



# Cargo Tank Measuring System

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## Production & Sales Items

LEVEL GAUGES  
LEVEL SWITCHES  
LEVEL TRANSMITTERS  
OIL DETECTOR  
ALARM ANNUNCIATORS  
LEVEL INDICATORS  
ELECTRIC CONVERTERS



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**VOL. 1**

**HANLA**  
**IMS**  
INSTRUMENT  
MACHINERY  
SYSTEM

# INSTRUMENTATIONS

GAUGES

SWITCHES

TRANSMITTERS

ELECTRIC INSTRUMENTATIONS

**HANLA**  
**IMS**



# Company History

HANLA IMS. was found in 1989 as a manufacturer to make a top leading company in the field of instrumentation for level control, and monitoring under the company motto of customer satisfaction, quality assurance, maintenance of the quality in the world. Since that time, we have been continuously making every possible effort to develop a wide variety of instrumentation such as level gauges, level switches and level transmitter to meet diversified demands of our customer.

As a result of the continuous effort, we were registered as a sub-supplier for biggest domestic shipyards, and could stand firm our position as a top leader in the field of marine by acquiring the type approval certificate for own product through the classification society since 1993.

In the 1993, we signed technical license with Auxitrol in France which is a leader company in the field of instrument in the world so as to diversify and improve our own product.

Between 1993 and 1995, we acquired the quality authorization certificate which can supply our own instrumentations to the thermal power plant and nuclear electric power plant from Korea Electric power cooperation on the basis of high quality assurance program to expand our land market share more and more.

We acquired the quality assurance system certificate conformed to Quality system standard ISO 9001 by DNV certification B.V to keep excellent quality and same in the November 19th, 1997 as well as CE mark for cargo monitoring system, air purge type remote sounding system and all kind of level switch in 31 March 2000. Hanla Level Co., Ltd. will do our best to be a best professional company and a leader in the world under our motto of customer satisfaction, quality assurance, maintenance of the quality, and business rationalization, unity & harmony among men.

On November, 1st, 2009, we are pleased announcing the new CI of HANLA IMS by launching Valve Remote Control System, Deck Machinery, Loading Computer as well as Level Measuring System. We know you will want to take advantage, and we will support all the of customers in the world. Expand your mind on the new HANLA IMS!

Many thanks and wish for your health.





# Manufacturing Line Authorized by the Quality

HANLA IMS Co., Ltd.

We are making the first class product in the world with optimum design from research & development, constant production system, standardization quality control system.



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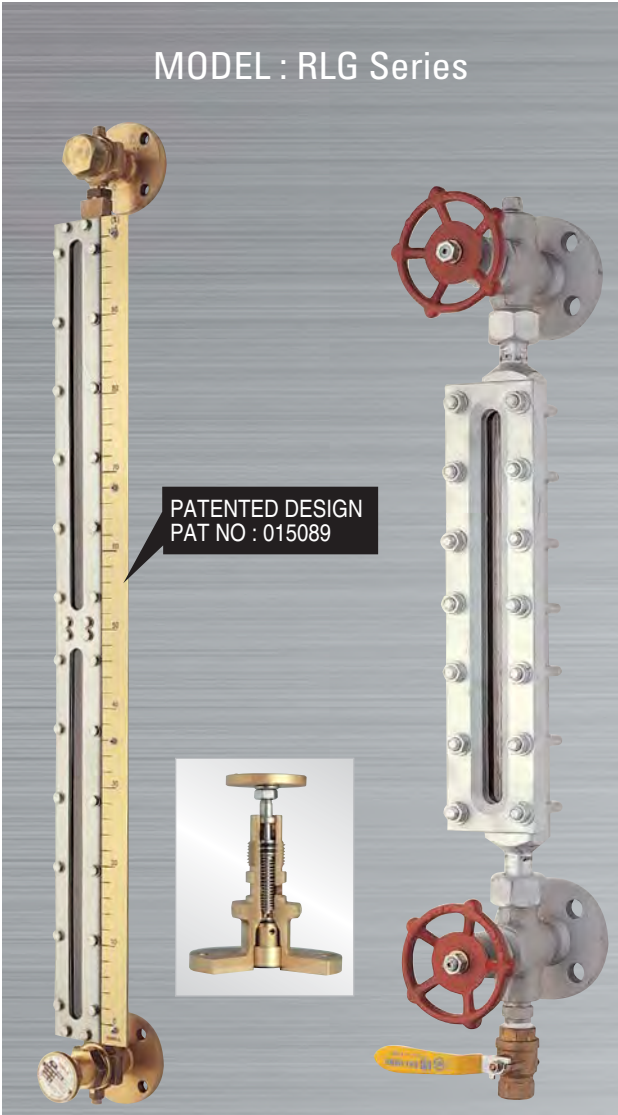


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# Level Gauges

## Flat Type Glass Level Gauge



• RLG-LP Series

• RLG-HP Series

### HANLA MARINE GAUGE

Flat type glass level gauges have been developed to comply with the requirements of the SOLAS 1981, 1983, 1996, 1997, 1998 amendments. The gauges have been reviewed and a suitable construction is accepted by marine classification authorities throughout the world.

### FLAT GLASS DESIGN

The toughened borosilicate glass window is housed and protected in a robust stainless steel column. The excellent level indication even of colourless liquids is provided by reflex glass viewing windows.

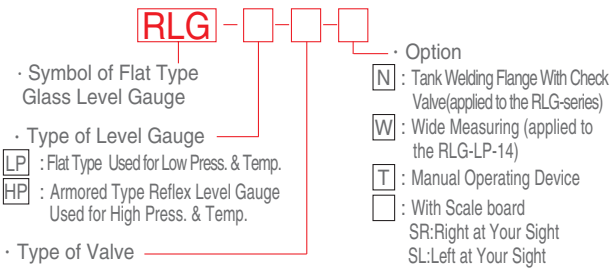
### APPLICATION

Flat type glass level gauges are used for water tanks, all oil tanks and boiler drum etc.

### EASY MAINTENANCE FOR RLG-LP SERIES

When required, the liquid chambers can be cleaned with the gauge on the tank, alternatively the isolating valves will be able to remove the column without drain of the tank.

### MODEL NUMBER CODE SYSTEM



APPLICATION	MODEL	VALVE TYPE	
		Upper	Lower
LP	11	Self-closing	Self-closing
	13	Tank return	Self-closing
	14	Top vent	Self-closing
HP	22	Screw-down valve	Screw-down valve with checkball
	C22	Chain valve	Chain valve with check ball
	CK22	Cock valve	Cock valve

### Standard model and specification

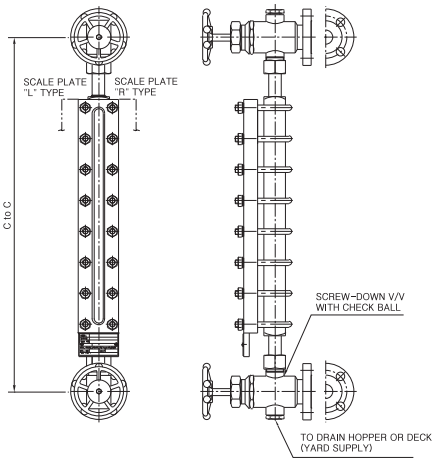
Model	Valve type		Connection size	Range of pressure	Range of temp.	Material				Center to Center
	Upper	Lower				Valve	Front channel	Back channel	Glass	
RLG-LP-11	Self-closing	Self-closing	JIS 5K20A, 25A	3 kg/cm <sup>2</sup>	150°C	BC6	SUS304	SUS304	Borosilicate	285
RLG-LP-13	Tank return	Self-closing	JIS 5K20A, 25A	3 kg/cm <sup>2</sup>	150°C	BC6	SUS304	SUS304	Borosilicate	~ 5100
RLG-LP-14	Top vent	Self-closing	JIS 5K20A, 25A	3 kg/cm <sup>2</sup>	150°C	BC6	SUS304	SUS304	Borosilicate	(m/m)
RLG-HP-22	Screw-down valve	Screw-down valve WITH CHECK BALL	JIS 16K20A	50 kg/cm <sup>2</sup>	300°C	C,S	C,S	C,S	Borosilicate	320
RLG-HP-C22	Chain valve	Chain valve WITH CHECK BALL	JIS 16K20A	30 kg/cm <sup>2</sup>	300°C	C,S	C,S	C,S	Borosilicate	~ 2870
RLG-HP-CK22	Cock valve	Cock valve	JIS 16K20A	20 kg/cm <sup>2</sup>	300°C	C,S	C,S	C,S	Borosilicate	(m/m)

- The level gauges shall be classified into three types 11, 13, 14 according to the shape of the upper body.
- Please consult with our factory when other conditions are required.

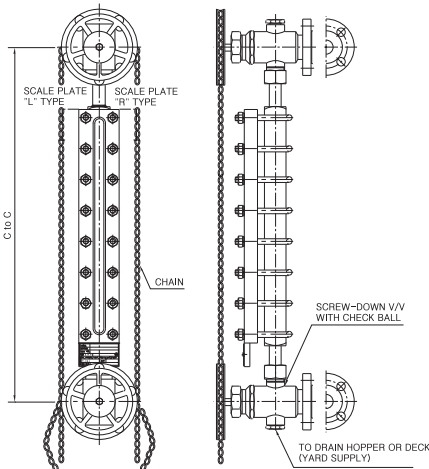


OUTLINE / DIMENSIONS

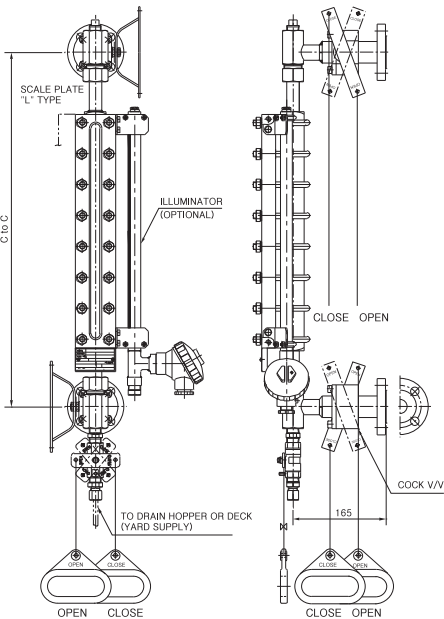
RLG-HP-22



RLG-HP-C22

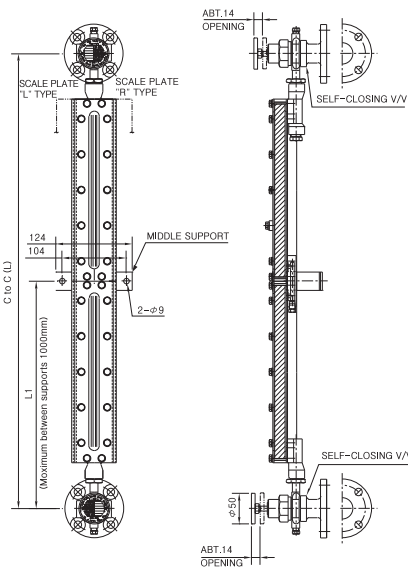


RLG-HP-CK22

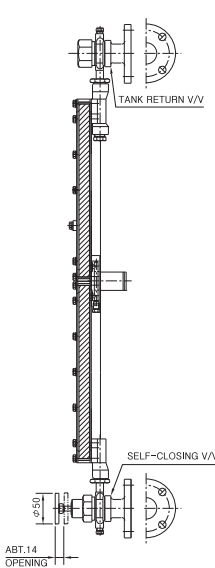


INSTALLATION OF THE FLAT TYPE  
GLASS LEVEL GAUGE

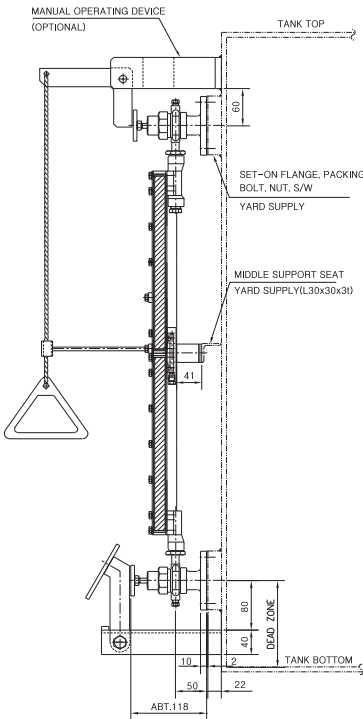
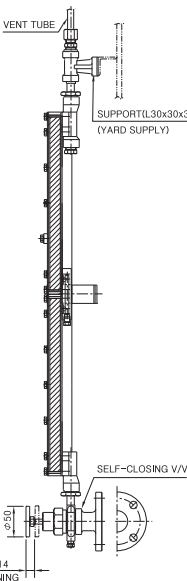
RLG-LP-11(T)



RLG-LP-13



RLG-LP-14



# Level Gauges

## Tubular Type Glass Level Gauge



· RLG-TB-24  
A-TYPE

· RLG-TB-23  
B-TYPE

· RLG-TB-22  
C-TYPE

### HANLA MARINE GAUGE

Tubular type glass level gauges have been developed to comply with the requirement of the SOLAS 1981 1983, 1996, 1997, 1998 amendments.

### LIMITATION

The tubular type glass level gauges, RLG-TB-12/13/14 can be used for following condition.

- Fuel oil tank of which the capacity is less than 1000 liter.
- In ship with class notation "Coasting Service" or whose gross tonnage is less than 500 tons.

### Standard model and specification

JIS Code	Model	Upper body type	Valve type		Connection size	Material			Protector type	Center to center	Range of pressure	Range of Temp.						
			Upper	Lower		Protector	Glass	Valve										
JIS F 7211	RLG-TB-24	A-type	Vent	Shut-off	5K 10A	SS41	HARD	BC6	K-type	325 ~ 3765 (mm)	0~3kg/cm <sup>2</sup>	0~100°C						
	RLG-TB-23	B-type	Tank return	Shut-off														
	RLG-TB-22	C-type	Shut-off	Shut-off														
JIS F 7212	RLG-TB-14	A-type	Vent	Self closing	10K 10A (16K 10A)													
	RLG-TB-13	B-type	Tank return	Self closing														
	RLG-TB-12	C-type	Shut-off	Self closing														

- The level gauges shall be classified into three types A.B.C according to the shape of the upper body.
- Please consult with our factory when other conditions are required.
- The scale board is an optional item.



· RLG-TB-14  
A-TYPE

· RLG-TB-13  
B-TYPE

· RLG-TB-12  
C-TYPE

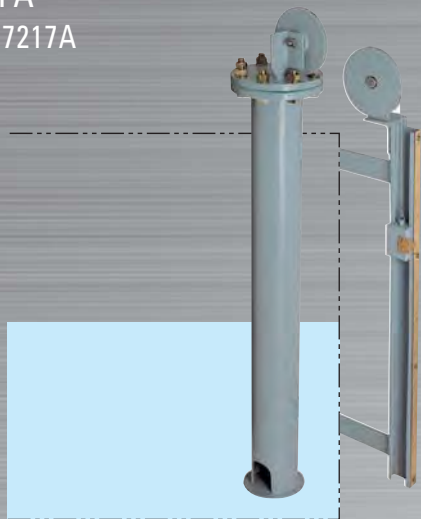
### APPLICATION

These type level gauges are used for water tanks except for fuel oil tanks.

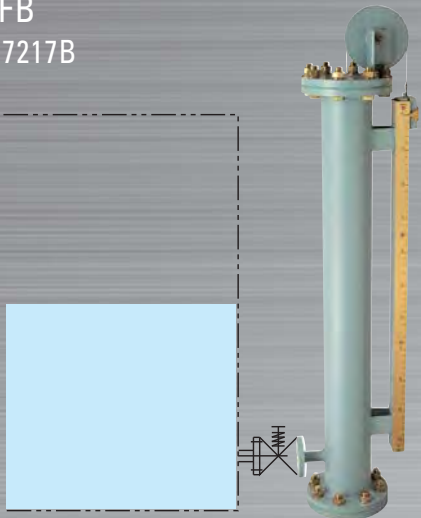
# Marine Float Type Level Guage



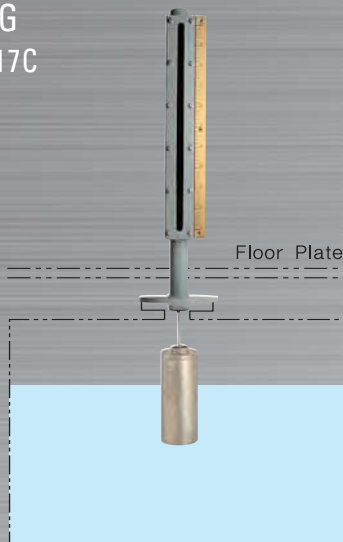
FLG-FA  
JIS F 7217A



FLG-FB  
JIS F 7217B



FLG-FCG  
JIS F 7217C



## GENERAL

These float level gauges specified in Japanes Industrial Standard are used for all kinds of tanks in ship.

## FEATURE

- FLG-FCG type is a gas tight
- Easy maintenance
- Easy installation
- Easy reading
- Exact indication

## Classification

Model	Mounting type	Nominal dia.	Application
FLG-FA-100	Inner balance weight	100	Medium tanks
FLG-FA-150	Inner balance weight	150	Large tanks
FLG-FB-100L FLG-FB-100R	Outer balance weight	100	Large and medium tanks
FLG-FCG-100	Direct acting	100	Removable tanks
FLG-FCG-150	Direct acting	150	Double bottom (Lubricating oil, water)tanks
FLG-FCG-200	Direct acting	200	

## Standard model and construction material

Model	Chamber	Float	Sheave	Spindle	Flange	Wire rope	Sight glass
FLG-FA	SGP	SUS304	SS41	N/A	SS41	SUS304	N/A
FLG-FB	SGP	SUS304	SS41	N/A	SS41	SUS304	N/A
FLG-FCG	SGP	SUS304	N/A	SUS304	SS41	N/A	Hard

## Operating condition

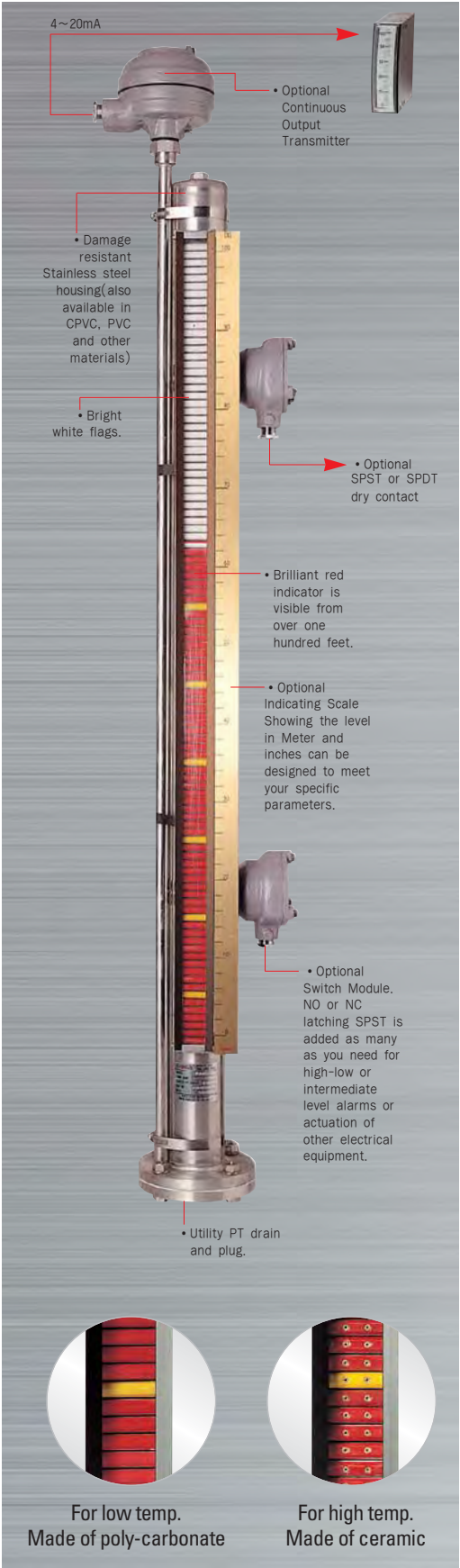
Model	Working condition		Conn. size	Chamber size	Max. Measuring range at Sp.Gr 0.92
	Press.	Temp.			
FLG-FA-100	Atm.	80°C	5K100A	100A	-
FLG-FA-150	Atm.	80°C	5K150A	150A	-
FLG-FB-100	Atm.	80°C	5K100A	100A	-
FLG-FCG-100	3 kg/cm <sup>2</sup>	80°C	5K100A	100A	3000m/m
FLG-FCG-150	3 kg/cm <sup>2</sup>	80°C	5K150A	150A	6000m/m
FLG-FCG-200	3 kg/cm <sup>2</sup>	80°C	5K200A	200A	10000m/m

- The scale board is an optional item.
- The JIS F 7216 angle valve for FLG-FB is an optional item.



