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HANLA
IMS
LEVEL MEASUREMENT SYSTEMS & INSTRUMENTATIONS

**HANLA
IMS**
INSTRUMENT
MONITORING
SYSTEM

LEVEL MEASUREMENT SYSTEMS & INSTRUMENTATIONS

LEVEL INSTRUMENTATIONS

LEVEL MEASUREMENT SYSTEMS

WATER INGRESS DETECTION SYSTEM

ELECTRIC INSTRUMENTATIONS



ISO-9001 REGISTERED FIRM



World Class 300



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Greetings / Company History

Our company was established in 1989 specialized in the production of the level measuring instrument with the people oriented business philosophy while leading the technology. As a result, the company was listed in KOSDAQ under the company name "HANLA Level Co., Ltd. in 2007. In Oct. 2009, the company name was changed to HANLA IMS Co., Ltd. and now we are pushing forward with another new take-off through the expansion of the business area.

The company name was changed to HANLA IMS (Instrumentation Machinery System) Co., Ltd. to cover every business area to be diversified to Loading Computer, Valve Remote Control System, Deck Machinery, LED Lighting, Ballast Water Treatment System (BWTS), etc. from the measuring instrument business which is the company's existing business area, so we are determined to keep growing up as a company to be specialized in the integrate system in the field of shipbuilding and marine engineering, onshore plant and eco-friendly industry.

The business diversified to be developed for the company specialized in integrate system is now showing the increase in the sales every year thanks to our customers' encouragement and further BWTS will unveil the best quality product with better quality and price having the conveniences in installation and operation by improving the problems that other companies encountered in the existing market. Moreover, we are always doing our utmost for customer satisfaction since we have set up the factory in China to have the basis to be a global company.

We are committed ourselves to pulling out all the stops to be a company giving our customers the full satisfaction and reliability and contributing to the global society through the continuous challenge and innovation and continuous technical development.

We sincerely appreciate your encouragement and interest.

CEO/HANLA IMS Co., Ltd.

" We will provide our customers with much more benefits from the integrate system. "

CEO, Seok jun Ji

CEO, Yeong Gu Kim



1980

- 1989
· Established company

1990

- 1997
· ISO 9001 certified from DNV
· Representative agreement with kamstrup & klay : pressure & temperature instrument
- 1996
· Representative agreement with CSI by in Holland : Engine room alarm & monitoring system
- 1995
· Registered on manufacturer list of Korea Electric Power corporation about instrumentations : Nuclear electric power plant (T and S quality class)
· Technical license with Tokyo Keiso Japan : Level Instrument

- 1994
· Registered on manufacturer list of Korea Electric Power corporation for instrumentations : Thermal electric power plant (R quality class)
· Products type approved from : ABS, KR, LR, DNV, BV, GL, NK, RINA, etc
· Level instrumentations
- 1993
· Representative agreement with VEGA Germany : Level instrumentations
- 1992
· Technical agreement with Auxitrol France : Air purge type level gauging system : Rader beam type level gauging system

2000

- 2005
· Awarded an export prize.(10,000,000 usd)
· O-gold mark certified from Samsung Heavy Industries
- 2004
· Awarded an export prize(5,000,000 usd)
- 2002
· Established a joint-venture company in China : "TAIZHOU HANVI INSTRUMENT Co., Ltd
- 2000
· Moved into new factory in national industrial complex : Land 3,300m² / Floor space 3,200m²
· CE mark certified from DNV

- 2009
· Acquired equity in Blue Science Co.,Ltd
· Changed Name to HANLA IMS(November)
· Started business of Deck Machinery
- 2008
· Started business of Valve Remote Control
· Established an affiliated company of HANLA NMT
- 2007
· Established branch factory in China
· Listed in Korean Stock Market (KOSDAQ)

