INSTRUCTION MANUAL FOR ISTRUMENTS EQUIPPED WITH "EP" EXPLOSION PROOF HOUSINGS TYPE C , S , D, FIXED OR SWIVELLING

FOREWORD

These safety instructions refer to the installation, use and maintenance of instruments with explosion proof housings of the EP series for use in areas with potentially explosive atmospheres.
The cases making up the object of these instructions are equipped with the following protections against explosion risks:

- **II 1/2 G Ex d IIC T6 o T5 Ga/Gb**: explosion proof housing
- **II 1/2 G Ex d/ib IIC T6 o T5 Ga/Gb**: explosion proof housing
- **II 2 G Ex d IIC T6 o T5 Gb**: explosion proof housing
- **II 1/2 D Ex ta/tb IIIC T85°C o T100°C Da/Db**: explosion proof housing

N.B: These instructions must be observed in addiction to the instructions provided in the user's manual supplied by the manufacturer.

INSTALLING THE EXPLOSION-PROOF CASES

Fitness of the case to the installation place

In cases when the case is used in areas featuring explosion dangers, the user needs to ensure the case suits the area classification and the characteristics of the flammable substances that are found in the plant.

The essential safety requirements against the risk of explosion in the classified areas are set forth in the 94/9/CE European Directives dated March 23 1994 (as regards the equipment) and 1999/92/CE dated December 16 1999 (as regards the systems).

Places where flammable gases, vapours, mists or powders are found

The criteria adopted for the classification of the areas featuring explosion risks are set forth in Standard EN 60079-10.

The technical requirements of the electrical systems in the classified areas are set forth in Standard EN 60079-14.

Special instructions for the manufacture, the testing and marking of electrical systems belonging to systems group II.

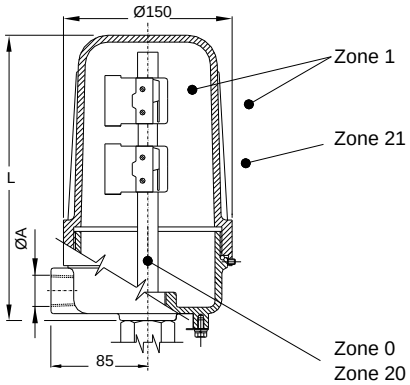
Based on these technical and legal provisions, the choice of the case shall also consider the following factors:

- System type: surface systems (group II)
- Area classification: 0, 1, 2 (for which units belonging to category 1(Ga), 2(Gb), 3(Gc) respectively are suitable)
- Characteristics of the flammable substances present in the form of gases, vapours, mists or powders
- subgroup: IIA, IIB, IIC
- temperature class: T5 or T6 (defining the gas ignition temperature)
- temperature class: 85 °C or 100 °C (defines ignition temperature of powders)

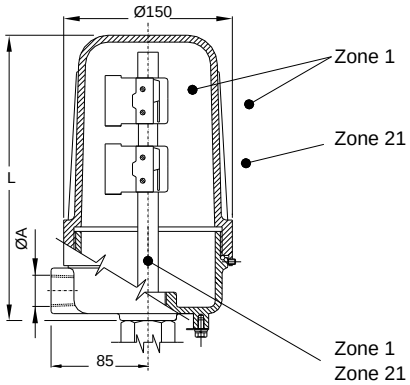
The ratings include, in addition to the functional data:

- all data required to choose the suitable type of case and its correct installation.
- the references to the notified organisms in charge of the certification.

INSTALLATION AREA



Always use Exb or Exia barriers



No prescription required

Ratings concerning safety

CE	Mark of compliance with directive 94/9/CE and the related technical regulations
Ex	Mark of compliance with the applicable European directives
II 1/2GD	Case for surface plants with presence of gases or vapours, category 1(side process) and 2 , suitable for area 0 (side process) and (with redundancy) for area 1 and 2 (G). Case for surface plants with presence of powders, category 1 (side process) and 2, suitable for area 20 (side process) and (with redundancy) for area 21 and 22 (D).
II 2 G	Housing for surface plants with presence of gases or vapours, category 2, suitable for zone 1
Ex d / Ex t	Protection mode: Ex d = explosion proof; Ex t = Protection through housing
Exd/ib	Protection mode Exd combined with intrinsically safe Exib
IIC	Case of the IIC group suitable for substances (gases) of the IIB or IIC group
IIIC	Housing of group IIIC suitable for substances (powders) of groups IIIA, IIIB and IIIC
T6 / T5	Case temperature class (maximum surface temperature) suitable to the corresponding temperature class of the flammable substance (gas)
T 85 °C / T 100 °C	Maximum surface temperature of the housing.
EPL Ga/Gb	Ga: “very high” protection degree Gb: “high” protection degree
EPL Da/Db	Da: “very high” protection degree Db: “high” protection degree
AB xx ATEX yyy	AB : name of the laboratory that issued the CE type certificate xx : year when the certificate was issued yyy : number of type certificate
xxxx	Number of the notified organism that carried out the notification of the production system quality

