Technical
Information
TI 225C/07/en
51503544

CUM 750 / CUS 70

Ultrasound 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.
For this task, Endress+Hauser offers the CUM 750 / CUS 70 ultrasound measuring system.

Applications

- Wastewater treatment:
  primary clarifier, sludge thickener
- Water purification:
  settling basin after flocculant dosage, sludge height in contact sludge process
- Chemical industry:
  static separation process

Benefits at a glance

- Reliable concentration measurement using ultrasound process
- Detection of sludge concentration profile
- Also applicable in regions of low differences in density
- Multi-channel version for parallel measurement in up to four basins
- Simple configuration, calibration and adjustment via menu-assisted user interface
- Backlit multifunctional display for graphical and numerical display
- Ultrasound sensor with large measuring range at small beam angle
- Insensitive to scum
- Easy to install
- Automatic sensor cleaning with self-priming pump (optional)

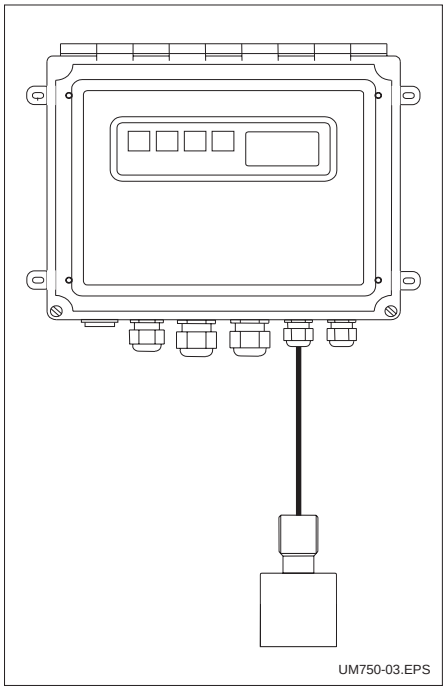
Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

The Power of Know How

Measuring instrument



CUM 750 / CUS 70
measuring system

The entire measuring system consists of:
- CUM 750 measuring transmitter
- CUS 70 ultrasound sensor

The instrument is specially designed as a closed field housing for use outdoors.

Measuring principle

CUS 70 ultrasound sensor
A piezoelectric crystal is integrated in a flat cylindrical plastic housing. When the crystal is excited by an electrical voltage, it generates a sonar signal. The ultrasound waves are transmitted at a frequency at 657 kHz at an angle of 6° to scan the separation zones.

The parameter measured is the time it takes for the transmitted ultrasound signal to reach the solid particles in the separation zone and return to the receiver.

Function

The speed of sound varies according to the physical properties of the measuring medium and is affected by temperature and air pressure. The liquid zones and solids content of the medium also vary.

To obtain precise measurement results, it is therefore vital to adapt system variables to the process, e.g. pulse length and the speed of sound.

The 32-bit processor offers the following possibilities for signal evaluation:

- Mask regions where the separation zone is not expected.
- Evaluate received signal strengths differently.
- Select leading or trailing signal edges in the evaluation.
- Amplify sensor signals at different rates, e.g. for floating sludge.
- Define a region (gate) above and below the separation zone. Signal evaluation only takes place in the defined region. The gate wanders with the separation zone. This makes smoothing algorithms unnecessary.
- Arrow indicator for basin floor.

