OPERATING MANUEL

Model : ELW

RADAR TYPE LEVEL TRANSMITTER

Information in this manual is reviewed and completely reliable. Responsibility is not assumed due to any typing error.
Products in this manual are available only for information purpose and they may be changed without notice.

Models :

ELW 801
ELW 802
ELW 803
ELW 804
ELW 1000



CE EAC

Important Notes:

Used Symbols :

: Caution : Note : Disposal

- Please read this manual carefully before installation of the **Radar Type Level Transmitter**. User is responsible for accidents and losses arising from failure to comply with the warnings in this manual.
- In the event that **Radar Type Level Transmitter** is broken, take measures in order to prevent accidents and l osses which can occur in its system.
- There is not any fuse and circuit breaker on the instrument; they should have been added to the system by the user.
- This manual should be stored in an easily accessible place for subsequent use.
- The manufacturer's liability cannot exceed the purchase price of the device according to the law.
- Do not make any modification on the instrument and do not try to repair it. Reparation should be made by authorized service staff.
- Do not operate the system before making assembly in compliance with the assembly chart related to the instrument.
- Products which do not contain label and serial number are considered to be excluded from the warranty scope.
- The instrument's useful life, determined and announced by the ministry, is 10 years.

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1. General Information :

1.1. Material Acceptance

Check that there is no damage on the packages during the transportation immediately after the material acceptance. If packages are damaged, open the packages immediately and check whether products are affected or not, if there is any damage, send your complaint report to the transporter company and its photocopy to the address of our company.

1.2. Information about Areas of Use

ELW Radar type level transmitter is a non-contact continuous level measurement method of liquid and solid. You can find detailed information about the application area for each model in the product description and on the product label of the radar. Follow the instructions and follow the basic conditions. Make sure it applicables. Only in this way can the reliability of the device be ensured.

Misusage :

Incorrect or improper use may impair the performance of the device or cause damage to the device or personnel, for example due to improper installation or adjustment, the installation of a non-corrosive device for the corrosive environment, the field condition does not comply with the technical specification limit value of the device. The manufacturer is not responsible for damage caused by incorrect or improper use.
We do not recommend using this device when the device is operated incorrectly or misevaluates the echo caused by special mounting conditions.
In the event that the user violates the warning, the manufacturer is not responsible for the relevant damage.
The Device Fullfills the Requirements of the Following Directive.

. Low Voltage Directive 2006/35/EC
. EMC Directive 2004/30/EC
. EN 61010-1
. EMC specification acc. to EN 61326/1

Advantages :

In compact structure
Easy to commission
Durable mechanical structure
High temperature versions are available

Application Areas :

Level measurement in liquids and solids, especially in abrasive aggressive fluids, under easy operating conditions. Chemical, pharmaceutical and pharmacy, food plastic industries, power plants, oil and cement factories . The small process connection offers particular advantages in small tanks or tight installation spaces. Very good signal focus guarantees use in containers with many installations, such as mixers and heating spirals. It is suitable for level measurement in storage vessels, reactors and process vessels. Wide temperature and pressure range facilitates project planning.

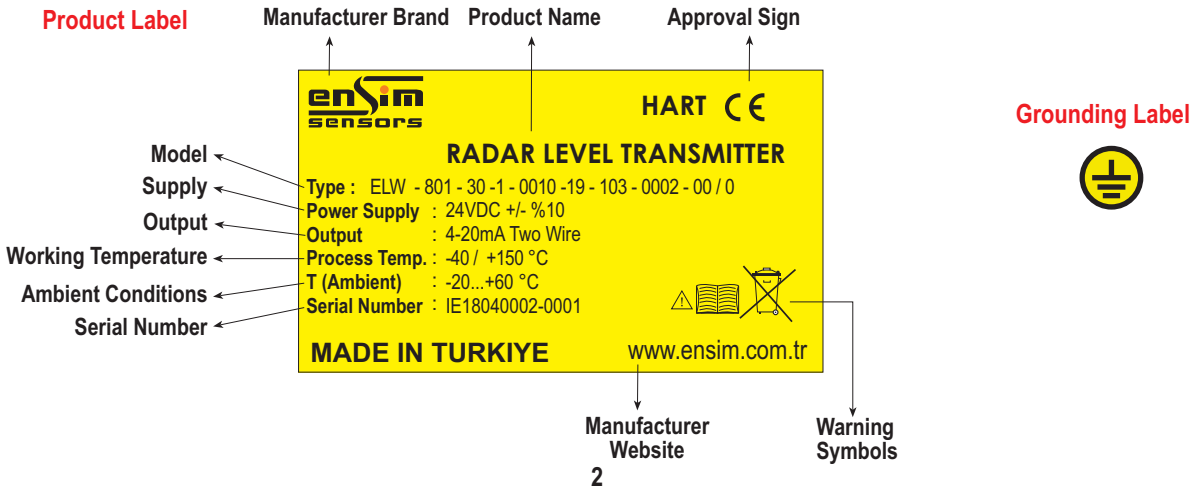
Ambient Conditions; Relative Humidity:5-98 %RH Ambient temperature: 60°C (not used below -40 °C)

1.3. Working Princible

Microwave pulses emitted by the antenna of the radar move at the speed of light and as part of its energy, reflected by the surface of the medium to be measured, recieved by the same antenna. The time between the emission and the arrival of the pulses (flight time) is proportional to the available distance between the antenna and the surface of the medium to be measured.

The electromagnetic wave travels at a very high speed (nanoseconds) so it is difficult to describe it. Ensim Sensors 80 GHz Radar Type Level Transmitters determine the emission and corrected capacity of pulses and consequently the level measurement with a suitable demodulation tehcnology that enables them to detect the between them, thanks to their integrated management systems. The alphanumeric display not only allows the user to input data for level measurement, but also separates false echoes.

1.4. Label Information :



1.5. Technical Specifications and Material Information:

Technical Specifications :	ELW 801, 802	ELW 803, 804
Material to Measure	Liquid, Solid Particulate Materials, Aggressive Liquids	
Range	0… 30 m	120 m
Accuracy	<± 2 mm	<± 3 mm <± 5 mm
Settings Menu Language	English	
Sensitivity	± 2 mm	
Repeatability	± 1 mm	
Resolution	1 mm	
Frequency	76 - 81 GHz	
Dielectric Constant (e)	Min. 1,4 (Selectable five diffirent way.)	
Response Time	< 2 sec	
Sampling Frequency	54 GHz	
Indicator and Adjustment	LCD Display	
Cable Input	M20x1,5mm	
Electric Connection	Terminal	
Process Connection	G 1½" (Std.) , G 3" , DN50, DN80 Flanged	
Antenna Type	Flange Lens	
Antenna Material	PTFE	
Housing Material	**Aluminum Injection AlSi2Fe Black (RAL9005) (Std)-Plastic**	
Connection Material	PTFE / 304 /316 Stainless Steel	
Working Temperature	(-) 40°C… 85°C	(-) 40°C… (+) 200°C
Ambient Temperature	(-) 20°C… 60°C	
Relative Humidity	< % 95	
Working Pressure	(-) 0,8 bar... (+) 3 bar	(-) 1 bar... (+) 20 bar
Beam Angle	7° , 3°	14° / 7° / 3°
Supply Voltage	15...36 VDC 2 Wire Version	
Power Absorption	< 0,5 W	
Output Signal	4-20 mA 2 Wire + HART (Resolution 1,6 mikro A)	
Error Signal	20.5 mA; 22 mA ; 3,9 mA (Adjustable)	
Integration Time	0... 20 s., Programmable	
Weight	~ 2 ... 4 kg	
Protection Class	IP 66 (EN60529)	



1.5. Technical Specifications and Material Information:

Technical Specifications :	ELW 1000	ELW 1200
Material to Measure	Liquid	Solid Particulate Materials
Range	0… 8 m. / 0… 15 m. / 30 m.	
Settings Menu Language	English	
Sensitivity	± 2 mm	
Repeatability	± 1 mm	
Resolution	1 mm	
Frequency	76 - 81 GHz	
Response Time	< 2 sec	
Adjustment	RS 485 / HART / Bluetooth	
Cable Input	M16x1,5mm	
Electric Connection	Cable (Ø 4 - 8 mm)	
Process Connection	G 1½" (Std.)	
Antenna Type	Compact	
Connection, Antenna and Body Material	PP	
Working Temperature	(-) 40°C… 80°C	
Ambient Temperature	(-) 20°C… 60°C	
Relative Humidity	< % 95	
Working Pressure	(-) 0,8 bar... (+) 3 bar	(-) 1 bar... (+) 30 bar
Beam Angle	8°	
Supply Voltage	15...36 VDC 2 Wire Version	
Power Absorption	< 0,5 W	
Output Signal	4-20 mA 2 Wire + HART (Resolution 1,6 micro A) / RS485 Modbus	
Integration Time	0... 20 s., Programmable	
Weight	~ 1 kg	
Protection Class	IP 67	IP 68 (EN60529)
Settings	Suitable for Bluetooth with . (Blueset)	

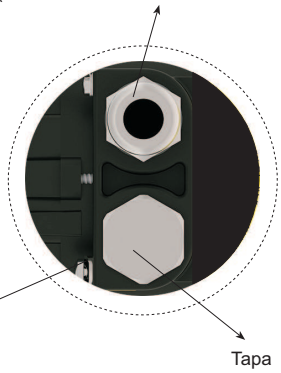
1.6. Housing :

DO NOT OPEN THE COVER WHEN ENERGY IS AVAILABLE
KEEP IT CLOSED WHILE OPERATING



Aluminium Housing

Cable Fitting
(Suitable cable diameter: Ø 6-12mm)



Grounding Terminal
(Max1,5 mm²)
Recommended cable (5x1,5 mm²)



B21x

Damp-proof

In damp and humid areas, cable fittings should be tightly tightened, replace at regular intervals, and in order to prevent water leakage into the sensor body in case of deformations that may occur over time, the cable should be left in a downward sloping position at the gland inlet.

