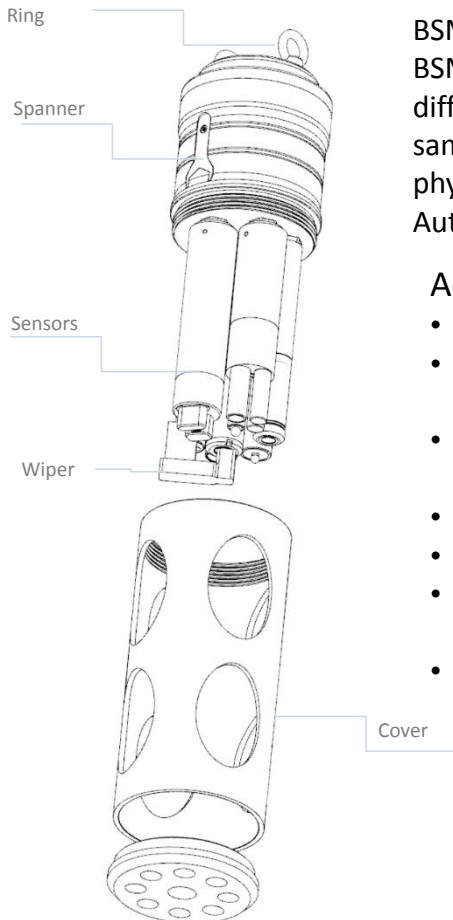# BSM-2 Multiparameter Sonde V2.0

BROADSENSOR
蛙视传感

BSM-2 $Parameter_1$: Temperature, pH, ORP, DO, Turbidity(SS, transparency), Conductivity (TDS, Salinity), COD TOC BOD. Ammonia, Chlorophyll a, Blue green algae, CDOM/fDOM

Ring

Spanner

Sensors

Wiper

Cover

BSM-2 is the 2nd generation Online Multiparameter Water Quality Sonde. BSM-2 is an instrument that collects water quality results. There are six different sensors at most and one wiper can plug into the sonde at the same time. Each sensor measures their parameter through optical, physical or electrochemical method. The sonde identifies the sensor Automatically.

Advantage:
- Universal platform, uniform 3.5mm audio connector.
- Up to 7 ports, each port accepts up to six of Broadsensor sensors and one wiper, recognizes them automatically.
- All sensors are digital, support RS485 and Modbus RTU, all calibration parameters are stored in each sensor.
- The sonde supports RS485 and Modbus RTU.
- The sonde supports low power mode, water leakage alarm.
- Independent structure design, one sensor leakage or broken will not infect other parts.
- IP68 class.

Technical Specifications

Interface	IP68 connector, RS-485, Modbus RTU protocol
Temperature(operation)	0~45℃
Temperature(storage)	-10~50℃
Power	12~24V DC
Power consumption	20~120mA@12V（Different sensors and wiper） <3mA@12V（Low power mode）
Leakage alarm	Support
Wiper	Support
Warranty	1 year, except for consumable material
IP rating	IP68, <10m
Materials	316L and POM
Diameter	Φ106x376mm
Flow rate	< 3 m/s
Accuracy, range and response time	Refer to the digital sensor spec
Lifetime*	Refer to the digital sensor spec
Maintenance and calibration frequency*	Refer to the digital sensor spec

Note: *Field life and calibration frequency dependent on site conditions.

Default: Baud rate: 9600 8N1, 32-bit IEEE 754 floating-point value(little-endian)

