

HITROL CO., LTD.

HEAD OFFICE.FACTORY.R&D INSTITUTE
HITROL CO., LTD. 141, Palhakgol-gil, Jori-eup
Paju-si, Gyeonggi-do, Korea
TEL. : (00)-82-31-950-9700
FAX. : (00)-82-31-943-5600
www.hitrol.com



INSTRUCTION MANUAL

PRESSURE TYPE LEVEL TRANSMITTER

HT-100PT

HT-100PS



Doc. no.: HT100P_IM_Eng_Rev.1.1

Issue date: 2023. 07

Table of contents

Over View 3

Characteristics 3

Operation Principle 3

Specifications 3

Products & Dimension 4

Precautions for Installation 4

Wiring 5

Failure Check & Maintenance 5

Precautions for Removal 6

Precautions for Transport & Assembly 6

Precaution for Connecting to Ground 6

Safety & Environment 6




Marking 7

User Training 7

Warranty & Contact 7

APPENDIX

APPENDIX K HT-100P DISPLAY Setting Guide

-  You should be well-informed of the contents where **WARNING** is marked before carrying out the work.
-  You should be careful where **CAUTION** is marked to carry out the work.
-  You should be aware of where **NOTICE** is marked to carry out the work.

Over View HT-100P Series is a Hydrostatic Pressure Type Level Transmitter installing in top or side of tank continuously measures the liquid levels in the tank. It measures hydrostatic pressure and converts it to the current output, DC 4~20mA. It can be widely used in various industries such as PC Tank, Dam Surge Tank, Sluiceway, River and Wastewater special work.

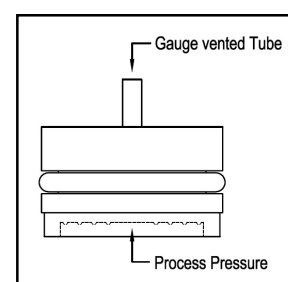
- Characteristics**
- Installation on top or side of tank.
 - Easy installation and maintenance
 - No effect by a conductivity or composition change of medium
 - It is required attention because it is affected by a change of density.

Operation Principle

It is a sensor to continuously measure a hydrostatic pressure of a liquid according to the certain height of the liquid column. Hydrostatic pressure is calculated using the equation given below.

$$P = \rho \times g \times h$$

[P=Hydrostatic Pressure, ρ =Density of Liquid,
g=Gravity of Acceleration, h=Height of Liquid Column]



