

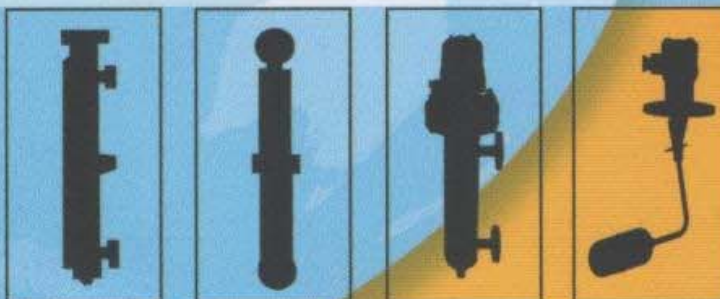


- **PUMPS TEMPERATURE MONITORING AND ALARM SYSTEM**

for Cargo pumps, Ballast pumps and Stripping pumps

- **HYDROCARBON GAS DETECTION SYSTEM FOR PUMP ROOM**

- **BILGE HIGH LEVEL ALARM SYSTEM FOR PUMP ROOM**



**designed and manufactured
in conformity with
2000 SOLAS Amendment
Chap. II-2, Reg. 4**

TECHNICAL SPECIFICATION

Power supply	: AC 110/220V (main) DC 24V (back up)
Number of measuring point	: No limits
Temperature accuracy	: Better than 0.45% FS
Temperature display range	: 0 ~ 200 °C
Temperature element	: PT 100ohm, 3 wire
Enclosure	: EEx ia II c T6
Function device	: Temp. Display Temp. high alarm Buzzer stop, Flicker stop Function test AC/DC power fail

SYSTEM SELECTION FOR ORDER CONFORMATION

PTMS - -

option

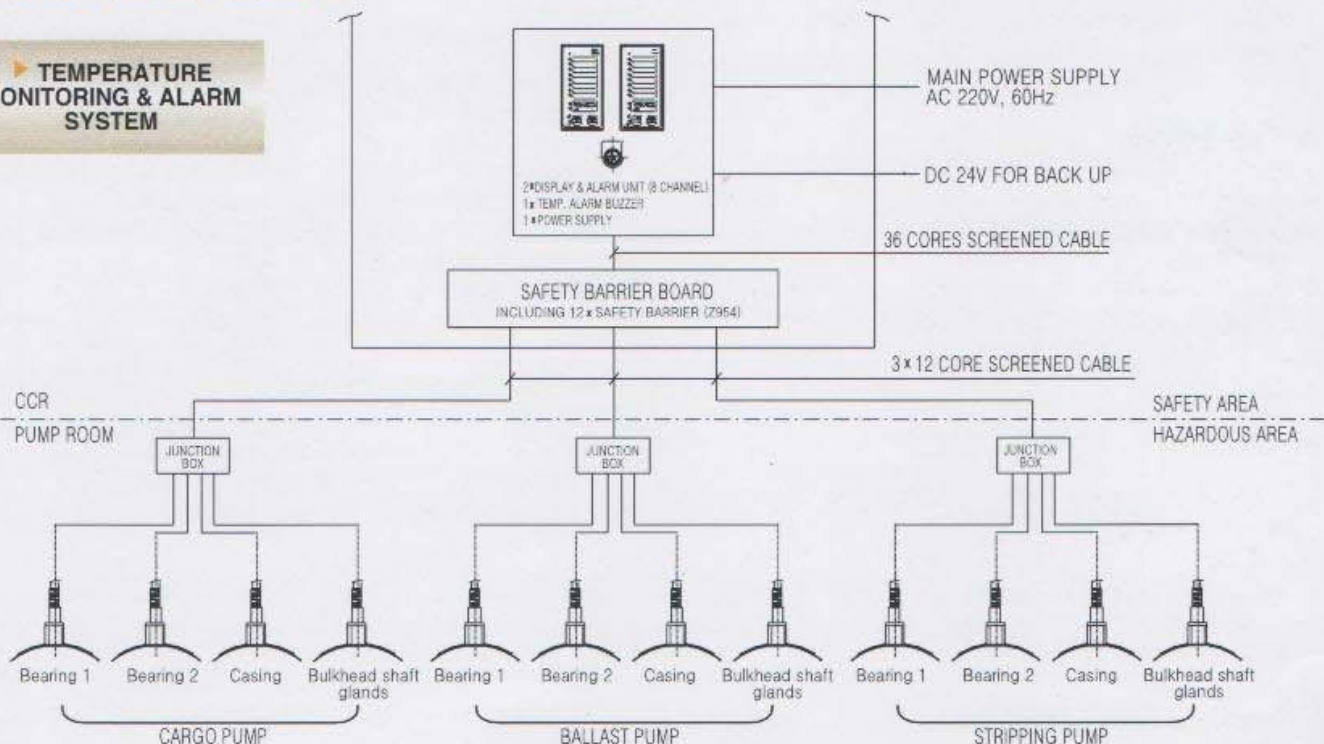
- A : Repeat alarm unit
- B : Add bilge alarm
- C : A + B

Number of Measuring Point

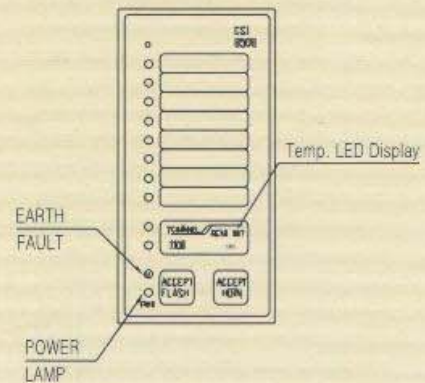
<input type="checkbox"/> P08	: 1 to 8
<input type="checkbox"/> P16	: 9 to 16
<input type="checkbox"/> P24	: 17 to 24
<input type="checkbox"/> P32	: 25 to 32
<input type="checkbox"/> POV	: over 32

ONE LINE BLOCK DIAGRAM

TEMPERATURE MONITORING & ALARM SYSTEM



TEMP. DISPLAY & ALARM UNIT



TECHNICAL DATA

Model	: 8508
Input	: 8 x PT 100, 3 WIRE
Lock delay time	: 0...99 seconds
Channel outputs	: 8 transistorised outputs
Horn output	: potential free make-or-break contact max. voltage 1A, 24VDC or 220VAC
Accept horn	: by means of push button on the front, or externally
Accept flash	: by means of push button on the front, or externally
Function test	: by pushing both accept and flash push buttons during at least 2 sec.
Supply voltage	: 24 VDC (18...32 VDC)
Accuracy	: better than 0.45% FS

HYDROCARBON GAS DETECTION SYSTEM FOR PUMP ROOM

GENERAL

This system has been specially designed, manufactured in conformity with

2000 SOLAS Amendment, Chap. II-2, Reg. 4 amended for continuous monitoring the connection of hydrocarbon gases in the PUMP ROOM.

It consists of complete catalytic pellistor type gas detectors and analox 1300 gas detection monitoring unit, repeat alarm panels for engine control room and navigation bridge as well as audible/visual alarm device in pump room.

THE ANALOX 1300 HYDROCARBON GAS DETECTION MONITORING UNIT

is wall mounted unit, which provides a mean of monitoring up to 4 channels of any physical parameter which can be converted to an electrical signal, e.g. oxygen, toxic gas or combustible gas concentrations, temperature, RH%, pressure. Each channel incorporates a 3 1/2 digital LCD display, two user settable alarm with audible and visual indication, user accessible zero and span adjustments on the front panel and an alarm inhibit function which allows the user to disable the alarms during calibration.

It has a fault indication which triggers when the input signal falls below a pre-set level.

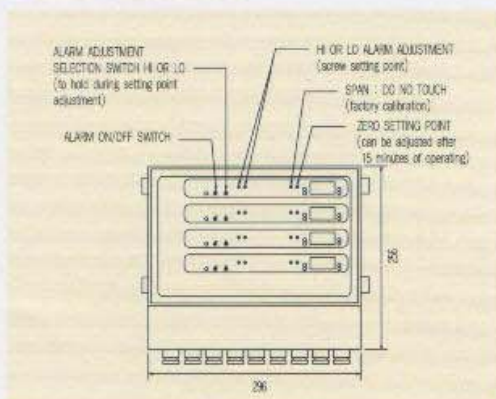
SPECIFICATION FOR GAS DETECTION SYSTEM

- Number of gas detecting points – MAX 4 points.
- Power supply – 220V AC

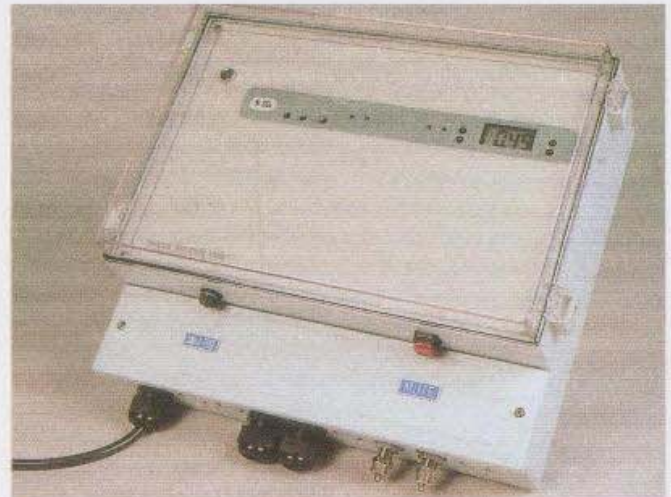
APPLICATION

- Marine cargo pump room and full spaces.
- Bulk gas storage area.
- Chemical industries.

Analox 1300



The Analox 1300 Hydrocarbon Gas Detection Monitoring Unit with 1-4 Channel Controller



BENEFITS AND FEATURES

■ INDEPENDENT DISPLAYS :

Analox 1300 gives from 1 to 4 clear independent digital indications of a variety of parameters from sensors, transducers or transmitters.

■ UPGRADEABILITY :

Can be upgraded by adding extra channels in situation.

■ MEASUREMENTS :

Common Measurements	Engineering Unit	
Hydrobarbon Gas	%LEL	} Option
Toxic Gases	VPPM	
Oxygen	%Vol	
Temperature	°C or F or K	
Humidity	%RH and Dewpoint	
Acidity Alkalinity	pH	
Smoke & Fire Detection	alarm	
Wind Velocity	m/sec	

■ SYSTEM CONFIGURATION :

- C.C.R Gas detection monitoring unit
- E.C.R Repeat alarm panel
- N. BRIDGE Repeat alarm panel
- PUMP ROOM Air horn and rotating light

ANALOX 2000S HYDROCARBON GAS DETECTOR

is a sealed stainless steel hydrocarbon gas detector head with a sintered stainless steel filter, which houses a poison resistance VQ 21 pellistor pair.

The sensor uses a device to detect the presence of a hydrocarbon gas in the air surrounding the sensing surface. The elements used in sensor are of the catalytic pellistor type and are sensitive to most common combustible gases and vapour. Also this sensor is connected to the ANALOX 1300 hydrocarbon gas detection monitoring unit.

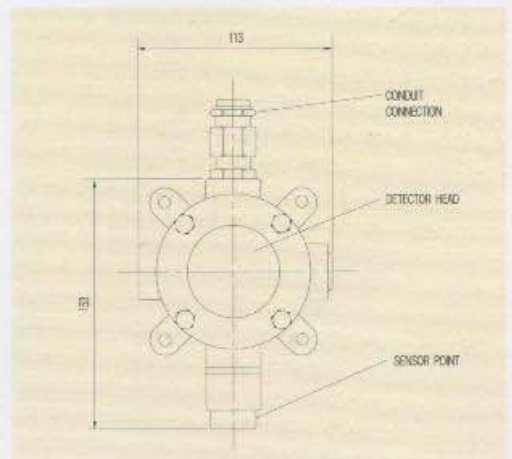
SPECIFICATIONS FOR ANALOX 2000S

PRODUCT	STANDARD	BASEEFA/CENELEC APPROVAL	BASEEFA CERTIFICATE NO.
2000S	BASEEFA SFA 3009 BS5501 Pts 1&5	Ex sd IIC T6	Ex 84016X
2000S JB	BS 5501 Pts 1&6 EN 50 014 EN 50 019	EEx e II T6	Ex 813145X
2000 Flammable Gas Detection System	BASEEFA SFA 3012	Ex ias IIC	Ex92 Y2506
2000S	BASEEFA SFA 3009	Ex sd IIC T3	Ex 84016X/2
High Temp Range	BS 5501 Pts 1&5		
Power	0-100% Lower explosive limit combustible Hydrocarbons		
	VQ27	2 volt 300 mA	
	VQ23	2.5 volt 335 mA	
	VQ22	2 volt 175 mA	
	VQ9	2 volt 175 mA	
Operating Temperature	2000 Sensor (VQ21)		-5° to +40°C
Linearity	2000 Sensor High temperature		-5° to +150°C
Response Time	Linear up to 5% vol Methane		
Interference	To 1 1/4% in 2 1/2% CH4		Less than 5 seconds
Shock Test	No interference from water vapour or Carbon Dioxide		
Vibration Test	250g, 5 blows in each plane		
	20g, 24 cycles from 100 to 3200 Hz		

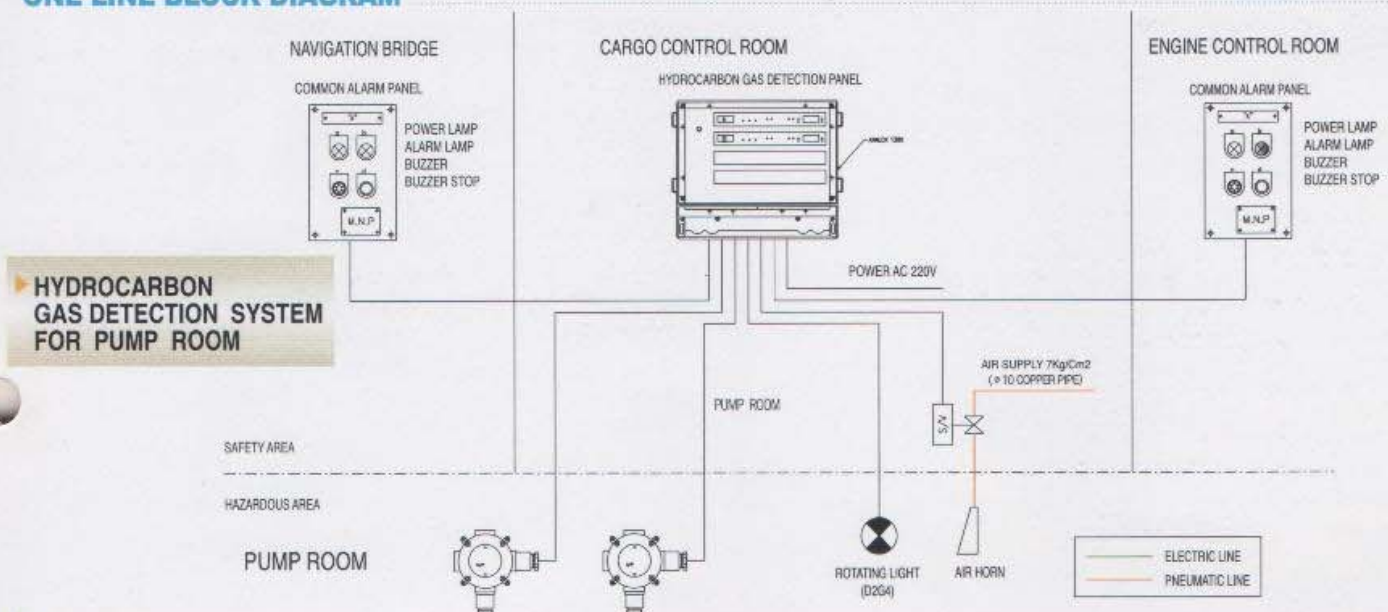
Analox 2000S Flammable Hydrocarbon Detector



Analox 2000S



ONE LINE BLOCK DIAGRAM



PUMP ROOM BILGE HIGH LEVEL ALARM SYSTEM

GENERAL

This system has been specially designed, manufactured in conformity with 2000 SOLAS Amendment, Chap. II-2, Reg. 4 amended for monitoring the BILGE HIGH LEVEL in the Pump Room.

THE BILGE HIGH LEVEL ALARM SYSTEM "BL-HA95" is designed to get an audible and visible alarm for high level of cargo P/R bilge well and E/R bilge well. This system consists of bilge alarm panel, safety barrier and, level switch.

PRINCIPLE OPERATION FOR BILGE HIGH LEVEL ALARM SYSTEM

When the liquid level reaches a set point, a level switch on the bilge well is actuated, and the alarm signal is given to the bilge alarm panel through safety barrier. The audible and visual alarm on the alarm panel will be operated.

SPECIFICATION FOR LEVEL SWITCH

- **The level switches shall be classified into three types** DMS-701A-CW, TMR-71A5S-CW, LIDEC-L91B according to the type of level switch.
- **Displacement type level switch/DMS-701A-CW**
The principle allows adjustment of the switching point by moving the displacer along the guide pipe.

Connection size	: JIS 5K 100A
Setting point	: 220~5000m/m
Setting accuracy	: ±8m/m
Max. working pressure	: 5kg/cm ²
Min. Sp. Gr	: 0.85
Switch contact form/Rating	: SPDT/250VAC, 15A
Enclosure	: IP56(option IP65)

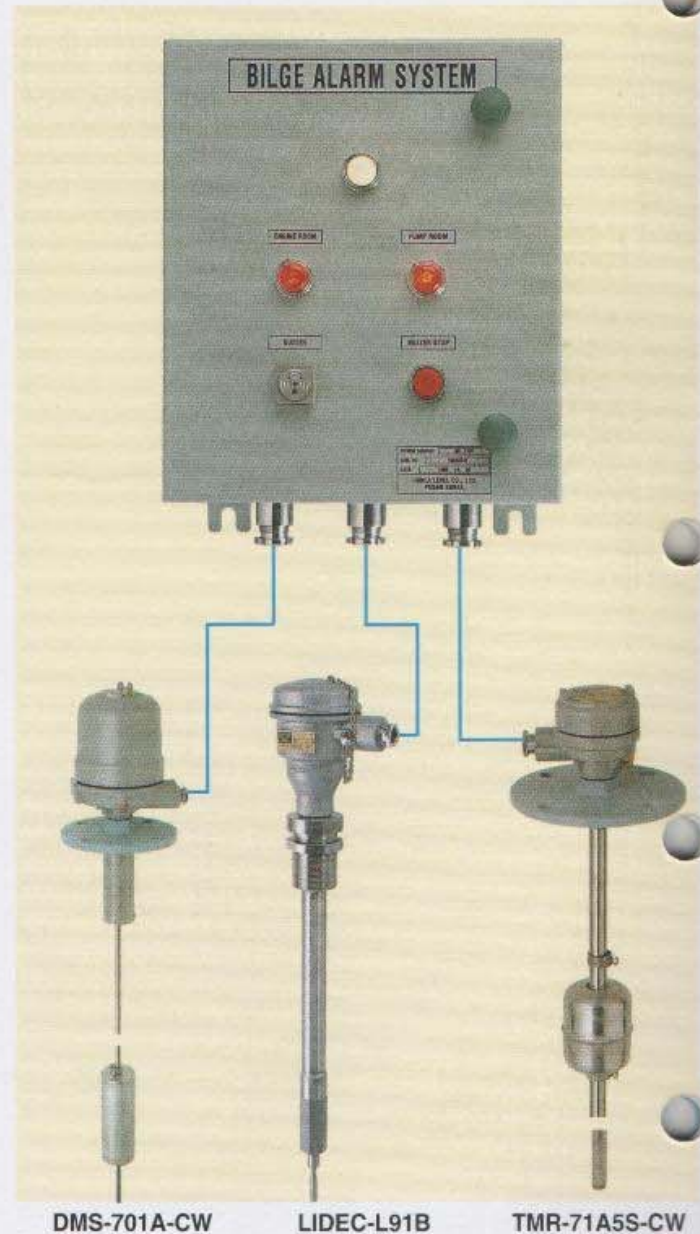
- **Reed switch type float level switch/TMR-71A5S-GW**
The reed switch type float level switch consists of a magnet built in the float and reed switch inside the pipe.

Connection size	: JIS 5K 100A
Setting point	: 120~5000m/m
Setting accuracy	: ±5m/m
Max. working pressure	: 5kg/cm ²
Min. Sp. Gr	: 0.85
Switch contact form/Rating	: SPST/250VAC, 0.5A
Enclosure	: IP56(option IP67)

- **Acoustic wave type level switch/LIDEC-L91B**
The principle of this switch is based on the propagation of an acoustic wave into a metallic probe.

Power source	: 16 to 48V DC(Nominal 24V DC)
Accuracy	: 5m/m
Connection size	: 1 1/2"thread or JIS 5K 50A
Setting point	: 150~3000m/m
Switch contact form	: 1 NO/NC dry contact
Enclosure	: IP56(option IP67)

- Other type bilge level detector can be applicable.



FEATURES

- Intrinsically safe detecting is applicable to all kind of inflammable fluids/EEEx ia II c T6
- Most advanced electronic technology for high reliability.
- Designed for all kind of liquid.
- Simple construction
- Easy installation

TECHNICAL SPECIFICATION

Power source	: 110V/220V, 60Hz
Output	: Visible and audible alarm
Enclosure	: EEx ia II c T6
Function device	: Bilge high level alarm lamp Buzzer Buzzer stop button External alarm

HANLA LEVEL'S

Hanla Level Co., Ltd. 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.

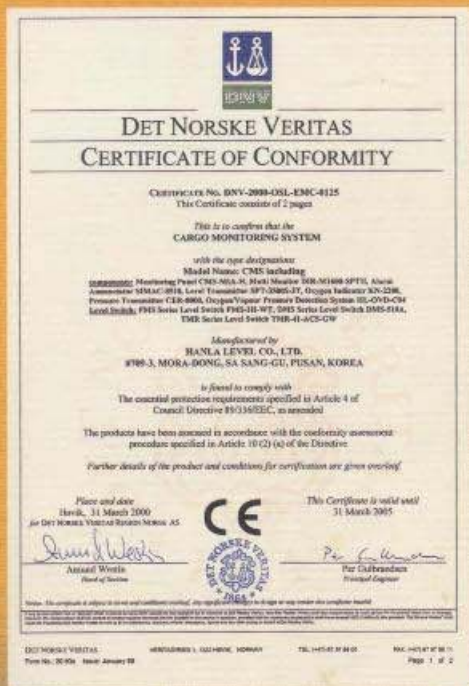
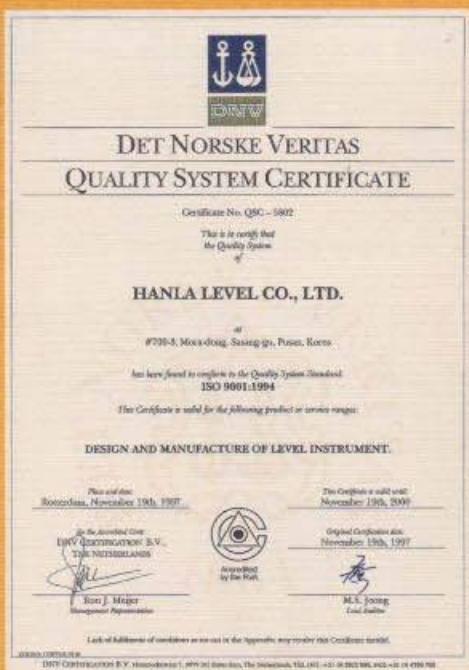
Between 1993 and 1995, we acquired the quality authorization certificate which can supply our own instrumentations to the thermal power plant and nuclear electric power plant from Korea Electric power cooperation on the basis of high quality assurance program to expand our land market share more and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

Many thanks and wish for your health.



Manufacturing Line Authorized by the Quality



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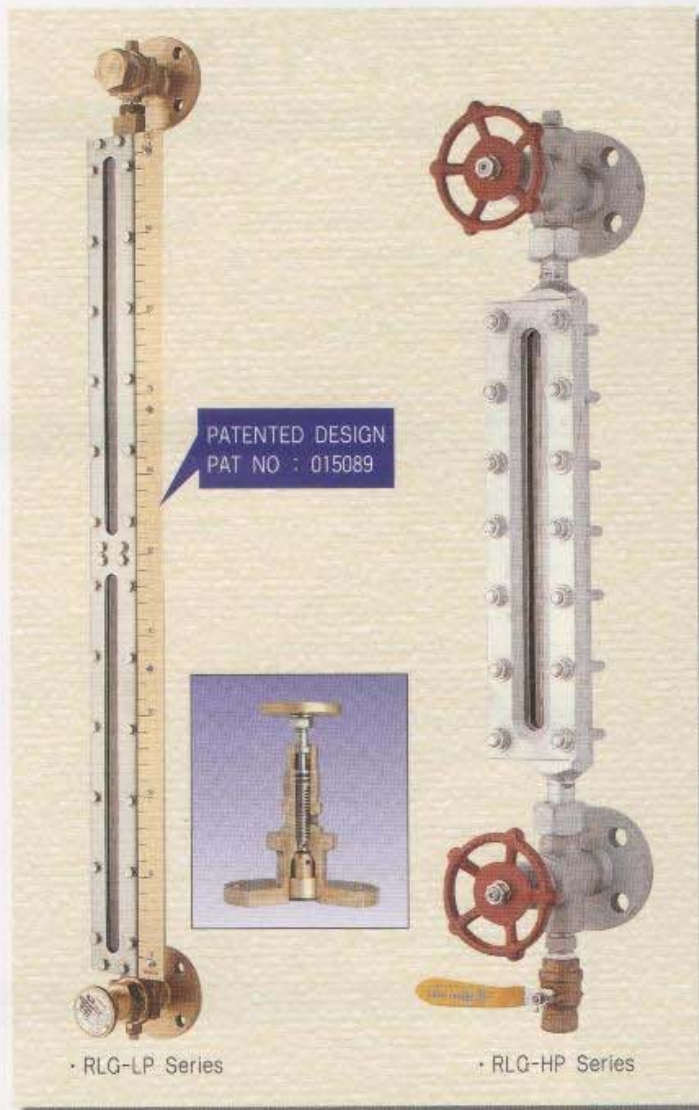
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CERTIFICATE

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● FLAT TYPE GLASS LEVEL GAUGE

MODEL: RLG 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.

