Ultrasonic Type Level Transmitter

We Guarantee Your Level Best

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Table of Contents

1. Summary

So to use this product safely and correctly, fully understand the manual and keep it for reference.

- Installation and operation manual must be provided to the end user.
- Installation and operation manual is subject to change without prior notice for quality improvement.
- This manual should not be altered without manufacturer's approval for any purpose.
- You must follow the instructions in the manual for safety, the manufacturer is not responsible for problems caused by user carelessness.
- The manufacturer does not have any resposnsibility to the accident arised by user's intentional or negligent fault. (any alteration, exploded)
  If A/S or modification of the product is required, please feel free to contact us.
- Unless it is specifically stated, warranty period is one year in principle after the product is shipped.
- Even during the warranty period, in case of any problems caused by the following reasons, please note that it will be charged.
  - Users improperly maintain and / or repair products
  - Improper transportation, storage or handling of the product beyond the its conditions
  - The breakdown caused by using the product beyond the specification range
  - Problems caused by natural disasters such as fire, earthquake, storm, flood, thunder, lightning, and etc
- During installation and operation, be sure to use the products in compliance with safety regulations of the site.
- When you open the cover of the product, be sure to shut off the power and should work after one minute waiting.
- You must use sealing fitting or cable gland when you do electrical wiring.

3. Specifications

Wiring : [DU03, 05, 08] 3-WIRE
[DU30, 60] 2-WIRE
(Shield cable 3Cx24AWG)

Ramge : [DU03,30] 300 ~ 3300mm
[DU05] 300 ~ 5300mm
[DU60] 300 ~ 6300mm
[DU08] 300 ~ 8300mm

Dead band : 300mm

Accuracy : Full Scale ±0.25%

Resolution : 1mm

Temp. Comp. : Automatic in full scale

Beam width : 11°

Current consumption : [DU08,05,03] Max 100mA
[DU60,30] Max 22mA

Supply Voltage : DC 24V

Output Signal : CURRENT
DC 4~20mA (DC 20~4mA)

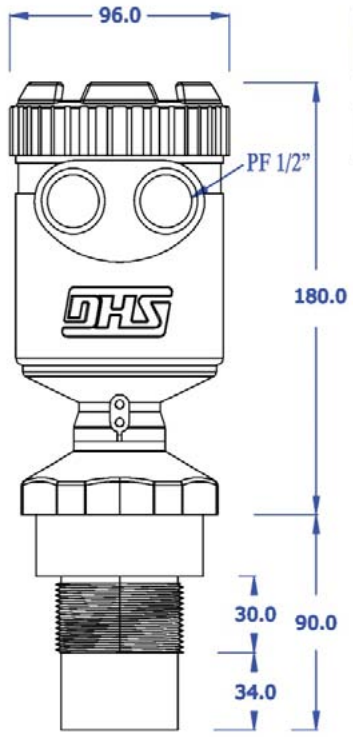
(OPTION) RS485 (Modbus RTU)
* Only DU03 / 05 / 08 *

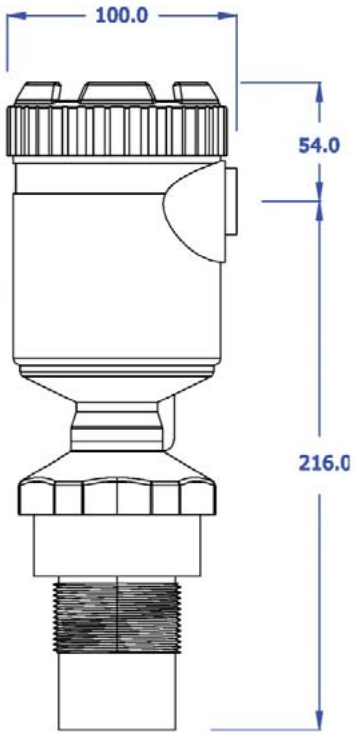
Process Temp. : -20℃ ~ 60℃

Pressure : 0.7~2.0 Kgf/㎠

Mounting : [DU05,03] 1.5 inch - 11.5 NPT
[DU08,60,30] 2 inch - 11.5 NPT

Material : Head - PBT-FR-GF10
(OPTION) Flange - PVC
(OPTION) Extention port - MC Nylon
Probe - PVDF kynar 720





Features

DU (Daehan Ultrasonic) senosr uses ultrasound to measure the level in non-contact signal. It is excellent in durability and easy to setup. Built-in temperature sensor enables to measure more precise level.

DU Series sensors are widely used in such as industrial sewage treatment plants, rivers, dams, power plants, untreated water / purified water ank, food / beverage tanks, fuel tanks, and chemical / medical tanks.

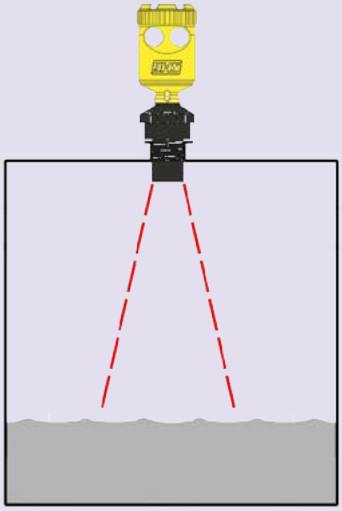
4. Installation

Install a sensor like in the picture.

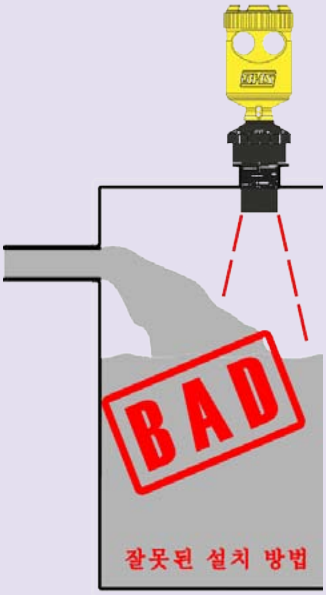
Check the suitability between the flange attached to the tank and the product specification.

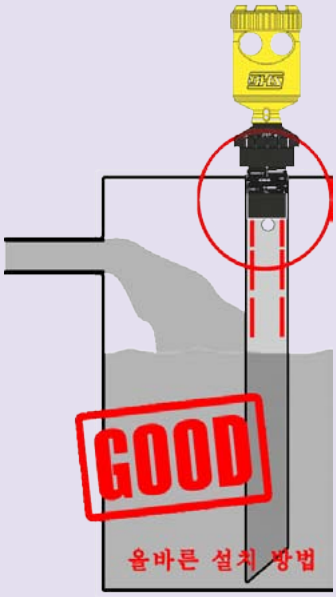
Install the sensor so that it is perpendicular.

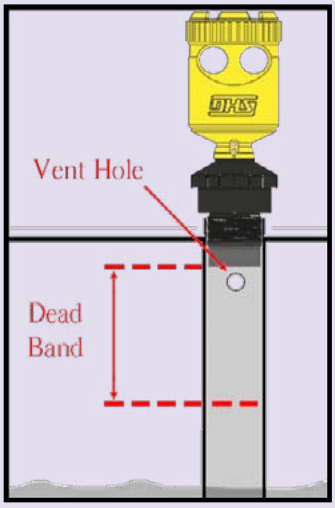
Avoid any interference from obstructions in tank.



* Water drops on the top of the tank can cause sensor malfunction.





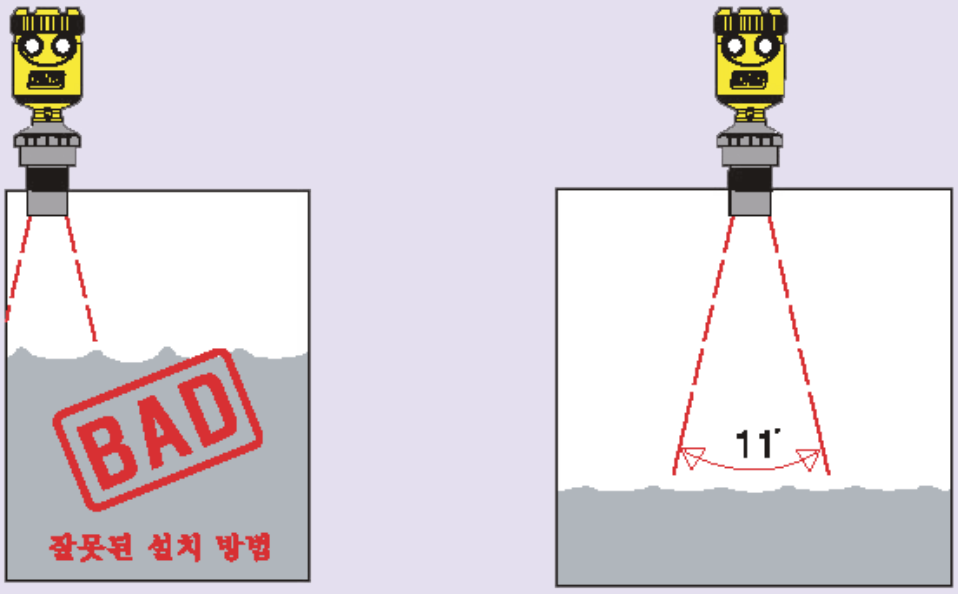


If there are water drops on the top of the tank, be cautious not to affect the sensor beaming. Swell due to water drops can occur sensor malfunction.

