ATRONIA
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DATASHEET

SENSBLUE
GATEWAY
# MONARCH

## Rugged.
## Reliable.
## Ready for any environment.

SENSBLUE MONARCH was designed for remote monitoring in demanding and harsh installation locations.

# Datasheet Index

## 2. Features

**Built for the Wild. Engineered for Industry.**

Remote monitoring is often required in the most unforgiving places. SENSBLUE MONARCH was explicitly designed for demanding and harsh installation locations where standard equipment often fails.

**True efficiency isn't about doing less. It's about timing.**

Engineered to master the balance between granular monitoring and energy conservation.
If values are not within range, it will send the data as soon as possible so you can act on time. It is autonomy, redefined.

### 2.1 Table of SENSBLUE MONARCH Reference ID Model Number

| | Solar Panel | Probe Connectors | External LTE Antenna |
|---|---|---|---|
| PA000000076 | x | x1 | - |
| PA000000079 | x | x2 | - |
| PA000000080 | x | x1 | x |
| PA000000074 | x | x2 | x |
| PA000000081 | - | x1 | - |
| PA000000082 | - | x2 | - |
| PA000000083 | - | x1 | x |
| PA000000084 | - | x2 | x |

## 3. General Description

SENSBLUE MONARCH is a multifunctional embedded system designed for industrial and remote monitoring applications.

It integrates a wide range of communication interfaces, sensor inputs, and control outputs, making it suitable for IoT, telemetry, and simple automation solutions. Powered by a solar panel and internal battery for remote, demanding and harsh installation locations, or, alternatively, by an external power supply.

### 3.1 Main Features

- Integrated Solar Panel (in specific model versions)
- Internal 18650 lithium-ion Battery
- RS485 Interface
- ESP32-WROOM-32E Microcontroller
- Internal USB-C for charging
- Internal Sensors (Humidity, Barometric Pressure and Temperature)
- Human-Machine Interface (RGB LEDs, push-button)
- FOTA (Firmware Over the Air Update)

### 3.2 Technical Specifications

| Parameter | Value |
|---|---|
| Microcontroller | ESP32-WROOM-32E |
| Communication Interfaces | RS485, GSM (2G, LTE-M), Wi-Fi |
| Power Supply | - (Li-Ion 18650) Internal battery + Solar panel<br>- 12-24V External power |
| Protections | Transient Voltage Protection, ESD Protection, Reverse Polarity Protection |
| Connectors | USB-C, standard headers, Male, Female *PA dependable |
| Operating Temperature / Humidity Range | -20 ~ 60 ºC 95% HR Non-condensing |
| Enclosure and lid material | Polycarbonate |

## 4. Communication Interfaces

SENSBLUE MONARCH supports the following communication interfaces:

| RS485 | |
|---|---|
| local 12V DC/DC boost converter (max100mA) | |
| **Wi-Fi** | |
| 2.4 GHz Wi-Fi 802.11 b/g/n with HT20 / HT40 | |
| Centre frequency range of operating channel: 2412 ~ 2484 MHz | |
| **GSM - Quectel BG95-M3:** | |
| Cat M1 | B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/ |
| | B25/B26/B27/B28/B66/B85 |
| Cat NB2 | B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/ |
| | B25/B28/B66/B71/B85 |
| EGPRS | GSM850/EGSM900/DCS1800/PCS1900 |
| LTE Bands Power Class | Power Class 5 (21 dBm) |
| **HMI** | |
| RGB LEDs | |
| Internal OLED Display 0.96” | |
| Push-button, Reset-button | |

**Led behaviour**

| Colour | | Meaning | Description | |
|---|---|---|---|---|
| | Cyan | Normal Operation | The device is starting up. | |
| | | | Sensors are being initialized or read. | |
| | | | The system is operating normally. | |
| | Blue | Connectivity | The device is connecting to the network (GSM or Wi-Fi). | |
| | | | The device is communicating with the server. | |
| | | | A periodic blue blink means the device is waiting for network access. | |
| | Green | Success | Data is being transmitted. | |
| | | | A short green blink indicates each data transmission. | |
| | | | A steady green light means the communication was completed successfully. | |
| | Orange | Warning | Data was sent but no confirmation was received. | |
| | | | A temporary or partial communication issue occurred. | |
| | Red | Error | Blinking patterns indicate different types of errors: | 1 blink: Communication error |
| | | | | 2 blinks: SIM card error |
| | | | | 3 blinks: Network or configuration error |

