Technical
Information
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7210 MTS

Optoelectronical Measuring System for Separation Zone and Sludge Level Detection

In many instances in process engineering, suspensions are separated into their solid and liquid components by sedimentation.
To operate this process economically and efficiently in practice, it is indispensable to monitor the separation and transition zones of the clarification and settling phases continuously.

Applications

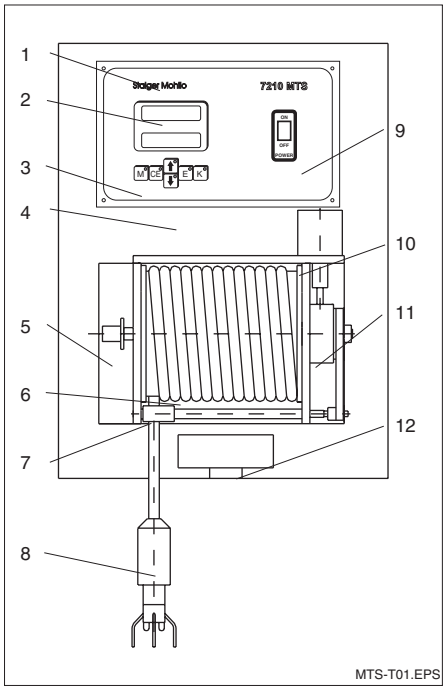
- Wastewater treatment:
  sludge thickener, secondary clarifier
- Water purification:
  settling basin after flocculant dosage, sludge height in contact sludge process
- Mining:
  thickening during coal washing process
- Chemical industry:
  static separation process

Benefits at a glance

- Reliable concentration measurement using optical measuring process
- Direct, continuous measurement of concentration levels using zone-tracking immersion sensor
- Parallel concentration measurement and height measurement for sludge profile evaluation
- Simple configuration, calibration and adjustment via menu-assisted user interface
- Backlit display
- Sensor with 4-beam pulsed light technology
- Safe position of sensor with Hold function for measured values during scraper passage
- Measured value pre-processing in sensor reduces susceptibility to interference during signal transfer
- Sensor replaceable without recalibration in most cases

ISO 9001

Measuring instrument



System design

1 Cable entries
2 Terminal chamber
3 Electronics housing
4 User interface
5 Slipring
6 Cable drum
7 Cable guide
8 Turbidity sensor with sensor weight and protection guard
9 Stepper motor controller
10 Stepper motor
11 Toothed belt ratio
12 Heater with thermostat

The complete measuring system is installed in a closed plastic housing.

The main system components include:
- turbidity measuring transmitter
- turbidity sensor
- stepper motor controller
- tracking unit (motor, cable drum, signal transfer)

The instrument is specially designed as a field housing for use outdoors and in industrial plants. Most of the mechanical parts are made of stainless steel or plastic.

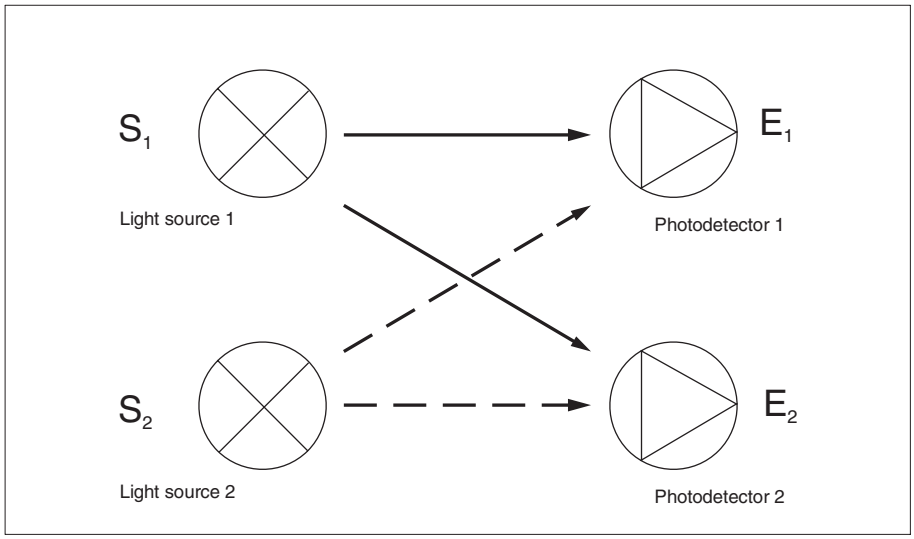
Measuring principle

Multi-beam pulsed light process
The MTS 7210 measuring system was specially designed to detect separation zones and sludge levels in sedimentation processes.
Separation zones are detected by measuring turbidity. This process is based on the conventional multi-beam pulsed light principle.