If the severity of the tank, a vertical pipe can be planted to prevent malfunction. The vertical pipe should have vent holes (Ø5~Ø10) which exist whithin the dead -band accordingly to the DU models.

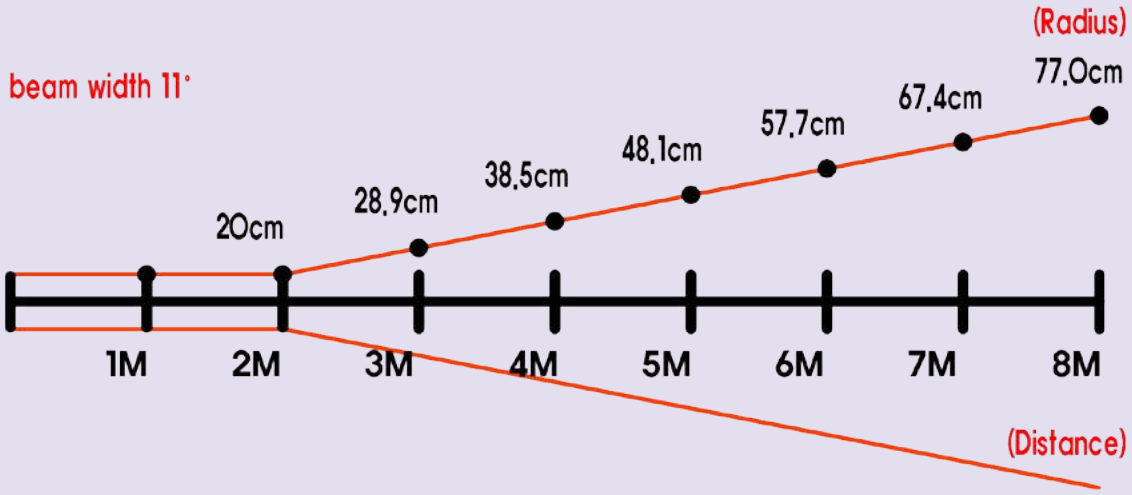
(100A or more diameters pipe is recommended.)

* Sensor installation close to the wall of the tank may cause malfunction.



Beamwidth is about 11°. Considering this beamwidth, install the sensor securing enough distance from the wall.

Ultrasound beam width in distance



If there is not enough space in the tank, you may prevent malfunction by using a veretical pipe planted.

* In sensor wiring, the following conditions must be considered.

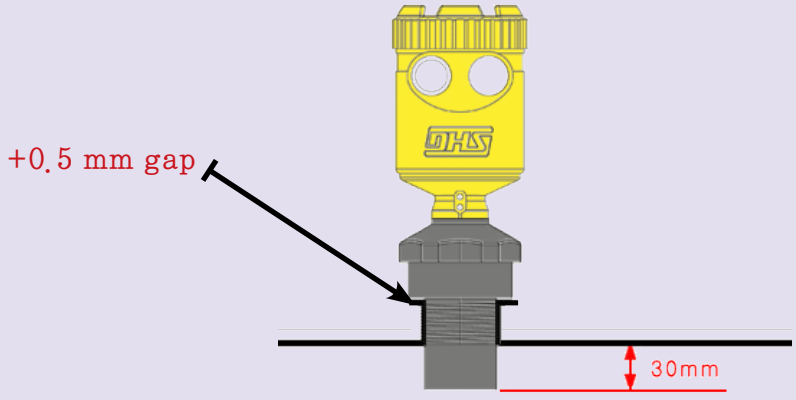
As shown in the above pictures, slacken the cable to the bottom in order to prevent water (rain, any liquid) coming in through the cable gland.

* If the cable is exposed to outdoor, less than 30 meters is recommended.

* When to install a sensor through the socket of the tank, there must be more than 30mm space between the bottom of tranducer and the tank as shown in the below picture.

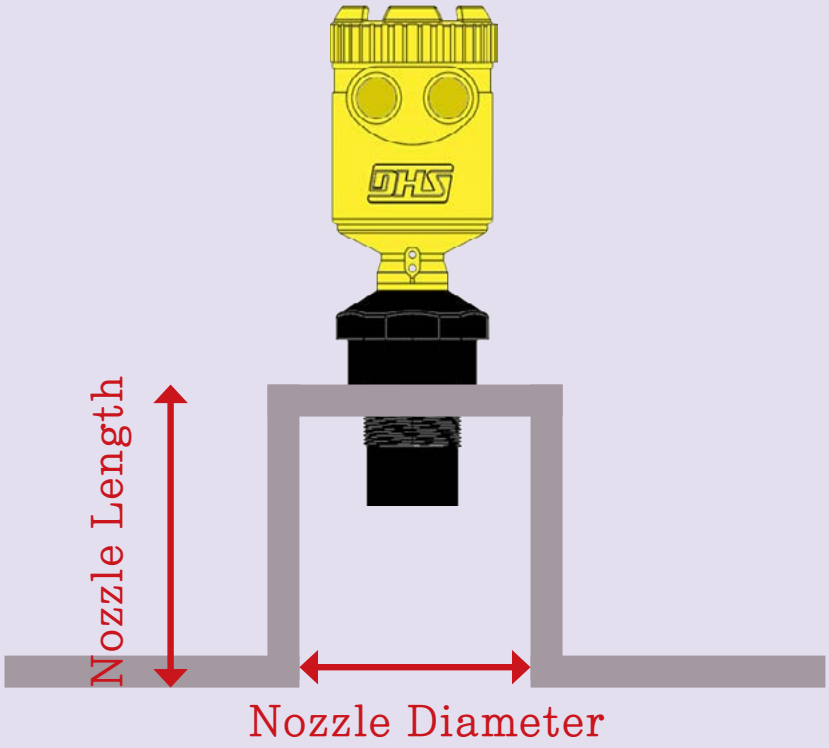
* Shielded cable is recommended for "Shield cable 3Cx24AWG".

* When installing the sensor socket area directly to the tank must be installed in consideration of the following environments..



* The floor surface sensor must be installed at least 30mm to enter the inner tank..

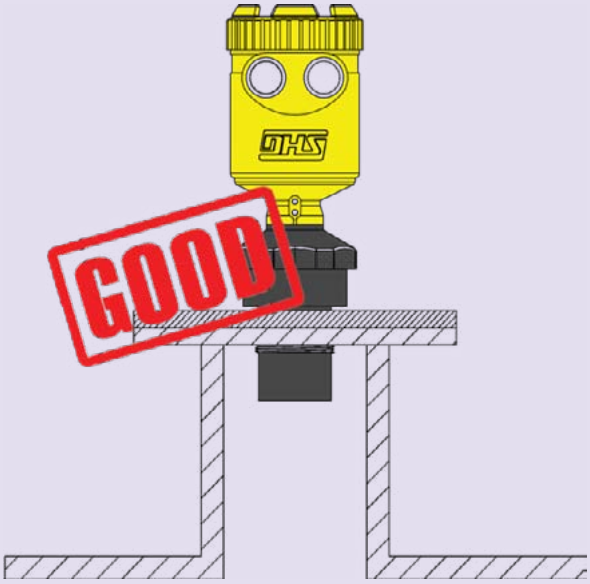
When to use a nozzle or pipe,
the following conditions must be considered.

