sensor, numerical value of the A/D conversion.

In each family all the dates can be displayed on after the other in rotation using **LB**. To go from a family to the other one it is necessary to follow the sequence **LB&RB**.
Besides, FAMILY 1 allows with a period of about three sec. the alternate displaying of “bar <->%” or “psi <-> % ” (for activate/inactivate this function the **LB** has to be pushed for about 2 sec.). “bar <->°C” or “psi <->°C” (for activate/inactivate this function the **RB** has to be pushed for about 2 sec.).

Summarasing panel of the different displaying modalities

FAMILY 1
A - pressure expressed by the engineering unit bar/mbar/psi.
B - pressure expressed by the engineering unit psi.
C - pressure expressed as % relative to the range set by the user (calibrated range).
D - automatic switching “bar <->%” or “psi <->%”.
E - automatic switching “bar <->°C” or “psi <->°C. ”.

FAMILY 2
F - Temperature (of the sensor) express in °C.
G - Pressure expressed as % of the sensor 0% ... 100% (nominal range of the sensor).
H - Numerical value (O...4095) referred to the value of A/D conversion.

4.3 - USE OF FUNCTIONS

From the “commands’ stand-by-position” using the sequence **LB+RB**, it is possible to accede to all the displaying functions and to modify all the instrument parameters.
The state of function is indicated by the “F” letter followed by the number of the function.
When the required function appears on the display the buttons have to be released:
in this way we remain in that state and the functions can be executed according to the modalities described in the following pages.
Keeping the buttons pushed we can scroll all the functions up to coming back to the commands’ stand-by-position.
In any function, if for some seconds no operation is done, an automatic time out option provides the return to the “commands’ stand-by-position”.
There are 4 more Functions available for Transmitter Calibration. These functions are indicated here below for reference and are described in par. 5.4

c000	⇒	LRV calibration
c0FS	⇒	URV calibration
c004	⇒	4 mA output calibration
c020	⇒	20 mA output calibration

To reach the Calibration Functions push **RB** followed by **LB (RB&LB)** while on the display are shown Family 1 or 2 parameters.

FUNCTION 1: Memorisation of predisposition and of parameters inside the eeprom memory.

This function allows to keep permanent, even in case of power switching off, the following parameters.

1) Zero calibration of the instrument (that is zero pressure reference).
2) Modality of selected visualization (among the seven above mentioned).
3) Zero value referred to the range selected by the user.
4) Full scale value.
5) Depth of the damping filter eventually set by the user.
6) Fail mode Selection.

To confirm F1 press **LB**: a short message will appear (like Ld) that is for confirmation of the required operation. After this message the system comes back into the commands’ stand-by-position.

> ⚠ **Attention:** if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the “commands’ stand-by-position”

FUNCTION 2: **Zero and full scale displaying (measuring range).**

This function allows to display zero and full scale settled by the user (without being able to make any adjustment).
Once entered in F2:

LB ->	:	displays zero in engineering unit selected by function F9 (bar or psi).
-> &RB	:	displays zero as % of sensor nominal range.
RB ->	:	displays the full scale value in engineering unit selected by function F9 (bar or psi).
-> &LB	:	displays zero as a % of sensor nominal range.

> ⚠ **Attention:** if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the “commands’ stand-by-position”.

FUNCTION 3: Digital control of zero value (measuring range).

This function allows to set the zero value without changing the state of full scale.

Once entered in F3:
LB <or> RB : displays zero in engineering unit selected by F9.
-> RB : increases.
-> LB : decreases.
-> LB+RB : fixes the zero to the displayed value.

After the confirmation **LB+RB** the message "Ld" will appear and the system comes back into the "commands' stand-by-position".

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

Whether the new span is below 10% of the nominal span the value of the full span is compelled so that the span value is brought back to the min. possible value.
In that case the user will find both edges of the actual measuring span modified even if he was adjusting only one parameter.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the "commands' stand-by-position".

FUNCTION 4: Digital control of full scale value (measuring range).

This function allows to set the full scale value without changing the zero settled.