Register map

| Address	Length	Type	Access	Description
0x0009	4	Char	R	SN number. e.g. V1603021
0x000E	1	UShort	R/W	MODBUS address, default 0x01
0x0012	1	UShort	R/W	Baud rate 0-1200，1-4800，2-9600(default)，3-19200 4-38400，5-115200
0x0014	1	UShort	R	Sonde alarm Low byte: 0x02-Leakage alarm(inside humidity is over 50%) 0x80-Power voltage alarm (out of 8~26V) High byte 0x01-Node(port) 1 communication fail 0x02-Node(port) 2 communication fail 0x04-Node(port) 3 communication fail 0x08-Node(port) 4 communication fail 0x10-Node(port) 5communication fail 0x20-Node(port) 6 communication fail 0x40-wiper communication fail
0x0605	1	UShort	R/W	Float data format[1]。 0-DCBA，1-BADC，2-CDAB，3-ABCD（Default, little-endian）
0x0030	2	Float	R	Temperature, ℃
0x0032	2	Float	R	DO data（mg/L）
0x0034	2	Float	R	DO data（%）e.g. 0.72 is 72% Sat
0x0036	2	Float	R	Turbidity data, NTU
0x0038	2	Float	R	Conductivity data, mS/cm
0x003A	2	Float	R	Chlorophyll a data, ug/L
0x003C	2	Float	R	BGA data, ug/L
0x003E	2	Float	R	CDOM data, ppb or ug/L
0x0040	2	Float	R	OIW(oil in water) data, ppb or mg/L (reserved)
0x0042	2	Float	R	COD data, mg/L
0x0044	2	Float	R	TOC data, mg/L (calculated from COD)
0x0046	2	Float	R	SAC data, Abs/m
0x0048	2	Float	R	BOD data, mg/L(calculated from COD)
0x004A	2	Float	R	PH data
0x004C	2	Float	R	ORP data, mV
0x004E	2	Float	R	NH4+ data, mg/L
0x0050	2	Float	R	K+ data, mg/L
0x0052	2	Float	R	NH4-N data, mg/L(calculated from temperature, pH and NH4+)
0x0054	2	Float	R	NH3 data, mg/L(calculated from temperature, pH and NH4+)
0x0056	2	Float	R	Inside humidity data, e.g. 77.8 is 77.8%
0x0058	2	Float	R	Salinity, ppt(calculated from conductivity)
0x005A	2	Float	R	SS data, mg/L(calculated from turbidity)
0x005C	2	Float	R	Transparency data, unit: cm (calculated from turbidity)
0x0072	1	UShort	R	Sonde alarm, it is a mirror of 0x0014, it is as same as 0x0014
0x0073	1	UShort	R	Wiper alarm, default 0x00(no alarm), refer to sensor spec for details
0x0074	1	UShort	R	DO alarm, default 0x00(no alarm), refer to sensor spec for details
0x0075	1	UShort	R	Turbidity alarm, default 0x00(no alarm), refer to sensor spec for details

| Address	Length	Type	Access	Description
0x0076	1	UShort	R	Conductivity alarm, default 0x00(no alarm), refer to sensor spec for details
0x0077	1	UShort	R	Chlorophyll a alarm, , default 0x00(no alarm), refer to sensor spec for details
0x0078	1	UShort	R	BGA alarm, default 0x00(no alarm), refer to sensor spec for details
0x0079	1	UShort	R	CDOM alarm, default 0x00(no alarm), refer to sensor spec for details
0x007A	1	UShort	R	OIW alarm(reserved)
0x007B	1	UShort	R	COD alarm, default 0x00(no alarm), refer to sensor spec for details
0x007C	1	UShort	R	PH alarm, default 0x00(no alarm), refer to sensor spec for details
0x007D	1	UShort	R	NH4-N alarm, default 0x00(no alarm), refer to sensor spec for details
0x0088	2	Float	R/W	Temperature calibration slope, K(reserved, DO NOT ACCESS)
0x008A	2	Float	R/W	Temperature calibration offset, B(reserved, DO NOT ACCESS)
0x008C	2	Float	R/W	DO user calibration slope, K, default K=1.0
0x008E	2	Float	R/W	DO user calibration offset, B, default B=0
0x0090	2	Float	R/W	Turbidity user calibration slope, K, default K=1.0
0x0092	2	Float	R/W	Turbidity user calibration offset, B, default B=0
0x0094	2	Float	R/W	Conductivity user calibration slope, K, default K=1.0
0x0096	2	Float	R/W	Conductivity user calibration offset, B, default B=0
0x0098	2	Float	R/W	Chlorophyll user calibration slope, K, default K=1.0
0x009A	2	Float	R/W	Chlorophyll user calibration offset, B, default B=0
0x009C	2	Float	R/W	BGA user calibration slope, K, default K=1.0
0x009E	2	Float	R/W	BGA user calibration offset, B, default B=0
0x00A0	2	Float	R/W	CDOM user calibration slope, K, default K=1.0
0x00A2	2	Float	R/W	CDOM user calibration offset, B, default B=0
0x00A4	2	Float	R/W	OIW user calibration slope, K(reserved, DO NOT ACCESS)
0x00A6	2	Float	R/W	OIW user calibration offset, B(reserved, DO NOT ACCESS)
0x00A8	2	Float	R/W	COD user calibration slope, K, default K=1.0
0x00AA	2	Float	R/W	COD user calibration offset, B, default B=0
0x00AC	2	Float	R/W	PH user calibration slope, K, default K=1.0
0x00AE	2	Float	R/W	PH user calibration offset, B, default B=0
0x00B0	2	Float	R/W	ORP user calibration slope, K, default K=1.0
0x00B2	2	Float	R/W	ORP user calibration offset, B, default B=0
0x00B4	2	Float	R/W	NH4+ user calibration slope, K, default K=1.0
0x00B6	2	Float	R/W	NH4+ user calibration offset, B, default B=0
0x00B8	2	Float	R/W	K+ user calibration slope, K, default K=1.0
0x00BA	2	Float	R/W	K+ user calibration offset, B, default B=0
0x00BC	2	Float	R/W	NH4-N user calibration slope, K, default K=1.0
0x00BE	2	Float	R/W	ONH4-N user calibration offset, B, default B=0