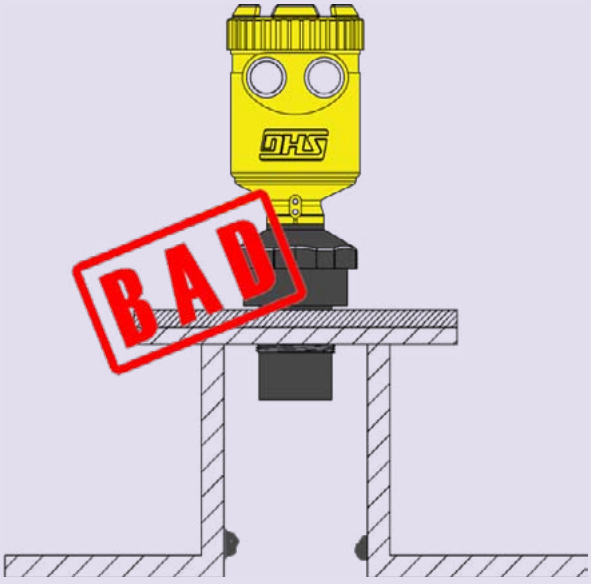


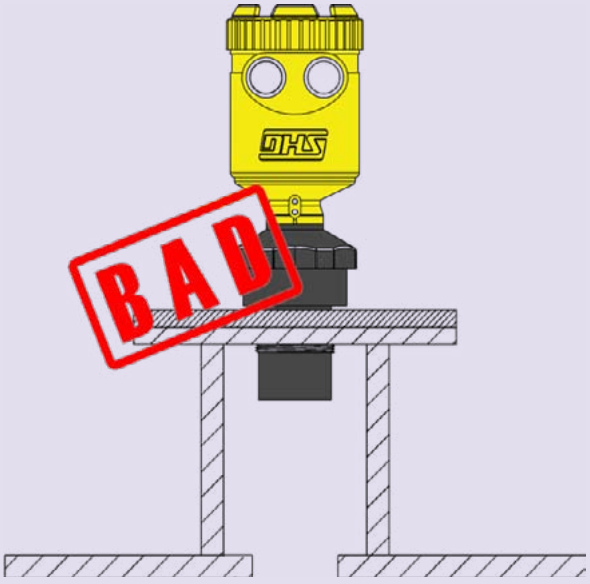
Nozzle Diameter	Nozzle Length
3 inch (80A)	Max. 200 mm
4 inch (100A)	Max. 300 mm
6 inch (150A)	Max. 400 mm
8 inch (200A)	Max. 400 mm

When nozzle length is too long and its diameter is narrow, it can cause malfunction caused from improper beamwidth. Nozzle must be used in compliance with specification..

When to use a nozzle or pipe,
the following conditions must be considered.

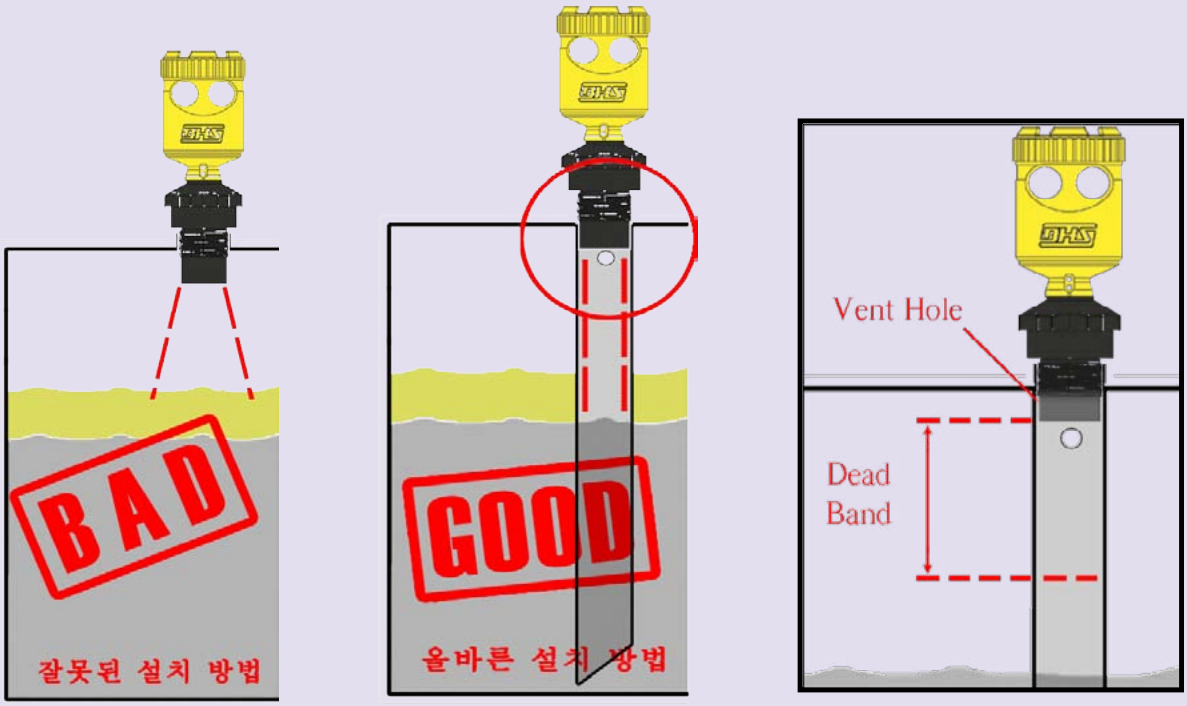






If there is a buy or a welding seam in the inner wall surface of the nozzle it can be recognized in detection target. After installation, you must remove.

If there is suspended solid or form in the tank, it can cause malfunction..



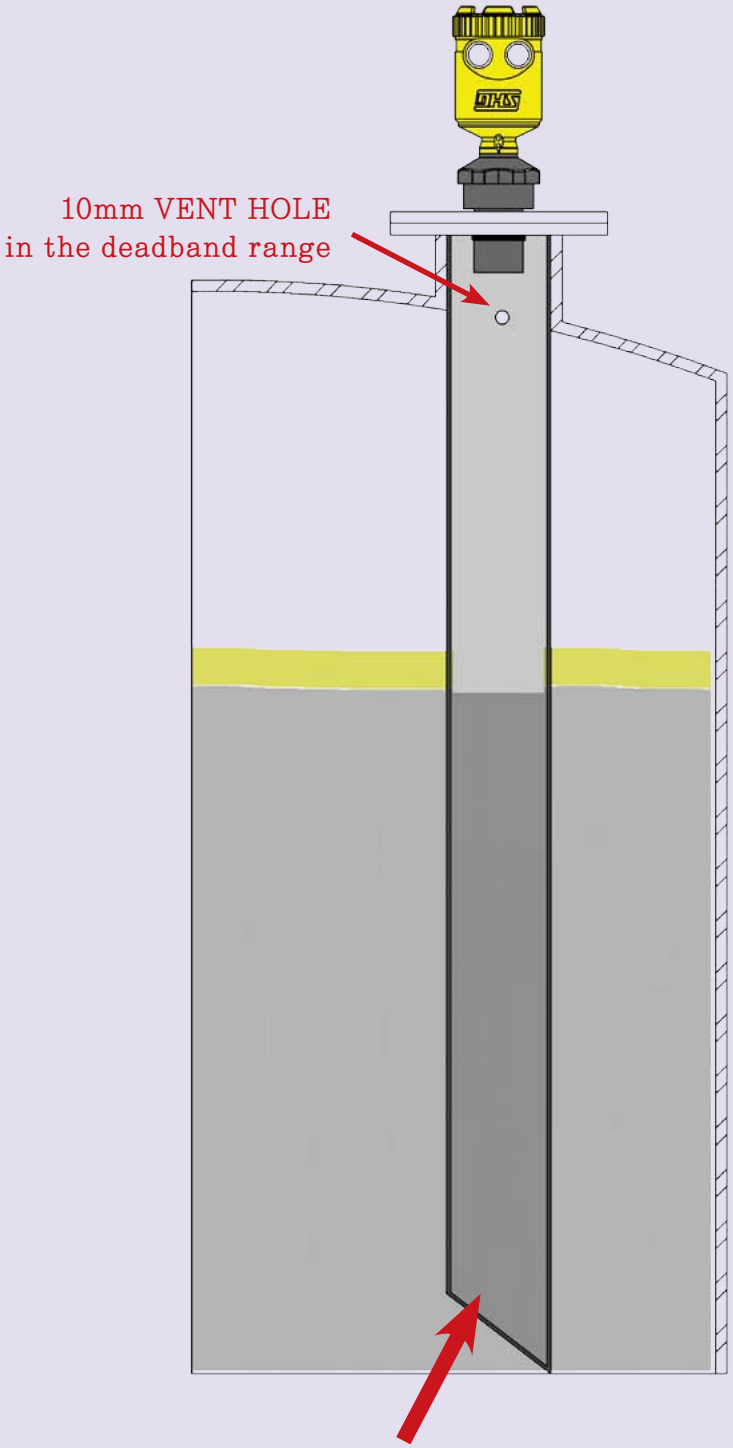
You can prevent malfunction with protection pipe when suspended solid exist in the tank as shwon in the above pictures.

The vertical pipe should have vent holes (Ø5~Ø10) which exist whithin the dead band.

DEAD BAND

300 mm

Install the pipes (STAND PIPE) inside the tank following the installation.



So as to cut into the bottom 15 ~ 45° float in the pipe it is not flowing net installed.

