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WHAT THEY ARE

These instruments are designed to keep under control the level of a fluid, liquid or gaseous, within vessels; they can be defined as :

- **Indicators.** They show the level of a liquid very clearly on their outside linear display. They can be completed with two important accessories : a *Linear Sensor* able to remote transmit an electric signal being proportional to the level; one or more *Alarms* able to give an electric or pneumatic signal when liquid reaches the max or min or any intermediate level.
- **Switches.** They give an electric or pneumatic signal when level reaches the preset level : max, min, etc.
- **Regulators.** They perform a pneumatic signal able to self-regulate loading/unloading of vessel on basis of the existing level.

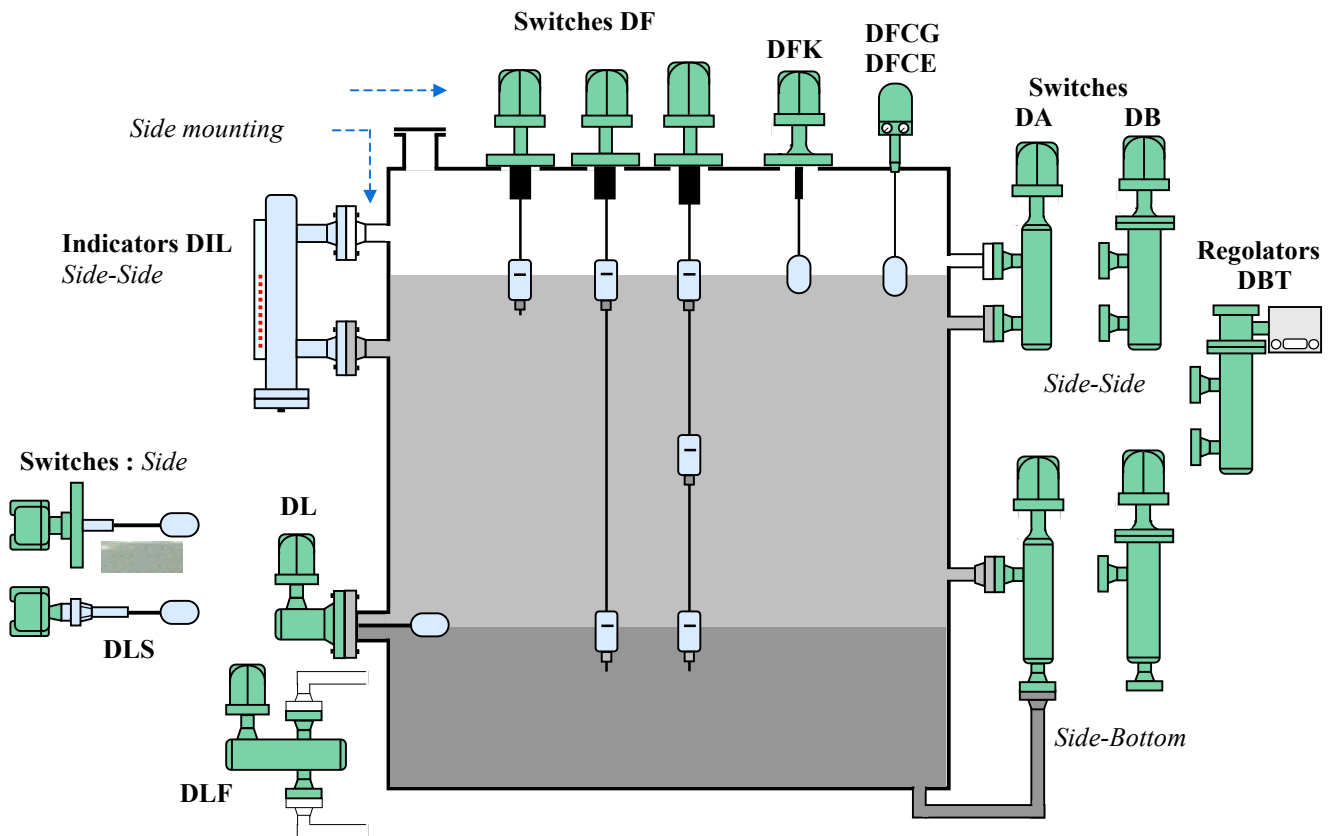
In these instruments the liquid and its fumes are sealed in their tight space and never come into contact with the output device : in fact the float movement is transmitted from liquid to output device only by means of magnetic field. In this way no risk of dangerous gas explosion exists.

Since these instruments operate within areas with risks of explosions, they are able to assure high specific performances :

- Their chamber/body is designed in conformity of the ASME standards and in different thickness, according to the pressures and temperatures of the liquid to be controlled.
- Their connection and inspection flanges are in conformity of the ASME B16.5 standards in the ratings ANSI 150÷2500psi, or in conformity of UNI/DIN standards.
- Their housing with electric output is flame-proof, EEx dc IIC T6, with Certificate EN 50018-1994.
- Their housing with pneumatic output is water-proof.
- The instruments are produced in conformity of the PED 97/23/CE and ATEX 94/9/CE Standards : page 37.
- The instruments are in production since 1971 by *Domizi Snc*, a company certified ISO 9001-2000.

HOW THEY ARE MOUNTED ON VESSELS

Our instruments can be mounted on vessels of process both on side and on top, as in the below sketch..