ORDER CODE	TYPE	MATERIAL	PROTECTION CLASS	TEMPERATURE (°C)	SIZE a x b (mm)
702	B21x	Aluminium	IP 66	(-) 40...(+) 200	140 x 104
103	B20p	Plastic (PP)	IP 66	(-) 40...(+) 150	132 x 104

1.7. Target Group

This user manual has been prepared for qualified technical personnel.

1.8. Safety Notes

The following notes should be taken into account to avouid hazards to the operator and its surroundings.

The installation, use and maintenance of this device should only be carried out by people who have read the user manual and have knowledge of work safety!
Work safety, accident prevention regulations and national installation standards must be complied with.
The product should only be used within the stated specifications!
You can only mount the device when there is no pressure!

1.9. Package contents :

Please check whether you have taken delivery of below listed content completely or not and check its conformity with criterions in your order:

* Radar Type Level Transmitter
* This operating manual

2. Installation:

2.1. General Notes

The installation of the device should only be carried out by qualified personnel.
Do not apply force to the device during installation!
Do not use the Radar Type Level Transmitter at higher pressure than the recommended one.
Do not forget that the contact setting of the device is sensitive, handle it carefully and prevent it from getting damaged.
It must be guaranteed that there are no magnetic particles.

2.2. General Installation Stages

*Remove Radar Type Level Transmitter from the box carefully
*Check whether gasket is appropriate for fluid or not. If is not appropriate, contact with the producer.
*Then, apply below mentioned explanations according to structure of the design.

2.3. Special Notes

*Please make sure that there is no mechanical stress on the shaft after installation. Such a situation will lead to a shift in the characteristic curve.
*Radar Type Level Transmitter should be placed in a vertical position on the line.
*If the device is installed outdoors and there is a danger of lightning or overpressure, we recommend to install an effectively sized overpressure protection between the supply cabinet and the device.
*Under operating conditions, the Level Transmitter may be hot depending on the condition of the fluid, in this case, do not touch the transmitter, your skin may be damaged.

2.4. Installation For Mechanical Connections

*Use appropriate O-ring or seal for sealing.
*Make sure that its surface is clean and smooth.
*Install the device manually.
*Tighten the key as shown in the figure.
(Max. 20 Nm. For stainless models)
(Max. 10 Nm. For plastic models)



2.5. Apparatus :

Protection Cover :

Material : 304 St. steel
Welded manufacturing
Open – Close Hinged
To protect the switch against external conditions.



Cooler :

Material : 304 Stainless steel
Welded manufacturing
Applicable to all models.
Process temperature max. for 250°C



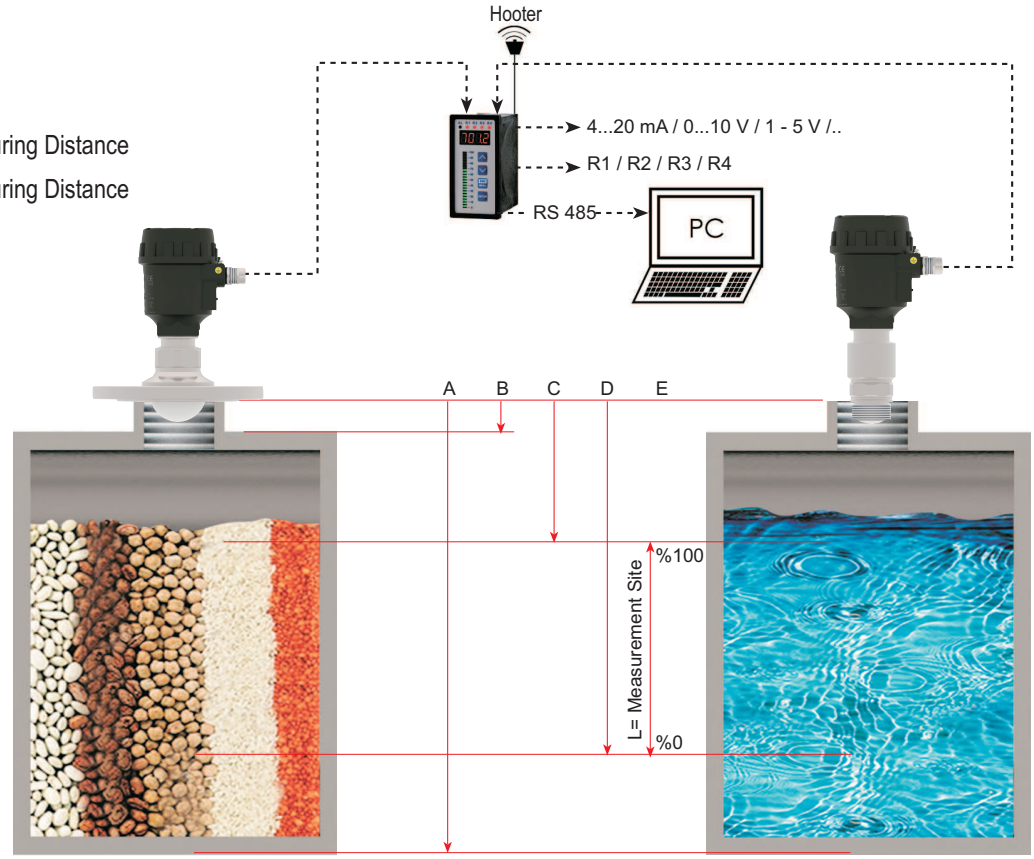
2.6. Mounting Requirements

Radar sensors have a signal angle followed by microwave pulses sent by the antenna to the surface. Therefore, between the antenna and the surface to be measured, other surfaces where these signals will be multiplied and reflected, stairs, mixer blenders, horizontal beams, heaters,etc. care should be taken that there are no elements that can create faulty echoes. In such cases, it is recommended to place the sensor so that it can see the real product surface, and if not, it is recommended to place reflectors at an angle of 45 degrees on vertical surfaces that may cause erreneous echoes.

During the installation , while the tank is empty, false echo detection should be made and the surfaces that create faulty echo should be recorded by the sensor. In this way, the sensor does not detect these points as a level and the measurement continues properly.
Care should be taken that the product entering the tank does not pass over the signal line of the sensor when filling through the silo or tank.

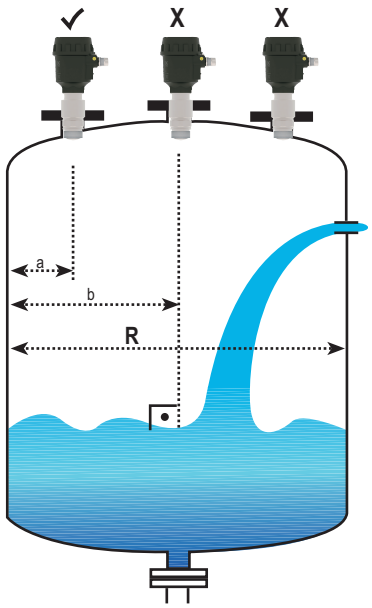
There is a blind area that cannot be measured by the sensors and known as the dead zone just below the antenna, which does not exceed 50cm according to the sensor. It is important that the product does not pass over the sensor's dead zone during filling, in which case the sensor will fail or the measurement values may remain constant.

A : Min. Dead Zone
B : Max. Dead Zone
C : Max. Level – Min. Measuring Distance
D : Min. Level – Max. Measuring Distance
E : Datum Plane



The measurement's maximum level, is the thread seal position or flanges bottom surface.

•When the liquid (solid) level is full, enter the dead zone correctly otherwise the instrument will not be able to measure the level effectively.



Mounting site selection

a >200 mm

b= R / 4 (Recommended)

Recommended distance from the tank wall to the outer edge of the mounting mouth:
It should be approximately ¼ of the tank"s diameter.
The sensor should not be mounted closer than 200 mm to the vessel wall.
It sould not be mounted in the middle. Interference can cause a loss of signal.
It should not be mounted above the filling point.
It is recommended to use a weatherproof case to protect the tool from sun or rain.
The radar antenna should be perpendicular to the meaured ambient surface.

Optimization options

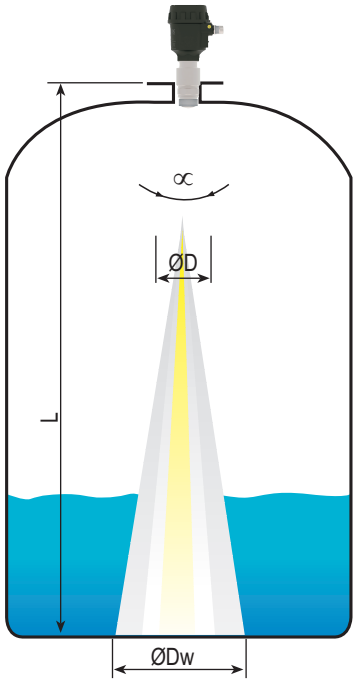
Antenna size: The larger the antenna size, the smaller the beam angle, the lower the interference echo.

Curved mounted metal screens : It is used to reflect the radar signal and interference can reduce echoes.

Emission angle

Dw = 2 L. Tan (∝/ 2)

The angle at which the energy density of the radar waves reaches half of the maximum energy density value is the beam angle defined as ∝ Microwaves also spread out of the signal beam and can be reflected from assemblies that generate interference.
The beam diameter Dw is function of the beam angle ∝ and the measurement distance D.



∝ = 3° ; 7° ; 14°

Measurement conditions

-PTFE antenna and metal antenna are used in case of a tendency to boil, bubble or foam on the surface. Depending on its consistency, the foam can absorb the microwave or reflect them off the foam surface.
Because the 6G radar beam angle is larger than 26G radar, the measurement result is better than 26G radar in boiling surface or bobbling and foam liquid or liquid cement level measurement.

-For conditions with heavy steam development or condensation, special metal antenna can be applied.

