INSTRUCTIONS

FOR

THE INSTALLATION AND THE USE

OF THE

PRESSURE TRANSDUCERS

SERIES LP 660

Mod. **S/N**

DS Europe
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Instructions N°100202-E

1) PRELIMINARY REMARKS

1-1) This *instruction manual* is an integral part of the supply-order and it is delivered with the material, even if not listed on the order.

Moreover, it is sent during the negotiation, whether the Customer tells about the installation or about the use of this product.
When several pieces are supplied, the quantity of manuals could decrease to one copy, if not requested the contrary.

1-2) RESPONSIBILITY FOR THE USE:

The transducers, even if supplied with external electronics or indicators, are *only components and parts of systems and of plants*; they are sold in elevated annual quantities, for different uses and they have to satisfy to several standards and recommendations often unknown to the Supplier.

Under these circumstances DS Europe is compelled to refuse any responsibility for the use.

In this manual are listed the most and common precautions for a correct use of his products.

In case of use with risks of damages to Persons and things and damages for stops of machineries, it is precise duty of the User to make a complete and focused insurance coverage and to inform the Supplier so that he can suggest the safe tricks or he may refuse the order and the supply.

1-3) QUALITY AND RELIABILITY:

The pressure transducers of DS Europe are high professional quality products, they are rugged and designed for the best safety and reliability and the limitations and cautions listed in this manual want to give prominence to the User the importance of a correct use and the need to put into action also all the law recommendations.

All the transducers supplied are tested and supplied with a final test certificate which states that they are perfectly working.

2) TERMINOLOGY

OF THE FINAL TEST CERTIFICATE

2-1) REMARKS:

The final test certificate is issued only in English. The several data are processed and written directly by computer, so without subsequent manipulation. As a result, they appear with all the decimal numbers (no rounding) although, sometimes, the last digits are non-significant.

Positive polarity is not indicated, but negative polarity is shown by a minus sign.

The following description comments only the main parameters of the certificate.

2-2) RATED CAPACITY:

It is the higher limit of the measuring range (FS = Full scale). The measuring unit is the bar.

2-3) FULL SCALE OUTPUT SIGNAL:

It is the output signal of the transducer when it is subjected to the pressure.

3) POSITION OF THE TRANSDUCER IN THE PLANT

3-1) AVOID OVERPRESSURES OR WATER-HAMMERINGS:

The transducer has to be installed in a point of the hydraulic network far from valves, servovalves, elements which may change quickly the flow.
The overlisted to reduce the overpressures due to water-hammering which stress the measuring diaphragm without any interest because they are not measured by the electronics and by the digital displays.

3-2) PUT THE TRANSDUCER IN A PROTECTED POSITION:

When possible, settle the transducer in position protected against difficult environment; far from heat sources, from quick thermal changes; indoor, with good ventilation, with a large volume free around for an easy installation of the transducer, of the connector and an easy positioning of the calibration magnet.
Moreover, in the plant, choose the measure point of the fluid where its temperature is the nearest to the ambient one or, any how, inside the central range of the operating temperature.