## 5. RSSI levels, valid for Wi-Fi and LTE:

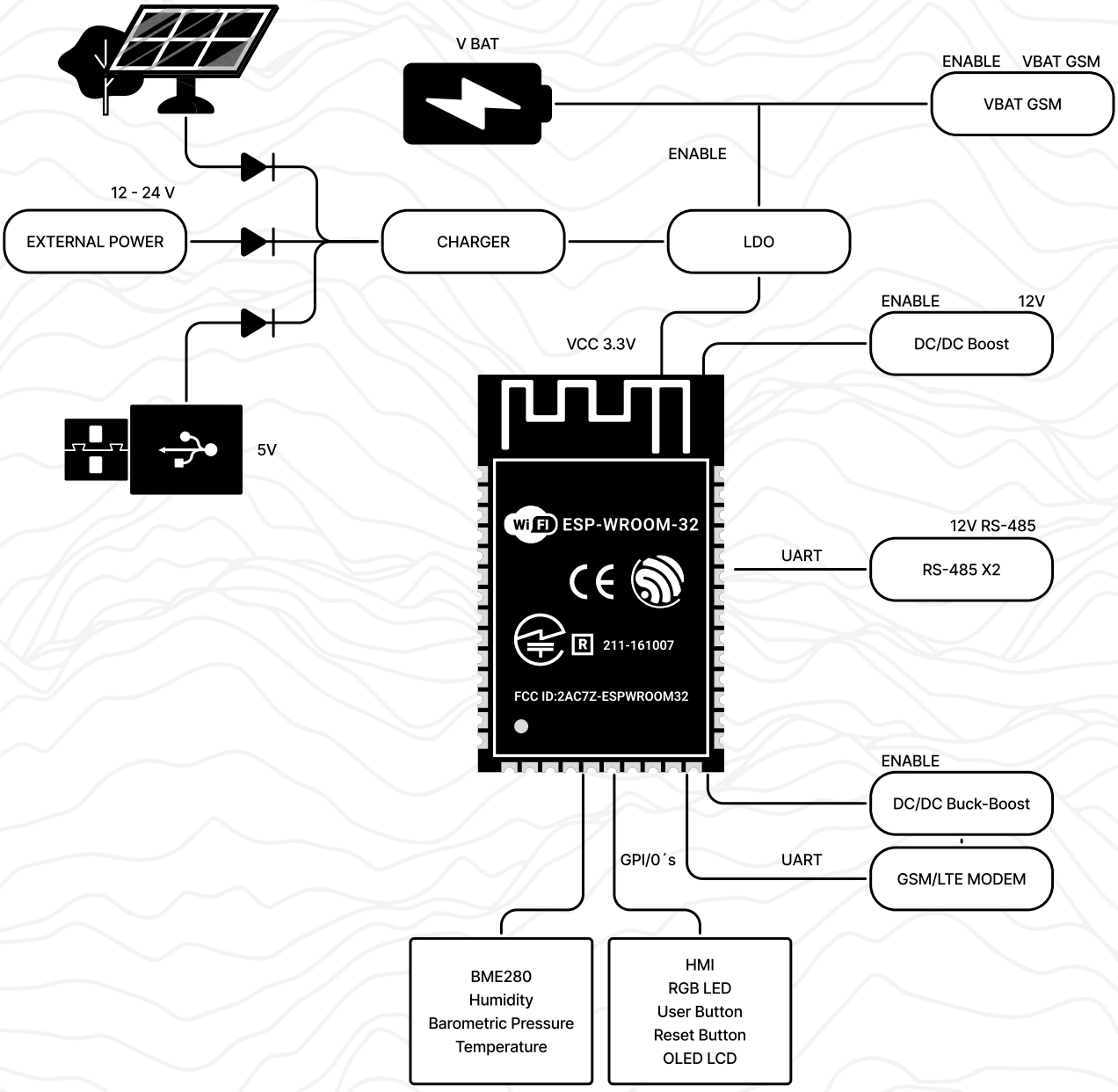
| | |
|---|---|
| **Excellent** | From 0 to -51 dBm |
| **Good** | From −52 to −64 dBm |
| **Medium** | From −65 to −94 dBm |
| **Poor** | From −95 to −125 dBm |

