



ALT 6500

Smart Magnetostrictive Level Transmitter



LEVEL



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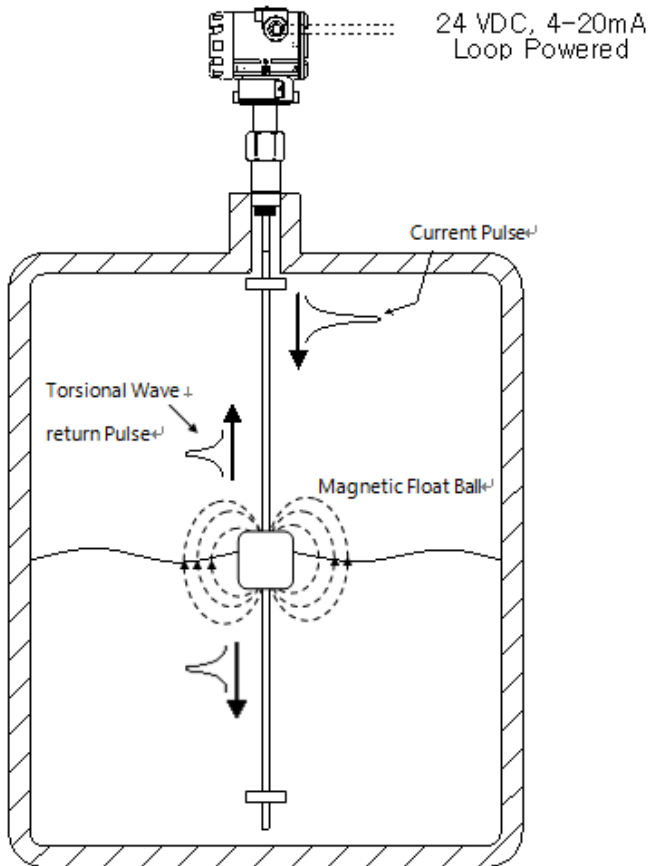
Overview

The Autrol ALT6500 Magnetostrictive Level Transmitter As a transmitter based transmitter, high precision measurement of clean fluid and It provides an ideal solution for high accuracy.

Time of Flight Principle is that a pulse generated by an electronic device travels along a probe and reaches a float ball floating by buoyancy to generate a twist, which in turn causes a mechanical wave to the electronic device.

Pulse generation time and returned mechanical wave time are measured to output 4 ~ 20mA value proportional to the level of process medium and it has the function to use control system such as DCS or PLC.

Basic Configuration



ALT6500 Smart Magnetostrictive Level Transmitter

Features

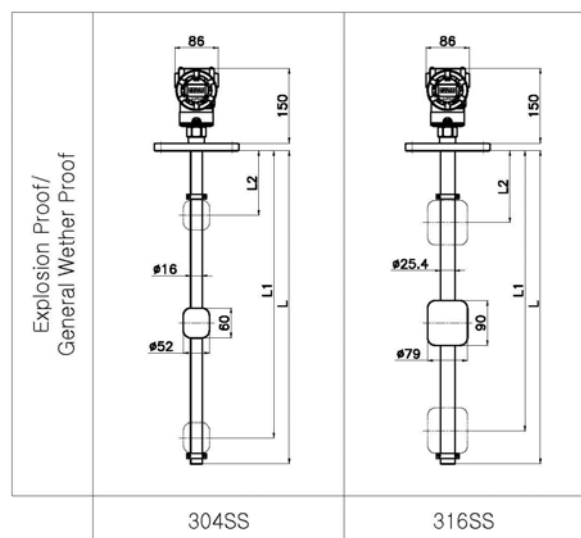
- Continuous level display is possible
- 4 ~ 20mA current output and indicator display
- Easy to calibrate and maintain in the field with a single instrument
- Easy to use for accurate level and interface measurement
- Continuous self-diagnostics
- Signal speed is not affected by temperature and pressure
- Influenced by bubbles, reflected waves, and beam dissipation.