Once entered in F4:
LB <or> RB : displays the full scale value in the engineering unit selected by F9.
-> RB : increases.
-> LB : decreases.
-> LB+RB : fixes the full scale value displayed.

After the confirmation **LB+RB** the message "Ld" will appear and the system comes back into the commands' stand-by-position".

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

Whether the new span is below 10% of the nominal span the zero value is compelled so that the span value is brought back to the min. possible value.
In that case the user will find both edges of the actual measuring span modified even if he was adjusting only one parameter.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the "commands' stand-by-position".

FUNCTION 5: Displaying and modifying filter damping.

This function allows to display and or to modify the time constant referred to the damping filter.

Once entered in F5:
LB <or> RB : displays the current time of filter lighting the symbol sec. at the bottom of the display.
-> RB : increases.
-> LB : decreases.
-> LB+RB : gives to the filter the time constant displayed.

After the confirmation **LB+RB** the message "Ld" will appear and the system comes back into the "commands' stand-by-position".

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

If the time constant is compelled to zero the filter will be cut out.
Whether a time constant is fixed the display will light the "sec" symbol.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the "commands' stand-by-position".

FUNCTION 6: Fixing zero/full scale with dragging of the span (measuring).

This function allows to modify the zero or the full span value keeping the span value.

Once entered in F6:

LB ->	:	displays the present pressure value in engineering unit selected by F9.
-> &RB	:	fixes the zero (4 mA) to the pressure value displayed and changes the full scale value so to keep constant the already settled span.
RB ->	:	displays the present pressure value in engineering unit selected by F9.
-> &LB	:	fixes the full scale (20 mA) to the pressure value displayed and adjust the zero value so to keep constant the already settled span.

The new zero value is accepted only whether the following hypothesis is respected:
a) pressure value + present span <115% of sensor nominal span.
The new full scale value is accepted only whether the following hypothesis are respected:
a) pressure value <115% of sensor nominal span.
b) pressure value-present span > -1 bar.

When the above mentioned conditions are verified the message “Ld” will appear to confirm the executed operation and the system comes back into the “commands’ stand-by.position”.
Whether the hypothesis are not correctly verified, the attempt to modify the zero and the full scale value won’t be valid and the writing F6 will appear again.

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the “commands’ stand-by-position”.

FUNCTION 7: Fixing zero/full scale with span modification (measuring).

This function allows to modify the zero or the full scale value also adjusting the span value.

Once entered in F7:

LB ->	:	displays the present pressure value in engineering unit selected by F9.
-> &RB	:	fixes the zero (4mA) to the pressure value displayed without changing the full scale value (changing the already settled span).
RB ->	:	displays the present pressure value in engineering unit selected by F9.
-> &LB:		fixes the full scale value (20 mA) to the pressure value displayed keeping constant the zero value (changing the already settled span).

The new zero value is accepted only whether the following hypothesis are respected:
a) pressure value <105% of sensor nominal span.
b) pressure value > -1 bar.

The new full scale value is accepted only whether the following hypothesis are respected:
a) pressure value <115% of sensor nominal span.
b) pressure value > -1 bar +10% of sensor nominal span.

When the above mentioned conditions are verified the message “Ld” will appear to confirm the executed operation and the system comes back into the “commands’ stand-by-position”.

You have to remember that to keep permanent the new settlement, you have to record the new values on the eprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

Whether the hypothesis are not correctly verified, the attempt to modify the zero and the full scale value won’t be valid and the writing F7 will appear again.
If the new zero (full scale) value reduces the span under 10% of sensor nominal range, full scale (zero) valve will be changed to have a span valve equal to minimum.
In that case the user will find both edges of the actual measuring span modified even if he was adjusting only one parameter.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the “commands’ stand-by-position”.

FUNCTION 8: Fixing zero.

This function allows, if necessary, to set the zero pressure value of the instrument.
Once entered in F8:

LB : displays the present pressure value in engineering unit selected by F9.
-> &RB : refers to the present value the sensor zero. The display will show the "0000" value. When **RB** is released, you go back to see the pressure present at that moment on the instrument. To make effective the selected fixing you have to keep the **RB** pressed, until the message of memorisation "Ld" is displayed.