## 6. Power Supply

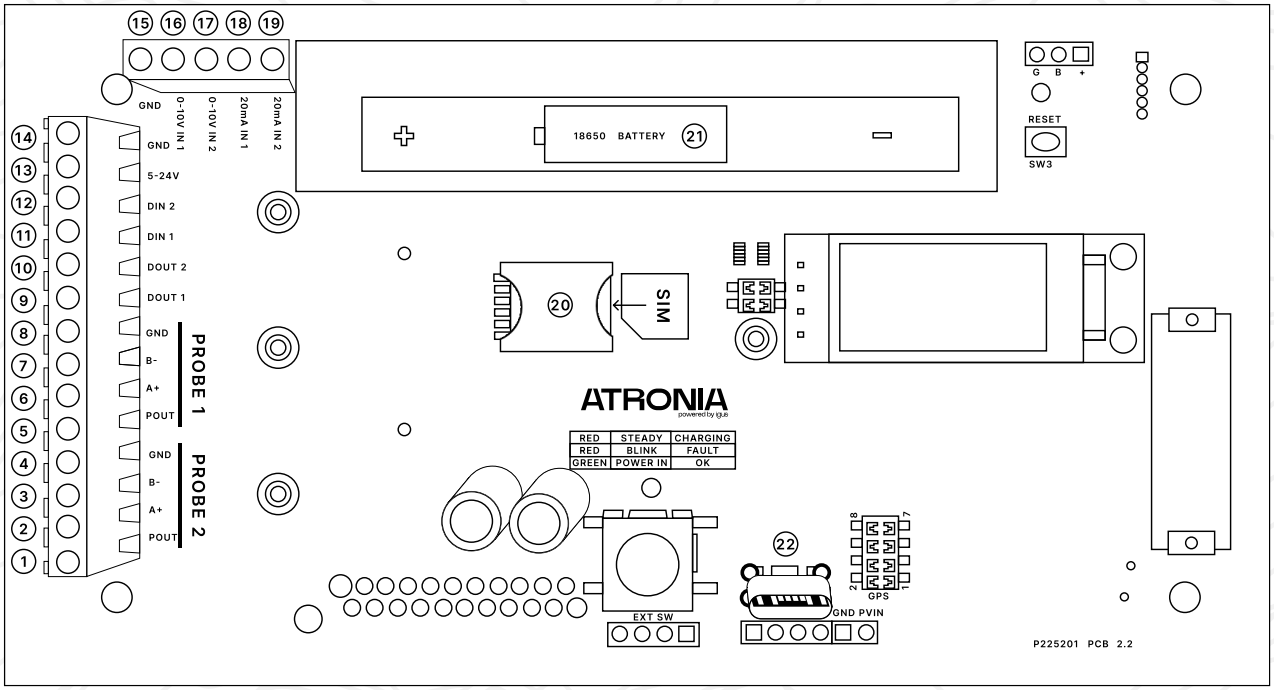
Multiple power inputs characteristics

| | | |
|---|---|---|
| **External DC/DC Power Supply** | 12 – 24VDC | |
| **Battery Input** | 4.2V Battery Li-Ion 18650 | |
| | 2900mAh | |
| | Working Temperature | Charge: -20ºC ~ 60ºC |
| | | Discharge: -40ºC ~ 85ºC |
| | On-board measurement | Range: 0–100% |
| | | Resolution: 1% |
| **USB** | Type C connector | |
| | 5V only | |
| **Solar panel** | For charging internal battery only | |