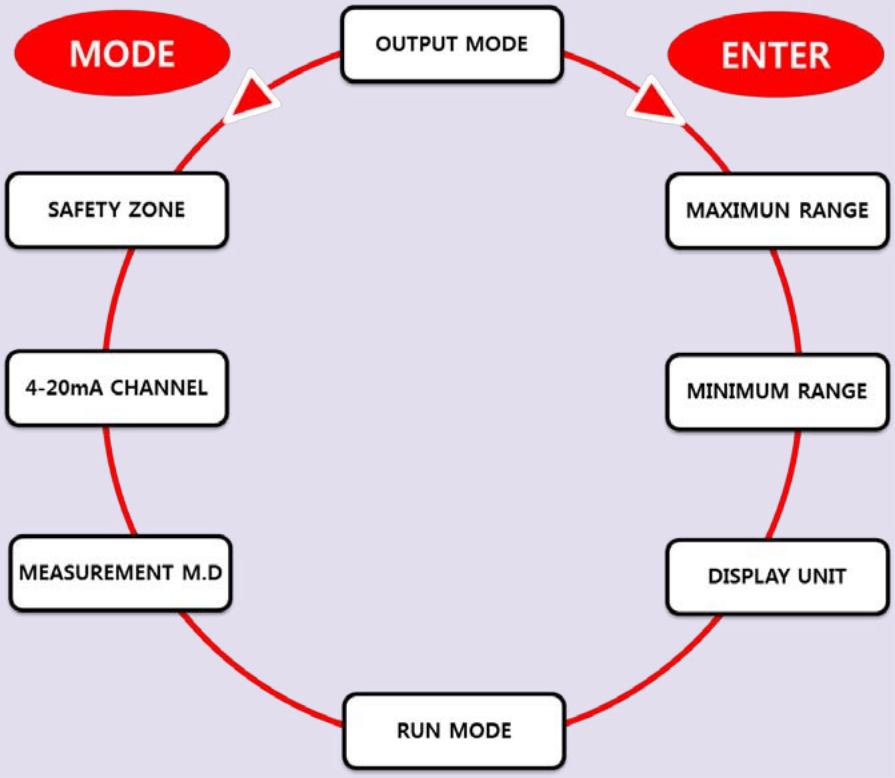
or

Install pipe plugs on the bottom and a 10mm hole drilled
more than 4ea should be given to create a liquid exit.

5. SETTING

Model : DU-03, DU-05, DU-08

Hold [MODE] over 2 seconds, press [ENTER] over 1 second, it starts menu setting.



In the menu setting, if press [MODE], it turns counter-clockwise, if press [ENTER], it turns clockwise. With [UP]/[DOWN] key, you can change the value.

After changing the value setting, press [ENTER] over 2 secnods to finish menu setting.

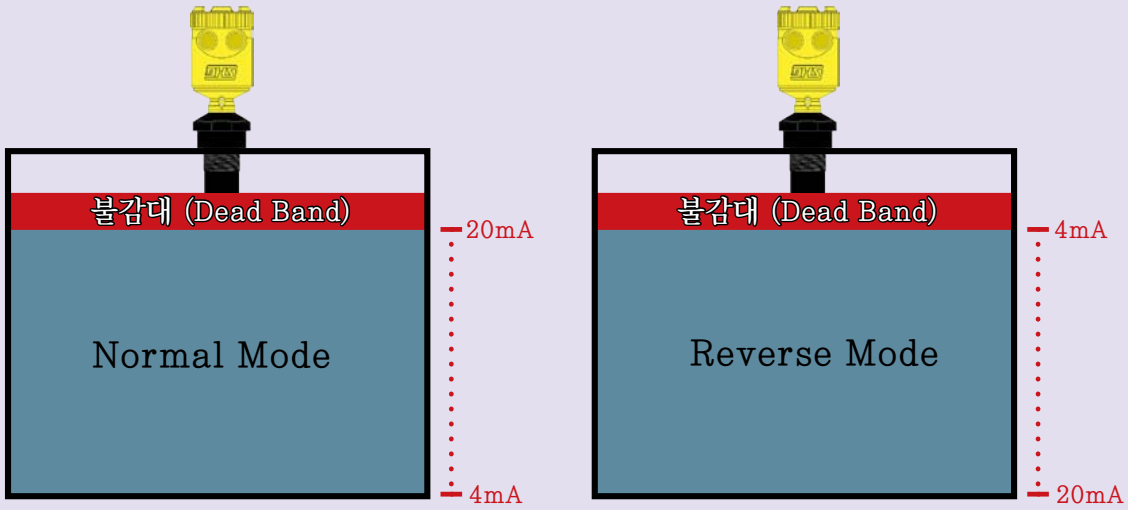
If you finish menu setting, the changed value will be saved automaticallly.

OUTPUT MODE

You can choose output signal type as below. (Default = NORMAL)

NORMAL – When the tank is empty, it shows 4mA..
When the tank is full, it shows 20mA..

REVERSE – When the tank is empty, it shows 20mA..
When the tank is full, it shows 4mA.



SAFETY ZONE

If sensor fails to measure, it show a default value of SafeOut. (Default = TOP)

TOP – It shows the value of full tank.
BOTTOM – It shows the value of empty tank.

Even if the sensor fails to detect, it dose not show SafeOut immediately. For a certain period, it keeps the value detected before measuring failure, then, the value will turn out SafeOut.

(At this moment, the output shows the last measured value, and LCD shows Error message.)

If the sensor restarts normal operation , it shows a measured value immediately.

(In the mode 4–20mA, output will be TOP value = 20mA and BOTTOM value = 4mA , in the mode 20–4mA, TOP = 4mA and BOTTOM = 20mA)

(Until measuring for the first time, it shows a default value of SafeOut.)

4-20mA CHANNEL

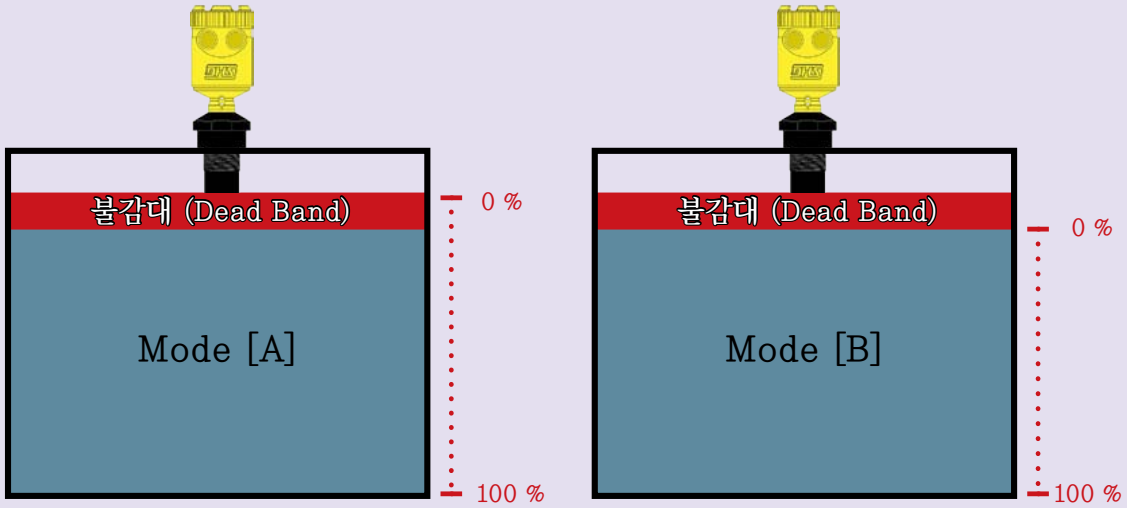
You can choose output value from CH1 and CH2. (Default = CH 1)

MEASUREMENT M.D (MODE)

You can set whether measuring distance value includes deadband or not.
(Default = MODE A)

MODE A – Measuring distance value including deadband.

MODE B – Measuring distance value excluding deadband.



