

# JUMO ecoLine NTU

## Optical Sensor for Turbidity Measurements

### Brief description

The turbidity measurement according to DIN EN ISO 7027 is a tried and tested method for monitoring waters with low to strong turbidity.

The measuring principle of the JUMO ecoLine NTU turbidity sensor is based on an infrared light measurement according to the 90 ° scattered light method. Thanks to the light measurement at a wavelength of 880 nm and the wide measuring range of 0 to 4,000 NTU, the sensor can be used in an array of water and wastewater treatment applications, e.g. for monitoring the water quality, detecting filter leaks, and for wastewater final inspection.

The JUMO ecoLine NTU stores its calibration data and history directly in the sensor electronics, meaning that it can be used quickly anywhere without the need for constant recalibration.

The sensor is characterized by its slim and robust design.

Suitable fittings are required for the installation of the sensor, e.g. in order to prevent the influence of extraneous light and the resulting measurement errors. For the corresponding immersion, suspended, and flow fittings that are available, see Chapter "Accessories", page 5.

The robust, simple sensor is particularly well-suited to the following areas of application:

- Drinking water treatment
- Water protection
- Fish farming companies
- Municipal and industrial sewage treatment plants
- Process plants
- Paper industry



Type 202670/...

## Technical data

### Specifications

|                                        |                                                                                                                                                                                                                                                        |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring principle                    | Optical, nephelometric turbidity measurement with 90 ° scattered light according to DIN EN ISO 7027                                                                                                                                                    |
| Measurands                             | Turbidity<br>Temperature                                                                                                                                                                                                                               |
| Measuring ranges                       | 0 to 4,000 NTU in a choice of 4 measuring ranges as well as automatic measuring range detection: <ul style="list-style-type: none"> <li>• 0.00 to 50.00 NTU</li> <li>• 0.0 to 200.0 NTU</li> <li>• 0 to 1,000 NTU</li> <li>• 0 to 4,000 NTU</li> </ul> |
| Resolution                             | 0.01 to 1, depending on measuring range                                                                                                                                                                                                                |
| Accuracy                               | < 5 % from NTU measured value                                                                                                                                                                                                                          |
| Max. sampling rate for measured values | 1 Hz                                                                                                                                                                                                                                                   |
| Temperature range                      | 0 to +50 °C                                                                                                                                                                                                                                            |
| Pressure range                         | Up to 5 bar                                                                                                                                                                                                                                            |
| Storage temperature                    | -10 to +60 °C                                                                                                                                                                                                                                          |

### Interfaces

|                  |                                                       |
|------------------|-------------------------------------------------------|
| Signal interface | RS485 interface with Modbus RTU protocol <sup>a</sup> |
|------------------|-------------------------------------------------------|

<sup>a</sup> Only in connection with suitable Modbus master devices, see "Display unit / controller" on page 2.

## Electrical data

|                               |                                                                                                                                                 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage supply                | DC 5 to 12 V                                                                                                                                    |
| Current consumption           | Standby: 40 µA<br>RS485 on average: 820 µA (at 1 measurement per second)<br>Current pulse (starting current peak): 500 mA, heat-up time: 100 ms |
| Connection                    | 4-conductor shielded cable, open conductor ends with ferrules                                                                                   |
| Electromagnetic compatibility | Acc. to EN 61326-1                                                                                                                              |
| Interference emission         | Class A                                                                                                                                         |
| Interference immunity         | Industrial requirements                                                                                                                         |