Note:

1, Do not access the register which is not in this document.

Normal flow:

Power on->delay 50mS->read SN(optional)->delay 2S or longer->read sensor data(DO NOT use one frame to get data if they are in discontinuous address)-> delay 2s or longer-> read sensor data.

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Φ106.0

24.5

109.5

376.5

237.0

10.0
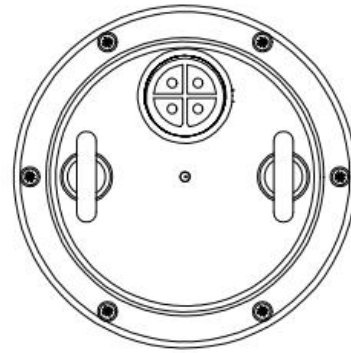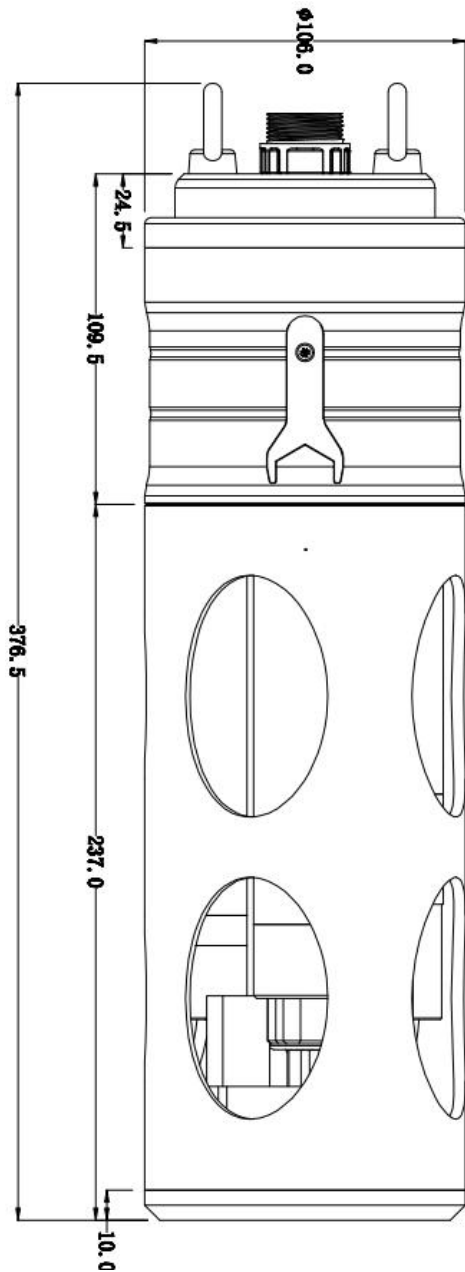
Note：
1, Unit: mm
2, Tolerance: +/-0.5mm
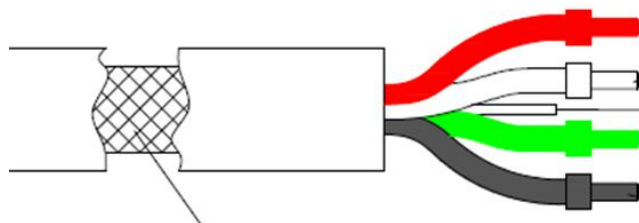
Red--VCC