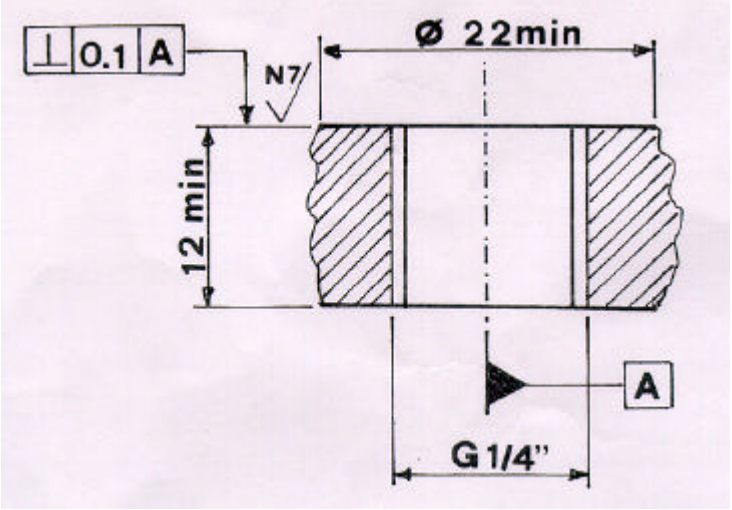
4) CONSTRUCTION OF THE SCREWED HOUSING

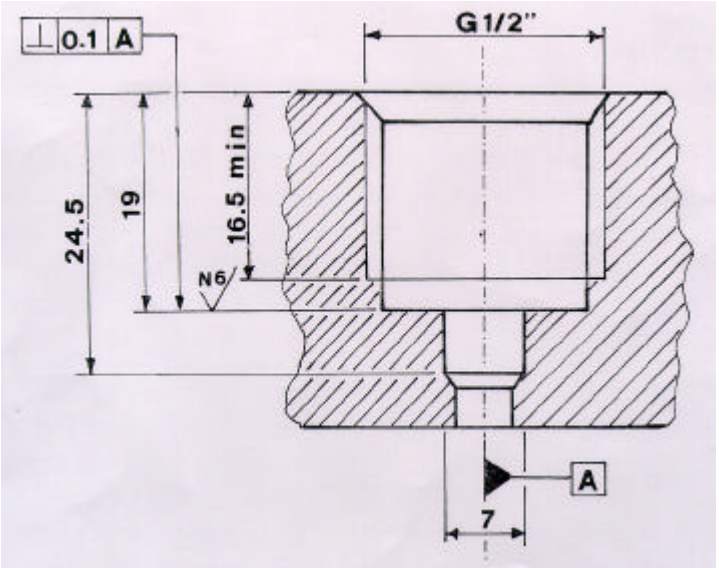
4.1) THREAD SIZES:

Each model of the LP660 series can be supplied with the hydraulic connection: G ¼" or G ½ ".

4.2) HOUSING OF THE PRESSURE CONNECTION:

The figures below shows an example for threads: G ¼" and G ½".
It is recommended: the fine machining of the sealing surface and the perfect perpendicularity of the drilling axis with the sealing surface.





5) PROTECTION AGAINST ELECTRICAL DISTURBANCES

5-1) The signal outputs may be seriously spoilt by strong external disturbances.
The *main cares* to be taken are the following:

5-2) Set up the transducer and the connecting cable far from electrical disturbances due to the nearness of electrical switches, servovalves, electric motors, transformers, electric cables submitted to heavy currents.

5-3) For the connection of the transducer use cable with braiding shield 100% (Supplier: DS Europe) connected to earth toward the side of the electronics.
Whether one screen is not sufficient, use the following cares:

5.3.1) Use a cable with two braiding shields 100% insulated between them (Supplier: DS Europe). Connect the external shield to earth toward the side of the electronics and the internal shield to earth toward the side of the transducer.

5.3.2) As last possibility with very serious electrical disturbances: put the double screened cable in tube of normal iron (paramagnetic, with low percentage of carbon: that is a good electromagnetic screen) with an external insulating sheath to avoid to pickup the stray Currents of the metal structures connected. Connect the tube to earth toward the side of the transducer.

5-4) When mating connectors are needed along the cable, the shield has to go through a pin and not through the metal shell of the connector and the connector has to be insulated and covered by plastic tape.

5-5) Connect to earth the metal structures near the transducer.
Avoid to use earth nets of industrial plants, always rich of electrical disturbances.
The earth tap has to be the center of all the earth leads. Never connect the earths in series but connect each directly to the tap.
For the earth use large and insulated cables.

5-6) *Follow all the local laws imposed for electrical connections and for the earth connections.*

5-7) To satisfy to the CE normatives it is imposed to connect the body of the transducer and the shield of the cables to a good earth without disturbances as for the CE standards.

EC CONFORMITY DECLARATION

Applied Directives: 89/336/CEE modified by Directives 92/31/CEE, 93/68/CEE

Standard to which is declared conformity:

EMC: EN 50081-1: 1992 – Generic emission standard
IEC 61000-6-2: 1999 – Generic immunity standard
EN 55022
EN 61000-4-2
EN 61000-4-3
EN 61000-4-4
EN 61000-4-8

Manufactirer: DS Europe srl

Address: via F. Russoli, 6 Milano (Italia)

Type of product: Amplified estensimetric transducers

Modelli: Series LP660

Year of mark's apposition: 2000

The product has been tested in a typical configuration, as prescribed in product's instruction manual.

DS Europe srl declares that the over listed product complies with the requirements of the EMC Directive over mentioned.

Milan, 24/09/01

DS Europe srl
Technical Direction

6) TEST FOR THE APPLICATION OF THE CE MARK

6-1) APPLICATION OF THE CE MARK:

a) *Non-amplified transducer Mod. LP 662:*
It is not submitted to certification for CE mark. It is considered a passive component (including only variable resistors).

b) *Amplified transducers: Mod. LP 665 - LP 661 - LP 664:*
They are submitted to certification for CE mark as including an amplifier (active component).