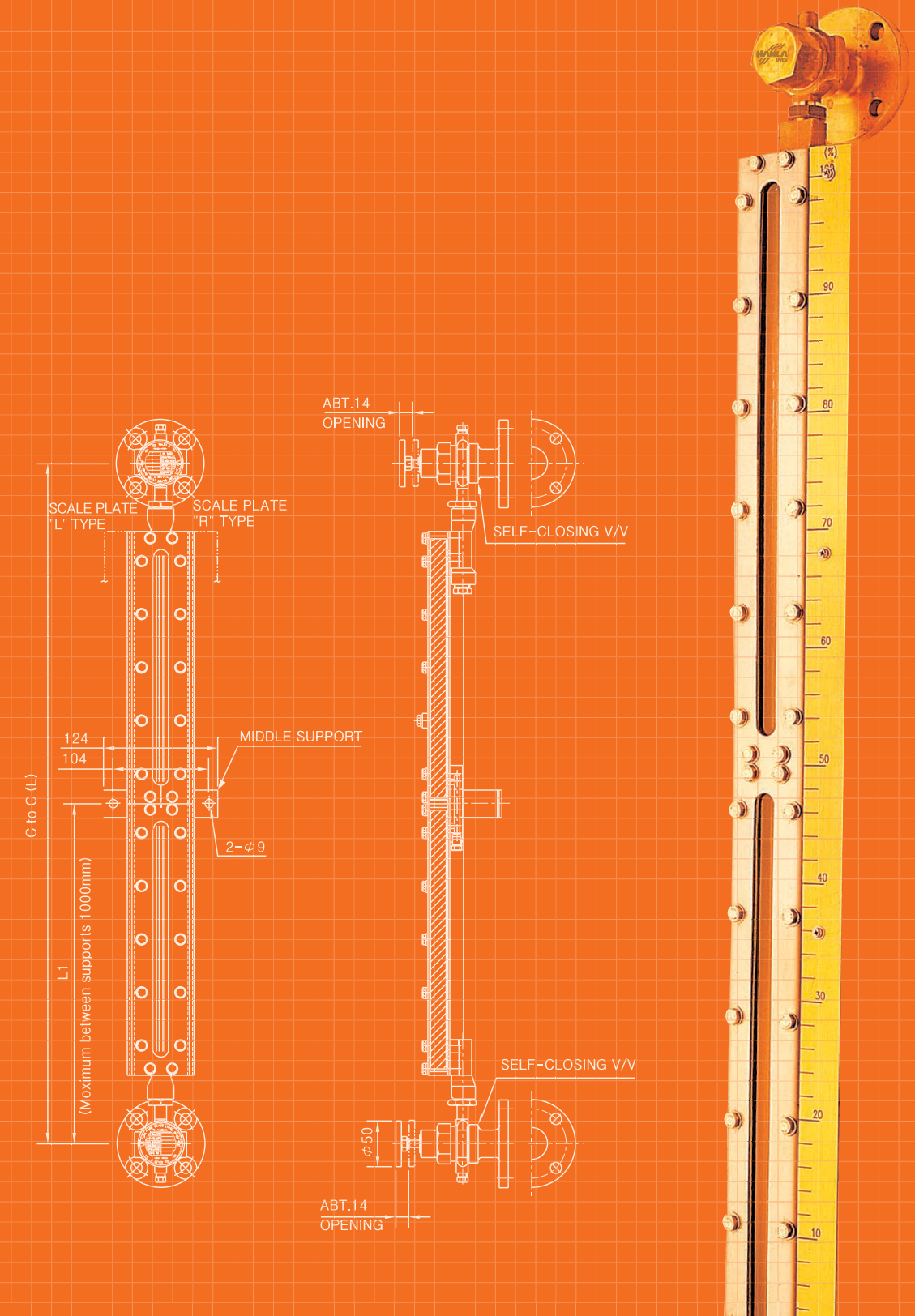
2010

- 2019
· USCG Type Approval Status : Under Review
- 2016
· Best Family Friendly Company Certification
· USCG AMIS Approval of Ballast Water Treatment System
- 2015
· New Excellent Technology Authentication
· High technology product confirmation
· World Class 300 Company' Certificate of Designation
· Next Global Champ Certificate of Designation
· Type Approval Certificate of Ballast Water Treatment System
- 2014
· Korean World-class Product Award 2014 by Minister of Trade, Industry & Energy Republic of Korea
- 2013
· Concluded OEM Agreement with ECONOSTO
- 2012
· Designated Global Small Giants 2012 Leading Employer Award (Busan Metropolitan City)
- 2011
· ISO 14001 Certified to EMS and QMS
- 2010
· Declared Vision HI 1520 LED Lighting certified by KS Mark

Level Measurement Systems & Instrumentations

Level Gauges

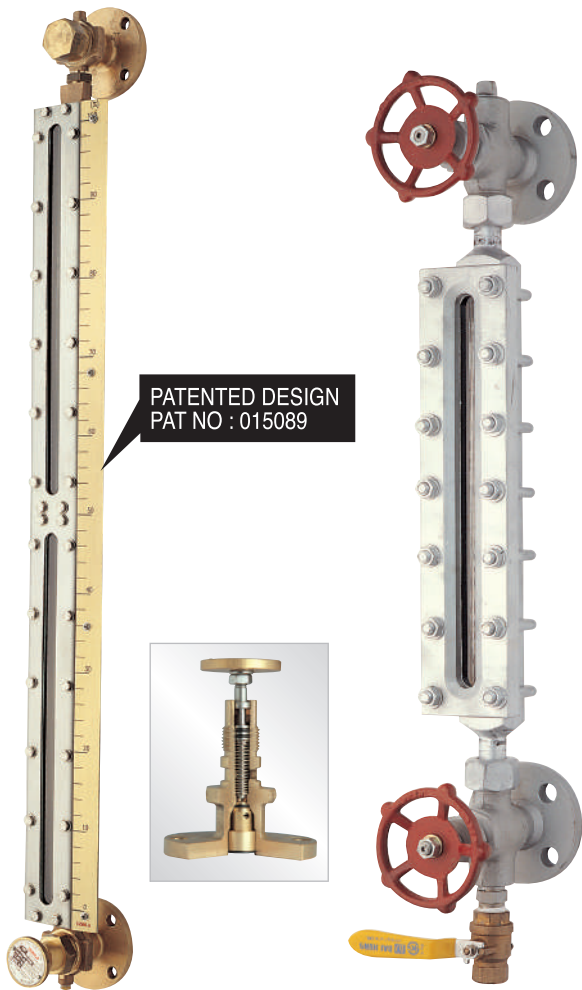
- Flat Type Glass Level Gauge
- Tubular Type Glass Level Gauge
- Marine Float Type Level Gauge
- Magnetic Float Type Level Gauge
- Self-Powered Content Gauge
- Dial Type Float Level Gauge