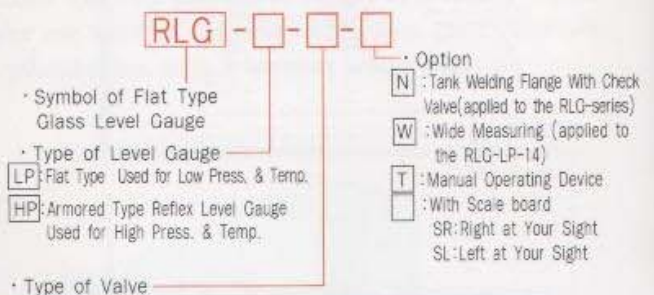
● APPLICATION

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

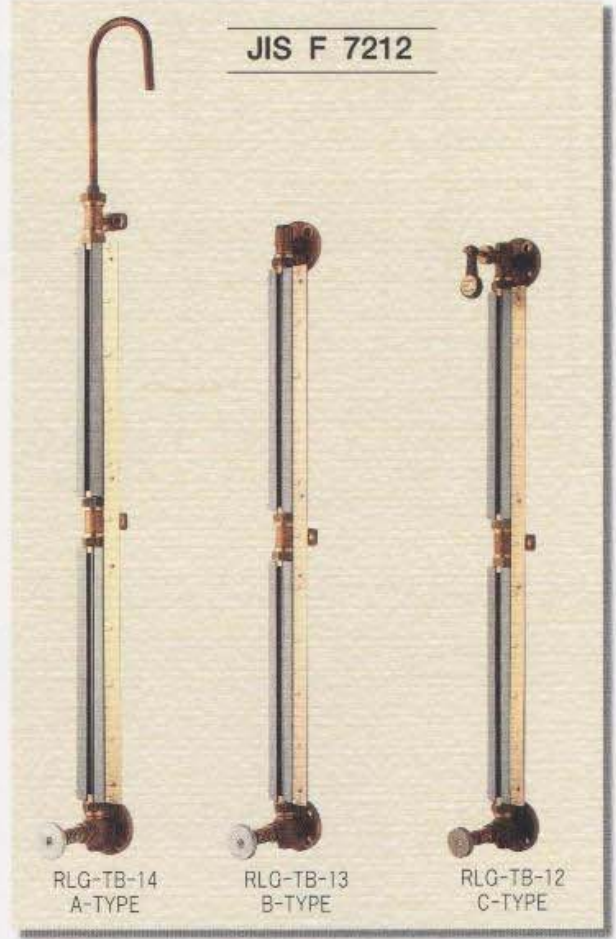
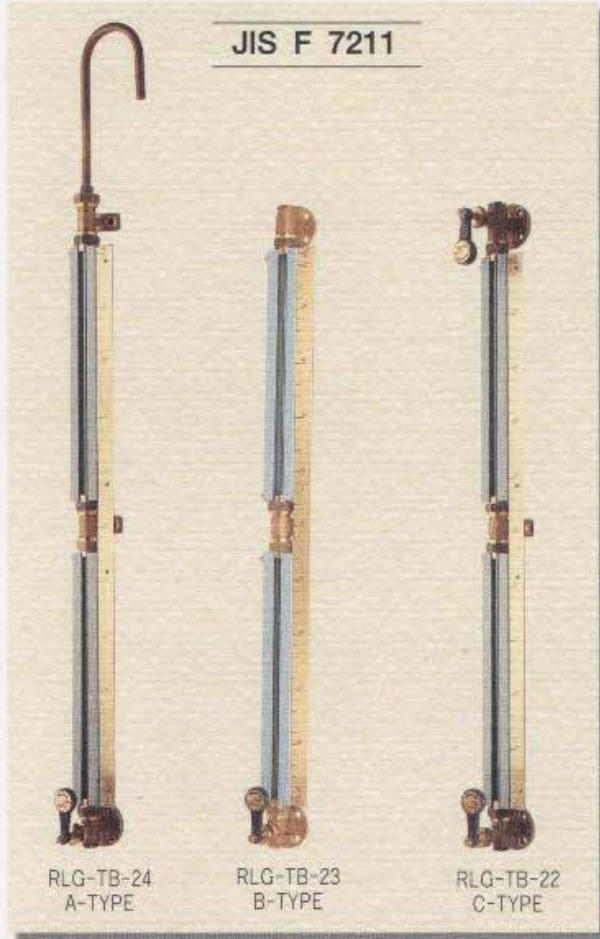
Standard model and specification

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 ²	150°C	BC6	SUS304	SUS304	Borosilicate	285
RLG-LP-13	Tank return	Self-closing	JIS 5K20A, 25A	3 kg/cm ²	150°C	BC6	SUS304	SUS304	Borosilicate	~
RLG-LP-14	Top vent	Self-closing	JIS 5K20A, 25A	3 kg/cm ²	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 ²	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 ²	300°C	C,S	C,S	C,S	Borosilicate	~
RLG-HP-CK22	Cock valve	Cock valve	JIS 16K20A	20 kg/cm ²	300°C	C,S	C,S	C,S	Borosilicate	2870 (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.

● TUBULAR TYPE GLASS LEVEL GAUGE

MODEL: RLG-TB Series



● 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.

● APPLICATION

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

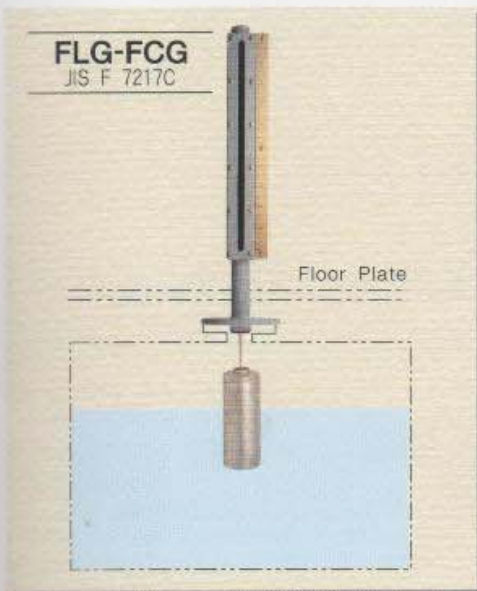
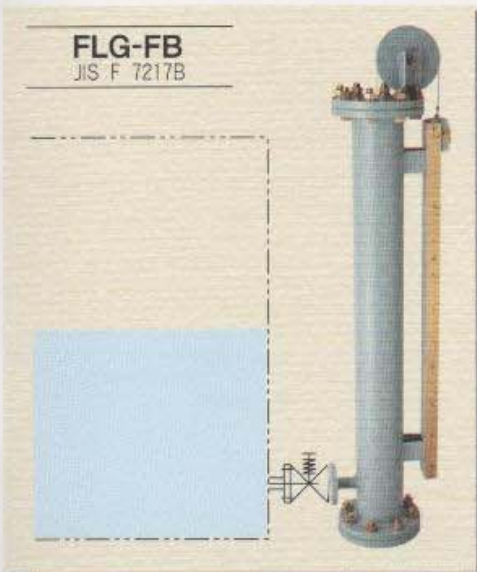
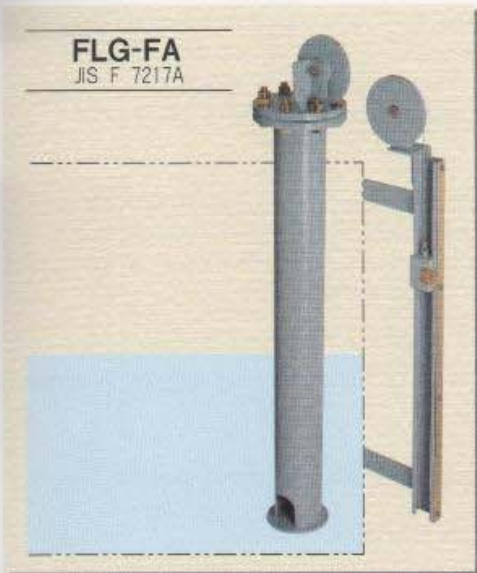
Standard model and specification

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 ²	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.



MARINE FLOAT LEVEL GAUGE



GENERAL

These float level gauges specified in Japan's Industrial Standard are used for all kind of tank in ships.

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

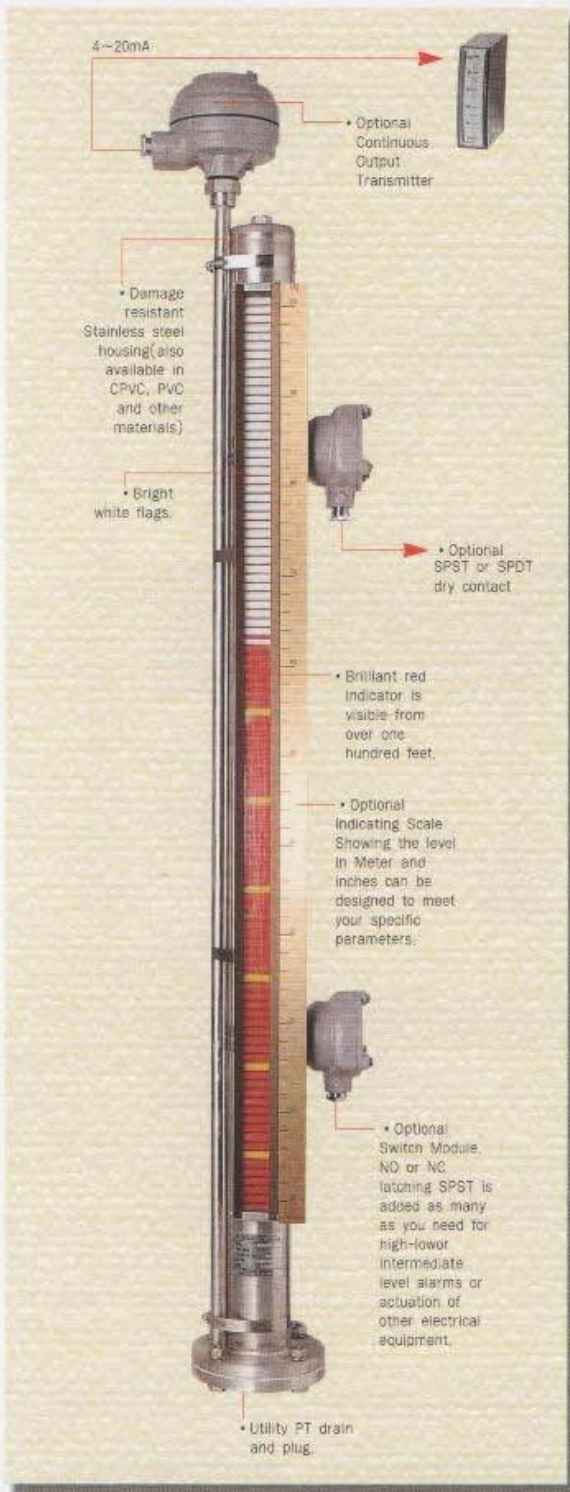
Model	Chamber	Float	Sheave	Spindle	Flange	Wire rope	Sight glass
FLG-FA	SGP	SUS304	SS41	N/A	SS41	SUS304	N/A
FLG-FB	SGP	SUS304	SS41	N/A	SS41	SUS304	N/A
FLG-FCG	SGP	SUS304	N/A	SUS304	SS41	N/A	Hard

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	3kg/cm ²	80°C	5K100A	100A	3000m/m
FLG-FCG-150	3kg/cm ²	80°C	5K150A	150A	6000m/m
FLG-FCG-200	3kg/cm ²	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.

● 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

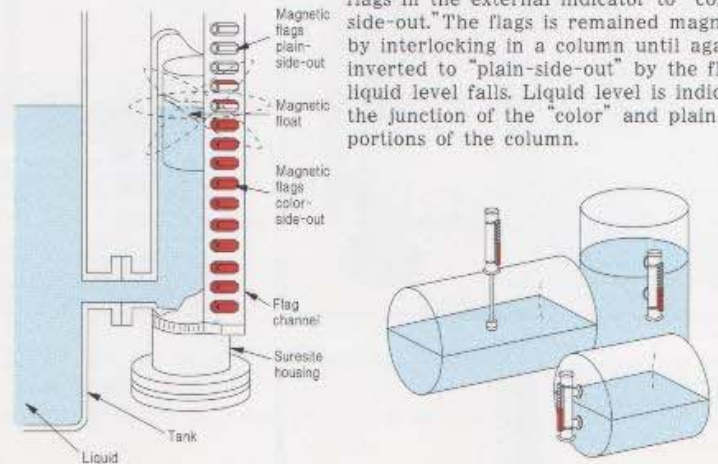
Attached optional point level switches and/or continuous level transmitters extend the capabilities beyond those of a simple sight glass replacement.

● 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 are remained 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



• Symbol of Magnetic Float Type Level Gauge

• Level gauge mounting type
 MS: Side-side mounting
 MT: Top mounting

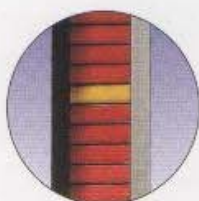
• No. of level switch
 1LS: 1-Level switch
 2LS: 2-Level switches
 3LS: 3-Level switches
 4LS: 4-Level switches

• Enclosure

W: Weather proof (IP56)
 E: Explosion proof (Exd IIC)

• Output of Level Transmitter

T: 4~20mA, 2wire
 TH: 4~20mA, 2wire, smart type HART®
 TR: 1Kohm



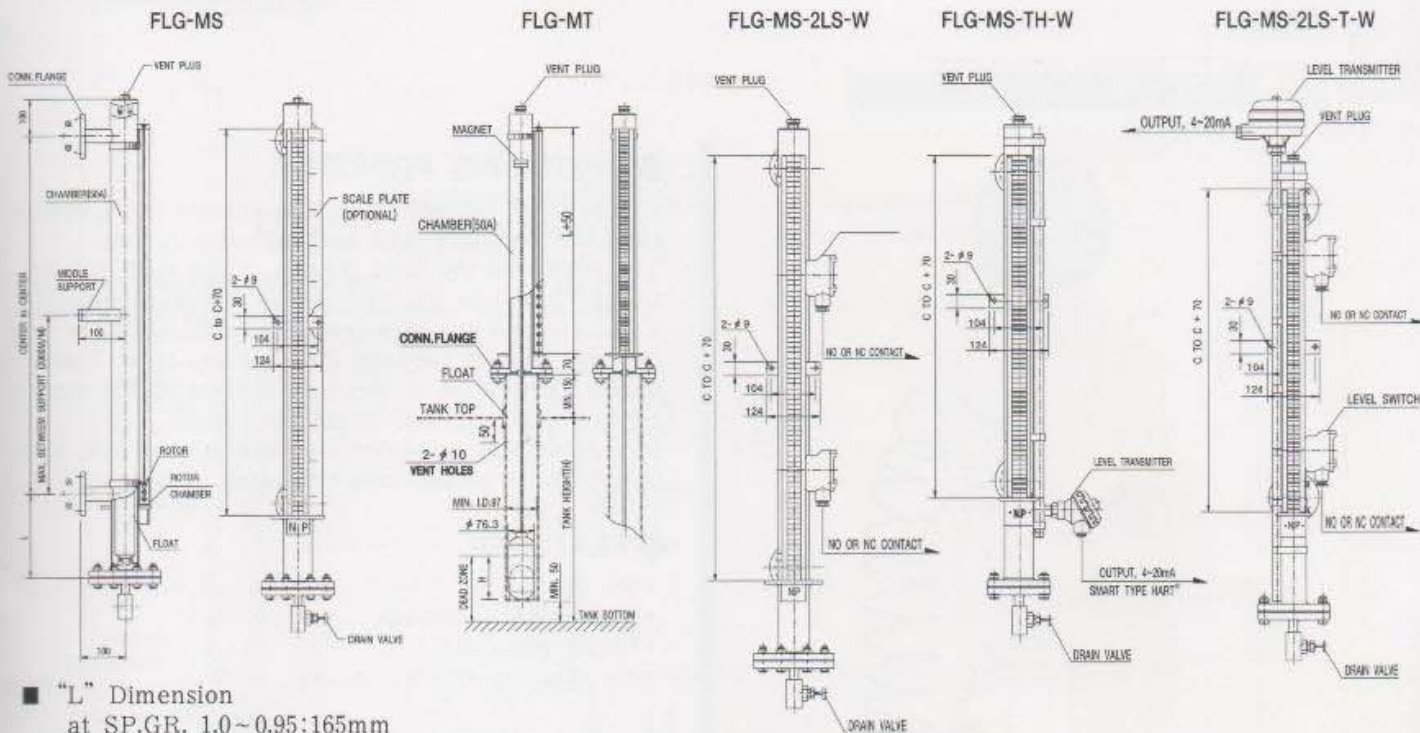
For low temp.
 Made of poly-carbonate



For high temp.
 Made of ceramic

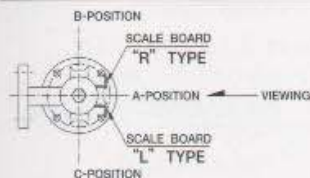


OUTLINE/DIMENSIONS

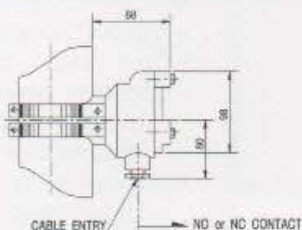


- "L" Dimension
 at SP.GR. 1.0~0.95:165mm
 SP.GR. 0.95~0.9:177mm
 SP.GR. 0.9~0.85:193mm
 SP.GR. 0.85~0.8:213mm
 SP.GR. 0.8~0.75:240mm

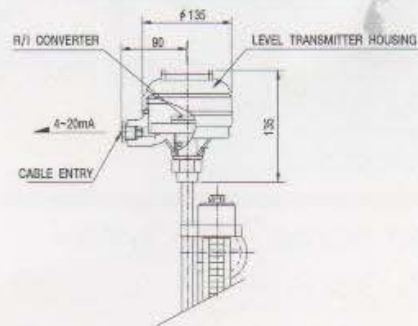
INDICATOR MOUNTING POSITION



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/caf	200°C	Over 0.8	+/-10m/m	SUS304	SUS304	Poly-carbonate	Aluminum
		JIS, DIN, ANSI 25A	Max.5000mm	120kg/caf	450°C	Over 0.69	+/-10m/m	SUS304	Titanium	Ceramic	Aluminum
FLG-MT-□-□	Top	JIS 5K100A or 125A	Max.2500mm	5kg/caf	200°C	Over 0.8	+/-10m/m	SUS304	SUS304	Poly-carbonate	Aluminum

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

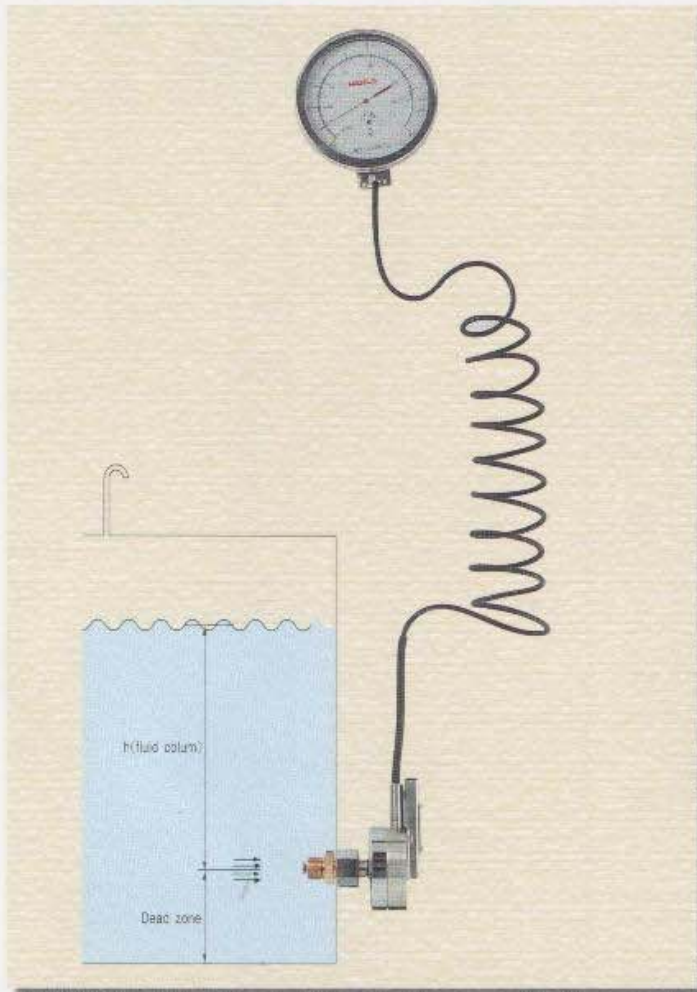
Specification of level switch and level transmitter assembly option

Description	Module	Output	Contact rating	Contact form	Power source	Accuracy/resolution	Material		No. of point	Measuring range	Max. working temp.	Enclosure
							Housing	Transmitter				
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.

● SELF-POWERED CONTENT GAUGE

MODEL: HB-SPCG Series



● 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 : ϕ 150mm
 - Gauge body mat'l : SUS 304
 - Graduation : Height or Volume/Dual scale available
- Capillary tube
 - Material : SUS 304
 - Available other length on request

● Model number code system

HB - SPCG - []

- Transmitter Mounting Type
 - [B150] : Non-Return Boss Type
 - [F150] : Non-Return Flange Type
 - [V150] : I.S Valve Type
 - [150S] : Submersible Type with Gauge Chamber
 - [150DIM] : Submersible Type for Double Deck

• Symbol of self-powered content gauge

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-F150	General Liquid	N/A	5K 100A	$\pm 1.0\%$ 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
HB-SPCG-150S	General Liquid	5K 100A	5K 100A	$\pm 1.0\%$ of Full Range	MAX.16M	SUS304	SUS304	SUS316
HB-SPCG-150DIM	General Liquid	5K 150A	5K 150A	$\pm 1.0\%$ of Full Range	MAX.14M	SUS304	SUS304	SUS316

Please consult with factory when other condition are required



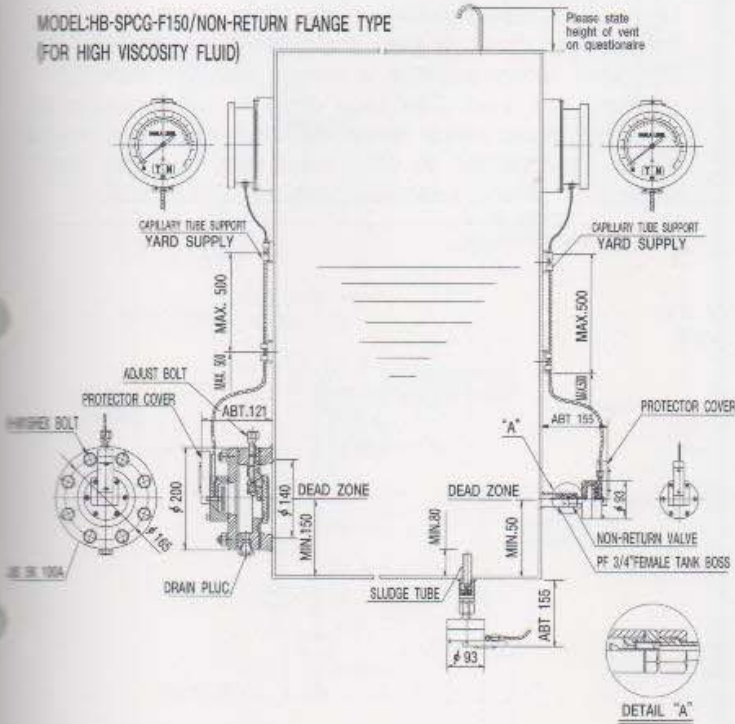
OUTLINE/DIMENSIONS

MODEL:HB-SPCG-150S/SUBMERSIBLE TYPE
WITH GAUGE CHAMBER
(FOR LOW OR HIGH VISCOSITY FLUID)

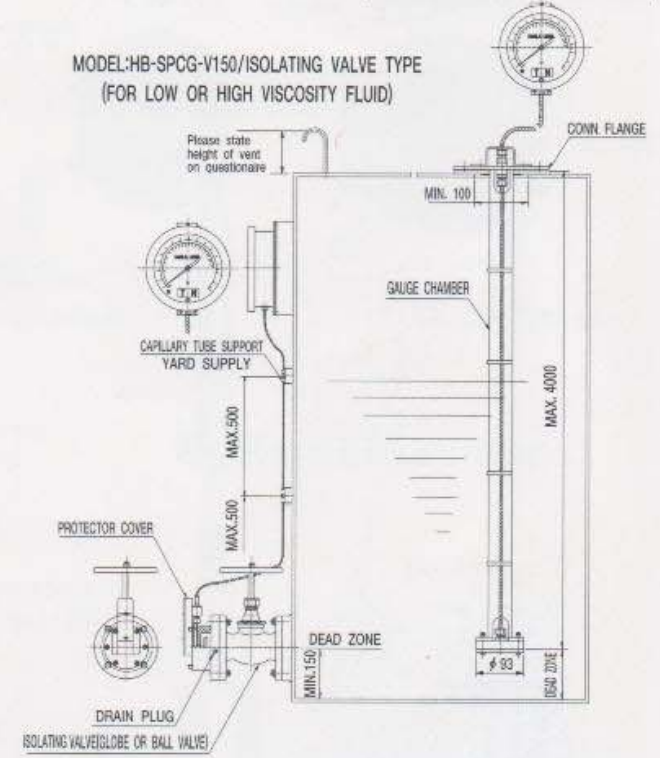
MODEL:HB-SPCG-B150/NON-RETURN BOSS TYPE
(FOR LOW VISCOSITY FLUID)

