Siemex

DATASHEET
Doc. DS-0000 · Rev. A

KEY FIGURES

–1 to 15 pH
Measuring range pH

4 to 20 mA
Analog output, 2-wire transmitter

1000 m
Cable length, digital operation

IP67
Protection type

SCOPE OF APPLICATION

- Aquaculture and fish farming
- Sea research and aquariums
- Water and waste water
- Food and beverages
- Chemistry
- Power stations
- Environmental monitoring
- Further applications of industrial liquid analysis

Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

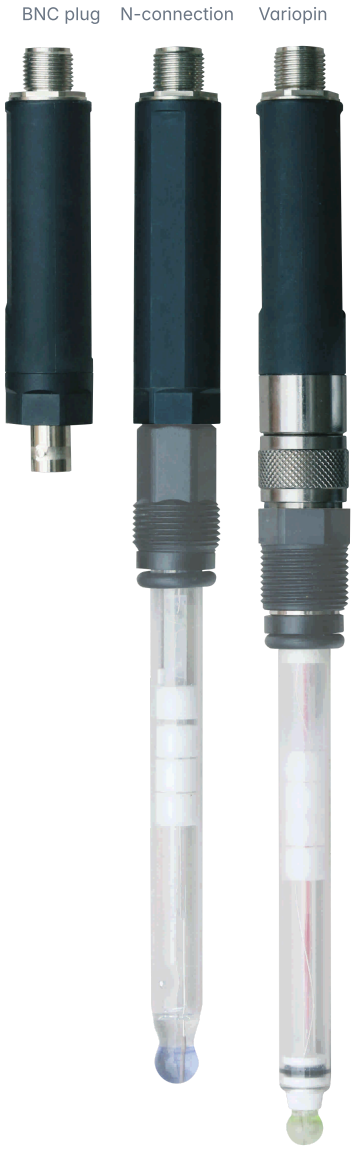
aquastar MT pH/ORP/T

Intelligent Electronics with Digital and Analog Interface for pH, Redox and Temperature Sensors

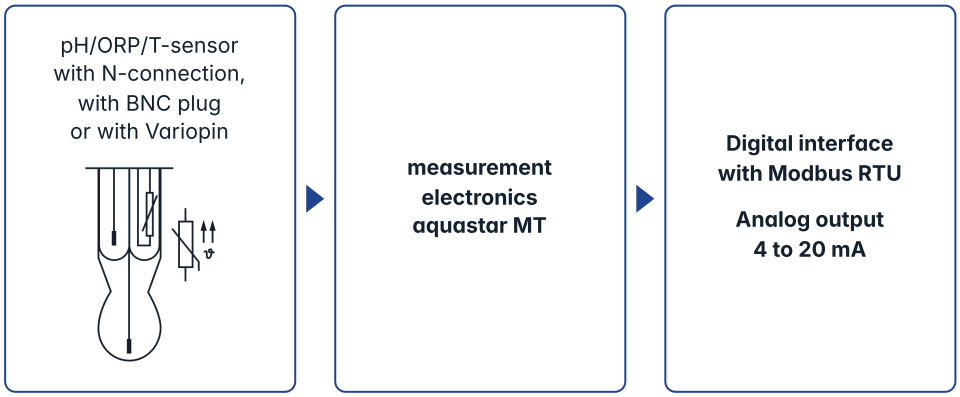
Description

The measurement electronics aquastar MT pH/ORP/ enable the transmission of measured values from the sensor to the measuring or automation device via digital bus communication or as analog signal. The connection is made via an M12 plug connector. For the digital connection to the systems aquastar mobile or aquastar V3 the plug & play support is used. Several sensors transmit their measured data continuously to a master device by the sensor bus.

Alternatively the analog interface can be used as well. It is designed as 2-wire transmitter with analog output and transmits the measured data as scalable standard signal (4 to 20 mA).