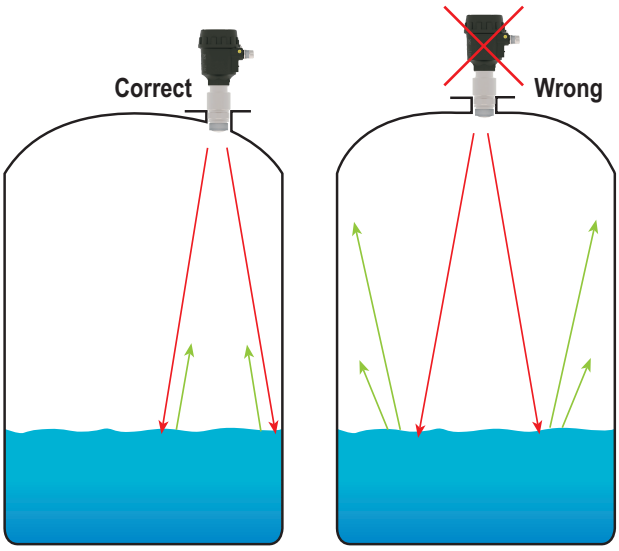
-For measurement of absorbent gases or some fluorocarbons, assemble with waveguide tube.

-The sensor cannot detect the lowest point for the bowl-based or conical outlet vessel.

-Electromagnetic waves for waveguide assembly do not propagate outside the tube, so accuracy may be reduced in the area outside the tube.

-For medium with low dielectric constant (ε = 1...5), the bottom of the tank is visible from the medium at low level. Accuracy can be reduced so the area is usually set lower dead zone.

-In principle, it is possible to measure up to the tip of the antenna, but area A is not considered for the measuring range due to corrosion or build-up. It is usually installed in the upper dead zone.



Mounting Site Selection

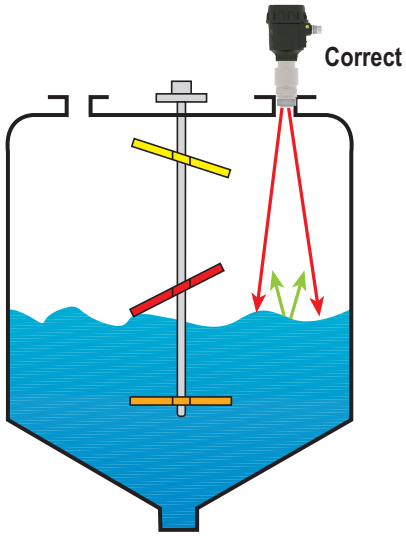
Correct : The sensor is mounted at a point half the radius of the tank, and within the sensor's signal area there are no physical factors affecting the sensor signals.

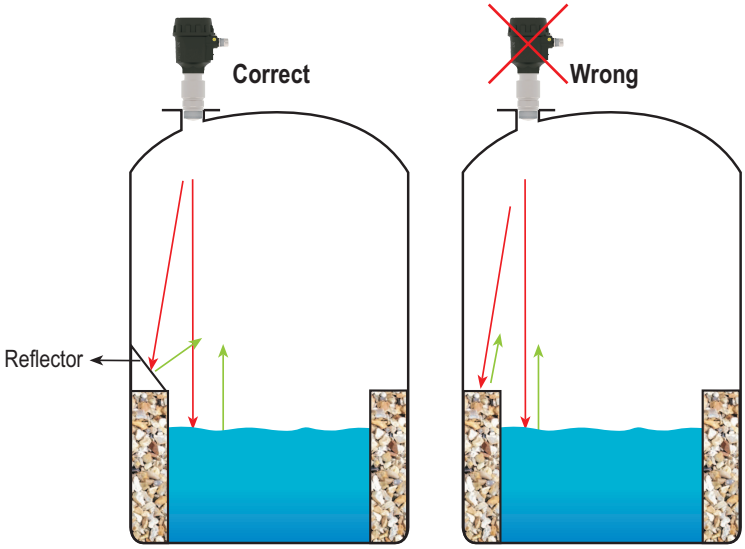
Wrong : The sensor is mounted at a point that corresponds approximately to the full radius of the tank. In this case, the signals sent by the sensor may not be reflected from the product surface and return with sufficient power, and because the signal stength received by the sensor is not sufficient, E013 may give Low Signal Error.

Mixer Application ;

If there is a mixer in the tank where the sensor will measure the level, the sensor should be installed at a point away from the filling line and as far as possible from the mixer that blocks its signals.

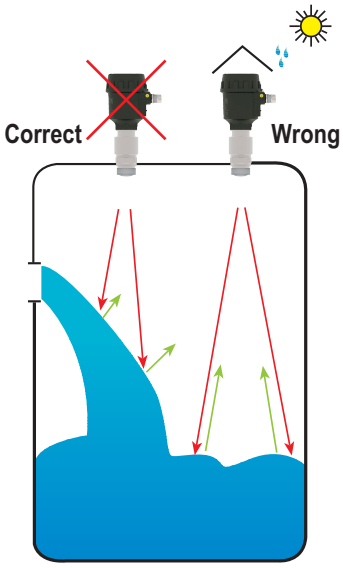
False signals reflected from the propellers of the mixer in the tank may reach the sensor and cause the sensor to make an incorrect evaluation. In such cases, when the tank is empty, erroneous signals must be detected and false signal suppression must be applied.
Thus, the sensor is prevented from making false measurements in case of faulty signals.





Reducing mixing echoes;

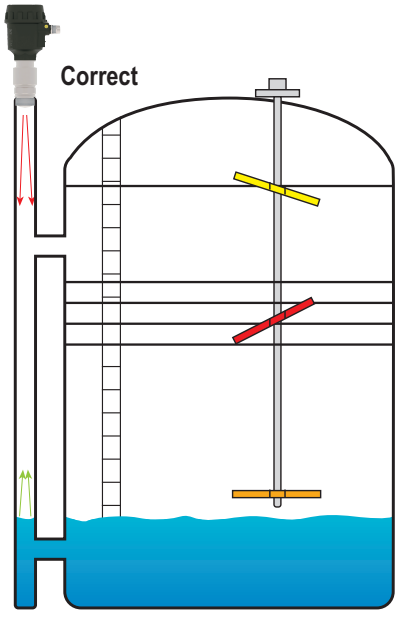
If there are structures that can mislead the sensor by producing false echoes on the tank, silo or open channels to be installed, it is necessary to use a reflector to reflect the faulty echoes that may be reflected from these surfaces to other directions.
As a result of the angled placement of any metal plate, the sensor signals will be diverted to other areas and will be weakened and the sensor will give the real level information from the surface to be read. If necessary, erroneous echo suppression should be done when the silo is empty.



Mounting Site Selection

Correct : Mount the sensor as far from the filling point as possible. In terms of its lifetime, use protectors to keep it away from snow, rain, sun and similar factors when necessary.

Wrong : Do not place the sensor on the fill line. The signal line must see the surface to be measured.

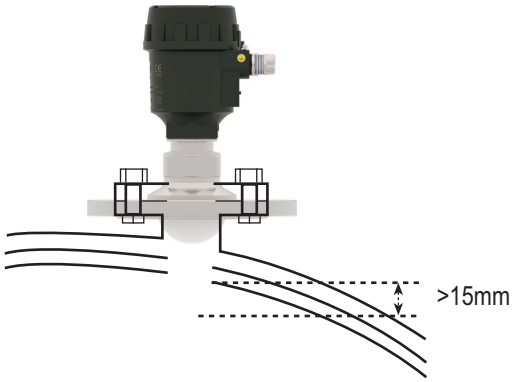


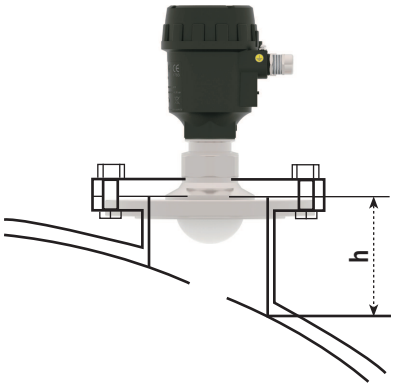
By-Pass Application

If there are difficult physical elements such as mixer, ladder, tank reinforcement metals in the tank where the sensor will measure, a By-Pass application is required. In this way, accurate and reliable measurement is provided.

Metal antenna

For the best measurement, the tip of the antenna should protrude at least 50 mm outside of the tank.





Hold the antenna perpendicular to the media surface.

Flat end face, large diameter and small mounting nozzle height are advantageous for measurement.

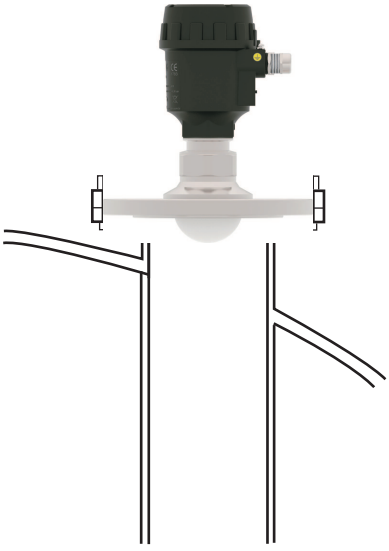
You can refer to the following data for antenna size and maximum nozzle height.

Mounting Nozzle Diameter	h
46mm	<90mm
76mm	<165mm
96mm	<230mm
126mm	<570mm

Mounting on waveguide tube

For boat setup and conditions with turbulence, you can mount the sensor with the waveguide tube.

For best measurement, the diameter of the antenna should be close to the diameter of the waveguide tube.



What should be a waveguide be like?

-The material must be metal.

-The diameter must be constant.

-The polarization must be marked on the sensor.

-Waveguide tube diameter should be larger than antenna diameter.

-The diameter difference between the outer diameter of the radar antenna and the inner diameter of the waveguide tube should be as small as possible.

-The welding point should be as smooth as possible and on the same axis.

-Duct width or hole diameter less than or equal to 5mm, without burrs. Length and number have no effect on the measurement.