## Case

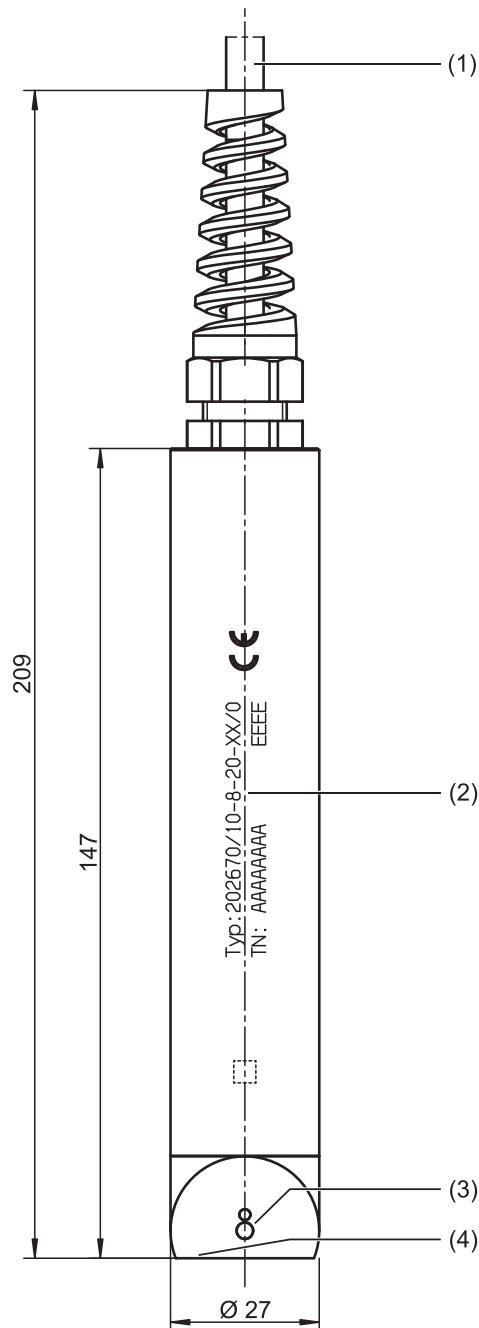
|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| Dimensions                | Ø 27 mm × 147 mm (sensor case without cable)                                   |
| Weight                    | 720 g (sensor including 10 m cable)<br>1,850 g (sensor including 30 m cable)   |
| Length of permanent cable | 10 m, 30 m                                                                     |
| Materials                 | Sensor case: PVC, POM-C<br>Optical window: PMMA<br>Connection cable: polyamide |
| Protection type           | IP68                                                                           |

## Display unit / controller



JUMO AQUIS 500 RS display unit / controller, type 202569/...  
See data sheet 202569

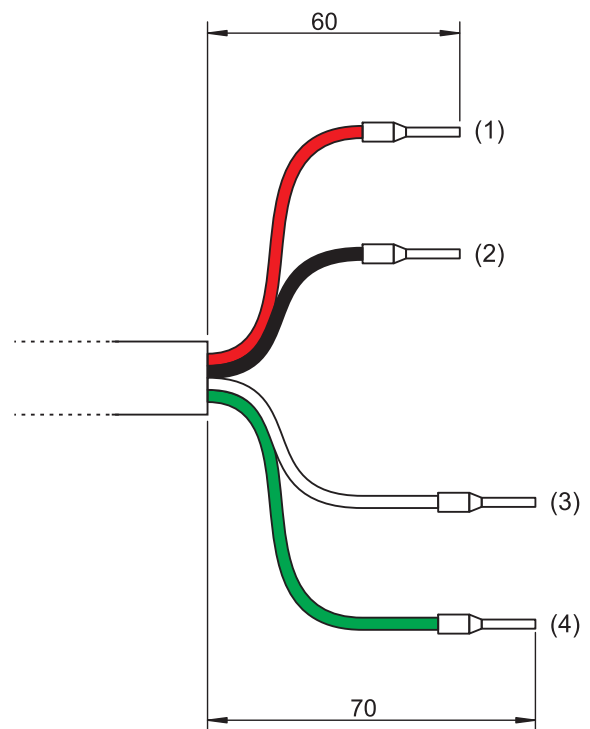
## Dimensions



- (1) RS485 connection cable
- (2) Laser engraving indicating the sensor type and part no.
- (3) Infrared transmitter and receiver
- (4) Temperature sensor

## Electrical connection

The cables with conductor end sleeves are connected without tension or soldering, using screw-type plug-in terminals on the JUMO AQUIS 500 RS (type 202569/...) display unit / controller.