# Level Gauges

## Magnetic Float Type Level Gauge



### GENERAL

Hanla magnetic float type level gauges have been developed to comply with the requirements of the SOLAS 1981, 1983, 1996, 1997, 1998 amendments. The gauges construction is accepted by marine classification authorities throughout the world.

### HIGH VISIBILITY

Brilliantly colored flags facilitate to read even at great distances. The indicator is isolated from the measured media; therefore suitable indicators can be used where sight glasses are not even a consideration.

### ENVIRONMENTAL SAFETY

Monitored liquid is contained inside a pressure tight housing.

### EFFICIENCY

Continuous level indication without external power.

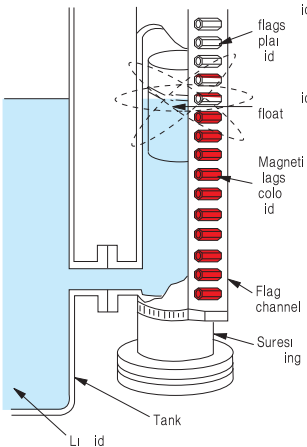
### ELECTRONIC CONTROL

Attached optional point level switches and/or continuous level transmitters extend the capabilities beyond those of a simple sight glass replacement.

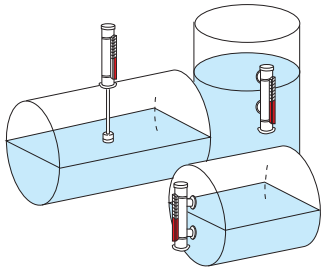
### WIDELY USED TO MEASURE

H.F.O, D.O, L.O, F.W, petrochemistry chemical instead of using the gauge glasses.

### Operating Principle



As liquid level rises, a magnet-equipped float within the unit inverts the magnetic flags in the external indicator to "color-side-out." The flags remain magnetically by interlocking in a column until again inverted to "plain-side-out" by the float as liquid level falls. Liquid level is indicated by the junction of the "color" and plain portions of the column.



### Model number code system

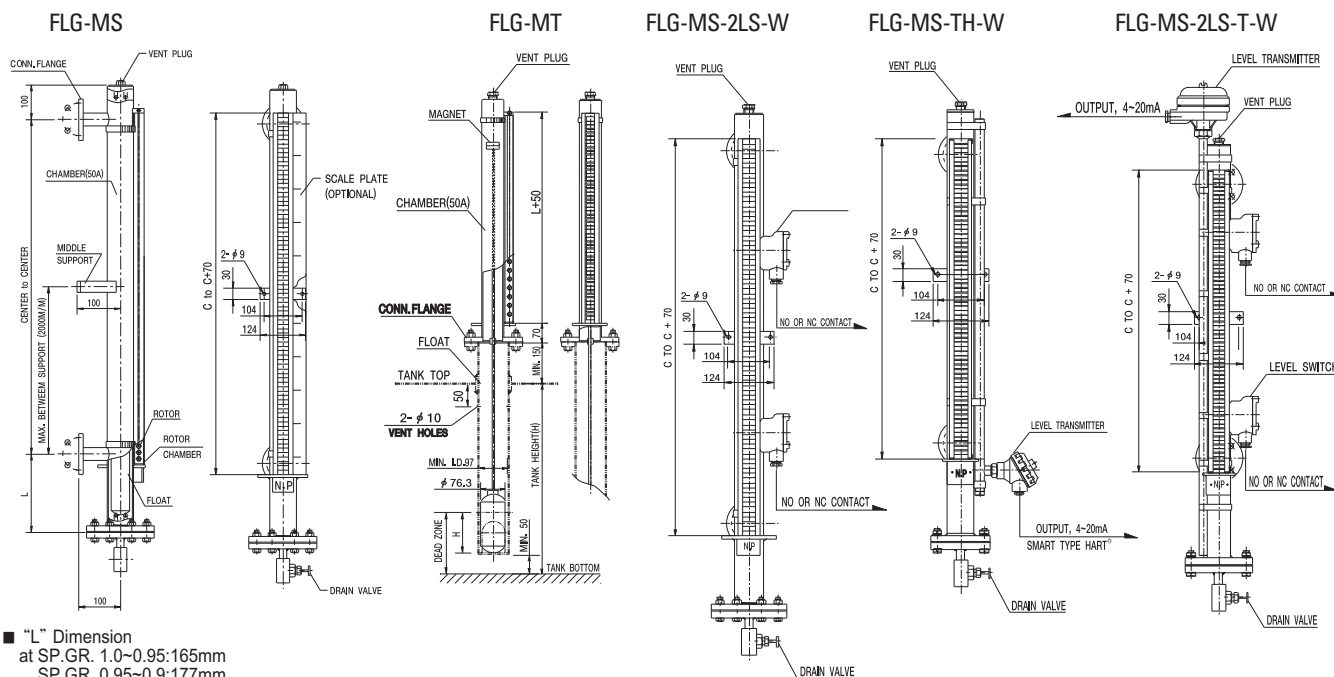
FLG - [ ] - [ ] - [ ] - [ ]

Option

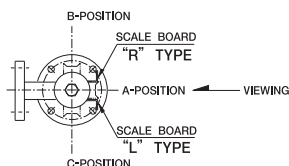
Symbol of Magnetic Float Type Level Gauge

- Level gauge mounting type
  - MS: Side-side mounting
  - MT: Top mounting
- No. of level switch
  - 1LS: 1-Level switch
  - 2LS: 2-Level switches
  - 3LS: 3-Level switches
  - 4LS: 4-Level switches
- Enclosure
  - W: Weather proof(IP56)
  - E: Explosion proof(Exd II C T6)
- Output of Level Transmitter
  - T: 4 ~ 20mA, 2wire
  - TH: 4 ~ 20mA, 2wire, smart type HART®
  - TR: 1Kohm

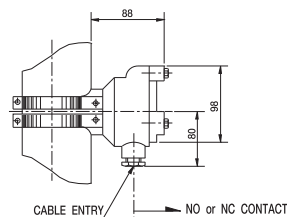
## OUTLINE / DIMENSIONS



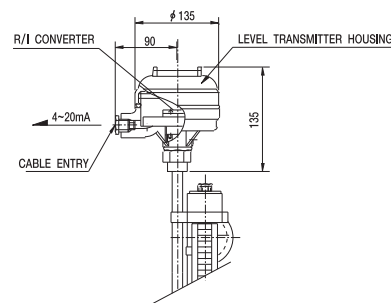
## INDICATOR MOUNTING POSITION



## LEVEL SWITCH OUTLINE



## LEVEL TRANSMITTER OUTLINE



## Standard model and specification

Symbol	Mounting method	Contact size	Measuring range	Working conditions		Specific gravity	Accuracy	Materials			
				Press.	Temp.			Chamber	Float	Rotor	Rotor chamber
FLG-MS-□-□	Side-Side	JIS, DIN, ANSI 25A	Max.5000mm	5kg/cm <sup>2</sup>	200°C	Over 0.8	+/-10m/m	SUS304	SUS304	Poly-carbonate	Aluminum
		JIS, DIN, ANSI 25A	Max.5000mm	120kg/cm <sup>2</sup>	450°C	Over 0.69	+/-10m/m	SUS304	Titanium	Ceramic	Aluminum
FLG-MT-□-□	Top	JIS 5K100A or 125A	Max.2500mm	5kg/cm <sup>2</sup>	200°C	Over 0.8	+/-10m/m	SUS304	SUS304	Poly-carbonate	Aluminum

■ Please consult with our factory when other conditions are required.

## Specification of level switch and level transmitter assembly option

Description	Module	Output	Contact rating	Contact form	Power source	Accuracy/resolution	Material		No. of point	Measuring range	Max. working temp.	Enclosure
Level switch	Reed switch	Dry contact	125VAC, 0.5A	SPDT, SPST	N/A	±3m/m	AC	N/A	Max.6	N/A	120°C	Weather proof
Level transmitter	R/I converter	4~20mA Two-wire	N/A	N/A	DC 24V	10m/m	AC	SUS304	N/A	400m/m~5000m/m	120°C	Weather proof
	Smart type HART® converter	4~20mA Two-wire Smart type HART®	N/A	N/A	DC 24V	10m/m						

■ These switches & transmitter modules can be intrinsically safe by using the I.S barrier.

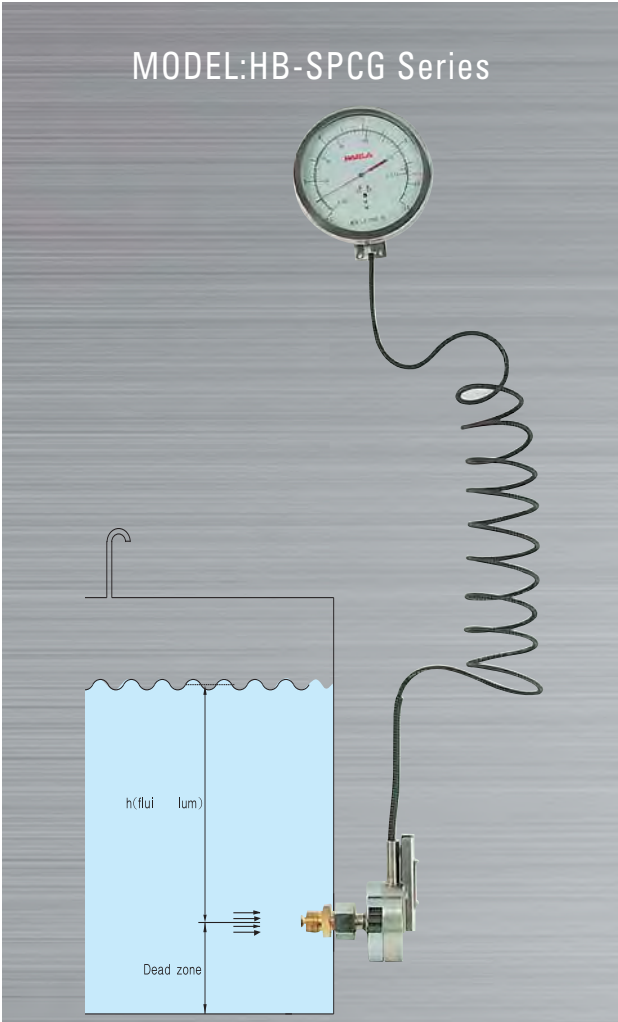
■ Please consult with our factory when other conditions are required.

■ The scale board is an optional item.

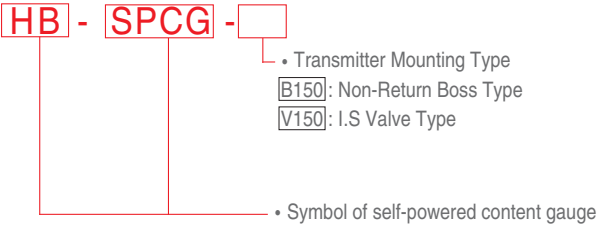


# Level Gauges

## Self-Powered Content Gauge



### Model number code system



### OPERATING PRINCIPLE

Self-powered content gauge unit consists of transmitter chamber, capillary tube and indication gauge. The weight of the fluid column in the tank will be transformed into gas pressure in the transmitter chamber. The gas pressure is transferred to the indicating gauge through the capillary tube. That means, the weight of the fluid column in the tank is directly proportional to the indication. In case of over or under-pressure in the tank, it is impossible to compensate the value of gauging.

### FEATURES

- No floats.
- Completely automatic.
- Local indication.
- No requires external power.

### APPLICATION

Self-powered content gauge is widely used for Diesel oil, Lub. oil, Heavy fuel oil, Solvents gas oil, Fresh water, and all no corrosive liquid.

### SPECIFICATIONS

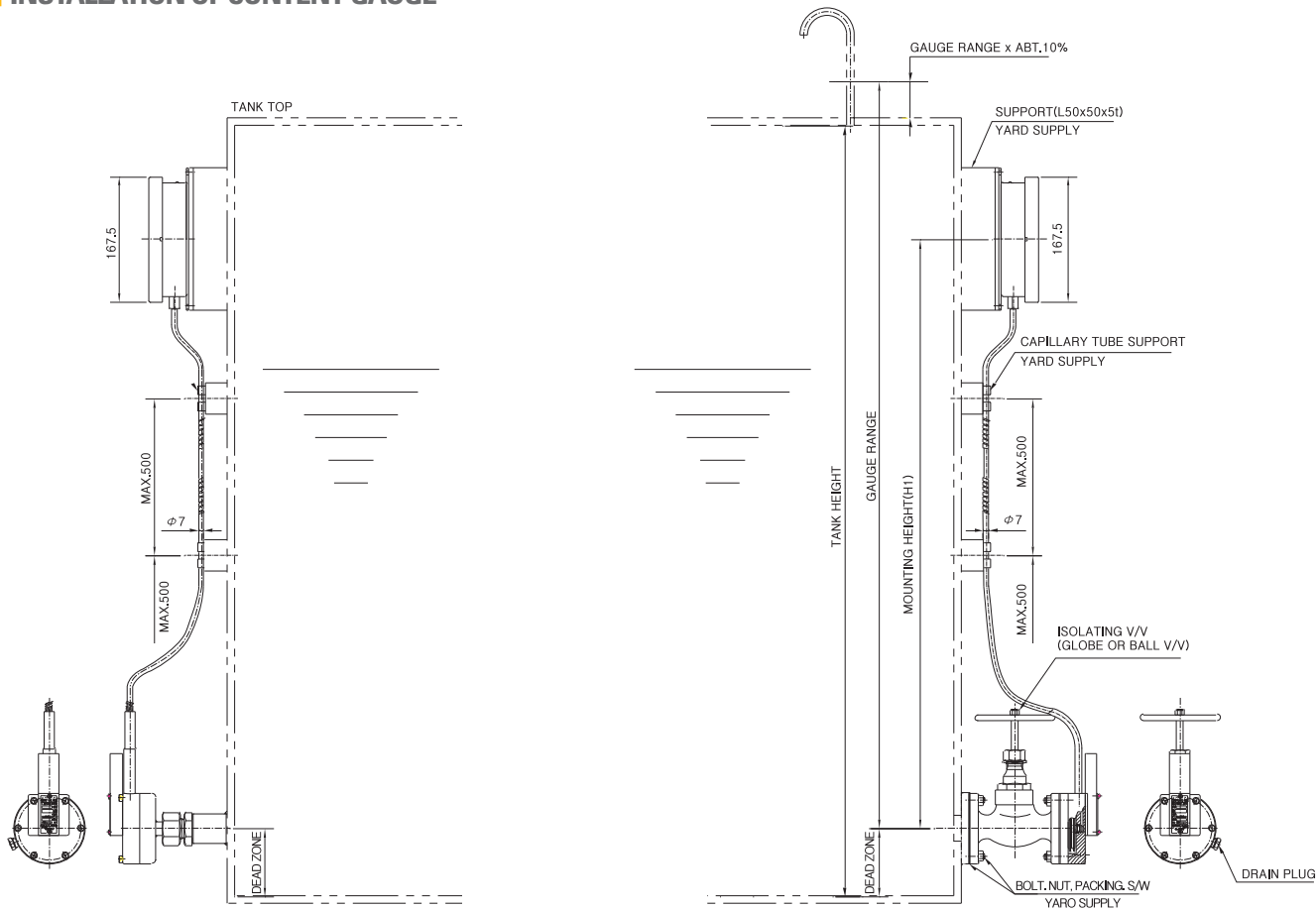
- Range(Tank depths):From 1 to 50 meters
- Over load : 100% above maximum range
- Operating temperature
  - Indication gauge : -40 to +70°C
  - Transmitter chamber : -40 to +120°C
- Indication gauge
  - Mounting : Wall mounting
  - Diameters :  $\phi$  150mm
  - Gauge body mat' l : SUS 304
  - Graduation : Height or Volume/Dual scale available
- Capillary tube
  - Material : SUS 304
  - Available other length on request

### Standard model and specification

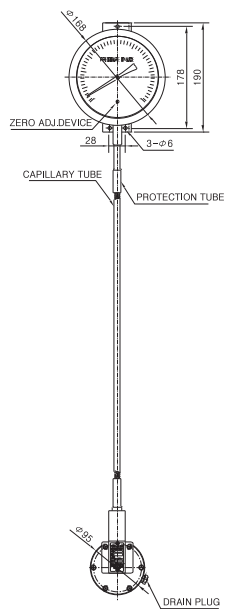
Model	Application	Connection Size		Accuracy	Capillary tube Length	Material		
		Low viscosity	high viscosity			Indication Gauge	Capillary Tube	Diaphragm
HB-SPCG-B150	General Liquid	PF3/4"	N/A	$\pm 1.0\%$ of Full Range	STD. 3M/MAX.16M	SUS304	SUS304	SUS316
HB-SPCG-V150	General Liquid	5K, 10K25A	5K, 10K25A	$\pm 1.0\%$ of Full Range	STD. 3M/MAX.16M	SUS304	SUS304	SUS316