White--RS485-B

Bare—Shielding

Green--RS485-A

Black--GND

Sensor	Principle	Parameter	Range	Accuracy	Resolution
pH/ORP/K+/NH4 3 in 1 combo sensor PN: 620911	Electrode	pH ORP NH$_4$-N K+	pH 0-14 ORP -999~+999mV NH$_4$-N 0.5-1000mg/L K+ 0.5-1000mg/L	0.2pH +/-20mV 5%FS 5%FS	0.01pH 0.1mV 0.01mg/L 0.01mg/L
UV254 COD PN: 610812	UV absorption 254nm 550nm	UV254 COD	0.15-300mg/L(KHP)	R^2>0.999 5%FS	0.01mg/L
Optical DO PN: 610114 PN: 610115	Fluorescence	Dissolved Oxygen Temperature	0-20mg/L or 0-200% Saturation 0-45℃	0.3mg/L 0.3℃	0.01mg/L 0.1% Sat. 0.01℃
Conductivity PN: 630313 PN: 630314	4-electrodes Nickel + PEEK or Titanium + PEEK cell	Conductivity Temperature Salinity TDS	1uS/cm-100mS/cm 0-70ppt 0-50℃	1%FS 0.2℃	0.0001mS/cm 0.01℃
Turbidity PN: 610211 PN: 610211-1 PN: 610211-2	90°scattering	Turbidity Suspended solid Transparency	0.3-100NTU 0.3-1000NTU 1.0-4000NTU 0-2000mg/L 2-100cm	3%FS	0.01NTU
Chlorophyll a PN: 610511	Fluorescence	Chlorophyll a	0.15-400ug/L	R^2>0.999	0.01ug/L
BGA PN: 610611	Fluorescence	Blue-green Algae Phycocyanin	0.15-100ug/L or 0-100RFU	R^2>0.999	0.01ug/L
CDOM/fDOM PN: 611011	Fluorescence UV360 source	Chromophoric Dissolved Organic Matter	0.15-300ppb QSU	R^2>0.999	0.01ppb
pH/ORP PN: 620413-P PN: 620413-O	Electrode	pH ORP	pH 0-14 ORP -999~+999mV	0.2pH +/-20mV	0.01pH 0.1mV
Digital Wiper PN: 741621	Gear motor	NA	Master or Slave Mode configurable	NA	NA
BSM-2 Sonde PN: 941621	Multi-parameter Sensor platform , uCOS OS	Refer to Sensor Spec	Refer to Sensor Spec	Refer to Sensor Spec	Refer to Sensor Spec

Sensor	Clean frequency*	Clean frequency**	Check inside humidity	Replace O-ring	Calibration frequency	Replace consumable part
Optical DO	1-4 days	4-8 weeks	6 months	12-24 months	6 months	24-36 months
Conductivity	4-8 weeks	4-8 weeks	6 months	12-24 months	6 months	No consumable part
Turbidity	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Chlorophyll a	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
BGA	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
NH4-N	0.5-3 days	4-8 weeks	6 months	12-24 months	2-3 weeks	3-6 months
pH	0.5-3 days	4-8 weeks	6 months	12-24 months	4-8 weeks	6-12 months
UV254 COD	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Oil in water	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
CDOM/fDOM	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Wiper	4-8 weeks	4-8 weeks	NA	18 months	NA	18 months***

Note:
1, * is without wiper system
2, ** is with wiper system.
3, *** are dynamic sealing parts
4, The O-ring between sensor and wiper is required to replace every 12 months.

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Order info:
PN 941621 BSM-2 sonde body
PN 741621 Digital wiper
PN 810001-xx PUR cable
        xx is cable length, unit is meter
Sensor PN refer to page 6