Applications

- Chemical chemicals, gasoline, light oil, liquefied gas
- Separators, Process Vessels
- Interface measurement in water tanks and various liquid tanks

Specification

Accuracy	0.01% of full scale or $\pm 1\text{mm}$, whichever is greater	
Output	Type	Analog 4 to 20mA (2wire) with Hart digital signal
	Diagnostic Alarm	Adjustable 3.78, 21.1mA
Power	16.5~45VDC (with Hart digital signal) 22~45V @ 250 Ω	
Operation temperature	-40 to + 80 $^{\circ}\text{C}$ (LCD temperature limits: -20 to + 80 $^{\circ}\text{C}$)	
Process temperature	-20 to 100 $^{\circ}\text{C}$ (High temperature probe) +200 $^{\circ}\text{C}$	
Process Pressure	0~20 bar	
Humidity Limits	5% ~ 100% RH	
Response Time	< 1second	
Zero/Span	Reed Switch	
Damping	0 ~60 seconds	



ALT-6500 Ordering Information

Model	Description	
ALT6500	Smart Magnetostrictive Level Transmitter	
Code	Measurement	
-L	Level	
-I	Interface*	
-X	Special (manufacture order)*	
Code	Probe Material	
S1	304SS	
S2	316SS	
Code	Process Connection	
A21	2" ANSI, #150	Flange
A23	2" ANSI, #300	
A26	2" ANSI, #600	
A29	2" ANSI, #900	
A31	3" ANSI, #150	
A33	3" ANSI, #300	
A36	3" ANSI, #600	
A39	3" ANSI, #900	
A41	4" ANSI, #150	
A43	4" ANSI, #300	
A46	4" ANSI, #600	
A49	4" ANSI, #900	
J51	JIS 50A, 10K	
J52	JIS 50A, 20K	
J81	JIS 80A, 10K	
J82	JIS 80A, 20K	
J10	JIS 100A, 10K	Thread
J11	JIS 100A, 20K	
TN1	1 1/2" NPT	
TN2	1" NPT	
TG1	G 1 1/2"	Thread
TG2	G 1"	
S	Special*	
Code	Output Signal	
A0	4-20mA, HART	
Code	Electrical Connection	
1	1/2-14NPT Epoxy-Polyester Painted Aluminum	