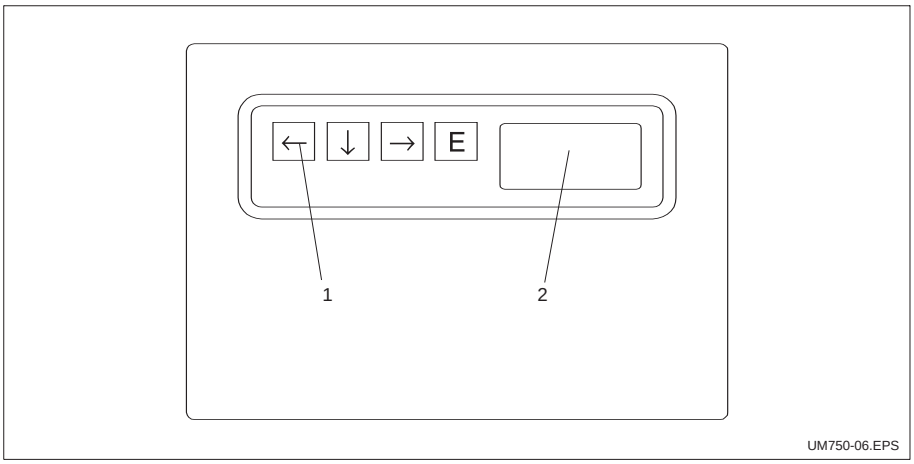
Operation

The CUM 750 can be completely set up and calibrated via the dirt-proof membrane keypad. The operator is guided interactively via the operating menu. The interface is a two-line plaintext display.

The use can selected from 3 configurations:
- 1 factory configuration
- 2 user-defined configurations

If the scraper causes interference, the signal can be smoothed and filtered. Interference from floating sludge can be eliminated by the cleaning pump.