HOW THEY WORK

Thanks to the principle of communicating vessels, the liquid within the instrument takes the same characteristics of **level, pressure, temperature and specific gravity** as the liquid within the vessel. The float inside the instrument receives from the liquid a hydrostatic lift, a *positive buoyancy*, and reaches a floatation level which is directly proportional to the specific gravity of the liquid and to the volume of float, and is inversely proportional to the intrinsic weight of the float itself. In any case the float inside the instrument follows with accuracy the level movements of the liquid inside the vessel.

Level Indicator. It is designed to show the level of a liquid contained in a vessel, and, possibly, to give an alarm signal when a certain height is reached. It operates thanks to magnetic transmission between the inner float and the outer display : during its vertical movements, the magnetic field of float interacts with that of the two-coloured rollers being inside the display, and makes them rotate of 180°. As level rises, the rollers rotate so that show their red side and hide their white side. The contrary happens when level comes down again.

Thanks to this method user obtains many advantages :

(A) The transmission of level from liquid to display is made by a magnetic field, i.e. without any physical contact. (B) Consequently, even if liquid is dirty and oily, the display is always legible and needs no periodic cleanings. (C) The display has no *dead zones* and can be read on the 100% of its height and under wide angles. (D) It is possible to mount on the display a *Level Sensor* able to remote transmit an electric 4-20mA signal. (E) It is possible to mount on the same display one or more *Alarms* tripping for example at max, min or intermediate level; it is also possible to add them in a second time, and to change the trip height at will. (F) Thanks to this *alarms* possibility, the instrument can perform a double function : as *Indicator* and as *Switch*.

Level switch. It operates thanks to magnetic transmission between the rod integral with float and the magnet placed on the output device included in housing : when level rises to the preset point (X in the side sketch), the output device trips (*trip on rise*); then, when level comes down again (Y in the sketch), the device comes to the initial position (*reset on fall*); between trip and reset points there is always a small gap, named *differential*. The inverse function is available too : *Trip on fall* and *Reset on rise*.

The output device can be electric (one or more microswitches, type SPDT) or pneumatic (one valve, type ON-OFF), as per page 34.

For example, if the Switch is used to control the High Level in a vessel, at the *trip* point the loading pump is switched off, and at the *reset* point the pump is switched on again.

The **pressure** of the liquid within a system (named also *process*) determines the wall thickness of our instrument, as well as that of the connection flanges. For this reason *Domizi Snc* absolutely need to know the pressure values (Max-Normal-Min) since the first inquiry.

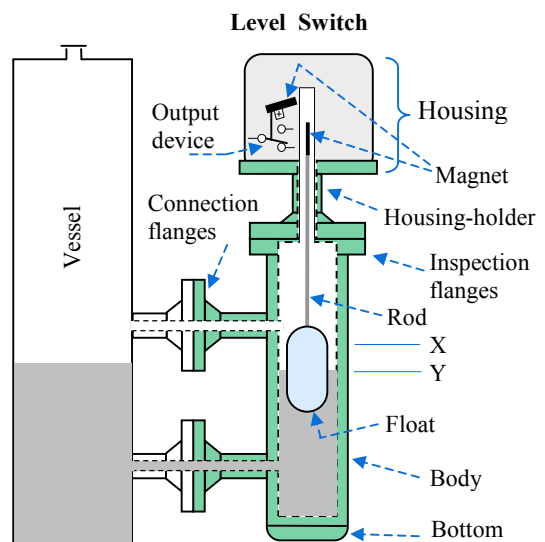
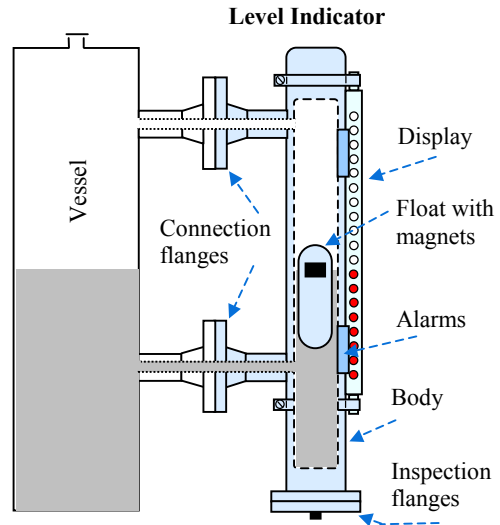
The same thing is said for **temperature**.

For similar reasons it is important to know the **specific gravity** of the liquid to be controlled : on base of it the more efficient float will be offered, both for the size and for the intrinsic weight.

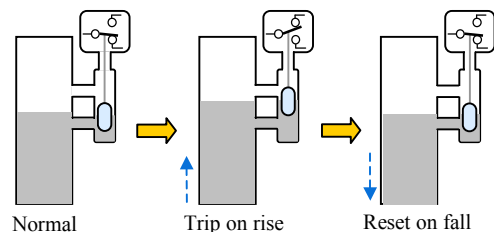
For example, in the Switches having liquids with rather low gravity ($<700\text{kg/m}^3$), the stainless steel float is opportunely lightened by means of springs; while on the contrary, when it is rather high ($>1.200\text{kg/m}^3$), the float is duly ballasted; in both cases the float is commonly named *displacer*.

In other cases, float changes both in dimensions and in material. Similar kind of problems arise on floats when pressure is high.

For the same reasons it is important to report the **nature** of the liquid under control, if it is simple water or oily, chemical corrosive liquids, etc. In this way *Domizi Snc* will be able to propose the proper materials for the various usage conditions.



Switch operation as HIGH LEVEL



Switch operation as LOW LEVEL