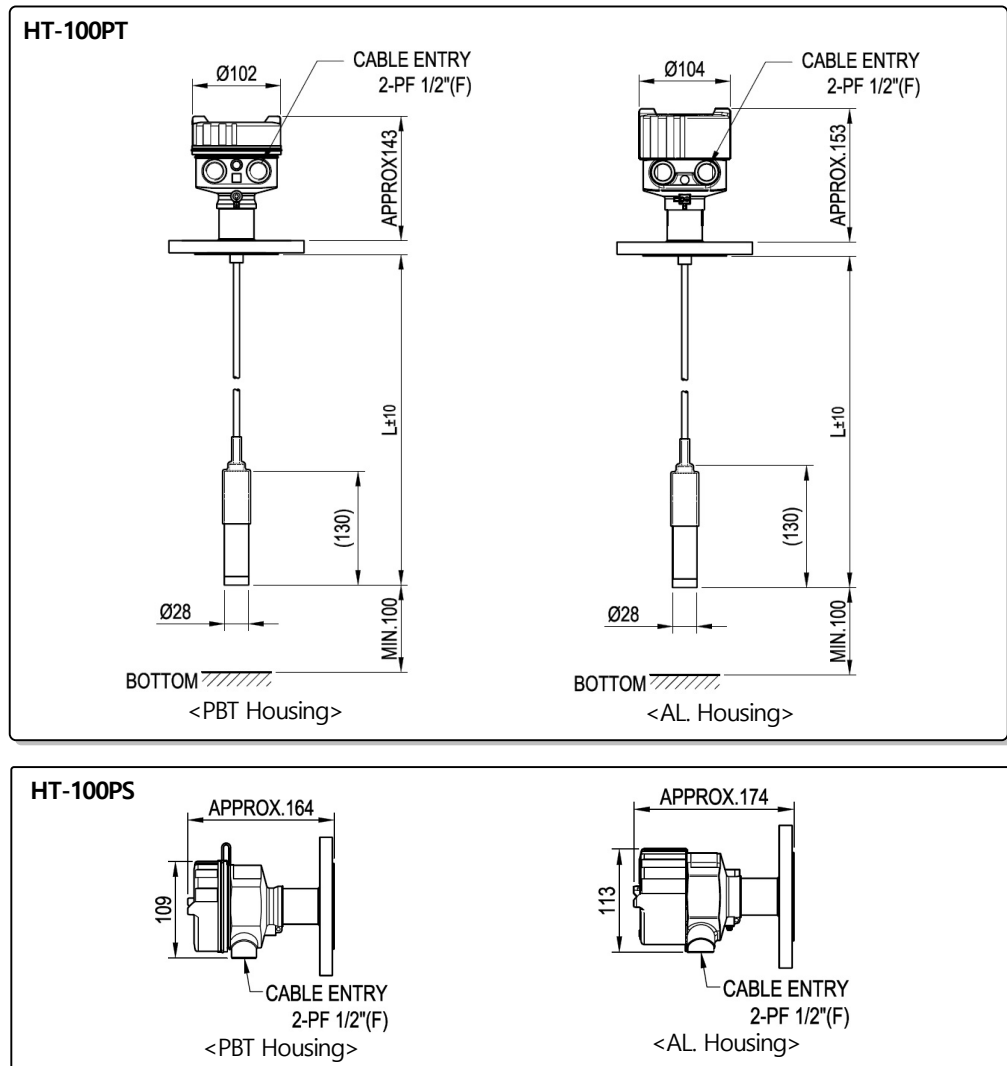
<Pressure Sensor>

As seen in above equation, if density of liquid does not change, measured hydrostatic pressure is detected as an electric signal proportional to the height of liquid column, since the height of liquid column is only variable.

Specification

Model	HT-100PT	HT-100PS
Installation	Top	Side
Mounting	Screw & Flange	
Ambient Temperature	-20°C ~ +60°C	
Process Temperature	Max. 70°C	
Process Pressure	ATM	
Power Source	DC 24V	
Output	DC 4~20mA (2~wire)	
Enclosure	Weather-Proof IP65 (AL. Housing IP66)	
Application	Liquid	
Range	Min. 1m, Max. 30m	
Wetted Parts Material	SUS 304, 316L	
Process Connection	50A JIS 10K RF Flange (Std.) PF 1"(M) Screw	50A JIS 10K RF Flange (Std.) PT 1"(M) Screw
Housing ; Cable Entry	AL. : PF 1/2"(F), IP66 PBT : PF 1/2"(F), IP65	
Accuracy	± 0.25 % F.S	

Products & Dimension



NOTICE

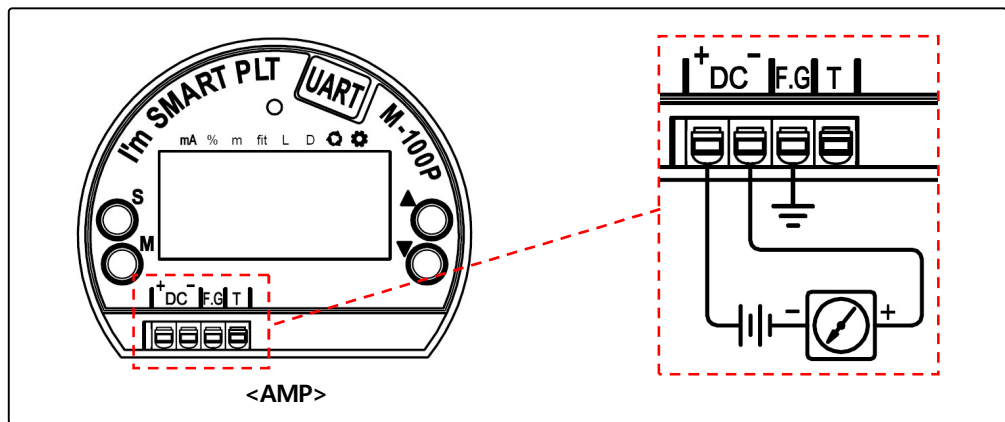
Actual product may have a tolerance slightly.