Level Gauges

Flat Type Glass Level Gauge

Model : RLG Series



RLG-LP Series

RLG-HP Series

Hanla marine gauge

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

Flat glass design

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

Application

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

Easy maintenance for rlg-lp series

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

Model number code system

RLG - [] - [] - [] - []

Symbol of Flat Type Glass Level Gauge

- Type of Level Gauge
 - LP : Flat Type Used for Low Press. & Temp.
 - HP : Armored Type Reflex Level Gauge Used for High Press. & Temp.
- Type of Valve
 - N : Tank Welding Flange With Check Valve (applied to the RLG-series)
 - W : Wide Measuring (applied to the RLG-LP-14)
 - T : Manual Operating Device
 - [] : With Scale board SR: Right at Your Sight SL: Left at Your Sight

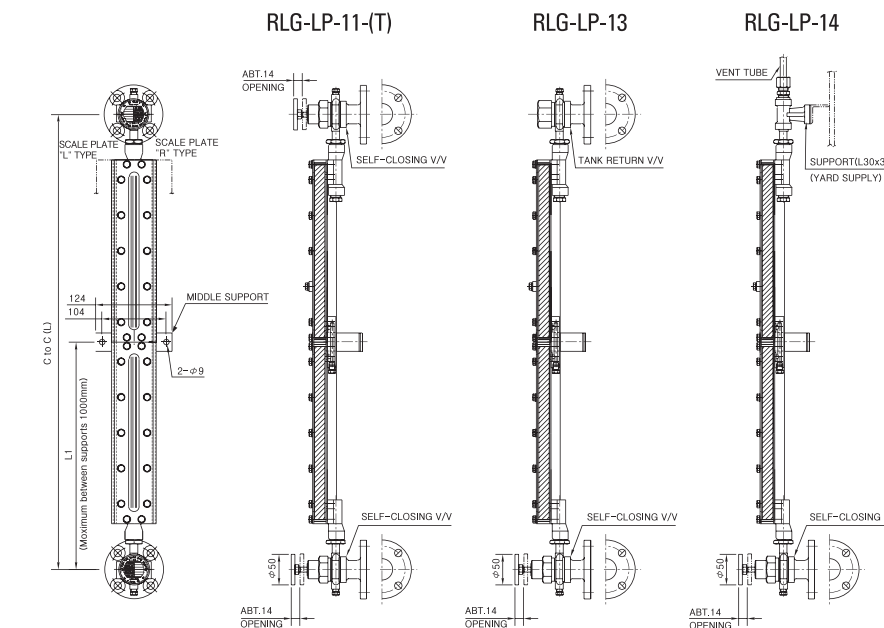
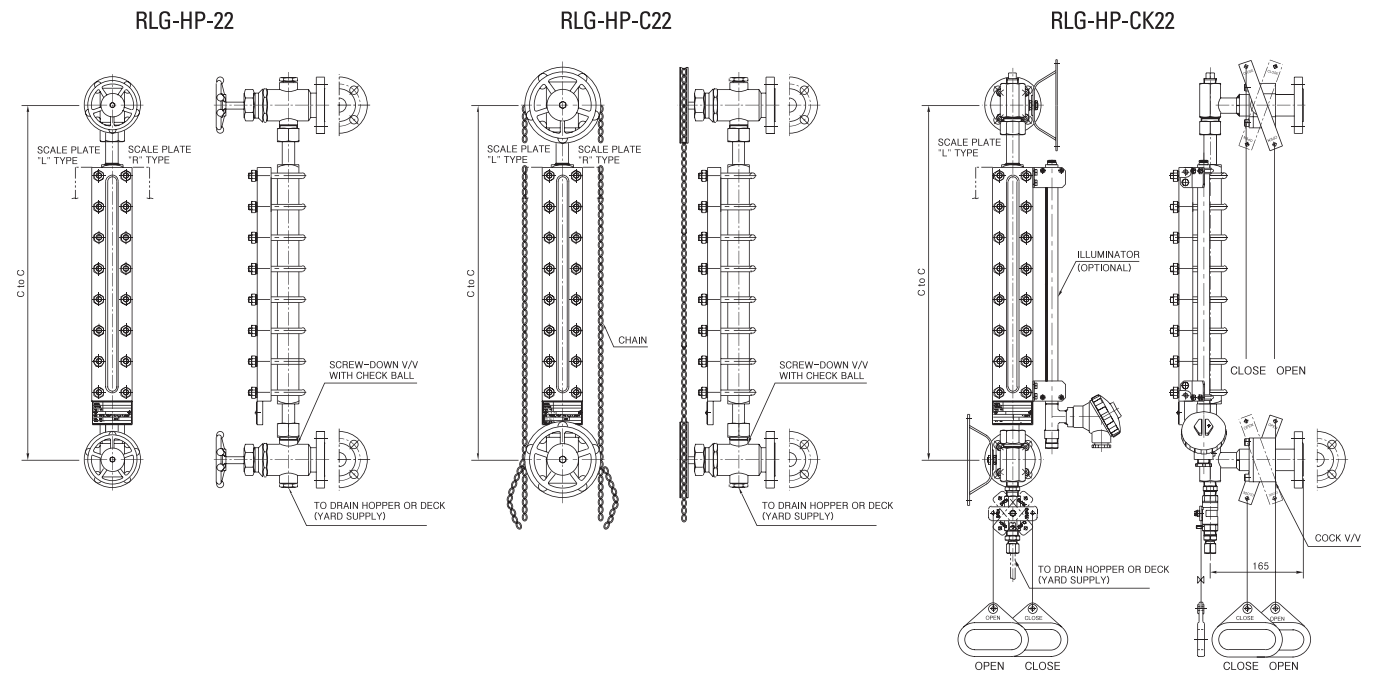
APPLICATION	MODEL	VALVE TYPE	
		Upper	Lower
LP	11	Self-closing	Self-closing
	13	Tank return	Self-closing
	14	Top vent	Self-closing
HP	22	Screw-down valve	Screw-down valve with checkball
	C22	Chain valve	Chain valve with check ball
	CK22	Cock valve	Cock valve