After the confirmation you return to the "commands' stand-by-position".

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

Attention: if for some seconds no action is done the time-out option provides to end the actual function without producing any effect and to come back in the "commands' stand-by-position".

FUNCTION 9: Modifying of the engineering unit

This function allows to choose one of two engineering units psi or bar.
After the selection the instrument will display pressure values applying the new measuring unit (1 bar = 14,5038 psi).

Attention: if the bar engineering unit has been selected, on the display the mark "bar" (or mbar) will appear, while with psi eng. unit selected marks bar, mbar and % remain always off, and every ten seconds on the LCD appears the mark psi for one second approx.

Once entered in F9:

LB : displays actual eng. unit.
-> &LB : changes the selection (bar <-> psi).
PS+PD : go to next Function F10
timeout exit : the choice becomes effective and the instrument goes back in stand-by position.

You have to remember that to keep permanent the new settlement, you have to record the new values on the eeprom memory, through the F1 function, otherwise the data will get lost after switching off the instrument.

FUNCTION 10: Fail Mode Selection

By means of this function it is possible to select which value of current will be present on analog output if the microprocessor finds an Hardware Failure.

LO**:** low alarm with a fixed current < 3.5 mA.
HI**:** high alarm with a fixed current > 24 mA.

Once entered in F10:

LB : displays the actual alarm selection.
->& LB : changes the selection (HI<->LO)
PS+PD : go to next Function F11
timeout exit : the choice becomes effective and the instrument goes back in stand-by position.

Note:
The Hardware Failure occurs when:
1. the sensor is disconnected or broken.
2. the pressure applied to the instrument satures the A/D converter.
In case of Failure the measurement in % on the display goes to 555.5%.

As for all other PX762 functions, to keep permanent the new settlement, you have to record the new values on the eeprom memory through the F1 function, otherwise the new selection will get lost after switching off the instrument.

FUNCTION 11: Output Action Selection

The current output signal (4-20 mA) is related to the input signal (pressure) depending on the action selection:
dO (direct Output): Direct linear action
Input= LRV - Output=0%=4 mA
Input= URV - Output=100%=20 mA
CO (Complementary Output): Reverse linear Action
Input= LRV - Output= 100%=20 mA
Input=URV - Output=0%= 4 mA

Press **LB+RB**	⇒	until you reach F11, then release
Press **LB** (first time)	⇒	Display the actual Output action
Press **LB**	⇒	Change the action (dO <-> cO) and store the new selection in volatile memory
Press **LB+RB**	⇒	The system returns to the normal display

WARNING. The time out will confirm the last direction you have selected

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

4.4 - TRANSMITTER CALIBRATION

The transmitter calibration function are:

c000	⇒	LRV calibration
c0FS	⇒	URV calibration
c004	⇒	4 mA output calibration
c020	⇒	20 mA output calibration

- ✓ To reach the Calibration Functions push **RB** followed by **LB (RB&LB)** while on the display are shown Family 1 or 2 parameters. On the display will appear **c000**.
- ✓ To scroll functions, keep the **LB+RB** pushed until you reach the desired function.
- ✓ When the required function appears on the display, the buttons have to be released to remain in that state.
- ✓ Functions can be executed according to the procedure described in the following paragraphs.
- ✓ A time out is implemented and therefore, if no action is taken after 3 seconds, the device returns to the normal display.