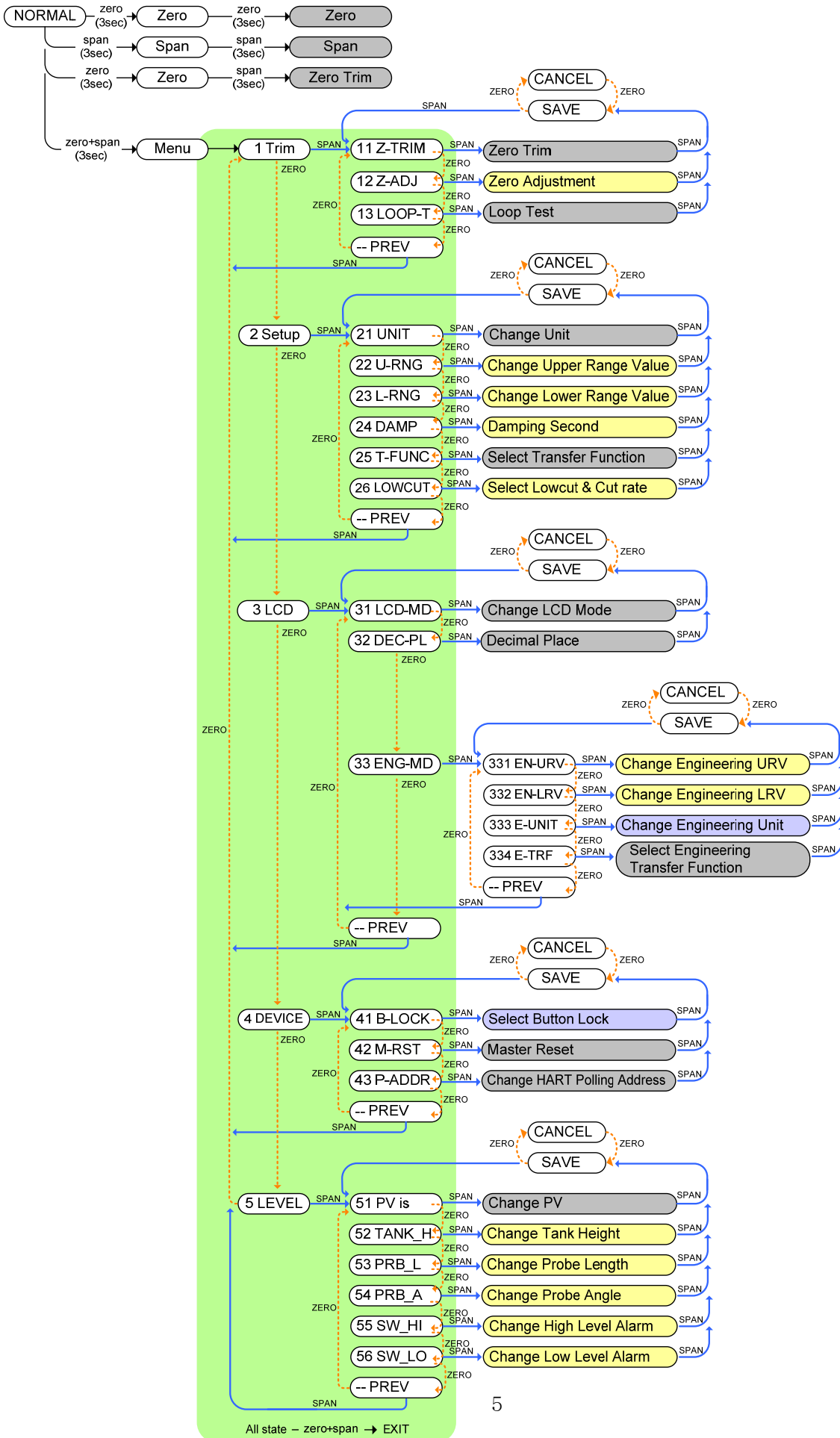
2	G1/2 Epoxy-Polyester Painted Aluminum
X	Special*
Code	Hazardous Location Certifications
K0	Maker Standard (Waterproof:IP66)*
Code	Option
ST	Stainless Steel Housing
M1	LCD Indicator(5digit)
LPE	Lightening Protector (External)
LPI	Lightening Protector (Internal)
Code	Probe Length (300~4,000mm)
- □□□...□ (with unit)	Probe Length (meter/ft/mm/inch...)