Turbidity is measured by light absorption. The monochromatic light sources are two long-life LEDs (≥ 20,000 operating hours).

To eliminate interference from extraneous light sources, the LEDs are pulsed at a rate of several kHz.

The signals of the two photodetectors are separately converted into logarithmic functions and set into relation. This compensates for both sensor fouling and component ageing.



Principle of measuring light emission

Function

The sensor generates a turbidity or solids-dependent absorption signal which is converted into a frequency signal. The frequency signal is transferred without interference via sliprings made of stainless steel.

The measured signal is compared with a preselected reference value for sludge concentration in the measuring transmitter. If there is a deviation, the sensor moves either up or down until it obtains the reference concentration (separation zone).

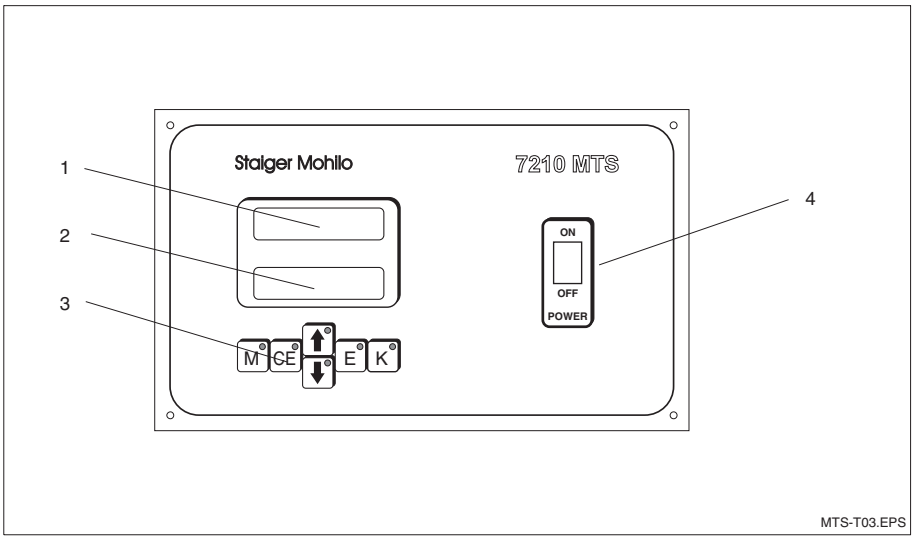
In order to save time, the tracking speed is controlled. This means that the greater the difference between the actual and reference concentration, the faster the sensor approaches the separation zone. The plastic cable drum used for this purpose is driven by a low-maintenance stepper motor.

An electronic device determines the sludge level height from the number of steps carried out by the stepper motor and supplies the result as an analogue signal. To avoid incorrect signals caused by stepper losses, e.g. power failure or maintenance work, an automatic zero point compensation of the height measurement takes place. For this the sensor moves to a specific reference point.

A synchronisation input allows the sensor to run up quickly.

This is required for the following situations:
- scraper passage
- sensor cleaning
- safety shut-down

The analogue signal is held during this time at the value last measured. When the synchronisation contact opens, the sensor moves to its original position and sends the current measured value again. An additional alarm contact signals when the measuring range is exceeded or when the sensor is soiled.



