

Mobrey

Ultrasonic Sludge Blanket Level Control Systems

Features

- Control features:
 - High or low level sludge blanket alarm
 - Automation for primary sludge discharge
 - Hazardous area approval
- Top mounted tank sensor
- Simple calibration

Typical Applications

- Waste water sewage sludge
- Water treatment sludge
- Industrial slurry processing
- Mineral ores
- China clay
- Sand slurry
- Coal tailings
- Process treatment sludge and slurry
- Industrial waste
- Metallic particles in suspension



Principle of Operation

Expert in the field of suspended solids monitoring with over 30 years experience, Mobrey systems are used to monitor many slurries varying from 0.2% to 50% solids in a number of different industries.

Ultrasonic technology can be used to detect and monitor sludge interface and suspended solids. Two ultrasonic transducers acting as transmitter and receiver are built into a sensor for mounting in a settling tank. The gap between the transducers and the frequency at which they operate is selected to suit the particular application.

The resultant measurement is virtually unaffected by vibration, temperature, viscosity or the color of the slurry.

The rugged stainless steel sensors require minimal maintenance.

Control Units



Electrosensor

Electrosensor systems for solids density detection and control where high system integrity coupled with low cost intrinsically safe installation is required.

- Comprises local amplifier and remote control unit
- 2 x SPDT relay output contacts (fault and alarm)
- LED status indication of relay
- Intrinsically safe ATEX II (1) G [EExia] IIC
- Up to 3300ft (1000m) separation between sensor and control unit
- Two wire twisted pair cable from amplifier to control unit
- Dual frequency operation



MCU200

Simple relay box for control or alarm of solids density interface, monitoring and control.

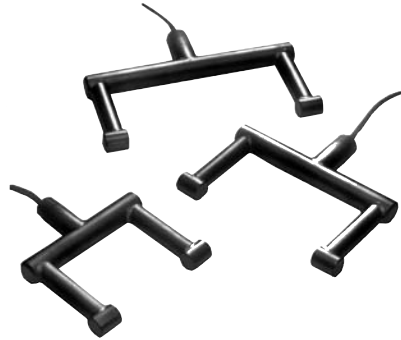
- Control unit local to sensor up to 100ft (30m)
- 2 x SPDT relay output contacts
- LED status indication of relay
- Selectable time delay 0.5 to 30 seconds
- Dual frequency operation

Calibration range

Mobrey MCU200 and Electrosensor control units provide a relay switch output at a pre-set level of suspended solids as detected between the sensors. The actual setting is established on site by trials with a typical sludge for that process. The range of operation of the sensors varies with the operating frequency and the separation gap between the ultrasonic sensor faces. Typical measuring ranges for 4" (100mm) to 18" (450mm) gap sensors are quoted in the table on the opposite page. For municipal waste water processes a 6" (150mm) gap sensor is most suitable for primary sludge types (3 to 5% solids), whereas a 18" (450mm) gap sensor is more suited to secondary or final type sludge (0.5 to 2% solids).

Sensors

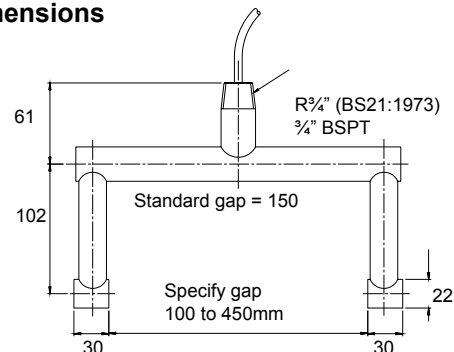
Sludge blanket sensors for tank mounting suspended solids density control or monitoring.



433 Tank mount sensors

The 433 sensor is available in a range of sizes depending on the range of density to be measured. The sensors are of an all welded 316 stainless steel construction, with an IP68 submersible rating for the cable entry. The sensor can be mounted by screwing the sensor onto a pipe or conduit by means of the 3/4" BSPT mounting thread. The sludge density is measured between the gap of the sensor, and can be located at the top of the tank to monitor the upper parts of the settled blanket, or close to the discharge point at the bottom of the tank to monitor the density leaving the tank.

Dimensions



Site installation

The suspended sensor for in-tank monitoring should be installed in the main flow of liquid to the sludge discharge hopper, to avoid sludge traps close to the tank walls.

If the screening on the site is poor, care must be taken to avoid ragging up of the sensor. Where rotating scrapers are used it is possible to suspend the sensor from the bridge itself. In this case the control unit must also be mounted on the bridge. It should be noted that this type of sensor is adversely affected by entrained gas in the sludge, which may cause the system to indicate the alarm state even when the suspended solids concentration is low.