RUN MODE

You can choose the sensing speed from Slow mode and Fast mode. (Default = Slow)

DISPLAY UNIT

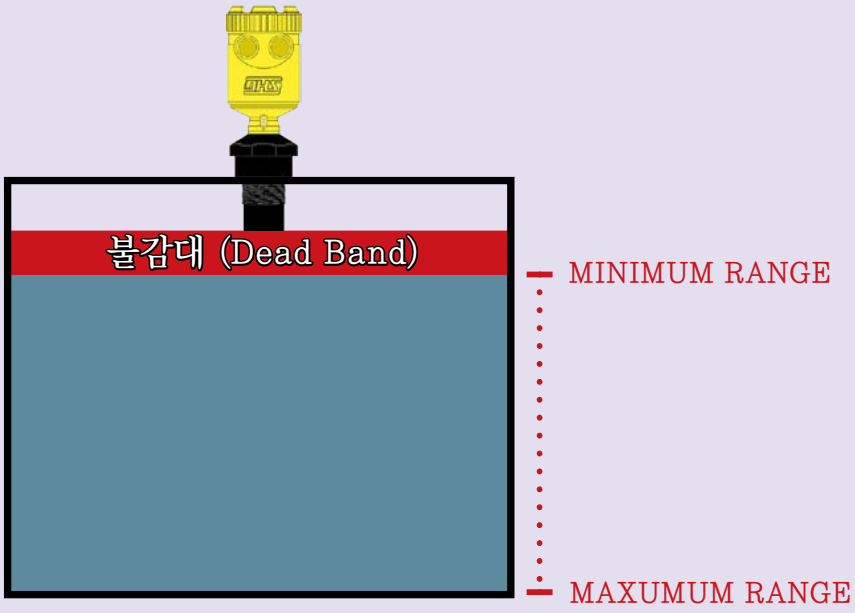
You can choose the display unit in Cm or in Inch. (Default = cm)

MINIMUM RANGE

It means a deadband , minimum distance from the bottom of the sensor..
(Default = 300mm)

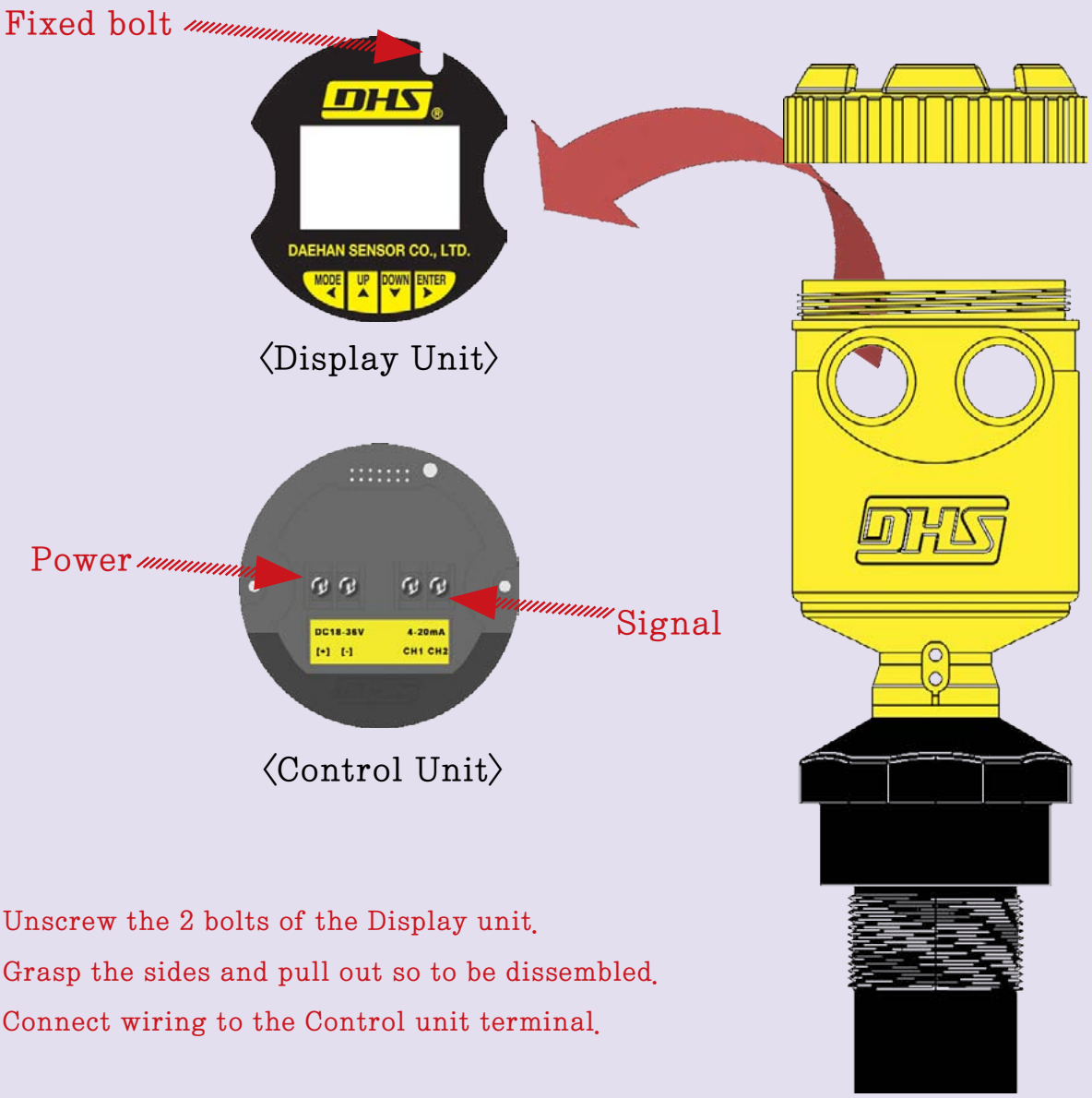
MAXIMUM RANGE

It is maximum distance for measuring, from the bottom of the sensor.
(Default = DU03 : 3300mm / DU05 : 5300mm / DU08 : 8300mm)



6. Wiring

After dissembling the Display unit, connect wiring to the Control unit.



① Unscrew the 2 bolts of the Display unit.

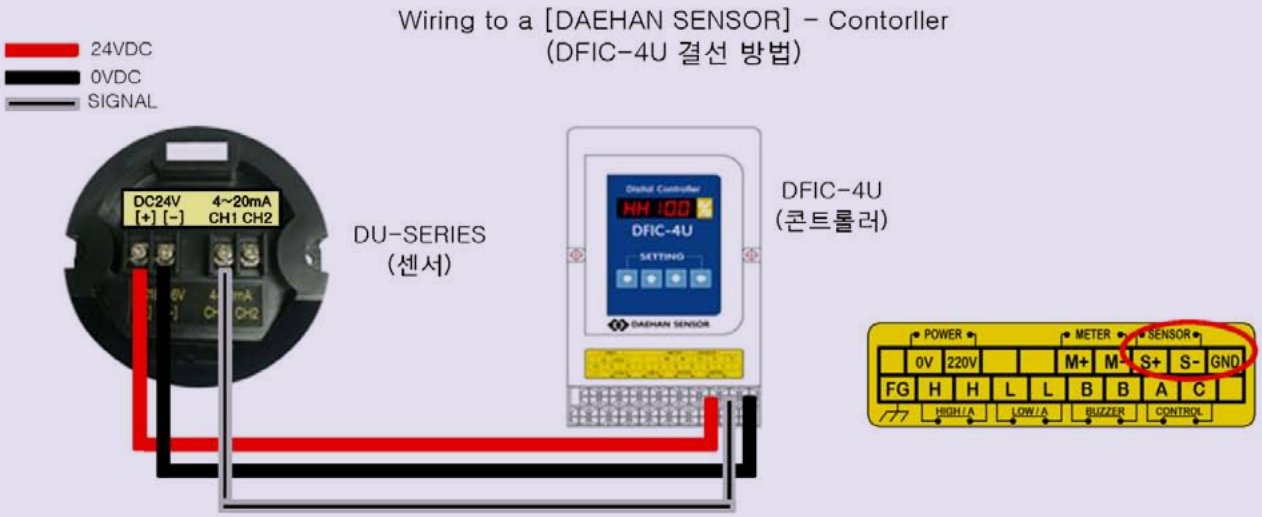
② Grasp the sides and pull out so to be dissembled.

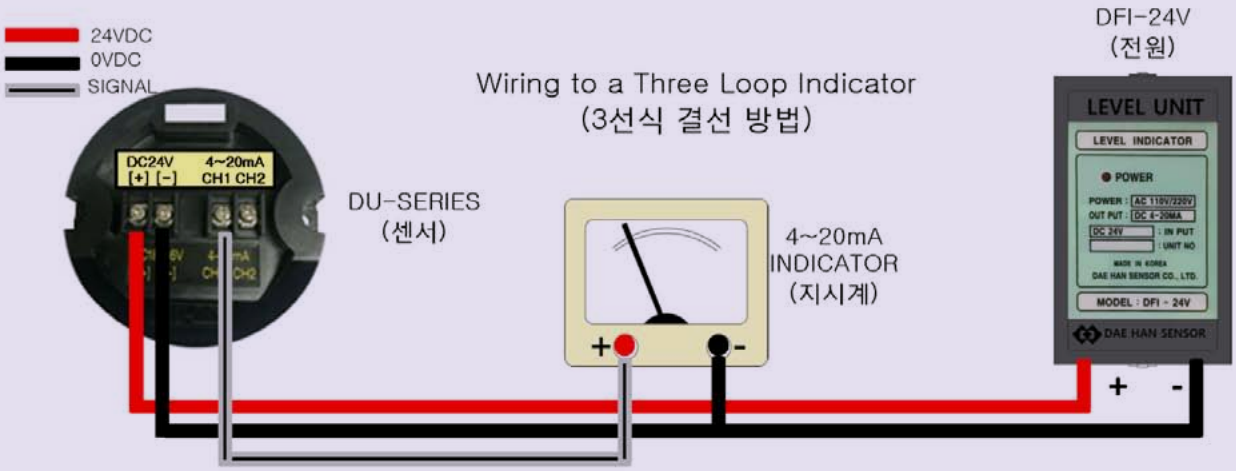
③ Connect wiring to the Control unit terminal.