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

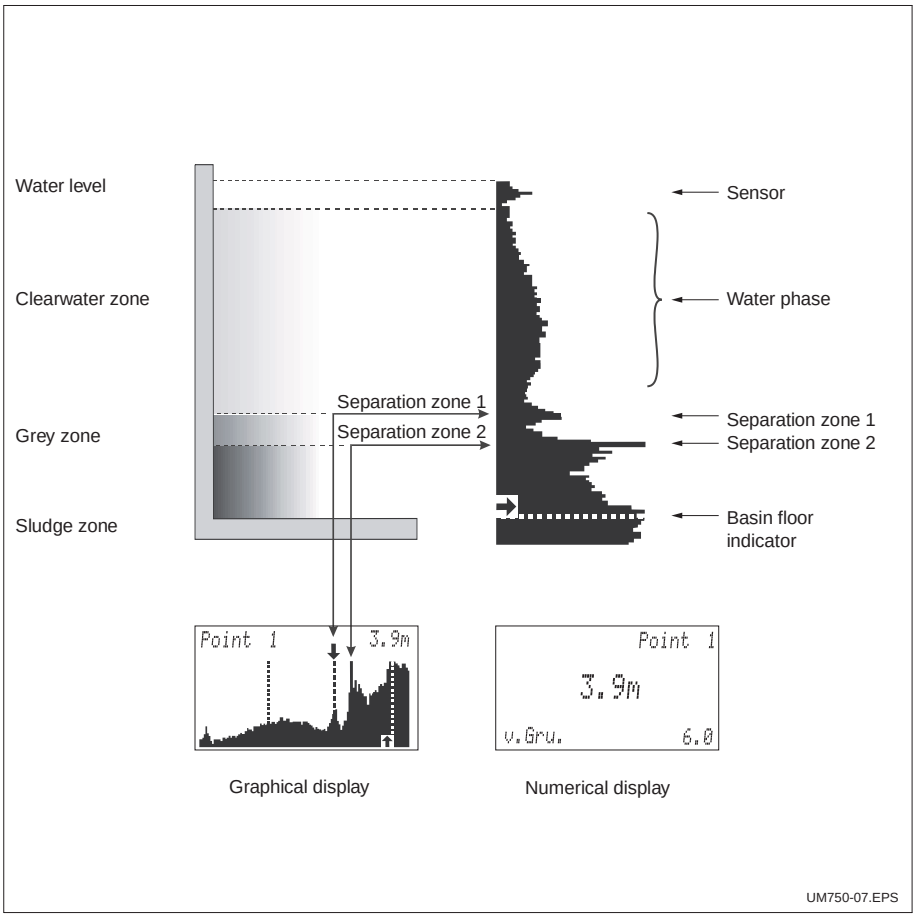


User interface

1 Membrane keypad
2 Large LC display for graphical and numerical display

Display

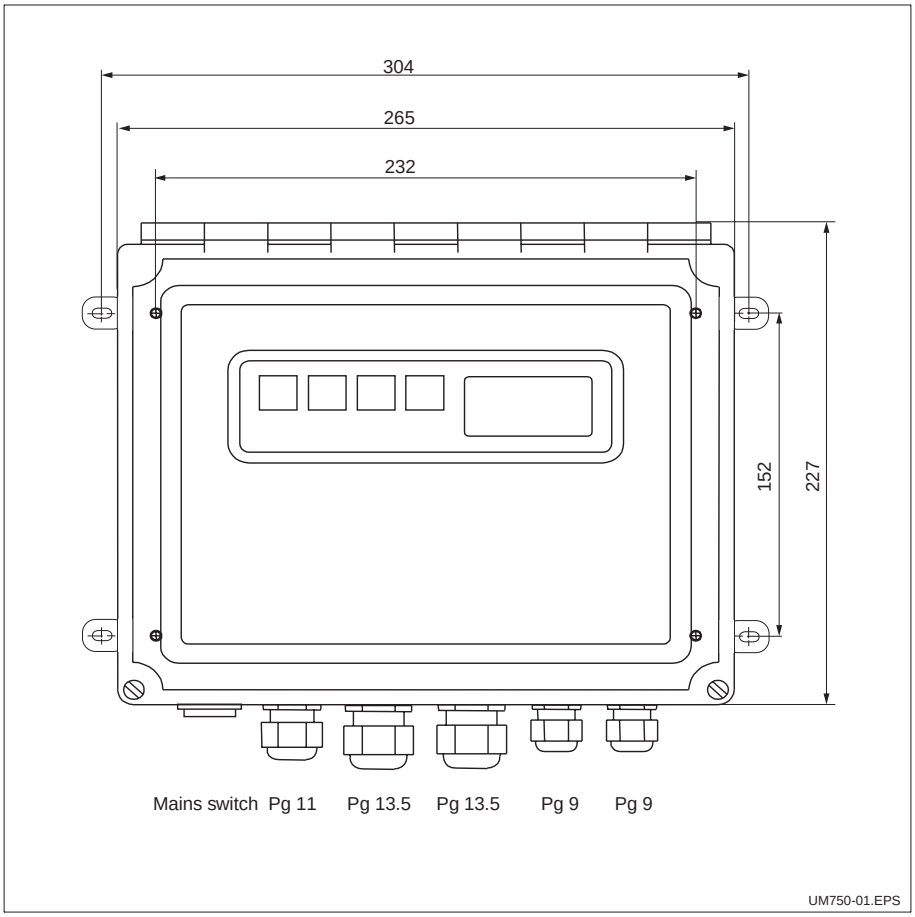
The multifunctional display has two different display modes:
- numerical display
- graphical display



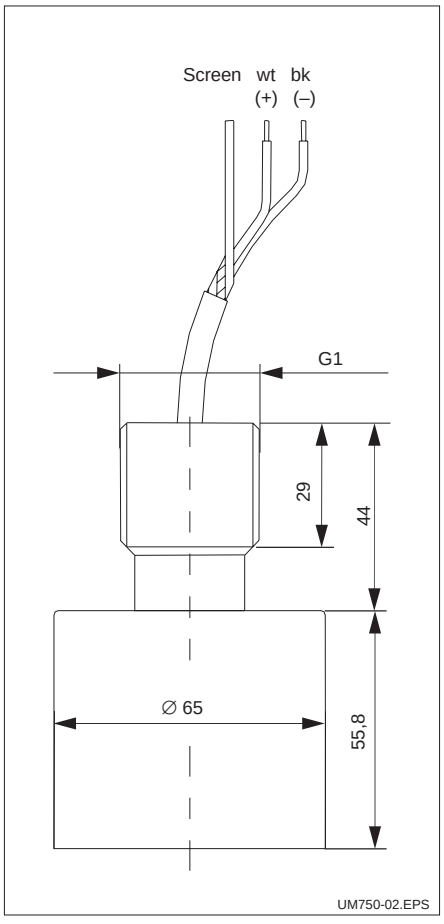
Sludge level measurement in primary clarifier