Standard model and specification

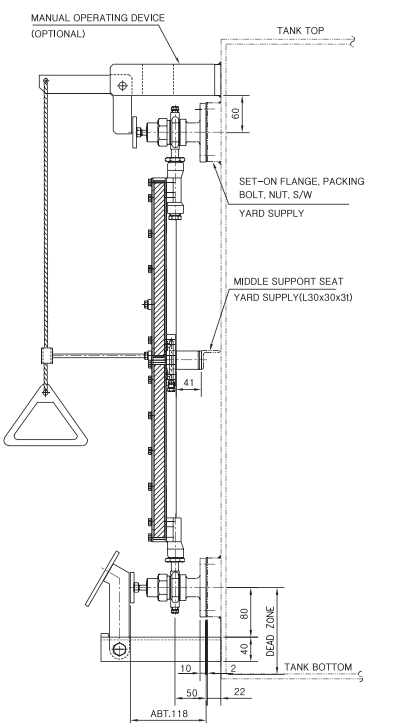
Model	Valve type		Connection size	Range of pressure	Range of temp.	Material				Center to Center
	Upper	Lower				Valve	Front channel	Back channel	Glass	
RLG-LP-11	Self-closing	Self-closing	JIS 5K20A, 25A	3kg/cm ²	150°C	HBsCI	SUS201	SUS201	Borosilicate	285
RLG-LP-13	Tank return	Self-closing	JIS 5K20A, 25A	3kg/cm ²	150°C	HBsCI	SUS201	SUS201	Borosilicate	~ 5100
RLG-LP-14	Top vent	Self-closing	JIS 5K20A, 25A	3kg/cm ²	150°C	HBsCI	SUS201	SUS201	Borosilicate	(m/m)
RLG-HP-22	Screw-down valve	Screw-down valve WITH CHECK BALL	JIS 16K20A	50kg/cm ²	300°C	C,S	C,S	C,S	Borosilicate	320
RLG-HP-C22	Chain valve	Chain valve WITH CHECK BALL	JIS 16K20A	30kg/cm ²	300°C	C,S	C,S	C,S	Borosilicate	~ 2870
RLG-HP-CK22	Cock valve	Cock valve	JIS 16K20A	20kg/cm ²	300°C	C,S	C,S	C,S	Borosilicate	(m/m)

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

Outline / Dimensions



INSTALLATION OF THE FLAT TYPE GLASS LEVEL GAUGE



Level Gauges

Tubular Type Glass Level Gauge

Marine Float Type Level Guage



Hanla marine gauge

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

Limitation

- The tubular type glass level gauges, RLG-TB-12/13/14 can be used for following condition.
- Fuel oil tank of which the capacity is less than 1000 liter.
- In ship with class notation "Coasting Service" or whose gross tonnage is less than 500 tons.

Standard model and specification

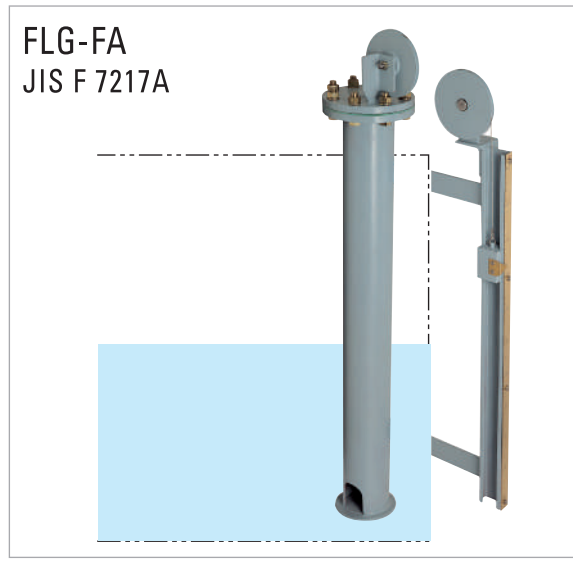
JIS Code	Model	Upper body type	Valve type		Connection size	Material			Protector type	Center to center	Range of pressure	Range of Temp.
			Upper	Lower		Protector	Glass	Valve				
JIS F 7211	RLG-TB-24	A-type	Vent	Shut-off	5K 10A	SS41	HARD	BC6	K-type	325 ~ 3765 (mm)	0~3kg/cm ²	0~100°C
	RLG-TB-23	B-type	Tank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

