Ultrasonic Level Measurements (Separate)

1 Product Overview

Transducer  LM-USL-511	Application:	Level measurement in various industrial fields, especially water treatment industry
	Measurement Range:	0.4…10m (Liquids version)
	Process Connection:	G1A
	Material for Transducer Housing:	PU/PC
	Process Temperature:	- 40…+80℃
	Process Pressure:	- 0.2…1 bar
	Approval (Explosion proof):	Exm Ⅱ T6
Transducer  LM-USL-512	Application:	Level measurement in various industrial fields, especially water treatment industry
	Measurement Range:	0.6...20m(Liquids version)
	Process Connection:	G1A
	Material for Transducer Housing:	PU/PC
	Process Temperature:	- 40...+80℃
	Process Pressure:	- 0.2...1 bar
	Approval (Explosion proof):	Exm Ⅱ T6
Transducer  LM-USL-514	Application:	Solid/liquid level measurement in various industrial fields
	Measurement Range:	Liquids: 0.8…40m/ Solids: 0.8…20m
	Process Connection:	G1A, M105×2
	Material for Transducer Housing:	PU/PC
	Process Temperature:	- 40…+80℃
	Process Pressure:	- 0.2…1 bar
	Approval (Explosion proof):	Exm Ⅱ T6
Transducer  LM-USL-516	Application:	Solid/liquid level measurement in various industrial fields
	Measurement Range:	Liquids: 1.2…80m/ Solids: 1.2…40m
	Process Connection:	G1A, M105×2
	Material for Transducer Housing:	PU/PC
	Process Temperature:	- 40…+80℃
	Process Pressure:	- 0.2…1 bar
	Approval (Explosion proof):	Exm Ⅱ T6

Ultrasonic Level Measurements (Separate)

Transducer

LM-USL-518

Application:	Solid/liquid level measurement in various industrial fields
Measurement Range:	Liquids: 1.6…100m/ Solids: 1.6…60m
Process Connection:	G1A, M105×2
Material for Transducer Housing:	PU/PC
Process Temperature:	- 40…+80℃
Process Pressure:	- 0.2…1 bar
Approval (Explosion proof):	Exm Ⅱ T6

Transducer

LM-USL-AIM

Material: Stainless steel/ 316L

Controller

LM-USL-53S

Application:	Measurement of levels, level difference, average levels and open channel flow in various industrial fields
Max. Measurement Range:	Liquids: 20m
Housing Material:	PC/AL
Process Temperature:	- 40…+80℃
Display/Programming:	Echo curves displayed on lattice LCD directly, CHS/ENG menu available

Controller

LM-USL-53E

Application:	Measurement of levels, level difference, average levels and open channel flow of solids levels in various industrial fields
Max. Measurement Range:	Liquids: 100m Solids: 60m
Housing Material:	PC/AL
Process Temperature:	- 40…+80℃
Display/Programming:	Echo curves displayed on lattice LCD directly, CHS/ENG menu available

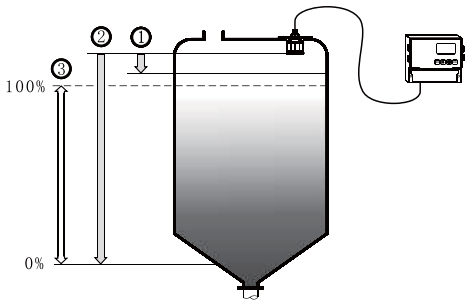
2 Mounting Requirement

Be cautious during the installation:

1. the highest level of target medium must Not enter into blanking zone;
2. the measurement must keep certain distance to vessel walls;
3. every possible measure needs to be taken to position the measurement so that the direction of transducer emission is perpendicular to the surface of measured medium.

The installation of measurements in explosion proof area must abide by relevant local or federal safety regulations.

Illustration

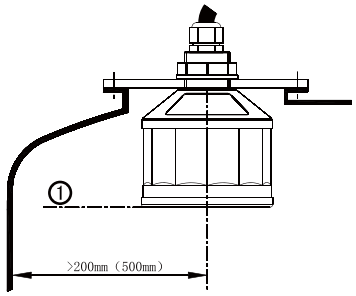


1 Blanking Distance
2 Empty (Max. Measurement Distance)
3 Max. Measurement Range

Reference Plane for Measurement: the lower edge of probe

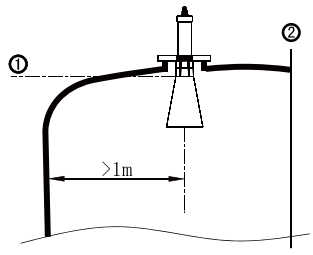
Note: The highest level of measured medium must not enter into blanking zone while ultrasonic level measurement is in operation.