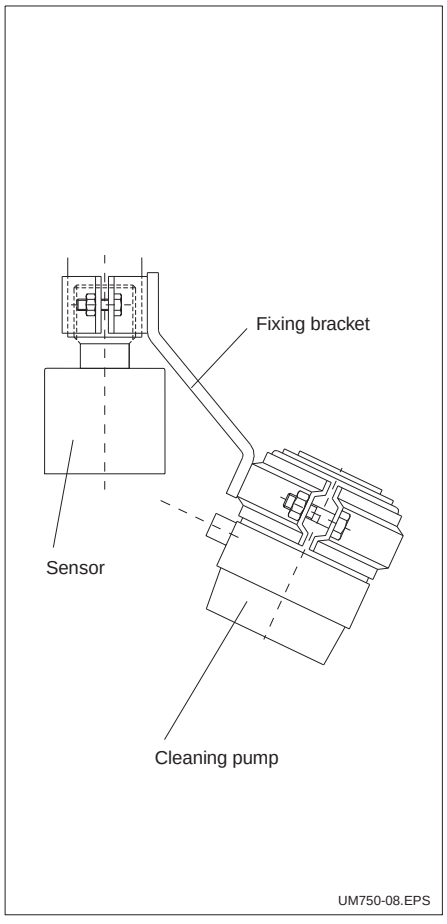
Display modes

Dimensions



Dimensions of
CUM 750 measuring
transmitter



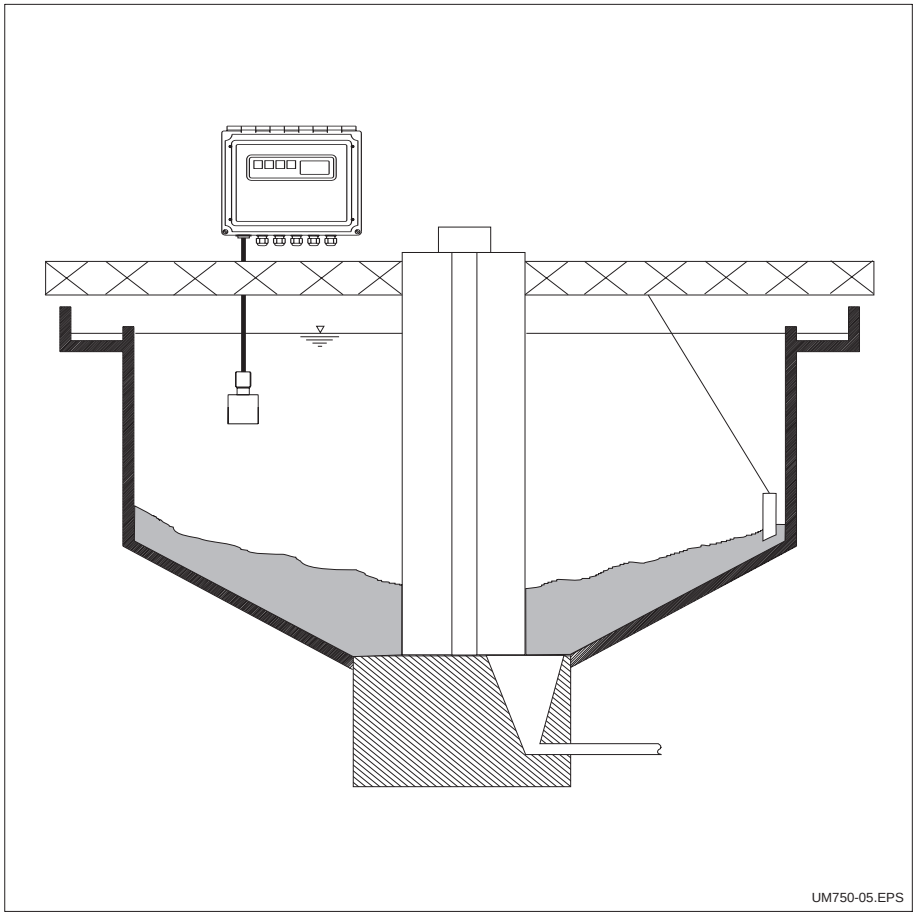


CUS 70 sensor

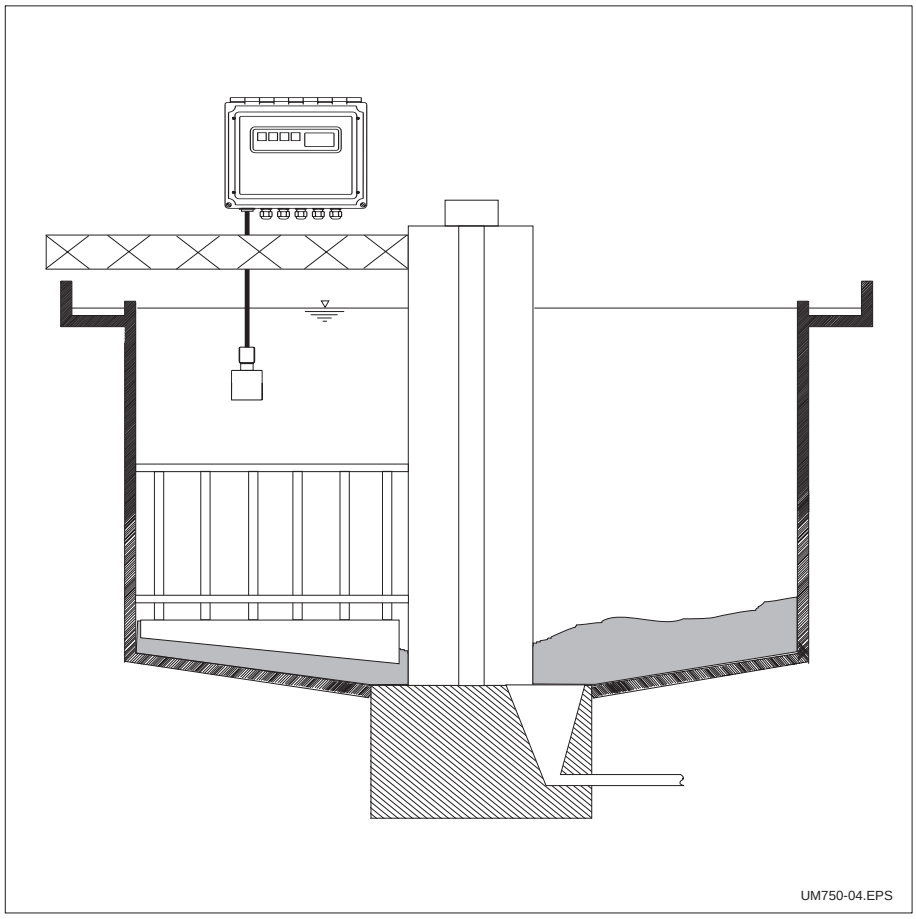
left:
Dimensions of
CUS 70 sensor

right:
CUS 70 sensor with
self-priming
cleaning pump

Installation



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



Continuous separation level measurement in sludge thickener

Technical data

CUM 750 measuring transmitter

General data	Manufacturer	Endress+Hauser
	Instrument designation	CUM 750 sludge level measuring transmitter
Mechanical data	Dimensions (L x W x D)	265 × 227 × 160 mm
	Weight	Approx. 4 kg
	Display	LED display (14 mm) for current measured value, 2-line LC display (5 mm) for programming
Materials	Housing	Polycarbonate
	Sight glass	Plexiglas®
	Protection class	IP 65
Input	Measured variable	Height measurement
	Measuring principle	Ultrasound
	Frequency	657 kHz
	Wavelength	0.2 cm
	Measuring beam angle	6°
	Dead zone	30 cm
	Measuring range	0.3 ... 100 m
	Signal resolution	0.03 m
	Accuracy	±1 % of measuring range
Output	Signal output	0/4 ... 20 mA for height measurement
	Number of signal outputs	Max. 4
	Load	Max. 500 Ω
	Switching outputs	Max. 4 relay contacts