Block Diagram



Siemex

DATASHEET
Doc. DS-0000 · Rev. A

aquastar MT pH/ORP/T

Measurement electronics aquastar MT

CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 Dimensions

Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

Device Setup



1. Sensor with Variopin connection
2. Variopin connection of the measurement electronics aquastar MT
3. Measurement electronics aquastar MT
4. 5-pole M12 plug connector
5. Sensor with N-connection
6. N-connection of the measurement electronics aquastar MT
7. Measurement electronics aquastar MT
8. 5-pole M12 plug connector



Assembly and Conncetion

The measurement electronics is available with N-connection or BNC-plug for commercially available pH/redox sensors with Variopin conncetion for sensors with integrated temperature probe and is simply put on top of the sensor and screwed tight. If it is necessary to replace the sensor because of defect or wear, the measurement electronics can be unscrewed and used again on the new sensor. The threaded connncetion between electronics and sensor guarantees protection type IP66 and IP67 to avoid mulfunctions by ingress of moisture. The electrical connection on the instrument side is established easily by plugging in and screwing on a preassembled bus cable.

Advantages

Digital Interface

The digital interface is the heart of the measurement electronics. This interface handles communcation over the bus communication. The plug & play support of the measurement electronics - when connected to the systems aquastar mobile and aquastar V3 - simplifies the sensor startup considerably. After connection to the aquastar mobile or the aquasatar V3 respectively the measurement electronics get configured automatically and start working immediately. The measurement electronics can also be configured and calibrated on a PC per software.

Profit from the Connection Opportunities

As device manufacturer or plant designer you can simply connect these electronics to your control via RS485-interface with Modbus protocol or analog via 4-20mA. An extensive description of the Modbus commands is available on request.

Analog Output

Analog output for operation as 2-wire transmitter. The analog output provides the pH/redox measured value or the measuremed value of the temperature input as freely scalable standard signal of 4 to 20 mA.

Cable Length up to 1000m for Maximum Freedom of Planning

In case of digital operation the cable from the sensor to the measuring device can be up to 1000m long. Up to now maximum cable lengths of 10m were recommended for pH and redox sensors.

Safe Transmission of the Measured Values via the Digital Sensor Bus

Simple and time saving bus cabling with readily assembled wires and safe digital data transmission.

Siemex

DATASHEET
Doc. DS-0000 · Rev. A

aquastar MT pH/ORP/T

Measurement electronics aquastar MT

CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 Dimensions

Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

Advantages (continued)

Sensor Monitoring for More Operational Safety

The measurement electronics can recognise a break of glass, a break of cable or a dirty glass mebrane of a pH/ORP electrode and provide this information to a master.

Saving Costs

You can save costs when replacing a sensor by taking over the measurement electronics to the new sensor.

Flexible Calibration

The calibration of the sensor can be done on an aquastar mobile, a PC or another compatible device. The calibration data are strored in the measurement electronics. So the sensor calibration can be done before the commissioning and the sensor later only has to be mounted on the system with its electronics. In case of a required sensor exchange the downtime of the system is reduced to a minimum by this.

Calibration Timer

The measurement electronics have a calibration timer which is able to trigger a reminder for the due sensor calibration on a master device after a set calibration interval has lapsed. The setting of the calibration interval can be done, e.g. via the configuration menu of the aquastar mobile. At each sensor calibration the calibration interval is restarted.

Calibration Logbook

The measurement electronics contain a calibration logbook in which the last 10 calibration operations are saved with date, time and calibration values. It provides an overview over the calibration history oft he sensor. The calibration logbook can either be read-out on an aquastar mobile or another compatible devivce.

Hour Counter

The implemented hour counter indicates the operating hours since first start-up during the production of the measurement electronics.

Temperature Compensation

The temperature compensation is done by the measurement electronics. By using a pH sensor with integrated temperature probe (Pt 1000) the electronics can get the compensation temperature directly from the sensor. Alternatively the compensation temperature can be transmitted from a master device (e.g. aquastar mobile or aquastar V3) or a fixed temperature can be specified in the configuration of the measurement electronics.