Precautions for Installation

- When the sensor is installed at an extended nozzle or a long pipe, liquid should not be crystallized or congealed on the pipe.
- Sensor should not be installed at the drainage of tank or a place that liquid is flowing.
- When the sensor is installed at the top of the tank, and material in the tank behaves like fluid, a guide pipe should be installed.
- When the sensor is installed at the side of the tank, a valve should be installed between the nozzle and sensor.
- Sensor should be installed and used at the open tank atmospheric pressure compensated.
- When flanges or screws are used for fastening, the size should be the same.
- The user should place a washer between each bolt and nut to prevent loosening.
- When fastening flanges to each other, gaskets should be used.
(The gaskets should be selected considering the temperature of the content and the pressure of the container.)
- The user should install appropriate products after judging whether the products are to be used in explosion-proof regions.

Wiring

- When wiring of power supply, + - should be wired correctly.
- Power source should be DC +17V ~ +40V
- Power should be applied after completion of installation and wiring.



Failure Check & Maintenance

■ Product Check

Pressure sensor should be cleaned periodically (every 2 or 3 months) using clean water so that the pressure sensor should not be plugged by sludge.

■ Failure Check

The level of measured object changes, but the output does not change.

- ▶ Check the AMP or Pressure Sensor for abnormalities.
- ▶ Check the capacity of the power supplied.
- ▶ Check the polarity of the supplied power.
- ▶ Check that zero, span adjustment is correct.

The output is only slightly changed for the LEVEL change of the measurement.

- ▶ Check the AMP or Pressure Sensor for abnormalities.
- ▶ Check that zero, span adjustment is correct.
- ▶ Check the pressure cell for abnormalities.

No change of level, but output fluctuation is present.

- ▶ Check the AMP or Pressure Sensor for abnormalities.
- ▶ Check that the measuring object is fluctuating a lot.

Output indicates full (20mA) or higher regardless of the change of level of the medium.

- ▶ Check the AMP or Pressure Sensor for abnormalities.
- ▶ Check that zero, span adjustment is correct.

**Precautions
for Removal**

- Check the level and presence of liquid in the tank before removing it.
- Overheated product may cause burn, so wear gloves to remove it.
- Remove it with the power disconnected.
- Make sure that any O-ring or gasket is not damaged while opening or closing the cover.

**Precautions
for Transport
& Assembly**

- Pay special attention to prevent any impact on the device during transportation or assembly.
- Pay attention to prevent any damage to any packing when transporting or mounting the machine to the vessel.



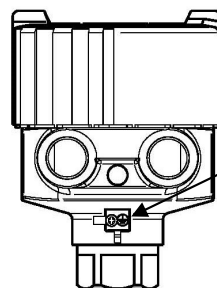
Make sure that it is not subject to any high impact when moving.

**Precautions
for Connecting
to Ground**

- As shown below, connect the external grounding with the wire at 4 mm².



Make sure to insert a washer if the terminal lug is removed from the ground terminal and subsequently reconnected. (loosening prevention)



외부접지 4mm² (4mmSQ)

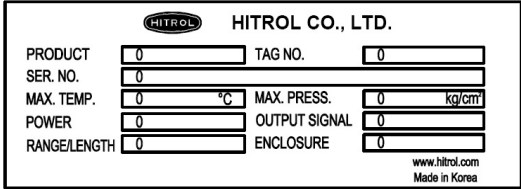
**Safety &
Environment**

- Precautions for Use
 - Make sure to connect the product and vessel using required tools for sure.
 - Keep the lock key safe and make sure that it is locked.
 - Do not apply high impact to the product.
- Precautions for Wiring
 - Wire should be corrected to terminals that correspond to the locations of contact points (refer to the connection method).
 - Wire and supply the power to the device after checking the specifications.
 - Entering the incorrect power voltage may cause damage or failure of the machine.
 - Pay attention to prevent electric shock.
- Disposal of Product
 - Make sure to separate the amplifier and main unit from housing before disposing the products. Also, the amplifier shall be detached and discard the metal and non-metallic materials. No part (ex. Mercury switch) has influence on the environment, so no special attention is required.

Marking

■ Product Identification

The product identification mark is attached onto the shows the model name, serial number, working temperature, working pressure, and matters regarding output. The serial number is a unique manufacturing number for the identification of products.



User Training

Under the aforementioned, do not exceed 70°C, respectively, for the liquid in containers when using the product. In addition, make sure that the ambient temperature of housing is kept at -20 to +60°C.