	Switching power	10 A at 115/230 V AC, 10 A at 30 V DC
	Interfaces	RS 232, RS 485
Electrical connection	Power supply	230/115 V AC, 50/60 Hz +6 ... –10%
	Power consumption	Max. 40 VA
Ambient conditions	Ambient temperature	–20 ... +50 °C

CUS 70 ultrasound sensor

General data	Manufacturer	Endress+Hauser
	Instrument designation	CUS 70 ultrasound sensor
Mechanical data	Dimensions	260 x ∅ 38 mm
	Weight	Approx. 0.5 kg
	Cable length	6 m
	Max. distance between sensor and measuring transmitter	100 m
	Process connection for installation pipe	Thread size G1
Materials	Sensor	epoxy resin
	Sensor cable	polyurethane jacket
Operating conditions	Max. temperature	60°C
	Pressure	max. 6 bar

Subject to modifications.

Accessories

- ❏ Weather protection cover CYY 101 for CUM 750
  stainless steel SS 304,
  (H x W x D) 320 x 300 x 270 mm
  Order No.: 50061258
- ❏ Stand with weather protection cover for CUM 750
  stainless steel SS 304
  (L x W x D) 60 x 60 x 1495 mm
  Order No.: 50064291
- ❏ Wall-mounting bracket for CUS 70 with 300 mm distance to wall
  Order No.: 51503581
- ❏ Railing-mounting bracket for CUS 70 with 300 mm distance from basin and variable length immersion tube
  Order No.: 51503582