Please consult with factory when other condition are required

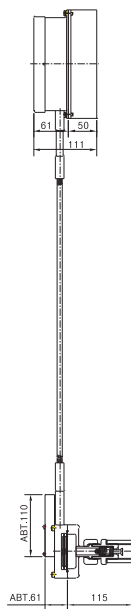
INSTALLATION OF CONTENT GAUGE



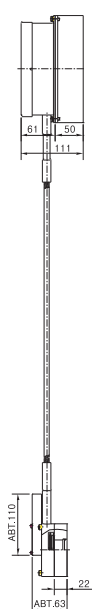
OUTLINE / DIMENSIONS



HB-SPCG-B150



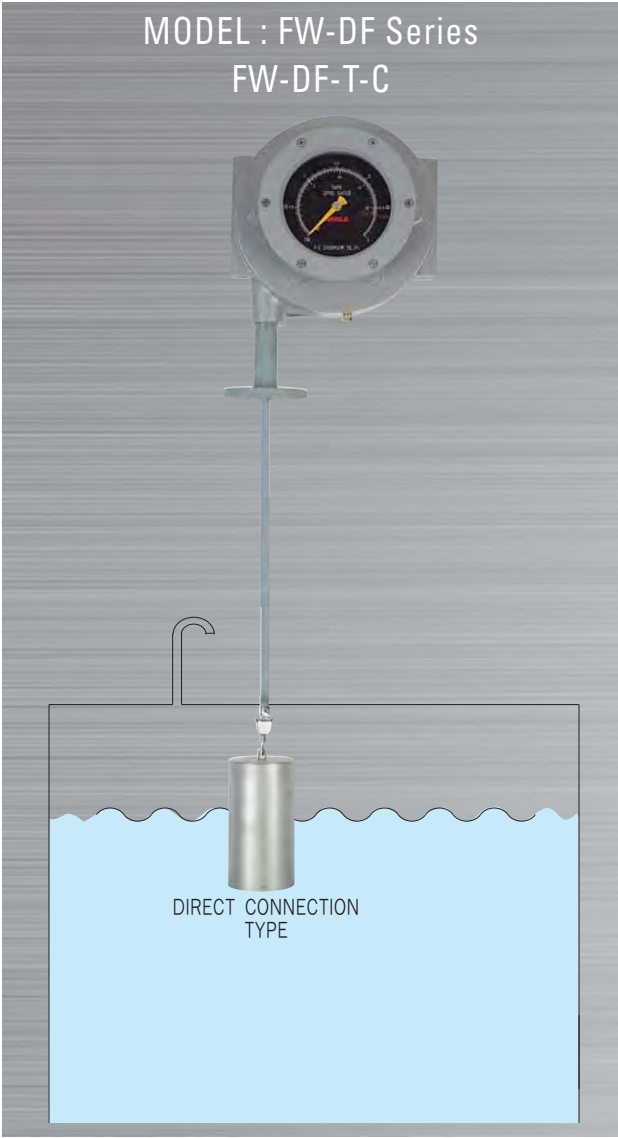
HB-SPCG-V150





# Level Gauges

## Dial Type Float Level Gauge



### APPLICATION

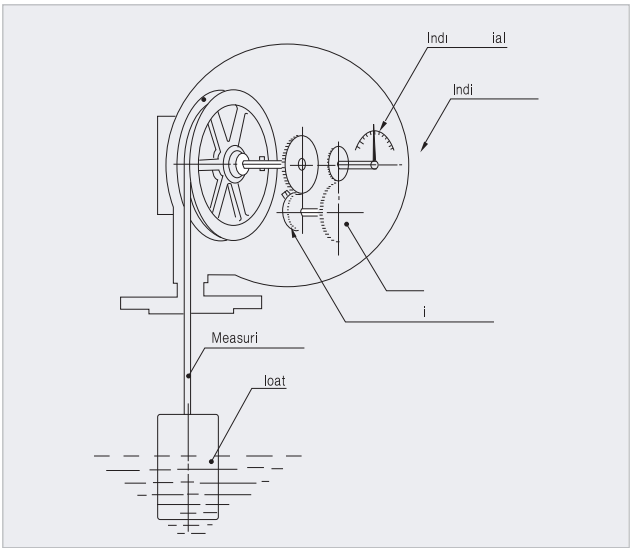
Dial type float level gauges are widely used for H.F.O, D.O, L.O tanks and water tanks, while magnetic coupling type dial float level gauge is especially designed to be used for liquid that can generate poisonous, corrosive or inflammable gases and odor. In addition, the system is excellent in that it is non-corrosive, safe and is facilitated to maintain.

### Standard model and specification

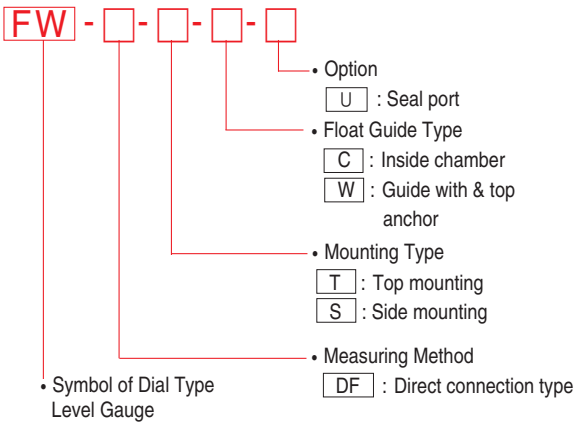
Type	Model	Mounting type	Measuring range(m)	Indication system	Specific gravity	Accuracy (mm)	Working condition		Material			
							Temp.	Press.	G/G Body	Tape	Float	Guide pipe
Direct connection type	FW-DF-T-C	TOP(With chamber)	0 ~ 6	One-Point	0.7~1.5	± 15	150℃	0.2 kg/cm <sup>2</sup>	AC	SUS304	SUS304	N/A
	FW-DF-T	TOP(With guide wire)	0 ~ 6	One-Point	0.7~1.5	± 15	150℃	0.2 kg/cm <sup>2</sup>	AC	SUS304	SUS304	N/A
	FW-DF-S	Side(With guide wire)	0 ~ 6	One-Point	0.7~1.5	± 15	150℃	0.2 kg/cm <sup>2</sup>	AC	SUS304	SUS304	N/A
	FW-DF-S-C	Side(With chamber)	0 ~ 6	One-Point	0.7~1.5	± 15	150℃	0.2 kg/cm <sup>2</sup>	AC	SUS304	SUS304	N/A

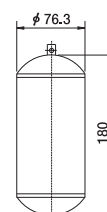
### OPERATING PRINCIPLE

Dial type float level gauges are composed of float, measuring tape and indicator unit. The measuring tape connected to the float on a liquid level is directly led into the indicator body and wound on tape drum. The rotation of the tape drum is transmitted through gear trains to the scale dial indicator where pointer is turned on dial scale to indicate the level. The tape drum is connected with constant drum which serves to wind excessive length of the tape caused by level variation, thus the tape tension is always kept constant.



### Model number code system

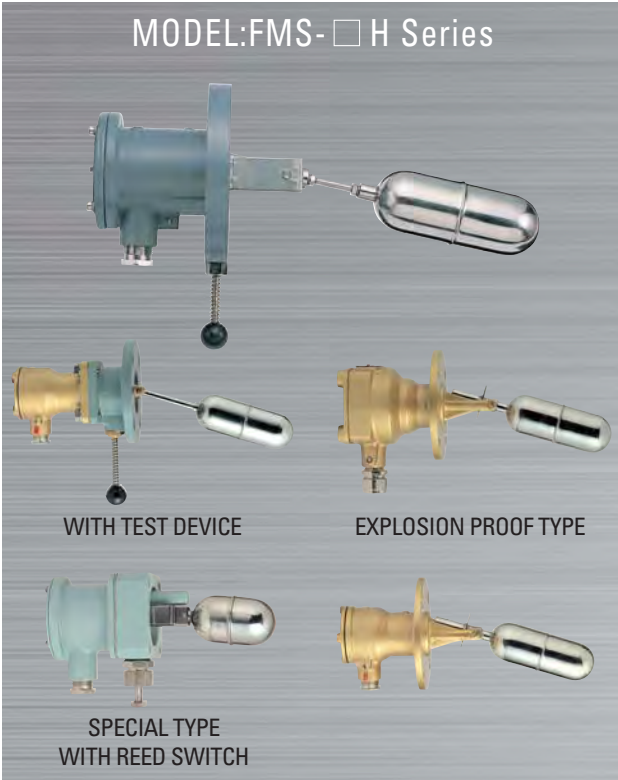






# Level Switches

## Horizontal Mounted Float Switch



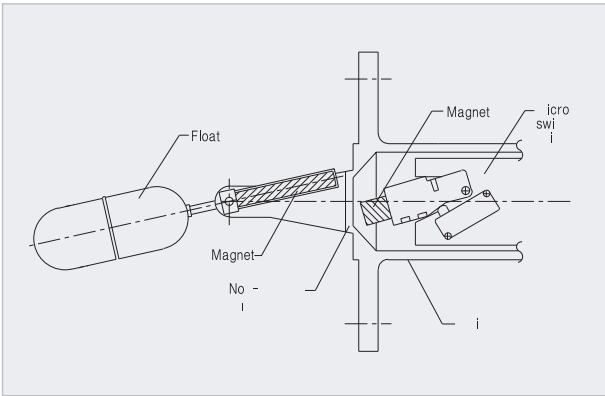
### Model number code system

**FMS** - □ - □ - □ - □

- Symbol of Horizontal Mounted Float Level Switch
- Connection size
  - 1 : A-Flange(Square)
  - 2 : JIS 5K65A(STD.)
  - 3 : Other size
- Option
  - T : With test device
- Contact form
  - S : SPDT
  - D : DPDT
  - SR : SPDT/Special Type with reed switch
- Enclosure
  - W : Weather proof/IP56
  - E : Explosion proof/IP66/Exd IIC T6
- Main application
  - H : General purpose
  - HD : Differential
  - HS : S-Shape

### OPERATING PRINCIPLE

Magnetic float type level switches detect the liquid level and send out contact signals of micro switch by ON-OFF action. A magnetic action between two magnet fully separated by each partition wall is utilized. One is built in another end of the float and the other is attached on the switch unit in the housing.



### FEATURES

- Fully sealed
- The switch unit is completely separated from the parts inserted within the tank by non-magnetic diaphragm
- Reliable
- Designed compact, it has a large contact rating of 250VAC, 5Amp. and is subject to no troubles.
- Easy maintenance
- Simply designed switch unit for easy maintenance.
- Durable float
- Argon Gas welded stainless steel floats are durable for pressure and temperature.

### APPLICATION

Magnetic float type level switches are widely used for Heavy fuel oil tanks, Settling tanks, Sludge tanks, Sewage tanks, Fresh water tanks, Lub. oil tanks, D.O tanks and others.

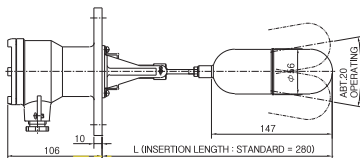
### Standard model and specification

Model	Application	Max. pressure (kg/cm <sup>2</sup> )	Max. temperature (°C)	Switch contact rating	Min. Sp.Gr	Cable entry	Material		
							Float	Flange	Switch body
FMS-□H-W□	General liquid	10	180	250VAC,5A	0.65	15b (PF1/2")	SUS304	ALBC 2	ALBC 2
FMS-□HD-W□	Widely Differential	10	180	250VAC,5A	0.8	15b (PF1/2")	SUS304	ALBC 2	ALBC 2
FMS-□HS-W□	Lowest sensing	10	180	250VAC,5A	0.75	15b (PF1/2")	SUS304	ALBC 2	ALBC 2
FMS-□□H-E□	Hazardous area	10	180	250VAC,5A	0.65	NPT1/2"	SUS304	ALBC 2	ALBC 2
FMS-3H-WSR	General liquid	10	120	250VAC,0.5A	0.65	15b (PF1/2")	SUS304	SS41	SS41

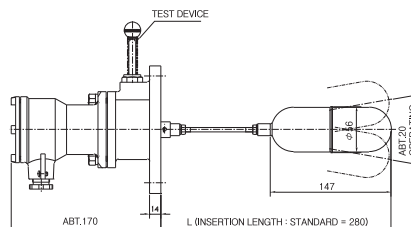
- Optional informations
1. Material(SUS 304, SUS316) for wet parts including float and flange is also available on request.
  2. Cable entry of 3/4" (JIS F 20 a, b, or c)is also available on request.
  3. Flanges of larger nominal diameter than the standard ones are also available on request.
  4. Non-explosion proof models can be used as intrinsically safe type joined with I.S barrier.

## OUTLINE / DIMENSIONS

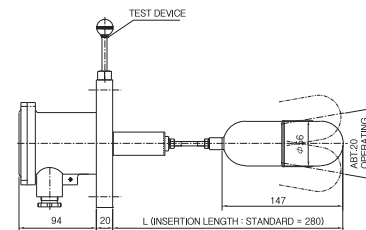
FMS-□H-WS



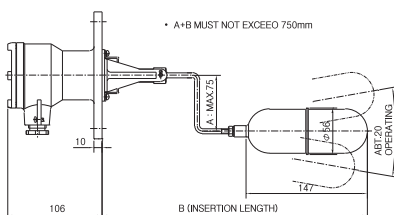
FMS-□H-WS-T



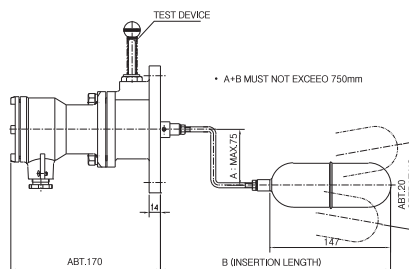
FMS-□H-WS-T “NEW TYPE”



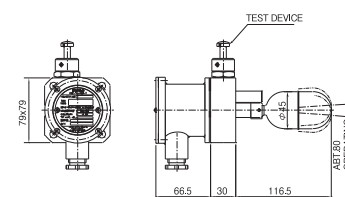
FMS-□HS-WS



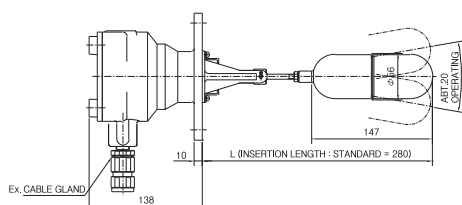
FMS-□HS-WS-T



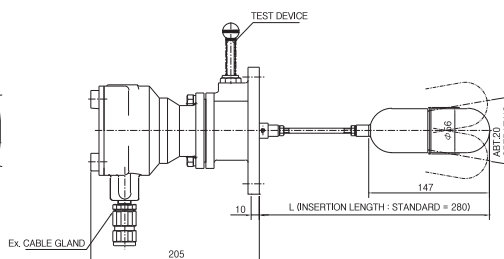
FMS-1HS-WSR-T  
(SPECIAL TYPE WITH REED SWITCH)



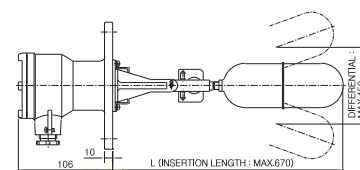
FMS-□H-ES, FMS-□H-ED  
EXPLOSION PROOF TYPE : IP66/Exd IIG T6



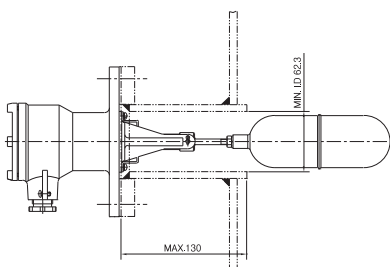
FMS-□H-ES-T, FMS-□H-ED-T  
EXPLOSION PROOF TYPE : IP66/Exd IIG T6



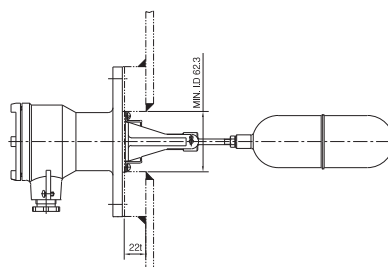
FMS-□HD-WS



□ SLIP-ON FLANGE MOUNTING

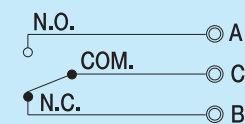


□ SET-ON FLANGE MOUNTING



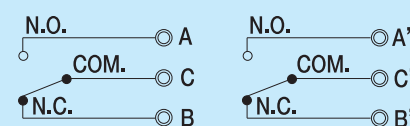
## CONTACT FORM

### TERMINAL & CONTACTS FOR SPDT



C-A MAKES ON RISING LEVEL  
C-B MAKES ON FALLING LEVEL

### TERMINAL & CONTACTS FOR DPDT



C-A, C'-A' MAKES ON RISING LEVEL  
C-B, C'-B' MAKES ON FALLING LEVEL

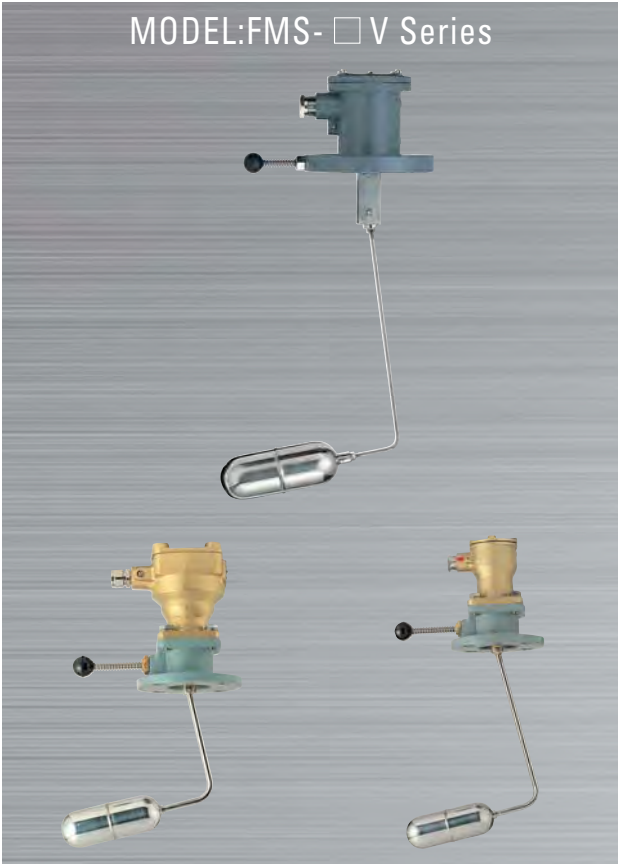
## CAUTION

- 1)The level switch must be fitted in horizontal position.
- 2)The cable entry points of the switch body should be fitted to downwards to get satisfactory function.