MODEL:HB-SPCG-V150/ISOLATING VALVE TYPE
(FOR LOW OR HIGH VISCOSITY FLUID)

MODEL:HB-SPCG-F150/NON-RETURN FLANGE TYPE
(FOR HIGH VISCOSITY FLUID)



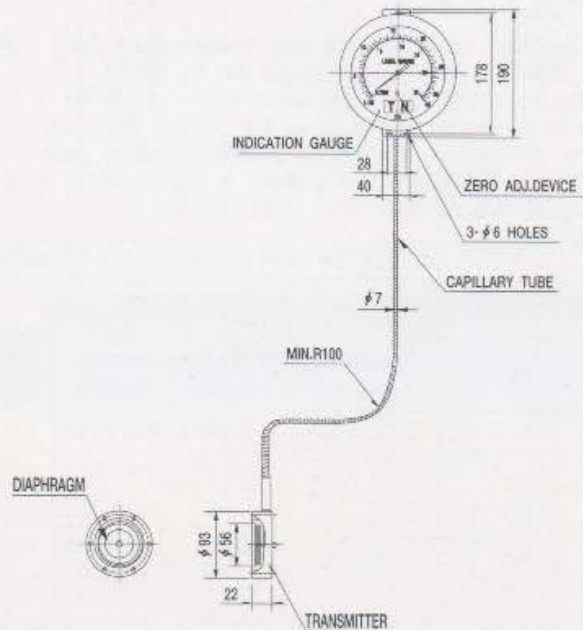
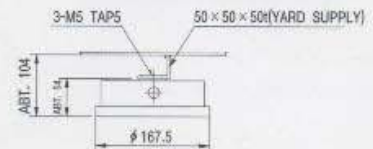
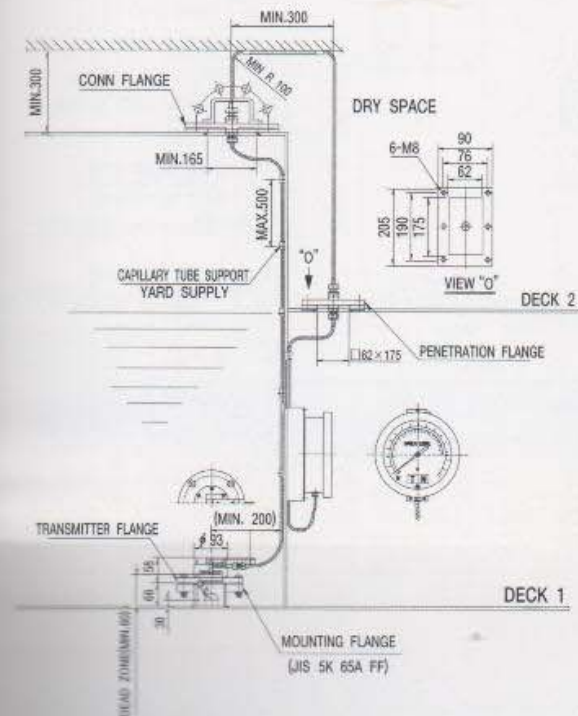
I.S. VALVE SIZE	APPLICATION
5K, 10K 25A	LOW VISCOSITY
5K, 10K 40A	HIGH VISCOSITY



OUTLINE/DIMENSIONS

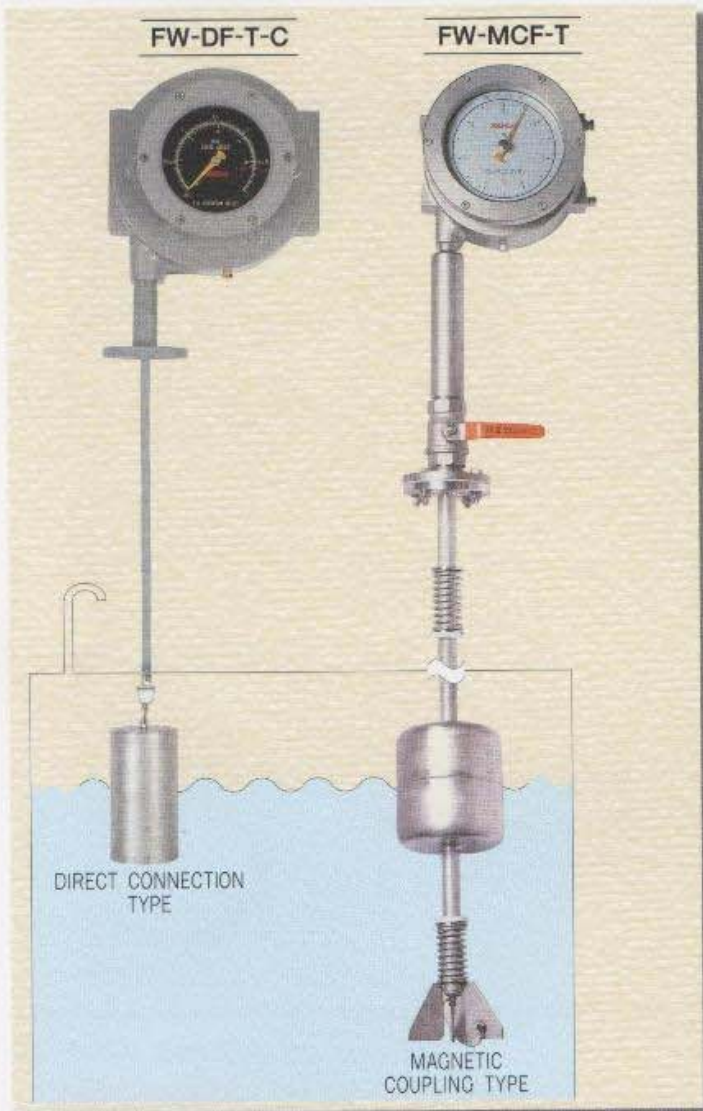
DETAILED OUTLINE

MODEL:HB-SPCG-150DIM/SUBMERSIBLE TYPE FOR DOUBLE DECK
(FOR LOW OR HIGH VISCOSITY FLUID)



● DIAL TYPE FLOAT LEVEL GAUGE

MODEL:FW-DF Series



● 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.

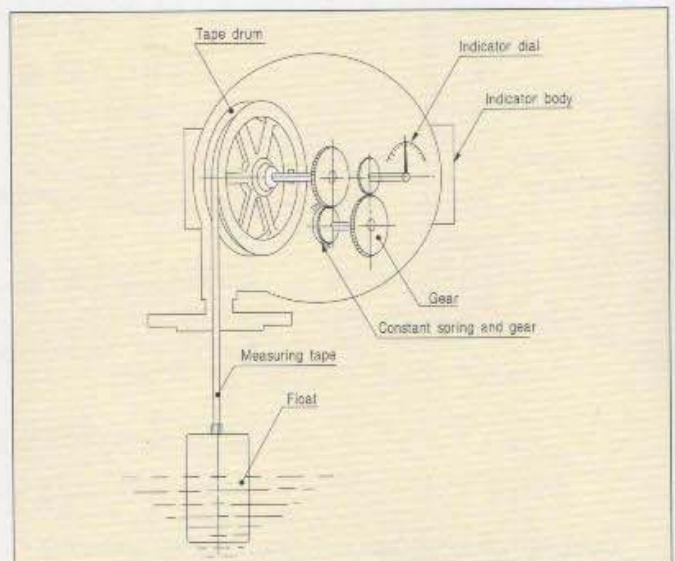
Standard model and specification

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°C	0.2kg/cm ²	AC	SUS304	SUS304	N/A
	FW-DF-T	TOP(With guide wire)	0~6	One-Point	0.7~1.5	±15	150°C	0.2kg/cm ²	AC	SUS304	SUS304	N/A
	FW-DF-S	Side(With guide wire)	0~6	One-Point	0.7~1.5	±15	150°C	0.2kg/cm ²	AC	SUS304	SUS304	N/A
	FW-DF-S-C	Side(With chamber)	0~6	One-Point	0.7~1.5	±15	150°C	0.2kg/cm ²	AC	SUS304	SUS304	N/A
Magnetic coupling type(indirect type)	FW-MCF-T	Top	0~6	One-Point	0.65~1.5	±15	150°C	2kg/cm ²	SCS13	SUS304	SUS316	SUS316
	FW-MCF-S	Side	0~6	One-Point	0.65~1.5	±15	150°C	2kg/cm ²	SCS13	SUS304	SUS316	SUS316

Please consult with factory when other conditions are required.

● 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

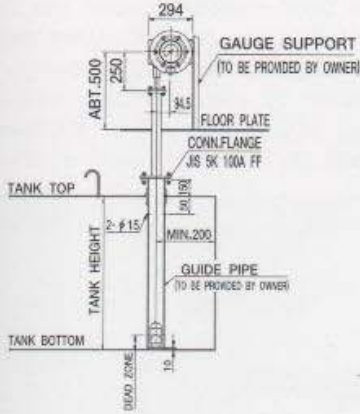
FW - [] - [] - [] - []

- Option
 - [U] : Seal port
- Float Guide Type
 - [C] : Inside chamber
 - [W] : Guide with & top anchor
- Mounting Type
 - [T] : Top mounting
 - [S] : Side mounting
- Measuring Method
 - [DF] : Direct connection type
 - [MCF] : Magnetic coupling type
- Symbol of Dial Type Level Gauge

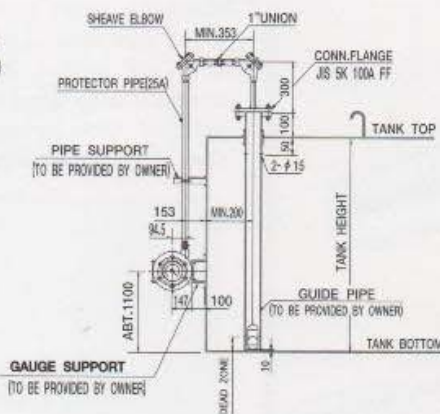


OUTLINE/DIMENSIONS

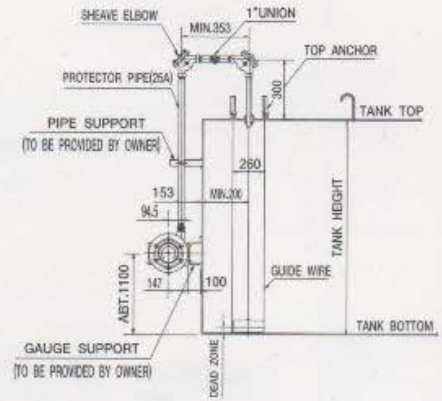
TOP MOUNTING (FW-DF-T-C)



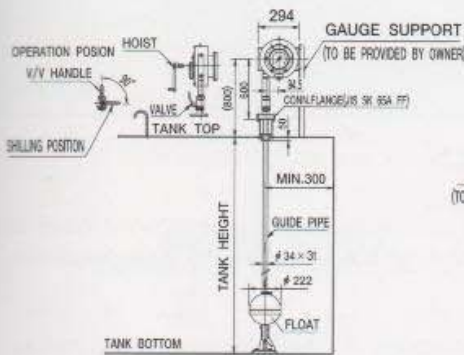
SIDE MOUNTING (FW-DF-S-C)



SIDE MOUNTING (FW-DF-S-W)



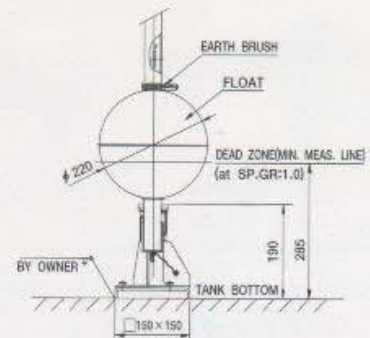
TOP MOUNTING (FW-MCF-T)



SIDE MOUNTING (FW-MCF-S)

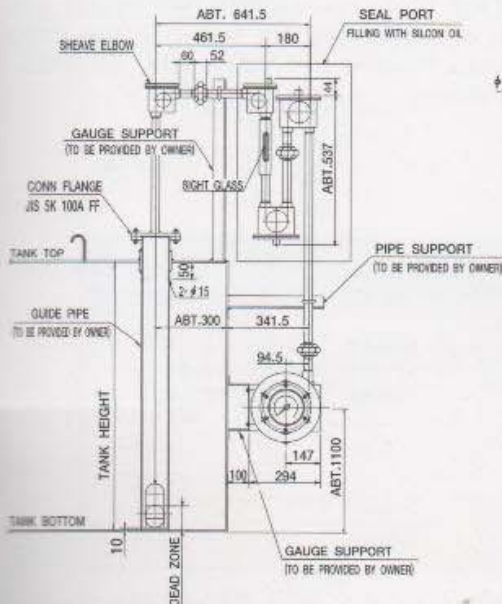


DETAILED BOTTOM CONSTRUCTION FW-MCF SERIES

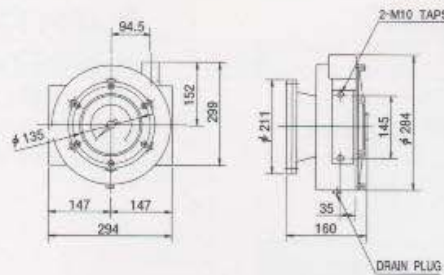


DETAILED DIMENSIONS FOR INDICATOR BODY

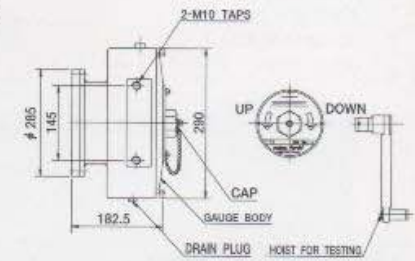
SIDE MOUNTING WITH SEAL PORT (FW-DF-S-C-U)



FW-DF SERIES

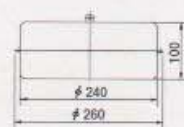


FW-MCF SERIES



DETAILED DIMENSIONS FOR INDICATOR BODY

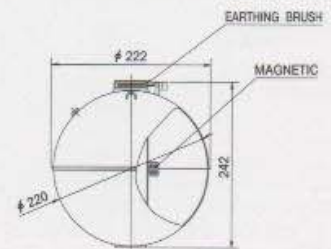
FLOAT FOR FW-DF-S-W



FLOAT FOR FW-DF-T-C SERIES

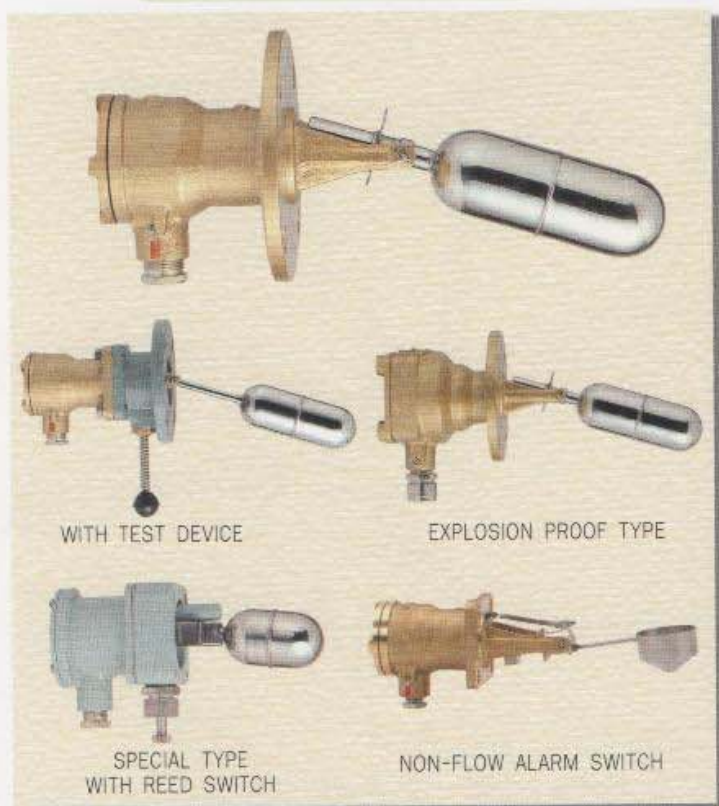


FLOAT FOR FW-MCF SERIES



● HORIZONTAL MOUNTED FLOAT SWITCH

MODEL: FMS-□H Series



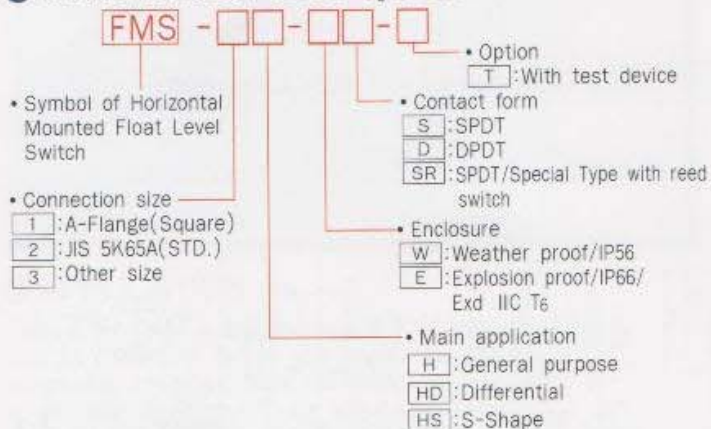
WITH TEST DEVICE

EXPLOSION PROOF TYPE

SPECIAL TYPE WITH REED SWITCH

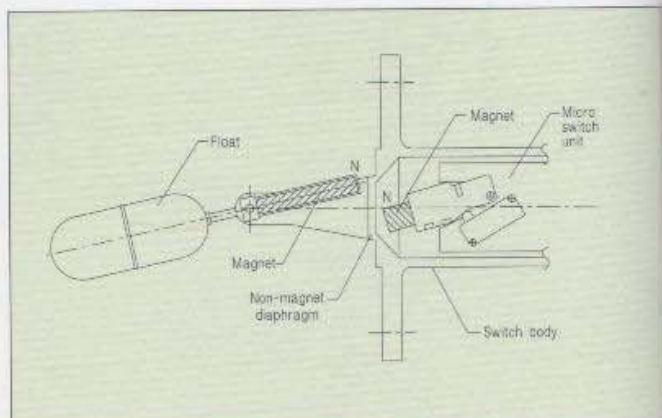
NON-FLOW ALARM SWITCH

● Model number code system



● 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 ²)	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

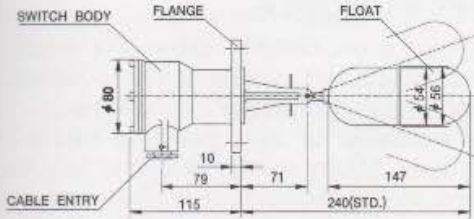
■ Optional informations

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.

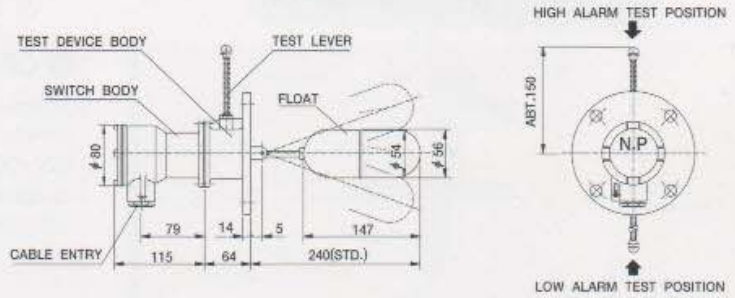


OUTLINE/DIMENSIONS

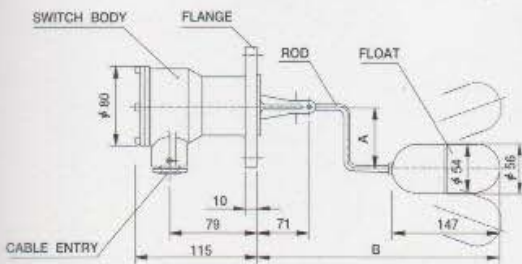
FMS-□H-WS



FMS-2H-WS-T/WITH TEST DEVICE

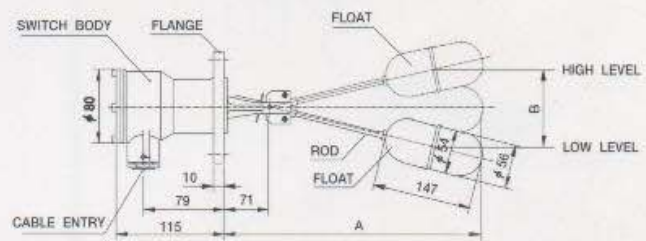


FMS-□HS-WS



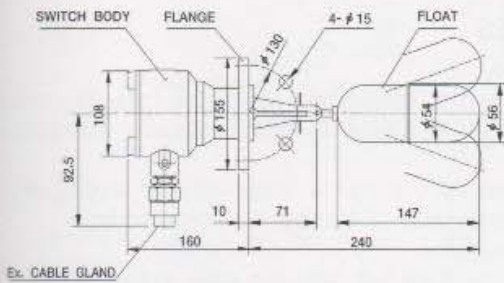
- A+B Must not exceed 750mm
- "A" Should not be less than 75mm

FMS-□HD-WS

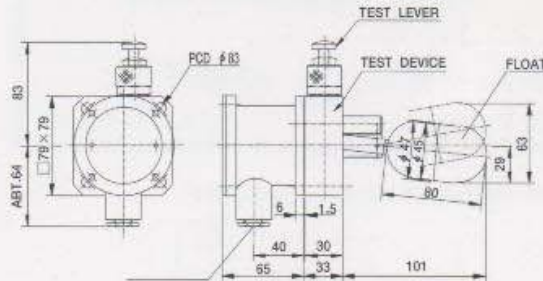


- Rod Length (A): Max.670mm
- Differential (B): Max.450mm

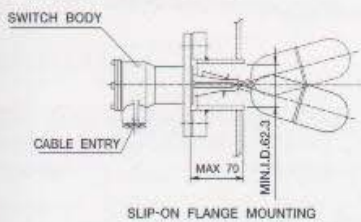
FMS-2H-ES, FMS-2H-ED
Explosion Proof Type:IP66/Exd IIC T6



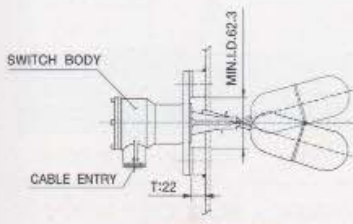
FMS-3H-WSR-T
SPECIAL TYPE WITH REED SWITCH



INSTALLATION



SLIP-ON FLANGE MOUNTING

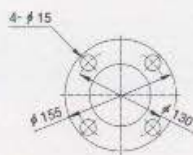


SET-ON FLANGE MOUNTING

CONNECTION FLANGE



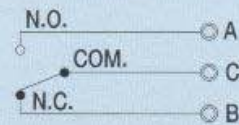
FMS-1H SERIES
SQUARE FLANGE TYPE



FMS-2H SERIES
JIS 5K 65A FF

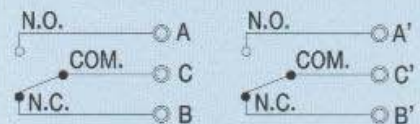
CONTACT FORM

TERMINAL & CONTACTS FOR SPDT



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

TERMINAL & CONTACTS FOR DPDT



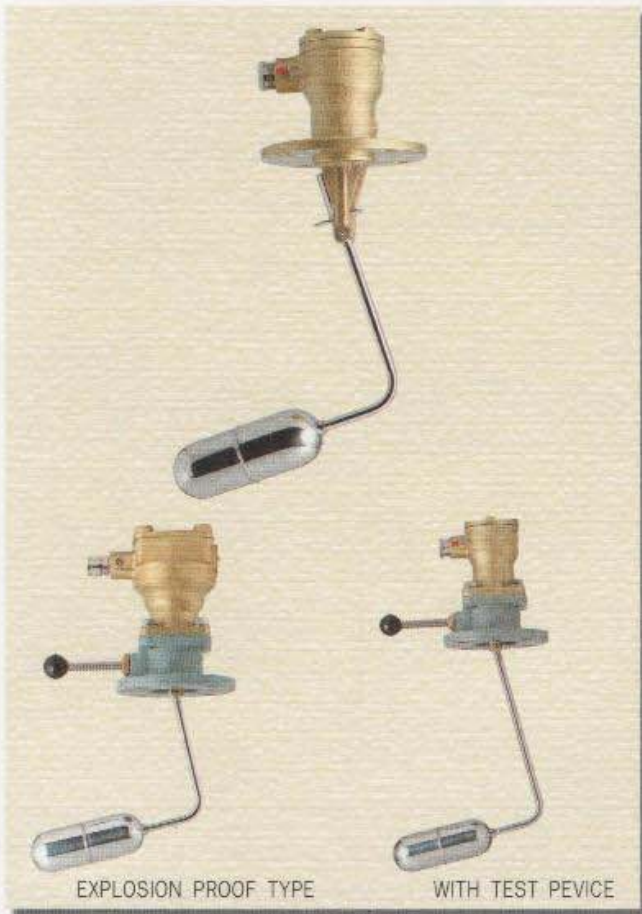
C-A, C'-A' MAKES ON RISING LEVEL
C-B, C'-B' MAKES ON FALLING LEVEL

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.

