# Modular Sensing Quality

The Modular Sensing Quality (MS Quality), is a multiparameter sonde based in open hardware and software designed to monitor water quality parameters in a wide range of applications, including fish farms, rivers, lakes, or fishways. The device is easily configurable without needing external applications by standard USB connection. MS Quality features water quality sensors such as pH, dissolved oxygen, conductivity and water temperature. The sensor suite is configurable, thus it is possible to include other water quality, water level (ultrasound, pressure) or other environmental (air temperature, humidity, barometric pressure) sensors. MS Quality can work standalone as an autonomous independent sensing platform (gateway + sensing node) or inside a sensor network (node), thanks to the on-board communication modules. The programmable recording and transmission time provides an ideal solution for long time monitoring of environmental variables. The system is compatible with our on-line management platform.

Specifications
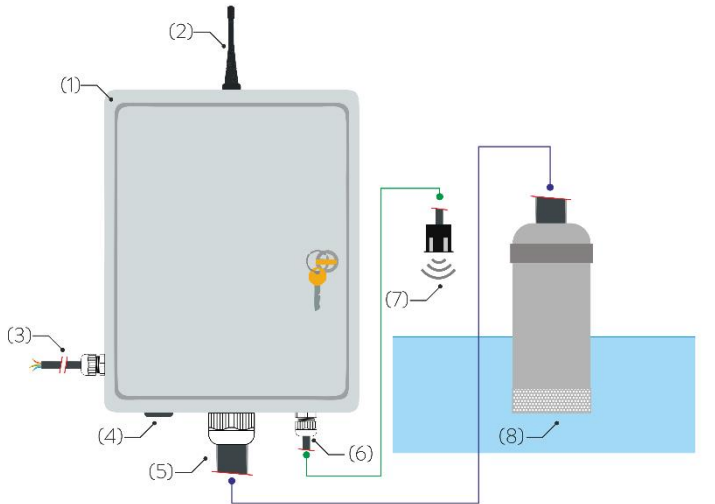
(1) Watertight ABS box; (2) Radio antenna; (3) Power; (4) Air sensors; (5) Water quality sensors connection;
(6) Ultrasound sensor connection; (7) Ultrasound sensor; (8) Water quality sensors container

Node*

Parameter	Sensors	Units	Range	Accuracy	Precision
pH	AtlasScientific	-	0.001 – 14.000	$\pm$ 0.001	$\pm$ 0.002
Dissolved oxygen		mg/L	0 – 100	$\pm$ 0.05	
Water temperature		°C	-200 – 850	$\pm$ (0.15 + (0.002*t))	
Conductivity		µS/cm	5 – 200.000	$\pm$ 2%	
Water level	JSN-SR04T	cm	25 – 450	1	0,2
Humidity	SI7021	%	0 – 80 (100)	$\pm$ 3	
Air temperature		°C	(-40) -10 – 85	$\pm$ 0,4	
Barometric pressure	BMP280	hPa	300 – 1100	$\pm$ 0,12	
*Default configuration, compatible with different sensors and ranges					

Communication Node*

Sensor type*	RFM95
Protocol*	Codified LoRa
Range	> 10 km (in optimal conditions)

*Default configuration, compatible with different modes and communication platforms.

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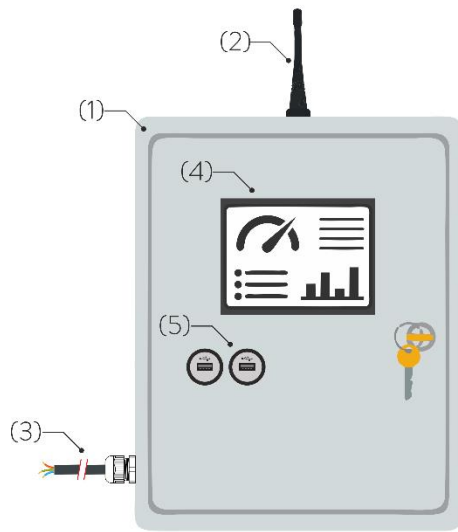
(1) Watertight ABS box
(2) Radio antenna
(3) Power
(4) Tactile screen
(5) USB connections

Gateway*

Microprocessor	Raspberry Pi
Protocol*	Codified LoRa and 4G
Range	> 10 km (in optimal conditions)

*Default configuration, compatible with different modes and communication platforms.
In de default configuration the node and gateway are separated devices, but this is modificable.
The gateway performance is highly customizable to adapt it to different programing requirements.