# Level Switches

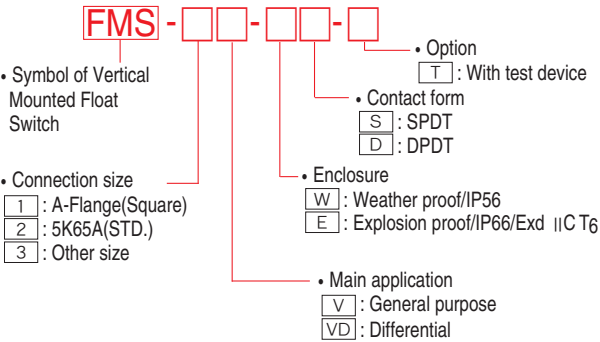
## Vertical Mounted Float Switch



EXPLOSION PROOF TYPE

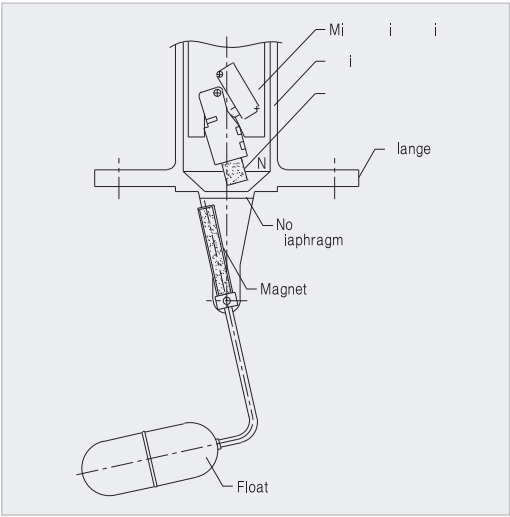
WITH TEST DEVICE

### Model number code system



### OPERATING PRINCIPLE

Magnetic float type level switches detect the liquid levels and send out contact signals of micro switches by ON-OFF action. A magnetic action between two magnets fully separated by each partition wall is utilized. One is built in the end of the float and the other is attached on the switch unit in the housing.



### FEATURES

- Fully sealed
- The switch unit is completely separated from the parts inserted within the tank by non-magnetic diaphragm.
- Reliable
- Designed compact, it has a large contact rating of 250VAC, 5Amp, and is subject to no troubles.
- Easy maintenance
- Simply designed switch unit for easy maintenance.
- Durable float
- Argon Gas stainless steel floats are durable for pressure and temperature.

### APPLICATION

Magnetic float type level switches are widely used for Heavy fuel oil tanks, Settling tanks, Sludge tanks, Sewage tanks, Fresh water tanks, Lub. oil tanks, D.O tanks, and others.

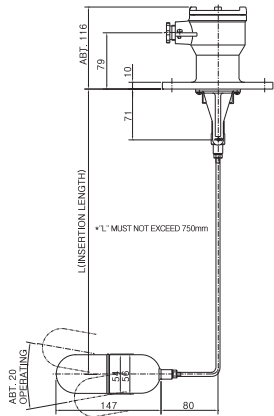
### Standard model and specification

Model	Application	Max. pressure (kg/cm <sup>2</sup> )	Max. temperature (°C)	Switch contact rating	Min. Sp.Gr	Cable entry	Material		
							Float	Flange	Switch body
FMS-□V-W□	General liquid	10	180	250VAC,5A	0.78	15b (PF1/2")	SUS304	ALBC 2	ALBC 2
FMS-□VD-W□	Widely Differential	10	180	250VAC,5A	0.8	15b (PF1/2")	SUS304	ALBC 2	ALBC 2
FMS-□□-E□	Hazardous area	10	180	250VAC,5A	0.78	NPT1/2"	SUS304	ALBC 2	ALBC 2

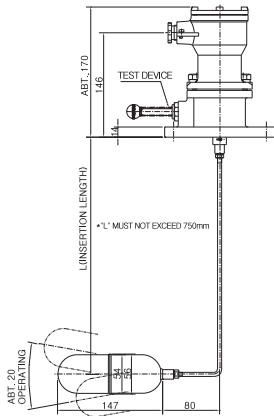
- Optional informations
1. Material(SUS304, SUS316)for wet parts including float and flange is also available on request.
  2. Cable entry of 3/4" (JIS F 20 a, b, or c)is also available on request.
  3. Flanges of larger nominal diameter than the standard ones are also available on request.
  4. Non-explosion proof models can be used as intrinsically safe type joined with I.S barrier.

## OUTLINE / DIMENSIONS

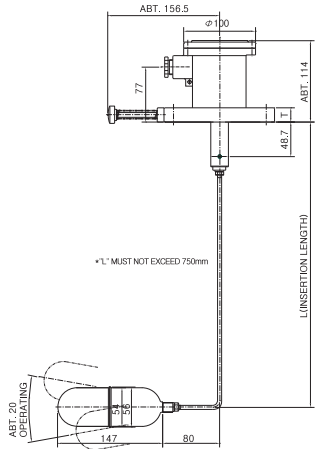
FMS-□V-WS



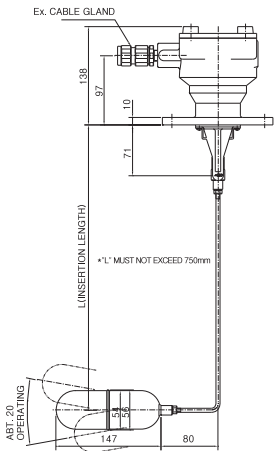
FMS-□V-WS-T



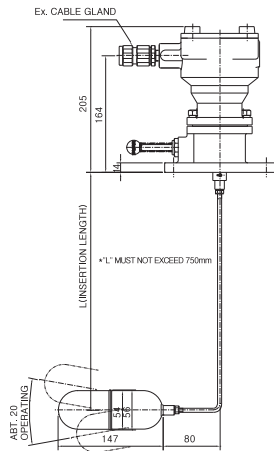
FMS-□V-WS-T “NEW TYPE”



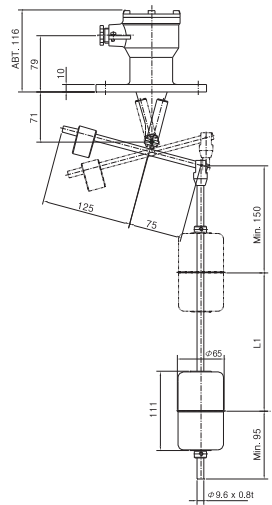
FMS-□V-ES, FMS-□V-ED  
EXPLOSION PROOF TYPE : IP66/Exd IIC T6



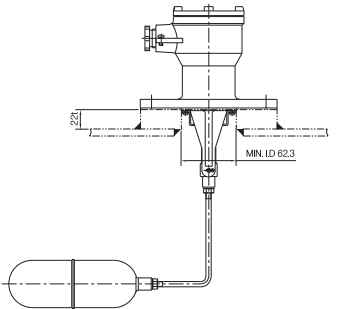
FMS-□V-ES-T, FMS-□V-ED-T  
EXPLOSION PROOF TYPE : IP66/Exd IIC T6



FMS-□VD-WS

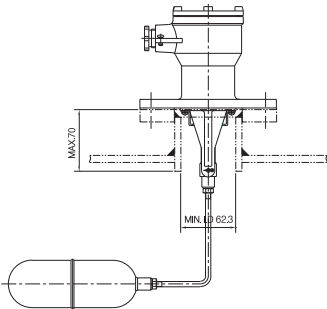


□ SLIP-ON FLANGE MOUNTING



SIZE : JIS 5K 65A FF  
MIN. INSERTION LENGTH : 150 mm

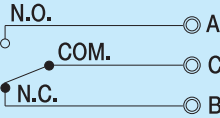
□ SET-ON FLANGE MOUNTING



SIZE : JIS 5K 65A FF  
MIN. INSERTION LENGTH : 200 mm

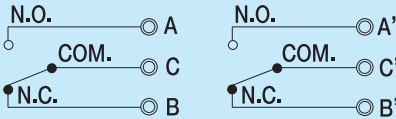
## CONTACT FORM

### TERMINAL & CONTACTS FOR SPDT



C-A MAKES ON RISING LEVEL  
C-B MAKES ON FALLING LEVEL

### TERMINAL & CONTACTS FOR DPDT



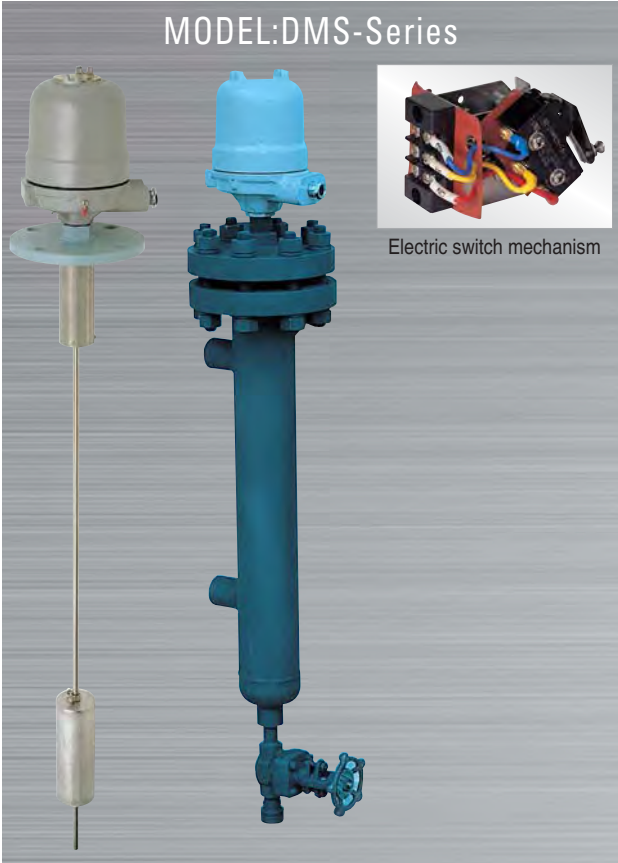
C-A, C'-A' MAKES ON RISING LEVEL  
C-B, C'-B' MAKES ON FALLING LEVEL

## CAUTION

1) The level switch must be fitted in vertical position.

# Level Switches

## Displacement Type Level Switch



### FEATURES

- Wide differential
- Fully sealed
- Large contact rating of 250VAC, 15Amp.
- Easy maintenance
- Durable float
- Unaffected by liquid agitation

### APPLICATION

Displacement type level switches are widely used for Coal tar fuel tanks, Heavy fuel oil tanks, Settling tanks, Sludge tanks, Sewage tanks, Fresh water tanks, Lub. oil tanks, D.O tanks, Bilge well and others.

### OPERATING PRINCIPLE

This level switch consists of compression spring, displacer and switch unit in which micro switch and magnetic are assembled.

The operation is based upon simple buoyancy whereby a spring is loaded with weighted displacer which are heavier than the liquid.

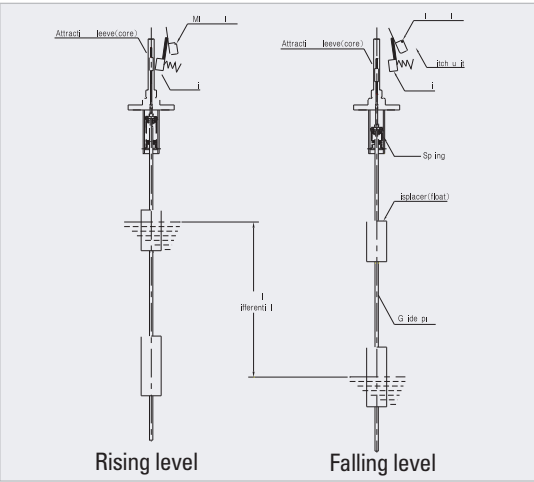
Immersion of the displacers in the liquid results in buoyancy force change, which moves the spring upward. Simultaneously, the spring is retracted or extended and the attraction sleeve moves upward into the field of external magnet in the switch unit.

The contact of micro switch is changed by magnetic force as the attraction sleeve is in the field of magnet point force. This principle allows adjustment of the switching point by moving the displacer along the guide pipe.

### Model number code system

**DMS** -  -  -  -

- Symbol of Displacement Type Level Switch
- Connection size
  - 5 : JIS 5K 80A FF
  - 6 : JIS 10K 80A FF
  - 7 : JIS 5K 100A FF
  - 8 : JIS 10K 100A FF
  - 9 : JIS 5K 25A FF for SS Type (side-side mounting type)
- Main application
  - 01A : High or low alarm
  - 01C : High or low control
  - 02A : High and low alarm
  - 02C : High and low control
  - 03AC : High alarm / Mid. and low control
  - 03CA : High and Mid. control/low alarm
- Option
  - T : With test device
- Enclosure
  - W : Weather proof(IP56)
  - E : Explosion proof/IP56/Exd II C T<sub>6</sub>
- Internal Construction
  - G : Without float chamber
  - C : With float chamber
  - R : Guide wire
  - SS : With external float chamber (side-side mounting type)



### Standard model and specification

Model	Main application	Connection	Max. setting range(mm)	Setting accuracy (mm)	Min. Sp.Gr	Max. press. (kg/cm <sup>2</sup> )	Max. temp. (°C)	Switch contact rating	Cable entry	Material			
										Housing	Flange	Float	Float chamber
DMS-□01A	High or Low alarm	Top flange type	220 ~ 5000	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□01C	High or Low control												
DMS-□02A	High and Low alarm	Top flange type	220 ~ 4500	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□02C	High and Low control												
DMS-□03AC	High alarm/ Mid. and low control	Top flange type	220 ~ 4000	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□03CA	High and Mid. control / Low alarm												

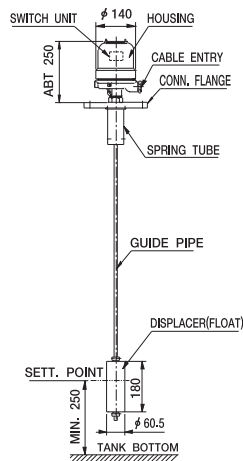
#### ■ Optional informations

1. Material (SUS304, SUS316) for wet parts including mounting flange, float chamber is also available on request.
2. Cable entry of 3/4" (JIS 20 a, b, or c) is also available on request.
3. Non-explosion proof models can be used as intrinsically safe type jointed with I.S barrier.
4. Please consult with our factory when the other press. / temp. is required.

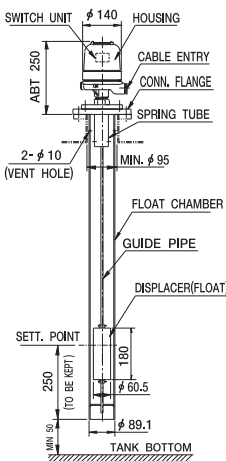


OUTLINE / DIMENSIONS

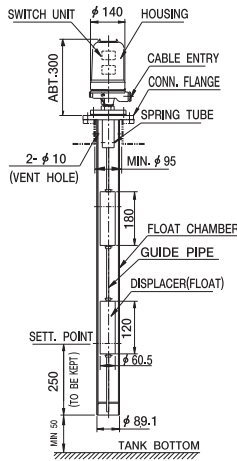
DMS-□01A/01C-GW SERIES



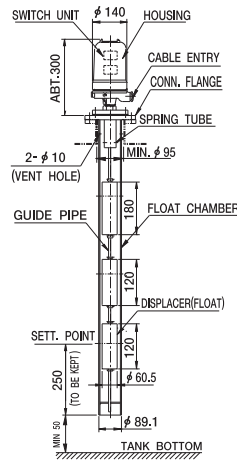
DMS-□01A/01C-CW SERIES



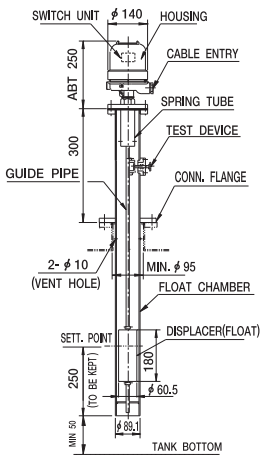
DMS-□02A/02C-CW SERIES



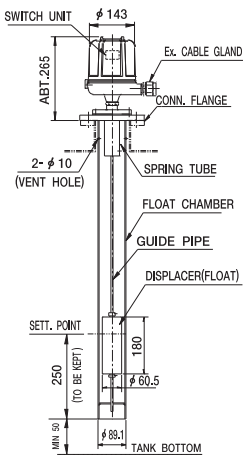
DMS-□03AC-CW SERIES



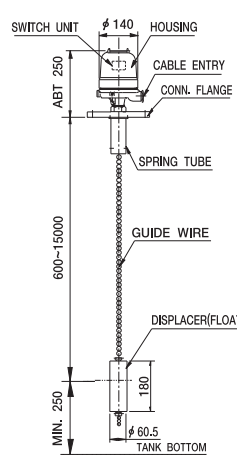
DMS-□01A/01C-CW-T SERIES



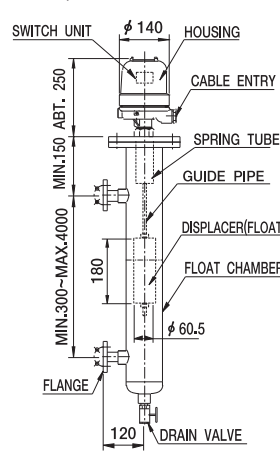
DMS-□01A/01C-CE SERIES  
Explosion Proof Type:IP56/Exd II C T6



DMS-□01A/01C-RW SERIES



DMS-901A/901C-SSW SERIES  
(SIDE-SIDE MOUNTING TYPE)



DIFFERENTIAL RANGE AND CONTACT FORM

NUMBER OF SWITCH UNIT		ONE(1)				TWO(2)			
MAIN MODEL		DMS-□01A/01C				DMS-□02A/02C		DMS-□03AC	
DIFFERENTIAL(mm) * 1		30 TO 50				UPPER:30 TO 50		UPPER:200 TO 4500	
						LOWER:30 TO 50		LOWER:200 TO 4500	
CONTACT OPERATION									
CONTACT CONFIGURATION		<p>SPDT</p> <p>N.C. ○B COM ○C N.O. ○A</p>				<p>FOR UPPER SWITCH</p> <p>N.C. ○HB COM ○HC N.O. ○HA</p>		<p>FOR LOWER SWITCH</p> <p>N.C. ○LB COM ○LC N.O. ○LA</p>	
		<p>DPDT</p> <p>N.C. ○B COM ○C N.O. ○A N.C. ○B' COM ○C' N.O. ○A'</p>				<p>FOR UPPER SWITCH</p> <p>N.C. ○HB COM ○HC N.O. ○HA N.C. ○HB' COM ○HC' N.O. ○HA'</p>		<p>FOR LOWER SWITCH</p> <p>N.C. ○LB COM ○LC N.O. ○LA N.C. ○LB' COM ○LC' N.O. ○LA'</p>	

\* 1 (Differential) is available for the range from the actuation level of the switch to the reset level

# Level Switches

## Float Operated Type Level Switch



### ELECTRICAL SWITCH MECHANISM

- Dry contact switches are recommended for critical environmental conditions.
- Standard switch mechanisms are offered in rugged stainless steel construction.
- Dry contact mechanisms are supplied in both SPDT & DPDT. Generally a maximum of two mechanisms per single control are available as standard.