6-2) LIST OF THE TEST AND OF NORMATIVE REFERCES:

The tests have been done at a *"Competent body"* Test Center internationally accepted.

For the compatibility tests have been chosen the standards **EN 50081-2 (*for emission*) and EN 50082-2 (*for immunity*)**, the most severe for industrial applications.

6.2.1) *Normative reference: EN 50011*: Test category: Emission; Port: enclosure; Type of test: radiated interference field strength; Frequency range: 30 to 1000 MHz.

6.2.2) *Normative reference: ENV 50140*: Port: enclosure; Test category: Immunity; Type of test: radiated radio-frequency, electro-magnetic field; Frequency range: 80 to 1000 MHz.

6.2.3) *Normative reference: ENV 50141*: Port: DC I/O power port; Test category: Immunity; Type of test: RF common mode; Frequency range: 0,15 to 80 MHz.

6.2.4) *Normative reference: ENV 50141*: Port: signal lines; Test category: Immunity; Type of test: RF common mode; Frequency range: 0,15 to 80 MHz.

6.2.5) *Normative reference: EN 61000-4-4*: Port: DC I/O power port; Test category: Immunity; Type of test: Fast transient (burst). Common mode.

6.2.6) *Normative reference: EN 61000-4-4*: Port: signal lines; Test category: Immunity; Type of test: Fast transient (burst) common mode.

6.2.7) *Normative reference: EN 61000-4-2*: Port: Enclosure; Test category: Immunity; Type of test: ESD.

6.2.8) *Normative reference: EN 61000-4-8*: Port: Enclosure; Test category: Immunity; Type of test: Power frequency magnetic field. Frequency range: 50 Hz.

6.2.9) *Normative reference: ENV 50204*: Port: Enclosure; Test category: Immunity; Type of test: Radio frequency electromagnetic field. Pulse modulated: 900 + 5 MHz.

Notes:

6.2.10) **The tests have given positive results.**

6.2.11) The test Laboratory and the normatives CE compel reserve on the paper-works and on the data of the tests; they neither can be advertised nor photocopied and they remain at disposal only to the Competent Authorities in our Factory.

7) ELECTRICAL CONNECTIONS

Note: The following instructions refer to transducers with internal analog electronics.
For transducers with internal digital electronics refer to separated instructions.

Near the electrical contacts of the transducer and of the mating connector are printed the numbers: 0-1-2-3 to which are corresponding the functions of the table below.

Note: in case of amendments, the functions listed in the "final test certificate" have the priority.

MOD.	FUNCTION	CONNECTOR PIN CONNECTION			
		0	**1**	**2**	**3**
LP 662	Without electronics	supply	output	output	supply: +
LP 665	Voltage amplifier Output: 0÷ 5 V	N/C	output 0÷5 Volts	common	supply: +
LP 661	Voltage amplifier Output: 0÷10 V	N/C	output 0÷10 V	common	supply: +
LP 664	Current amplifier Output: 4÷20 mA	N/C	N/C	common	supply and output 4÷20 mA

N/C = not connected

8) SEALING OF THE ELECTRICAL CONNECTOR

Each transducer is supplied with *a rubber gasket* for the connector and with a *plastic washer-gasket* for the underhead of the clamping screw of the connector.

To obtain an hermetic seal of the connector the following suggestions are:

8.1) Before all, solder each wire to the electrical contact.

8.2) Smear the clamping nut by silicon sealant and, after, clamp it to the body of the connector.

8.3) Smear the rubber gasket by silicon sealant, before the final clamping of the connector.

8.4) Smear the plastic washer-gasket and the underhead before the clamping of the screw of the connection. Fill the free head space by silicon sealant.

Important: Use only silicon adhesive sealant with neutral or alcoholic cure (= polymerization), without exit of acetic acid (it has the smell of vinegar) or of corrosive vapors which will damage with time the electronics inside.
Are suggested e.g.: the sealant Models RTV 160 - RTV 163 made by General Electric and the Model 738 made by Dow Corning.

9) ELECTRICAL SUPPLY TO THE TRANSDUCERS

9.1) NOT-AMPLIFIED TRANSDUCER: MOD. LP 662:

The recommended excitation voltage is: 10 V DC stabilized.
The stabilization of the excitation is imperative as to its variation is corresponding a variation of the output signal.

9.2) VOLTAGE AMPLIFIED TRANSDUCERS: MOD. LP 665 - LP 661:

Although the Models LP 665 and LP 661 hold inside a voltage stabilizer which provides to supply a constant voltage to the electronics, to avoid even very little output voltage variations, an external stabilized voltage is recommended.