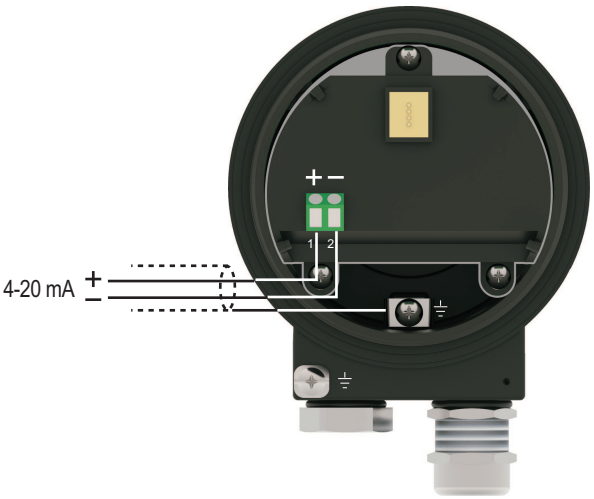
-The antenna diameter of the sensor should be suitable for the inner diameter of the pipe.

-The inner wall of the waveguide tube should be smooth and there should be no welding seams.

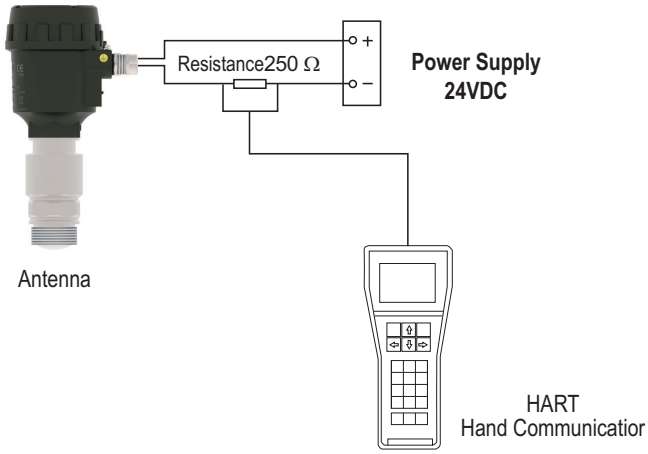
2.7. Electrical Connection

Two-wire 4...20mA HART protocol

DC energy between 14…36V is required as the power supply. The outer diameter of the cable bringing the energy should be between 5…9mm, with at least two wires and, if necessary, shielded type to protect it from electromagnetic fields. 4…20mA analog output signal is also received through the same cable.

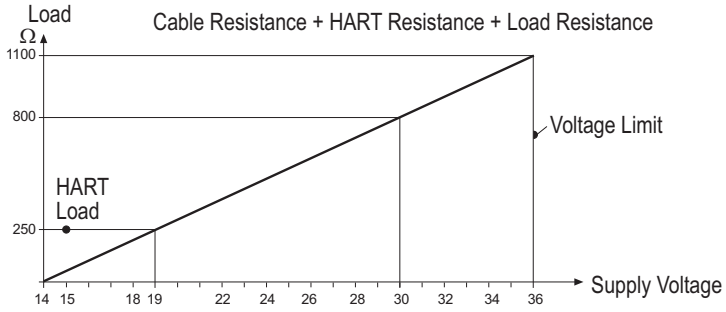


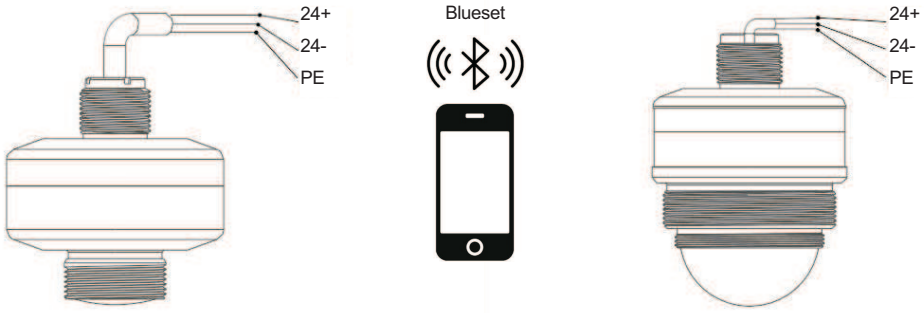
24 VDC Supply



HART Communication, with Hand Terminal

Load resistance diagram (Two-wire version)





2.8. Display and Adjustment Module

ESC -Back to the next upper menu
-Back to the main menu
-Switch to the graphic display



-Switch between menus
-Change values, switch between values
-Move the enlarge wave edge logo to the left.
-Change Numbers / Values

OK -Enter the main menu
-Enter the selected menu
-Save the values
-Edit parameter

-Switch between menus
-Swştch between values
-Move the enlarge wave edge logo to the right
-Switch between steps



For mounting the display and adjustment module;

1 Remove the housing cover.

2 Position the display and adjustment module in the target position.

3 Screw on the housing cover.

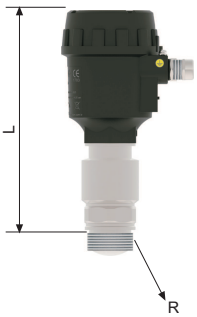
2.9. Setting Options

Radar Level Transmitter Display can be adjusted with the following adjustment media:

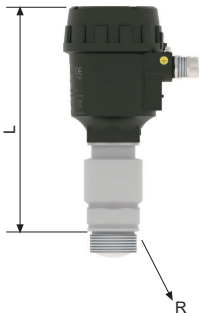
a) With local display and adjustment module
b) Tank side monitor
c) Setting software on upper monitor
d) HART communication
e) ROSEMOUNT 375 / 475 (only for hart common position)

2.10. Mechanical Dimensions

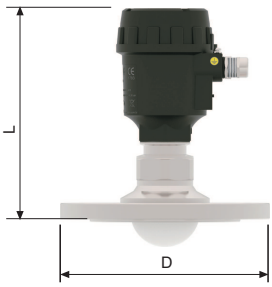
ELW 801



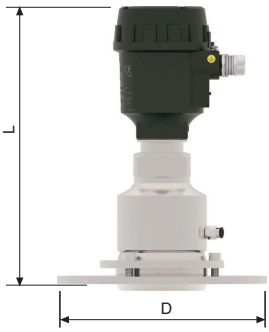
ELW 802



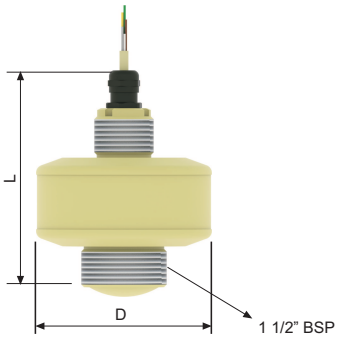
ELW 803



ELW 804



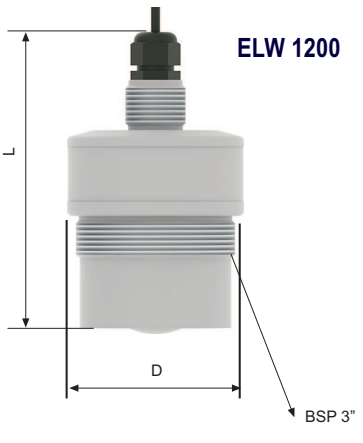
ELW 1000 / ELW 1200



Dimensions:

	Connection BSP (mm)	D (mm)	Angle (°)	L (mm)
ELW 801	1 1/2" BSP	Ø 39	7°	230
	3"	Ø 70	3°	230
ELW 802 Plastic	1 1/2" BSP	Ø 38	7°	230
	3" BSP	Ø 70	3°	230
ELW 803	DN80	Ø 200	6°	225
	DN100	Ø 220	3°	225
ELW 804	DN100	Ø 220	3°	292
ELW 1000	1 1/2" BSP	Ø 98	8°	100
ELW 1200	3" BSP	Ø 98	3°	155

ELW 1200



2.11. Operation Menu Structure and Function

The device is adapted to the application conditions through parameter adjustment. Parameterization is carried out via a settings menu.

The main menu is divided into ten seconds with the following functions:

▶ Quick Setup	Linearization	Information
Basic Setup	Security	Frecord Curve
Display	Communication	
System	Diagnosis	

A - QUICK SETUP: The radar sensor can measure the level accurately for most field conditions with quick setup.
You can set the maximum level, minimum level and level confirmation.

B - BASIC SETUP : Settings, eg. Damping time, Dielectric constant, Max. Dead zone, Min. Dead zone, Speed change, Magnification times

C - DISPLAY : Settings, eg. Display value, Unit, LCD contrast, Language

D -SYSTEM : Settings, eg. Echo decision, Current caliber, Distance caliber, Distance coefficient, Mapping setting

E - LINEARIZATION : Settings, eg. Distance linearity selection, Distance linearity regulation, Ratio linearity selection, Ratio linearity regulation

F - SECURITY : Settings, eg. Echo loss adjustment, Skip processing, Current output, Parameter protection

G - COMMUNICATION : Settings, eg. Address type

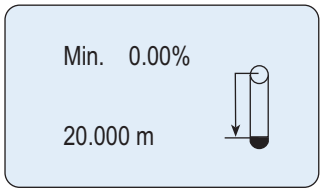
H - DIAGNOSIS : Information, eg. Distance record, Number of restarts

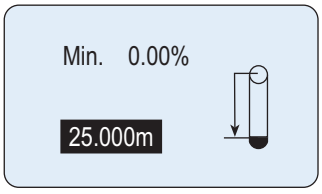
I - INFORMATION : Information, eg. Production date, Serial number, Part number, Version number

J - RECORD CURVE : Information, eg. Echo curve , Measurement curve

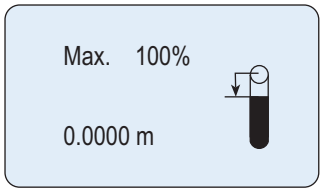
A - QUICK SETUP **Min. and Max. Level Adjustment**

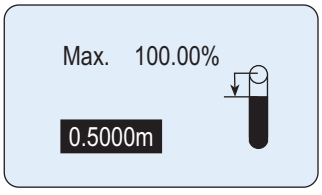
1 - Select the menu item “Quick Setup” and confirm with “OK”.
“Min. 0.00%” Press the “OK” button to change the distance value,
use the arrow keys ⇩⇧ to change the values.
Confirm the determine value with “OK”.
Enter the appropriate distance value in m for the full tank.
Max. Level is the distance from the farthest point of the antenna part to the tank max. level. It cannot be more than the min. level distance.