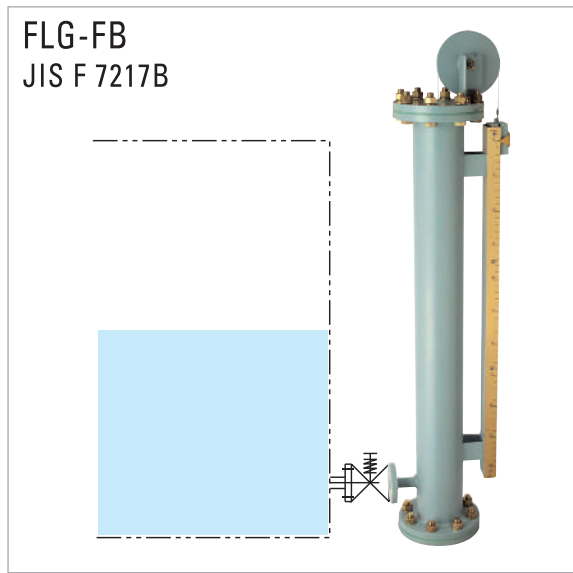
Application

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

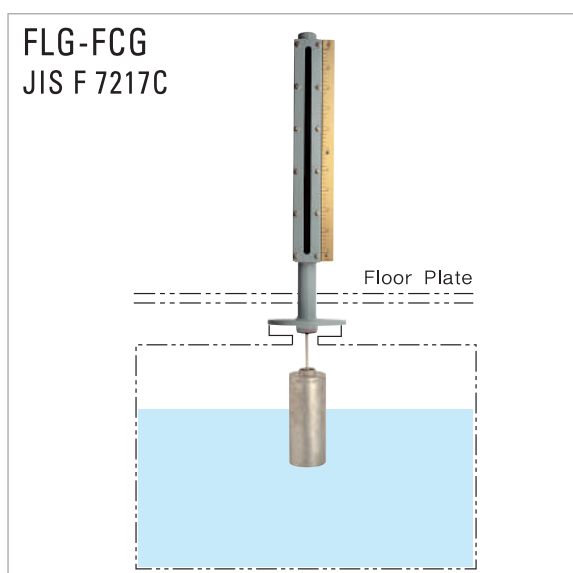
FLG-FA
JIS F 7217A



FLG-FB
JIS F 7217B



FLG-FCG
JIS F 7217C



General

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

Feature

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

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

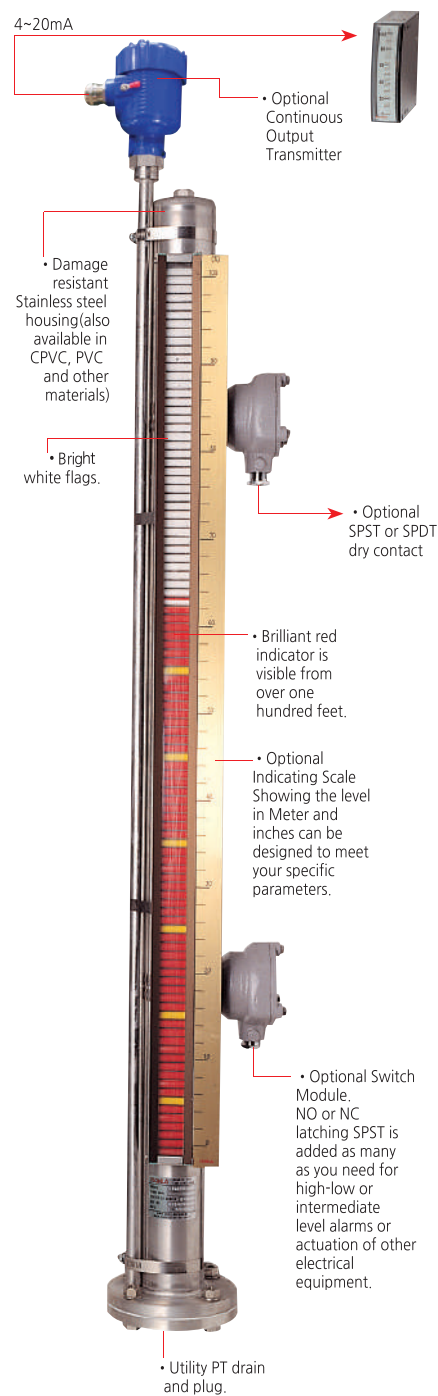
Operating condition

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.

Level Gauges

Magnetic Float Type Level Gauge



General

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

High visibility

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

Environmental safety

Monitored liquid is contained inside a pressure tight housing.

Efficiency

Continuous level indication without external power.

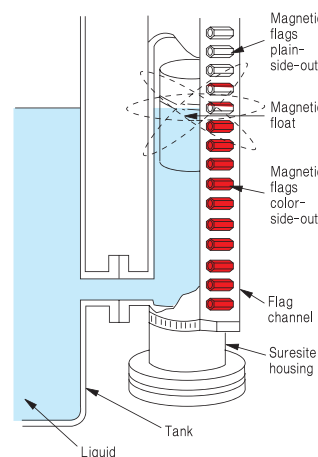
Electronic control

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

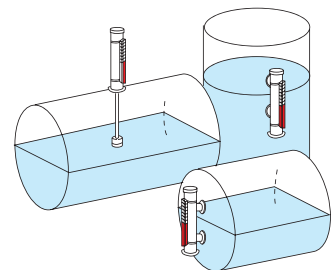
Widely used to measure

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

Operating principle



As liquid level rises, a magnet-equipped float within the unit inverts the magnetic flags in the external indicator to "color-side-out." The flags is 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.