Do not apply general products to hazardous areas.

Warranty & Contact

■ Warranty & Service

This product is subject to a two-year shipment warranty. Unpaid service will be provided for any damage found under normal operating conditions. If it does not refer to product failure, payment will be required for the service charge.

You can request for A/S through our website or by contacting our headquarters.

■ Headquarters · Factory · Laboratory Contact Number

Address : HITROL CO.,LTD 141, Palhakgol-road, Jori-eup, Paju-si, Gyeonggi-do, Korea
TEL : 031-950-9700 (Headquarters and A/S)
FAX : 031-943-5600 (Headquarters and A/S)



HT-100P DISPLAY

Setting Guide

Pressure Type Level Transmitter



Doc. no. : Rev2.0

Issued Date : 2020.09.25

1. HT-100P DISPLAY Module Composition & Function



No	Composition	Function
1	S Key	<ul style="list-style-type: none"> ■ Function Setting ■ Save the setting
2	M Key	<ul style="list-style-type: none"> ■ Mode change ■ Cancellation
3	▲ Key	<ul style="list-style-type: none"> ■ Span set ■ Setting the value left / up
4	▼ Key	<ul style="list-style-type: none"> ■ Zero set ■ Setting the value right / down
5	LCD	<ul style="list-style-type: none"> ■ Display of operating and setting status
6	LED	<ul style="list-style-type: none"> ■ Display of power and status
7	UART	<ul style="list-style-type: none"> ■ Communication port of HT-100P setup and operation status
8	PWR	<ul style="list-style-type: none"> ■ For supply power and current output ■ Check for output current
9	N/A	<ul style="list-style-type: none"> ■ Not used

2. Amplifier Specification

Item	Specification	
Enclosure	Weather Proof	
Material	P.B.T / A.L.C	
Mounting	100PT (Top Mounting) / 100PS (side Mounting)	
Microprocessor	16Bit Microprocessor	
Current Loop Interface	2-Wire Loop Current	
Supply Voltage	DC+17V ~ DC+35V @ Typ.+24V	
Output Current Accuracy	4.0mA ~ 20.0mA @ ±0.25% F.S	
Measuring Range	0 ~ 200KPa (2bar / 20.4mH ₂ O) @ Gauge Pressure	
Output Current Range	4.0mA ~ 20.0mA @ NAMUR NE43 Holding	
	3.8mA ~ 20.5mA @ Alarm 3.6mA, 21mA [NAMUR NE43]	
Output Current Offset	Zero : 3.9 ~ 4.1mA	±0.1mA @ 0.01mA Step
	Span : 19.9 ~ 20.1mA	
Output Current Check	TP	
Damping Time	Default 0.5sec	
	Range : 0sec ~ 10sec @ 0.5sec Step ADJ.	
Self-Diagnosis	Lower than the Zero	3.6mA Current Output [NAMUR NE43]
	Higher than the Span	21mA Current Output [NAMUR NE43]
Simulation Current Out	4mA @ 5sec	
	12mA @ 5sec	
	20mA @ 5sec	
State Indicator	Bi-Color LED [Green]	Normal Operation
	Bi-Color LED [Red]	Abnormal Operation
	Bi-Color LED [Orange]	Zero, Span Not Set
Setting Menu	Quick Menu / Set Menu / UART	
Display	mA, %, m, ft, Level, Distance	
Ambient Temperature	-20°C ~ +60°C	