2 - With ⇩ switch to “Max. Level Adjustment” menu.
Press “OK” button to change Max. % 100,00 Distance value,
Use the arrow keys ⇩⇧ to change the values.
Confirm the determined value with “OK”.
Enter the appropriate distance value in m for the full tank.
Max. Level is the distance from the farthest point of the antenna part to the tank max. level. It cannot be more than the min. level distance.

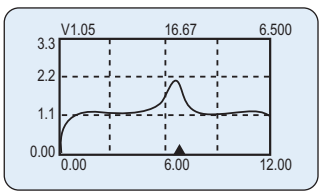




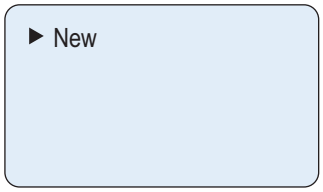
A - QUICK SETUP : **Level Confirm**

1 - Switch to the“Level Confirm” menu with the key ⇩ Confirm with “OK”.
Echo curve will be displayed as follows:





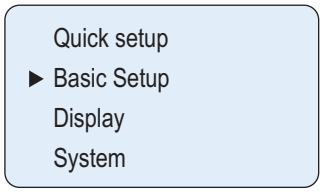
2- You can set a new reference distance with “OK”. Increase and decrease the distance with the direction key. Confirm with “OK”.



3- Return to the main menu by pressing the “ESC” button.
“Changes in this menu have no effect on the measurement. For determining a reference distance line from the graphic screen.

B - BASIC SETUP :

1- Select the “Basic Setup” menu item and confirm with “OK”.

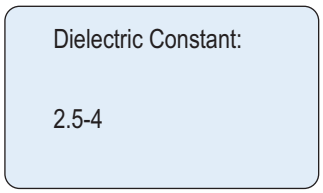


2- “Extinction Time” menu is displayed. Press the “OK” key to jump from cursor to value. You can set the suitable value between 0 ~ 99S. Save the value with “OK”. It is used to determine the range of variation of measurement values. Time can be kept high in fluctuating tanks.

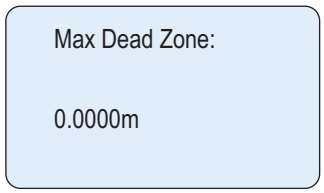


3- ⇩ With change to the menu “Dielectric Constant” with “OK”.Confirm with “OK”. Select the appropriate range of values for the “Dielectric Constant” in accordance with the measured liquid or solid. Save with “OK”.

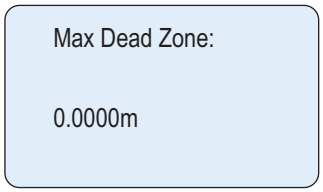
There are six options : **>7**, **4 ~ 7**, **2.5 ~ 4**, **1.9 ~ 2.5**, **1.6 ~ 1.9**, **1.4 ~ 1.6.**



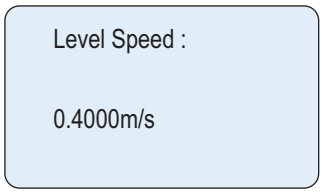
4- With ⇩ change to the “Max. Dead Zone” menu confirm with “OK” Enter the appropriate value according to the application. Confirm with “OK”.



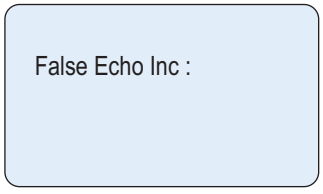
5- With ⇩ change to the “Min. Dead Zone” menu with “OK”. Set the appropriate value.



6- With ⇩ change to the “Change Speed” menu with “OK”. Set the appropriate value according to the application. Confirm with “OK”. Enter the appropriate value according to the level filling speed. Save with “OK”.

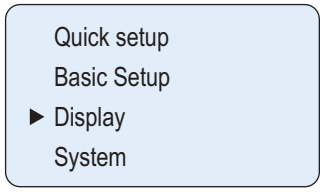


7- With ⇩ change to the “False Echo” menu with “OK”.

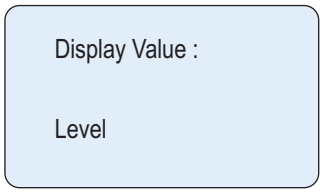


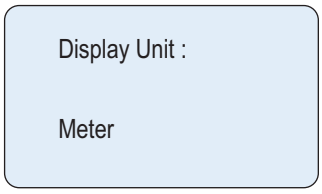
C - DISPLAY :

1- Select the “Display” menu and confirm with “OK”



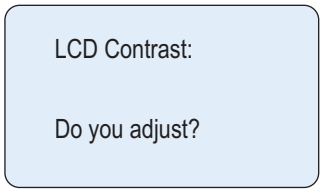
2- You can select the values to be seen on the screen from the “Display Content”. Login with “OK”. Select one of the options of Level, Current, Distance, Percent and Mapping and confirm with “OK”.

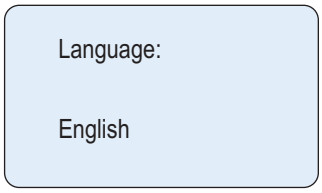




3- Select the “Display Unit” menu with ⇩ key and enter with “OK”. Unit selection is made for “Level” and “Distance” in this field. Make a selection with the ⇩⇧ arrow keys and confirm with “OK”.

4- Select the menu “LCD Contrast” with the key ⇩ and enter with “OK”. Make the setting with the ⇩⇧ keys . Confirm with “OK”.



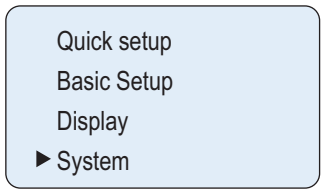


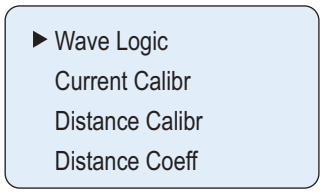
5- Select the menu “Language” with the key ⇩ and confirm with “OK”. Available in “English” only.

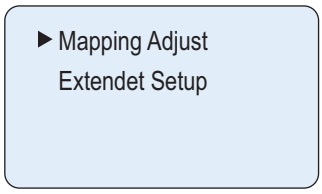
D -SYSTEM :

Wave Logic

1- Select the menu “System” with the key ⇩ and confirm with “OK”. Enter the submenu and select the “Wave Logic” menu and confirm with “OK”.

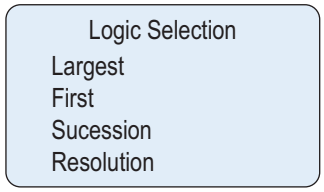




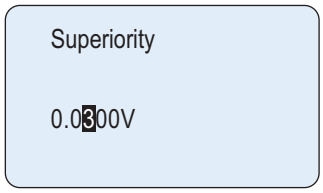


2. Select the “Largest (Std.)” option to read the largest value. This should be chosen in order not to see false echoes occurring in the environment. Select “First” to see the first read echo value. Confirm with “OK”.

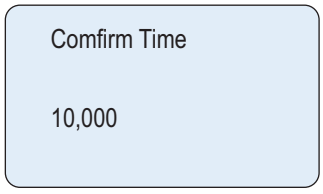
***Other options are for the manufacturer only.**



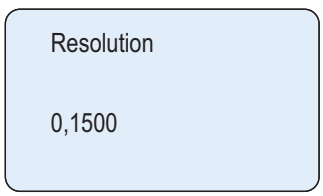
4- With ⇩ enter the “Superiority”, confirm with “OK”. Adjust the value between -3 ~ 3to increase or decrease the distance between two echoes. Save the value with “OK”.

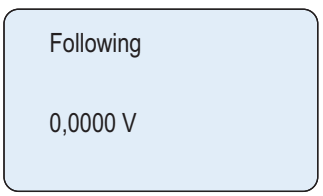


5- With ⇩ enter the “Confirm Time”, confirm with “OK”. Set the value between 0 ~ 90,000. Save the value with “OK”. It affects the resolution time of the sensor’s measured data.



6- With ⇩ enter the “Min. Resolution”, confirm with “OK”. Adjust the value between 0 ~ 2. Save the value with “OK”.





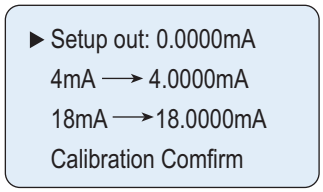
7- With ⇩ switch to the “Following” menü. Set it to 0.0000 V (Std.). Save the value with “OK”.

D -SYSTEM : **Current Calibration**

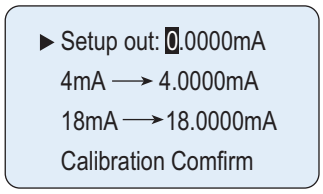
System - Current Calibration

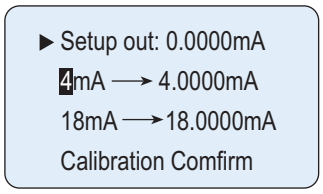
Proceed as follows :

1- Select “Current Calibration” and press “OK”. The submenu is as follows:



2- Select the appropriate current and adjust the value according to the field condition. Save the selection with “OK”.



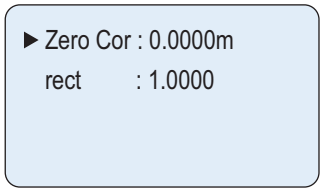


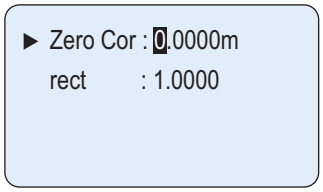
3- With ⇩ enter the “Calibration Confirm”, confirm with “OK”. The setting above will be saved.

D -SYSTEM : **Distance Coefficient**

1 - Select “Distance Coefficient” and press “OK”, the submenu is as follows:

2- Select the appropriate distance and adjust the value according to the field condition. Save the selection with “OK”.



