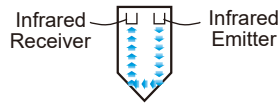


# SDX8 OPTICAL SWITCH OPERATION MANUAL

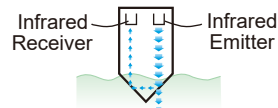
## OPERATION PRINCIPLE

The optical switch is designed by the principle of Snell's law, when light moves from a medium of a given refractive index  $n_1$  into a second medium with refractive index  $n_2$ , both reflection and refraction of the light may occur. An incident light ray strikes at point on the interface between two media of refractive indices  $n_1$  and  $n_2$ . Total internal reflection is an optical phenomenon that happens when a ray of light strikes a medium boundary at an angle larger than a particular critical angle with respect to the normal to the surface. If the refractive index is lower on the other side of the boundary, no light can pass through and all of the light is reflected. When light crosses a boundary between materials with different refractive indices, the light beam will be partially refracted at the boundary surface, and partially reflected.

Optical switch operates by sensing the difference of refraction index between various mediums, which causes different degree of refraction and penetration. When the liquid is in empty, the transmitted light is reflected back to the receiver. When the liquid flow in, part of the transmitted light would be reflected back to the receiver and most of ray emitted into the liquid. The receiver senses the signal loss and switches accordingly.



**Dry Total Internal Reflection**  
Fig.1

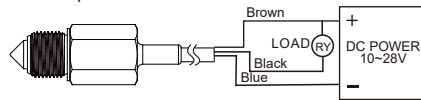


**Wetted In Liquid Infrared penetrate the cone**  
Fig.2

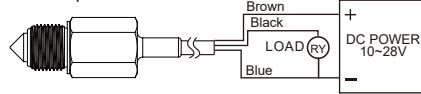
## WIRING

### 3-Wire Single Output

NPN output



PNP output



### 3-Wire Dual Output

| Output function | Wire color | Wiring   |
|-----------------|------------|--|
| NO              | Green      | <div> <div> <p>NPN</p> <p>Brown +</p> <p>Black</p> <p>White(Green)</p> <p>Blue -</p> </div> <div> <p>PNP</p> <p>Brown +</p> <p>White(Green)</p> <p>Black</p> <p>Blue -</p> </div> </div> |
| NC              | Black      | <div> <div> <p>NPN</p> <p>Brown +</p> <p>Black</p> <p>White(Green)</p> <p>Blue -</p> </div> <div> <p>PNP</p> <p>Brown +</p> <p>White(Green)</p> <p>Black</p> <p>Blue -</p> </div> </div> |

## POWER SUPPLY AND OUTPUT

1. Power Supply: 10~28 Vdc with reverse charge protection
2. Output: NPN/PNP
3. Contact: NO./NC.

## APPLICATION EXAMPLE

Liquid Level Control:

In Fig.3, two optical switches are installed individually in upper and lower level of the tank. When liquid rises to cover the upper optical switch, it will stop fill in liquid. When liquid drops down and lower optical switch is not covered by liquid, it will start filling up. Liquid has to be maintained in between upper and lower optical switches.

Motor Protection:

In Fig.4, optical switch is installed in lower level of the tank to prevent pump burning caused by the lack of water/liquid.

\*Avoid to install it near the corner region.

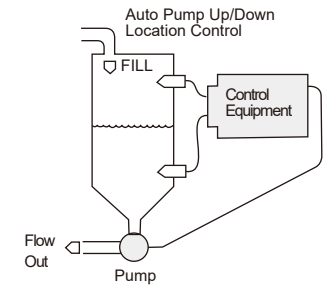


Fig.3

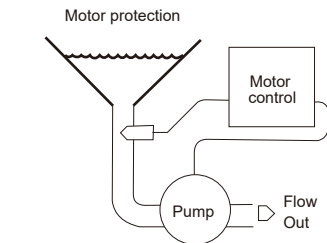


Fig.4

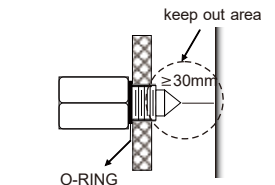


Fig.5

## CAUTION

- The recommended tightening torque for the standard sealing ring (O-ring) is 8-12 kgf-cm. This torque may vary depending on the internal pressure of the pipe/barrel or if the material is changed.
- Maximum Allowable Torque for the Casing:  
25 kgf-cm(Connction: M12x1.0); 50 kgf-cm(Connction: 3/8")
- Power supply is 10~28Vdc. Color code: Brown for positive and blue for negative terminal.
- Optical switch is not recommended for operating in emulsion and phase-change liquids.
- Do not install sensor close to infrared sources.
- Tip of the optical sensor must be free at least 30mm from any reflective surfaces or other interferences. Like the tank wall (Fig.5.)
- Do not install the sensor in a stagnation point of the liquid.
- The sensor installed a thread casing when the sensor tip must be exposed.
- This product is not recommended for organic solution especially for viscous liquid which easy to stick on the optical surface (Fig.6.)
- We recommend the following installation below. The horizontal plane parallel to the 0° ~ 45° for optimal

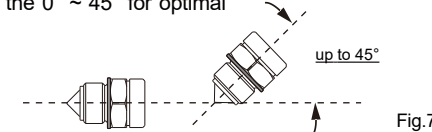


Fig.7

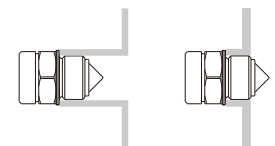


Fig.6

## REGULAR MAINTENANCE

- Please clean the top part of optical switch with clean water regularly.
- Please do not use organic solution or scrub while washing to avoid scratches on the surface.



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