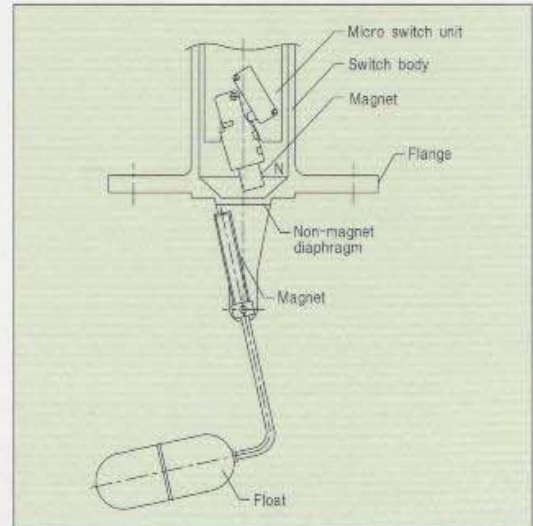
● VERTICAL MOUNTED FLOAT SWITCH

MODEL: FMS-□V Series



● 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.



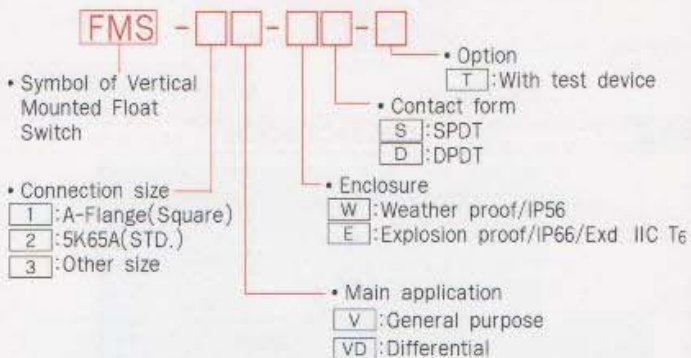
● FEATURES

- 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.

● Model number code system



Standard model and specification

Model	Application	Max. pressure (kg/cm ²)	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

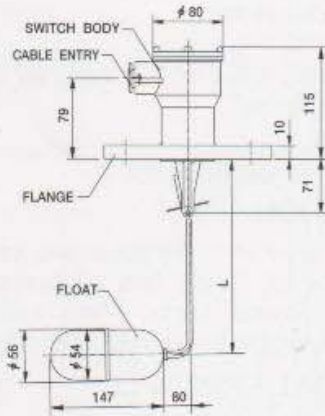
■ Optional informations

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.



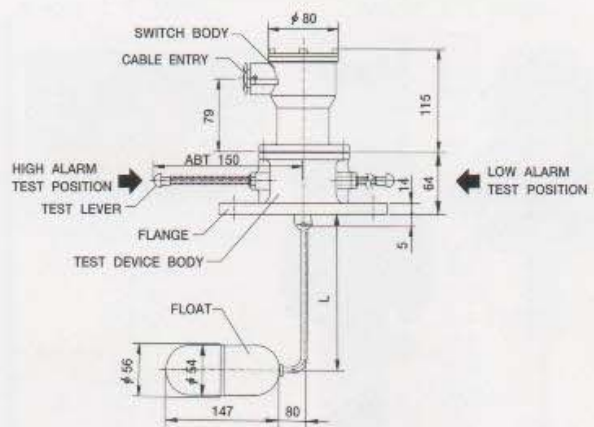
OUTLINE/DIMENSIONS

FMS-□V-WS



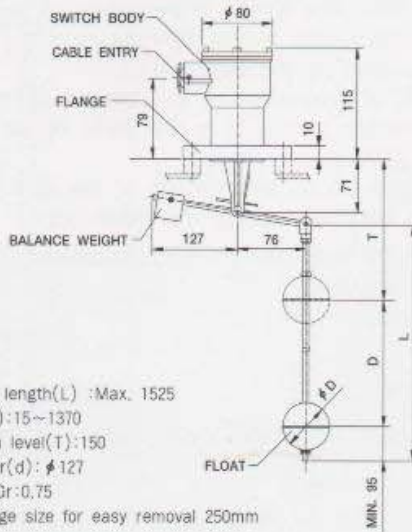
- "L": Should not be less than 75mm, in case of set-on flange mounting
- "L": Should not be less than 100mm, in case of slip-on flange mounting
- "L": Must not exceed 750mm

FMS-2V-WS-T/WITH TEST DEVICE



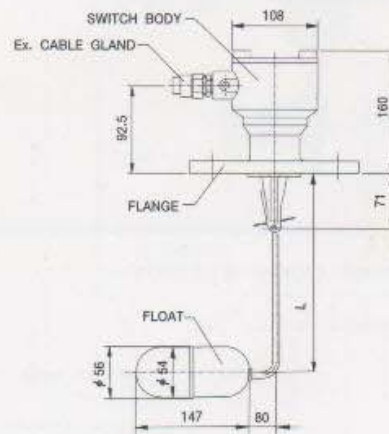
- "L": Should not be less than 140mm, in case of set-on flange mounting
- "L": Should not be less than 170mm, in case of slip-on flange mounting
- "L": Must not exceed 750mm

FMS-□VD-WS



- Standard rod length(L) : Max. 1525
- Differential(D): 15~1370
- Minimum high level(T): 150
- Float diameter(d): φ127
- Minimum Sp.Gr: 0.75
- Minimum flange size for easy removal 250mm

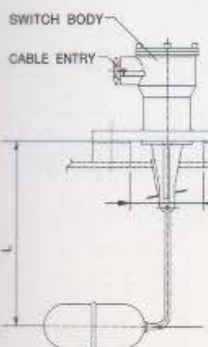
FMS-□V-ES, FMS-□V-ED
Explosion Proof Type: IP66/Exd IIC T6



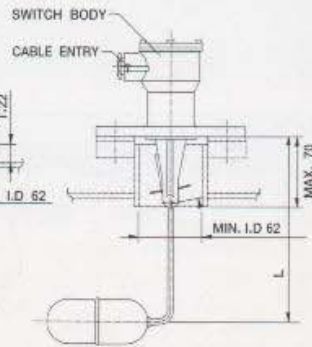
- "L": Should not be less than 75mm, in case of set-on flange mounting
- "L": Should not be less than 100mm, in case of slip-on flange mounting
- "L": Must not exceed 750mm

INSTALLATION

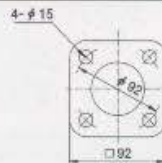
Set-on flange mounting



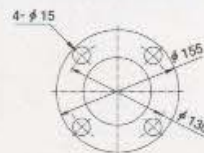
Slip-on flange mounting



CONNECTION FLANGE



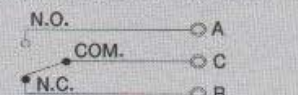
FMS-1V SERIES
SQUARE FLANGE TYPE



FMS-2V SERIES
JIS 5K 65A FF

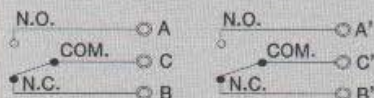
CONTACT FORM

TERMINAL & CONTACTS FOR SPDT



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

TERMINAL & CONTACTS FOR DPDT



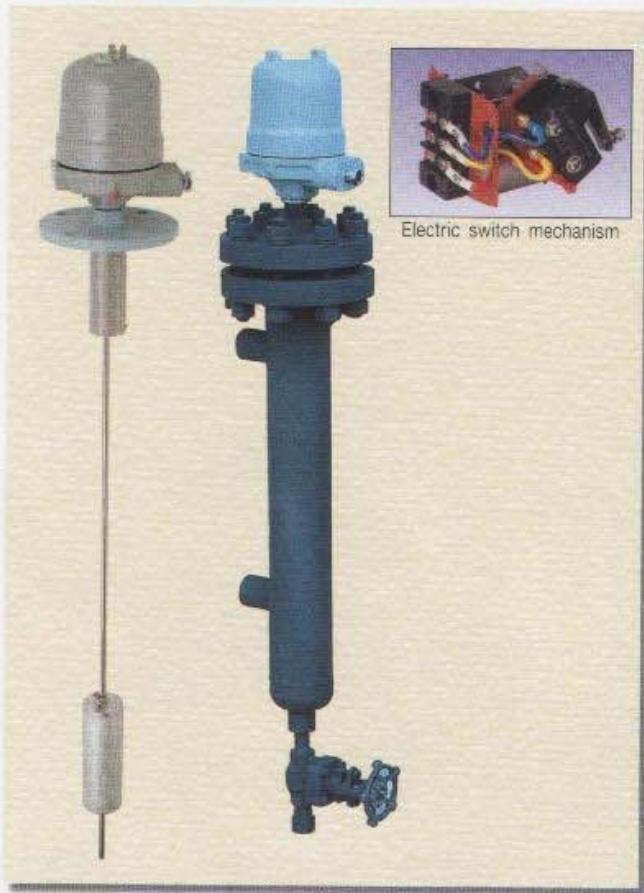
C-A, C'-A' MAKES ON RISING LEVEL
C-B, C'-B' MAKES ON FALLING LEVEL

CAUTION

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

DISPLACEMENT TYPE LEVEL SWITCH

MODEL: DMS-Series



Electric switch mechanism

FEATURES

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

APPLICATION

Displacement type level switches are widely used for Coaltar 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

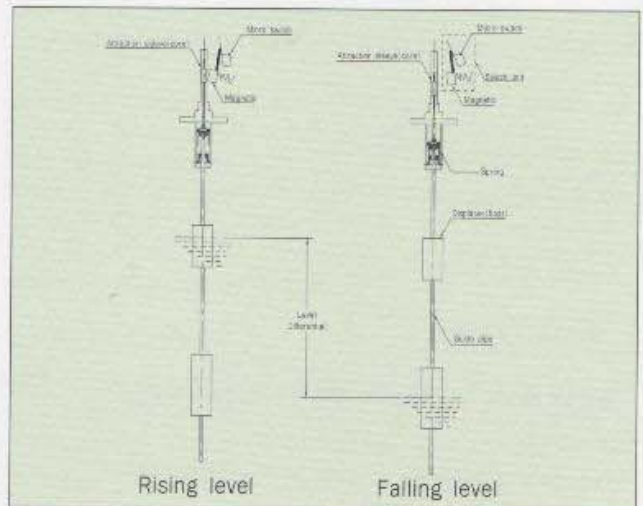
T : With test device

• Enclosure

- W : Weather proof (IP56)
- E : Explosion proof (IP56/Exd IIC T4)

• 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 ²)	Max. temp. (°C)	Switch contact rating	Cable entry	Material			
										Housing	Flange	Float	Float chamber
DMS-□01A	High or Low alarm	Top flange type	220~	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□01C	High or Low control		5000										
DMS-□02A	High and Low alarm	Top flange type	220~	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□02C	High and Low control		4500										
DMS-□03AC	High alarm/Mid and low control	Top flange type	220~	±8	0.85	10	180	250VAC, 15A	15b	AC	SS41	SUS304	SUS 304
DMS-□03CA	High and Mid control/low alarm		4000										

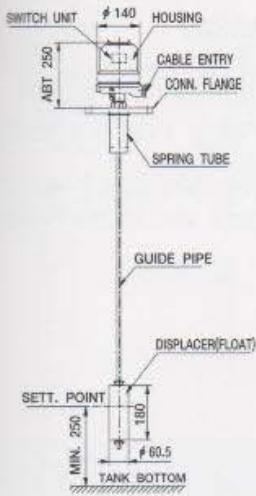
Optional informations

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.

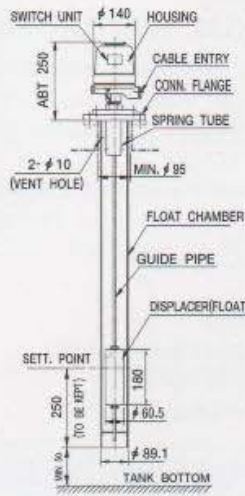


OUTLINE/DIMENSIONS

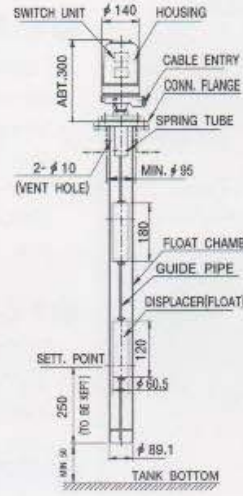
DMS-□01A/01C-GW SERIES



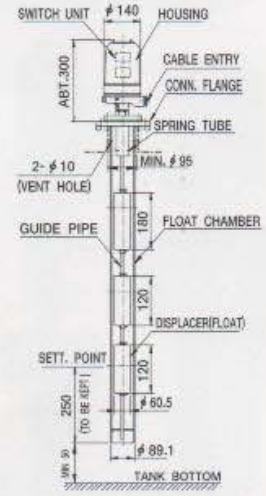
DMS-□01A/01C-CW SERIES



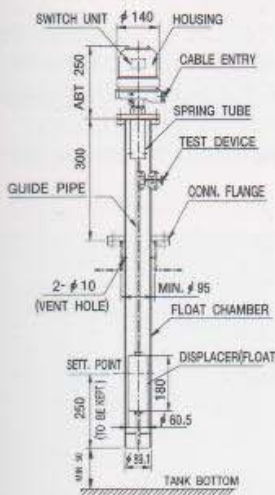
DMS-□02A/02C-CW SERIES



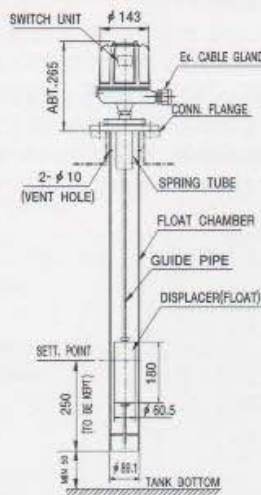
DMS-□03AC-CW SERIES



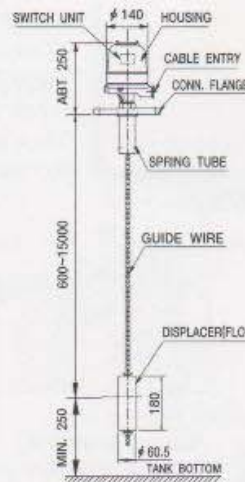
DMS-□01A/01C-CW-T SERIES



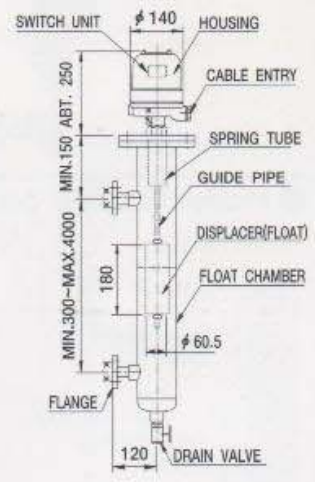
DMS-□01A/01C-CE SERIES
Explosion Proof Type:IP56/Exd IIC T6



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	DMS-□03CA
DIFFERENTIAL(mm) * 1	30 TO 50	UPPER:30 TO 50 LOWER:30 TO 50	UPPER:30 TO 50 LOWER:200 TO 4500	UPPER:200 TO 4500 LOWER:30 TO 50
CONTACT OPERATION				
CONTACT CONFIGURATION	SPDT	N.C ○ B COM ○ C N.O ○ A	N.C ○ HB COM ○ HC N.O ○ HA	N.C ○ LB COM ○ LC N.O ○ LA
	DPDT	N.C ○ B' COM ○ C' N.O ○ A'	N.C ○ HB' COM ○ HC' N.O ○ HA'	N.C ○ LB' COM ○ LC' N.O ○ LA'

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

● FLOAT OPERATED TYPE LEVEL SWITCH

MODEL:OMS Series



● 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

OMS - □□□ - □□

• Main application

- F401, F402, F301, F302: Flanged external chamber
- S401, S301, S302, S303: Sealed external chamber
- SF: Side flange type
- TF: Top flange type

• Connection method

- SS: Side-side
- SB: Side-bottom
- SV: Side-bottom side

• Radiation fin

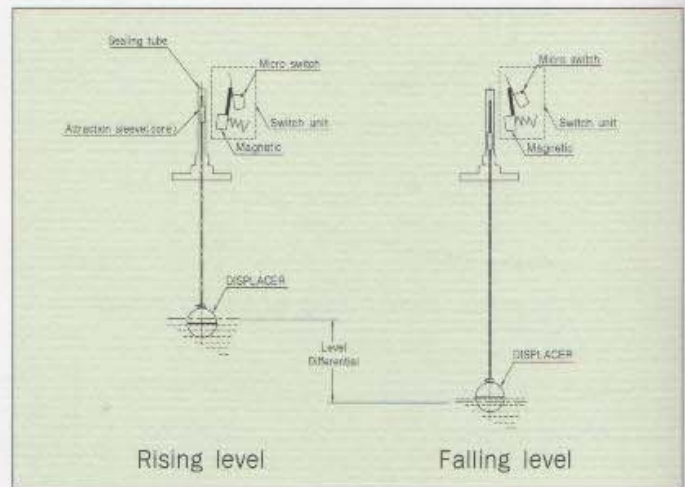
	FIN	Temp. range
	Not provided	0(T)~110
F4	4Wings	110(T)~200
F6	6Wings	200(T)~250
F9	9Wings	250(T)~310

• Switch housing

- W: Weather proof(IP56)
- E: Explosion proof(Exd II CT6)

• Connection size

- S1: 1" Socket weld
- S1.5: 1-1/2" Socket weld
- S2: 2" Socket weld
- F1: JIS 5K 25A
- F2: JIS 16K 25A
- FS: Special flange (ANSI, DIN)



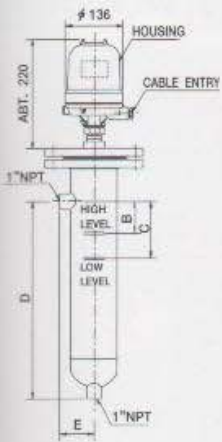
Standard model and specification

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

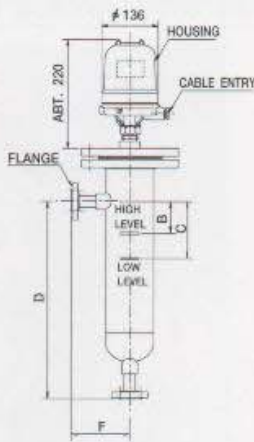


OUTLINE/DIMENSIONS FOR FLANGE EXTERNAL CHAMBER TYPE

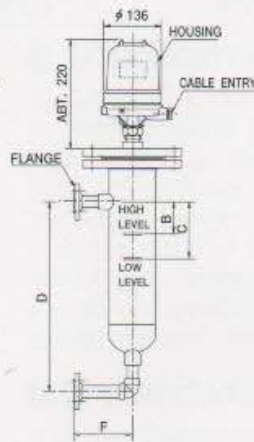
OMS-F401SBS1-W



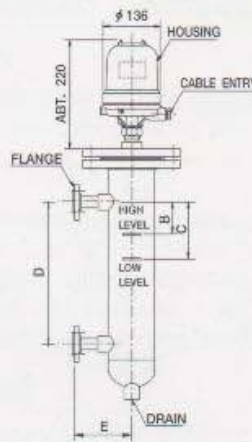
OMS-F401SBFS-W



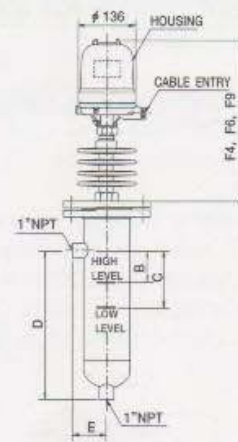
OMS-F401SVFS-W



OMS-F401SSFS-W



OMS-F401SBS1-WF4



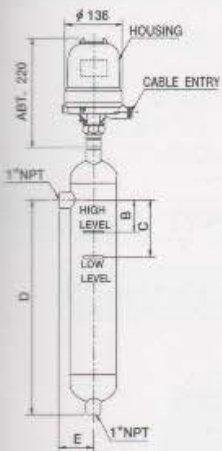
Model	B(1)		C(1)		D(2)		E(2)		F	
	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
OMS-F401	3	76	4	102	10 1/2"	267	3 11/16"	94	6 1/2"	165
OMS-F402	2 1/2"	64	3 1/4"	83	10 1/2"	267	3 11/16"	94	6 1/2"	165
OMS-F301	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152
OMS-F302	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152

(mm)

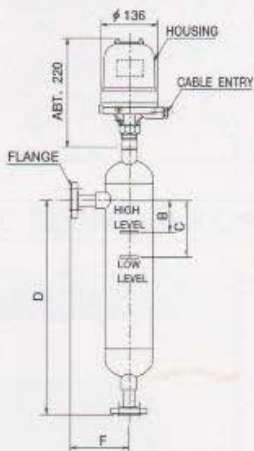
Height of housing(single switch function)			
Number of radiation fins			
0(F0)	4(F4)	6(F6)	9(F9)
250	357	407	467

OUTLINE/DIMENSIONS FOR SEALED EXTERNAL CHAMBER TYPE

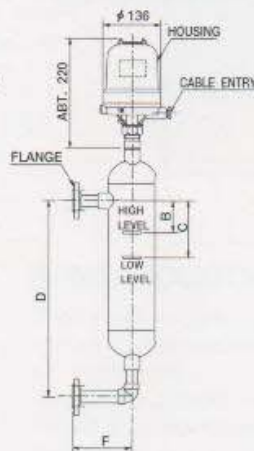
OMS-S401SBS1-W



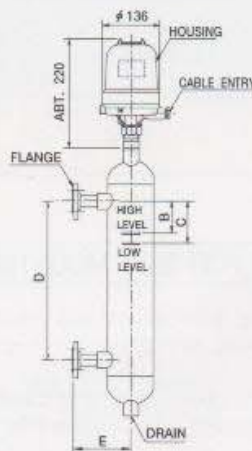
OMS-S401SBFS-W



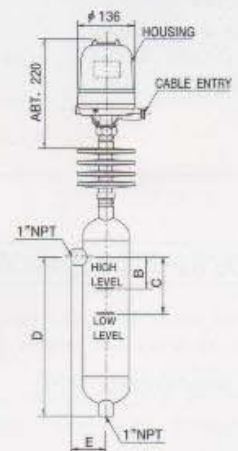
OMS-S401SVFS-W



OMS-S401SSFS-W



OMS-S401SBS1-WF4



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
OMS SERIES	<p>HIGH LEVEL LOW LEVEL</p>	<p>N.C. — ○B COM — ○C N.O. — ○A</p>	<p>N.C. — ○B' COM — ○C' N.O. — ○A'</p>
NUMBER OF SWITCH UNIT			
ONE(1)			

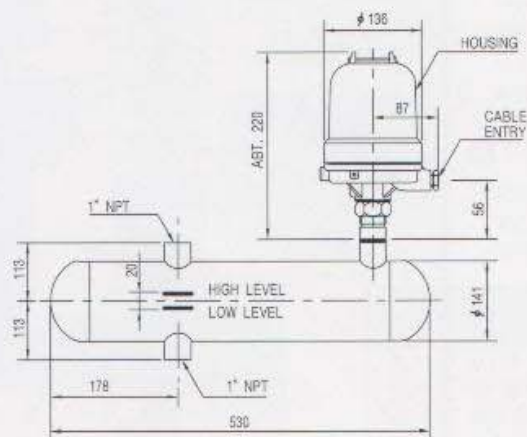
NOTE

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

● FLOAT OPERATED TYPE LEVEL SWITCH

OUTLINE/DIMENSION FOR SEALED EXTERNAL CHAMBER TYPE

Model:OMS-S303 TYPE

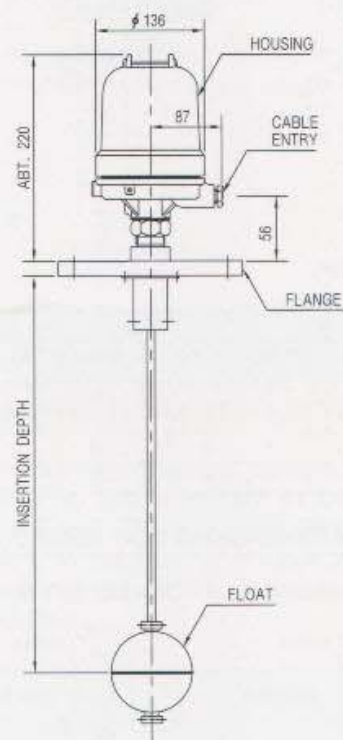


■ For super temperature up to 400°C

Min.liquid specific gravity at insertion depth (single switch function)	Float size	Mounting connection	Control Press. rating	
			Bars	
			38°C	400°C Max.
500	900	5" — 300 #	16	11
0.7	0.81		16	11

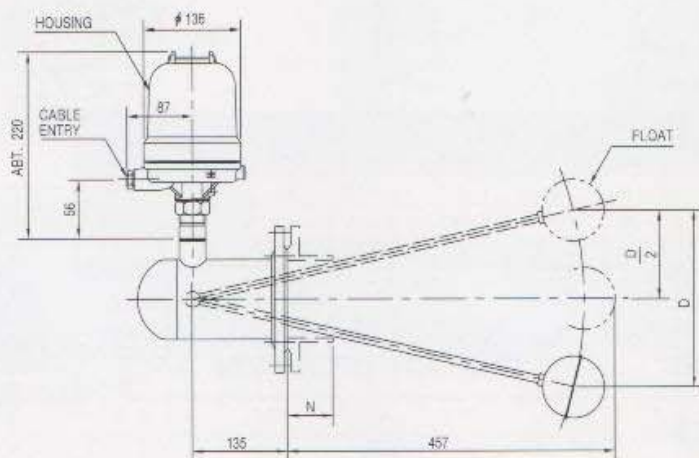
OUTLINE/DIMENSION FOR TOP MOUNTED

Model:OMS-TF TYPE



OUTLINE/DIMENSION FOR 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.	IN. MM.	2	51	4	102	6	152	8	203	10	254	12	305	14	365
18 457	2 51	13	330	9	229	7	178	5	127	4 1/2	114	4	102	3 1/2	89
10 254	1 25	7	178	5	127	4	102	-	-	-	-	-	-	-	-



● LIQUID LEVEL AND FLOW DETECTION SWITCH

VIBRATION TYPE LEVEL SWITCH



● 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. 3W
- Output: - Relay output/1×SPDT
- Transistor output
- Non-contact switch
- Viscosity range: 0.2~10,000mPas
- Density range: 0.7~2.5g/m³
- Protection: IP66

● TECHNICAL DATA

PARAMETER	VEGASWING 81	VEGASWING 82	VEGASWING 83
Housing material	PBTP(Valox)	PBTP(Valox)	PBTP(Valox)
Connection	1"BSP or flanged	1"BSP or flanged	1"BSP or flanged
Extension tube length	153	Min.500~Max.2500mm	Min.200~Max.800mm
Tuning fork material	Stainless steel	Stainless steel	Stainless steel
Product temp.	-40°C~100°C	-40°C~100°C	-40°C~100°C
Operating press.	Max. 25bar	Max. 25bar	Max. 25bar
Meas. frequency	380Hz	380Hz	380Hz

PADDLE TYPE FLOW SWITCH

MODEL: FWS-3P



● INTRODUCTION

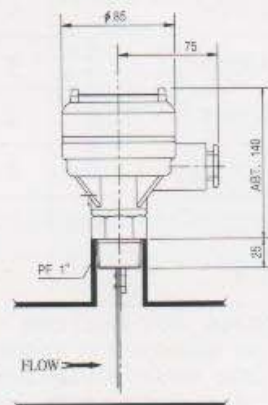
This flow switch is used for protecting equipment or pipe line system from excessive flowing in the pipe when the flow is reduced or increased.