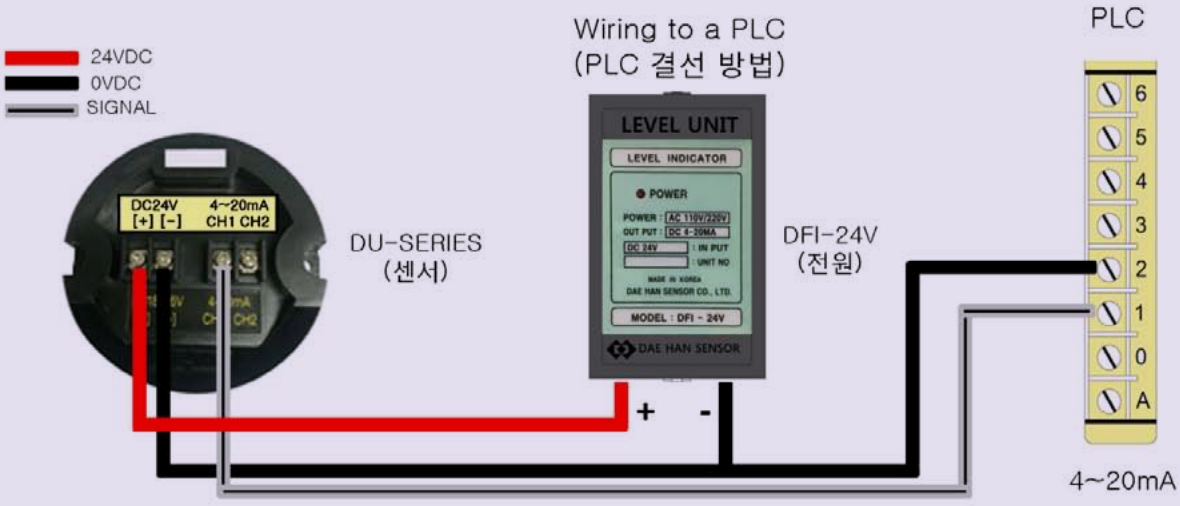
* Dissembly / assembly at discretion of senosr can cause malfunction.
  In the case of defects caused by a discreational alteration , all reponsibility falls on the end users, and it may void manufacturer's warranty.

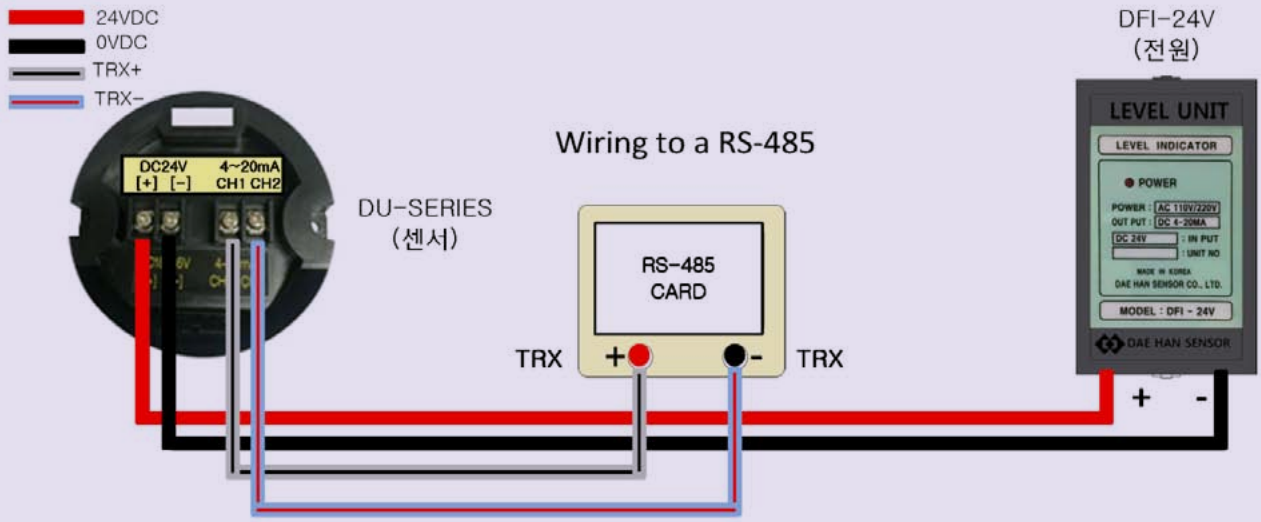
* We recommend that you install the line filter just infront of the cable gland.
  The line filter (ZCAT-V-BK by TDK) is included in the package

[DU08,05,03] 3-WIRE 결선









DU – Series MODBUS RTU Protocol

1. QUERY (MASTER 측)

Slave (국번) Address	Function (명령)	Starting Address (시작 번지)		No. of Point (데이터 개수)		Error Check (CRC16)	
		Hi (상위)	Lo(하위)	Hi (상위)	Lo(하위)	Hi (상위)	Lo(하위)
01H	04H	00H	00H	00H	02H	##H	##H

CRC 16

2. RESPONSE (SLAVE 측) Ex) 측정값 : 926(039E H) / 온도 : 24 / Error : 없음

Slave (국번) Address	Function (명령)	Byte Conut (데이터 Byte 수)	Starting Address (시작 번지)		No. of Point (데이터 개수)		Error Check (CRC16)	
			Hi (상위)	Lo(하위)	Hi (상위)	Lo(하위)	Hi (상위)	Lo(하위)
01H	04H	04H	03H	9EH	00H	18H	##H	##H

CRC 16

3. Mapping Table

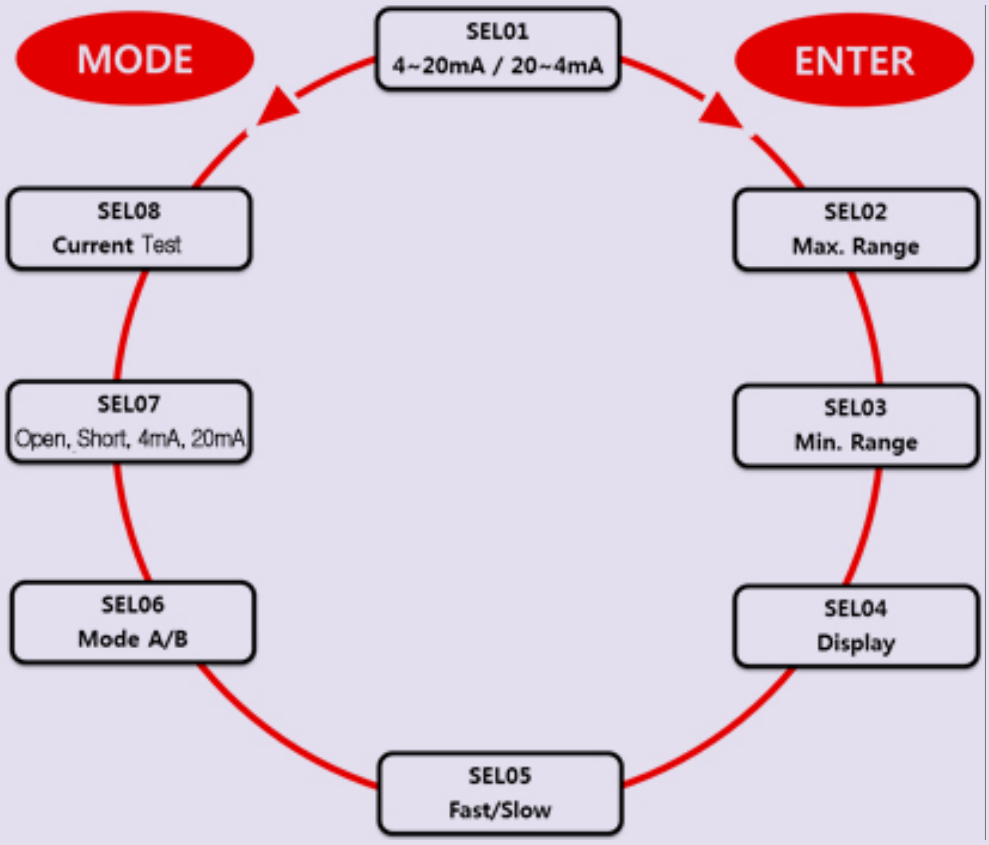
Read Input Register

No.	Function	R/W	Item	Details
30001 (0000 H)	04 H	Read Only	측정값 (mm)	측정거리의 HEX값 Ex) 380 H / 944 (mm)
30002 (0000 H)	04 H	Read Only	하위 1Byte의 최상위 1Bit Lo#XXXXXXX b 온도 부호	온도 부호 0 : 양수 / 1 : 음수 Ex) 81 H / -1℃
			하위 1Byte의 하위 7Bit LoX####### b 온도값	측정 온도의 HEX 값 단, 온도 에러시 FF H
			상위 1Byte의 최하위 1Bit LoXXXXXXX# b Error Cobe	에러 상태값 0 : Noraml / 1: Error Ex) 01 H / Error

7. Setting

Model : DU-30, DU-60

Hold [MODE] over 2 seconds, press [ENTER] over 1 second, it starts menu setting.