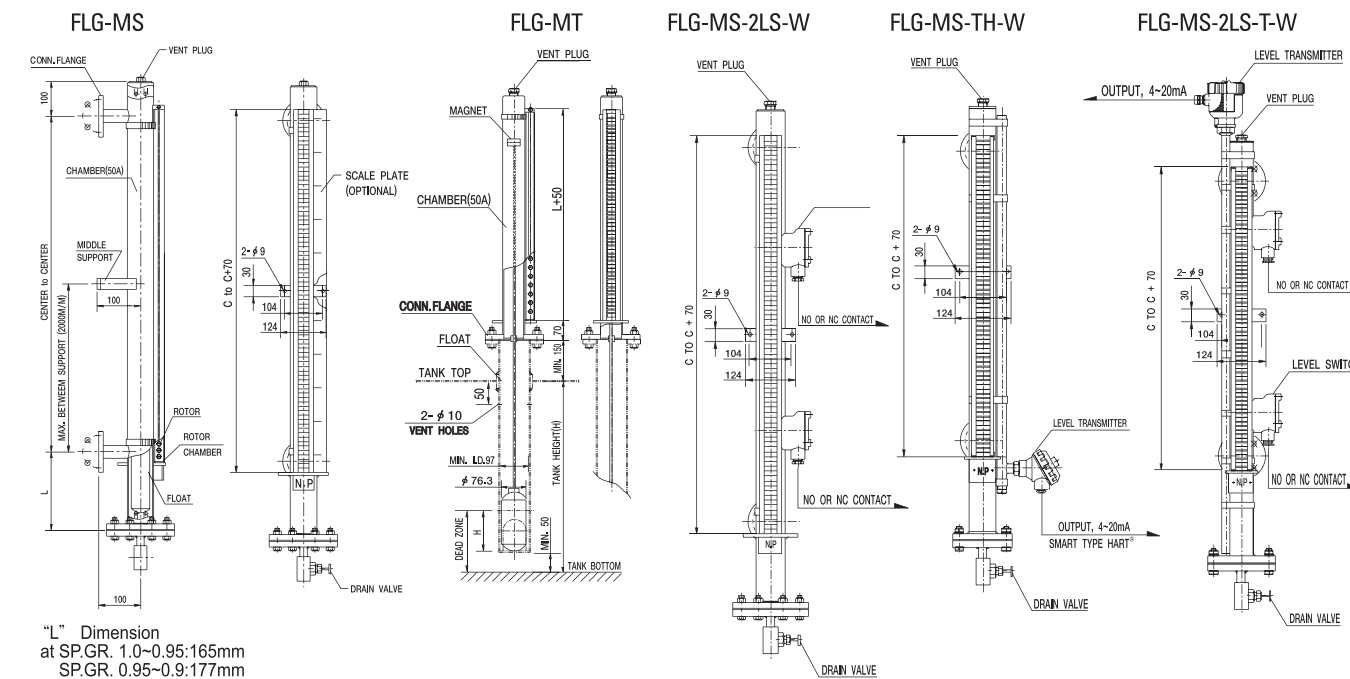


Model number code system

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

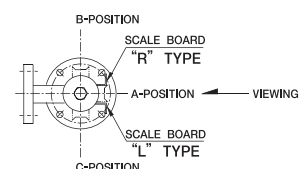
- Symbol of Magnetic Float Type Level Gauge
- Level gauge mounting type
 - MS: Side-side mounting
 - MT: Top mounting
- No. of level switch
 - 1LS: 1-Level switch
 - 2LS: 2-Level switches
 - 3LS: 3-Level switches
 - 4LS: 4-Level switches
- Enclosure
 - W: Weather proof(IP56)
 - E: Explosion proof(Exd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

Outline / Dimensions

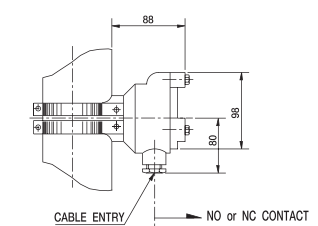


"L" Dimension
 at SP.GR. 1.0~0.95:165mm
 SP.GR. 0.95~0.9:177mm
 SP.GR. 0.9~0.85:193mm
 SP.GR. 0.85~0.8:213mm
 SP.GR. 0.8~0.75:240mm

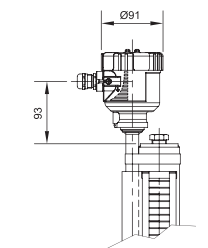
Indicator mounting position



Level switch outline



Level transmitter outline



Standard model and specification

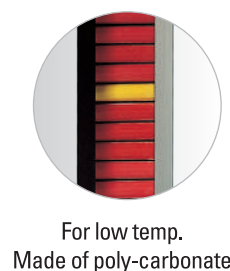
Symbol	Mounting method	Contact size	Measuring range	Working conditions		Specific gravity	Accuracy	Materials			
				Press.	Temp.			Chamber	Float	Rotor	Rotor chamber
FLG-MS-□-□	Side-Side	JIS, DIN, ANSI 25A	Max.5000mm	5kg/crit	200°C	Over 0.8	+/-10m/m	SUS304	Titanium	Aluminum	Aluminum
		JIS, DIN, ANSI 25A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

Please consult with our factory when other conditions are required.