User interface

1 Large 14 mm display 4 1/2-digit for current sludge level depth
2 LC display for menu guidance
3 Membrane keypad
4 Mains switch

Operation

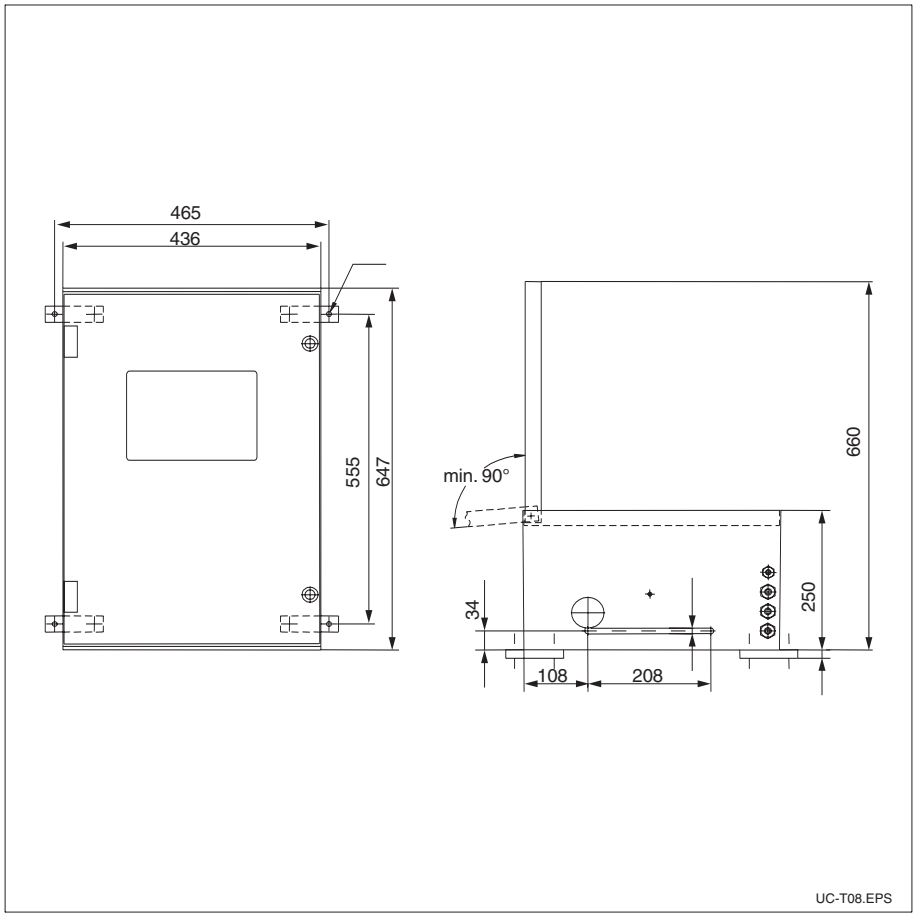
The MTS 7210 can be completely set up and calibrated via the dirt-proof membrane keypad. The operator is guided interactively through the operating menu. The interface is a two-line plaintext display.

A language selection menu permits the device to be operated in various languages.

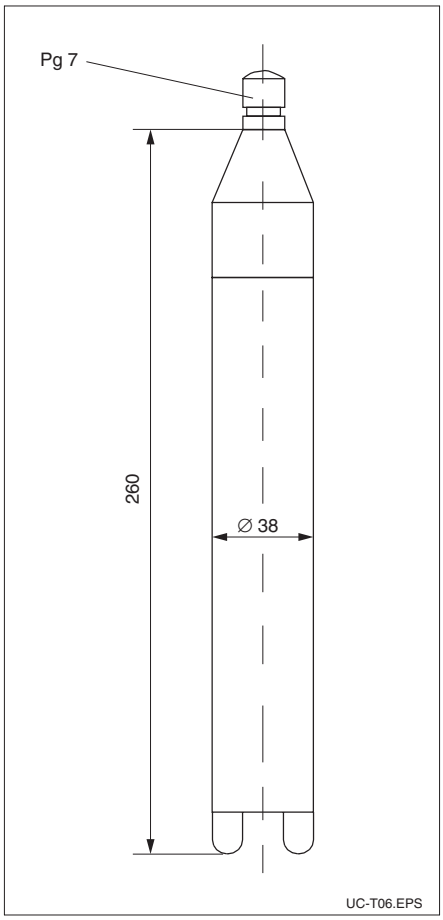
Programming levels which go beyond everyday operation processes are only accessible by entering a password.

All the calibration data and parameters are retained if there is a power failure or when the device is shut down (non-volatile RAM).