FUNCTION c000: Zero Input (LRV) calibration

- ✓ For this calibration it is required an accurate pressure source (Accuracy better than 0,05% of sensor span) connected to the pressure connection of the Tx.
- ✓ Apply a pressure equal to LRV and read the measure as % of the span set by user (URV-LRV)
- ✓ If there is an error in the measure, using **c000** it is possible to adjust the measure to LVR (0,0%) with a resolution of 0,1% of the span set by the user.
- ✓ Correction limits are ± 5% of the span set by the user

While **c000** is displayed Press **LB** or **RB**	⇒	Display the actual correction (-5.0/+5.0%)
Press **RB**	⇒	Introduce a positive correction (Zero adjust) to the pressure measure. Each count corresponds to an increase of the 0,1% of the span set by user (URV-LRV)
Press **LB**	⇒	Introduce a negative correction (Zero adjust) to the pressure measure. Each count corresponds to a decrease of the 0,1% of the span set by user (URV-LRV)
Press **RB+LB**	⇒	Store the value in Volatile Memory

After the confirmation LB+RB, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

Example:
Sensor nominal range: 5 bar. User calibration : LRV=1 bar URV=3 bar (Span=2 bar)
Pressure applied by precision pressure source 1 bar: Tx measure: 0,3% (1.006 bar) ⇒ Error=+0,3%
Introduce a correction of - 0,3% of the span (-0,006 bar)
New measure after calibration 0.0%

Note: LRV calibration does not affect Span calibration

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION c0FS: Full Scale Input (URV) calibration

- ✓ For this calibration it is required an accurate (better than 0,05% of sensor span) pressure source connected to the pressure connection of the Tx.
- ✓ Apply a pressure equal to URV and read the measure as % of the span set by user (URV-LRV)
- ✓ If there is an error in the measure, using **c0Fs** it is possible to adjust the measure to URV (100.0)% with a resolution of 0,1% of the span set by the user.
- ✓ Correction limit are ±9,9% of the span set by the user

Press **LB+RB**	⇒	Until you reach **c0FS**, then release
Press **LB or RB**	⇒	Display the actual correction (- 9,9/+9,9%)
Press **RB**	⇒	Introduce a positive correction (Span adjust) to the pressure measure. Each count corresponds to an increase of the 0,1% of the span set by user (URV-LRV)
Press **LB**	⇒	Introduce a negative correction (Span adjust) to the pressure measure. Each count corresponds to a decrease of the 0,1% of the span set by user (URV-LRV)
Press **RB+LB**	⇒	Store the value in Volatile Memory

After the confirmation **LB+RB**, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

Example:
Sensor nominal range: 5 bar. User calibration : LRV=1 bar URV=3 bar (Span=2 bar)
Pressure applied by precision pressure source 3 bar: Tx measure: 99,6% (2.992 bar) ⇒ Error=-0,4%
Introduce a Correction of +0,4% of the span (+ 0,008 bar)
New measure after calibration will be 100.0%

Note: SPAN calibration does not affect Span calibration

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION c004: 4 mA Output calibration

- ✓ Using this function it is possible to verify and adjust the 4 mA output signal.
- ✓ For the calibration it is required a precision multimeter (resolution min. 0,01 mA) for current measurement
- ✓ Insert the multimeter in series in the current loop.
- ✓ Correction limits are ± 0,5 mA around the 4 mA generated by the Tx

Note: This calibration adjust the D/A output of the transmitter and doesn't affect the pressure calibration.

Press **LB+RB**	⇒	Until you reach c004, then release
Press **LB or RB**	⇒	Force the Output to 4 mA and display actual 4 mA correction (-50/+50 counts)
Press **RB**	⇒	Increase current output. Each count correspond to 10 μA increase of the output
Press **LB**	⇒	Decrease current output. Each count correspond to 10 μA decrease of the output
Press **RB+LB**	⇒	Store the value in Volatile Memory and release the Output current

After the confirmation LB+RB, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system goes automatically to the **c020 Function**

Warning: The output calibration forces the current output to values not related to the process variable measure. Never perform calibration while the process is running

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

FUNCTION c020: 20 mA Output calibration

- ✓ Using this function it is possible to verify and adjust the 20 mA output signal
- ✓ For the calibration it is required a precision multimeter (resolution min. 0,01 mA) for current measurement
- ✓ Insert the multimeter in series in the current loop
- ✓ Corrections limits are ± 1 mA around the 20 mA generated by the Tx

Note: this calibration adjust the D/A output of the transmitter and doesn't affect the pressure calibration.