In the menu setting, if press [MODE], it turns counter-clockwise, if press [ENTER], it turns clockwise. With [UP]/[DOWN] key, you can change the value.

After changing the value setting, press [ENTER] over 2 secnods to finish menu setting.

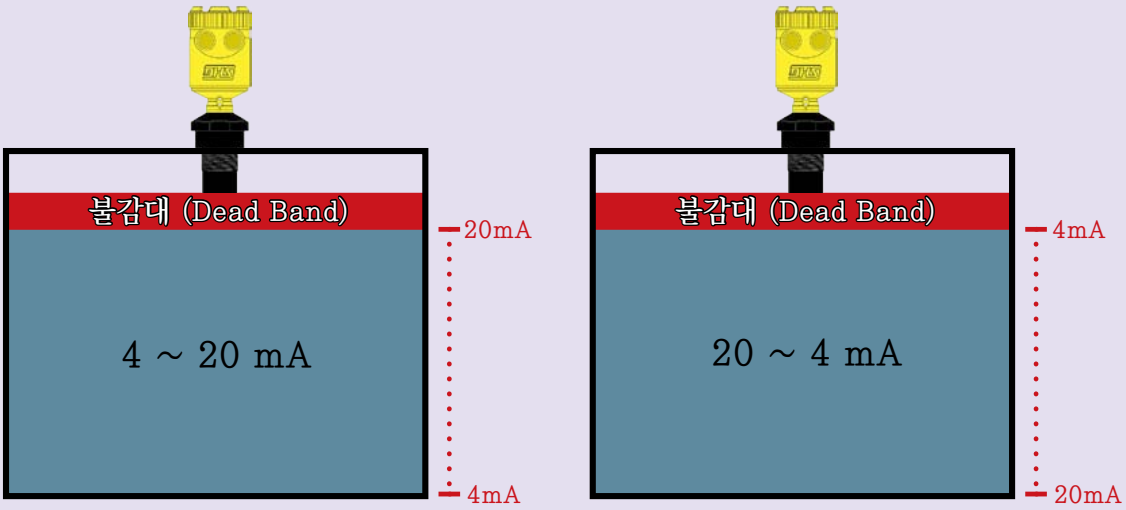
If you finish menu setting, the changed value will be saved automaticallly.

SEL 01

You can choose output signal type as below..

4 ~ 20 – When the tank is empty, it shows 4mA..
When the tank is full, it shows 20mA..

20 ~ 4 – When the tank is empty, it shows 20mA..
When the tank is full, it shows 4mA.



SEL 02

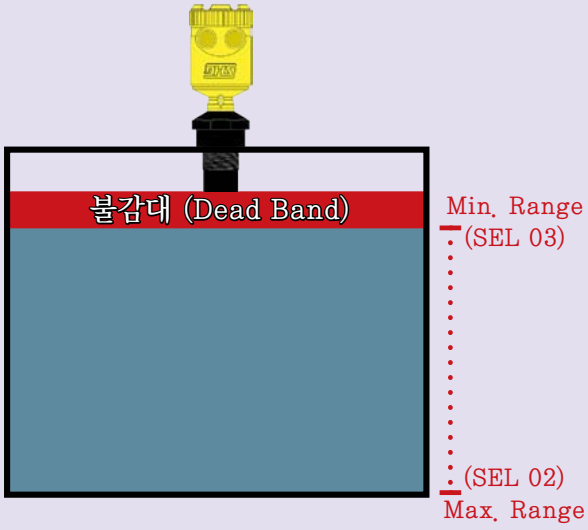
Set the distance from the bottom sensor of the tank is empty state when.

Each model can be set up to measure the distance..
The point is moved Mode Key.

SEL 03

Set the distance from the bottom sensor
of the tank is Full state when.

Dead zone can not be set to less than.
The point is moved Mode Key.



SEL 04

millimeter(mm), inch, percent(%) It sets the LCD display unit.

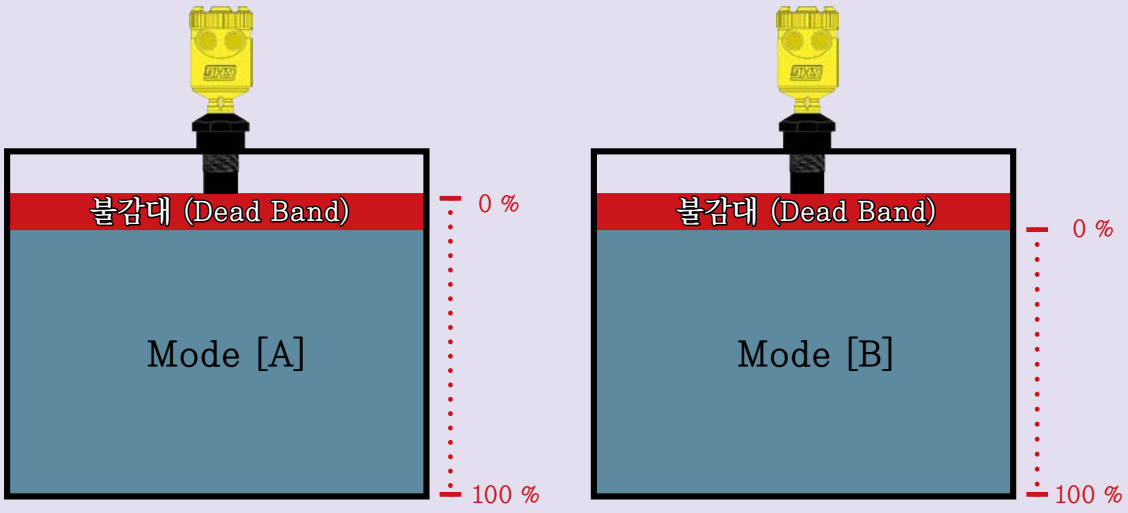
SEL 05

You can choose the sensing speed from Slow mode and Fast mode.

SEL 06

불감대를 측정거리에 포함 할 것인지 제외 할 것인지 설정 할 수 있습니다.

M – A (Mode A) : Measuring distance value including deadband.
M – B (Mode B) : Measuring distance value excluding deadband.



SEL 07

If sensor fails to measure, it show a default value of SafeOut.

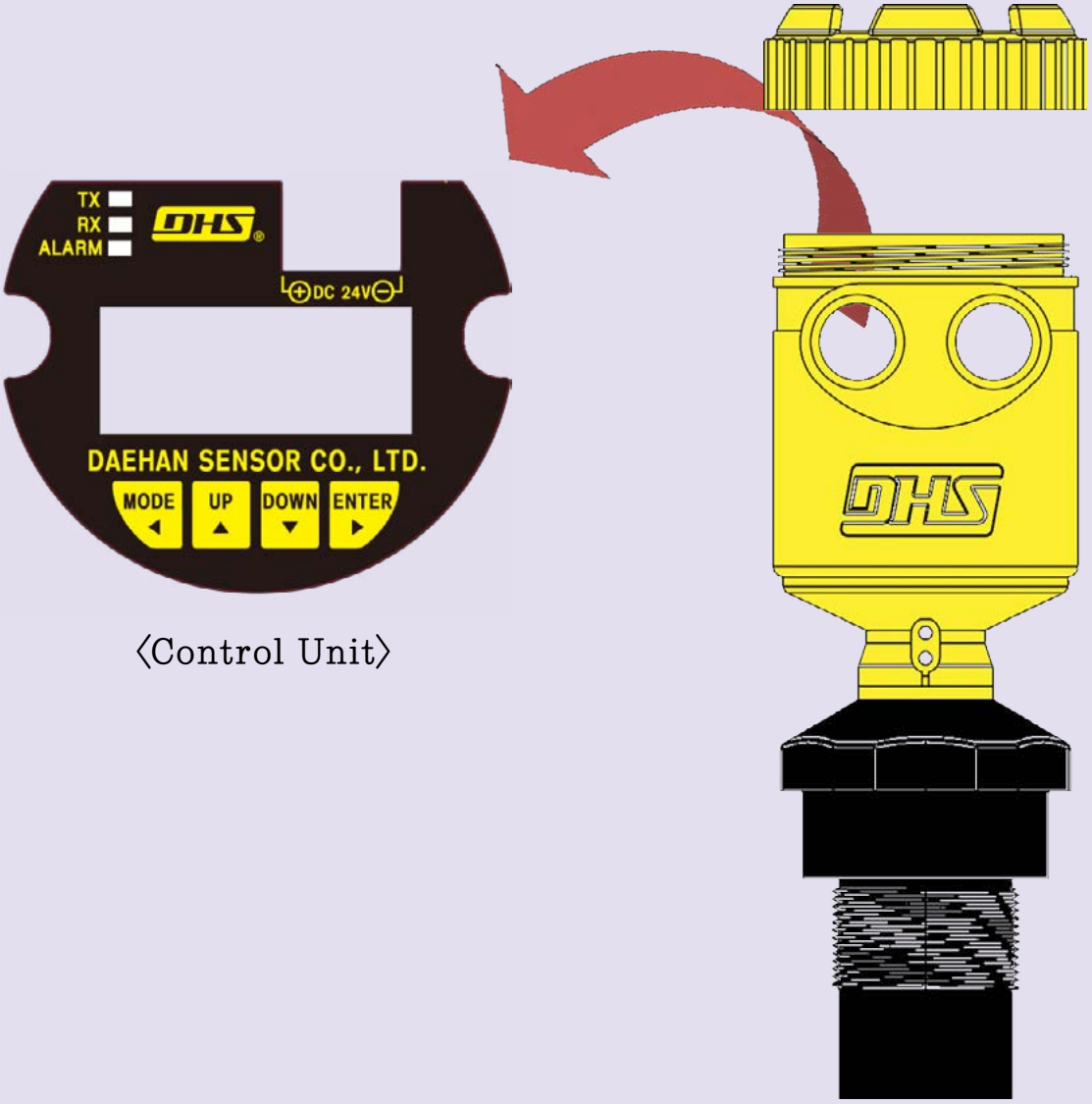
Short : 22mA Open : 3.75mA
20.0 : 20mA 4.0 : 4mA