[Table 1] Amplifier Specification

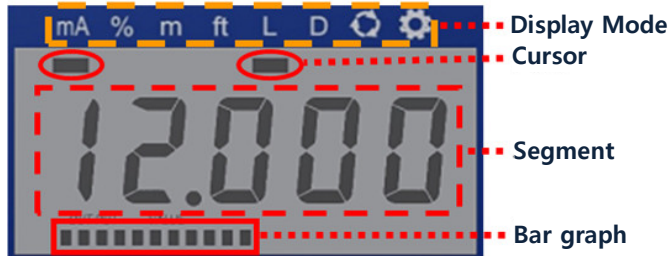
3. Setting Menu Function

No.	Contents	Description	Remarks
[00]	mA / % Unit Set	▲ : mA, ▼ : percent (※ [02], [03] setting unit)	
[01]	Level / Distance Set	▲ : Level, ▼ : Distance	Quick Menu
[02]	Zero Point Set	0.0 ~ 95.0% or 4.000 ~ 19.200 mA setting	Quick Menu
[03]	Span Point Set	5.0 ~ 100.0% or 4.800 ~ 20.000 mA setting (Span setting when the level are more than 50%)	Quick Menu
[04]	Zero Height Set	Level setting criteria ※ -9.999~99.999m (User setting)	
[05]	Span Height Set		
[06]	Tank Height Set		
[07]	Auto Set	Yes : Execution , No : Execution	Quick Menu
[08]	NAMUR NE43 Set	NAMUR NE43 function setting and holding	
[10]	Damping Time Set	0 ~ 10 sec. (Default 0.5 sec. @ 0.5 sec. Step ADJ.)	
[11]	Pressure Sensor Range	Apply Pressure Sensor Setting (KPa)	
[12]	Pressure Measurement Range	Measurement Range Setting	
[20]	Zero Output Current Adjustment	-0.100~ 0.100 mA (0.001mA Step ADJ.)	
[21]	Span Output Current Adjustment	※ When the output current is adjusted offset	
[30]	Rotation Time	0.5 ~ 10 sec. (Default 1 sec. @ 0.5 sec. Step ADJ.)	
[31]	'mA' Display On/Off	Rotation 'mA' select display	
[32]	'%' Display On/Off	Rotation '%' select display	
[33]	'Meter' Display On/Off	Rotation 'Meter' select display	
[34]	'Feet' Display On/Off	Rotation 'Feet' select display	
[40]	4mA Output	Output "4mA" for 5 sec.	Quick Menu
	12mA Output	Output "12mA" for 5 sec.	
	20mA Output	Output "20mA" for 5 sec.	
[90]	Error Number Output	Display of error number according to malfunction	
[91]	Voltange value Output	Display Zero, Span, and current measured value	

[Table 2] Setting Menu List

4. Operating Method

■ LCD Composition



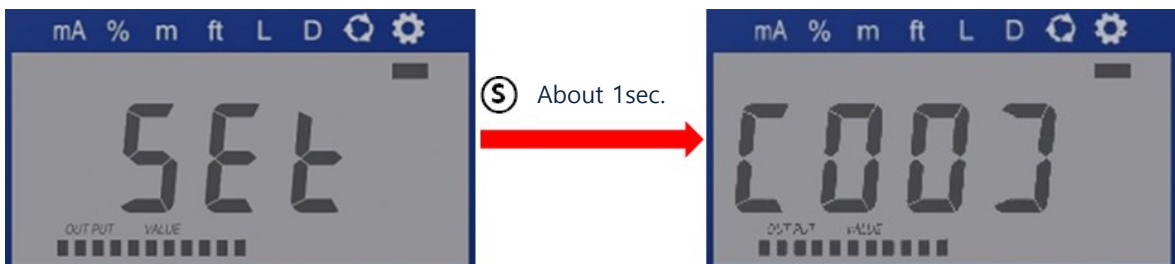
DISPLAY MODE	
mA	mA Mode
%	Percent Mode
m	Meter Mode
ft	Feet Mode
L	Level Mode (User setting)
D	Distance Mode (User setting)
	Rotation Mode
	Setting Mode

The cursor moves sequentially whenever the **(M)** button is pressed.

The order of movement is as follows.

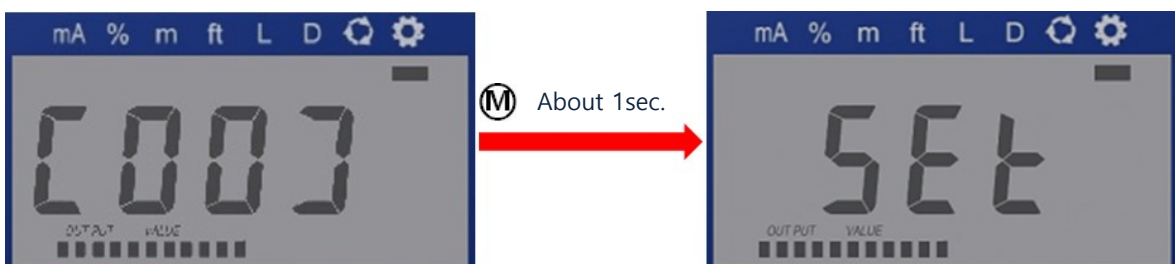
mA → % → m → ft → → → mA → % → ...