Dimensions

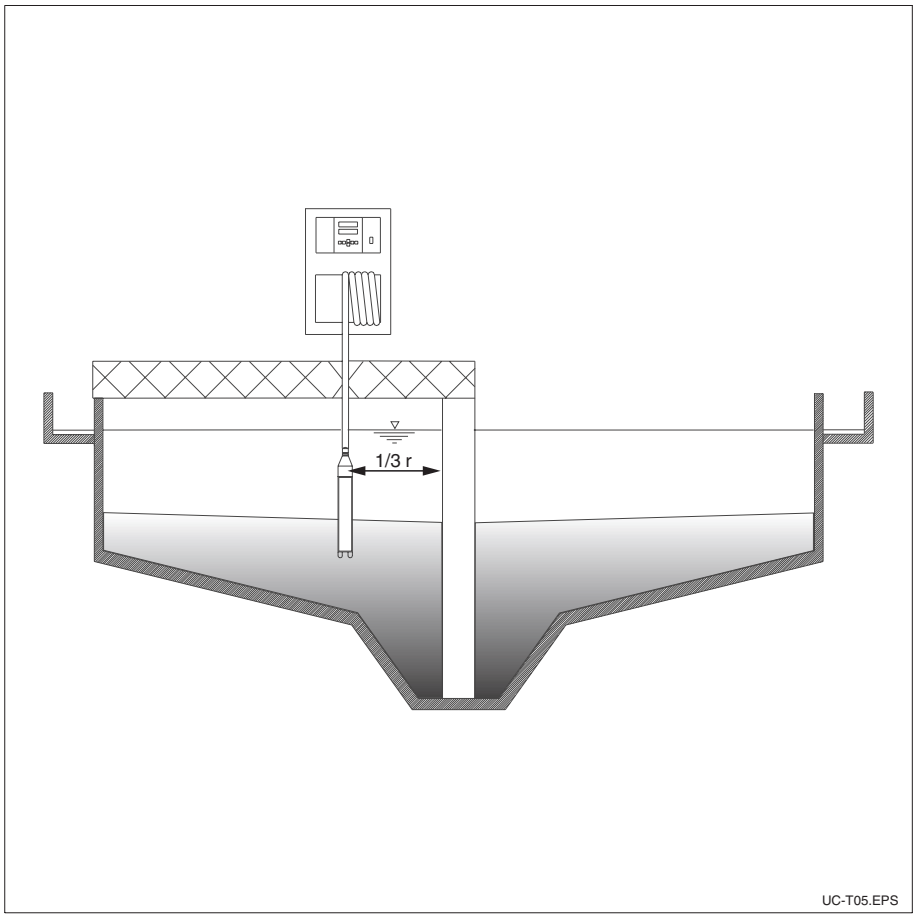


Dimensions of measuring transmitter

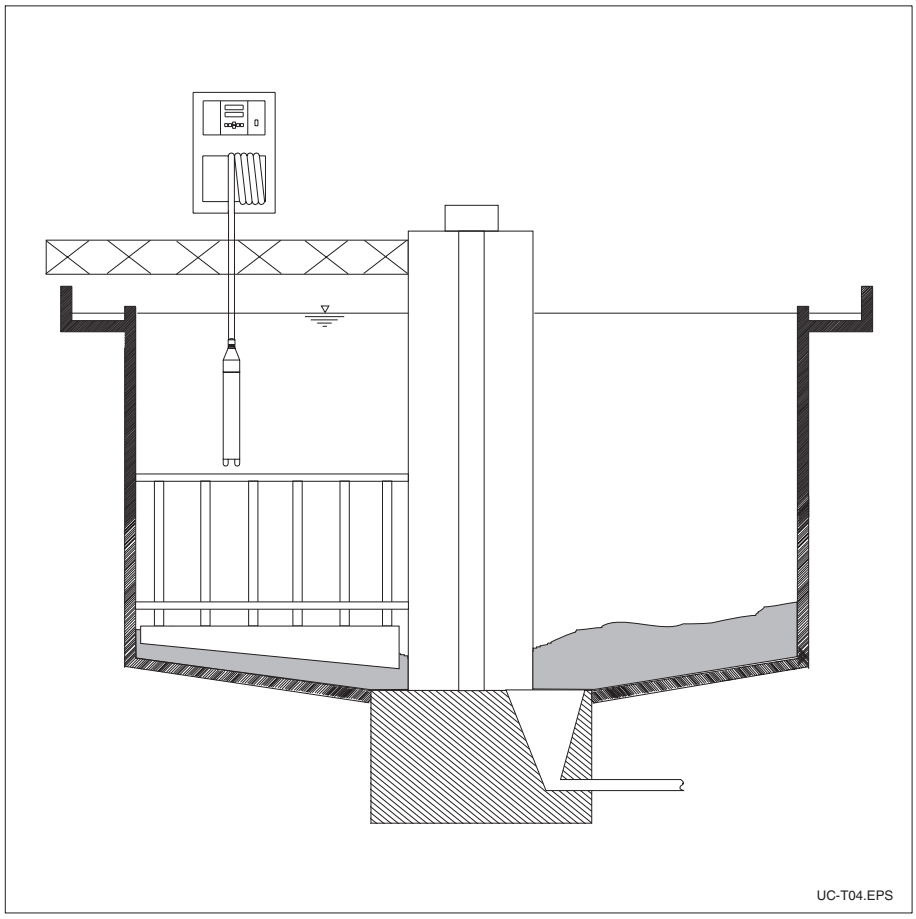


Dimensions of sensor

Installation



Continuous sludge level measurement in secondary clarifier. Installation on scraper bridge



Continuous separation zone measurement in sludge thickener

Technical data

General data

Manufacturer	ISI Europa
Product designation	Sludge level measuring system 7210 MTS

Measuring transmitter

Mechanical data

Dimensions (L x W x D)	647 × 436 × 250 mm
Total weight including sensor and tracking unit	approx. 30 kg
Display	LED display (14 mm) for current measured value, 2-line LC display (5 mm) for programming

Materials

Housing	Polyester Connector between electronics and tracking unit
Sight glass	Polycarbonate
Protection class	IP 30

Input

Signal input 1	Measuring input
Measured variable	Turbidity measurement, height measurement
Principle of turbidity measurement	Multi-beam pulsed light process
Measuring light	Infrared light at 880 nm
Measuring range	0 ... 12 g/l
Accuracy	±1 % of measured value
Reproducibility	0.5 %
Height measurement	Stepper motor control
Measuring range	0 ... 11 m, free parameter entry
Signal input 2 (24 V DC)	Synchronisation, e.g. to run up sensor during scraper passage
Signal input 2 (24 V DC)	Profile run

Output

Signal output 1	0/4 ... 20 mA for sludge level measurement (height)
Signal output 2	0/4 ... 20 mA for solids measurement (concentration)
Load	Max. 500 Ω