Mounting Position



1 Reference Plane

Note: Minimum distance of 200mm (LM-USL-511)/ 500mm(LM-USL-512) between measurement and vessel wall must be assured while mounting LM-USL-511/ LM-USL-512.

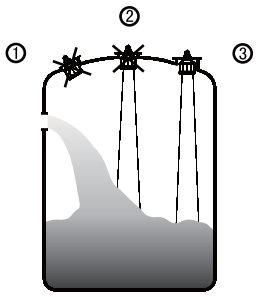


1 Reference Plane (filling stream not allowed to enter into horn)
2 Center of Vessel or Symmetrical Axis

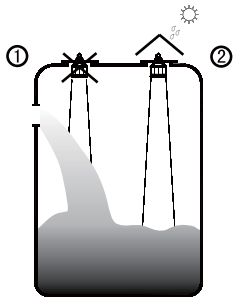
Minimum distance of 1m between transducer and vessel wall must be assured while mounting LM-USL-514/516/518.

Ultrasonic Level Measurements (Separate)

Illustrative Diagram on Installation

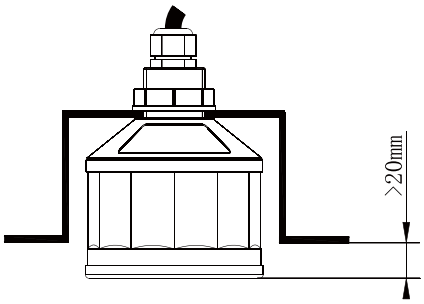


1 Wrong: Fail to turn the antenna perpendicular to the surface of target medium.
2 Wrong: Measurements are mounted in the center of concave or arched vessel tops, which results in multiple echoes.
3 Correct

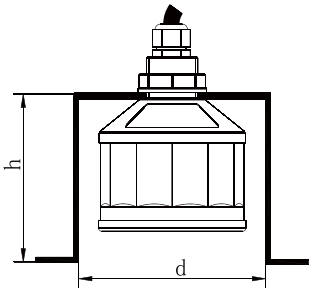


1 Wrong: Mount the measurement in/above filling stream, which results in the measurement of filling stream not the target medium.
2 Correct Note: Sun shield or rain-proof is required for outdoor mounting.

Socket



The transducer end must at least protrude 20mm out of socket.



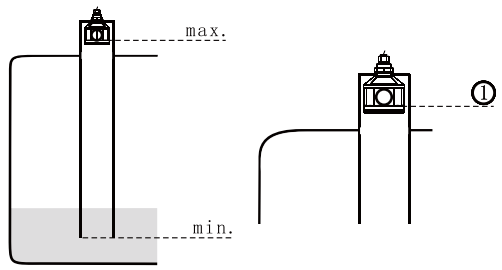
Only applicable for GDSL511

d	h
100mm/4″	200mm
150mm/6″	400mm

In case of strong reflective properties of target medium and big socket diameter, you can mount measurements on sockets higher than the antenna length. The recommended values for socket heights are shown in the illustration below. The socket end should be smooth and burr-free, if possible also rounded. Moreover, false echo storage must be carried out afterwards.

Ultrasonic Level Measurements (Separate)

Installation with Standpipe (Only applicable for LM-USL-511/512)



1 Vent hole of diameter 5…10mm

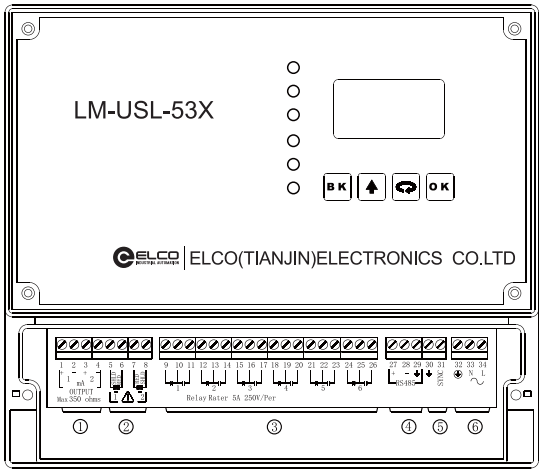
You are advised to opt for installation with standpipe (or bypass tube) to avoid the influence on measurement caused by barriers inside vessels, foam generation or air vortex.

If the measurement is undertaken by LM-USL-511/512 inside the standpipe the inner diameter of standpipe should be at least bigger than the outside diameter of transducer. Please see Dimensional Drawings for actual sizes. Avoid large cracks or welding seam when connecting standpipe. False echo storage must be carried out in this case.

Note: You must NOT mount measurement inside standpipe while measuring adhesive medium.