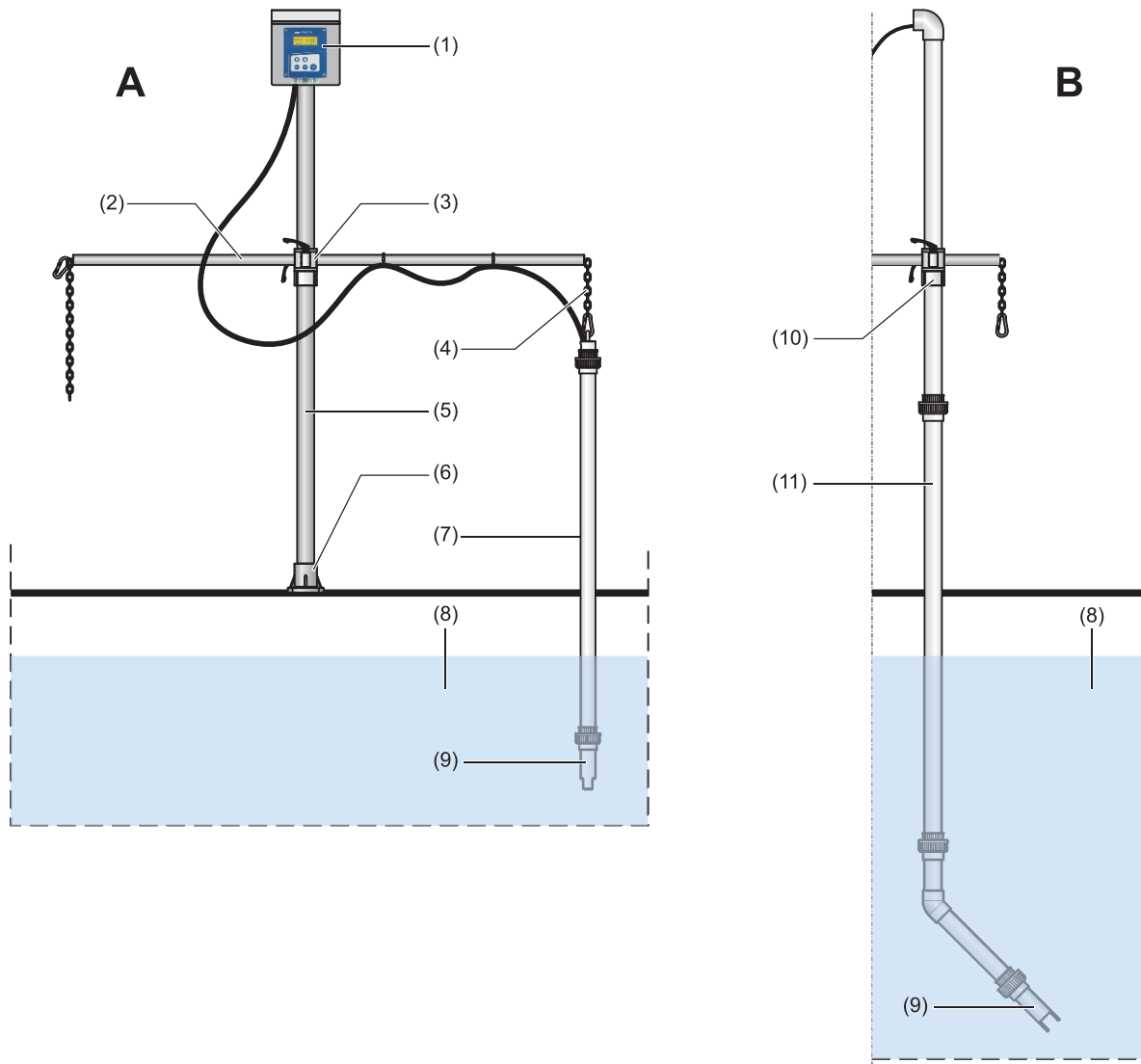


- (1) Red Voltage supply +
- (2) Black Voltage supply -
- (3) White RS485 +
- (4) Green RS485 -

## Measuring point set-up

The set-up of a complete measuring system for turbidity measurements is shown below. The figure shows a support pillar with pedestal base, cantilever arm, and chain. A JUMO AQUIS 500 RS is used as a display unit / controller, which is mounted on the support pillar and protected by a weather protection canopy (see Chapter "Accessories", page 9).

The suspended fitting in image A is attached to the cantilever arm by a chain. Alternatively, an immersion fitting can also be attached to the cantilever arm using a cross clamp, see image B.