Technical specification

Control units

Specification	Electrosensor	MCU200
Housing dimensions	6" x 3" x 4.4" 150 x 75 x 112mm	4.7" x 8" x 3" 120 x 200 x 75mm
Enclosure rating	IP20	IP65
Cable entries	Grommet	3 off holes Ø 16 mm
Mounting options	Wall mount (DIN rail mount optional)	Wall mount
Operating temp.	-4°F to + 150°F (- 20°C to + 65°C)	- 40°F to + 131°F (- 40°C to + 55°C)
Output relay (Alarm)	SPDT rated up to 5A 100VA max	DPDT 5A 230V ac max.
Output relay (Fault)	SPDT rated up to 5A 100VA max	No
Override input	No	Contact closure
Power supply	115/230V 50/60Hz (24V dc option - <i>non-certified</i>)	115/230V 50/60Hz (24V dc option)
Frequency	1MHz or 3.7MHz selectable at head amplifier	1MHz or 3.7MHz selectable
Cable termination from the sensors	Captive screw terminal block	Captive screw terminal block
Max. cable size	1.5mm ² / 14 AWG	1.5mm ² / 14 AWG
Hazardous area approval	ATEX II (1) G [Ex ia] IIC	No

Sensors

	Tank mount sensors
Material sensors	316 Stainless steel
Mounting connection	¾" BSPT
Standard sizes	Gap size 4" (100mm), 6" (150mm), 8" (200mm), 12" (300mm) 18" (450mm) (others on request)
Max pressure	145psi (10 bar)
Operating temp.	-40°F to 158°F -40°C to +70°C
Sensor cable	Dual RG178B/U miniature co-axial
Cable length	Standard 23ft (7m) others on request to a maximum length of 100ft (30m)
Protection	IP68 submersible
Hazardous area approval	ATEX II 1 G EEx ia IIC T5 (U8H*M* for use with electrosensor)

Typical measuring ranges in % solids for 433 Gap sensors

Gap mm	Gap inches	PRIMARY		FINAL
		1MHz	3.7MHz	3.7MHz
100	4	3 - 29%	1 - 6%	2 - 15%
150	6	2 - 19%	1 - 4%	1 - 10%
200	8	2 - 14.5%	0.5 - 3%	1 - 7.5%
300	12	1 - 10%	0.5 - 2%	0.5 - 5%
450	18	N/A	0.5 - 1.3%	0.5 - 3.3%

Note: Ranges based on typical attenuation factors for municipal wastewater sludge

Level

Ordering codes: Control units

Code	Control unit
MCU201	MCU200 230/115V version 50/60Hz
MCU203	MCU200 24V DC version (grounded negative)

MCU200 controllers are locally mounted to the sensor, normally within 100ft (30m). For remote electronics use MES Electrosensor electronics which can be remote mounted up to 3,300ft (1000m) from the sensor.

MES	Mobrey Electrosensor control unit			
	Code	Intrinsic safety		
	2	Non IS		
	3	ATEX Intrinsically safe E Exia IIC T5		
		Code	Enclosure	
		D	DIN rail enclosure (non IS version only)	
		L	Stand alone enclosure	
		Code	Voltage input	
		1	230V AC MES3L only	
		2	115V AC MES3L only	
		3	24V DC (non I.S.)	
		Code	Relay output	
		S	SPDT	
	MES	3	L /	1 S
	Typical model number			

Ordering codes: Electrosensor head amplifier (use with MES* control unit)

Code	Mobrey electrosensor adjacent amplifier
MES3AI	Electrosensor head amplifier in IP65 enclosure, dual frequency

Ordering codes: Sensors

Gap sensors : Tank mounting

433SD	Tank mount sensor	
	Code	Gap size
	805M1	6" (150 mm) gap sensor for MCU200
	802M1	8" (200 mm) gap sensor for MCU200
	803M1	12" (300 mm) gap sensor for MCU200
	804M3	18" (450 mm) gap sensor for MCU200
	U8H5M1	6" (150 mm) gap sensor ATEX II 1G, EEx ia T5
	U8H2M1	8" (200 mm) gap sensor ATEX II 1G, EEx ia T5
	U8H3M1	12" (300 mm) gap sensor ATEX II 1G, EEx ia T5
	U8H4M3	18" (450 mm) gap sensor ATEX II 1G, EEx ia T5
433SD	805M1	Typical ordering example: 6" gap sensor for use with MCU200

The Emerson logo is a trade mark and service mark of Emerson Electric Co.

Mobrey is a registered trademark of Mobrey Ltd.

All other marks are the property of their respective owners

We reserve the right to modify or improve the designs or specifications of product and services at any time without notice.

International:

**Emerson Process Management
Mobrey Measurement**
158 Edinburgh Avenue, Slough,
Berks UK SL1 4UE
Tel: +44 (0)1753 756600
Fax: +44 (0)1753 823589
www.mobrey.com

Americas:

**Emerson Process Management
Rosemount Inc.**
8200 Market Boulevard
Chanhassen, MN USA 55317
Tel: (US) (800) 999-9307
Tel: (International) (952) 906-8888
Fax: (952) 949-7001



EMERSON
Process Management