Specification of level switch and level transmitter assembly option

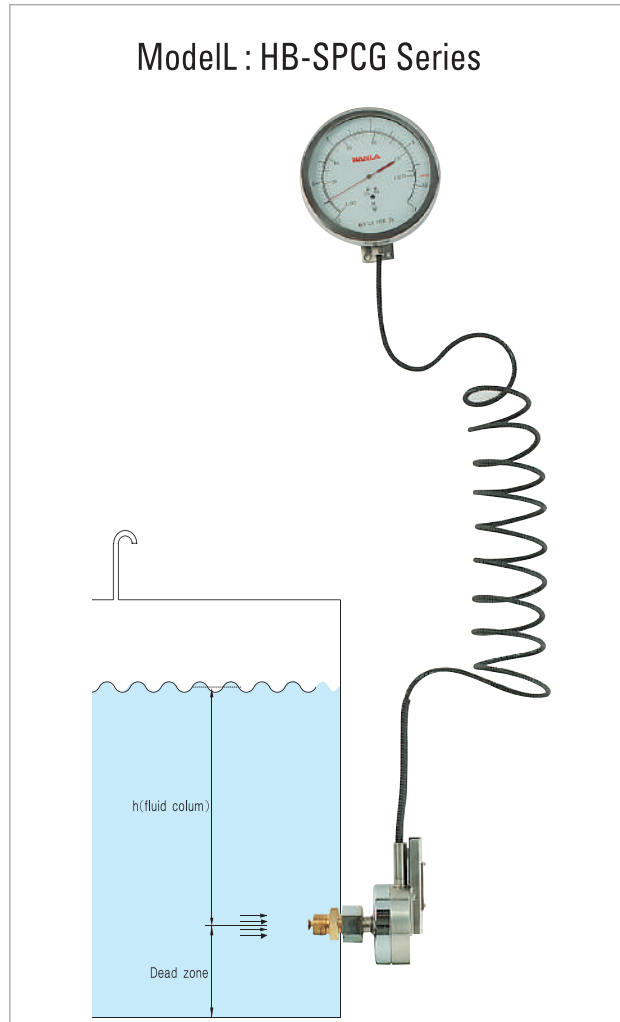
Description	Module	Output	Contact rating	Contact form	Power source	Accuracy/resolution	Material		No. of point	Measuring range	Max. working temp.	Enclosure
							Housing	Transmitter				
Level switch	Reed switch	Dry contact	125VAC, 0.5A	SPDT, SPST	N/A	± 3m/m	AC	N/A	Max.6	N/A	120	Weather proof
Level transmitter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

These switches & transmitter modules can be intrinsically safe by using the I.S barrier.
 Please consult with our factory when other conditions are required.
 The scale board is an optional item.



Level Gauges

Self-Powered Content Gauge



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.

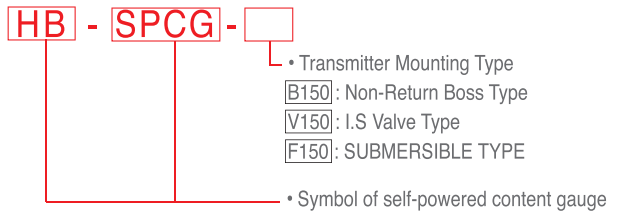
Application

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 12 meters
- Over load : 120% 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