In the range of recommended voltages, higher is the external voltage, greater is the internal drop of voltage and greater is the thermal energy to be dissipated inside; therefore it is advisable to adopt the voltages recommended below to avoid unless and large temperature gradients that bring less stable the electrical specifications:

- Mod. LP 665 (output: 0÷ 5 V) *Recommended voltages*: 12 to 15 V stabilized.
- Mod. LP 661 (output 0÷10 V) *Recommended voltages*: 20 to 24 V stabilized.

9.3) CURRENT AMPLIFIED TRANSDUCER: MOD. LP 654:

The diagram shows the "AREA OF V_{ps}" enclosed between the straight lines "MINIMUM V_{ps} ALLOWED" and "MAXIMUM V_{ps} ALLOWED".

All the points enclosed into the "AREA OF V_{ps}" represent possible combination of working voltages V_{ps} against load resistors R_L.
Outside the points of the "AREA V_{ps}" the transducer does not work correctly or it may be damaged.

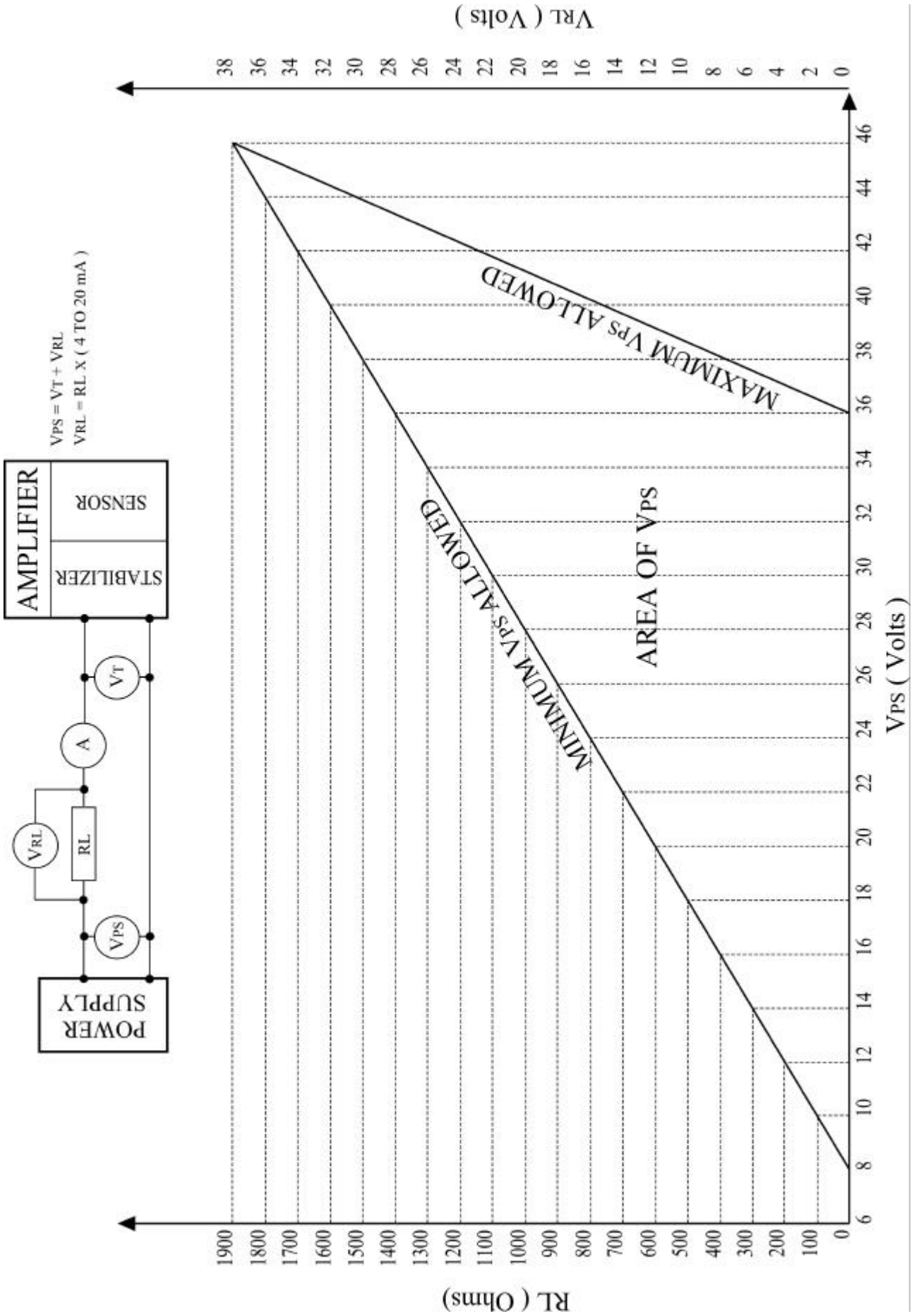
Also for the Model LP 664 it is advisable to keep the Voltage V_{ps} about 20 to 30% far from the "MINIMUM V_{ps}" and to keep it also far from the "MAXIMUM V_{ps}" to avoid useless heating of the transducer.