### FEATURES

- High load carrying capacity
- Environmental safety
- Vibration resistance

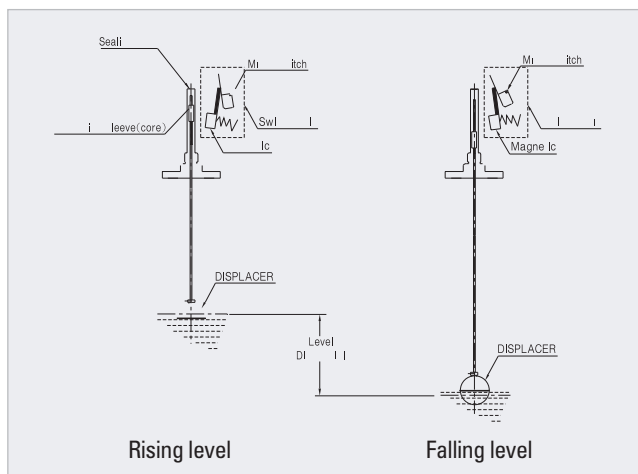
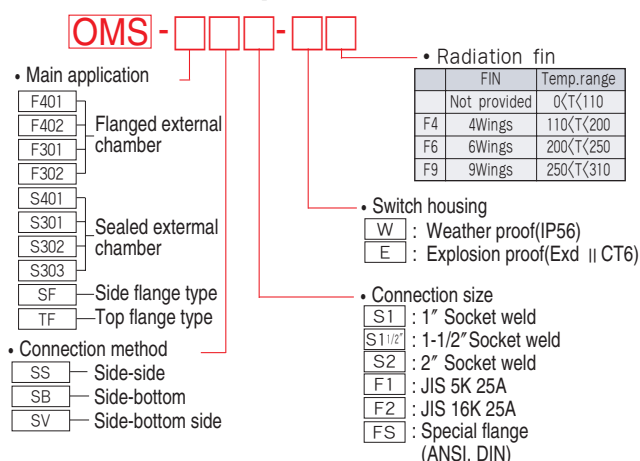
### OPERATING PRINCIPLE

This level switch consists of displacer, switch unit in which micro switch and magnetic are assembled. The operation is based upon simple buoyancy.

Immersion of the displacer in the liquid results in buoyancy force change, which moves the attraction sleeve upward or downward. Simultaneously, the contact of micro switch is changed by magnetic force as the attraction sleeve is in the field of magnet force.

This principle allows adjustment of the switching point up to 15mm by moving the switch unit position.

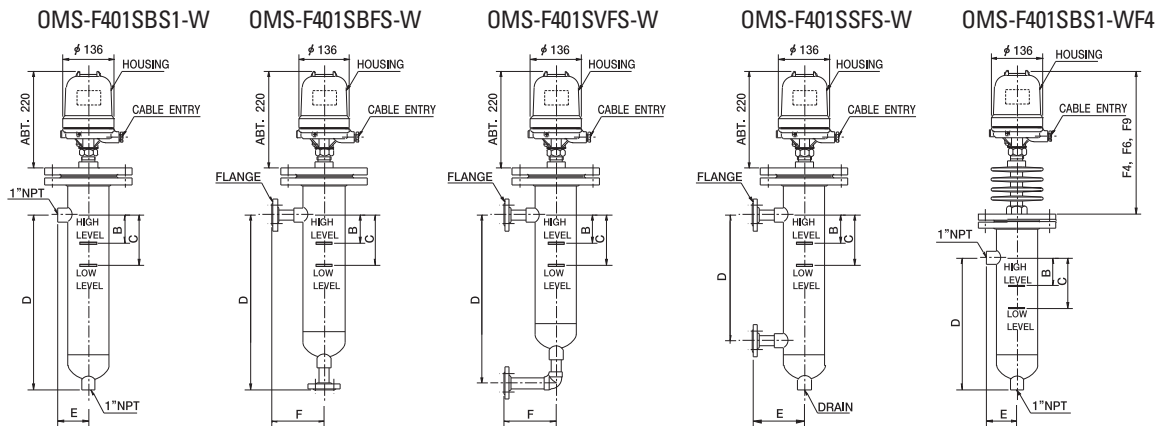
### Model number code system



### Standard model and specification

Model	Chamber material and pipe size	Max. No. of switch mechan.	Control press. rating				Minimum liquid Sp.Gr	Switch contact rating	Switch contact type
			Psig		Bars				
			100° F	750° F	38° C	400° C Max.			
OMS-F401	Carbon steel (4")	2	285	95	20	7	0.57	120VAC, 15A	SPDT
OMS-F402	Carbon steel (4")	2	600	450	41	31	0.65	120VAC, 15A	SPDT
OMS-F301	Carbon steel (3")	1	285	95	20	7	0.67	120VAC, 15A	SPDT
OMS-F302	Carbon steel (3")	1	350	260	24	18	0.67	120VAC, 15A	SPDT
OMS-S401	Carbon steel (4")	2	600	450	41	31	0.65	120VAC, 15A	SPDT
OMS-S301	Carbon steel (3")	1	300	225	21	16	0.57	120VAC, 15A	SPDT
OMS-S302	Carbon steel (3")	1	350	260	24	18	0.67	120VAC, 15A	SPDT
OMS-SF	Carbon steel	1	230	95	16	7	0.50	120VAC, 15A	SPDT
OMS-TF	Carbon steel	1	225	165	16	11	0.81	120VAC, 15A	SPDT
OMS-S303	Carbon steel	1	285	95	20	7	0.70	120VAC, 15A	SPDT

**OUTLINE / DIMENSIONS FOR FLANGE EXTERNAL CHAMBER TYPE**

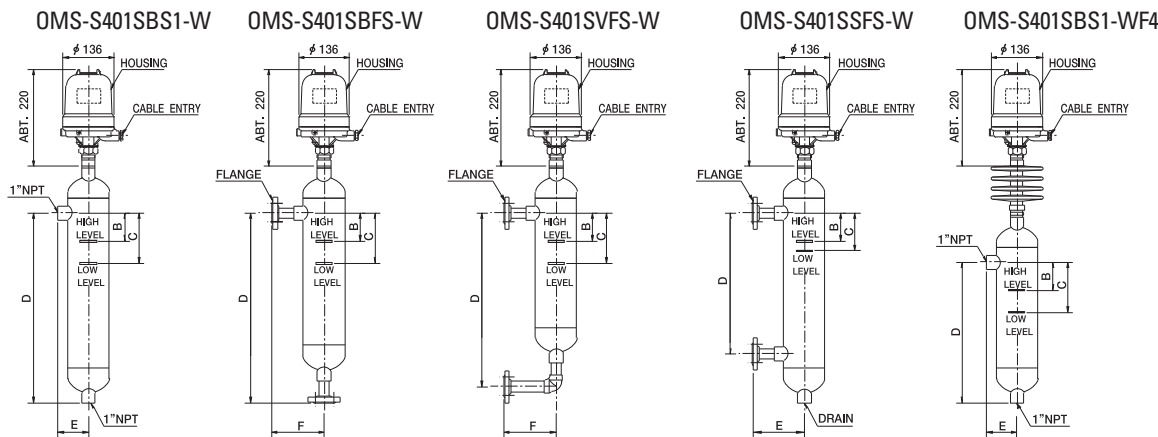


Model	B(1)		C(1)		D(2)		E(2)		F	
	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
OMS-F401	3	76	4	102	10 1/2"	267	3 11/16	94	6 1/2"	165
OMS-F402	2 1/2"	64	3 1/4"	83	10 1/2"	267	3 11/16	94	6 1/2"	165
OMS-F301	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152
OMS-F302	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152

(mm)

Height of housing(single switch function)			
Number of radiation fins			
0(F0)	4(F4)	6(F6)	9(F9)
250	357	407	467

**OUTLINE / DIMENSIONS FOR SEALED EXTERNAL CHAMBER TYPE**



Model	B(1)		C(1)		D(2)		E(2)		F	
	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
OMS-S401	2 1/4"	57	3"	76	10 1/2"	267	3 11/16"	94	6 1/2"	165
OMS-S301	2 5/8"	67	3 1/2"	89	10 1/2"	267	3 11/16"	94	6	152
OMS-S302	2 1/2"	64	3 3/4"	95	9"	229	3 3/16"	81	6	152

**CONTACT FORM**

MAIN MODEL	CONTACT OPERATION	CONTACT CONFIGURATION	
		SPDT	DPDT

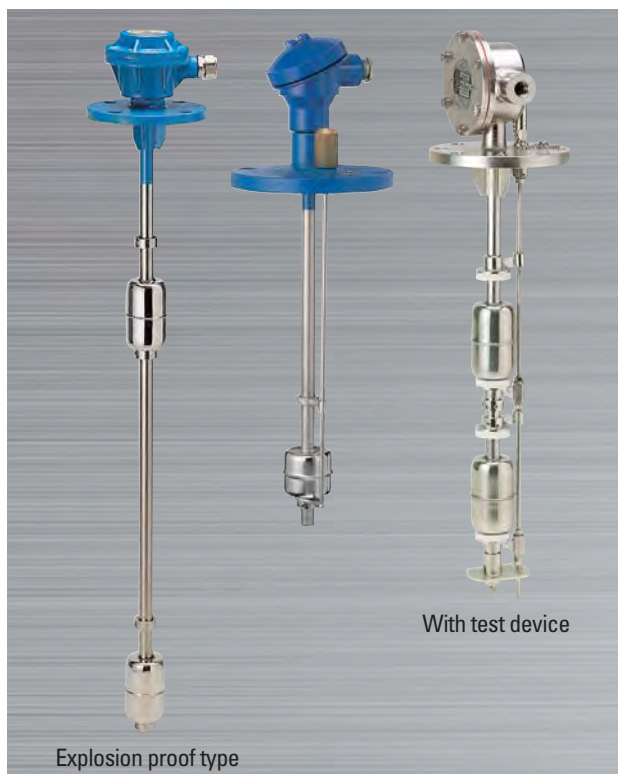
**NOTE**

- 1) Nominal dimensions depend on minimum differential setting, minimum liquid specific gravity and single switch function.
- 2) Dimensions are for 1" NPT or S.W. type only.



# Level Switches

## Reed Switch Type Float Level Switch

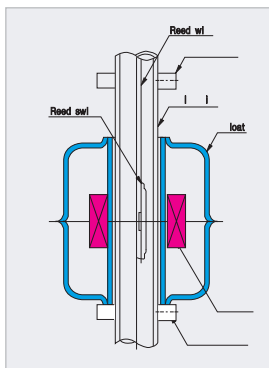


### APPLICATION

REED SWITCH TYPE FLOAT LEVEL SWITCHES are widely used for Water, Seawater, Oil and general liquids.

### OPERATING PRINCIPLE

Reed switch type float level switches have a magnet built in the float and a reed switch set inside guide pipe. The reed switch is turned on and off with the up-and-down liquid level. The two stoppers located above and below enable float shift range to limit, thereby providing a self-hold reed switch contact operation.



### FEATURES

- Compact construction
- Stainless steel and plastic models
- Totally enclosed electric parts
- Wide selection of switch functions and ratings
- Easy maintenance

### Model number code system

**TMR** - [ ] - [ ] - [ ] - [ ] - [ ]

- Symbol of Reed Switch Type Float Level Switch
- Connection size
  - [4] : JIS 5K 65A FF
  - [5] : JIS 5K 80A FF
  - [6] : JIS 10K 80A FF
  - [7] : JIS 5K 100A FF
  - [8] : JIS 10K 100A FF
  - [P1] : PF 1/4"
  - [P2] : PF 2"
- Main application
  - [1A] : High or Low alarm
  - [2A] : High and Low alarm
  - [2C] : High and Low control
  - [3CA] : High and Mid control/Low alarm
  - [3AC] : High alarm/Mid. and Low control
  - [4AC] : H,H and L,L alarm
  - [ ] : /High and Low control
  - [6I] : Level indicator(MAX. 6 point)
- Option
  - [T] : With test device
- Enclosure
  - [W] : Weather proof:IP56
  - [E] : Explosion proof:IP56/Exd II C T6
  - [SB] : Submersible Type:IP68
- Internal construction
  - [G] : Without float chamber
  - [C] : With float chamber
- Float size and material
  - [5S] :  $\phi 65 \times 111$ L/SUS 304
  - [5S3] :  $\phi 65 \times 111$ L/SUS 316
  - [5R] :  $\phi 50 \times 45$ L/Resin
  - [6S] :  $\phi 50 \times 47.5$ L/SUS 304
  - [5P] :  $\phi 76 \times 100$ L/P.V.C
  - [5RS] :  $\phi 26.5 \times 25$ L/Resin
  - [5SS] :  $\phi 28 \times 25$ L/SUS 304

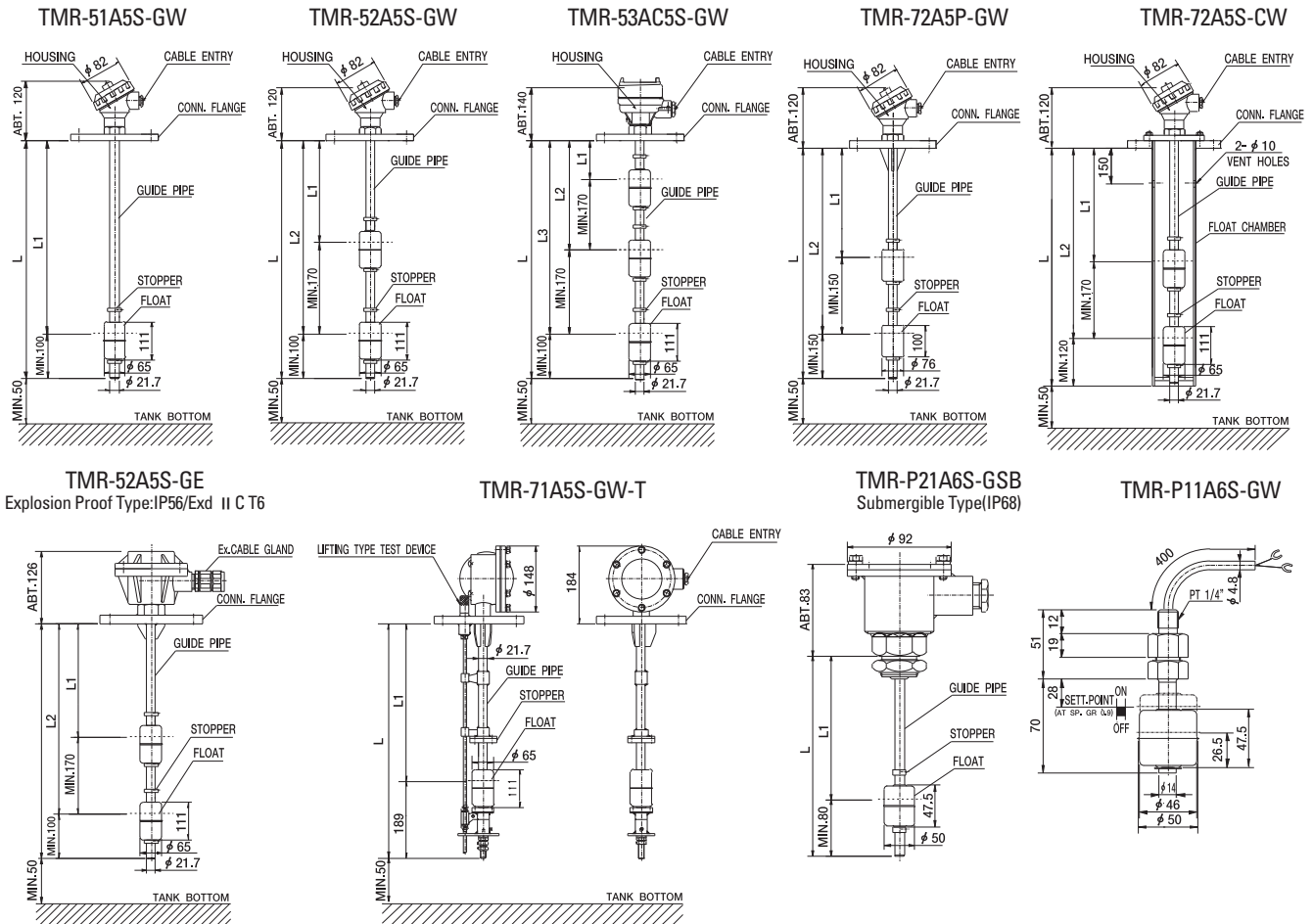
### Standard model and specification

Model	Application	Max. press. (kg/cm <sup>2</sup> )	Max. Temp. (°C)	Mounring flange (standard)	Min. Sp.Gr	Connection	Maximum detection point	Cable entry	Contact form/Rating	Material			
										Housing	Flange	Float	Guide pipe
TMR-5□5S-G	General liquid (Oil, Water)	10	80	JIS 5K 80A	0.85	Top flange type	6	15b	SPST 250VAC,0.5A	AC	SS41	SUS304	SUS304
TMR-5□5S3-G	Anti-corrosive liquid	10	80	JIS 5K 80A	0.85	Top flange type	6	15b	SPST 250VAC,0.5A	AC	SUS304	SUS316	SUS316
TMR-4□5R-G	Low specific gravity liquid	5	70	JIS 5K 65A	0.6	Top flange type	6	15b	SPST 250VAC,0.5A	AC	SS41	Resin	SUS304
TMR-8□5P-G	Anti-corrosive liquid	3	50	JIS 10K 100A	0.7	Top flange type	6	15b	SPST 250VAC,0.5A	P.V.C	P.V.C	P.V.C	P.V.C
TMR-P1□5RS-G	Mini vessel	5	70	PF 1/4"	0.7	Thread type	2	-	SPST 250VAC,0.5A	-	-	Resin	SUS304
TMR-P1□5SS-G	Mini vessel	10	80	PF 1/4"	0.9	Thread type	2	-	SPST 250VAC,0.5A	-	-	SUS304	SUS304
TMR-4□6S-G	General liquid	10	80	JIS 5K 65A	0.85	Top flange type	6	15b	SPST 250VAC,0.5A	AC	SS41	SUS304	SUS304

#### OPTIONAL INFORMATIONS

- (1) Non-explosion proof models can be used as intrinsically safe type joined with I.S barrier.
- (2) Cable entry of 3/4" (JIS 20 a, b or c)is also available on request.
- (3) Flanges of larger nominal diameter than the standard ones are also available on request.

## OUTLINE / DIMENSIONS



## CONTACT FORM

<p>FOR HIGH OR LOW LEVEL ALARM</p>	<p>FOR HIGH AND LOW LEVEL ALARM</p>	<p>FOR HIGH LEVEL PUMP AUTO STOP AND LOW LEVEL PUMP START</p>	<p>FOR HIGH LEVEL PUMP AUTO START AND LOW LEVEL PUMP STOP</p>
<p>FOR HIGH LEVEL ALARM AND MID LEVEL PUMP AUTO STOP, AND LOW LEVEL PUMP AUTO START</p>	<p>FOR HIGH LEVEL PUMP AUTO STOP AND MID LEVEL PUMP AUTO START, AND LOW LEVEL ALARM</p>	<p>FOR HIGH HIGH &amp; LOW LOW LEVEL ALARM AND HIGH &amp; LOW CONTROL</p>	<p>FOR HIGH HIGH &amp; LOW LOW LEVEL ALARM AND HIGH &amp; LOW CONTROL</p>

Nominal condition is the empty condition without liquid in the tank.