* : ask before order

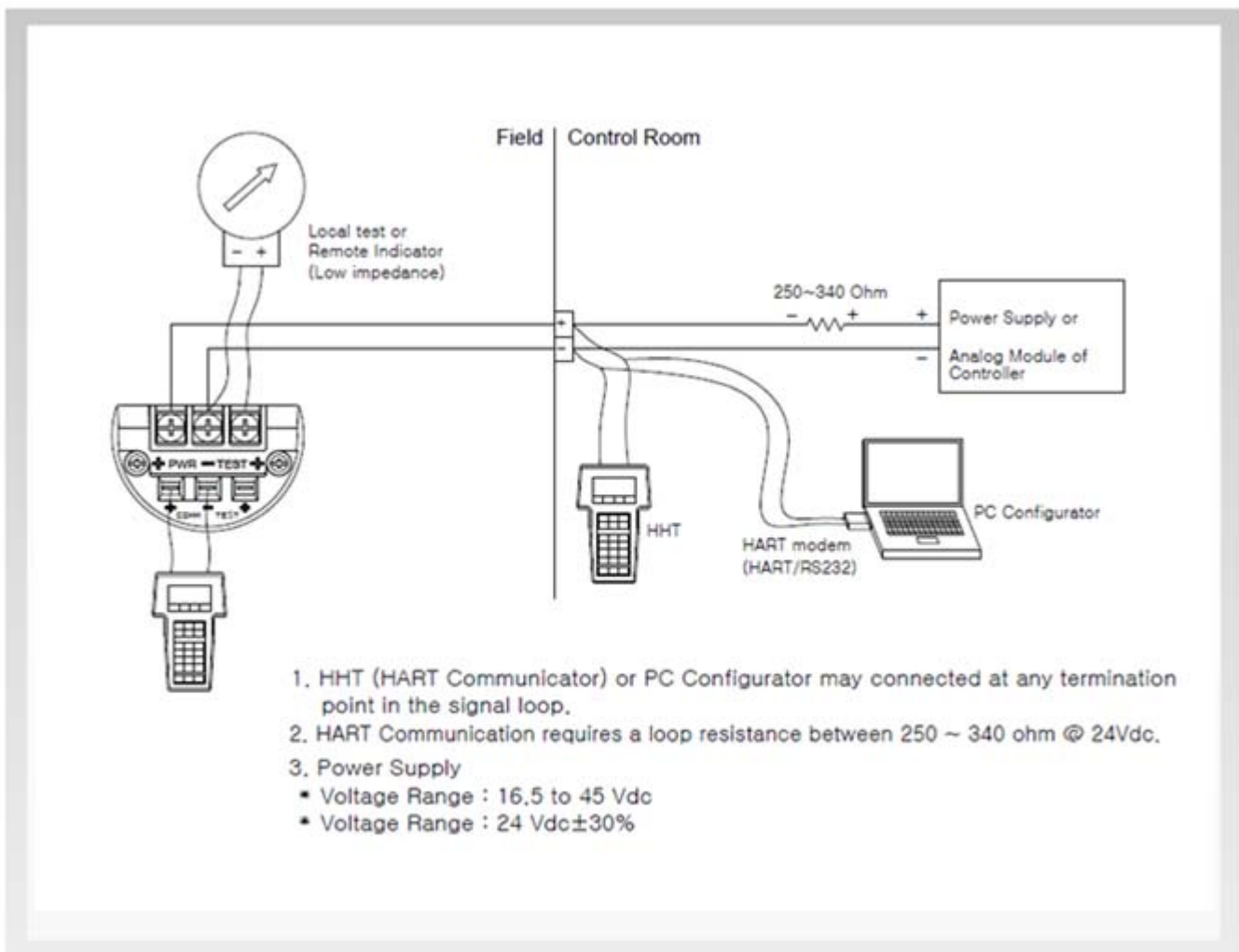
Example : ALT6500-LS1J81A01K0M1-1M

SUS304SS, JIS 80A, 10K FLANGE, 4-20mA, HART,
 1/2-14NPT Epoxy-Polyester Painted Aluminum, Maker Standard(Waterproof:IP:66),
 LCD indicator(5digit), 0~1M

Operation Manual



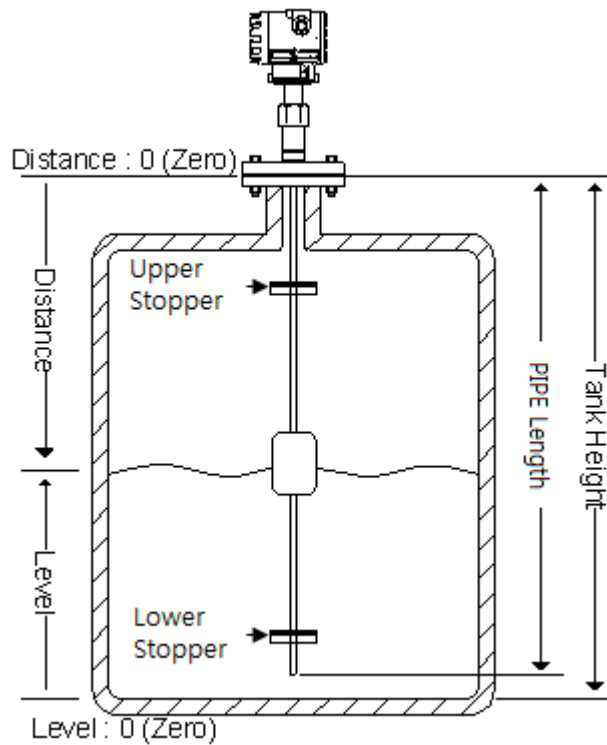
Connection Diagram of Signal, Power, HHT for Transmitter



Common function

Parameters for level measurement

To measure the level, the parameters for the tank structure should be set as shown below.