## 7. Hardware Block Diagram



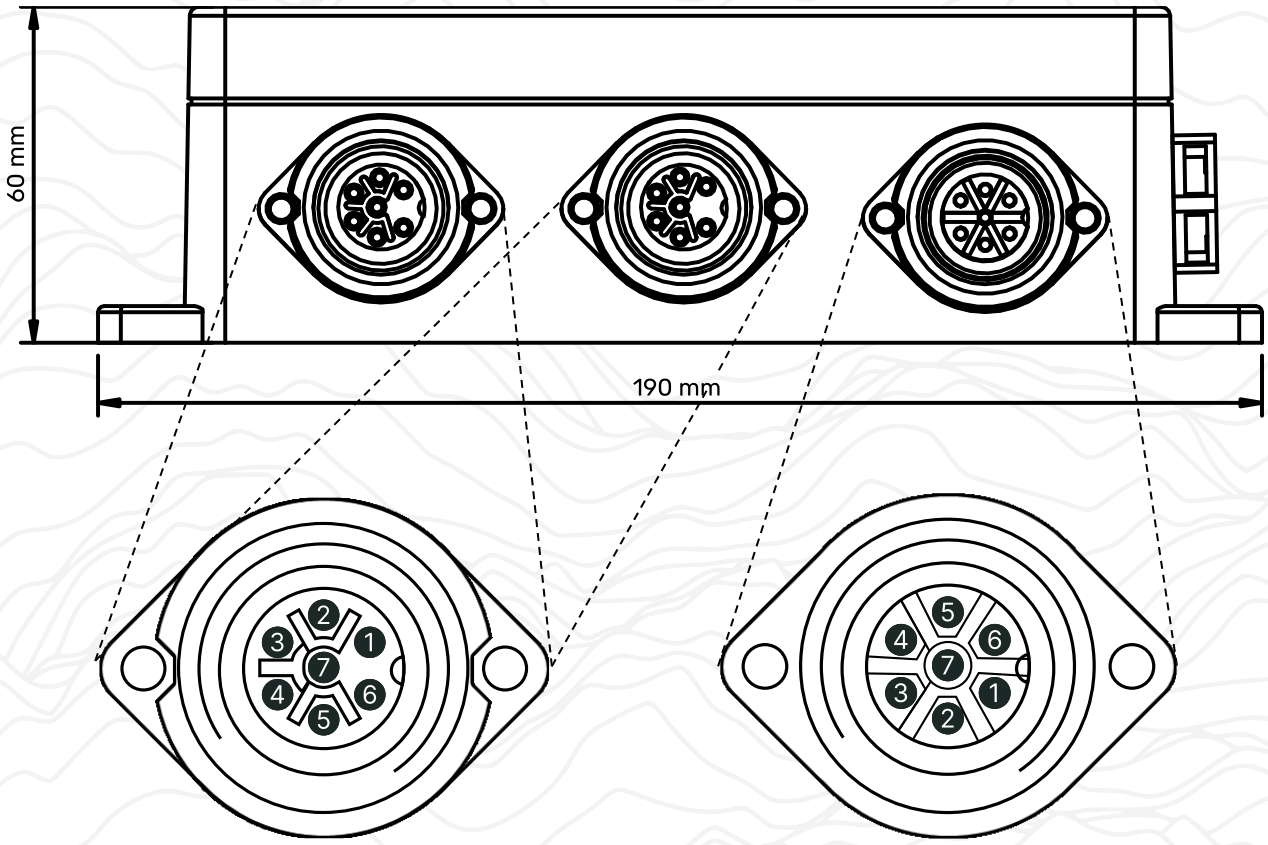
## 8. Internal Pinout Diagram




| | | | |
|---|---|---|---|
| 1 | 12V Sensor power Out | 12 | ASP (Application-Specific Port) |
| 2 | RS485 A+ | 13 | 5-24V External Power Supply |
| 3 | RS485 B- | 14 | GND |
| 4 | GND | 15 | GND |
| 5 | Same as 1 | 16 | ASP (Application-Specific Port) |
| 6 | Same as 2 | 17 | ASP (Application-Specific Port) |
| 7 | Same as 3 | 18 | ASP (Application-Specific Port) |
| 8 | Same as 4 | 19 | ASP (Application-Specific Port) |
| 9 | ASP (Application-Specific Port) | 20 | Nano Sim Holder |
| 10 | ASP (Application-Specific Port) | 21 | 18650 Battery |
| 11 | ASP (Application-Specific Port) | 22 | Type C USB connector |