- |      |                                                                                              |                                                                                         |
|------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| (1)  | JUMO AQUIS 500 RS display unit / controller, type 202569/...                                 |                                                                                         |
| (2)  | Cantilever arm, adjustable                                                                   |                                                                                         |
| (3)  | Cross clamp with 2 clamping levers                                                           |                                                                                         |
| (4)  | Chain                                                                                        |                                                                                         |
| (5)  | Support pillar                                                                               | } Support pillar with pedestal base,<br>cantilever arm, and chain;<br>part no. 00398163 |
| (6)  | Pedestal base                                                                                |                                                                                         |
| (7)  | Suspended fitting including sensor mounting (9), part no.: 00616716                          |                                                                                         |
| (8)  | Basin/tank/container                                                                         |                                                                                         |
| (10) | Cross clamp for support pillar (part no. 00605468), required to attach the immersion fitting |                                                                                         |
| (11) | Angled immersion fitting including sensor mounting (9), part no.: 00616717                   |                                                                                         |

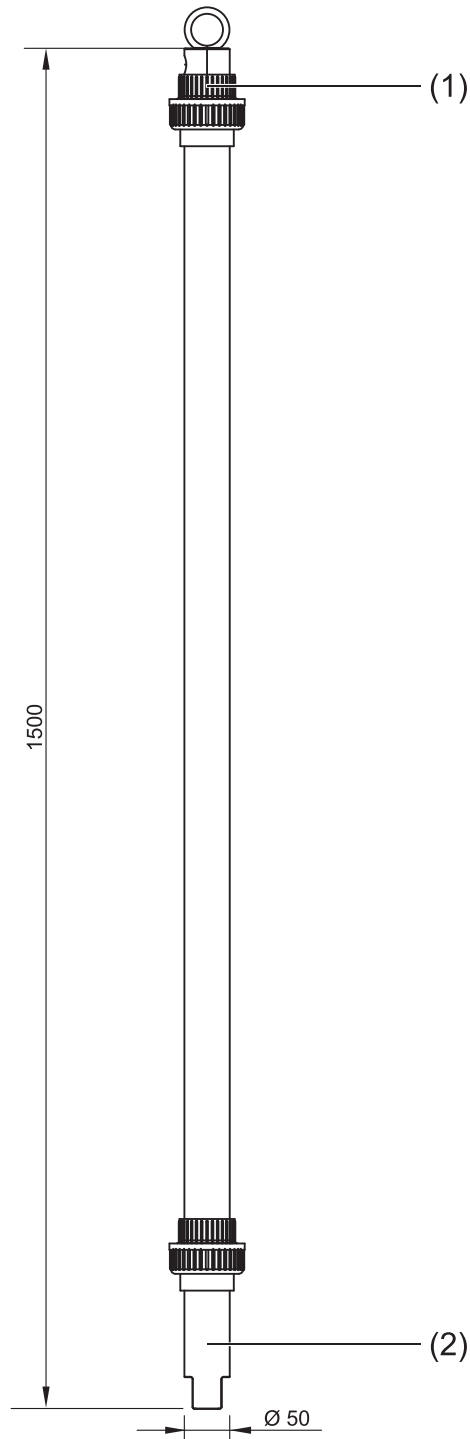
## Accessories

### Suspended fitting

The suspended fitting is used to hold the JUMO ecoLine NTU turbidity sensor and position it at a suitable point in the measurement medium. It is designed to provide the greatest possible protection for the sensor against extraneous light and damage through mechanical influences. The fitting is suspended on a chain, enabling it to follow the movement of the medium in various directions as the water level fluctuates. The fitting is primarily used to take measurements from open channels or basins. Please note the following when planning your set-up:

- The fitting must be easily accessible to allow the sensor and the fitting itself to be maintained and cleaned regularly.
- Do not allow the fitting (and thus also the sensor) to swing against and hit the basin edge.
- When working with systems involving pressure and/or temperature, ensure that the fitting and sensor meet all relevant requirements.
- The system designer must check that the materials in the fitting and sensor are suitable for the measurement (chemical compatibility, for instance).

| Suspended fitting |                  |     |
|-------------------|------------------|-----|
| Materials         | Pipe:            | PVC |
|                   | Sensor mounting: | PVC |
| Temperature range | 0 to 60 °C       |     |
| Pressure range    | Up to 5 bar      |     |
| Total length      | 1,500 mm         |     |
| Part no.          | 00616716         |     |