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/cm²
- 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



● 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.

● REED SWITCH TYPE FLOAT LEVEL SWITCH

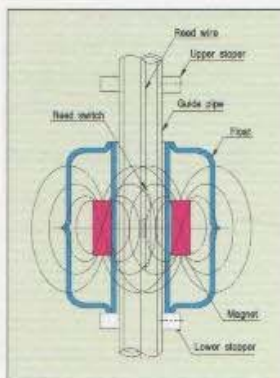


● APPLICATION

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

● OPERATING PRINCIPLE

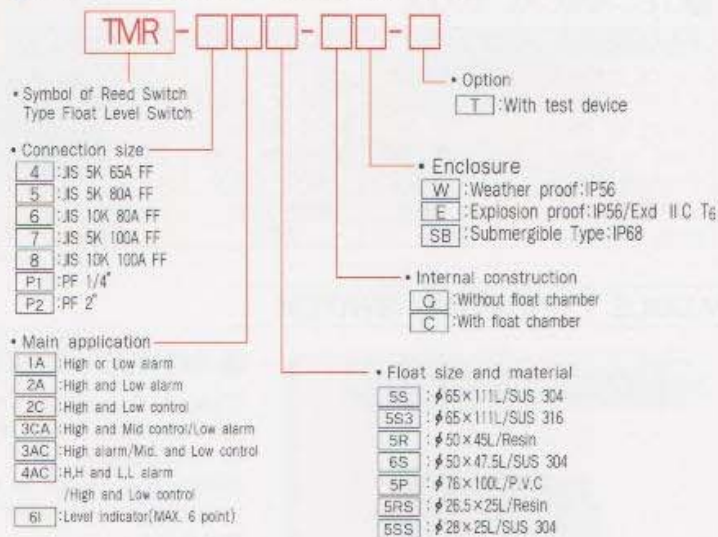
Reed switch type float level switches have a magnet built in the float and a reed switch set inside guide pipe. The reed switch is turned on and off with the up-and-down liquid levels. The two stoppers located above and below enable float shift range to limit, thereby providing a self-hold reed switch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



Standard model and specification

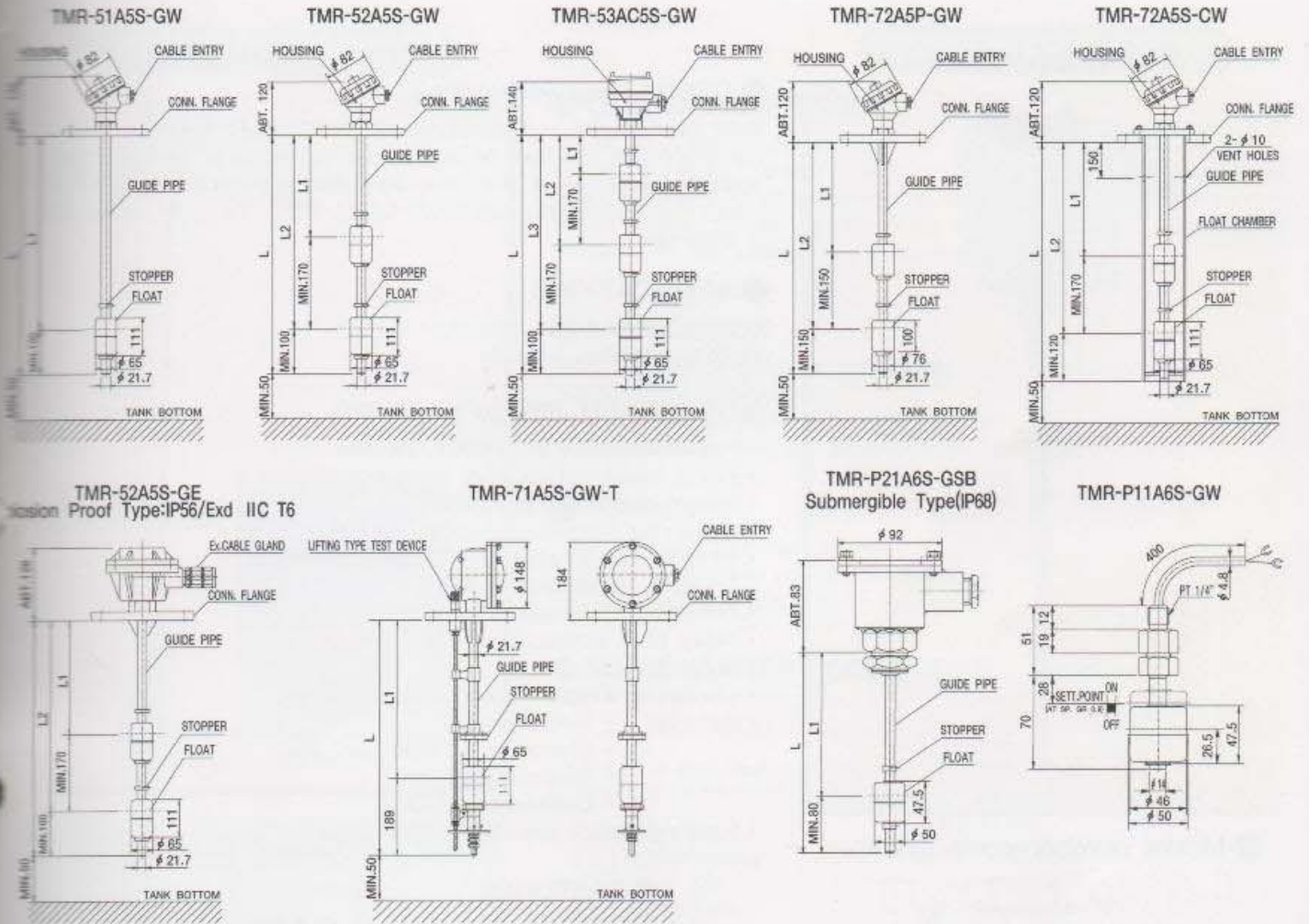
Model	Application	Max. press. (kg/cm ²)	Max. Temp. (°C)	Mourning flange (standard)	Min. Sp.Gr	Connection	Maximum detection point	Cable entry	Contact form/Rating	Material			
										Housing	Flange	Float	Guide pipe
TMR-5□5S-G	General liquid (Oil, Water)	10	80	JIS 5K 80A	0.85	Top flange type	6	15b	SPST 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 & LOW LOW LEVEL ALARM AND HIGH & LOW CONTROL</p>	<p>FOR HIGH HIGH & LOW LOW LEVEL ALARM AND HIGH & 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.

● CAPACITANCE TYPE LEVEL SWITCH

MODEL:CLS Series



● OPERATING PRINCIPLE

Both capacitance and conductance are changed between the electrode and the wall of tank when the material contacts the electrode inserted in the tank. And this impedance variation is taken out as electric signal(ON-OFF). Thus the level or interface is detected.

● APPLICATIONS

Liquid, Mixed liquid, Interface
Viscous, Powder, Granule

● STANDARD SPECIFICATIONS

- Power source:AC110V/220V, 50/60Hz
- Power consumption:3VA
- Output contact:SPDT 250VAC, 5A
- Measuring frequency:Approx. 400KHz
- Working temperature:-25°C ~ 100°C (electrode)
- Ambient temperature:-25°C ~ +70°C
- Switching hysteresis:Approx 0.5PF
- Delay time setting:0 ~ 20 sec
- Pressure:Max. 10kg/cm²
- Enclosure:Weather proof/IP56
- Material : - Housing:AC
- Electrode:SUS304
- Insulation:Teflon
- Connector:SUS304
- Painting:Epoxy powder coating(gray)

● Model number code system

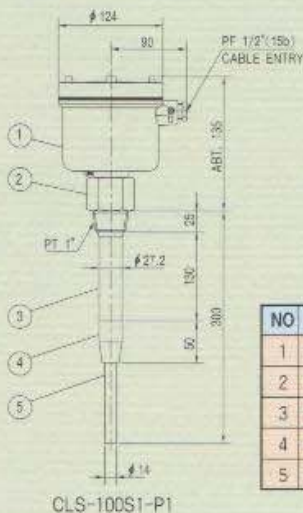
CLS - [] - [] - []

- Symbol of capacitance type level switch
- Shape of detection electrode
 - [100S]:Standard
 - [100F]:Flat
 - [100W]:Wire
- Composition
 - [1]:Electrode-amplifier combined unit type
 - [2]:Electrode-amplifier separated type
- Connection size
 - [P1]:PT1"(STD)
 - [F1]:JIS 5K 50A
 - [F2]:JIS 5K 65A
 - [S]:Special size
- [T]:Heat resisting type

● FEATURES

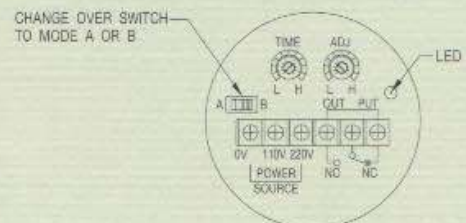
- No influence to the stuck and adhesive objects.
- Can be used for conductive objects
- Easy detection to the strongly corrosive objects.
- Sensitive and stable detector.
- Strong and durable.
- Easy to mount and adjust.

OUTLINE/DIMENSION

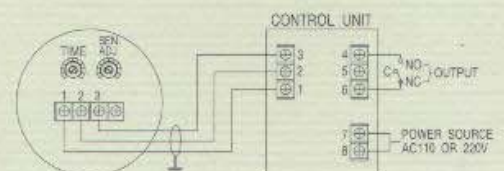


NO	Description	Material	Q'ty
1	Housing	AC	1
2	Connector	SUS 304	1
3	Earthing electrode	SUS 304	1
4	Insulation	TEFLON	1
5	Electrode	SUS-304	1

WIRING DIAGRAM FOR ELECTRODE-AMPLIFIER COMBINED TYPE



WIRING DIAGRAM FOR ELECTRODE-AMPLIFIER SEPARATED TYPE





● QUICK FLOAT TYPE LEVEL SWITCH

MODEL: HTUM Series

HTUM-7SN-1



HTUM-1PN-1

● 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

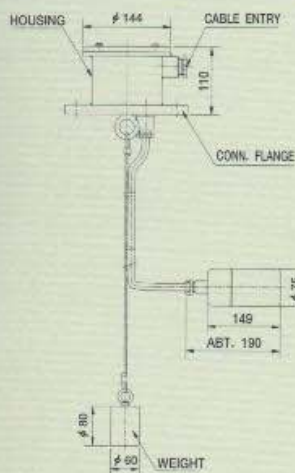
- Simple and low cost design
- Easy installation and maintenance
- Stainless steel and plastic models

● MODEL NUMBER CODE SYSTEM

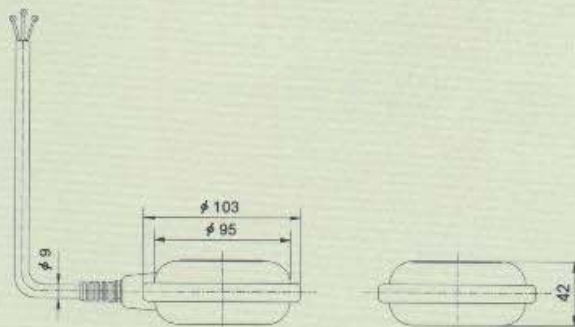
HTUM - □ - □ - □

- 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)

OUTLINE/DIMENSIONS



HTUM-7SN-1



HTUM-1PN-1

Standard model and specification

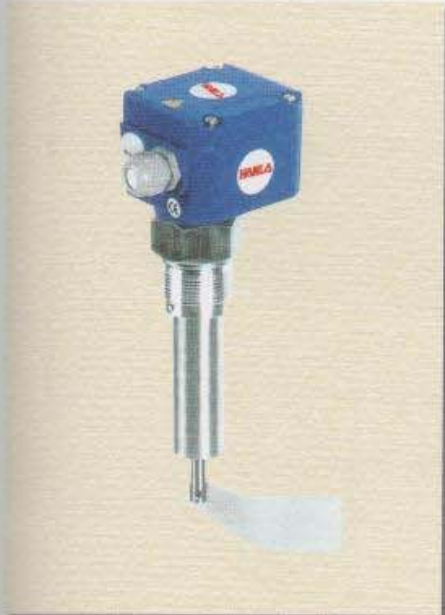
Model	Connection	Float Material	Max. Pressure (kg/cm ²)	Max. Temp. (°C)	Protection (float)	Switch Type	Switching Distance (mm)	Switch Form/Rating	Cable Max. Length	Cable Entry
HTUM-7PN-□	Top flange type	Polypropylene	10	60	IP68	Micro switch	10~50	SPDT 250VAC, 10A	10,000mm	20 (PF3/4)
HTUM-7SN-□	Top flange 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



● PADDLE TYPE LEVEL SWITCH FOR SOLID

MODEL:RN 3000 Series



● APPLICATION

It is used wherever

- Dustlike
- Granulated
- Powdery
- 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.

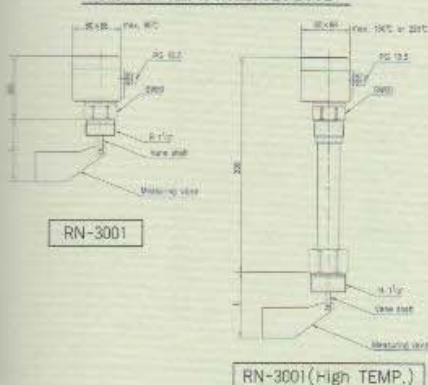
■ Electrical data

- 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

OUTLINE/DIMENSIONS



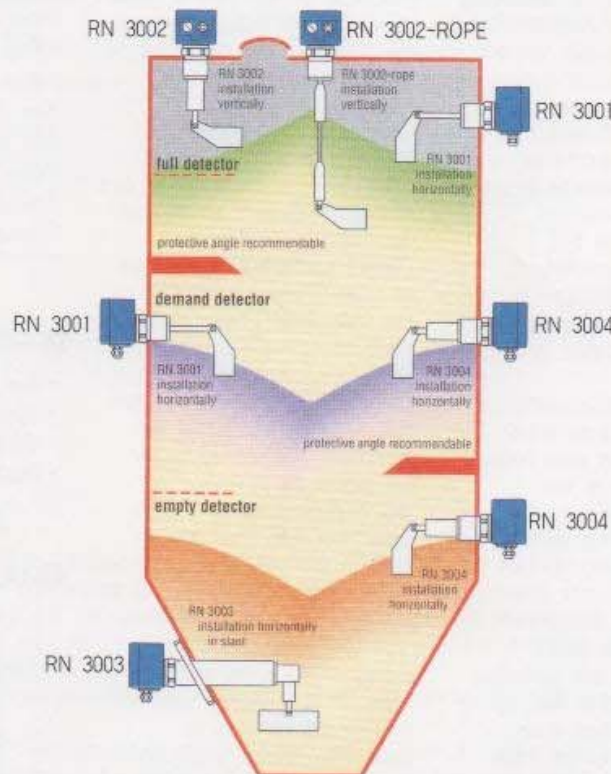
● OPERATING PRINCIPLE

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

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	×				×		×
dustEx zone 10/11	×	×	×	×	×	×	×
temperature upto 220°C**	×	×	×	×	×		
container over pressure 1 upto 10bar	×	×	×	×	×	×	×

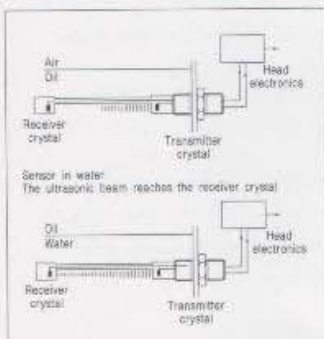
* not for zone 10/11

** zone 10/11 upto 200°C

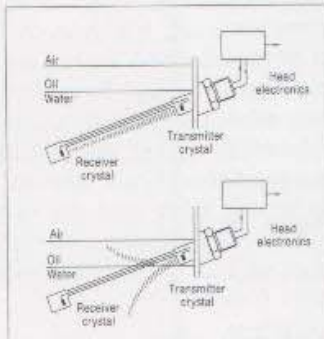
● ULTRASONIC TYPE OIL/WATER INTERFACE DETECTOR

● OPERATING PRINCIPLE

Interface detection by attenuation



Interface detection by reflection



Ultrasonic attenuation is the reduction in energy of the beam as it is transmitted through the liquid. Viscous liquids, emulsions and liquids with entrained solids generally have a higher ultrasonic attenuation than low viscosity clear liquids such as water. When the attenuation difference is sufficient, the amplifier gain can be adjusted so that the ultrasound beam passes through the less attenuative liquid but is stopped by the more attenuative liquid. The output relay can then be set to monitor which liquid is in the gap.

The ultrasonic attenuation of a liquid depends on many factors, the main ones being the complexity of the molecule, followed by the viscosity, assuming there is no aeration. Many liquids can be distinguished by this technique and for further information on previously tested liquid systems consult our technical sales. If samples of the liquids are available then a simple site test can often be done.

When two immiscible liquids have similar attenuations the above method cannot be used, however it is likely that the velocity of ultrasound will be different. In this case a beam of ultrasound passing through the interface will be reflected and refracted and if the sensor is arranged at a shallow angle the effect is that the transmitted beam tends to miss the receiver and is thus effectively attenuated. An angle of 10 degrees is chosen and often this results in total internal reflection of the transmitted beam. Thus when the interface is within the gap of the angled sensor, very little ultrasound reaches the receiver, but when the interface is above or below the sensor (ie in either liquid) then there is a large signal present. The control unit gain is set to actuate the relay when the interface is in the gap. Note this condition will also occur if the upper liquid drains away and air (gas) is in the gap. Note for further information on suitability of this application consult our technical sales.



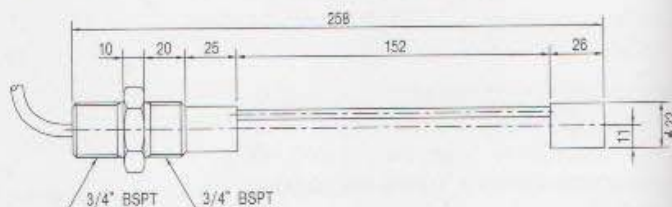
● SPECIFICATION FOR MCU 200

	MCU201	MCU203
Power supply (Selector switch)	AC110/120V AC220/240V	DC24V
Power consumption	6VA	0.1A Max
Relay output	DPCO	
Relay rating	5A at 230V	
Box dimensions	200 x 120 x 75	
Box rating	IP65 Polycarbonate	
Holes for glands	3 over 16mm dia.	
Fixing centers (W x H)	188 x 88	
Fixing hole diameter	4mm	

● FEATURES

- No moving parts
- Ignores forms
- Simple installation
- Hazardous area approvals

● ULTRASONIC POINT LEVEL SENSOR TYPE:402SD



● SPECIFICATION FOR 402SD

- Material : Stainless steel
- Conn.size : 3/4" BSPT Thread
- Design or Duty : Chemical interface
- Liquid Type : Clean, viscous with solids
- Temperature : -70°C to +150°C
- Max. Pressure : 105bar
- Standard frequency : 3.7 MHz
- Enclose : IP 65
- Cable Length : 3meters

● APPLICATIONS

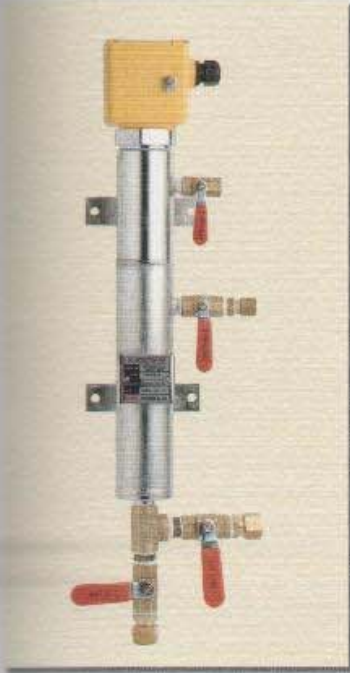
- Petroleum processing
- Chemical processing
- Food processing
- Marine operation
- Water industry



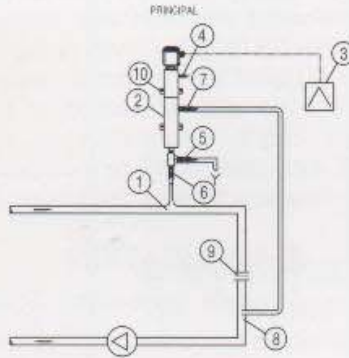
● CAPACITIVE TYPE OIL DETECTOR

OIL CONTAMINATION DETECTOR ON THE PIPING LINE

MODEL:EL 21



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 Oil detection control unit
- ④ Vent valve
- ⑤ Sampling & cleaning cock
- ⑥ Inlet isolating valve
- ⑦ Outlet isolating valve with cleaning process
- ⑧ Return partial flow 3/8" PT
- ⑨ Orifice plate
- ⑩ 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 detected or not in signal from the capacitive compact switch and convert point of contact to relay contact.

● TECHNICAL SPECIFICATION

- Consists of - Oil detection pot
- Capacitive oil detector(EL 21)
- Control unit(VEGATOR 621)
- Max. Pressure : 5kg/cm²
- Max. Temp. : 110°C
- Flow : 100~300 l/h
- Sensitivity : Approx. 50ml oil
- Power supply : AC 110/220V
- Output : Relay output(SPDT)

OIL DETECTOR ON THE TANK

MODEL:CAP 21



● GENERAL

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

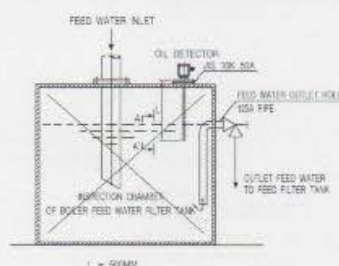
When incoming oil contaminated water in inspection chamber, the feed water only go out to feed filter tank and oil will be accumulate in inspection chamber until drainage.

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(SPDT)
- Operating pressure : 10bar
- Max. Temp. : 100°C
- Protection : IP66
- Conn. size : G 1-1/2"

● ELECTRODE TYPE LEVEL SWITCH



● OPERATING PRINCIPLE

Conductivity liquid level control is simple and direct. Both concept and operation utilize low level of electrical energy and the conductivity of the liquid itself, these solid-state systems provide consistently accurate "ON/OFF" switching for an almost limitless range of liquid level control requirements.

The system consists of a single or multi-point sensor, cut-to-length stainless steel electrodes, and a controller. In tank refill or pumpdown applications, the controller automatically maintains liquid level high and low limits.

● APPLICATION

Strongly conducting liquids.

● ELECTRODE CONTROLS MUST NOT BE USED

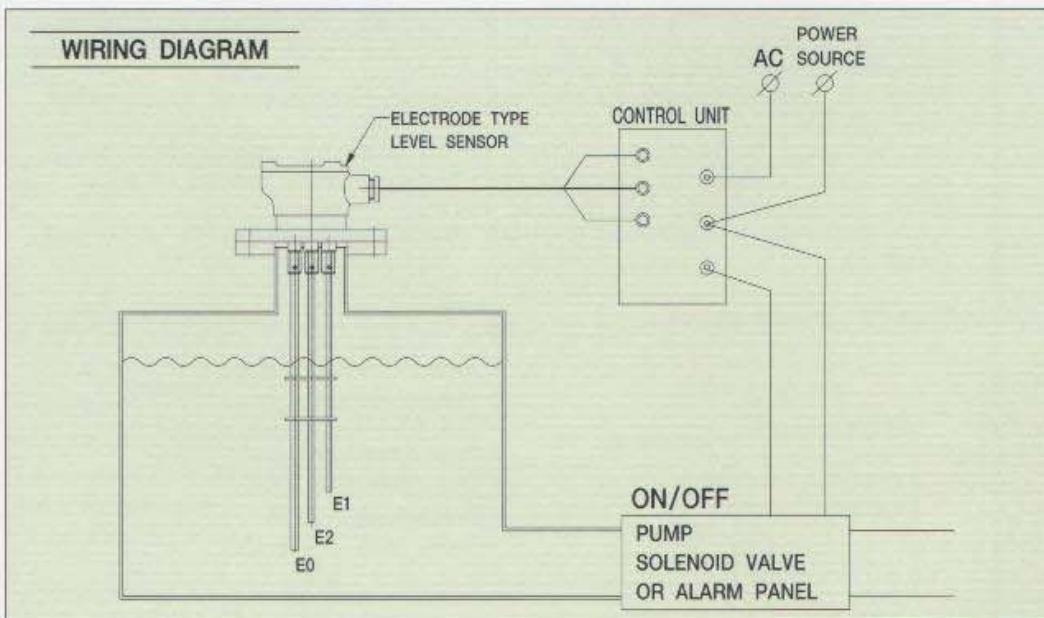
- In non -Electrically conductive liquids.(mineral oils)
- In liquids forming a foam. (circumstances in beer, washing suds etc.)
- In liquids with a tendency to form deposits. (milk of lime, greasy effluents etc.)
- In liquids generating vapour and condensates.