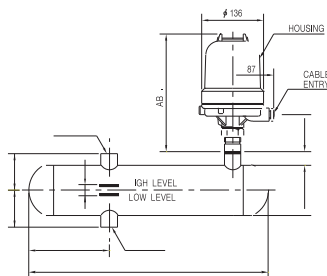
- 1) The arrangement is the same even with more detection point.
- 2) The detection points, if up to 3points, can be independently terminal connected as desired.

# Level Switches

## Float Operated Type Level Switch

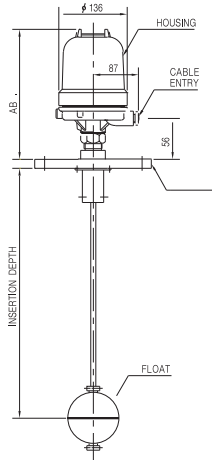
### OUTLINE / DIMENSION FOR SEALED EXTERNAL CHAMBER TYPE

Model : OMS-S303 TYPE



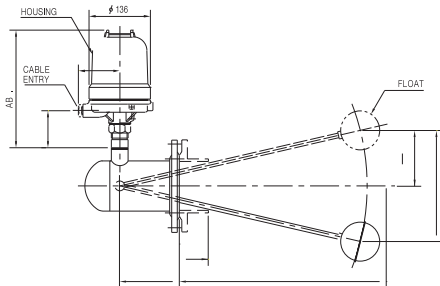
### OUTLINE / DIMENSION FOR SEALED EXTERNAL TOP MOUNTED

Model : OMS-TF TYPE



### OUTLINE / DIMENSION FOR SEALED EXTERNAL SIDE MOUNTED

Model : OMS-3F TYPE



Insertion depth		Min.level differential (D)		Maximum differential(D) for 4 sch.40 pipe with nozzle length(N)											
				IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
IN.	MM.	IN.	MM.	2	51	4	102	6	152	8	203	10	254	12	305
18	457	2	51	13	330	9	229	7	178	5	127	4 1/2	114	4	102
10	254	1	25	7	178	5	127	4	102	-	-	-	-	-	-

## Flow Detection Switch

### PADDLE TYPE FLOW SWITCH



#### APPLICATION

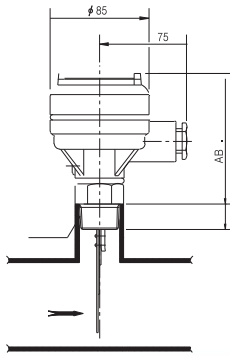
- When the flowing is higher or lower, it is used for protecting the equipment, pump, motors from them.
- Controls of pumps etc.
- Starts pumps, engines etc.

#### INTRODUCTION

This flow switch is used for protecting equipment or pipe line system from excessive flowing in the pipe when the flow is reduced or increased. When the liquid is flowing excessively, the micro switch in the housing is operated by hydrostatic pressure caused by flowing in the pipe. If flowing is stopped, the lever arm will be returned to the normal position by the spring in the switch housing.

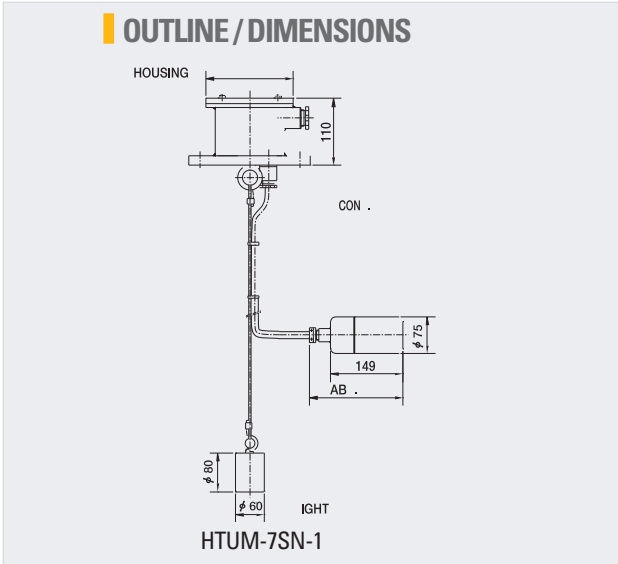
#### TECHNICAL SPECIFICATION

- Mounting Method : Screw/Flanged
- Mounting Size : 1" PT
- Working Pressure : Atm.  
: Max. 0.2kg/cm<sup>2</sup>
- Process Temp. - std.:60°C  
- option:120°C
- Enclosure:Weather proof/IP56
- Material - Head : AC  
- Connector : BS  
- Paddle : SUS304
- Output : 1 × SPDT
- Conduit conn. : 3/4" PF(F)
- Switch type : Micro switch
- Contact Rating : 250VAC, 15A





# Quick Float Type Level Switch



## OPERATING PRINCIPLE

Quick float level switches contain a switch units(Reed switch or micro switch) inside a float casing connected to a reed cable. Also, the reed cable is assembled with the float casing completely. When a float moves up and down due to buoyancy, electrical contacts in the switch unit converted to close or open.

## APPLICATION

This product is used for atmospheric pressure and ambient temperature applications.

- Wells, locks, rivers etc.
- Waste water, sewage, drain, sludge tank etc.

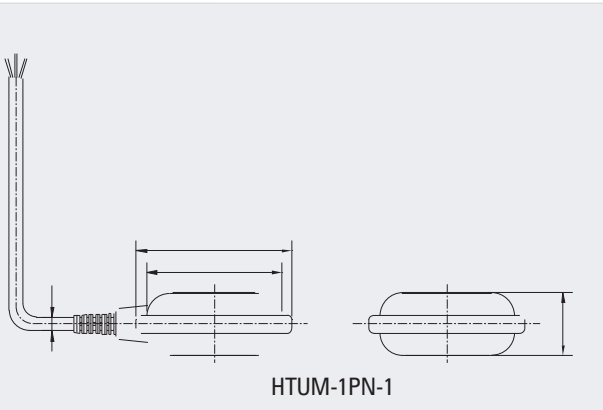
## FEATURES

- Simlpe and low cost design
- Easy installation and maintenance
- Stainless steel and plastic models

## MODEL NUMBER CODE SYSTEM

**HTUM** -  -  -

- Symbol of quick float type level switch
- Connection size
  - 1 : Without housing
  - 7 : JIS 5K 100A
  - 8 : JIS 10K 100A
- No of float
  - 1 : 1 Float
  - 2 : 2 Float
  - 3 : 3 Float
  - 4 : 4 Float
- Float material
  - PN : Polypropylene
  - SN : Stainless steel(SUS304)



## Standard model and specification

Model	Connection	Float Material	Max. Pressure (kg/cm <sup>2</sup> )	Max. Temp. (°C)	Protection (float)	Switch Type	Switching Distance (mm)	Switch Form/ Rating	Cable Max. Length	Cable Entry
HTUM-7PN- <input type="text"/>	Top flange type	Polypropylene	10	60	IP68	Micro switch	10 ~ 50	SPDT 250VAC, 10A	10,000mm	20 (PF3/4)
HTUM-7SN- <input type="text"/>	Top flange type	Stainless steel (SUS304)	10	80	IP68	Reed switch	10 ~ 50	SPST or SPDT 250VAC, 0.5A	5000mm	20 (PF3/4)

■ Please consult with our factory when the other type is required

# Level Switches

## Paddle Type Level Switch for Solid



### APPLICATION

It is used wherever

- Dustlike
- Powdery
- Granulated
- Granular

### STANDARD SPECIFICATION

#### ■ Mechanical data

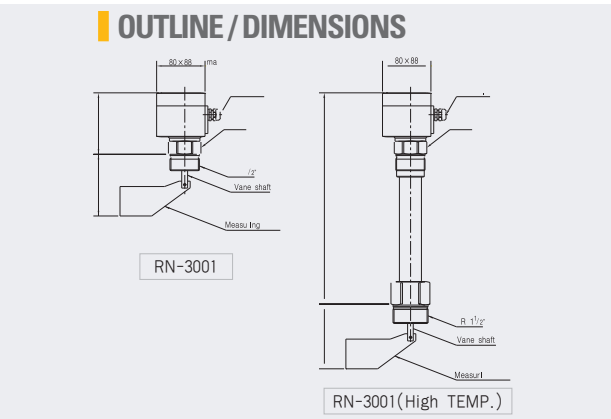
- Material : - Housing:Die-casted housing
- Connector:Steel galvanized or stainless steel
- Vane shaft:SUS304
- Process connection : Thread or flange according to selection
- Enclosure : IP65
- Speed of measuring vane : 11/min
- Pick up delay : approx 1.3 sec.

#### ■ Electrical data

- Mains voltage : 220...240V / 50-60Hz
- : 110...200V / 50-60Hz
- Signal output : 1 × SPDT Micro switch
- Cable gland : 1 × PG 13.5

#### ■ Operating conditions

- Pressure : Max. 0.8bar / 5bar / 10bar
- Temperature : Max. 80°C /150°C /220°C
- Powder density : Down to 20g/l



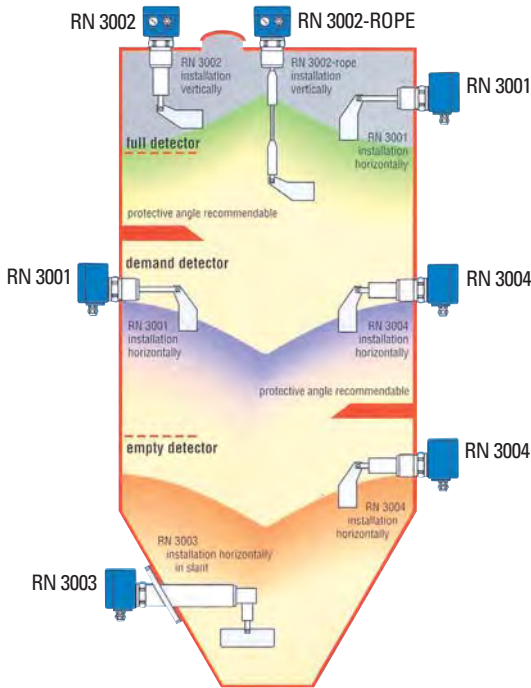
### OPERATING PRINCIPLE

A low revolution synchronous induction gearing motor drives a rotating measuring vane, which is mounted at a container. As soon as the material level, which is to be checked, reaches the measuring vane, it is handicapped in his rotation. The synchronous induction motor is freely suspended within the housing. The caused reaction torque is used to operate a micro switch giving a suitable electrical signal and to stopping the motor. When the vane becomes free again due to the drop in material level, a spring draws the motor back into his operating position, the micro switch returns to his initial position and the motor is switched on. The electrical output signal is then switched over.

### FEATURES

- Appropriate on powder and granulated bulk goods
- A reliable and simple principle of function
- Maintenance-free
- Small and compact design

### MOUNTING INSTRUCTIONS



### MODEL SELECTION GUIDE

Application \ Type	RN 3001	RN 3002	RN 3002-ROPE	RN 3003	RN 3004	RN 3005	RN 3006
full detector	×	×	×	×	×		×
demand detector	×		×	×	×		×
empty detector	×		×	×	×		×
loading telescope						×	
vertical	×	×	×		×	×	×
oblique from the top	×			×	×		×
horizontal	×			×	×		×
oblique from the bottom	×				×		×
dust Ex zone 10/11	×	×	×	×	×	×	×
temperature up to 220°C **	×	×	×	×	×		
container over pressure 1 up to 10bar	×	×	×	×	×	×	×

\* not for zone 10/11

\*\* zone 10/11 upto 200°C

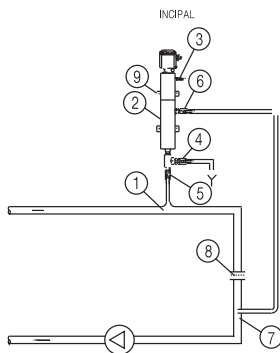
# Capacitive Type Oil Detector



## • OIL CONTAMINATION DETECTOR ON THE PIPING LINE



PRINCIPAL PIPING DIAGRAM



- ① Tapping point for partial flow 1/2" PT on the top of the cooling water line
- ② Measuring pot with oil detector
- ③ Vent valve
- ④ Sampling & Cleaning cock
- ⑤ Inlet isolating valve
- ⑥ Outlet isolating valve with cleaning process
- ⑦ Return partial flow 3/8" PT
- ⑧ Orifice plate
- ⑨ Wall mounting plate

### GENERAL

This device is installed in the cooling water line of ship and is designed to detect oil in cooling water.

This system consists of oil detection pot, capacitive compact switch and control unit. Oil detection pot for separating oil and water has not cock valve for isolating the input and output line.

Capacitive type oil detector is installed in oil detection pot, detecting oil Isolated from water on the top of oil detection pot.

Control unit receive whether it is deteted or not in signal from the capacitive compact switch and convert point of contact to relay contact.

### TECHNICAL SPECIFICATION

- Max. Pressure : 5kg/ cm<sup>2</sup>
- Max. Temp. : 110°C
- Flow : 100~300 t /h
- Sensitivity : Approx. 50ml oil
- Power supply : AC 110/220V
- Output : Relay output(DPDT)

## • OIL DETECTOR ON THE TANK



### GENERAL

Boiler feed filter tank have a inspection chamber or devide area in tank to accumulate oil when oil contamination in boiler water.

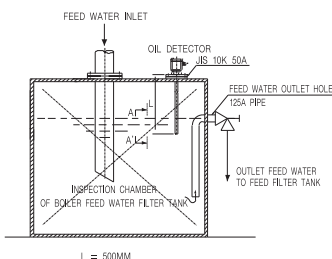
When incoming oil contaminated water in inspection chamber, the feed water only go out to feed filter tank and oil with be accumulate in inspection chamber until drainage.

When the normal conditions, the end part of electrode will be in water level always.

But the water contaminate oil that the oil is accumulate top level in inspection chamber, the electrode will be in oil level instead of water level. The oil detector will activate alarm.

After drain oil in inspection chamber, the oil detector return to normal condition.

INSTALLATION ARRANGEMENT



### TECHNICAL SPECIFICATION

- Type : Capacitive oil detector
- Power supply : AC 110/220V
- Output : Relay contact(DPDT)
- Operating pressure : 10bar
- Max. Temp. : 100°C
- Protection : IP66
- Conn. size : G 1-1/2"



# Vibration Type Level Switch for Liquid and Solid

MODEL:SWING Series



## INTRODUCTION

VEGASWING, the vibrating sensor which uses tuning fork technology, finds almost universal applications in industrial liquid level switching, and offers the choice of four output options from compact electronics.

Innovative design has produced several practical, user-orientated features, such as the 'universal' power input and modular electronics incorporating self-diagnostics. Attention to quality in design and production has created a level switch of unparalleled sensitivity and reliability, even for 'heavy-duty' installations.

## SPECIFICATIONS

- Power source:20~250VAC, 20~250VDC
- Power consumption:Max. 3N
- Output: - Relay output/1 × SPDT
  - Transistor output
  - Non-contact switch
- Viscosity range:0.2~10,000mPas
- Density range:0.7~2.5g/m<sup>3</sup>
- Protection:IP66

## OPERATING PRINCIPLE

The piezo-electrically stimulated oscillating probe vibrates at its mechanical frequency of resonance of 125Hz. If the probe is covered by the bulk material, the damping thus generated is registered electronically and a corresponding signal output is actuated.

The oscillation of the device ensures that it features certain self-cleaning properties.

The device is used for level detecting in all types of containers and silos, it can be used with all powdery and granulated bulk materials that do not show a strong propensity to form crusts or deposits.

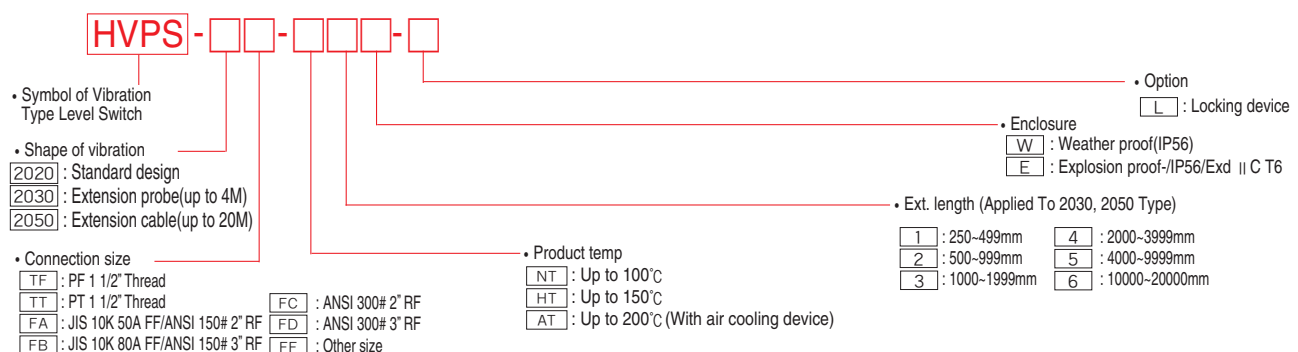
## STANDARD SPECIFICATIONS

- Material : - Housing:ADC
  - Connector:SUS304
  - Tuning fork:SUS304
- Max. Pressure : 16bar
- Max. Temp. : 200°C
- Enclosure : IP65
- Main voltage : AC 230V / AC115V / DC24V
- Installed load : Max. 1A(Relay)
- Output : 1 × SPDT
- Min. Powder density : Approx. 30g/L
- Cable gland : PG 13.5

MODEL:HVPS Series



## Model number code system



# Microwave Type Level Transmitter



## MODEL:VEGAPULS SERIES



### APPLICATION

VEGAPULS radar sensors are made of resistant materials. Unaffected by pressure, temperature, density and gas composition, they are not subjected to an aging process.

Communicative and adaptable they speak many languages and are hence used in many systems and industries.

- Waste water, disposal
- Recycling
- Chemicals
- Pharmaceutical industry
- Foodstuffs
- Metal treatment and generation
- Automobile industry
- Power generation and transport
- Process technology
- Mining
- Shipbuilding
- Offshore

### FEATURES

- Small housing and small process connection
- Low cost with VEGA high quality
- Two-wire technology loop powered
- Accurate and rugged design
- Adjustment choice

### Standard model and specification

	PULS 61	PULS 62	PULS 63	PULS 65	PULS 66	PULS 68
Application	aggressive liquids in small vessels under easy process conditions	storage and process vessels under arduous process conditions	aggressive liquids under arduous process conditions	aggressive liquids under easy process conditions	storage and process vessels under arduous process conditions	large solid vessels under arduous process conditions
Measuring range	up to 20m	up to 35m	up to 20m	up to 35m	up to 35m	up to 70m
Process temperature	-40..80°C	-40..200°C	-40..150°C	-40..150°C	-40..500°C	-40..200°C
Process pressure	-1..3bar	-1..40bar	-1..16bar	-1..16bar	-1..160bar	-1..40bar
Accuracy	±5mm	±3mm	±3mm	±10mm	±10mm	±15mm

### INTRODUCTION

Radar is a sophisticated level measuring principle. VEGA's new design of small, compact and price favourable radar sensors VEGAPULS are in its function as loop powered sensors a sensation in radar level measuring technology.