## 9. External Connectors Electrical Pinout Diagram & Mechanical Dimensions (mm)

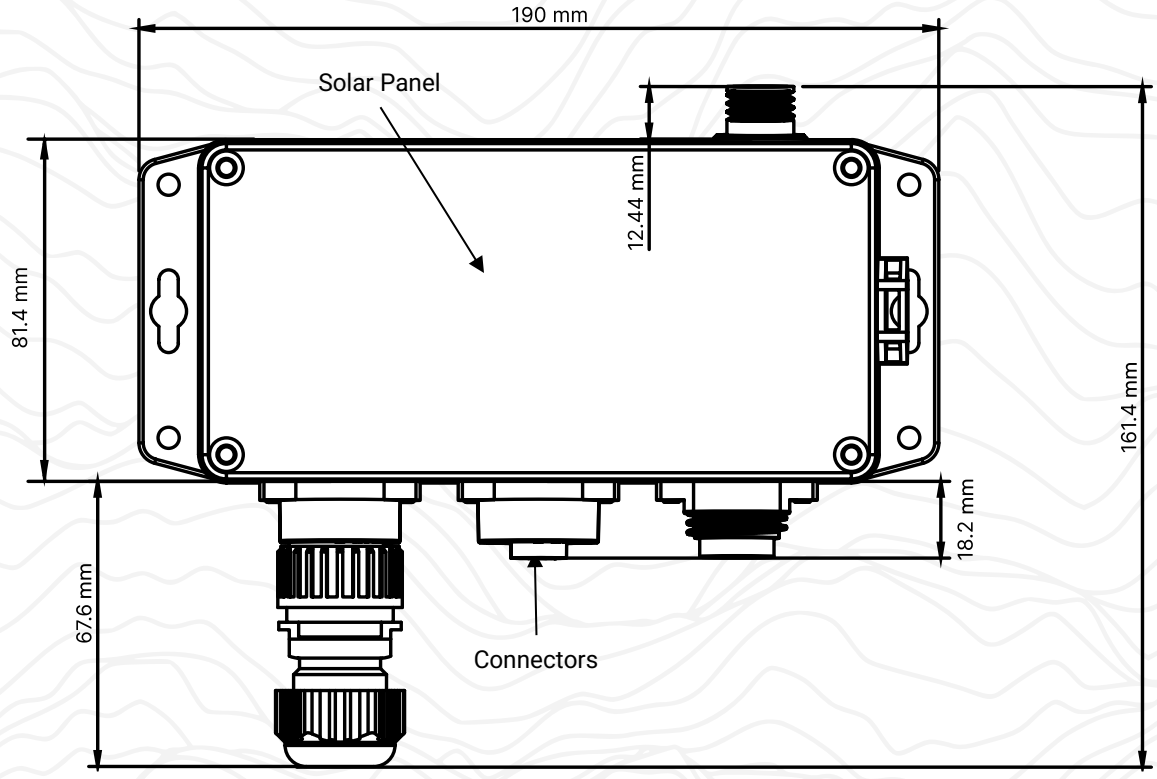
**PA000000074 Side View**



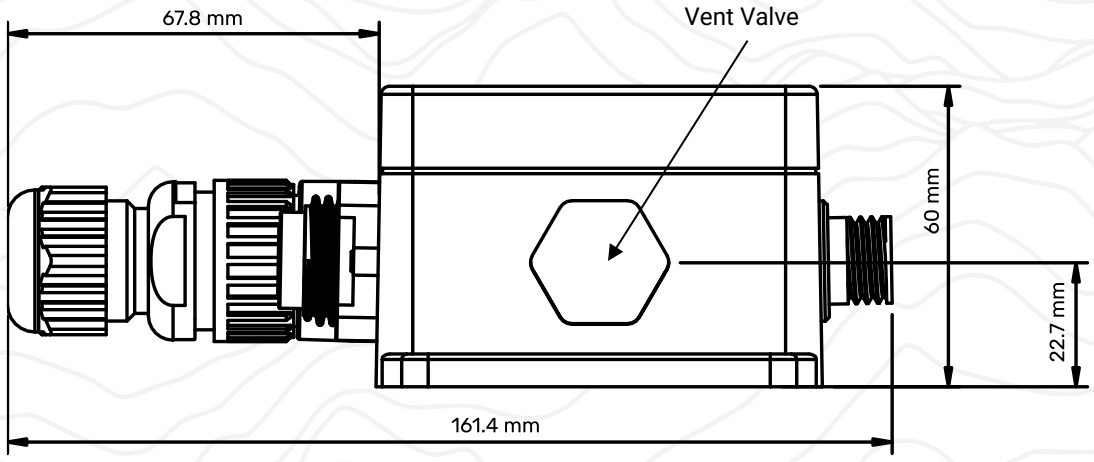

| Left/Centre Connector |
|---|
| CA6GD Female 7-pin (6+PE) IP67 HIRSCHMANN<br>Pinout: |
| 1 - 12V Sensor power Out |
| 2 - GND |
| 3 - RS485 A+ |
| 4 - RS485 B- |
| 5 - NA |
| 6 - External power supply (12V-24V) |
| 7 - NA |

| Right Connector |
|---|
| CA6GS Male 7-pin (6+PE) IP67 HIRSCHMANN<br>Pinout: |
| 1 - External Power Supply (12V-24V) |
| 2 - GND |
| 3 - NA |
| 4 - NA |
| 5 - RS485 B- |
| 6 - RS485 A+ |
| 7 - 12V Sensor power Out |

### PA000000074 Top View




### PA000000074 Front View




| European Directives |
|---|
| Directive 2014/53/EU (RED) |
| Directive 2014/30/EU (EMC) |
| Directive 2011/65/EU (RoHS) |

| Applicable harmonized standards |
|---|
| EN 61326-1 |
| EN 62368-1 |
| ETSI EN 301 489-1 / -17 / -52 |
| ETSI EN 300 328 |
| ETSI EN 301 908-1 / -13 |

## 10. Probes

| | Name | Firmware v. | Requirements |
|---|---|---|---|
| PA000000085 | SENSBLUE RS-485 Dissolved Oxygen Probe AT-SB-PROBE-DO-T-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000066 | SENSBLUE RS-485 Turbidity Probe AT-SB-PROBE-T-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000067 | SENSBLUE RS-485 pH Probe AT-SB-PROBE-pH-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000086 | SENSBLUE RS-485 Low Conductivity Probe AT-SB-PROBE-LC-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000087 | SENSBLUE RS-485 Medium Conductivity Probe AT-SB-PROBE-MC-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000068 | SENSBLUE