[Figure 1-1] Tank construction

Distance Distance from the transmitter to the surface of the measuring medium (measurement result). Increase in the direction of guide pipe with zero (0) at the point where the transmitter and guide pipe meet. The transmitter converts the distance into the Level value after measuring the distance first. However, not all measurements measure the range exceeding the stopper.

Level Distance from the bottom surface to the surface of the measuring medium (measurement result). It is a measure that can measure the amount of the medium stored in the tank by increasing the bottom surface to zero (0). As with Distance, it can not measure the range exceeding the Stopper.

Tank Height Set the height of the tank. It is the distance from the tank bottom to the transmitter installation position, and it is a parameter that must be set for the level measurement. Exactly, "Level is 0 (Zero) From the desired point to be measured "to the transmitter mounting position. In general, if you want to set the level of the tank bottom to 0 (Zero), but you want to consider the level at a location other than the bottom as zero (Zero), adjust the value of Tank Height. You can make the desired settings. See the "Level Setting Example" below for a detailed explanation. Tank Height must be greater than Upper Range Value.

The relationship between level and distance is as follows.

$$\text{Level} = \text{Tank Height} - \text{Distance}$$

Level Adjustment

Change the Tank Height to adjust the level to the entered value.

That is, Tank Height = Input Value + Distance

Probe Length

Set the length of the guide pipe. This should be set to the length from the Distance (Zero) to the Lower Stopper. This setting is preset at the factory, so it should be changed only when adjusting the length of guide pipe or lower stopper or changing the pipe tube fixing method. Probe Length does not participate in level calculation, but is used only for error checking.

Probe Angle

It is recommended that the guide pipe be installed parallel to the tank wall. However, if the guide pipe is installed at an angle, the angle of the tilt can be compensated by adjusting the probe angle value. The Probe Angle is set to 0 degree when installed parallel to the tank wall, and can be set from 0 to 70 degrees.

Analog Output

4 ~ 20mA Analog Output converts the Primary Value to the current value corresponding to Range and outputs it. Primary Value can be selected as Distance or Level. The range is set to LRV (Lower Range Value) to URV (Upper Range Value). When the Primary Value is equal to LRV, it is 4mA. When it is equal to URV, 20mA is output.

Output unit setting

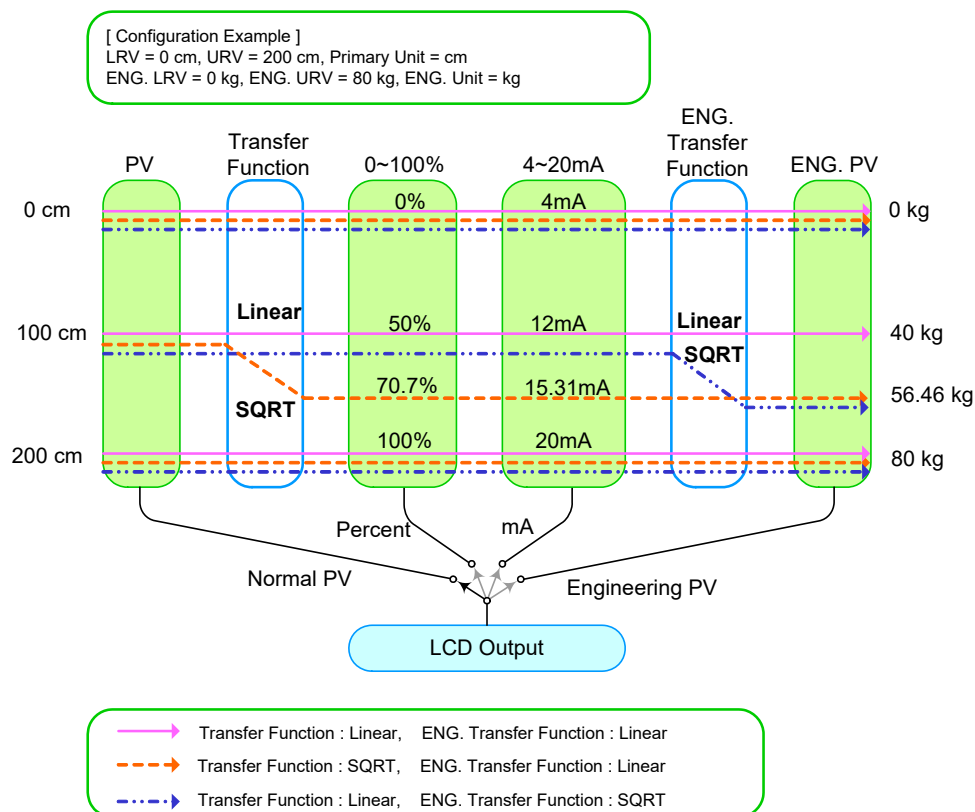
The measured primary value can be set to the desired unit for display by LCD and HART. Available units are as follows.

