

# DAEHAN SENSOR



Magnetostrictive type Level Transmitter

DPS – Series

with Explosion Protect

Product Name

DPS-500L



ISO 9001 인증업체

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# 1. Summary

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

- Information for safe use and Disclaimer
- ⊙ Installation and operation manual must be provided to the end user.
- ⊙ This 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 responsibility to the accident arising 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.
- ⊙ If A/S or modification of the product is required, please feel free to contact us.
- ⊙ 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 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.

List of application – Application criteria

: Protective equipment compulsory safety certification examination ( 2013–54 )

## 2. Safety Guide

Installation of the product, maintenance and repair shall be entitled to be carried out in compliance with safety regulations, regulatory requirements by qualified personnel in professional occupations. Improper installation, use and maintenance may cause fire and explosion damage, in order to prevent the risk of possible danger, users should read the warnings and precautions on safety that are stated in this manual.

After reading, keep it where you can see always.

### – Danger to safety, warnings and precautions

The definition on the danger, warning, caution indicated in this instruction manual

#### ⦿ Danger

- It may cause death or serious injury due to improper handling and refers to the risk of predictable physical damage.

#### ⦿ Warning

- It may cause death or serious injury due to improper use or installation and refers to the risk of predictable physical damage.

#### ⦿ Caution

- It may cause physical damage due to improper use or installation.

# Transport and assembly, installation

## – Danger –

- ⦿ Make sure to read all the user's manual before installing or using explosion-proof magnetostrictive sensor.
- ⦿ In case of failure to follow the user's manual, it can result in severe injury or even death to humans and it may result in damage and property damage due to fire or explosion by abnormal functioning.
- ⦿ Do not act affecting the explosion-proof performance with the decomposition or modification of the product for the user's any purpose. If you change and use it, it can not maintain the explosion-proof performance, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⦿ Do not disassemble the product when electric power is supplied. In the state of disassembling, it can not maintain the explosion-proof performance, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⦿ Make sure power off and wait one minute and proceed installation and internal wiring connection of explosion-proof magnetostrictive sensor.  
In the state that electric power is supplied, if you do installation and / or internal wiring connection, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⦿ You must use explosion-proof cable glands, and explosion-proof cable flexible.  
Non-explosion-proof products may result in personal injuries and property damage caused by explosion or fire.

# Transport and assembly, installation

## – Warning –

- ⊙ Transportation, installation, plumbing, operation, and maintenance work must be done by an expert who has knowledge on technical implementation of the principles and features, such as explosion-proof electrical equipment structure construction laws.
- ⊙ Do not open the sensor during operation.
- ⊙ Do not remove display nameplate attached to the body so that it is always visible.

## – Caution –

- ⊙ Do not apply excessive pressure on the product. Please do not use excessive force when installing the product.
- ⊙ You should check any damage that may occur during transportation immediately when you receive the product.
- ⊙ If you do not consider the product weight and the center of gravity during moving a sensor, the operator may result in personal injury as well as product broken by dropping it.
- ⊙ Do not shock the product during transport. Internal switch damage caused by the shock may affect to abnormal operation.
- ⊙ This product is divided into an upper part ( Head ) and lower part (FLOAT) by the FLANGE. When the sensor is damaged by an impact on the bottom (FLOAT), it may not operate normally to change output according to the liquid level. Do not give an impact to the bottom (FLOAT).

# Function, operation and use

## – Danger –

- ⦿ Do not open the sensor when power is supplied and sensor is working.
- ⦿ In case of power outage, turn off the power of the connected equipment.  
Since power can be supplied again and the equipment automatically restarts, it may cause unexpected accidents.
- ⦿ Do not any decomposition or modification of the product for any user's purpose so that it affects the explosion-proof performance. Do not act affecting the explosion-proof performance with the decomposition or modification of the product for the user's any purpose. If you change and use it, it can not maintain the explosion-proof performance, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⦿ Do not disassemble the product when electric power is supplied. In the state of disassembling, it can not maintain the explosion-proof performance, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⦿ Make sure power off and wait one minute and proceed installation and internal wiring connection of explosion-proof magnetostrictive sensor.  
In the state that electric power is supplied, if you do installation and / or internal wiring connection, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.

# Function, operation and use

## – Warning –

- ⦿ Be sure to be grounded in accordance with the relevant standards by using the external grounding terminal with the internal terminal of the explosion-proof sensor.
- ⦿ Be sure to disconnect the power before wires connections, and do not work with wet hands when wiring. Otherwise, it may result in personal injury due to electric shock.