● MODEL NUMBER CODE SYSTEM

ELS - [] - [] - []

- Symbol of electrode type level switch
- Number of electrode
 - [1E] : 1
 - [2E] : 2
 - [3E] : 3
 - [4E] : 4
 - [5E] : 5
- Material of connector
 - [P] : P.V.C
 - [S] : SUS 304
 - [C] : Carbon steel
- Material of insulation
 - [PT] : Polyolefin tubing
 - [TL] : Teflon lining
 - [CF] : Cable electrode
- Connection size
 - [1T] : PT 1" (Screw in nipple)
 - [2T] : PT 2" (Screw in nipple)
 - [3T] : PF 2 1/4" (Screw in nipple)
 - [3F] : JIS 10K 50A
 - [4F] : JIS 10K 100A

WIRING DIAGRAM



- E0: Earth electrode
- E1, E2: Control electrodes

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 4-20 mA 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.

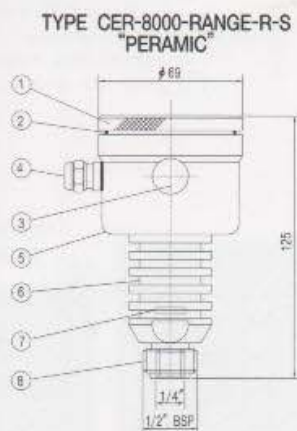
● STANDARD SPECIFICATION

- Measuring ranges : from 0-0.1 to 350 bar.
- Output signal : 2-wire, 4-20mA
- Overall accuracy : $\pm 0.2\%$
- Power supply : 12 to 40 VDC.
- Electrical connection : PG 9/1/2" NPT or M20
- Load(max.) : 600 Ohm/24 V till 1400Ohm/40 v.
- 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.

● MEASURING RANGE(CER-8000)

Order code key	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



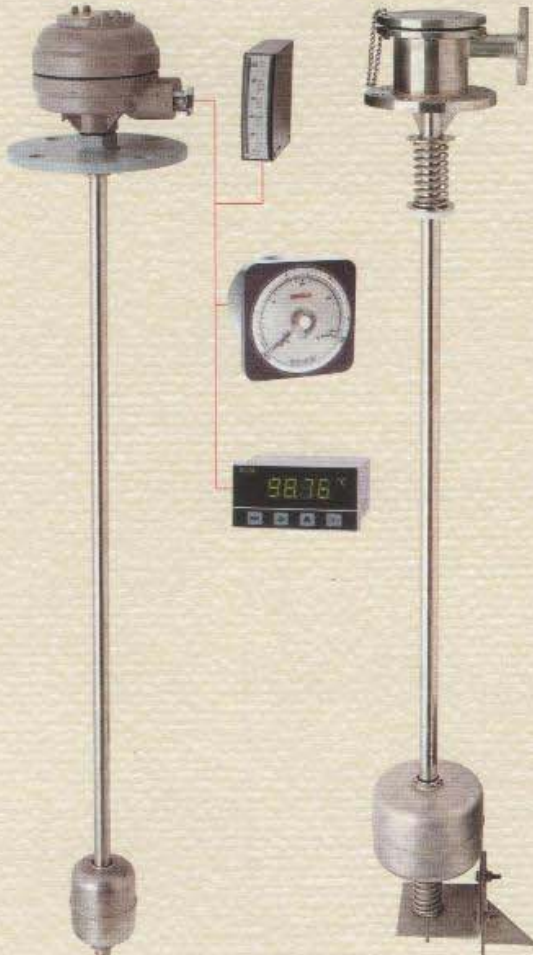
ITEM	QUANTITY	DESCRIPTION	MATERIAL
1	1	Cover	AISI 304
2	1	O-ring	EPDM
3	1	Venting	
4	1	PG9 cable connector	
5	1	Electronic housing	AISI 304
6	1	Foot/Cooling fins	AISI 316
7	1	Ceramic sensor	Al ₂ O ₃ (96%)
8	1	Gauge connection 1/2" BSP	AISI 316
		DIN 16288	

● 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

● MAGNETIC FLOAT TYPE LEVEL TRANSMITTER

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



Cargo tank level transmitter FLT-100RC

● STANDARD SPECIFICATIONS

- Connection size : JIS 5K 80A, 100A.
With float chamber type: JIS 5K 100A only
- Max. pressure : 10 kg/cm²
- 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 Ω
- Max. current : 25mA
- Power source : 12~32V DC
- Output : 4~20mA DC
- 2 Wire system balancing type
- Cable entry : 15b
- Enclosure : Weather proof/IP56
- Material - Housing : AC
- 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

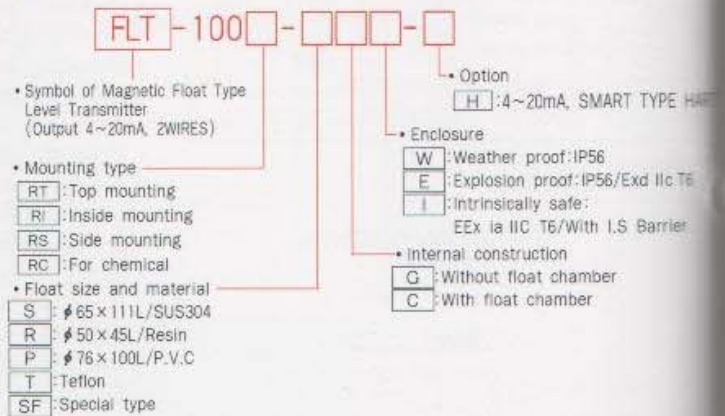
- Consistent accuracy regardless of the tank depth.
- High accuracy.
- Service-proven reliability.
- Simple installation.
- Magnet-float type in which the construction is simple.
- The maintenance is easy.
- Only single 2core cable.
- Wide measuring range.

● APPLICATIONS

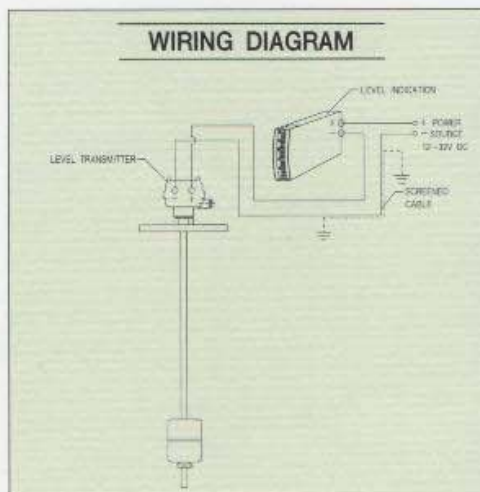
Level measurement continuously indicates the actual level and can provide an analogue and digital indication as well as operation of switching contacts predetermined levels.

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

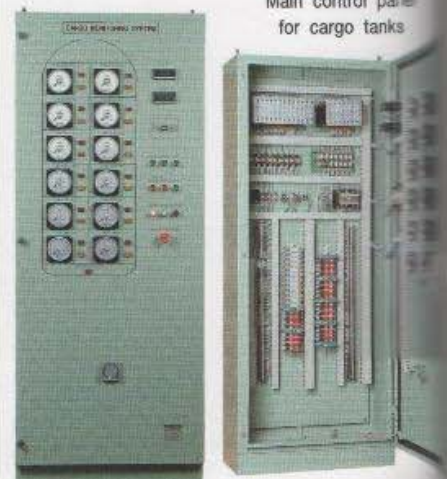
● Model number code system



WIRING DIAGRAM



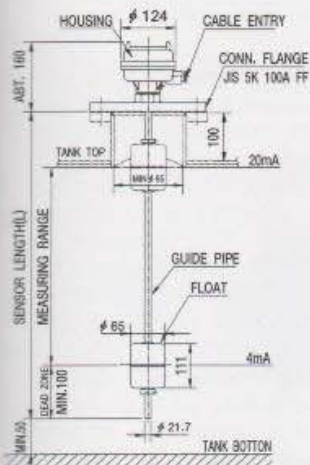
Main control panel for cargo tanks





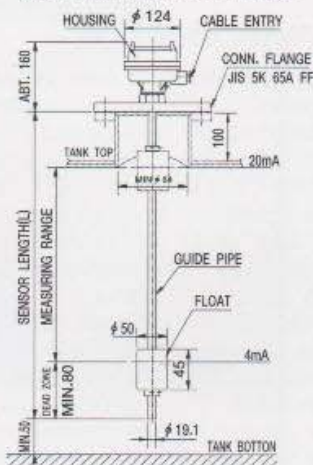
OUTLINE/DIMENSIONS

FLT-100RT-SGW



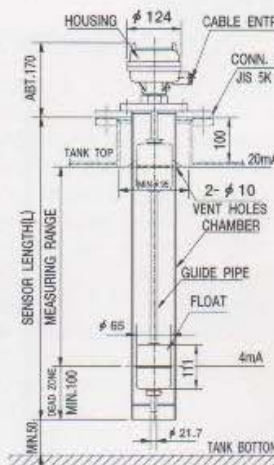
- Installation: Top mounting
- Connection Flange: Min. JIS 5K 80A FF
- Minimum Sp.Gr: 0.85
- Measuring Range: Max. 3M
- Material - Float: SUS304
 - Guide pipe: SUS304
 - Housing: AC

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



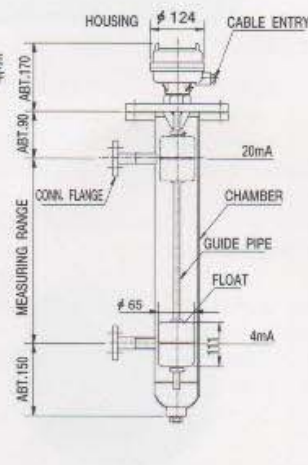
- Installation: Top mounting
- Connection Flange: Min. JIS 5K 65A FF
- Minimum Sp.Gr: 0.60
- Measuring Range: Max. 3M
- Material - Float: Resin
 - Guide pipe: SUS304
 - Housing: AC

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

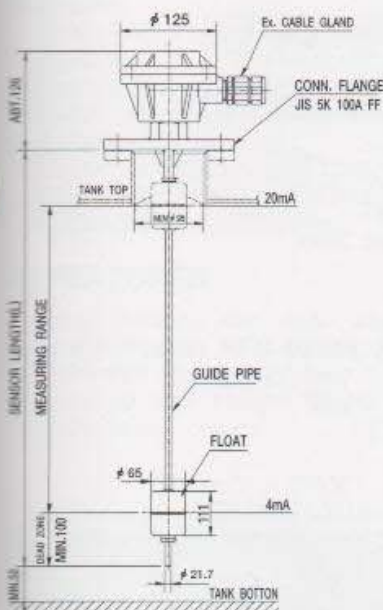
FLT-100RS-SCW



- 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

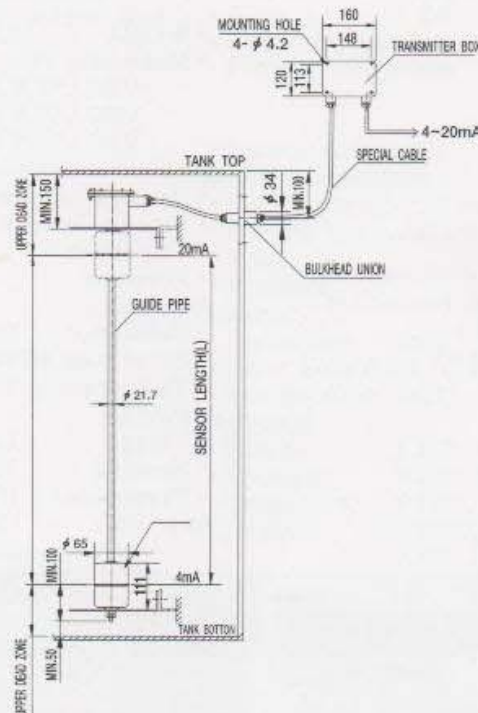
FLT-100RT-SGE

Explosion Proof Type : IP56/Exd IIC T6



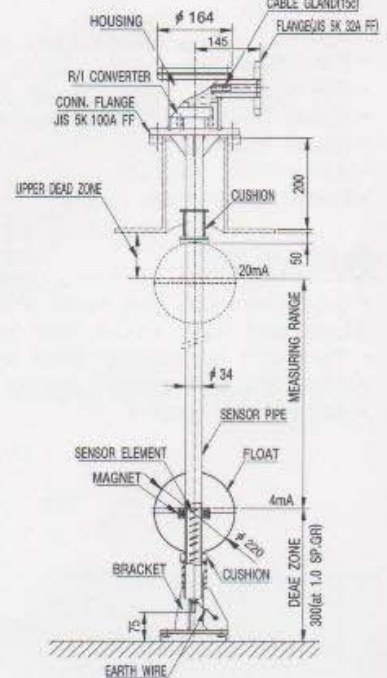
- Installation: Top mounting
- Connection Flange: Min. JIS 5K 80A FF
- Minimum Sp.Gr: 0.85
- Measuring Range: Max. 3M
- Material - Float: SUS304
 - Guide pipe: SUS304
 - Housing: AC

FLT-100RI-SGW



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

FLT-100RC-SFGI



- Accuracy: ±20mm
- Measuring range: Max. 30m
- Max. current: 25mA
- Power source: 12~32V DC
- Output: 4~20mA DC
- 2 wire system balancing type
- Specific gravity: Min. 0.65
- Connection Flange: JIS 5K 100A FF
- Conduit connection size: JIS 5K 32A FF
- Construction: IP 68 and intrinsically safe EEx ia IIC T6
- Material - Connection flange: SUS304
 - Guide pipe: SUS316
 - Float: SUS316
 - Housing: SUS304

● ULTRASONIC TYPE LEVEL TRANSMITTER

MODEL: VEGASON 50 SERIES



● APPLICATION

Communicative, uncomplicated and clever VEGASON 50 ultrasonic sensors speak many languages and can be used in different processes and industries:

- Water
- Waste water, disposal
- Chemicals
- Mining
- Foodstuffs
- Shipbuilding
- Metal treatment and generation
- Paper industry
- Automobile industry
- Power generation

● FEATURES

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

● INTRODUCTION

VEGA presents a new generation of compact ultrasonic sensors. VEGASON 50 is designated for standard level measurement applications in the measurement range of 0.25...15m. Small housing dimensions, small process connections (1 1/2" to 4") and the Ex-approvals meet the requirements of level and flow measurement technology. VEGASON 50 ultrasonic are based on a two-wire technology. The supply voltage and output signal (4...20 mA analog or digital) are transmitted via two-core line, connectable with max. 15 sensors on a two-core line. The sensors can be operated either with PC, check card-sized and detachable adjustment module or HART® handheld. The operation on the signal line, directly on the sensor, switch cabinet or DCS is possible by use of the PC and self-explanatory operation program.

● SPECIFICATION

General data

- Supply voltage 20...36V DC, 20...250V AC or from the signal conditioning instrument (sensors with digital output signal)
- Power consumption Max. 0.2W
- Output signal 4...20mA or digital output signal
- Load 0...500 Ω
- Beam angle 3° or 5.5°
- Ultrasonic frequency 34kHz, 55kHz, 70kHz
- Process connection G 1 1/2A, G 2A, 1 1/2" NPT, 2" NPT, compress. flange DN 100, ANSI 4"

- Weight 1,2...2,3kg

• Measuring range

	LIQUID	SOLID
-VEGASON 51	0,25...4m	0,25...2m
-VEGASON 52	0,40...7m	0,40...3,5m
-VEGASON 53	0,60...15m	0,60...7m

Ambient conditions

- Housing temperature -20°C ... +60°C
- Process temperature -40°C ... +80°C
- Protection IP67
- Pressure Max. 2bar

Accuracy

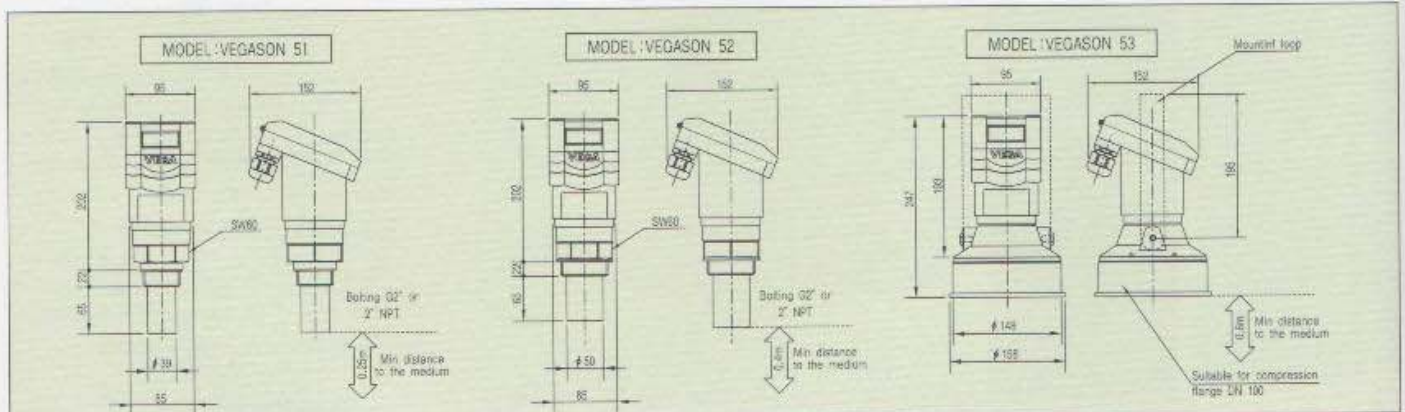
- Resolution 1mm
- Error Max. 0.25% of span
- Temperature drift <0.015%/10 K of range

Materials

- Flange 1.4571, PP, PVDF
- Housing Valox(PBT)
- Transducer PVDF

Approvals

CENELEC, FM/CSA Class 1, Division 1, ABS, LRS, GL





● RADAR BEAM TYPE LEVEL TRANSMITTER

MODEL: VEGAPULS 50 SERIES



● INTRODUCTION

Radar is a sophisticated level measuring principle. VEGA's new design of small, compact and price favourable radar sensors VEGAPULS 50 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 50 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.

● APPLICATION

VEGAPULS 50 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

● SPECIFICATION

General data

- Supply voltage 20...36V DC, 20...250V AC of from the signal conditioning instrument (sensors with digital output signal)
 - Power consumption max. 0.2W
 - Output signal 4...20mA or digital output signal
 - Beam angle < 24°
 - Radar frequency 5.8GHz (USA 6.3 GHz)
 - Process connection G 1 1/2", 1 1/2" NPT
DN 50...DN 150
ANSI 2" ...6"
 - Measuring ranges 0...20m
- Ambient conditions
- Housing temperature -20°C... +60°C
 - Process temperature -40°C... +150°C
 - Protection IP67
 - Pressure 2...16bar

Accuracy

- Resolution 1mm
- Error Max. 0.1% of span
- Temperature drift < 0.015%/10 K of range

Materials

- Flange 1.4571, PVDF
 - Housing Valox (PBT)
 - Transducer PTFE, PP, 1.4571
- Approvals
CENELEC, FM, CSA,
ABS, LRS, GL

Standard model and specification

	VEGAPULS 51	VEGAPULS 52	VEGAPULS 53	VEGAPULS 54	VEGAPULS 56
Housing material	PBT or Aluminium	PBT or Aluminium	PBT or Aluminium	PBT or Aluminium	Aluminium
Process connection	G1 1/2" or 1/2" NPT	G1 1/2" or 1/2" NPT	Flange conn.	Flange conn.	Flange conn.
Connection material	PVDF or 1.4435	PVDF or 1.4571	1.4571 with PTFE coating	1.4571	1.4571
Antenna system	Rod / PP or PPS	Rod / PTFE	Rod / PTFE	Horn / 1.4571	Horn / 1.4571
Process temperature	-20°C ~ + 80°C (PP) -20°C ~ + 120°C (PP)	-20°C ~ +130°C (PVDF) -20°C ~ +150°C (1.4571)	-40°C ~ +150°C	-40°C ~ +150°C	-40°C ~ +350°C
Process pressure	Max. 3bar Max. 16bar (1.4435)	Max. 3bar (PVDF) Max. 16bar (1.4571)	Max. 16bar	Max. 40bar	Max. 64bar
Measuring range	to 20m	to 20m	to 20m	to 20m	to 20m

● CAPACITIVE LEVEL MEASUREMENT



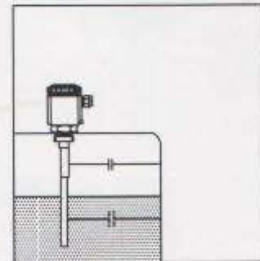
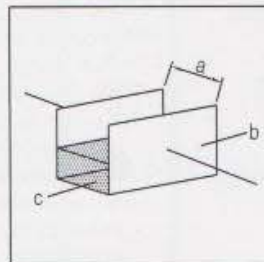
● APPLICATION

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

● MEASURING PRINCIPLE

Electrode, 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 EL 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 ϵ , 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 such as e.g. VEGALOG without providing an additional potential equalization.

In addition to the continuous measurement, also levels can be detected(VEGAMENT or VEGASEL)

● LEVEL DETECTION

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

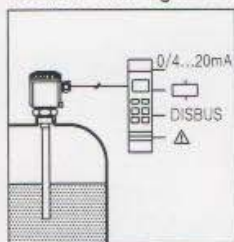
These levels are detected at a fixed point and converted into a switching signal.

For level detection the capacitive electrodes type EL with respective VEGATOR signal conditioning instruments and VEGACAP compact level switches are available.