Available units	feet, meter, inch, cm, mm
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The transmitter of the AUTROL series provides additional units for use in the LCD Engineering Mode. However, since the LCD Engineering Mode is a method of setting the display method on the LCD screen, the units added by the LCD Engineering Mode are used only for the LCD display and the HART uses the existing units.

LCD Engineering Mode

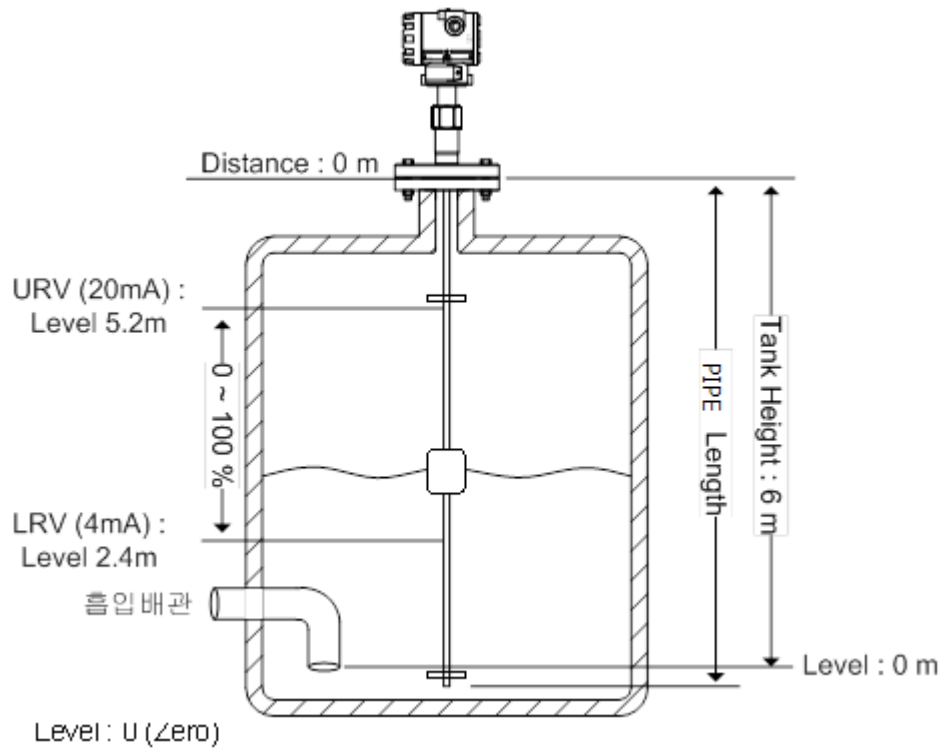
The ALT-6500 can output measured results to the LCD screen in various ways. LCD Engineering Mode is a function that converts measured results into "numerical values with different weights" and outputs them to the LCD screen. In LCD Engineering Mode, Engineering Range is set separately and the measured result (0 ~ 100%) is mapped to Engineering Range and displayed on LCD. Refer to [Fig. 1-2] for the measurement value processing procedure in LCD Engineering Mode. Transfer Function and ENG. Note that the Transfer Function can not be set to SQRT at the same time.