## – Caution –

- ⦿ Do not use higher than the rated voltage and current indicated on the nameplate.
- ⦿ Do not use in the places other than the specified ambient temperature ( $-20^{\circ}\text{C} \sim 40^{\circ}\text{C}$ ) and humidity.
- ⦿ When to connect wires, be sure to conduct wiring according to the instruction manual's diagram.
- ⦿ Magnetostrictive explosion-proof sensor must be mounted vertically.
- ⦿ When installed, you must install the sensor vertically.  
If you do not install it vertically, it may cause a malfunction.
- ⦿ Precautions such as the nameplate and display attachments that attach to the body is never removed so that always do to be seen. Do not remove the display precautions such as nameplate on the body, so that let it always to be seen.



# Cleaning, maintenance, fault diagnosis and repair

## – Danger –

- ⊙ Do not open the sensor when power is supplied and sensor is working..
- ⊙ Do not disassemble the product when electric power is supplied. In the state of disassembling, it can not maintain the explosion-proof performance, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.
- ⊙ Make sure power off and wait one minute and proceed installation and internal wiring connection of explosion-proof magnetostrictive level sensor. In the state that electric power is supplied, if you do installation and / or internal wiring connection, it may result in personal injuries and property damage due to fire or explosion by abnormal functioning.

## – Warning –

- ⊙ Be sure to disconnect the power before wires connections, and do not work with wet hands when wiring. Otherwise, it may result in personal injury due to electric shock.

## – Caution –

- ⊙ When users do any alteration on the product without maker's permission, the manufacturer has no responsibility on that.
- ⊙ Be sure to disconnect the power supply during maintenance and inspection.
- ⊙ Be cautious to check the environment of gas explosion during inspection on the internal switch and do not touch terminals.

### 3. Specifications

Model : DPS – 500

Media : 액체 전용

Input Voltage : TYPE\_A : 2 WIRE (DC 24V)  
TYPE\_B : 3 WIRE (DC 5V / DC 15V)

Output Signal : Current (DC 4~20mA),  
RS-485 (OPTION)