- (1) Fastener with chain holder  
(2) Sensor mounting

## Immersion fitting

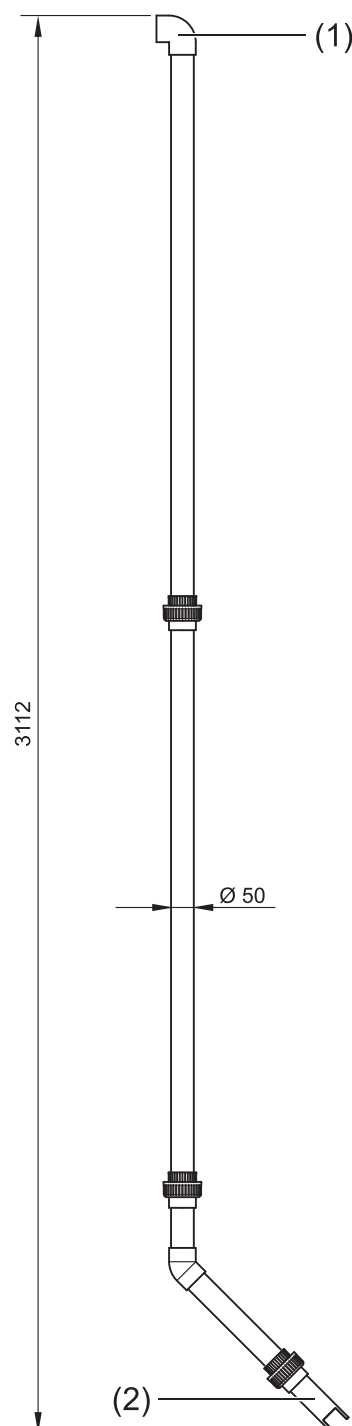
The immersion fitting is used to hold the JUMO ecoLine NTU turbidity sensor and position it at different immersion depths. The fitting is angled at the lower end, thus keeping rising gas bubbles as far away as possible from the sensor. It also protects the sensor against extraneous light and mechanical influences. The fitting is attached to the support pillar using a cross clamp, see Chapter "Measuring point set-up", page 4.

Alongside the standard version with a total length of 3,112 mm, shorter versions are also available on request.

Please note the following when planning your set-up:

- The fitting must be easily accessible to allow the sensor and the fitting itself to be maintained and cleaned regularly.
- Do not allow the fitting (and thus also the sensor) to swing against and hit the basin edge.
- When working with systems involving pressure and/or temperature, ensure that the fitting and sensor meet all relevant requirements.
- The system designer must check that the materials in the fitting and sensor are suitable for the measurement (chemical compatibility, for instance).

| Immersion fitting |                                   |                          |
|-------------------|-----------------------------------|--------------------------|
| Materials         | Pipe: PVC<br>Sensor mounting: PVC |                          |
| Temperature range | 0 to 60 °C                        |                          |
| Pressure range    | Up to 5 bar                       |                          |
| Total length      | 3,112 mm                          | Other lengths on request |
| Part no.          | 00616717                          |                          |



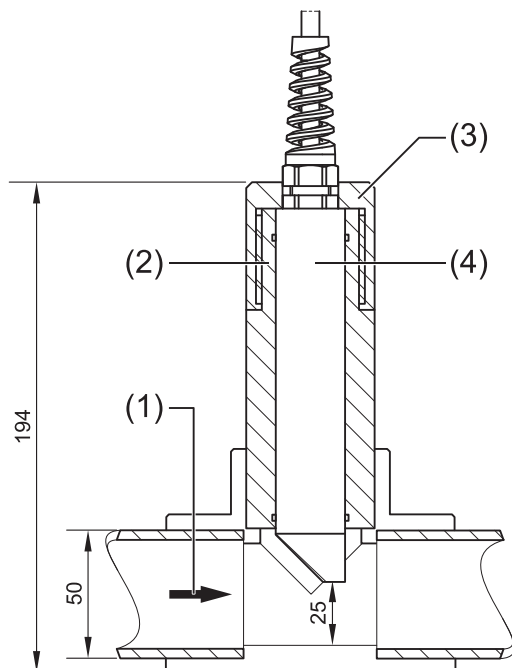
- (1) Angled end piece  
(2) Sensor mounting