[Figure 1-2] Procedure for measuring value

Level setting example

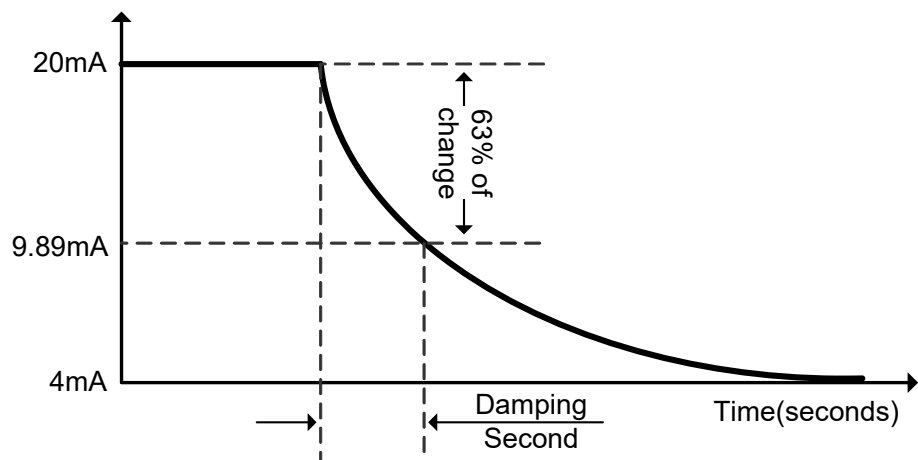
I would like to install the transmitter in a tank with the structure shown in [Figure 1-3]. The lower end of the tank has a suction line for the pump, and the suction line end point is at 0 m. Tank Height is set to the distance from the end point of the suction pipe to the transmitter, and LRV (Lower Range Value) was set at 2.4 m above the end point of the suction pipe. Similarly, the URV (Upper Range Value) corresponding to 20 mA was set at 5.2 m above the end point of the suction pipe, and the measurement span was 2.8 m, which is 5.2-2.4.



[Figure 1-3] Example of level setting

Damping Time Setting

Damping is a function that relaxes and outputs the sudden change (shock) of the input without reflecting it directly to the output. In addition, the periodic noise and vibration components included in the measurement And filtering. Damping Second is defined as the time it takes for the output to reach 63% of the change in instantaneous input change. Damping Second shall be established by reviewing the system's required response time, signal stability, and other requirements.



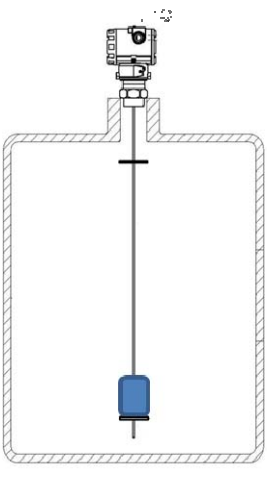
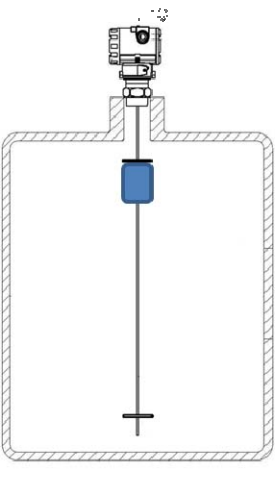
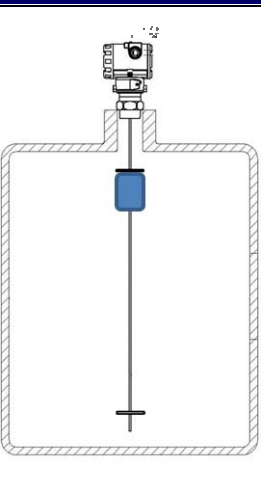
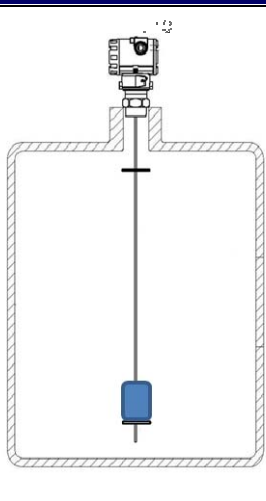
[Figure 1-4] Damping Second