SEL 08

The current test mode. 5 seconds, the output cycle of the sequential 3.75mA and 22mA.

8. Wiring

After dissembling the Display unit, connect wiring to the Control unit.

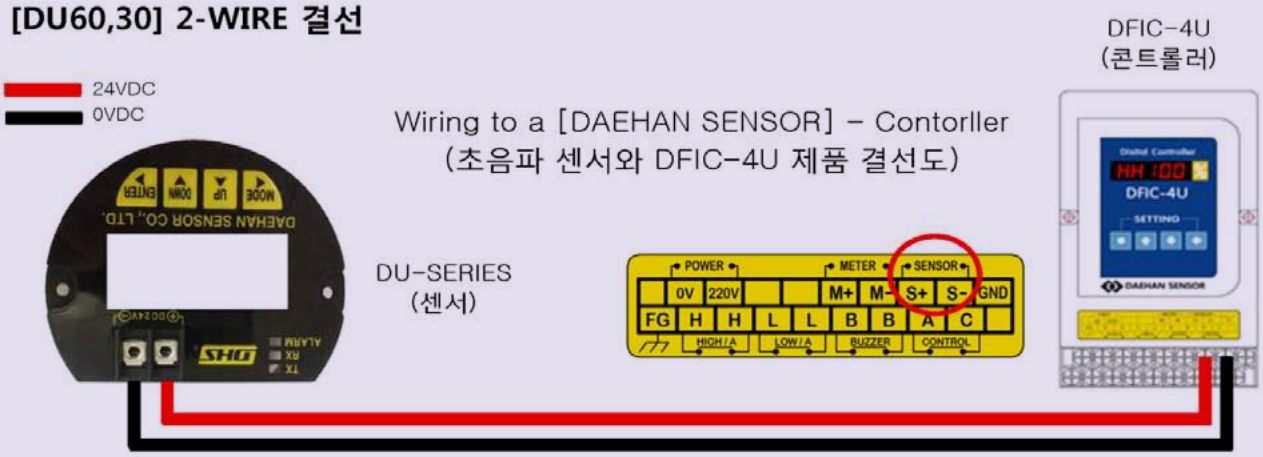


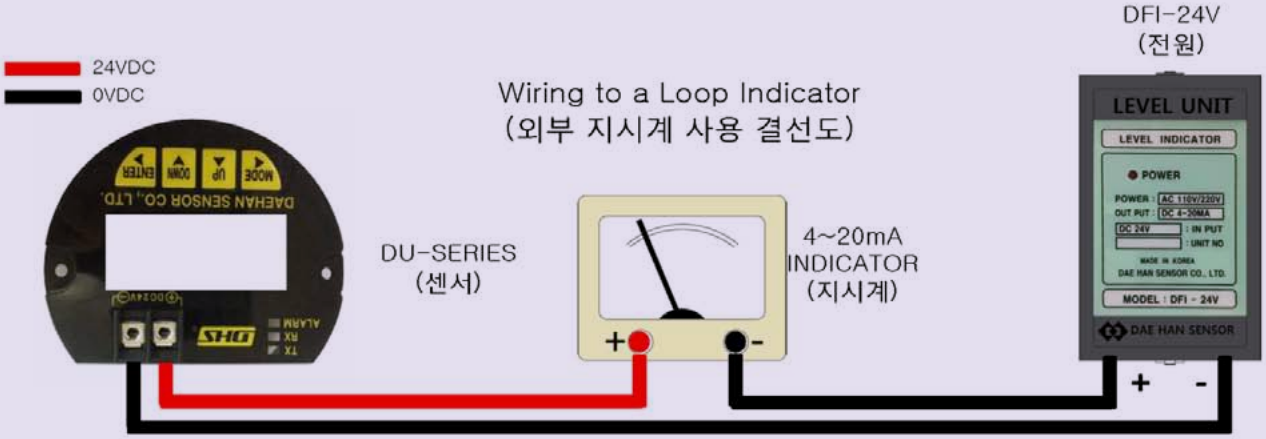
〈Control Unit〉

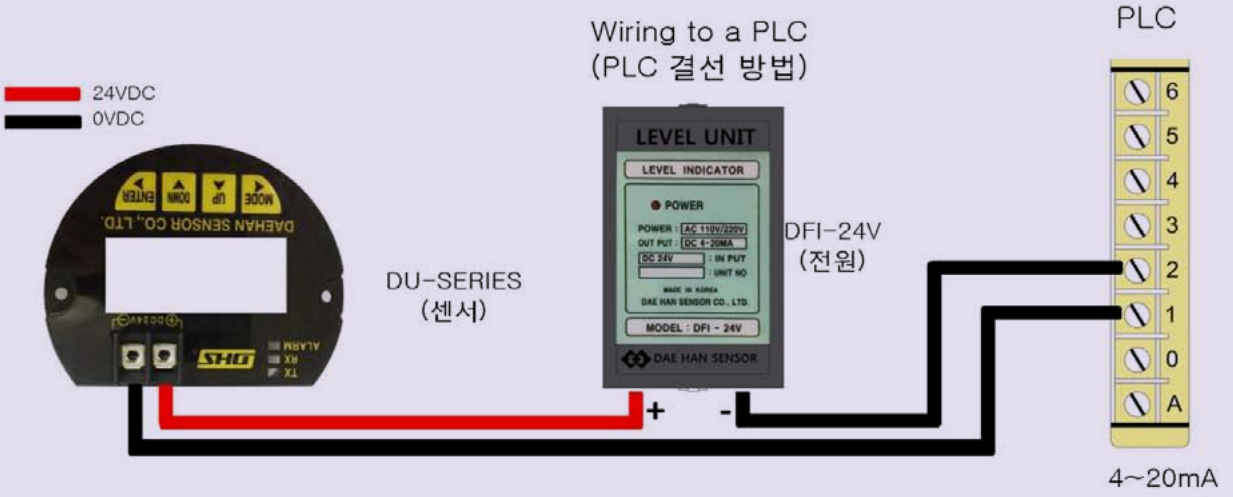
* Dissembly / assembly at discretion of senosr can cause malfunction.
  In the case of defects caused by a discreational alteration , all reponsibility falls on the end users, and it may void manufacturer's warranty.

* We recommend that you install the line filter just infront of the cable gland.
  The line filter (ZCAT-V-BK by TDK) is included in the package.

[DU60,30] 2-WIRE 결선







9. Check Point

The Current output is normal?
: Make it sure that output, 4~20mA, is normally coming out.

The wiring is correct?
: Check the connect the wire short-circuit and / or poor contact.

The state of sensor, inside, is normal?
: Problem is caused by exterior structures?

Check if water or liquid exists inside of the sensor.

Head Office
94-2, Yongdap-dong, Seongdong-gu, Seoul, Korea

R&D Office
2-71, Jeonong-dong, Dongdaemun-gu, Seoul, Korea

Tel : 02-2213-9888(代) Fax : 02-2245-3482
e.mail : master@dh34.com Domain : www.dh34.com