Press **LB+RB**	⇒	Until you reach c020, then release
Press **LB or RB**	⇒	Force the Output to 20 mA and display actual 20 mA correction (-99/+99 counts)
Press **RB**	⇒	Increase current output. Each count correspond to 10 µA increase of the output
Press **LB**	⇒	Decrease current output. Each count correspond to 10 µA decrease of the output
Press **RB+LB**	⇒	Store the value in Volatile Memory and release the Output current

After the confirmation LB+RB, the message "Ld" will appear to confirm that your modification has been loaded in the Volatile Memory. After this message, the system returns to the normal display.

Warning: The output calibration forces the current output to values not related to the process variable measure. Never perform calibration while the process is running

Remember to store the new values in the Non Volatile Memory through the F1 function; otherwise the data will get lost after switching off the instrument.

4.5 - TRANSMITTER CALIBRATION PROCEDURES

- ✓ PX762 transmitters are factory calibrated for the nominal range of the sensor or for the selected LRV and URV. A periodical calibration can be performed by the user using the described Functions and following the procedure indicated in this program
- ✓ Calibration frequency can very greatly depending on the application, performance requirements. Generally a new calibration is necessary after a reranging (change of LRV and URV) of the transmitter

Warning: it possible to degrade the performance of the Tx if the calibration is done improperly or using equipments that does not satisfy the accuracy requirements

1) Using Function **F8** the user can adjust the transmitter Zero reference (P= atmospheric pressure for gauge Tx or P= vacuum for absolute pressure tx) trimming the initial position of the factory calibration curve.
-) Ensure zero pressure applied (P= atmospheric pressure for gauge tx or P=vacuum for absolute pressure tx)
-) Follow the indication provided in the Function **F8** description.

2) Using Functions **c000** and **c0FS** the user can calibrate the Tx at the selected LRV and URV:
-) Set the Output action to Direct using Function F11 to avoid inconsistency in the measurements.
-) Set damping to 0 sec using Function F5 to avoid errors due to Tx response delay.
-) These calibrations should not be performed while the device is connected to the process.
-) Note: Perform LRV calibration first and then URV calibration
-) Follow the indication provided in the Functions **c000** and **c0FS** descriptions.

1. Using Functions **c004** and **c020** the user can calibrate the current output. These Functions adjust the digital to analog signal conversion and does not influence the pressure measure of the sensor:
-) These calibrations should not be performed while the device is connected to the process.
-) Note: Perform c004 calibration first and then c020 calibration.
-) Follow the indication provided in the Functions c004 and c020 descriptions.

5 - MAINTENANCE

5.1 - PERIODIC SERVICE

The transmitters of this series have no moving components and therefore the maintenance operations are related only to the environment conditions. It is suggested a periodic control of the internal parts in the top housing to ensure that no moisture infiltration is present and that the terminals are clean so as to assure a good electric continuity.
Do not use solvents for cleaning. The main electronic components, the housing with incapsulated sensor and electronic module are mounted; if the necessary equipment is not available it is very difficult to replace one of these components and retain good accuracy; it is necessary to send the instrument to OMEGA Engineering.

5.2 - TROUBLESHOOTING

Verification of correct operation of the transmitter should be based on the instructions discussed in the present manual.
In absence of output signal or an output value not corresponding to the real value, the following tests are suggested:
5.2.1- Connections. The process piping must be installed correctly, unwanted gas or liquid pockets can affect the measured value and accumulation of dirt and pipe incrustation may cause blocks. The interception must be in the open position. Check that wiring is correct (polarity) and in good condition, both for mains supply and shielding.
5.2.2 - External load: supply voltage value is a function of the resistive load, verify this value.
5.2.3 - Power supply: the D.C. voltage must have the correct value and polarity.
5.2.4 - Calibration tests.
Follow the instruction in chapters 4.1 to 4.3.
With the adjustment of LB and RB buttons it should be possible to set lower and upper scale values 4 and 20 to mA.
If this operation is not succesful, contact the Customer Service Department of OMEGA Engineering.

NOTES:

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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