



Present Weather Precipitation Identification Sensor S8312

- Laser-optical weather identifier technology
 - Utilizes scintillation analysis

A laser-optical beaming source (laser diode and optics) produces a parallel light-beam (infrared, 780 mm, not visible). A photo diode with a lens is situated on the receiver side in order to measure the optical capacity by transforming it into an electrical signal.

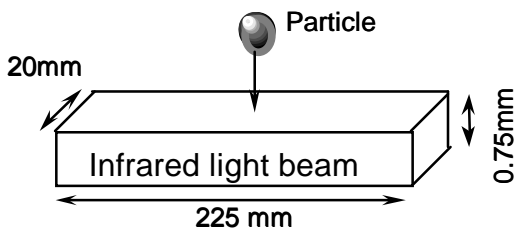


Fig.1: Measurement of the precipitation particle

When a precipitation particle falls through the light beam (measuring area 45cm²(7inch²)) (fig.1) the receiving signal is reduced. The diameter of the particle is calculated from the amplitude of the reduction. Moreover, the fall speed of the particle is determined from the duration of the reducer signal.



Fig. 2: in explanation of the measuring principle

The measured values are processed by a signal processor (DSP), and are checked for plausibility (e.g. edge hits). Calculation comprises the intensity, quantity, and type of precipitation (drizzle, rain, snow, soft hail, hail as well as mixed precipitation), and the particle spectrum (distribution of the particles over the class binning)

The type of precipitation is determined from the statistic proportion of all particles referring to diameter, and velocity. These proportions have



been tested scientifically (e.g. Gun, R., and Kinzer, G.D., 1949, "The terminal velocity of fall for water droplets in stagnant air," *J. of Meteorology*, Vol . 6, pp. 243–248). In addition, temperature is included in order to improve the identification: Precipitations with a temperature of above 9 °C are automatically accepted as liquid (exception: soft hail, and hail), and with a temperature of below –4°C as solid. In the temperature range between, all forms of precipitation might occur.



Technical Specifications

S8312

Principle of operation	Laser 785 nm, max 0,5 mW optical power, Laserclass 1M
Measuring area	46 cm ² (23 x 2.0 cm)
Environmental	-40...+70°C; 0 ..100% rH, Optional -60...+70°C; 0...100%rH
Protection	IP 65
Mounting	Mast 48 mm...102 mm; 1.9...4 inch
Power	24 V AC /750 mA, alternative 230 VAC or 115 VAC incl. std. heaters
Housing	al, die cast, stainless steel, 270x 170x 540 mm
Weight	4.8 kg
Data output	RS485 1200...115200 Bd, full duplex 2 opt. coupler 24 V DC 1 mA
Optional inputs	PT100, 0-1 V, 0-1000 Hz, serial synchronous
Precipitation	
Particle size	0.16...8 mm
Particle velocity	0.2 ... 20 m/s
Distinction for kind of precipitation drizzle, rain, hail, snow	> 97 % in compar. with synopt. observer
Minimum intensity	0.005 mm/h drizzle
Maximum intensity	250 mm/h