RS-485 High Conductivity Probe AT-SB-PROBE-HC-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000069 | SENSBLUE RS-485 Nitrates (NO3) Probe AT-SB-PROBE-NO3-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000088 | SENSBLUE RS-485 ORP Probe AT-SB-PROBE-ORP-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000089 | SENSBLUE RS-485 Salinity/Conductivity/TDS Probe AT-SB-PROBE-S-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000090 | SENSBLUE RS-485 Ammonia Nitrogen (NH4-N) Sensor Probe AT-SB-PROBE-NH4-P-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000091 | SENSBLUE RS-485 Dissolved CO2 Sensor Probe AT-SB-PROBE-CO2-P-5000-C1, w/ 15m cable w/connector | 10.70 | |
| PA000000073 | SENSBLUE RS-485 Multiparameter Probe AT-SB-PROBE-MP-P-C1, w/ 15m cable w/connector | 10,71 | |

## 11. Accessories

| | Name | Requirements |
|---|---|---|
| PA000000020 | SENSBLUE MONARCH RS485 Probe Splitter Box (1 input -> 2 outputs) | |
| PA000000046 | SENSBLUE MONARCH Power Supply (EU) 230VAC/12V@1A CA6LD | |
| PA000000092 | SENSBLUE MONARCH External Solar Panel 60W W/ Battery LiFePO4 12v 20Ah | |
| MP000000428 | SENSBLUE IoT Data Card 500MB | |
| MP000000431 | N-Type Antenna Cable 1m Male to Male | |
| MP000000432 | N-Type Antenna Cable 1m Male to Female | |
| MP000000429 | Straight N-Type Outdoor Antenna | |
| MP000000430 | Panel Mount Cellular N Type Antenna | |

## 12. Document History

| Version | Description | Date |
|---|---|---|
| SBMDATA v1.0 | First version of SENSBLUE MONARCH Datasheet | 16/02/2026 |

# MONARCH in-the-field

# SENSBLUE MONARCH

## DATASHEET

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