First, radar sensor in two-wire technology supply voltage and output signal(4~20mA analog or digital);connectable with max. 15 sensors on a two-core line.

VEGAPULS radar sensors offer benefits which meet the technicians requirements:Pressure and temperature independent, Ex-approved, small housing dimensions and process connections(1 1/2" or DN 50);integrated analog and digital display;convenient connection form to all BUS systems.

Radar technology can also be realized in low budget applications. The sensors are very informative and can be operated optionally with check card-sized and detachable adjustment module, HART® handheld or self explanatory operating program on PC, hence the operation at any place e.g. signal line, directly on the sensor, switch cabinet or DCS is possible.

## MODEL:VEGA FLEX SERIES



### SPECIFICATION

High frequency microwave pulses are coupled on a cable or rod and guided along the probe. The pulses are reflected by the product surface and received by the processing electronics. A microcomputer identifies these level echoes which are measured, evaluated and converted into level information by using the ECHOFOX software.

Thanks to this measuring principle, the adjustment with medium in no longer necessary. The sensors are preset to the ordered probe length.

The cable and rod versions(can be shortened) can be adapted in an ideal way to the individual conditions on site.

### APPLICATION

- Liquids and solids
- Measuring range : cable up to 32m
- Process temperature : -40~150°C (Max.-100~400 °C)
- Process pressure : -1~40bar (Max.-1~160bar)

# Level Transmitters

## Capacitive Level Measurement

MODEL:VEGACAL Series



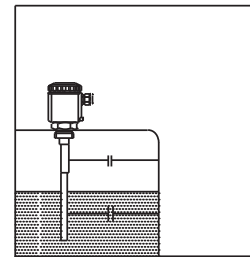
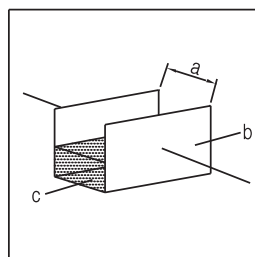
### APPLICATION

Capacitive electrodes of series detect levels of virtually every product, such as liquid, powder, granule or paste. This includes also adhesive products.

### MEASURING PRINCIPLE

Electrodes, product and vessel wall form an electrical capacitor. The capacitance is mainly influenced by three factors:

- distance of the electrode plates(a)
- size of the electrode plates(b)
- dielectric value of material between the electrodes(c)



The product is the dielectricum. Due to the higher dielectric constant(DK-value) of the product against air, the capacitance value increases with the height of covering.

The capacitance change is converted by the oscillator into a level proportional, floating current in the range of 4...20mA or into a switching signal.

### CONTINUOUS LEVEL MEASUREMENT

With continuous level measurement the product level is continuously monitored and converted into a level proportional signal which is either indicated directly or further processed.

A capacitive electrode of series with oscillator and a VEGAMET signal conditioning instrument converting the proportional current of the oscillator into standardized current and voltage signals is required.

The continuous measurement requires a constant dielectric value  $\epsilon$  i.e. the product should have steady features.

The floating measuring signal of the electrode electronics is in the range of 4...20mA and be therefore connected to other processing systems without providing an additional potential equalization. In addition to the continuous measurement, also levels can be detected.

### LEVEL DETECTION

Level switches should signal the reaching of certain levels, e.g. max. or min. level.

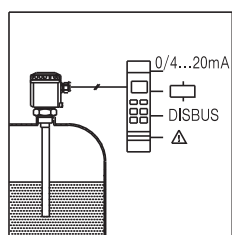
These levels are detected at a fixed point and converted into a switching signal.

For level detection the capacitive electrodes type

A switching signal can be either triggered when the electrode is covered or when the electrode is uncovered(adjustable mode).

### CONFIGURATION OF THE MEASURING SYSTEM

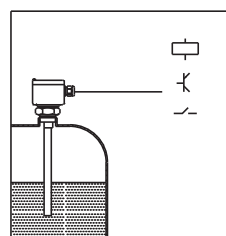
#### Electrode with signal conditioning instrument



A measuring system consists of:

- a capacitive electrode type
- an oscillator mounted in the electrode housing
- a VEGAMET signal conditioning instrument or a VEGALOG processing system
- connected instruments(e.g. indicating instruments, VEGASEL auxiliary level switches)

#### Compact level switch VEGACAP



A measuring system consists of:

- a VEGACAP capacitive compact level switch
- an oscillator mounted in the housing
- connected instruments operated with the output signal of VEGACAP



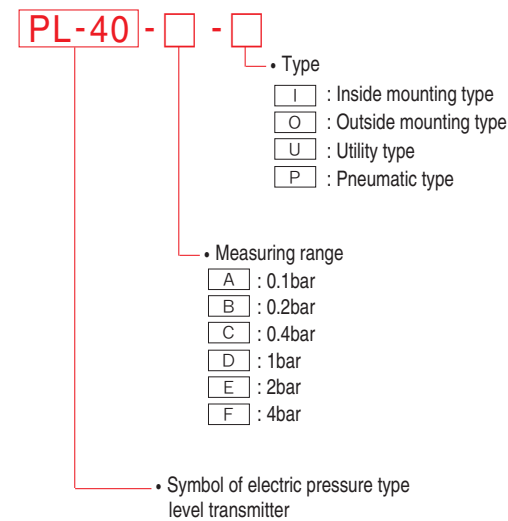
# Electric Pressure Type Level Transmitter



## APPLICATIONS

- Ballast tank remote reading
- Draft remote reading
- Heeling and trim remote reading
- Fuel oil tank remote reading
- Waste waters, wells, locks, rivers etc.

## MODEL NUMBER CODE SYSTEM



## OPERATING PRINCIPLE

The Hanla Pressure Type Level Transmitter is for continuously measuring the liquid level of ballast tank, draft and fuel oil tank in the marine ships as well as tanks containing media. The PL40 is a 2-wire, 4~20mA level transmitter consisting of a transducer and an amplifier connected via a submersible vented cable. Pressure change in the front of the diaphragm will bring about a capacitance change in the cell of the transducer. This change will be transmitted to amplifier as a change in the electrical signal. The PL40 is manufactured in several ranges, and available. Especially the electro pressure type level transmitter can be connected to C.R.T. display cargo system, loading computer, indicator, and analog type indicator to measure the actual level.

## TECHNICAL SPECIFICATION

- Output : 4 ... 20mA adjustable
- Accuracy :  $\pm 0.2\%$  F.S at 20°C
- Supply voltage : 12 ... 28VDC
- Range : Gauge 175mbar to 4bar  
Absolute 1400mbar to 4bar
- Overpressure : Gauge 6bar to 25bar  
Absolute 10bar to 25bar
- Diaphragm cell : Capacitive transmitter with ceramic diaphragm
- Materials
  - Diaphragm : Ceramic
  - Sensor Body : Stainless steel 316L
  - Amplifier box : SCS13(Indoor) / SCS14(Outdoor)
  - Special cable : Sheathed polyethylene cable
- Operating temperature range
  - Transducer : -40~125°C
  - Amplifier : -25~85°C
- Protection class
  - Transducer : IP68/submersible
  - Amplifier : IP66
- Intrinsic safety : EEx ia II c T5  
(Max. 50m cable between transducer and amplifier box)
- Cable length : 3m in standard (option : up to 50m)

## FEATURES

- High measuring accuracy
- Excellent stability
- Capacitive transmitter with Ceramic diaphragm
- High overload limit
- High temperature stability
- Corrosion resistance
- No hysteresis
- Marine class approval

# Level Transmitters

## Magnetic Float Type Level Transmitter

Continuous liquid level meter, display, with four separated adjustable alarm points, and Output signal for remote level transmitter.



### STANDARD SPECIFICATIONS

- Connection size : JIS 5K 80A, 100A  
With float chamber type: JIS 5K 100A only
- Max. pressure : 10 kg/cm<sup>2</sup>
- Max. temperature - SUS 316 float : 100°C  
- RESIN float : 70°C  
- P.V.C float : 60°C
- Min. Sp. Gr - SUS 316 float : 0.85  
- RESIN float : 0.6  
- P.V.C float : 0.7
- Measuring range : Max. 30m
- Sensor resistance : about 1k  $\Omega$
- Max. current : 25mA
- Power source : 12~32VDC
- Output : 4~20mA DC
- 2 Wire system balancing type
- Cable entry : 15b
- Enclosure : Weather proof/IP56
- Material - Housing : AC and SUS 304  
- Flange : Carbon steel  
- Float : SUS 304  
- Guide pipe : SUS 304

### OPERATING PRINCIPLE

Reed switches arranged with a certain pitch inside a pipe as shown on fig. 1, activated by means of the magnet inside float, the detecting circuit electric equivalent to the potentiometer is constituted.

By adjusting the size and power of the magnet inside the float so as one or two reed switches could be operated in any time. Resolution of the potentiometer would become 1/2 of the pitch of the reed switches. Consequently, when the pitch is 10mm, a resolution of 5mm can be obtained.

A necessary accuracy can be ensured in the FLT-100 series by modifying the pitch of the reed switches and the divided number of the measuring range conforming with the total measuring range.

### FEATURES

- Consistent accuracy regardless of the tank depth.
- High accuracy.
- Service-proven reliability.
- Simple installation.
- Magnet-float type in which the construction is simple.
- The maintenance is easy.
- Only single 2core cable.
- Wide measuring range.

### APPLICATIONS

Level measurement continuously indicates the actual level and can provide an analogue and digital indication as well as operation of switching contacts predetermined levels.

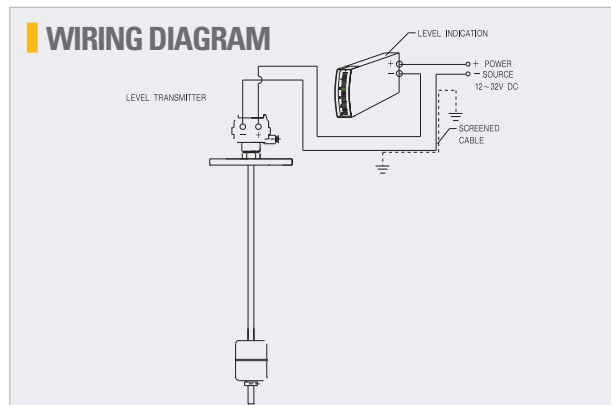
Typical applications are the measurement of water, H.F.O, D.O, L.O, Vegetable oil, and others.

### Model number code system

**FLT - 100** - [ ] - [ ] - [ ] - [ ]

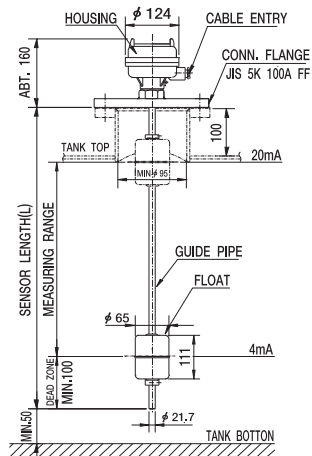
- Symbol of Magnetic Float Type Level Transmitter (Output 4~20mA, 2WIRES)
- Mounting type
  - [RT] : Top mounting
  - [RI] : Inside mounting
  - [RS] : Side mounting
- Float size and material
  - [S] :  $\phi$  65 x 111L/SUS304
  - [R] :  $\phi$  50 x 45L/Resin
  - [P] :  $\phi$  76 x 100L/P.V.C
  - [T] : Teflon
  - [SF] : Special type
- Option
  - [H] : 4~20mA, SMART TYPE HART®
- Enclosure
  - [W] : Weather proof: IP56
  - [E] : Explosion proof: IP56/Exd II c T6
  - [I] : Intrinsically safe: EEx ia II C T6/With I.S Barrier
- Internal construction
  - [G] : Without float chamber
  - [C] : With float chamber

### WIRING DIAGRAM



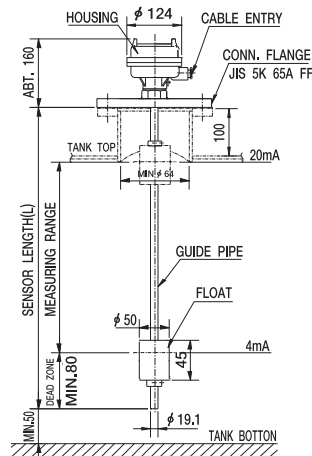
## OUTLINE / DIMENSIONS

**FLT-100RT-SGW**



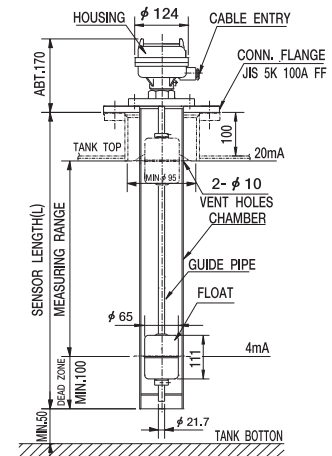
- Installation : Top mounting
- Connection Flange : Min. JIS 5K 80A FF
- Minimum Sp.Gr : 0.85
- Measuring Range : Max.3M
- Material - Float : SUS304
  - Guide pipe : SUS304
  - Housing : AC

**FLT-100RT-RGW**  
(FOR LOW VISCOSITY FLUID)



- Installation : Top mounting
- Connection Flange : Min. JIS 5K 65A FF
- Minimum Sp.Gr : 0.60
- Measuring Range : Max.3M
- Material - Float:Resin
  - Guide pipe:SUS304
  - Housing:AC

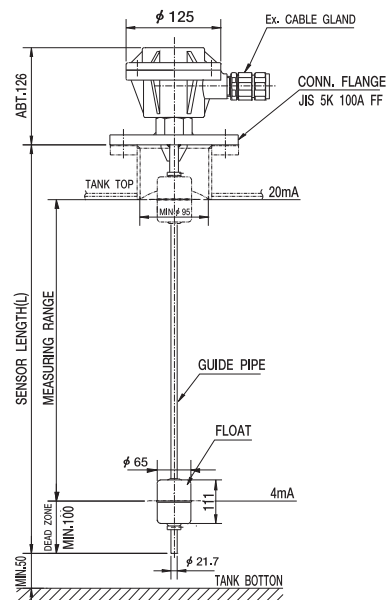
**FLT-100RT-SCW**



- Installation : Top mounting
- Connection Flange : Min. JIS 5K 100A FF
- Minimum Sp.Gr : 0.85
- Measuring Range : Max.4M
- Material
  - Float:SUS304
  - Guide pipe:SUS304
  - Chamber:SGP
  - Housing:AC

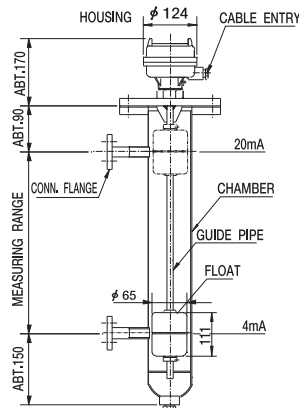
**FLT-100RT-SGE**

Explosion Proof Type : IP56/Exd II C T6



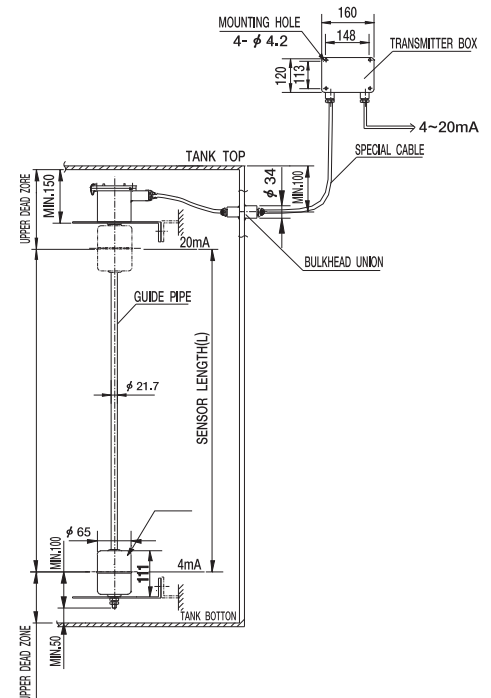
- Installation : Top mounting
- Connection Flange : Min. JIS 5K 80A FF
- Minimum Sp.Gr : 0.85
- Measuring Range : Max.3M
- Material - Float : SUS304
  - Guide pipe : SUS304
  - Housing : AC

**FLT-100RS-SCW**



- Installation : Side mounting
- Connection Flange : Min. JIS 5K 25A FF(STD.)
- Minimum Sp.Gr : 0.85
- Measuring Range : Max.4M
- Material
  - Float : SUS304
  - Guide pipe : SUS304
  - Chamber : SGP
  - Housing : AC

**FLT-100RI-SGW**



- Installation : Inside mounting
- Minimum Sp.Gr : 0.85
- Measuring Range : Max.3M
- Material - Float : SUS304
  - Guide pipe : SUS304



# Level Transmitters

## Electric Pressure Sensor



### DESCRIPTION

The PERAMIC is a solid state, all stainless, pressure sensor based on a ceramic pressure cell with a very high burst pressure. The amplifier system is based on a single integrated circuit, which ensures a perfect linearity in the 4-20mA output. Also the sensor is fully temperature compensated. The PERAMIC is made for applications in liquids, gases and vapours. All materials in contact with the process are made of SS-316(AISI), a lot of other materials are available. Zero and Span are internally adjustable in wide ranges. A local indicator (programmable) is available (option).

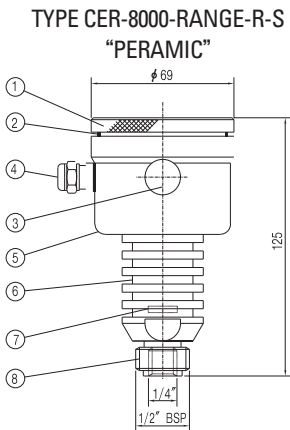
### APPLICATION

The “PERAMIC” is an universal pressure sensor for all gauge and absolute pressure measurements on liquids, gases and vapours. When a flush diaphragm has to be used for food or paper industry, ask for our transmitters series 8000 or 8000-SAN.