- ❏ Railing-mounting bracket for CUS 70 with 300 mm distance from basin, variable length immersion tube and weather protection cover
  Order No.: 51503583

Product structure

CUM 750 sludge level measuring transmitter

Version
1 Single-channel version
2 Two-cahnnel version
3 Three-channel version
4 Four-channel version
9 Special version

Language version
D German
E English
Y Special version

Power supply
0 Power supply 230 V AC, 50/60 Hz
1 Power supply 115 V AC / DC, 50/60 Hz
9 Special version

Communication
A RS 232 and 4 ... 20 mA
B RS 485 and 4 ... 20 mA
Y Special version

Additional equipment
A Standard
Y Special version

CUM 750- [ ][ ][ ][ ][ ] **complete order code**

CUS 70 ultrasound sensor

Version
1 Standard version
9 Special version

Cable length
A 6 m cable
Y Special version

Cleaning
1 Without cleaning
2 With cleaning pump 230 V AC, attachment
3 With cleaning pump 115 V AC, attachment
9 Special version

Additional equipment
A Standard
Y Special version

CUS 70- [ ][ ][ ][ ] **complete order code**

Endress+Hauser GmbH+Co.
- Instruments International -
P.O. Box 2222
D-79574 Weil am Rhein
Tel. (0 76 21) 9 75-02
Fax (0 76 21) 9 75-3 45
E-mail: info@ii.endress.com

Endress+Hauser
The Power of Know How

TI 225C/07/en/07.00
Printed in Germany / DT / CV5 (51503544)