■ Into the Setting Menu



In the Setting Mode, press **(S)** button for 1 second then the green LED will be flickering and you can go into the Setting Menu.

■ Return to the Setting Mode



In the Setting Mode, press **(M)** button for 1 second then the green LED will be flickering and you can go into the Setting Menu.

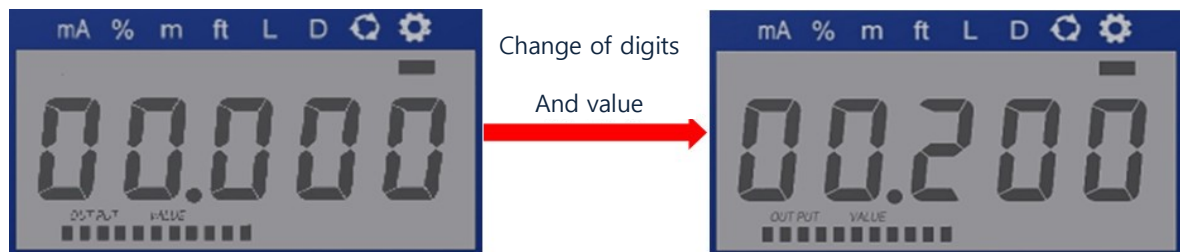
■ Select Setting Menu



In the Setting Menu, use ▼/▲ buttons to select the user setting function.

Pressing **(S)** button for 1 second will enter the function.

■ Change the User Setting



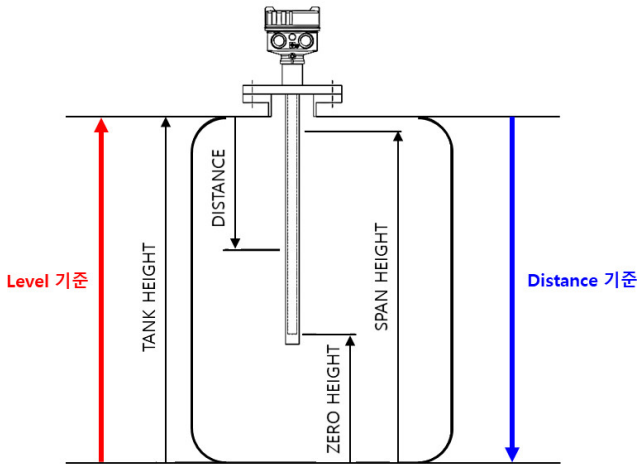
If **just 1 digit is flickering**, it can be moved between the digits.

If **full digits are flickering**, it can only be set up to the specified number.

Key Button	Function
▲ Press more than 1 sec.	Increasing of digits(Left)
▼ Press more than 1 sec.	Decreasing of digits(Right)
▲ Press shortly	Increasing of the numerical value
▼ Press shortly	Decreasing of the numerical value
(S) Press more than 1 sec.	Save and Leave
(M) Press more than 1 sec.	Leave without Save

[Table 3] Key Button Guidance

■ Height Setting



■ Level

This refers to the direction in which the medium is raised based on the bottom of the tank.

■ Zero Height

The distance from the bottom of the tank to the zero point is called "Zero Height".

■ Span Height

The distance from the bottom of the tank to the span point is called "Span Height".

■ Tank Height

The distance from the bottom of the tank to the top of the tank is called "Tank Height".

■ Distance

This refers to the direction of the downing of the medium from the top of the tank.

■ Zero, Span Quick Setting

□ Setting Screen



mA Setting



Percent Setting



※ The default unit is set to "%".

□ Zero Setting

No.	Contents	Quick Menu Setting
[02]	Zero Setting	⏴ Press for 1 sec. → input the value → Ⓢ Press for 1 sec.

□ Span Setting

No.	Contents	Quick Menu Setting
[02]	Span Setting	⏴ Press for 1 sec. → input the value → Ⓢ Press for 1 sec.

※ Span setting when the level are more than 50%.

□ Others

- ▶ Zero & Span can be set regardless of display mode status
- ▶ It can set, save, and cancel the values. (Refer to Table 3)
- ▶ The level shall not be changed when Zero & Span are setting.