3 Electrical Connection

Wiring Diagram



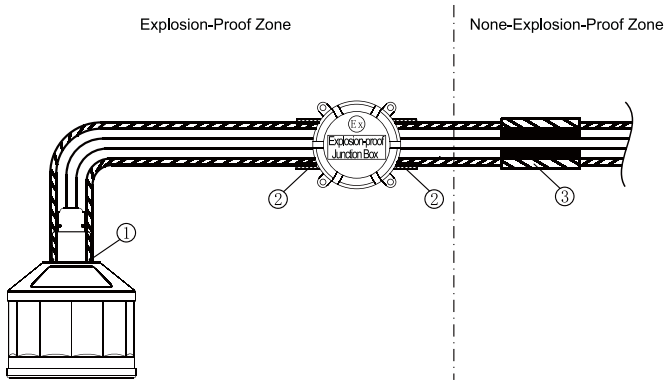
1 4…20mA output
2 Port for transducer
3 Alarm relay
4 Communicate with another unit
5 Synchronization of multiple units
6 Power

Explosion Proof Connection

This product is an intrinsically safe version (Exia ⅡB T6) with plastic-encapsulated internal structure aimed to prevent sparks caused by transducer circuit malfunction from leaking out.

The controller must be installed in safety zone. Cables must be connected through exposed conduits while installing transducer and the fitted metal pipe must be extended into the safety zone with both of its two ends sealed, thus the cable inside the pipe can be isolated from flammable gas.

If the distance between transducer and controller is >5m, explosion-proof junction box must be used to connect cables in unsafe zone, meanwhile cable saddles at both ends of the cable and the explosion –proof junction box itself must be sealed through thread. Two cables are connected inside the explosion-proof junction box and the box must be sealed to enable the cables to be isolated from flammable gas.



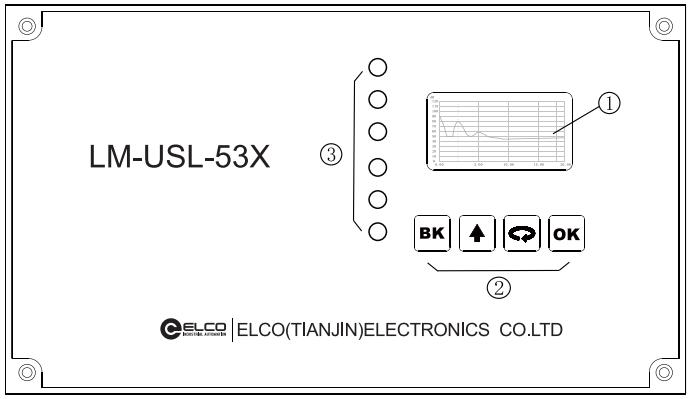
1 Seal O-ring
2 Threaded Seal
3 Pipe Closure Seal

4 Adjustment Instructions

Adjustment Methods: Two adjustment methods available for LM-USL-53X

1 Display /adjustment module
2 An adjustment software-GODA ware

Display/ Adjustment Module



1 LCD 2 Adjustment Keypad 3 Relay

The adjustment can be done through operating with four key-strokes on the panel of controller and the menu is available in multiple languages. Measurement results, which are shown on LCD, can be seen through glass window after the measurement is adjusted.

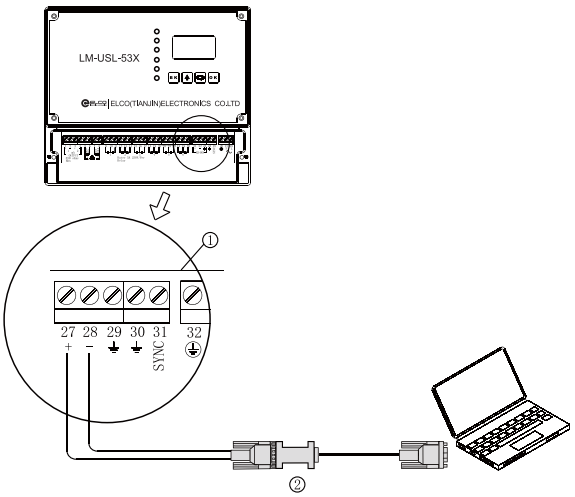
[OK]: - Enter programming mode;
- Confirm programming options;
- Confirm modifications to parameters.

[↻]: - Choose programming options;
- Choose the digit of parameters to edit;
- Display the contents of parameters.
- Display mode switch between single-channel and multiple-channel while running

[▲]: - Modify parameter values;
- Choose digital number;
- Choose single-channel display mode while running

[BK]: - Programming mode exit;
- Return to higher menu level;
- Choose multiple-path display mode while running