Are recommended supply voltages V_{ps}: 20 to 30 Volts and a load resistor R_L = 250 ohms.

E.g.: For a load resistance R_L = 250 ohms (the most common resistance value) the "MINIMUM V_{ps}" is 17 Volts and the "MAXIMUM V_{ps}" is 37 Volts, but the advisable V_{ps} Voltages are 20 to 24 Volts.

4-I) WARM-UP TIME OF THE TRANSDUCERS:

Before regulating the zero (LP 665-LP 661), or the bias 4mA (LP 664) wait 15÷30 minutes so that the transducer is thermally stable.


VPS = VT + VRL
VRL = RL X (4 TO 20 mA)
AMPLIFIER
STABILIZER
SENSOR
POWER SUPPLY
VPS
RL
VRL
A
VT
MINIMUM VPS ALLOWED
MAXIMUM VPS ALLOWED
AREA OF VPS
VPS (Volts)
VRL (Volts)
RL (Ohms)

10) ZERO REGULATION

10.1) NOTES:

1) The model LP 662, without internal electronics, has not zero regulation.

2) **The zero regulation has been done very carefully in Factory at the final test, so not necessary. This regulation has to be done by an expert Technician.**

3) The transducer has to be at atmosphere pressure, difficult condition to find in an industrial net usually under pressure.

4) Before making the zero regulation wait for the warm-up time of 15÷30 minutes.

10.2) REGULATION:

Unscrew and take-off the clamping screw of the connector but leave it plugged-in and the transducer with its electronics powered.
After a warm-up time of 15÷30 minutes, start the zero regulation (or 4 mA regulation for the Model LP 664).

Enter axially by a screw-drive (diameter: 1÷1,5 mm possibly in plastic material) into the hole of the connector screw. Reach (inside the transducer) the multiturn potentiometer and bring to zero the atmospheric pressure applied to the transducer.

In the Model LP 664 (4÷20 mA) avoid wide (and useless) bias regulations different from 4 mA, that could bring changes on the gain.

11) NOTICE

The information contained in this document is subject to change without notice.

DS Europe shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

SALE CONDITIONS
(for all the products DS Europe)

A) WARRANTY:

From raw material through in-process operations to the final test and to finished piece, DS Europe product is subject to rigorous inspections and to continuous quality controls to assure a production free from defects in parts, in materials and workmanship.

When the product is submitted to warranty claims and it results defective from normal use within 6 months from the date of shipment, it will be repaired or substituted free of charge in our factory; the transport, insurance expenses, custom's duties are to be prepaid and borne by the Customer.

The material delivered has to be controlled within 10 days from the receipt; after this period the material is considered as accepted.

The responsibility is strictly restricted to the above provision and DS Europe declines any liability for damages to Persons and things, for damages of stopping of plants, of machineries due to the applications and due to the use of its products.

B) RESPONSABILITY FOR DAMAGES:

DS Europe products are only parts of more complex machineries and of plants sold in thousands of pieces/year, for thousands of different applications with different local standards and specifications unknown to the Supplier.

For installations and for uses which directly or indirectly may involve risks of damage to Persons and things, of damage for stopping of machineries, of plants is precise obligation for the end User, for the Distributor, or for the Retailer to inform immediately and before the installation DS Europe which will stop the negotiation and which will cancel the delivery of the product.

Nevertheless DS Europe is at disposal to suggest, without any responsibility, protection accessories, test certificates, Consulting Companies or research and test Laboratories so to reduce or to zero the risks of damages.

It is underlined to read the "instructions of installation and of use" of the products that may be sent, under request, even during the negotiations.

C) REMARKS:

These "sale conditions" are integral part of the bulletins, of the invoices, of the instruction manual, also if not written on them.

DS EUROPE S.R.L.

Sale conditions N°221194 E dated November 22, 1994.

NOTE