Notes a) Cases of the IIC group also suit IIA and IIB environments.
b) Cases of the IIIC group also suit IIIA and IIIB environments.
c) Explosion-proof cases are envisaged for service with room temperature within the range:
-50 ÷ +60°C (-40 ÷ +60°C with ULS model) for temperature class T6 (gas) T85°C (powders) and -50 ÷ +70°C (-40 ÷ +70°C with ULS model) for temperature class T5 (gas) T100°C (powders) with limitations below dictated by the temperature limits of the switches in use
d) The T6 temperature service housings are suitable for use for T1 to T5 levels, too.

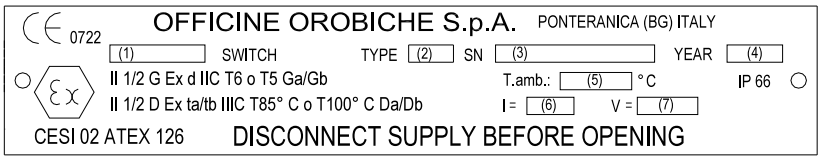
1. DESCRIPTION

Housings type C, S, D, in the fixed or swivelling version, are designed in compliance with the EN60079-0 (2012), EN60079-1 (2007), EN60079-11 (2012), EN60079-26 (2007) and EN60079-31 (2009) Standards, to be mounted on level and/or flow switches.
They can be equipped with:

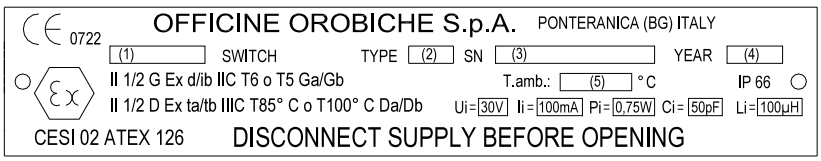
a) One or two tripping units, where each one can be equipped with individual (SPDT) or double (DPDT) switching contacts for control and/or alarm function.
b) With electronic circuit.

2. PLATE IDENTIFICATION

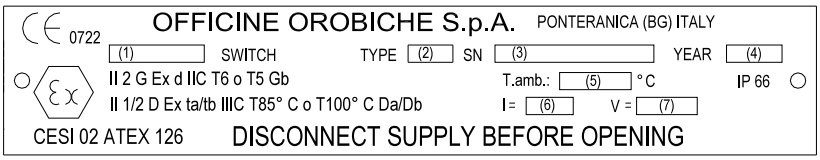
The plate is applied to each instrument/housing as shown in the figure.



Series 1020, ULC / ULS only



All series except for 1020,ULC/ULS



All series

The plate bears the following data:

(1) "LEVEL" or "FLOW"
(2) "C", "S", "D" for the fixed model and "CG", "SG", "DG" for the swivelling model
(3) instrument serial number
(4) instrument's year of manufacture
(5) Room temperature : -50 ÷ +60°C for temperature class "T6" (-40 ÷ +60°C with ULS model)
-50 ÷ +70°C for temperature class "T5" (-40 ÷ +70°C with ULS model)
(With limitations dictated by the switch model in use as per the table below).
(6) Max. current (A)
(7) Max. voltage (Vac or Vdc)

Microswitch code	Minimum room temperature
M4, M12	**-15 °C**
M19, M22	**-20 °C**
M6, M20	**-23 °C**
M2, M3	**-25 °C**
M9, M10, M11, M14, M21, M23, VD	**-50 °C**

3. SETTING AT WORK

3.1 Make sure that the use of the instrument does not exceed the intended use and that the applied electrical rated value complies with the values printed on the plate.
3.2 The user shall ensure that the use of the equipment is compatible with the data printed on the additional plate (e.g.: Pressure, Temperature).
Namely, the surface temperature shall be less than 80% the hazardous gas firing temperature.
3.3 Level switches of all series, except for 1020 and ULC/ULS, shall be interface-connected with Ex ib or Ex ia intrinsically-safe equipment.