Adjustment with Another Unit

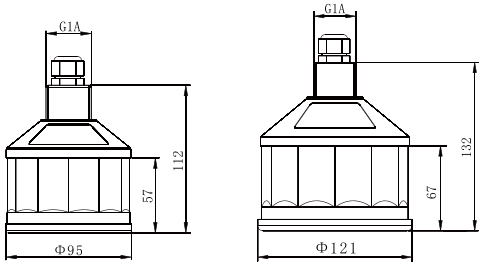


1 Connection Terminal of LM-USL-53X Controller

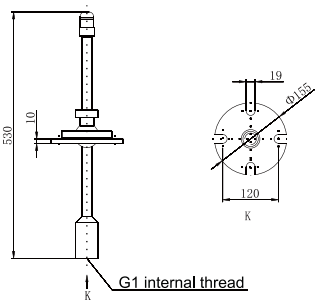
2 RS485/232 Convertor

5 Dimensional Drawings (Unit: mm)

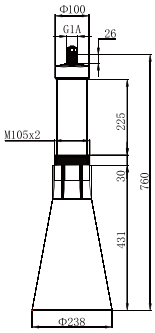
LM-USL-511/LM-USL-512



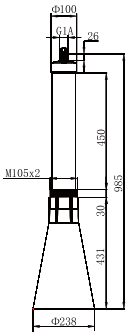
LM-USL-AIM



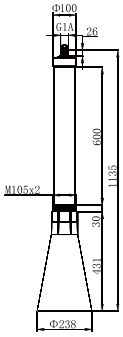
LM-USL-514



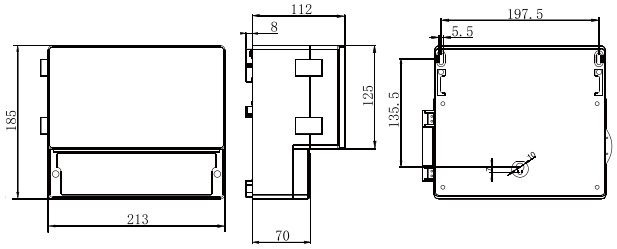
LM-USL-516



LM-USL-518



LM-USL-53X



6 Technical Specifications

General Parameters	
Process Connection and Material	
-Process Connection LM-USL-511	Thread G1A
-Process Connection LM-USL-512	Thread G1A
-Process Connection LM-USL-514	Thread G1A、M105X2
-Process Connection LM-USL-516	Thread G1A、M105X2
-Process Connection LM-USL-518	Thread G1A、M105X2
-Transducer	PU/PC
Weight	
-LM-USL-511	1.2kg (Depend on process connections and housings)
-LM-USL-512	1.9kg (Depend on process connections and housings)
-LM-USL-514	6.0kg (Depend on process connections and housings)
-LM-USL-516	7.0kg (Depend on process connections and housings)
-LM-USL-518	8.0kg (Depend on process connections and housings)

Characteristic Parameters of Transducer

Blanking Distance		
LM-USL-511	0.4m	
LM-USL-512	0.6m	
LM-USL-514	0.8m	
LM-USL-516	1.2m	
LM-USL-518	1.6m	
Max. Measurement Distance	Solids	Liquids
LM-USL-511	---	10m
LM-USL-512	---	20m
LM-USL-514	20m	40m
LM-USL-516	40m	80m
LM-USL-518	60m	100m
Ultrasonic Frequency		
LM-USL-511	48KHz	
LM-USL-512	26.7KHz	
LM-USL-514	15KHz	
LM-USL-516	10KHz	
LM-USL-518	5KHz	
Ultrasonic Parameters		
Beam Angle	7°	
Relative Humidity	100%	
Ambient Temperature	- 40℃...+60℃	
Operating Pressure	Max.1bar	
General Protection Level	IP67	
Installation/Connection Format	G1A External Thraed	
Approval (Explosion Proof)	Exm Ⅱ T6	

Ultrasonic Level Measurements (Separate)

Characteristic Parameters of Controller

Display/Programming	Echo curves shown on lattice LCD with CH/EN menu
Accuracy	±0.5%
Resolution	1mm
Signal Input	LM-USL-51X (2 Pairs)
Output Current	4...20mA（2）
Power Supply	110/220VAC±10% 50Hz
Load Resistance	500Ω（Max）
Alarm Relay	6 single-pole double throw relays, contact rating 5A/250V
Communication Interface	RS485/MODBUS Protocol
Ambient Temperature	-20℃...+60℃
Protection Level	IP66
Housing Material	PC/AL

7 Selection & Ordering Information

Transducer

LM-USL-51X	
Measurement Range	
LM-USL-511	
Liquids	10m
LM-USL-512	
Liquids	20m
LM-USL-514	
Liquids	40m
Solids	20m
LM-USL-516	
Liquids	80m
Solids	40m
LM-USL-518	
Liquids	100m
Solids	60m

Controller

LM-USL-53	
S	in conjunction with LM-USL-511/512
E	in conjunction with LM-USL-514/516/518
M	measurement of open channel flow
1	single channel
2	twin-channel
X	number of relays
Example: LM-USL-53SM11	

Aimer

LM-USL-AIM