Switching outputs	2 limit contacts, freely configurable 1 relay contact for sensor cleaning, 1 relay contact for alarm signal 1 relay contact each for messages 1 and 2
Switching power	2 A at 115/230 V AC, 1 A at 30 V DC

Electrical connection

Power supply	230/115 V AC, 50/60 Hz +6 ... –10%
Power consumption	Max. 105 VA (electronics + heater)

Heater

Heating capacity	Thermostatically controlled, 55 VA

Ambient conditions

Ambient temperature	–20 ... +60 °C

Reeling unit

Components

Cable drum (w x ∅)	210 x ∅ 160 mm
Cable length	13 m
Drive	Stepper motor with worm gear and toothed belt
Stepping rate	200 steps per revolution
Signal transfer	Noble metal sliprings
Zone-tracking speed	Max. 10 cm /s

Sensor

Physical data

Dimensions	260 x ∅ 38 mm

Material

Sensor	Stainless steel SS 316 Ti and polyoxymethylene (POM)
Sensor cable	Polyurethane jacket
Sensor weight	Stainless steel SS 316 Ti and polyamide 6.6 GFRP
Protection guard	Stainless steel SS 316 Ti

Height measurement

Max. sensor stroke	11.4 m

Operating conditions

Max. temperature	50°C
Pressure	max. 6 bar

Subject to modifications.

Accessories

- ❏ Railing-mounting bracket with weather protection cover
  Order No.: 51503584

- ❏ Cleaning brush for cable
  Order No.: 51503585

- ❏ Sensor rinsing device
  stainless steel VA, DN 200
  incl. solenoid valve
  Order No.: 51503586

- ❏ Sensor rinsing device
  plastic PP, DN 300
  incl. solenoid valve
  Order No.: 51503587

- ❏ Sensor protection guard with 90° angle bracket
  Order No.: 51503783

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