4. INSTALLATION

4.1 CABLE INLET

The wiring shall be made using cable inlets or pipe conduits in compliance with the EN 60079-14 Standard.
The cable inlet shall be made in such a way as not to alter the properties that are typical of the protection mode, as described in the EN 60079-1 Standard for Ex d housings; and the EN 60079-31 Standards for the Ex tb housings.
When the cable inlet is made by using a cable gland, this must be properly selected as a function of the type of plant and cable. The cable gland shall be tightened to allow the seal rings to achieve the pressure required:
a) to prevent the transmission of mechanical stress to the terminals
b) to guarantee the mechanical protection (IP degree) of the terminal box.
Cable inlets shall be made with Ex d and Ext sealing fittings or cable glands certified in accordance with the EN 60079-0, EN 60079-1 and EN 60079-31 ATEX Standards (directive 94/9/CE) and a minimum protection degree equalling IP 66.
Please note: No seals shall be added unless they are supplied by the manufacturer;

4.2 GROUND CONNECTION

Beside the ground connection envisaged to take place inside the case, the latter is equipped with another ground clamp located outwardly.
It shall be connected to the system's main ground using a suitably sized conductor.

As a function of the **S** section of the line conductor, the section of the ground conductor shall be:

= S	For $S \leq 16\ mm^2$
16	For $16\ mm^2 < S \leq 35\ mm^2$
≥ 0,5 S	for $S > 35\ mm^2$

4.3 ELECTRICAL WIRING

The instrument is equipped with a terminal board located inside the case; for instruments equipped with miniature switches -see dwg. in Fig. 1, whereas for ULS/C models - see dwg in Fig. 2.
Please ensure that the case cover is closed before feeding it with voltage.

Fig.1

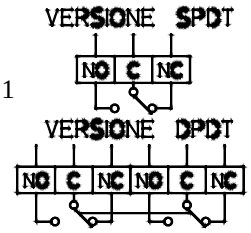
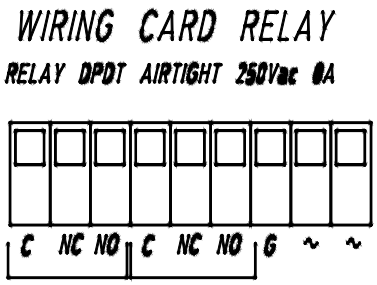
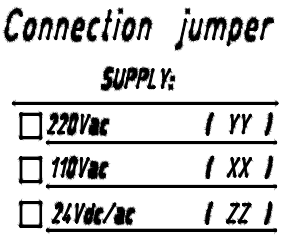


Fig.2





4.4 LID CLOSURE

In order to ensure the IP66 degree of tightness to water and powders, the lid, whether it be of type "C", "S" or "D" in either the fixed or the swivelling versions, shall be closed by following the instructions below:
- tighten the lid up to the point when the seal rests on the whole flat sealing surface; the latter can be found as soon as the lid stops turning freely and starts rubbing against the gasket itself.
- make two corresponding marks on the base and on the lid with a pen or some adhesive tape so as to be able to remove it at the end of the job.
- close the lid so as to make it run a chord measuring not less than 90 mm; it can be measured by using a flexible meter wound around the collar whose diameter is larger than the cap.
- tighten the self-locking headless screw M5.

4.5 CABLE OUTLET ORIENTATION (FOR SWIVELLING VERSION ONLY)

The swivelling version of the housing makes it possible to orientate the cable outlet to fit the actual conditions of the wiring on the spot. The admitted level of freedom is that of a round angle (360°), which always enables you to find the right position of the incoming cables. After finding the right position, you need to tighten the two headless screws M4 located in the lower section.

4.6 TESTING AND SERVICING EXPLOSION-PROOF CASES

All testing and servicing of explosion-proof cases shall be carried out in full compliance with the criteria of the EN 60079-17 Standard.

- The terminals of the electrical connections shall be properly tightened to avoid high contact resistances and ensuing overheating.
- The threaded lid shall be closed as described above and secured against loosening by the special headless screw.
- The replacement of gaskets and parts of the cable inlets shall be performed by using parts that are identical to those supplied by the manufacturer to ensure a lasting protection.

The surfaces of explosion-proof joints (e.g.: lid body joint) shall not be processed, and no seals shall be applied unless they are supplied by the manufacturer. These surfaces shall be kept clean. To fight corrosion and to ensure that the IP 66 mechanical protection class against water seepage is preserved, a thin layer of non-hardening fat may be used (E.g. silicone grease). This fat shall be reinstated any time the above-mentioned surfaces are disassembled.

5.MAINTENANCE

5.1 WARNING

Before opening the case, ensure that you are not in an explosive atmosphere.
"DISCONNECT SUPPLY BEFORE OPENING"

-NEVER open the lid without being sure that voltage has been cut out;
-NEVER leave the case without its lid for longer than the inspection time;
-NEVER use the instrument with an electrical rating that exceeds the rating plate values;
-NEVER perform settings or replace parts without having read the instructions beforehand; in case of doubts, please turn to our customer service department;
-NEVER lubricate any instrument parts;

5.2 PERIODICAL CHECKS OVER CONTACTS

Cut out voltage.
With the lid open, perform a sight check to ensure that the tripping unit does not have damaged or aged parts.