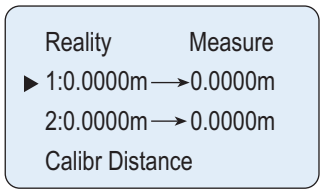


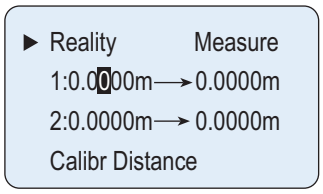
D -SYSTEM : **Distance Calibration**

1- Select “Distance Calibration” and press “OK” button, the submenu is as follows:

2- Select the appropriate distance and adjust the value according to the field condition. Save the selection with “OK”.

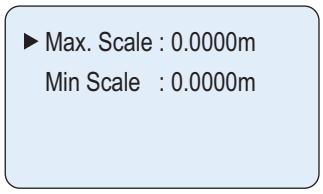
3- With ⇩ use toenter “Calibrated Distance”, confirm with “OK”. The edit will be saved.

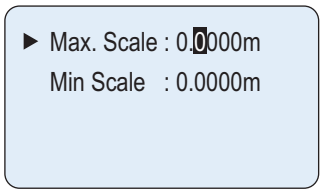




D -SYSTEM : **Mapping Coefficient**

1- Select “Mapping Setting” and press “OK”, the submenu is as follows:



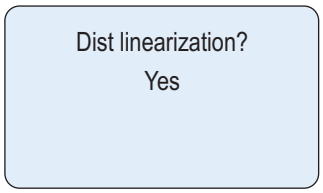


2- Select the appropriate value and adjust it according to the field condition. Save the selection with “OK”.

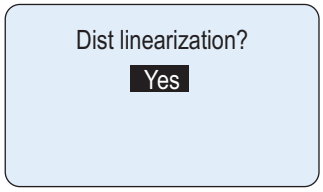
E - LINEARIZATION :

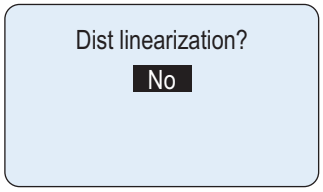
1- Enter “Linearization” with “OK”. You can choose yes or nor depending on the field condition.





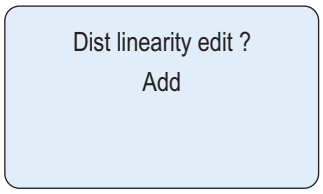
2- It should be choosen as “Yes” to activate “Distance Linearity Calibration”.

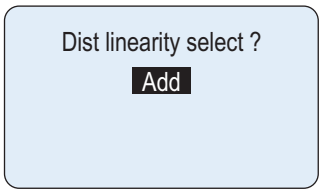




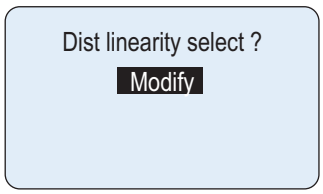
3- With ⇩ enter “Distance Linearity Edit”, confirm with “OK”. New parameter can be added with “Add”.

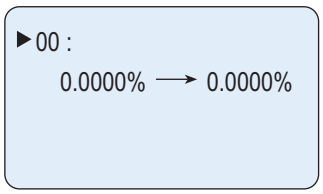
New parameter can be added with “Add”.

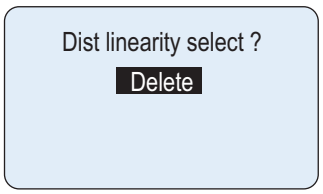




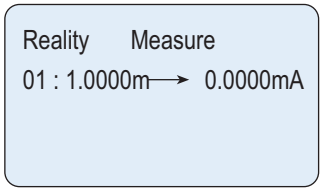
4- Set the value and then save with “OK”.

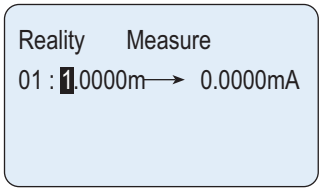




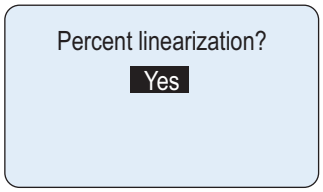


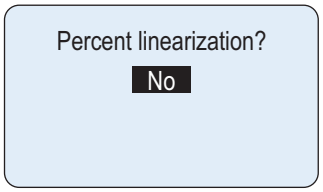
5- With ⇩ enter “Select-Change Distance Linearity (Modify)”, confirm with “OK”. Change the value and save with “OK”. You can also delete the linear selection.





6- Enter “Percent Linearization” with “OK”. You can choose yes or no depending on the field condition.

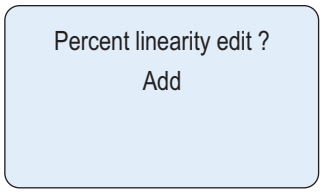


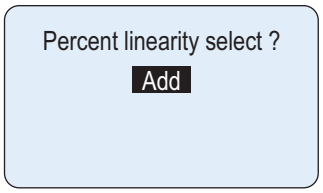


7- With ⇩ enter “Percent Linearity Edit”, confirm with “OK”.

New parameter can be added with “Add”.

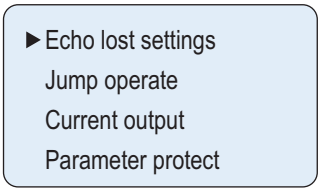
With ⇩ enter “Select-Change Distance Linearity (Modify)”, confirm with “OK”. Change the value and save with “OK”. You can also delete the linear selection.



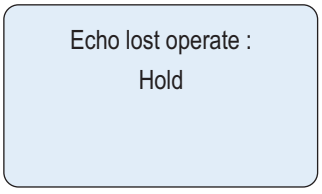


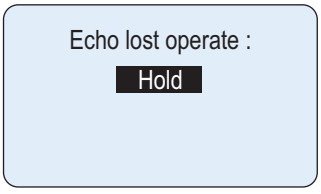
F - SECURITY : **Running Echo Loss**

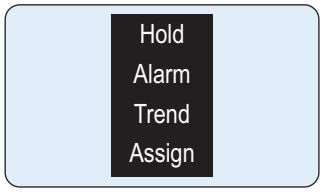
1 -Enter “Security” menu, the submenu is as follows:



2- Enter “Echo Lost Settings” with “OK”. You can choose “Delay, Alarm” for “Echo Lost Setting”. Other options are for the manufacturer.

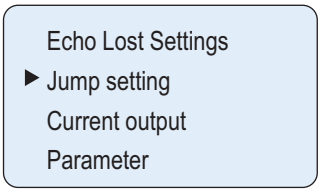




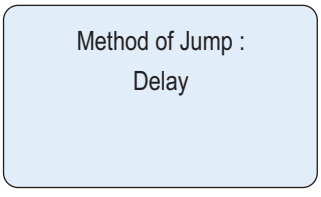


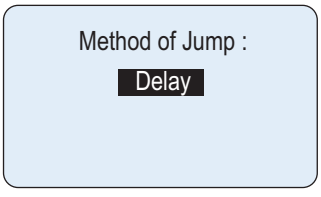
F - SECURITY : **Jump Setting**

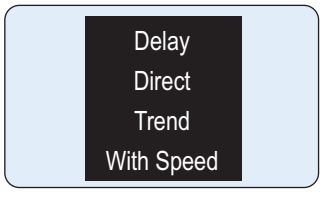
1- Enter “Jump Setting” menu with “OK”.

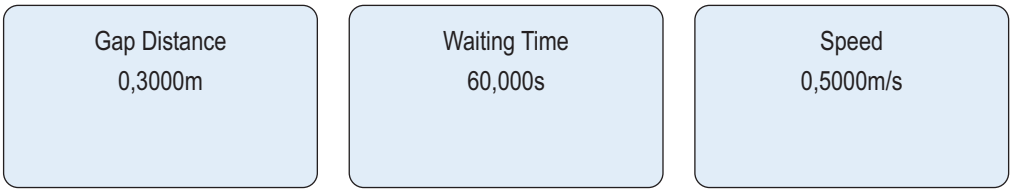


2- You can choose “Delay, Direct, Trend, With Speed” for “Jumping Mode”.



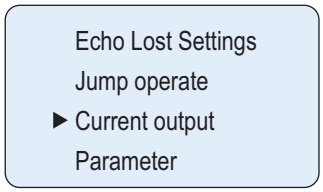




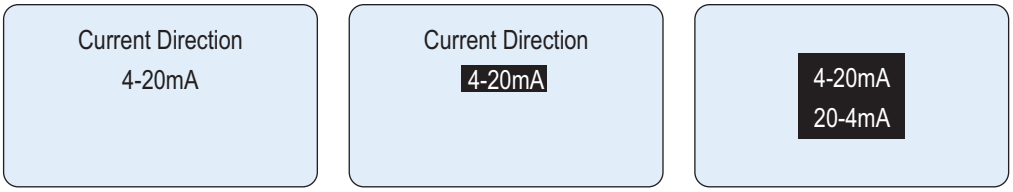


F - SECURITY : **Current Output**

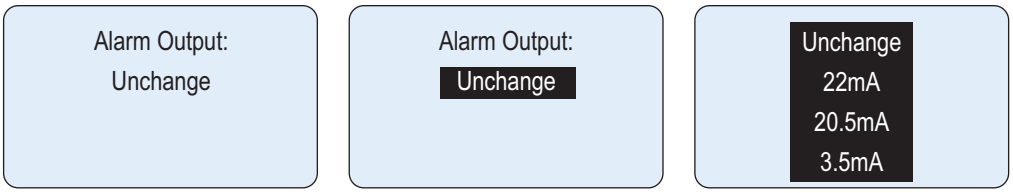
1- Enter “Current Output” with “OK”.



2- You can choose “4-20mA or 20-4mA” for “Current Direction”.



3- With ⇩ enter “Alarm Output”, confirm with “OK”. There are four options. “Unchange, 22mA, 20.5mA, 3.5mA. You can choose one depending on the field condition.