### MEASURING RANGE(CER-8000)

Order code key measuring range bar	max. over pressure bar	SERIE CER-8000- adjustable span range bar min.-max.
0 ~ 0.1...0.4	2	0 ~ 0.1 / 0 ~ 0.4
0 ~ 0.2...0.8	5	0 ~ 0.2 / 0 ~ 0.8
0 ~ 0.8...1.6	12	0 ~ 0.8 / 0 ~ 1.6
0 ~ 1.6...4	20	0 ~ 1.6 / 0 ~ 4
0 ~ 2.5...10	50	0 ~ 2.5 / 0 ~ 10
0 ~ 10...40	120	0 ~ 10 / 0 ~ 40
0 ~ 40...150	350	0 ~ 40 / 0 ~ 150
0 ~ 100...350	600	0 ~ 100 / 0 ~ 350

### DIMENSIONS



ITEM	QUANTITY	DESCRIPTION	MATERIAL
1	1	Cover	AISI 304
2	1	O-ring	EPDM
3	1	Venting	
4	1	PG9 cable connector	
5	1	Electronic housing	AISI 304
6	1	Foot/Cooling fins	AISI 316
7	1	Ceramic sensor	Al2O3 (96%)
8	1	Gauge connection 1/2" BSP DIN 16288	AISI 316

### STANDARD SPECIFICATION

- Measuring ranges : from 0-0.1 to 350 bar
- Output signal : 2-wire, 4-20mA
- Overall accuracy :  $\pm 0.2\%$
- Power supply : 12 to 40VDC
- Electrical connection : PG 9/1/2" NPT or M20
- Load(max.) : 600 Ohm/24V till 1400Ohm/40V
- Protection grade : IP65
- Weight : 0.6kg
- Over pressure : see measuring range
- Process temperature : standard-30°C to 100°C (1/2 hour 150°C)
- Temperature effect :  $\pm 0.015\%K$  adjusted span
- Housing temperature : -20°C +70°C
- Storage temperature : -30°C +80°C
- Adjustment : zero and span internally
- Process connections : see ordering information
- Wetted parts measuring cell : ceramic(Aluminiumoxyde 96%)
- Sensor sealing : standard viton  
O-ring(other materials on request)
- Other wetted parts standard : AISI 316
- Material housing : AISI 304
- Zero elevation / suppression available
- Vacuum and compound ranges available, please specify
- Specifications can change without notice

### FEATURE

- ALL STAINLESS STEEL MATERIAL
- CERAMIC PRESSURE CELL
- WITHSTAND FULL VACUUM
- OUTPUT 4-20 mA/2-WIRE
- NO OIL FILLING
- ACCURACY 0.2%(ADJUSTED SPAN)
- ZERO/SPAN INTERNAL ADJUSTABLE
- VERY HIGH BURST PRESSURES
- LOCAL INDICATOR AVAILABLE
- INTRINSICALLY SAFE, EEx ia IIC T4

# Alarm Annunciator



## MODEL:AU-100



- Channel number : 10 contacts
- Alarm Input time delay : 0-99 sec
- Alarm escape time delay : 0-99 sec
- Channel outputs : NC or NO
- Common relay output
- Internal Buzzer
- Buzzer Stop button
- Flicker Stop button
- Supply voltage : 24VDC(18-32VDC)  
100-240 VAC(option)

- Indication LEDs : 10 × red/green, 1 × yellow, 1 × green
- First alarm flashing
- Serial Communication : RS-485
- Channel setting : by internal rotary switch  
by windows setting program
- Power consumption : Max. 160mA at 24VDC
- Operating temperature : -10°C to +55°C (70°C peak)
- Alarm module enclosure : standard DIN 144 x 72 x 166.5 mm
- Type code selection : AU-100D-AB
  - A : Channel Output
  - 0 : None
  - 1 : Isolated Output
  - B : Power
  - 0 : 24VDC
  - 1 : 100-240VAC
- AU-100D : High Level Alarm, Overfill Alarm application  
Inhibit buttons for each channel  
Navigation function
- AU-100D(W) : Water Ingress Detection System application  
Overriding buttons for Pre-alarm and Main-alarm
- Optional repeater unit : AU-100R by RS-485

## MODEL:AU-160



- Channel number : 16 contacts
- Alarm Input time delay : 0-99 sec
- Alarm escape time delay : 0-99 sec
- Channel outputs : NC or NO
- Common relay output
- Internal Buzzer
- Buzzer Stop button
- Flicker Stop button
- Supply voltage : 24VDC(18-32VDC)  
100-240VAC(option)

- Indication LEDs : 16 × red/green, 1 × yellow, 1 × green
- First alarm flashing
- Serial Communication : RS-485
- Channel setting : by internal rotary switch  
by windows setting program
- Power consumption : Max. 4.5 Watt at 24VDC
- Operating temperature : -10°C to +55°C (70°C peak)
- Alarm module enclosure : standard DIN 144 x 144 x 86 mm
- Type code selection : AU-160D-AB
  - A : Channel Output
  - 0 : None
  - 1 : Isolated Output
  - B : Power
  - 0 : 24VDC
  - 1 : 100-240VAC
- AU-160D : High Level Alarm, Overfill Alarm application  
Inhibit buttons for each channel  
Navigation function
- AU-160D(W) : Water Ingress Detection System application  
Overriding buttons for Pre-alarm and Main-alarm
- Optional repeater unit : AU-160R by RS-485

## MODEL:AU-240L



- Channel number : 24
- Input type : Current 4-20mA, Contact
- Scaling : -999999-999999
- Accuracy : +/- 0.2%FS
- Channel outputs : NC or NO
- Common relay output
- Power failure output
- Internal Buzzer
- Buzzer Stop button
- Flicker Stop button
- Supply voltage : 100-240VAC  
24VDC(18-32VDC)(option)

- Indication LEDs : 48 × red, 24 × yellow, 1 × green
- Menu Button : 8
- Max. 8 channel display by LCD 128 × 64
- Unit display
- Channel setting : by menu button  
by windows setting program
- Power consumption : Max. 6.6 Watt at 220VAC
- Operating temperature : -5°C to +55°C (10-90%)
- Weight : Approximately 1.1kg
- Alarm module enclosure : standard DIN 144 x 144 x 120 mm
- Serial Communication : RS-485 MODBUS RTU  
Long Integer Type(4byte/channel)

## MODEL:OVMS-50



- Channel number : 5
- Input type : Current 4-20mA, Contact
- Scaling : -999999-999999
- Accuracy : +/- 0.2%FS
- Channel outputs : NC or NO
- Common relay output
- Power failure output
- Internal Buzzer
- Buzzer Stop button
- Flicker Stop button
- Supply voltage : 100-240VAC only

- Indication LEDs : 8 × red(Max.10), 5 × yellow, 1 × green
- Menu Button : 8
- Front/Rear Power Switches
- Max. 5 channel display by LCD 128 × 64
- Unit display
- Channel setting : by menu button  
by windows setting program
- Power consumption : Max. 8.8 Watt at 220VAC
- Operating temperature : -5°C to +55°C (10-90%)
- Weight : Approximately 1.1kg
- Alarm module enclosure : standard DIN 144 x 144 x 120 mm
- Serial Communication : RS-485 MODBUS RTU  
Long Integer Type(4byte/channel)
- Application : Oxygen/Vapour Pressure monitoring

# Electric Equipments

## Level Indicator

MODEL:SIL-100



- Total/Individual channel indication by selecting "AUTO/FIX"
- Input: MODBUS RTU(RS-485/232)
- Level, Temp., Pressure display with unit
- Bar-graphic indication
- Display of Channel name
- Channel auto scanning
- Common relay output(NC,NO)
- Power: AC100~240V Max.0.25A. optional DC24V
- Internal Buzzer
- Indication LEDs: 1xred, 1xgreen
- Dimension: 95x95x134mm
- Dimming function

MODEL:SIL-200



- Total/Individual channel indication by selecting "MANUAL/FIX"
- Input: MODBUS RTU(1xRS-485/232)
- Output: MODBUS RTU(3xRS-485/422/232)
- Alarm relay outputs: 4EA(HH,H,L,LL)
- Level, Temp., Pressure display with unit
- Bar-graphic indication
- Display of Channel name
- Channel auto scanning
- Common relay output(NC,NO)
- Power: AC100~240V Max.0.25A optional DC24V
- Internal Buzzer
- Indication LEDs: 1xred, 1xgreen
- Dimension: 213x129x200mm
- Dimming function

MODEL:HDI-200



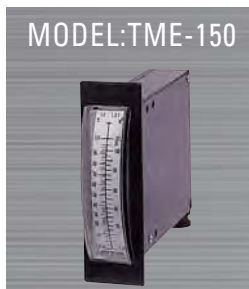
- Input: 4~20mA
- 16bit A/D conversion
- Range and Scale: -9999~9999
- 2point alarm(AL1, AL2) and Dead band
- Alarm outputs: NC or NO
- Optional output: 4~20mA
- 10 points linearized transform function
- Accuracy: +/- 0.2%F.S
- Power: DC24V 4Watt optional AC100~240
- Internal Buzzer
- Dimension: 96x48x112mm
- Dimming function

MODEL:HDU-100



- Large Display : graphic LCD with 240x128
- Display Channel : 8 ch. per one page
- Display of Individual tank name
- Corrected Level/Volume display
- Display of Date/Time
- 1xRS-232/ 3xRS-485 communication ports
- Relay output for Common Alarm
- 6 Status LEDs
- Alarm Buzzer

MODEL:TME-150



- Model : TME-150
- Size : 50.7 × 152.3mm
- Mounting method : Panel front mounting
- Input signal : DC 4~20mA
- Internal resistance : 2.5  $\Omega$
- Accuracy :  $\pm 1.5\%$  of F.S
- Scale length: 100mm
- Scale range : 0~100% of F.S or Owner requirement
- Indicating type : Vertical
- Case material : ABS resin
- Weight : 1.2kg
- Temperature : 0~40°C
- Application : Panel and local indicator

MODEL:NRE-152



- Model : NRE-152
- Size : 50.7 × 152.3mm
- Mounting method : Panel front mounting
- Power source : AC100/110V 200/220V(50/60Hz)
- Input signal : DC 4~20mA
- Internal resistance : 2  $\Omega$
- Accuracy :  $\pm 1.5\%$  of F.S
- Scale length : 100mm
- Scale range : 0~100% or Owner requirement
- Output contact : 1 Transfer contact each on "H" and "L" sides
- Contact rating : AC230V 2.5A DC 30V 2.5A
- Setting range : 0~100% of scale range on each of "H" and "L" sides
- Proximity limit : 3% of scale range
- Temperature : 0~50°C
- Weight : 1.3kg



# Electric Converter



MODEL:KN-1000 series



- Model: KN-1000 series
- Size: 36(W) × 144(H) × 169.5(D)
- Mounting method: Panel front mounting
- Display: Bar-101 segment LED
- Digit: 4 digit
- Power source: AC 85~265V(50/60 Hz)  
DC 24V(option)
- Input signal: 4~20mA
- Accuracy:  $\pm 0.2\%$ (Digit.)and  $\pm 1.0\%$ (Bar)of F.S
- Scale range: 0~100%
- Option: output alarm(2 or 4point)  
output signal 4~20mA  
RS-422A interface

MODEL:HLI-110A



- Model: HLI-110A
- Size: 110 × 110mm squaresquare
- Mounting method  
: Panel front mounting
- Input signal: 4~20mA
- Internal resistance: 1.5  $\Omega$
- Accuracy:  $\pm 1.5\%$  of F.S
- Scale range  
: 0~100% or Owner requirement
- Indicating angle: 250deg
- Color: black
- Weight: 450g
- Temperature: 0~40°C
- Application  
: Panel and local indicator

MODEL:TMP-100



- 4~20mA output Temperature Transmitter
- Input range: 0~100°C / 0~200°C (selectable)
- Input: Pt-100  $\Omega$
- Output: Current 4~20mA, 2-wire
- Power supply: 7.5~36VDC
- Current limit
- Response time: Nom. 0.3sec.(10~90%)
- Accuracy:  $< 0.2\%$ F.S
- Operating temp.: -10~60°C
- Storage temp.: -40~85°C
- Dimension: 109.5x75x22.5mm
- DIN-rail mounting: DIN EN 50022-35
- Weight: 0.1kg

MODEL:HIC-100



- 4~20mA Isolation Converter
- Input: Current 4~20mA, 2-wire
- Voltage drop: Max. 3.0V
- Protection:  $\pm 35$ VDC
- Output: Current 4~20mA, 2-wire
- Power supply: 7.5~36VDC
- Protection:  $\pm 35$ VDC
- Current limit: Nom. 26mA
- Response time: Nom. 0.3sec.(10~90%)
- Isolation voltage: 3.75kVAC
- Linearity error:  $< 0.1\%$ F.S
- Operating temp.: -10~60°C
- Storage temp.: -40~85°C
- Dimension: 109.5x75x22.5mm
- DIN-rail mounting: DIN EN 50022-35
- Weight: 0.1kg

MODEL:AD-82



- Analog to Digital Converter
- Channel number: 8
- Input: Current 4~20mA
- Output value: 400~2000 (default)  
(Long Integer Type(4byte/channel))
- Serial Communication: RS-485 MODBUS RTU
- 24bit A/D conversion
- Scaling: -999999~999999
- Accuracy:  $\pm 0.2\%$ FS
- Supply voltage: 24VDC(18~32 VDC)
- Indication LEDs : 1 × red, 2 × green
- Menu Button: 4
- Display by LCD(8 character × 2 line)
- Unit display
- Channel setting: by menu button  
by windows setting program
- Power consumption: Max. 6.6 Watt at 220VAC
- Operating temperature: -5°C to +55°C  
(10~90%)
- Weight: Approximately 1.1kg
- Dimension: 70x110x109.5 mm

MODEL:DA-82



- Digital to current 4~20mA output
- Channel number: 8
- Input: MODBUS RTU, RS-485
- Output: 3.5~24mA(reliable operating span)
- 17bit D/A conversion
- Supply voltage: 24VDC(18~32VDC)
- Channel Power Power: External Power of 24VDC
- Indication LEDs: 1xred, 2xgreen
- Internal DIP Switch for setting(baudrate, address)
- Calibration of Channel output by serial communication
- Operating temperature: -5°C to +55°C (10~90%)
- Weight: Approximately 230g
- Dimension: 70x110x109.5mm

# List of Type Approval Cert

NO.	Class	Item	Type	Cert. No.	Remarks
1	ABS	AIR PURGE TYPE REMOTE SOUNDING SYSTEM	CT-180 OPN/EPN/CPN.	95-BK33945-X	
2	ABS	FLOAT TYPE LEVEL SWITH	FLS-FMS/DMS/TMR	95-BK3313-X	
3	BV	LEVEL GAUGE INDICATORS	CT-180-EPN.	06460/B0 BV	
4	BV	GAUGE GLASSES, SIGHT GLASS LEVEL INDICATORS	RLG SERIES	3715H/2769/CO/PRSO BV	
5	BV	GAUGE GLASSES, SIGHT GLASS LEVEL INDICATORS	HB-SPCG SERIES	05982/B0/BV	
6	BV	LEVEL GAUGE INDICATORS	CT-180-OPN/CPN	06461/B0/BV	
7	BV	TEMP. MONITORIG AND ALARM SYSTEM	CMS-MIA-H	06330/B0/BV	
8	BV	LEVEL SENSORS/TRANSMITTERS	MAG-DISPLACE-REED S/W	06169/B0/BV	
9	BV	TEMP MONITORING AND AL. SYS	SPT2000S SERIES	06330/B0/BV	
10	BV	CARGO MULTIPURPOSE MONITORING SYS	CMS-MIA-H	06756/B0 BV	
11	BV	LEVEL MONITORING / ALARM SYS	CMS-LIDEC	06755/B0 BV	
12	DNV	LEVEL INDICATOR	HB-SPCG B150/F150/V150	A-7629	
13	DNV	GAUGE GLASS LEVEL INDICATOR	RLG-LP-11/13/14	P-10628	
14	DNV	LEVEL SWITCH	FLS-FMS/DMS/TMR	A-7632	
15	DNV	MONITORING SYSTEM	CMS-LIDE SERIES	A-7631	
16	DNV	LEVEL INDICATING SYSTEM	CT-180 SERIES	A-7630	
17	GL	PNEUMATIC SOUNDING SYSTEM	CT-180-OPN/CPN	98 917-96H	
18	GL	ELECTRO-PNEUMATIC SOUNDING SYSTEM	CT-180- EPN	98 918-96HH	
19	GL	MAGENETIC LEVEL INDICATORS	MFLG-65S	55 999-90HH	
20	GL	SELF POWERED TYPE CONTENT LEVEL GAUGE	HP-SPCG SERIES	98 930-96HH	
21	GL	DISPLACEMENT TYPE FLOAT LEVEL SWITCH	FLS-DMS SERIES	84 569-95HH	
22	GL	REED SWITCH TYPE FLOAT LEVEL SWITCH	FLS-TMR SERIES	84 570-95HH	
23	GL	MAGENETIC FLOAT LEVEL INDICATORS	FLS-FMS SERIES	84 568-95HH	
24	KR	ANNUNCIATORS	ANN. SERIES	GCH03375-AC001	
25	KR	LEVEL TRANSMITER WITH TEMP. SENSOR	FLT-100 SERIES	GCH03375-AE002	
26	KR	LEVEL SWITCH WITH TEMP. TRANSMITTER	TMR-70 SERIES	GCH03375-AE001	
27	KR	CARGO MONITORING SYS.	CMS SERIES	GCH03375-MS007	
28	KR	LEVEL MEASURING SYS.	CT-180 SERIES	GCH03375-MS006	
29	KR	LEVEL GAUGE	HB-SPCG SERIES	GCH03375-MS005	
30	KR	LEVEL GAUGE	FW SERIES	GCH03375-MS004	
31	KR	LEVEL GAUGE	FLG-FA/FB/FCG/MS/MT	GCH03375-MS002	
32	KR	LEVEL SWITCH	FMS SERIES/DMS SERIES/TMR SERIES	GCH03375-AE004	
33	KR	LEVEL GAUGE	RLG-TB/LP/HP SERIES	GCH03375-MS001	
34	KR	CARGO MONITORING SYS.	MIA-L2	GCH03375-MS008	
35	LR	FLOAT TYPE LEVEL SWITCH	FLS-FMS/DMS/TMR	98/40006	
36	LR	SELF POWERED TYPE CONTENT GAUGE	HB-SPCG-B150/F150/V150	98/40015	
37	LR	FLAT TYPE GLASS LEVEL GAUGE	RLG-LP SERIES	92/00164(E1)	
38	NK	LEVEL & TEMP MONITORING SYS.	CMS-MIA-H	L-39-1A	
39	NK	PRESS. MONOTORING SYSTEM	HL-VPMS-1H, HL-VPMS-CT	P-3	
40	NK	REMOTE SOUNDING SYS.	CT-180 SERIES	L-60	
41	NK	LEVEL SWITCH / LEVEL GAUGE	FLS SERIES/RLG, FW, HB-SPCG SERIES	PF-01-276	
42	RINA	MAGNETIC FLOAT LEVEL SWITCH	FLS-FMS SERIES	MAC/696400PU1	
43	RINA	DISPLACEMENT TYPE FLOAT LEVEL SWITCH	FLS-DMS SERIES	MAC/696400PU2	
44	RINA	REED SWITCH TYPE FLOAT LEVEL SWITCH	FLS-TMR SERIES	MAC/696400PU3	
45	RINA	LEVEL GUAGE	RLG SERIES	MAC/705100/1/TO/01	
46	RINA	FLOAT TYPE DIAL L/G	FW	MAC/705100/4/TO/01	
47	RINA	LEVEL GAUGES	FLG SERIES A, B, C, MS & MT	MAC/705100/2/TO/01	
48	RINA	LEVEL GAUGES	HB-SPCG B150, F150, V150	MAC/705100/3/TO/01	

[illegible]