5.3 INSTRUCTIONS FOR DISASSEMBLING

- To open the case, unlock the screw that is fastened on the cap and unscrew the latter.
- Perform the above-mentioned inspection.
- Remember to re-tighten the screw after closing the cap.

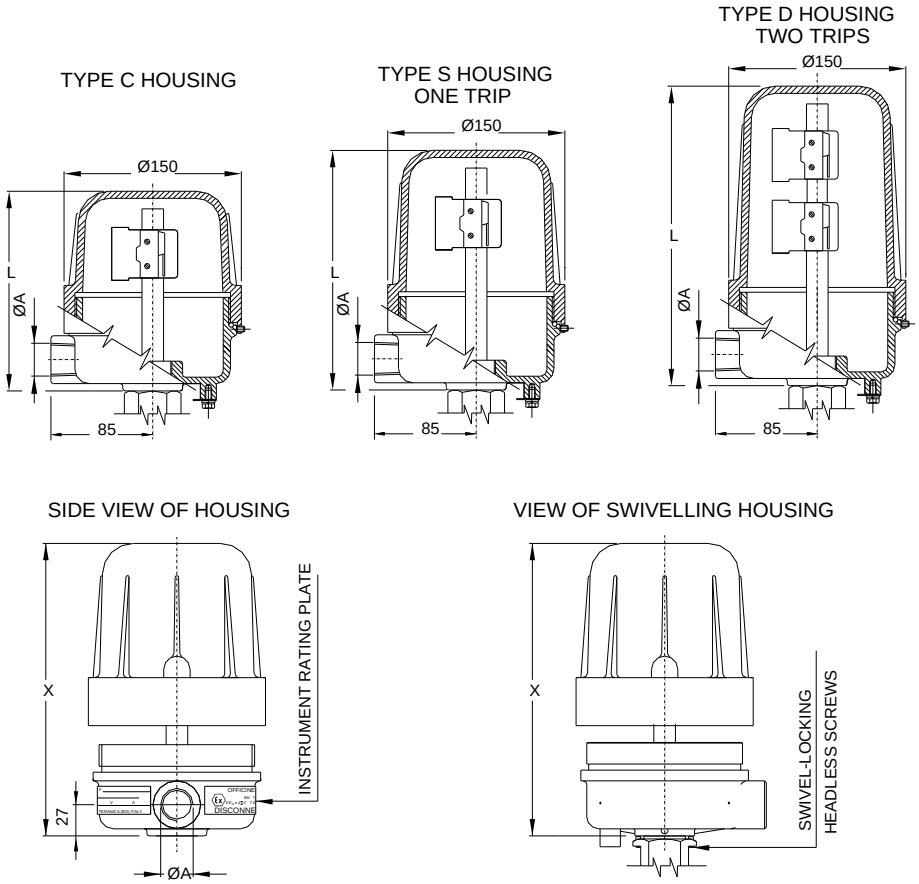
5.4 REPAIRING THE EXPLOSION-PROOF BOXES

Repairing the explosion-proof equipment shall comply with the criteria set forth in the IEC 79-19 Standard.
In cases when the repairs are not carried out by Officine Orobiche, they must be carried out by workshops that own the equipment required for the repairs and only provided that Officine Orobiche has approved of them.
All the replaced parts shall be genuine spare parts supplied by Officine Orobiche, repairs of broken parts are not authorized.

6. DIMENSIONAL DRAWINGS OF CASE

TYPE	L	X
C	150	230
S	210	290
D	260	440

ELECTRICAL CONNECTIONS ∅ A
EP
1/2" NPT
3/4" NPT
1/2" UNI 6125
3/4" UNI 6125
ISO M20x1.5



X=SPACE NEEDED FOR REMOVING THE HOUSING COVER

7. DISPOSAL

Once their service life is over, the instruments are meant to be scrapped; please comply with the provisions of the law in force dealing with this subject.

The metal parts, once all seals, gaskets and special protection coating requested by the customer are removed along with any other plastic part, can be recycled.

8. GUARANTEE

All the parts that make up the case are guaranteed to be free from manufacturing faults over a period of 12 months from the date of shipment.

In the event of failures, implying return of goods within the limit specified above, Officine Orobiche will replace (shipment fees not included) all damaged parts free, provided that the failure does not ensue from incorrect use.

OFFICINE OROBICHE shall never be held for any incorrect use of their products when these are used for purposes other than those mentioned in the specifications approved at the order stage.

In these cases, no complaints will ever be taken into consideration.

No damage and/or fee, whether direct or indirect, ensuing from an incorrect installation or use shall ever be debited to OFFICINE OROBICHE.