Technical Data

Digital interface RS485 Modbus RTU

Protocol	Modbus RTU
Device address	1 to 247
Data formats[a]	8 - 1 - no parity 8 - 2 - no parity 8 - 1 - odd parity 8 - 1 - even parity
Baud rates RS485	9600 Baud 19200 Baud 38400 Baud 57600 Baud 115200 Baud
Minimal response time	0 to 500 ms

[a]Specification in useful bit – stop bit – parity format.

Siemex

DATASHEET
Doc. DS-0000 · Rev. A

aquastar MT pH/ORP/T

Measurement electronics aquastar MT

CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 Dimensions

Analog Inputs (Sensor Connection Side)

INPUT	MEASURING RANGE	CONNECTION TYPE	MEASURING ACCURACY TYP. AT 25°C	AMBIENT TEMPERATURE INFLUENCE
pH	–1 to 15 pH		< 1 mV bei pH 7 < 5 mV MB[b]	0,3 %/10 K
Redox	–500 to +1700 mV		< 1 mV bei 1200 mV < 5 mV MB[b]	0,3 %/10 K
Temperature[c]	–10 to +100°C	Pt1000 in 2-wire electrical circuit	±0,2 °C	≤ 100 ppm/K

[b] MR: Measuring range span

[c] Temperature input (for temperature compensation) only available for version with VP-plug connection and version MT/T.

Analog Output 4 to 20 mA

Signal range	4 to 20 mA
Voltage supply	DC 11,5 to 30 V
Maximum load resistance (12 V and more)	R_b = 100 Ω + 33 Ω (U_b - 12 V)[d]
Accuracy	typ @ 25 °C ±0,04 mA

[d] R_b: Load resistance, U_b: Supply voltage

Electrical Data

Supply voltage	SELV or PELV (must be rated as SELV or PELV)
Digital operation	DC 4,8 to 30 V
2-wire-transmitter mode (analog output of 4-20 mA)	DC 11,5 to 30 V
Power/current consumption	
Digital operation at sensor bus	50 mW / 10 mA (bei 5 V) 40 mW / 3,33 MA (bei 12 V)
2-wire-transmitter mode (analog output of 4-20 mA)	270 mW / 22 mA (bei 12 V) 530 mW / 22 mA (bei 24 V) 660 mW / 22 mA (bei 30 V)
Electromagnetic compatibility (EMC)	DIN EN 61326-1
Interference emission	Class B
Interference immunity	Industrial requirements
Protection rating	Protection rating III

Case

Ambient temperature	–10 to +60 °C
Storage temperature	–10 to +85 °C
Resistance to climatic conditions	Relative humidity < 92 % annual average no condensation
Protection type	IP66 (not with BNC-connection) and IP67

Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

Siemex

DATASHEET
Doc. DS-0000 · Rev. A

aquastar MT pH/ORP/T

Measurement electronics aquastar MT

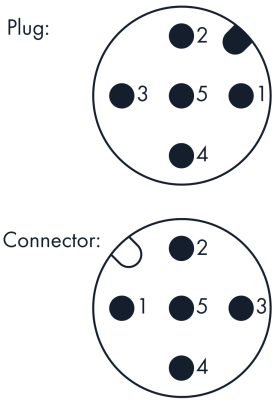
CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 Dimensions

Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

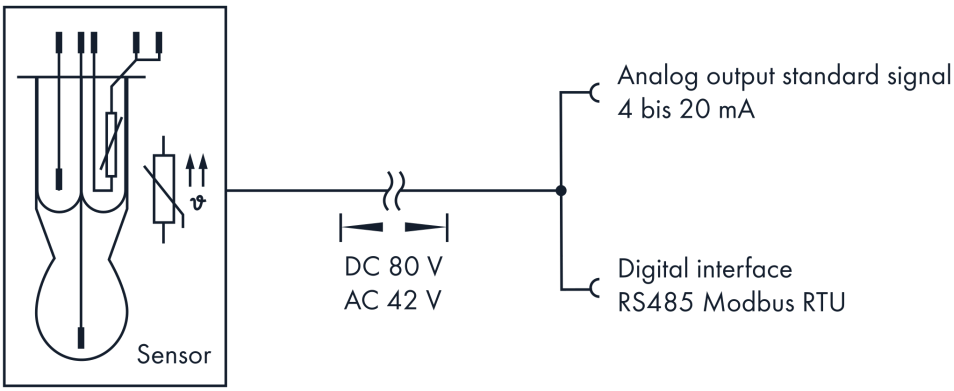
Connection Diagram

5-pole M12 plug connection, A-coded



PIN	POTENTIAL
1	VCC alternatively
2	VCC (4 – 20 mA loop) 4,5 to 30 V
3	GND (4 – 20 mA loop)
4	RS485 B (RxD/TxD–)
5	RS485 A (RxD/TxD+)

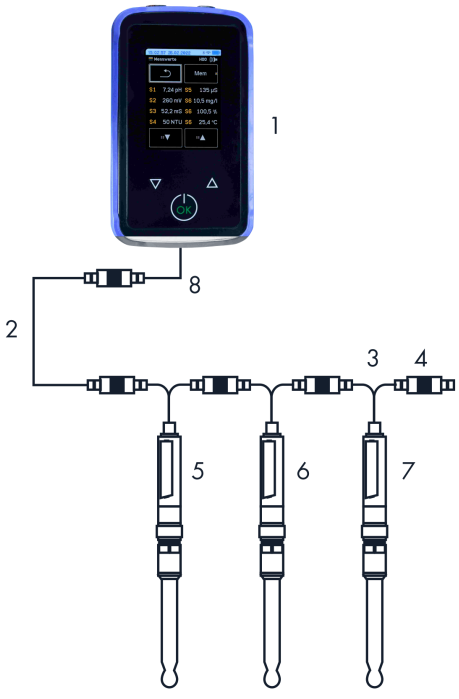
Galvanic Isolation



Connection Examples

Wiring Example of Digital Sensor Bus Connection

Displayed ist he digital connection of three sensors for pH, conductivity and dissolved oxygen to the mobile measuring device aquastar mobile. The three sensors are conncted via wye junctions.



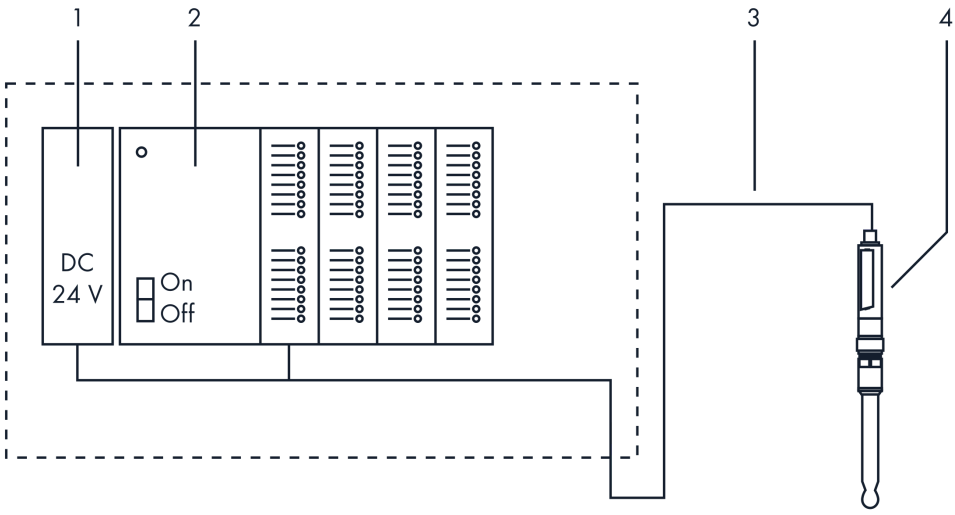
CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 Dimensions

Wiring Example of Analog Connection

Wiring Diagram 2-Way-Transmitter Mode (Standard Signal 4 to 20 mA)

Displayed is the analog connection of a sensor to a measuring or automation device as 2-wire transmitter with standard signal 4 to 20 mA.