Damping Second can be set to a value between 0 and 60 seconds, and it is set to 1 second when shipped from the factory. The set value (Second) should be regarded as a "coefficient indicating the degree of damping". In practice, the definition itself is defined as "time to reach 63%", but it should be understood as "degree of relaxation" rather than "time" in actual use. In particular, if Damping Second is set to 1 second, do not perform an operation such as updating the output once every second.

Item	Setting history	HART	button	Affected output items when changing settings
Basic setting	Change Range	○	○	All outputs except PV displayed on LCD
	Unit change	○	○	PV displayed on the LCD
	Change Damping Second	○	○	All outputs
	Change Transfer Function	○	○	All outputs except PV displayed on LCD
	Low-cut change	○	○	All outputs except PV displayed on LCD
	Loop Test	○	○	All outputs except PV displayed on LCD
	PV is Changed	○	○	All outputs
	Change Tank Height	○	○	If Level, Output All
	Probe Length 변경	○	○	In some cases,
	Probe Angle 변경	○	○	All outputs
Change High and Low Alarm values	○	○	Change alarm output	
correction	Zero Trim	○	○	All outputs
	Zero Adjustment	○	○	All outputs
	Full Trim	○	✗	All outputs
	D/A Trim	○	✗	4~20mA
telautograph Information setting	Change Polling Address	○	○	4~20mA
	Set transmitter default information. (Tag, Date, Descriptor, Message, etc.)	○	✗	
LCD display	Change LCD mode	○	○	LCD display all
	Change Decimal Place	○	○	LCD display all
	Change LCD Engineering Mode (Eng Range, Eng Unit, Eng Transfer Function, etc.)	○	○	LCD Engineering Value
Other	Button Lock setting	△	○	
	Master Reset	○	○	All outputs

Field Calibration methods

If you need to reposition the Stopper after site installation, you must calibrate it in the following way. The next calibration method is to calibrate with the button operation on the upper part of the transmitter, and remove the upper name plate protecting the operation button and calibrate it.

A	B	1. LEVEL A -> B in this order. 2. For Distance C-> D in this order. * If you need to change the LRV value between A and B or between C and D ZERO1 function should be added. In this function, the position of the stopper should be in condition condition of A condition in LEVEL and condition condition of C in case of distance.
		
Float Ball to Lower Stopper Located behind Zero trim2 I do.	Place Float Ball on Upper Stopper I do.	
C	D	
		
Float Ball to Upper Stopper Run back Zero trim do.	Float Ball is placed on Lower Stopper and SPAN is executed. do.	

1 **ZERO** In the initial screen, if you press ZERO button for 3 seconds, ZERO appears on the LCD window and then press ZERO button for 3 seconds The -TR- message will appear and ZERO will be executed.

2 **Zero trim** Press ZERO button for 3 seconds on the initial screen, ZERO appears on the LCD window, then press SPAN button for 3 seconds after that, -TR-phrase will appear and Zero trim will be executed.

3 **SPAN** Press SPAN button on the initial screen for 3 seconds to display SPAN on LCD window and then press SPAN button for 3 seconds SPAN is executed with -TR- phrase.

Customer Service and Support



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Autrol Corporation Of America

796 Tek Drive, Crystal Lake, IL 60014, USA

Tel: +1 847-857-6062, +1 847-779-5000 Fax: +1 847-655-6062

Email: info@autroltransmitters.com

www.autroltransmitters.com