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

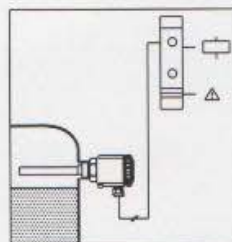
● CONFIGURATION OF THE MEASURING SYSTEM

Electrode with signal conditioning instrument



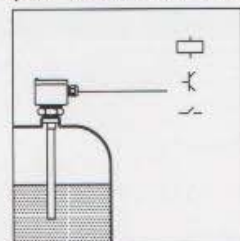
- A measuring system consists of:
- a capacitive electrode type EL
 - an oscillator mounted in the electrode housing
 - a VEGAMET signal conditioning instrument or a VEGALOG processing system,
 - connected instruments(e.g. indicating instruments, VEGASEL auxiliary level switches)

Electrode with level switch



- A measuring system consists of:
- a capacitive electrode type EL
 - an oscillator mounted in the electrode housing
 - a VEGATOR signal conditioning instrument or a VEGALOG processing system,
 - connected instruments which are operated with the measuring system,

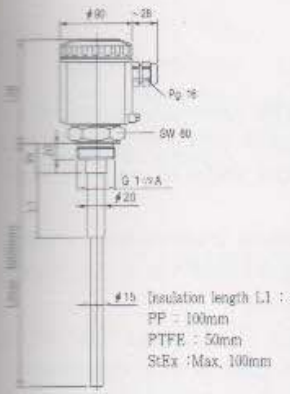
Compact level switch VEGACAP



- 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

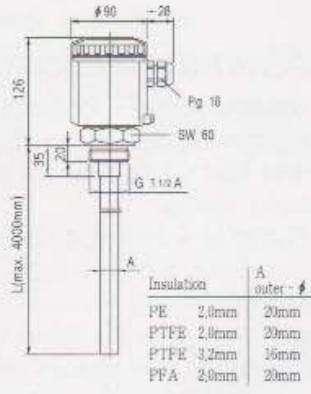


EL 11
(Partly insulated)



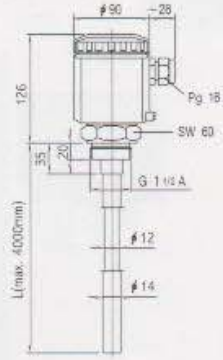
Insulation length L1 :
PP : 100mm
PTFE : 50mm
StEx : Max. 100mm

EL 21
(Fully insulated)



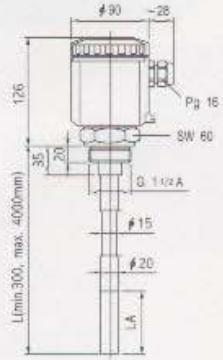
Insulation: PE or PTFE or PFA
With integral oscillator
For continuous level

EL 24
(Fully insulated, For adhesive products)



Insulation: FEP
With integral oscillator
For continuous level

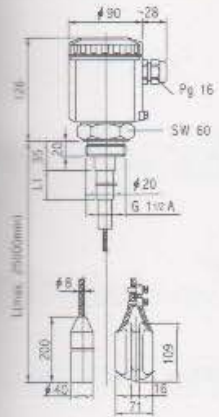
EL 26
(Fully insulated, For adhesive products)



Insulation: PTFE or PFA
With integral oscillator
For level detection

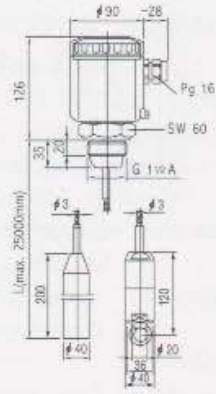
LA = active length (Standard 100mm)

EL 31
(Partly insulated, Cable electrode)



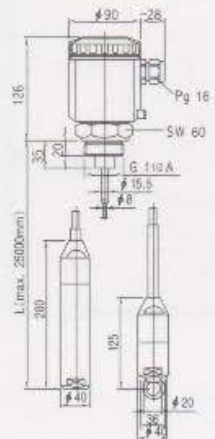
Insulation: PP or PTFE
With integral oscillator
For level detection or continuous level

EL 42
(Fully insulated, Cable electrode)



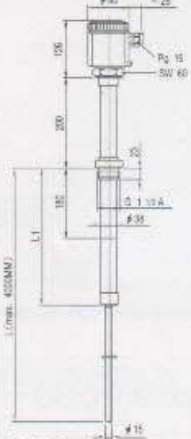
Insulation: PTFE
With integral oscillator
For level detection or continuous level

EL 52
(Fully insulated, Cable electrode)



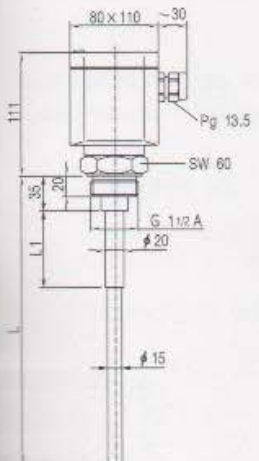
Insulation: PTFE
With integral oscillator
For level detection or continuous level

EL 60
(Partly insulated, High temp. electrode)



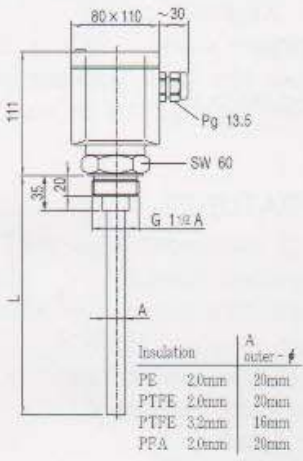
Insulation: Ceramic
400°C and Max. 16bar
With integral oscillator
For level detection or continuous level in solids

VEGACAP 11
(Partly insulated)



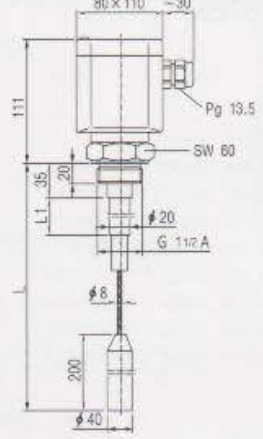
Compact level switch
Insulation: PP or PTFE

VEGACAP 21
(Fully insulated)



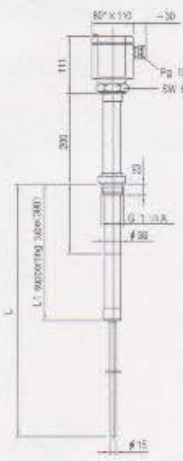
Compact level switch
Insulation: PE or PFA or PTFE

VEGACAP 31
(Partly insulated, Cable electrode)



Compact level switch
Insulation: PP or PTFE

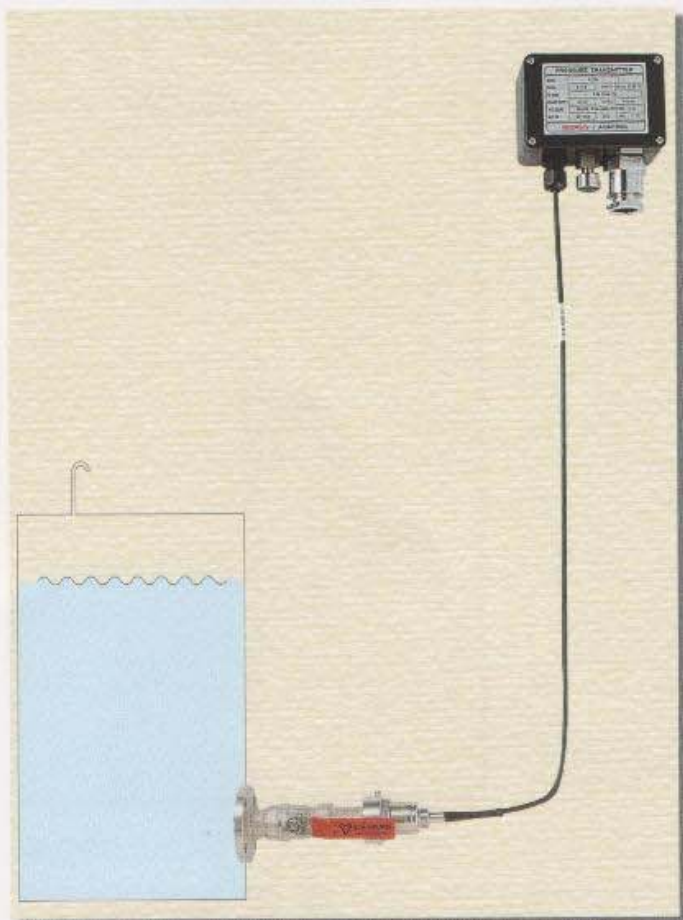
VEGACAP 60
(Fully insulated, High temp. electrode)



Compact level switch in s-lids
Insulation: Ceramic 400°C and Max. 16bar

● ELECTRIC PRESSURE TYPE LEVEL TRANSMITTER

MODEL: PL-3700



● 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

PL3700 - □

• Measuring range

A	:0 to 250mbar (min. range 0 to 175mbar)
B	:0 to 350mbar (min. range 0 to 250mbar)
C	:0 to 500mbar (min. range 0 to 350mbar)
D	:0 to 700mbar (min. range 0 to 500mbar)
E	:0 to 1000mbar (min. range 0 to 700mbar)
F	:0 to 1400mbar (min. range 0 to 1000mbar)
G	:0 to 2000mbar (min. range 0 to 1400mbar)
H	:0 to 2800mbar (min. range 0 to 2000mbar)
J	:0 to 4000mbar (min. range 0 to 2800mbar)
X	:other range

• Symbol of electric pressure type level transmitter

● OPERATING PRINCIPLE

The Hanla/Auxitrol's 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 PL3700 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 PL3000 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 analogue type indicator to measure the actual level.

● TECHNICAL SPECIFICATION

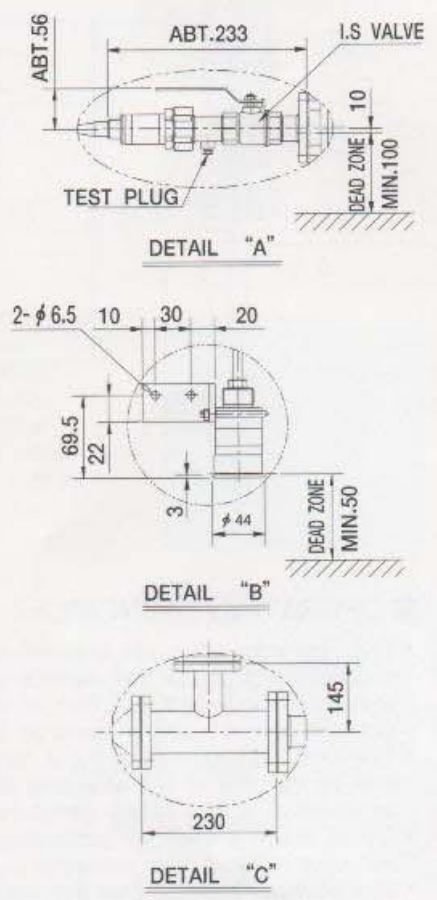
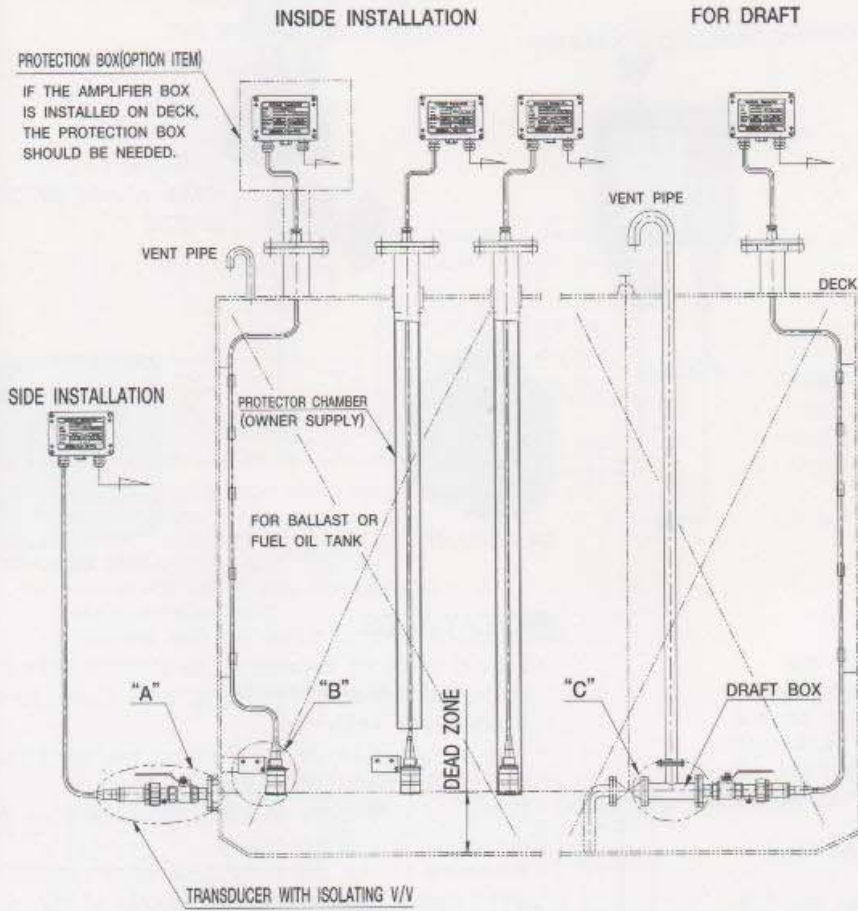
- Output : 4 ... 20mA adjustable
- Accuracy : $\pm 0.30\%$ F.R at 20°C
- Supply voltage : 12 ... 28VDC
- Range : Gauge 175mbar to 4bar
Absolute 1400mbar to 4bar
- Overpressure : Gauge 6bar to 25bar
Absolute 10bar to 25bar
- Diaphragm cell : Capacitive transmitter with ceramic diaphragm
- Materials
 - Diaphragm : Ceramic
 - Sensor Body : Stainless steel 316L
 - Amplifier box : Polyester casing
 - 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 T6
(Max. 50m cable between transducer and amplifier box)
- Cable length : 3m in standard (option : up to 50m)

● FEATURES

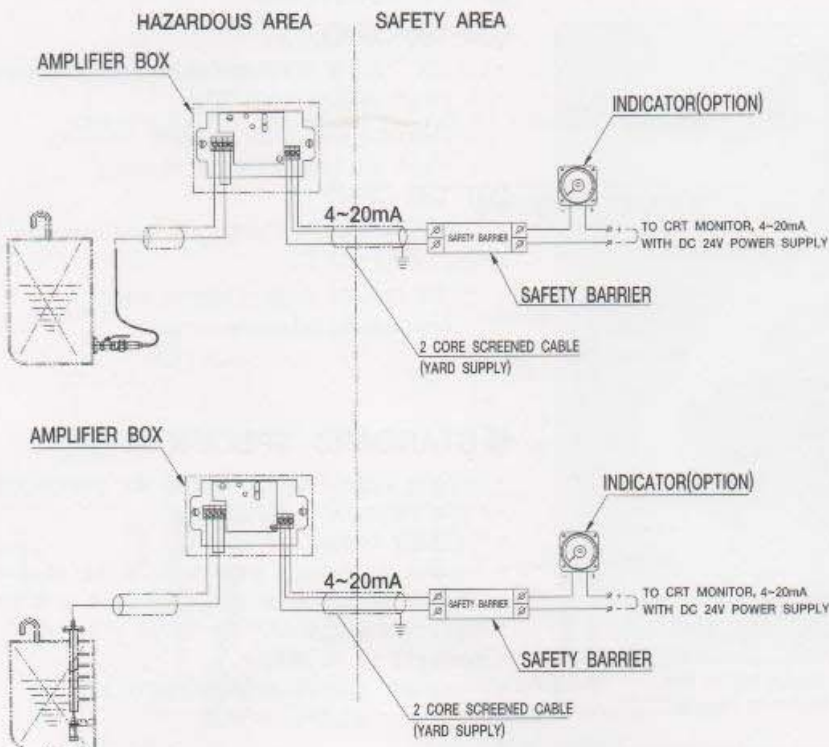
- High measuring accuracy
- Excellent stability
- Capacitive transmitter with Ceramic diaphragm
- High overload limit
- High temperature stability
- Corrosion resistance
- No hysteresis
- Marine class approval



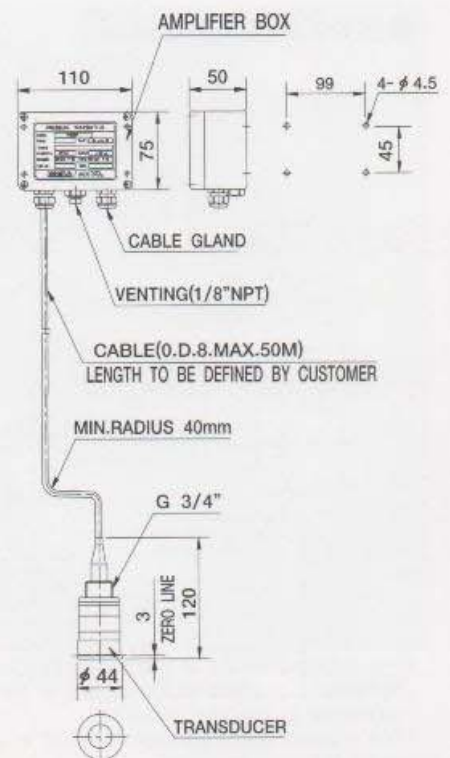
INSTALLATION METHOD



GENERAL WIRING DIAGRAM

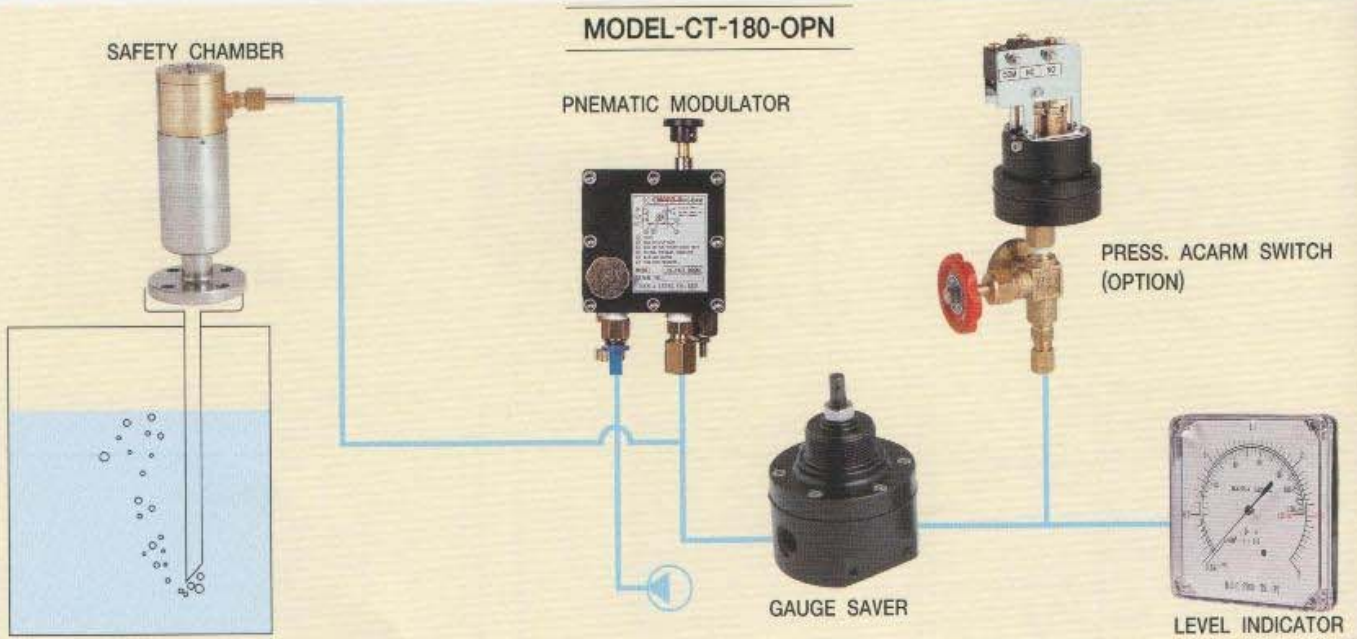


OUTLINE/DIMENSION



TANK LEVEL MONITORING SYSTEM

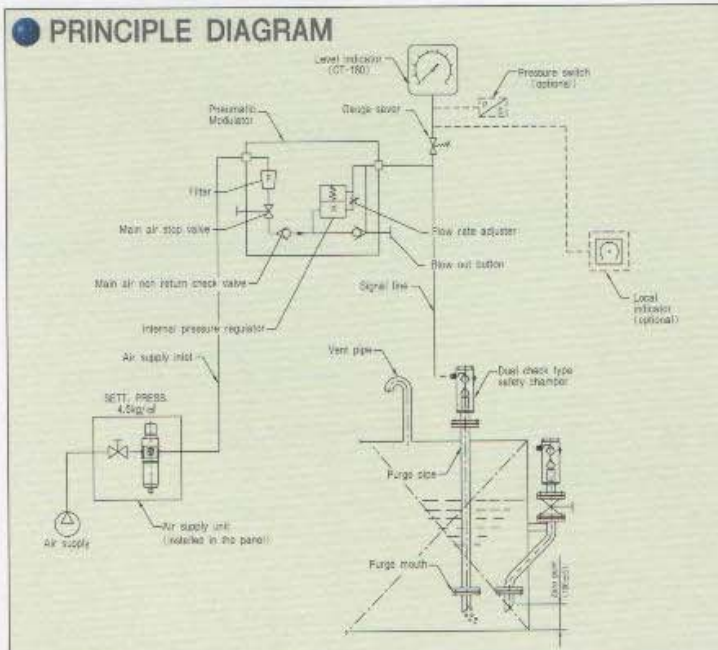
● AIR PURGE TYPE REMOTE LEVEL GAUGING SYSTEM(PURE PNEUMATIC TYPE)



● OPERATING PRINCIPLE

- The operating principle is based upon the measurement of the hydrostatic pressure by providing a constant low flow of air or neutral gas into a probe which opens at the tank bottom.
- The flow regulator ensuring a constant pre-set flow at the end of the sounding pipe in the tank irrespective of the supply pressure.
- Gauge saver is used for protecting the level indicator against over pressure.
- The blowing valve is used for sending the full air pressure through the signal line for cleaning purposes.
- The air supply valve is used for isolation from other channel without any influence.
- Principle Diagram

● PRINCIPLE DIAGRAM



- The output pressure of this modulator (Corresponding to the hydrostatic pressure at the bottom of the sounding pipe) is connected to the level indicator.
- The indicator and modulator are built in interconnecting assembly ready for panel mounting.

● FEATURES

- Liquid level or measuring depth pressure is indicated for direct reading, and then the high precision is achieved.
- The construction is simple and the handling and maintenance is easy.
- Since no electricity is used, the explosion-proof measures is not necessary.
- With use of the pressure type high sensitive level switch, the signal and alarm of the preset liquid level can be transmitted.

● APPLICATIONS

《CT-180-OPN》

- OPEN TANK-Ballast tank remote reading
 - Draft remote reading
 - Heeling and trim remote reading
 - Fuel oil tank remote reading

《CT-180-CPN》

- CLOSED TANK-Cargo oil tank remote reading
 - All liquids even viscous ones (molasses, bitumen, etc...)

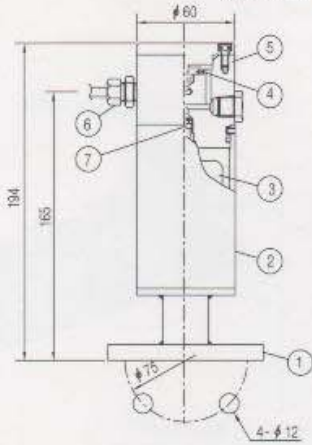
● STANDARD SPECIFICATION

- System type: One line type air purge system
- Flow rating: 10~80Nl/hour
- Working temp.: -30°C ~ 70°C
- Supply air setting pressure : 4.5kg/cm²
- 400m Max. distance of signal line and indicator
- Signal line size: OD8 or OD10
- Range: 1 to 40 meter
- Accuracy: $\pm 0.5\%$ os F.R (optional)
 $\pm 1.0\%$ os F.R



COMPONENTS OF SYSTEM

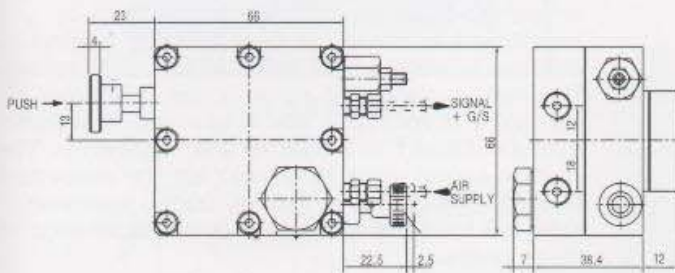
DUAL CHECK TYPE SAFETY CHAMBER (AIR PURGE HEAD)



NO	Description	Material	Q'ty
1	Flange	SUS 304	1
2	Float chamber	SUS 304	1
3	Float	SUS 316	1
4	Upper disc	NAVAL BRASS	1
5	Chamber	NAVAL BRASS	1
6	Connector	BS	1
7	Lower disc	NAVAL BRASS	1

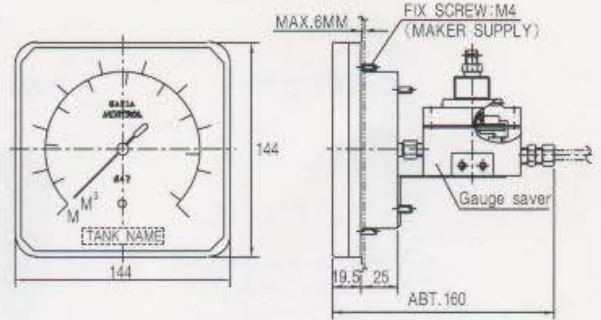
- Avoids entry of liquid inside the device in case of air supply failure.
- Connection size: JIS 5K 25A, or 5K 20A.
- Working pressure: Max. 10kg/cm².
- Connection size of local test device: PT 1/4".
- Material: Naval brass.
- Including local test device for check of actual level.