## Flow fitting

The flow fitting is used to hold the JUMO ecoLine NTU turbidity sensor. The fitting is mounted directly in the supply line for the medium being measured or in the bypass. Its special design type ensures the correct inflow to the sensor, thus preventing incorrect measurements. Please note the following when planning your piping set-up:

- The fitting must be easily accessible to allow the sensor and the fitting itself to be maintained and cleaned regularly
- It is recommended that the fitting be installed in a bypass with gate valves. This variant allows the sensor to be removed without interference in the process.
- When working with systems involving pressure and/or temperature, ensure that the fitting and sensor meet all relevant requirements.
- The system designer must check that the materials in the fitting and sensor are suitable for the measurement (chemical compatibility, for instance).

| PVC flow fitting   |                    |
|--------------------|--------------------|
| Material           | PVC                |
| Temperature range  | 0 to 60 °C         |
| Pressure range     | Up to 5 bar        |
| Connection         | Bonded sockets     |
| Process connection | 90° T-piece, DN 40 |
| Part no.           | 00616715           |



- (1) Flow direction
- (2) Sensor mounting
- (3) Union nut
- (4) JUMO ecoLine NTU sensor

## Order details

|                                      |                                |
|--------------------------------------|--------------------------------|
| <b>(1) Basic type</b>                |                                |
| 202670                               | JUMO ecoLine NTU               |
|                                      | Optical turbidity sensor       |
| <b>(2) Basic type extension</b>      |                                |
| 10                                   | Standard, 0 to 4000 NTU        |
| <b>(3) Version</b>                   |                                |
| 8                                    | Standard with factory settings |
| <b>(4) Electrical connection</b>     |                                |
| 20                                   | Permanent cable                |
| <b>(5) Length of permanent cable</b> |                                |
| 10                                   | 10 m                           |
| 30                                   | 30 m                           |
| <b>(6) Extra code</b>                |                                |
| 0                                    | Without                        |

|               |        |   |     |   |     |   |     |   |     |   |     |
|---------------|--------|---|-----|---|-----|---|-----|---|-----|---|-----|
|               | (1)    |   | (2) |   | (3) |   | (4) |   | (5) |   | (6) |
| Order code    |        | / |     | - |     | - |     | - |     | / |     |
| Order example | 202670 | / | 20  | - | 8   | - | 20  | - | 10  | / | 0   |



## Scope of delivery

|                                                 |
|-------------------------------------------------|
| Turbidity sensor with the ordered cable version |
| Operating manual B 202670.0                     |
| Calibration certificate                         |

## Stock versions

(Delivery within 3 working days after receipt of order)

| Type                  | Part no. |
|-----------------------|----------|
| 202670/20-8-20-10/000 | 00614965 |
| 202670/20-8-20-30/000 | 00614966 |

## Accessories

(Delivery within 10 working days after receipt of order)

Fittings

| Description                                                                    | Part no. |
|--------------------------------------------------------------------------------|----------|
| Suspended fitting for type 202670/..., PVC, total length 1,500 mm              | 00616716 |
| Immersion fitting for type 202670/..., PVC, total length 3,112 mm <sup>a</sup> | 00616717 |
| Flow fitting for type 202670/..., PVC                                          | 00616715 |

<sup>a</sup> Other lengths on request.

Display unit / controller

| Description                        | Part no.              |
|------------------------------------|-----------------------|
| JUMO AQUIS 500 RS, type 202569/... | See data sheet 202569 |

Accessories for JUMO AQUIS 500RS

| Description                                                                                | Part no. |
|--------------------------------------------------------------------------------------------|----------|
| Support pillar with pedestal base, cantilever arm, and chain                               | 00398163 |
| Additional cross clamp for support pillar, required to attach the immersion fitting        | 00605468 |
| Pipe-mounted kit for JUMO AQUIS 500 RS                                                     | 00398162 |
| Weather protection canopy for JUMO AQUIS 500 RS                                            | 00398161 |
| Setup program for JUMO AQUIS 500 on CD-ROM                                                 | 00483602 |
| PC interface with USB/TTL converter, for connecting the PC/laptop to the JUMO AQUIS 500 RS | 00456352 |