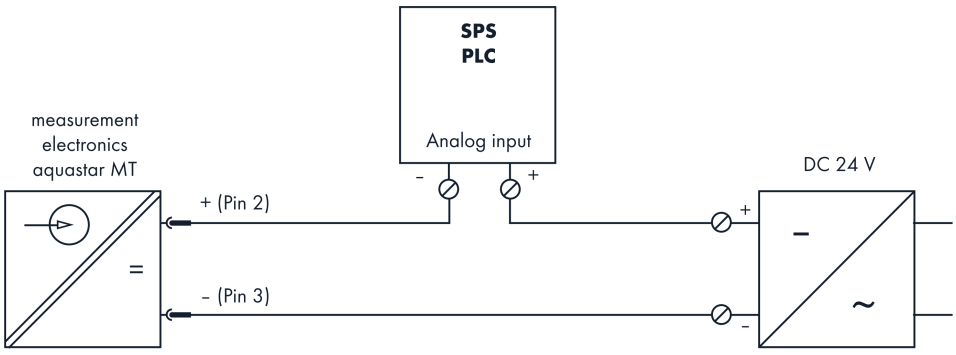
1: stabilised power supply unit with DC 24 V-output for feeding the automation system, the current loop (standard signal 4 to 20 mA) and the measurement electronics

2: measure or automation device with analog input for standard signal 4 to 20 mA; the current loop of the standard signal must be made by a stabilised power supply unit with an output voltage of DC 12 to 30 V.

3: sensor with measurement electronics

4: customer-provided conncetion cable with 5-pole M12 cable connector for connecting to the measurement electronics. For the connector assignment refer to the wiring diagram in the following.

Wiring Diagram 2-Way-Transmitter Mode



Siemex
+45 00 00 00 00
mal@siemex.tech
Siemex.tech

Siemex

DATASHEET
Doc. DS-0000 · Rev. A

aquastar MT pH/ORP/T

Measurement electronics aquastar MT

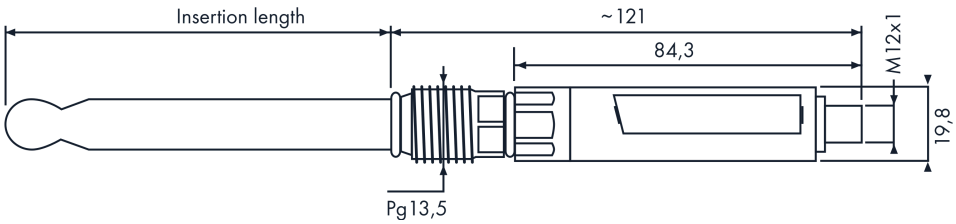
CONTENTS

1 Overview & Block Diagram
2 Device Setup
3 Advantages
4 Technical Data
5 Connection & Galvanic Isolation
6 Wiring Examples
7 **Dimensions**

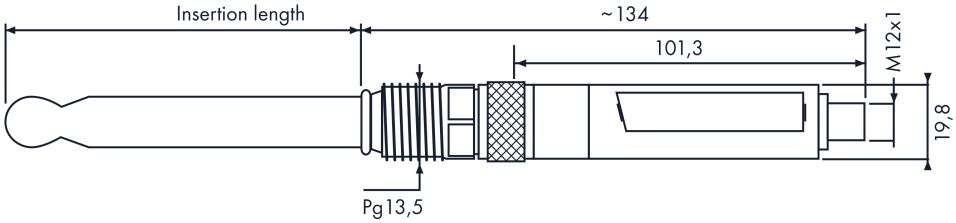
Dimensions

The following dimensioned drawings give the dimensions of sensors with measurement electronics. The insertion length varies and depends on the type of sensor to which the measurement electronics are connected.

Dimensions of Sensor with Measurement Electronics and Variopin Connection



Dimensions of Sensor with Measurement Electronics and N-Connection.



Made in Germany

Siemex

Siemex
Address 00, 0000 City
CVR 00 00 00 00

Sales +45 00 00 00 00
Support +45 00 00 00 00

mal@siemex.tech
Siemex.tech

All information in this datasheet is for guidance only and subject to change without notice. Siemex accepts no liability for errors or omissions.