PNEUMATIC MODULATOR



- Air pressure : 4.5kg/cm²
- Flow rating : 10~80NI/h
- Blowing pressure : 4.5kg/cm²
- Connection: Air supply-PT 1/8"
Signal line-PT 1/8"
- Including the Flow rate adjuster and main air non-return check valve

LEVEL INDICATOR WITH GAUGE SAVER



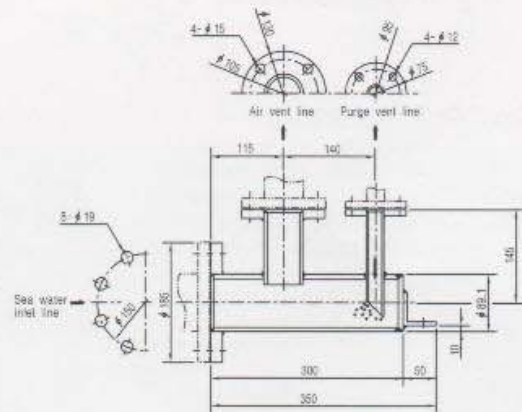
LEVEL INDICATOR

- Size: 144 x 144
- Class 1.5 standard
- Class 1.0 option
- Class 0.5 option
- Graduation : Height or volume
Height and volume
- Including the zero adjuster

GAUGE SAVER

- Body material : AL6061
- Differential : Below 0.01 kg/cm²
- Including the range Adjuster

DRAFT BOX

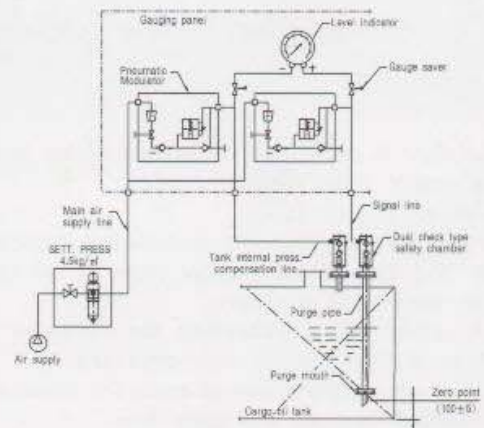
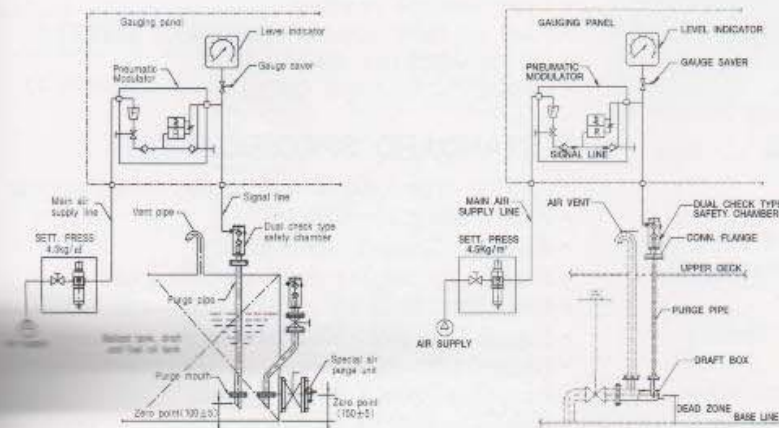


- Material-SUS304 or SUS316
- Std. Connection size:
-Signal line: JIS 5K 25A
-Vent line: JIS 5K 20A
-Sea water inlet: JIS 10K 80A

SYSTEM EXAMPLE

CT-180-OPN

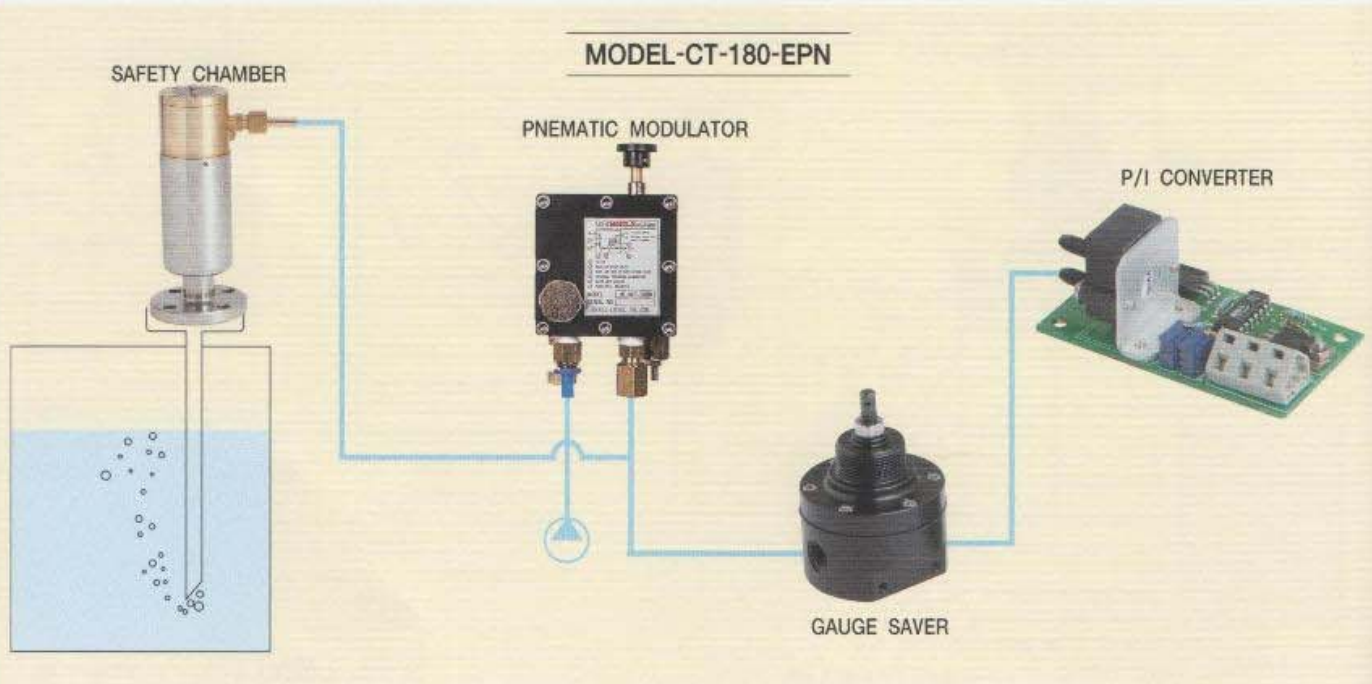
CT-180-CPN



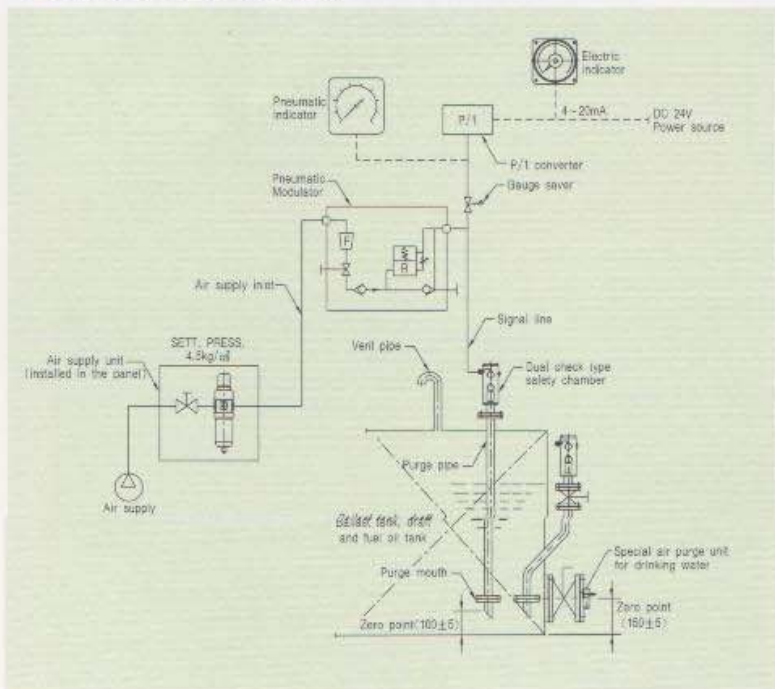
FOR DRAFT

TANK LEVEL MONITORING SYSTEM

● AIR PURGE TYPE REMOTE LEVEL GAUGING SYSTEM (ELECTRO PNEUMATIC TYPE)



● PRINCIPLE DIAGRAM



The flow is produced by means of an automatic air flow modulator, type which includes:

- An air supply filter
- An air flow regulator ensuring a constant pre-set flow at the end of the bubble pipe in the tank irrespective of the supply pressure.
- A safety valve protecting the indicator and pressure transmitter against over pressure.
- The air supply valve is used for isolation from other channel without any influence.
- The blowing valve is used for sending the full air pressure through the signal line for cleaning purposes.

● OPERATING PRINCIPLE

The operating principle is based upon the measurement of the hydrostatic pressure by providing a constant low flow of air or neutral gas into a probe which opens at the tank bottom. The output pneumatic signal of the modulator is fed into P/I converter and is changed to electric signal (4~20mA) in 2 wire by P/I converter. The electric output signal (4~20mA) can be connected to C.R.T display cargo system, Digital indicator, analogue type indicators, etc. or a combination of these systems.

● FEATURES

- Liquid level of measuring depth pressure is indicated for direct reading, and then the high precision is achieved.
- The construction is simple and the handling, and maintenance is easy.
- 4~20mA output signal/Two wires.

● APPLICATIONS

- Ballast tank remote reading
- Draft remote reading
- Fuel oil tank remote reading
- All liquids even viscous ones (molasses, bitumen etc...)

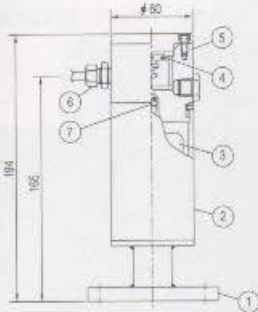
● STANDARD SPECIFICATIONS

- System type: One line type air purge system
- Flow rating: 10~80Nl/h
- Working Temp.: -30°C ~ 70°C
- Supply air setting pressure: 4.5kg/cm²
- 400m Max. distance of signal line and indicator
- Signal line size: OD 8 or OD 10
- Range: 1 to 40 meter
- Output: 4~20mA 2wire system
- Power supply: 16 to 32VDC
- Accuracy: ±0.5% of F.R
±0.2% of F.R (optional)



COMPONENTS OF SYSTEM

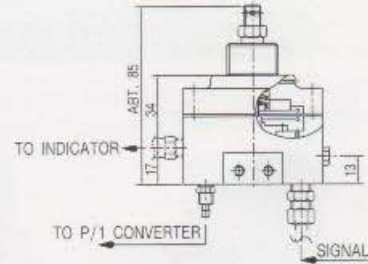
DUAL CHECK TYPE SAFETY CHAMBER (AIR PURGE HEAD)



NO	Description	Material	Q'ty
1	Flange	SUS 304	1
2	Float chamber	SUS 304	1
3	Float	SUS 316	1
4	Upper disc	NAVAL BRASS	1
5	Chamber	NAVAL BRASS	1
6	Connector	BS	1
7	Lower disc	NAVAL BRASS	1

- Avoids entry of liquid inside the device in case of air supply failure.
- Connection size: JIS 5K 25A, or 5K 20A
- Working pressure: Max. 10kg/cm²
- Connection size of local test device: PT 1/4"
- Material: Naval brass
- Including local test device for check of actual level.

GAUGE SAVER

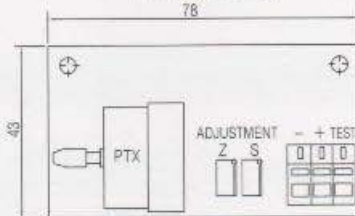


- Body material : AL6061
- Differential: Below 0.01kg/cm²
- Including the range adjuster

TRANSMITTER PANEL

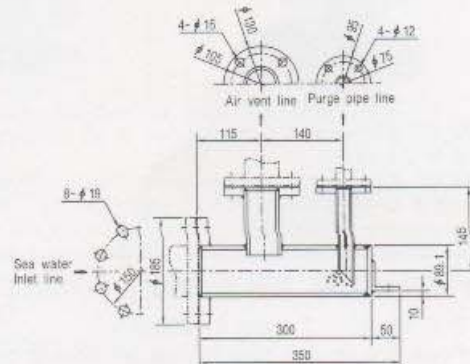


P/I CONVERTER



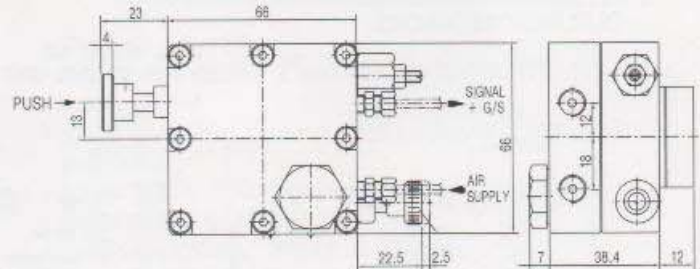
- The transmitter is linked to an integral air regulator and consists of:
 - a sensyn piezoresistand type sensor
 - an electronic unit which converts the signal from the sensor into a standard 2 wire, 4-20mA signal
- Power supply
From 18 to 36V/DC
- Output signal : standard 4-20mA(2 wires)
- Accuracy : ±0.2%, OF F.S
- Enclosure : EEx ia II c T6

DRAFT BOX



- Material-SUS304 or SUS316
- Std.Connection size:
 - Signal line:JIS 5K 25A
 - Vent line:JIS 5K 20A
 - Sea water inlet:JIS 10K 80A

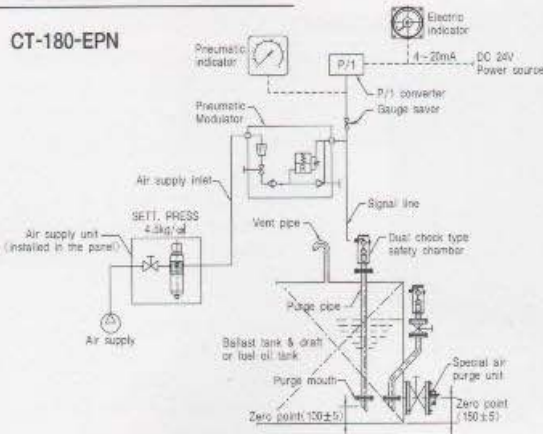
PNEUMATIC MODULATOR



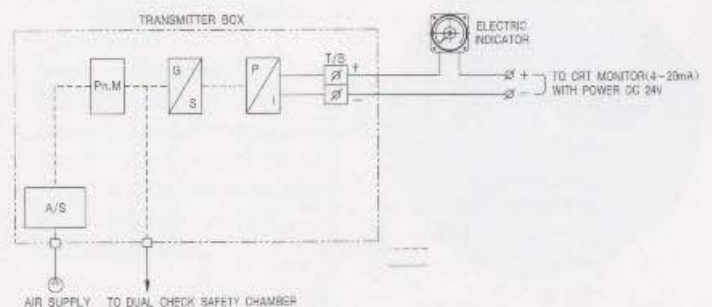
- Air pressure : 4.5kg/cm²
- Flow rating : 10~80NI/h
- Blowing pressure : 4.5kg/cm²
- Connetion: Air supply-PT 1/8" Signal line-PT 1/8"
- Including the flow rate adjuster and main air non-return check valve

SYSTEM EXAMPLE

CT-180-EPN



GENERAL WIRING DIAGRAM



TANK LEVEL MONITORING SYSTEM

● ELECTRO-PNEUMATIC TYPE REMOTE LEVEL GAUGING SYSTEM

MODEL:CT-801 SERIES

EXPLOSION PROOF TYPE



The CT-801 transmitter is designed to be mounted on the top of the tanks.
The CT-801 transmitter allows a remote level measurement using a 4~20mA analog output, while keeping the principle of bubbling.

● TECHNICAL FEATURES

- Transmitter: 2 wire 4~20mA
- Pressure scale: from 40 up to 4000 mbar.
- Pressure of supply: 4 to 10 bar.
- Accuracy: 0.3% of the measured scale.
- Power supply: 18 to 36V DC.
- Operating temperature: -20°C ~ 70°C
- Automatic bubbling line clearing.
- Protection category.

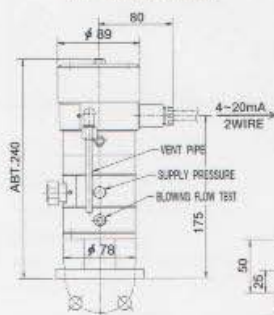
Data acquisition and display from analog signal(4-20mA DC) with completely compatible PC(colour screen)



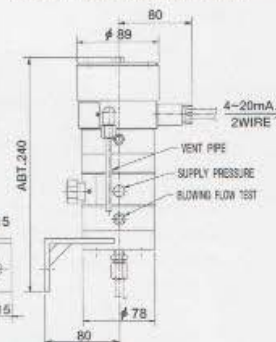
- Analog(bargraph) and numeric level display.
- Volume(tank table) display.
- Temperature display.
- Alarm status and warning signal.
- Analog or RS 485 transmission.
- 16 to 48 channels.
- User friendly.(Ask for our documentation MIC/90E)

OUTLINE/DIMENSIONS

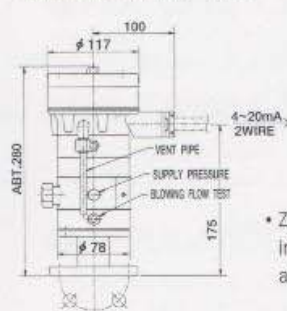
TOP MOUNTING



WALL MOUNTING USED FOR SPECIAL UNIT



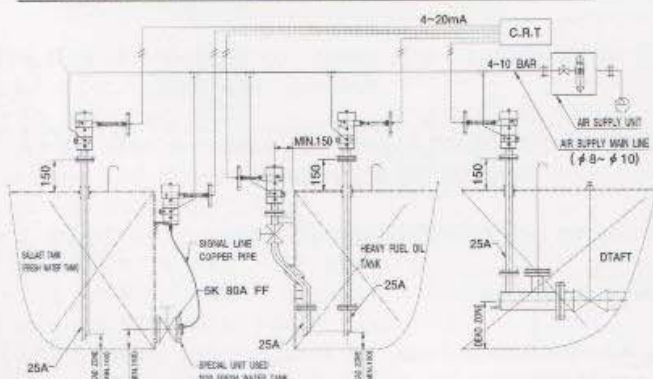
INTRINSIC SAFETY TYPE



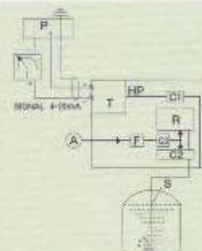
- Explosion proof type
- Explosion proof housing
- :IP66/EEExd IIC T6
- Intrinsic safety : EEx ia IIC T6

- Zener safety barrier to be added in case of an installation in hazardous areas, Zone 0.

PRINCIPAL PIPING DIAGRAM & INSTALLATION MOUNTING



SCHEMATIC DIAGRAM



- A: Air pressure
- C1: Over pressure safety valve
- C2: Safety valve through air supply pressure
- C3: Non return shut-off valve
- F: Filter
- T: Transmitter(4~20mA)
- R: Automatic flow regulator
- S: Probe
- P: Power supply (18~36V DC)
- I: Indicator



● TEMP. CONVERTER/DISPLAY UNIT

FlexTop Temperature Transmitter



- Type: 81 47/48/49 51X
- Measuring range can be configured via an IBM compatible PC
- Input: Pt 100, Ni 100, Cu 100 and thermocouple
- Output: 4...20mA, 2-wire
- Accuracy: 0.1% of span
- Current limiting: 3.8mA/22mA
- Operating temp.: -10...70°C
- Dimension: $\phi 44 \times 27$ mm
- Protection: Housing - IP 55
Terminal - IP 10
- Safety: EEx ia II c T6

FlexView Display Unit



- Type: 81 46 X1X
- PC programmable display, measuring unit, damping and linearization table
- Input: 4...20mA
- Power supply: 6.5...28VDC
- Display type: 4 digits, 7 segment LCD (-9999...+9999)
- Accuracy: 0.1% + 1 digit
- Display limiting: 3.8mA/22mA (programmed Min./Max. value)
- Operating temp.: -10...70°C
- Dimension: $\phi 86$ mm housing
- Protection: Housing - IP 65
Terminal - IP 10
- Safety: EEx ia II c T7

FlexTemp Iso Universal Transmitter

- Type: 82 23/24 5XX
- Programmable linearization, damping and status indication
- LCD bargraph with zoom feature
- PC signal monitoring
- Opto relay output
- 2-way programming (Windows)
- Input: RTD, T/C, mV and R
- Power supply: 6.5...35VDC
- Output: 4...20mA/4...20mA, 2-wire
Relay output-programmable set/reset
- Display: LCD bargraph, 51 segments, resolution 1%
- Accuracy: 0.1% of span
- Current limiting: 3.8mA/23mA (programmable)
- Operating Temp.: -10...70°C
- Dimension: 62 x 88 x 24mm
- Protection: Housing - IP 30
Terminal - IP 10
- Safety: EEx ia II c T5



FlexTop HRT[®] Universal Transmitter

- Type: 81 4X 72X
- Configuration via FlexProgrammer or HART[®] configurator
- Programmable linearization, damping and status indication
- Input: RTD, T/C, mV and R input
- Power supply: 12...35VDC
- Output: 4...20mA, 20...4mA, 2-wire
- Accuracy: 0.1% of span
- UP/DOWN scaling: 23mA/3.6mA (programmable)
- Current limiting: 3.6mA/23mA
- Operating temp.: -10...70°C
- Dimension: $\phi 44 \times 26.3$ mm
- Protection: Housing - IP 55
Terminal - IP 10
- Safety: EEx ia II c T5
- HART[®] DATA
- Protocol: HCF standard
- Feature:
Read serial number
Read/Change user ID
Read/Change configuration
Read input signal value
Read output signal value
Input signal logging
Sensor trim



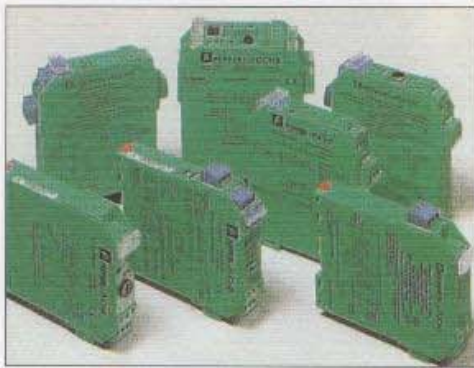
ANNUNCIATOR/I.S BARRIER/LOOP ISOLATOR

ALARM ANNUNCIATOR(8510)



- Model:8510
- Input 10 potentation free contacts. NC or NO
- Input time delay 0...99 seconds
- Channel outputs(option):10 open collector output NC or NO
- Horn output:patention free make-or-break contact
Max. voltage 1A, 24VDC or 220VAC
- Accept horn:by means of pushbutton on the front, or externality
- Accept flash:by means of pushbutton on the front, or externality
- Test function:by pushing bath accept pushbuttons auring at east 2 sec.
- Outputs:open collector, galvanically isolated from all other circuits
Max. 50mA DC, secured from overioecc
Max. voltage 32 VDC
- Indication LED's :12 LED's being 10×red, 1×yellow and 1×green
- Supply voltage :24 VDC(18...32 VDC)
- Power consumption :1.5 Watt(24 VDC)
- Protection class :IP52 (front only)
- Ambient temperature :-10...55°C...(peak 70°C)
- Weight:0.5kg

I.S BARRIER



TYPE : KFDO-CS Ex 1.51P

- Inputs(Not intrinsically) : DC 4V...35V
- Max. current consumption : 0mA...40mA
- Permissible circuit values
- Ignition protection class, category : [EEx ia]
- Explosion group : IIA IIB
- Max. external capacitance : 1.04μF 0.39μF
- Max. external inductance : 33.6mH 12.6mH
- Fail-safe Max. voltage
- Power supply : 250V
- Amb. temperature : -20°C +60°C

TYPE : KFD2-SR2-Ex.1W

- Power supply : DC 4V...35V
- Max. current consumption : 20mA...23mA
- Permissible circuit values
- Ignition protection class, category : [EEx ia]
- Explosion group : IIB IIC
- Max. external capacitance : 2.1μF 0.62μF
- Max. external inductance : 7mH 3mH
- Fail-safe Max. voltage
- Power supply : DC 40V
- Contact load : AC 253V, 2A
DC 40V, 2A
resistance load
- Amb. temperature : -20°C +60°C

Type:KFDO-CS-Ex1.51P
APP'L:TRANSMITTER
(4~20mA)

Type:KFD2-SR2-Ex1.W
APP'L:ALARM

MODEL:ANN-BD2

FEATURE

- Dual points annunciator
- Power supply : DC 24V ±10%
- Input : Dry contact. NO or NC
- Time delay : 0-30 sec
- Output : Relay contact(SPDT)

FUNCTION

- alarm lamp output/flicker
- input buzzer stop/flicker stop
- reset/lamp test/function test



MODEL:ANN-AD2

FEATURE

- Dual points temp. monitor annunciator
- Power supply : DC 24V ±10%
- Input : 2×4-20mA
- Output1 : 2×4-20mA
- Output2 : Common relay contact

FUNCTION

- sett. value adjustable(2×0-100%)
- Alarm output/alarm lamp output / flicker / input / buzzer stop / flicker stop / reset / lamp test / function test



Loop Isolator, Isolation Amplifier (DC/DC Converter)

Type:82, 33, 114

INPUT DATA

- Signal type:4...20mA, 2-Wire
- Voltage drop:Max. 3.0V
- Protection: +/- 35V

OUTPUT DATA

- Signal type:4...20mA, 2-Wire
- Output:1...25mA
- Power supply:5...35V
- Protection: +/- 35V
- Current limit. :Nom. 26mA



MODEL:LI2C-AD

FEATURE

- Dual channel alarm free setter
- Power supply : DC 24V±10%
- Input : 2×4-20mA
- Output1 : 2×4-20mA
- Output2 : 2×high low alarm contact





● LEVEL INDICATOR WITH CONTROLLER

WIDE ANGLE TYPE



- Model : HLI-110A
- Size : 110×110mm square
- Mounting method : Panel front mounting
- Input signal : 4~20mA
- Internal resistance : 1.5Ω
- Accuracy : ±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

RIBBON TYPE



- Model : TME-152
- Size : 50.7×152.3mm
- Mounting method : Panel front mounting
- Input signal : DC 4~20mA
- Internal resistance:2.5Ω
- Accuracy : ±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

RIBBON TYPE



- 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 : 2Ω
- Accuracy : ±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

DIGITAL TYPE

- Model:KN-2000 series
- Size:48(H)×96(W)×112(D)mm
- Mounting method:Panel front mounting
- Power source:AC 110/220V±10%(50/60Hz) option:DC24V
- Input signal:4~20mA
- Accuracy:±0.2% of F.S
- Resolution:1 digit(31/2±1999)
- Scale unit:°C,%,kg/cm
- Output contact:1 transfer contact each on "H" and "L" sides
- Contact rating:AC 110V 1A, DC 30V 2A
- Setting range: 0~100% of scale range on each "H" and "L" side
- Setting accuracy:0.3% F.S ±1 digit
- Temperature:-5°~55°
- Weight:approx.:450g

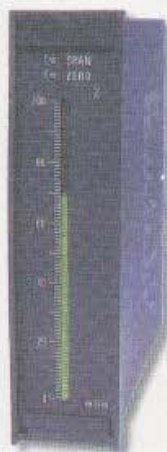


BAR. AND DIGITAL INDICATOR



- 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 : ±0.2%(Digit.)and±1.0%(Bar)of F.S
- Scale range : 0~100%
- Option : output alarm(2 or 4point) output signal 4~20mA RS-422A interface

BARGRAPHIC INDICATOR



- Model:KN-1600 series
- Microprocessor type indicator
- Size:36(W)×144(H)×169.5(D)
- Mounting method:Panel front mounting
- Display:Bar-101 segment LED
- Power source:AC 85~265V(50/60Hz)
- Input signal:4~20mA
- Accuracy:±1.0% of F.S
- Scale range:0~100%
- Output:2 point(H.L)