Temperature :  $-20^{\circ}\text{C} \sim +40^{\circ}\text{C}$

Process Temperature : Max.  $75^{\circ}\text{C}$

Zone : 1 / 2

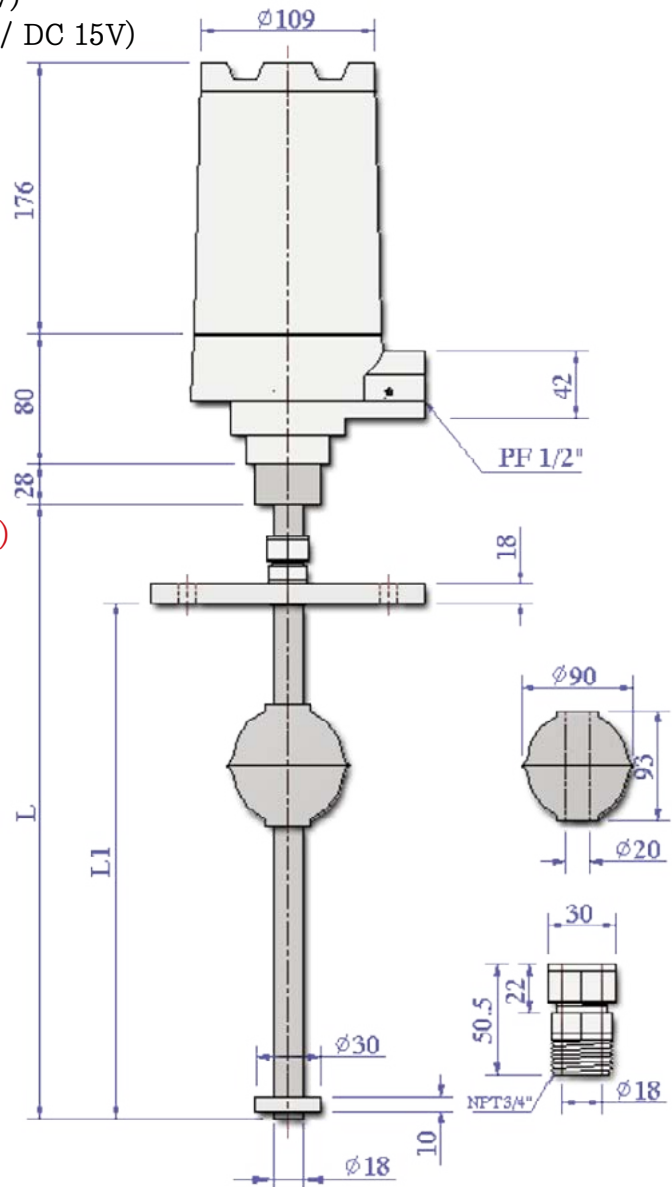
explosion-proof : Ex ed II B T6

배선 인입 규격 : PF 1/2" x 1ea  
(Option – M20 x P1.5 x 1ea)

Cable wiring : cable glands,  
conduit sealing device

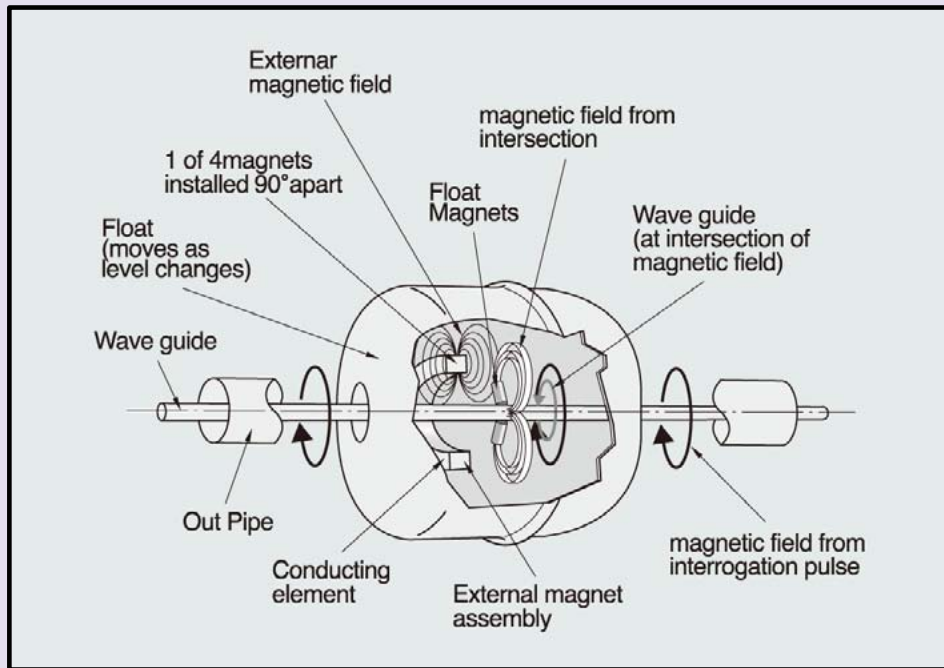
### 4. Material

- ① Head(Top) – AC2BS (Aluminum)
- ② Head(Bottom) – AC2BS (Aluminum)
- ③ Stem Guide – STS 304 / STS 316
- ④ Flange – SCS 13 / SCS 14
- ⑤ Float – STS 304 / STS 316 / NBR
- ⑥ Stopper – STS 304 / STS 316
- ⑦ Pitting – Brass / STS 304



## 5. Introduction

DPS ( Magnetostrictive type sensor ) is the level transmitter which detects the change of liquid level by the buoyant force of the float.



〈 The basic operating principle of the magnetostrictive sensor 〉

When the current pulses flowing inside waveguide of the sensor reacts to the magnetic field of the magnet inside a float, it calculate the height of the tank.

The calculated value is converted to 4–20mA or RS-485 signal for sending out by which enables to calculate the capacitance of the liquid in the tank.

In order to prevent corrosion on the level sensor's wet part, the stem and the float are made of stainless steel

## 6. Product Applications

DPS is a level transmitter with flame-proof structure so that it is suitable for installation and use in explosive gas environments.

## 7. Assembly and installation

### – General Information

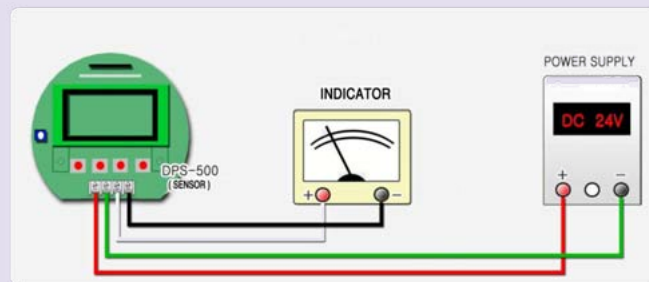
DPS is a customer-made product, so that you may connect it to the tank and use it.