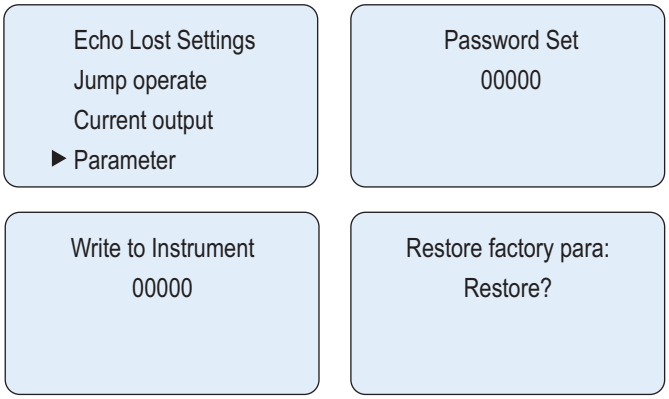


F - SECURITY : **Parameter Protection**

1- With ⇩ enter “Parameter”, confirm with “OK”. Login with admin password. Confirm with “OK”.

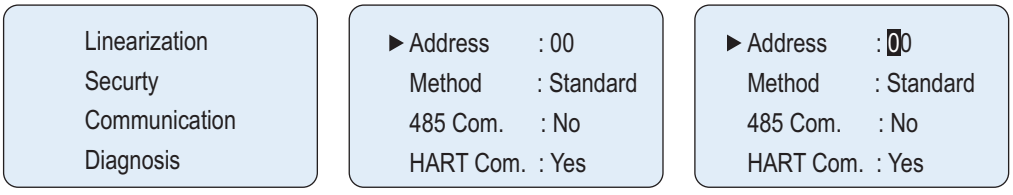
2- You can set a new password on the “Password Set” screen. After entering, confirm with “OK”.

3- With ⇩ you can enter “Write to Instrument” or “Restore Factory Parameter”.

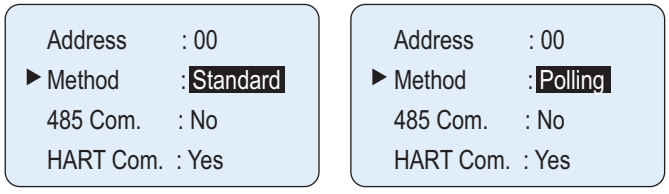


G - COMMUNICATION :

1- Enter “Communication” with “OK”. Enter the admin password. Change the “Address” value between 00 ~ 99.

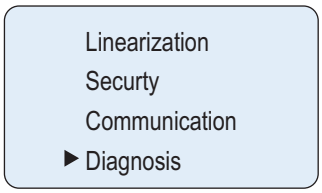


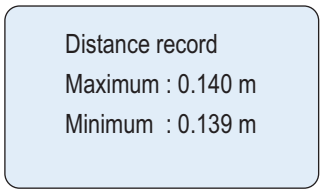
2- With ⇩ enter “Method”. You can select the communication type as “Standard” or “Polling”.



H - DIAGNOSIS :

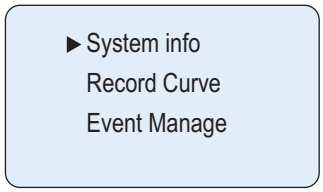
1- Enter “Diagnosis” with “OK”, You can set the max. and min. values.

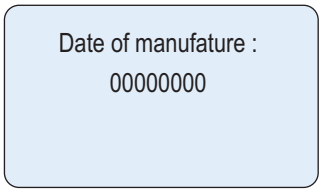


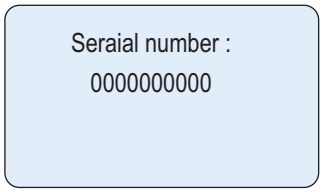


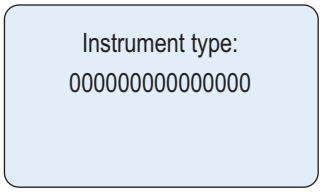
I - INFORMATION :

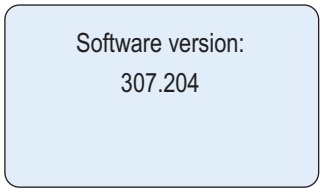
1 - Enter “System Info” with “OK”, information about the device will be displayed. You can check “Date of manufacture, Serial number, Part number, Software version”





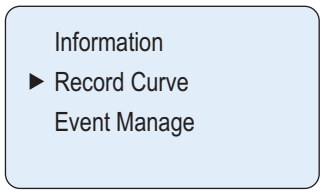


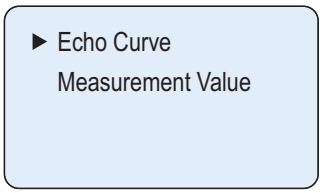


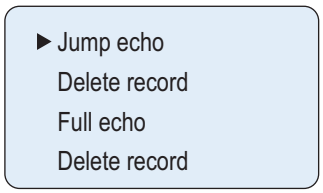


J - RECORD CURVE : Echo Curve Record

1 - Enter “Record Curve” with “OK”, select “Echo Curve”, enter “Jump Echo, curve will be displayed.

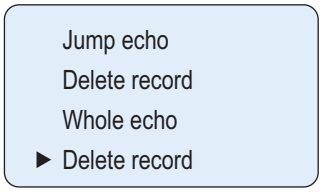


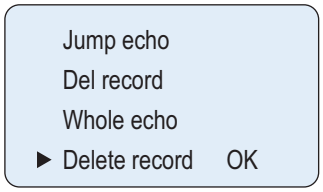




2 - With ⇩ select “Delete Record”. You can delete jump echo.

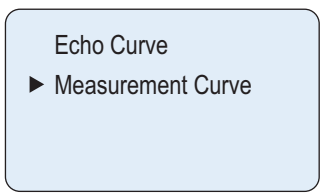
3 - Enter “Whole Echo” with “OK”. You can control or delete whole echo.

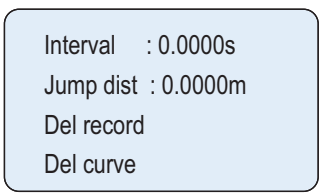


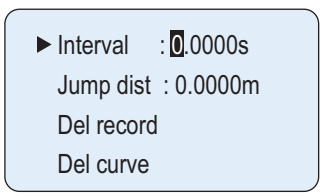


J - RECORD CURVE : Measurement Curve

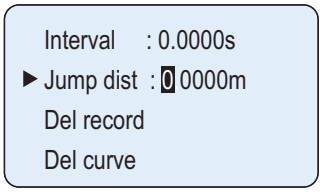
1- Enter “Measurement Curve” with “OK” and select “Interval”, you can set the value and save it with “OK”.

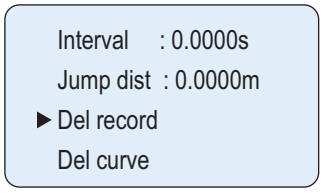






2 - Select “Jump Distance” with “OK”. You can set the value and save it with “OK”. With ⇩ you can delete the recording or view the measurement curve through “Delete Record” or “Show Curve”.



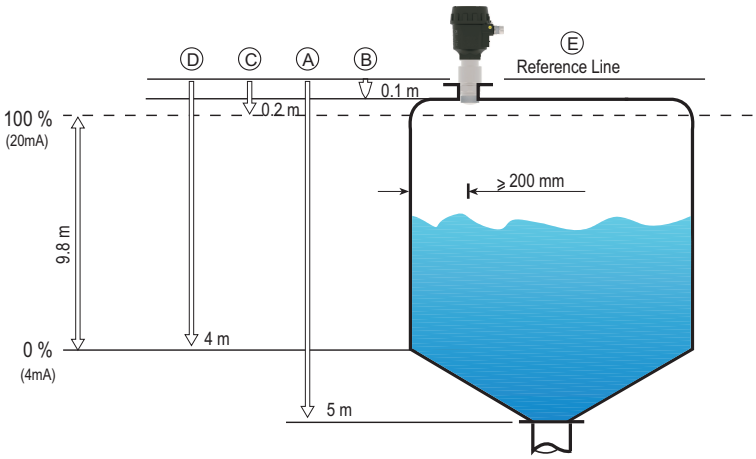


2.12. Troubleshooting

Error Code	Probable Cause
E040	Hardware error
E013	No echo curve
E022	Storage error
E031	Ultra high
E032	Ultra low
E0027	Active code wrong more than one time
E001	Ultra range

2.13.Programming Example

Before checking all the features of the sensor available in menus and submenus, 5 m. Let's make a simple but complete adjustment of the level measurement made on a tank at height.



This example shows the features of the setup that should be considered in programming the sensor.

B Mounting neck height (0,1 m)
A Total empty height (5m)
C Max. adjustment (0,2 m) (Generally dead zone)
D Min. adjustment (4 m)

As mentioned, the height of the tank (total) is 5 m, but it is not possible to measure the usable height completely due to the dead zone 3 as shown in the picture. However, if desired, in terms of easy calculation, the full height of the tank is max. It can enter the sensor as occupancy. In this case, 100% value will never be taken, if the dead zone is exceeded, the sensor will fail.

Before programming, the user must have certain parameter values for the application as in the example below.

-Maximum Vessel Height A (m)

This value is the distance between the reference line and the lowest point of the vessel, in this example it is 5.00 m.

-Mounting Thread Height B (m)

This value is the distance between the reference line and the inner ceiling of the vessel, in this example it is 0.1 m.

-Maximum Level C (20 mA)

This value with reference line max. is the distance at the height of the liquid. In this example it is 0.2 m. In other words, it is the 100% point where 20mA will be taken. This point should not be within the dead zone of the sensor. If the sensor's dead zone is 0.3 m, do not set this value to 0.2 m.

-Minimum Level D (4mA)

This value is min. is the distance at the height of the liquid. In this example it is 0.4 m. In other words, it is the 0% point where 4 mA will be taken. Inside the vessel min. and max., the points are determined by the user and the shape of the operation. The lowest point of the vessel can be selected as 0% or a safety filling can be left under the vessel. Thus, the last 1 m to full discharge. It can also be set to 0%. This point is the empty point of the vessel where 4 mA will be taken.

With a simple calculation, the max. measuring range can be calculated.

-Empty vessel height = actual height = 5 m
-Empty value = 0% = 4 mA = 4 m from the liquid surface to the reference line
-Filled value= 100% = 20mA = 0.2 m from the liquid surface to the reference line

Example. When the sensor sees a gap of 4 m below the reference line, it will output 4.00 mA (0%), at a liquid height of 3.8 m, and 20.00 mA (100%) when the reference line is 0.2 m.

The basic principle is to always measure the empty distance between the sensor and the product surface. All radar ultrasonic and microwave sensors based on the signal transmission and retrieval time only measure the gap from the sensor to the surface. Level, volume, weight, height and other similar measurement units are obtained by calculating distance measurements and the values frecorded during the programming of the sensor.

2.14. Order Type

Order Form : Please consider sample models when coding.

1 MODEL ELW

Std. Type.....8
OEM Type (Liquid).....10
High Temperature Type.....9
OEM Type (Solid).....12

2 CERTIFICATE

Yok..... 0
(EN10204-3-1) Material Certification 1

3 CONNECTION TYPE

PTFE Antenna.....1
Metal Antenna.....2
Flanged Antenna.....3
Movable Flange.....4
PP Antenna.....00

4 MEASURAMENT RANGE

8 m. 08
15 m. 15
30 m. 30
70 m. 70
120 m. 120
Special.....x

5 WORKING TEMPERATURE

(-) 40°C...(+) 150 °C (Std.) 1
(-) 40°C...(+) 85 °C (Std.) 2
(-) 40°C...(+) 250 °C (Std.) 3
(-) 40°C...(+) 80 °C (OEM Type).....4
Special.....x

6 CONNECTION MEASUREMENT

1 1/2" BSP (Std.).....0010
3" BSP.....0014
DN 50 - PN 16 (Std.).....0505
DN 80 - PN 16.....0507
DN 100 - PN 16.....0508
Special.....x

7 OUTPUT

4-20mA Two Wire HART. (Std.).....19
4-20mA RS485.....
4-20mA Two Wire.....20
Special.....x

8 HOUSING

Aluminium Housing, B21x IP 66.....702
Plastic Housing , B20p.....103
Special.....x

9 CONNECTION and ANTENNA

316 Stainless Steel.....0002
PP (For OEM).....062
PTFE.....0066
Special.....x

10 ELECTRICAL CONNECTION

Terminal.....00
PVC Cable (Max. 60°C For OEM).....80
Special.....x

11 OPTIONAL

None...../ 0
Protection Sleeve–For External side of tank, 304 St.St. .../ K6
Cooling Apparatus ..... / H
Special...../ x

EXAMPLE ELW - 801 - 30 -1 - 0010 -19 - 103 - 0002 - 00 / 0

Radar Level Transmitter, Model ELW 1801 , 30 m, 4-20 mA Two Wires HART with communication, 1 1/2" BSP

*1 It has to be used with "Cooling Apparatus" code "/ H"

WARNING !!!

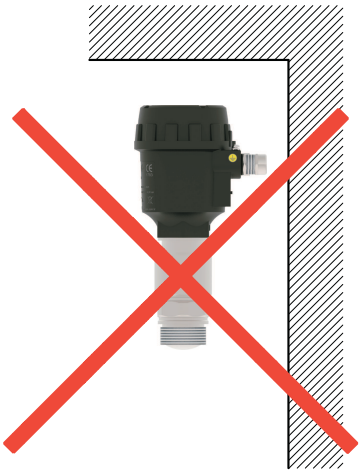
2.15. In order for the level transmitter to work properly, please pay attention to the following points.



Do not pull by the cable, otherwise its characteristics may be affected.



Keep away from magnetic fields. Otherwise, its characteristics may be affected.



Keep away from magnetic materials such as iron plates. Otherwise, its characteristics may be affected.



Vibration can cause instability.



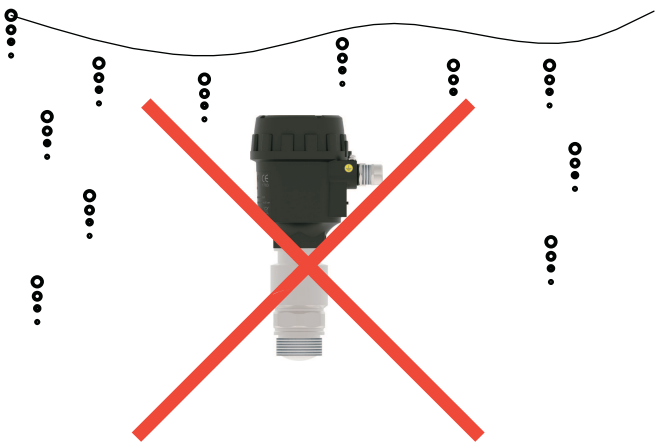
Do not drop the transmitters and do not subject them to impacts. Otherwise, its characteristics may be affected.



Do not remove the cover while energized.



The contact of the cable with steam may cause an insulation problem.



Do not leave the cable connection points below the liquid level, otherwise insulation problems may occur.

3. Error Detection::

Malfunction	Probable cause	Error detection/correction
Normal viewing in the central control room, no value on the device.	1.Display plug is not connected correctly. 2.The screen is defective.	1.Connect the plug correctly. 2.Change the screen.
The central control room shows 0 and there is no value in the device.	1.Supply voltage does not match the value specified on the product label. 2.Cable is not making proper contact with terminal. 3.Pole of supply voltage is wrong.	1.Reconnect the cable to the terminal. 2.Straighten the pole. 3.Connect the plug correctly.
No echo (No signal output)	1.False echo is improperly set and overlaps true echo. 2.Medium level Max. It is below the Dead Zone. 3.Ambient level Min. Dead Zone lower than upper level 4.Empty tank, the tank is cone shaped. 5.The dielectric constant of the medium is too low. 6.When measuring solid media, the antenna is not perpendicular to the media surface. 7.Accumulation occurs on the antenna.	1.Check the actual level of the environment and adjust the false echo accordingly. 2.If there is a clear echo at ambient level Max. You can reduce the dead value accordingly. If the echo of the ambient level is not clearly visible, you can raise the device with the bracket or limit the stream level of the media. You can also set the echo loss setting as forcing output. 3.Min. Increase Dead Zone. 4.Echo loss min. Set it to 0% and the output to 4 mA. 5.Replace the device with a high energy model. 6. Adjust the mounting angle to make the antenna average vertical. 7.Clean the antenna.
There are instantaneous increases and decreases in the output value.	1.There is noise echo not covered by false echo.	1.Set a new false echo and check the antenna for build-up or drop and clean the antenna.
Output value shows low level and comes back automatically in a short time.	1.The second echo is higher than the real ambient echo due to improper mounting position.	1.Adjust the superiority or adjust the mounting position to keep from the center of the circular arch of the tank top.
HART communication does not work.	1.Communication resistor missing or incorrectly installed. 2.Dialog box did not switch to HART mode. 3.The dialog is connected incorrectly.	1.Install the communication resistor correctly. 2.Set the toggle switch of the dialog box to HART. 3.Connect the dialog correctly.
The device is measuring incorrectly.	The parameter is set incorrectly.	Set the parameter correctly.
During filling or emptying, the measured value jumps down.	There are multiple echoes.	Use waveguide tube if possible. Change the mounting position. Do not install in the middle of the tank.

If you find an error, try to eliminate it by using this table or send the instrument to our service address for repair.


The instrument should be repaired only by authorized service! Serial number shall be indicated to the authorized service center.

4. Disassembly of Instrument

Instrument should be disassembled while feeding and pressure is not available!

5. Service

The instrument does not require maintenance. If it is desired, residue accumulated inside should be blown according to kind of fluid and instrument can be cleaned with soft cleaning solutions. Measures should be taken during the disassembly.

6. Re-Calibration

During long period usage of Radar type level transmitter, there might be deviations on measurements. In those cases, recalibration is recomended. Re-calibration could be made by your technical staff or you could send to manufacturer company. According to IEC 60017, ex proof devices must be go through detailed inspection every 3 year from purchase date.Respobsibility of inspections are belong to the user (IEC: International Electrotechnical Commission)

7. Repair – Manufacturer Address

If irreparable breakdowns occur, the instrument should be sent to us for repair purpose. Before this, the instrument should be cleaned carefully and packaged so as not to be broken. Furthermore, you should also add a detailed explanation which describes the breakdown while instrument is sent. If your instrument contacts with harmful substances, decontamination report should be also sent additionally. In the event that instrument does not have any decontamination report or our service department has doubts about instrument, repair process will not start until an acceptable report is sent.


If the instrument contacts with hazardous substances, necessary measures should be taken for decontamination!

Service -Manufacturer Company Name and Address:

LONCA MAK. SAN. TİC. A.Ş.

Ferhatpaşa Mah. 37 Sok. No:78/A 34888 Ataşehir - İSTANBUL / TÜRKİYE

Phone : +90 216 50 50 555 / E-Maila : lonca@ensim.com.tr Web : www.ensim.com.tr

8. Disposal

The instrument should be disposed according to 2002/96/EC and 2003/108/EC European Directives (waste electrical and electronic instruments). Waste electrical and electronic equipment should not be mixed with domestic wastes!


If the instrument has contacted with harmful substances, special attention should be paid for its disposal! 

9. Terms of Warranty

The instrument has warranty legally for 24 months after delivery date. Warranty demands are not accepted in case of inappropriate operation, damage on the instrument or any modification on the instrument.

10. Terms of Return

In the return of materials, user should send an open list related to damage or problem, malfunction of the material to be returned or its operation in the different modification, with the instrument. If it is required to return the material, used in the dangerous, corrosive or toxic fluid, in this case, used part should be cleaned very carefully. Security of personnel should be ensured. All products to be returned should be sent to our company address, which we have stated.