Operating temperature range is generally from  $-20^{\circ}\text{C} \sim 40^{\circ}\text{C}$ . Measuring the temperature of the medium Max. Products available in more than  $120^{\circ}\text{C}$  high temperature can be supplied according to customer needs.

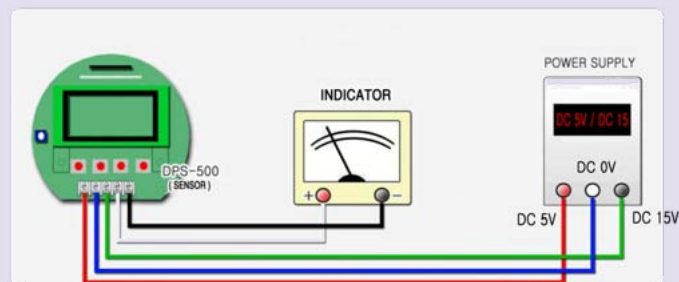
High temperature products like one that measuring maximum temperature is over  $120^{\circ}\text{C}$  are available on the customers demand.

### – Electrical Wiring

If power is connected to equipment, maintenance and repair of electrical components should be performed by a qualified person.



〈 DC 24V 전원 결선 및 외부 출력 결선 방법 〉



〈 DC 5V/ DC 15V 전원 결선 및 외부 출력 결선 방법 〉

Equipment must be connected depending on the desired application and wiring diagrams.

You should keep a local valid regulation on the electrical equipment.

### – Adjustments and changes

Level Switch (water alarms) are made in accordance with the customer's requirement, it can be operated even without special operation adjustment.

## 8. Storage, equipment, maintenance/repair

### – General storage

- ◎ No vibrations on the indoor temperature is less clean and stored in a dry place. It is recommended to store a sensor where is no indoor vibration, less temperature change, clean and dry.
- ◎ Check the power supply insulation at every three months.
- ◎ Please put a desiccant inside and keep it replaced regularly in the area where the humidity is high and humidity penetration is concerned.
- ◎ It may cause rust and corrosion depending on the storage conditions, so that you should check regularly.

### – General way to install

- ◎ In case of hazardous place, use the product in the temperature range of  $-20^{\circ}\text{C}$  ~  $40^{\circ}\text{C}$
- ◎ If there is some structure in the tank, which obstructs free up and down movement of the float, it may cause malfunction. You must remove the structure, or change the position of the level transmitter.
- ◎ Do not bend the sensor and avoid shock.
- ◎ Any changes of the stopper (Stopper) position may cause malfunction.
- ◎ DPS magnetostrictive sensor should be installed vertically.

### – Maintenance and Repair

- ◎ If you keep the record such as daily check, monthly maintenance and assembly inspection, it will be good contents as maintenance text.

### – Disposal methods

- ◎ When it comes to the end of product life, it should be disposed by designated industrial waste companies.

## 9. Diagnosis and trouble shooting

### – General diagnostic methods

- ◎ Check if liquid exist inside the sensor.
- ◎ Check if the float moves smoothly and according to level change.
- ◎ Check if the stopper is secured firmly in place.
- ◎ Check if the wiring is correct.

Repair, disassembly must be conducted by professional engineers.  
The product should not be disassembled without manufacturer's authorization.

### – External device diagnostics

- ◎ Check if power is properly supplied. (DC 24V / DC 5V & DC 15V)
- ◎ Check if current output is normal. (DC 4~20mA / RS - 485)

## 10. Warranty and Warranty Coverage

### – General diagnostic methods

- ◎ The warranty period for this product is one year from a shipping date.  
If it is not clear when to be shipped out, manufacturing date in the nameplate will be the base date.

### – Exceptions against warranty coverage

- ◎ Problem occurred due to the negligence of the users
- ◎ If you use where the ambient temperature does not fit, and where beyond explosion-proof rating, and danger rating.
- ◎ Any modifications or repair by the users without authority.
- ◎ In case of force majeure clause
- ◎ Any violation against the content in the nameplate or user's manual.