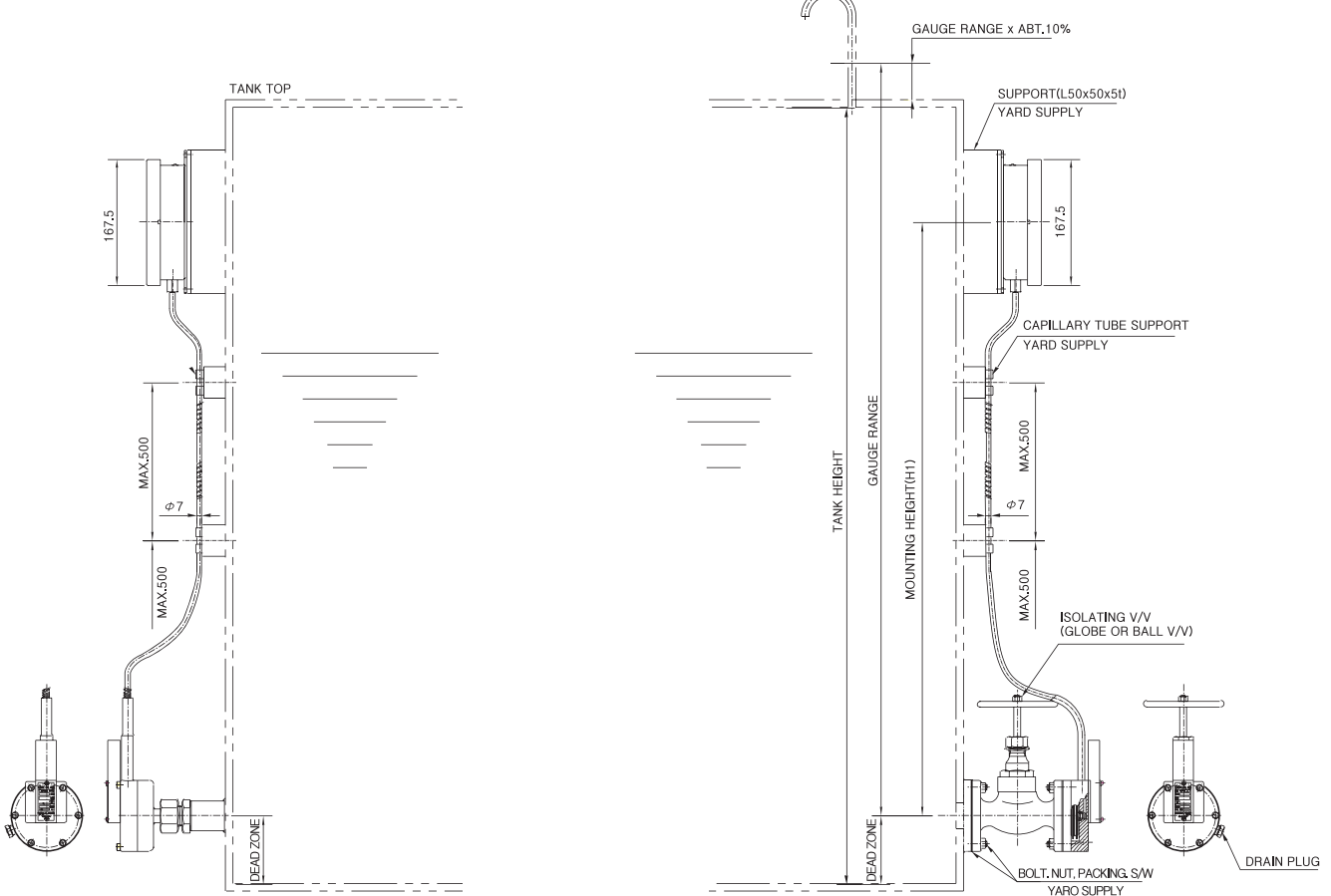


Standard model and specification

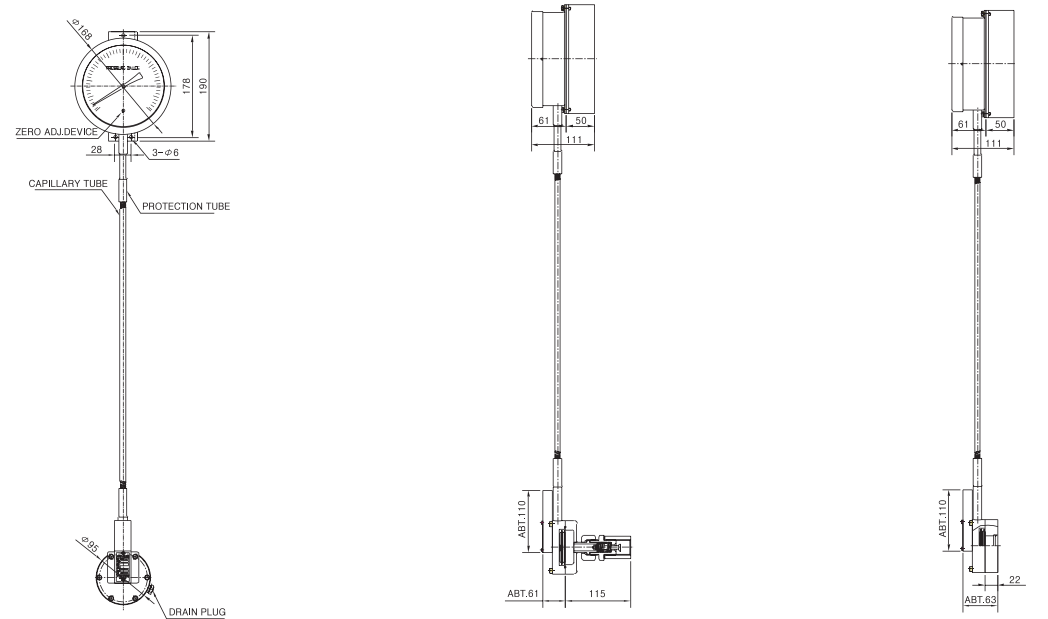
Model	Application	Connection Size	Accuracy	Capillary tube Length	Material			
					Indication Gauge	Capillary Tube	Flexible Tube	Diaphragm
HB-SPCG-B150	General liquid (Oil, Water)	PF3/4"	$\pm 1.0\%$ of Full Range	STD. 3M/MAX.16M	SUS304	COPPER	SUS304 WITH P.V.C COATING	PBP/ SUS316L
HB-SPCG-V150	General liquid (Oil, Water)	JIS 5K / 10K / 16K 25A / 40A	$\pm 1.0\%$ of Full Range	STD. 3M/MAX.16M	SUS304	COPPER	SUS304 WITH P.V.C COATING	PBP/ SUS316L
HB-SPCG-F150	General liquid (Oil, Water)	JIS 5K 100A / 125A / 150A	$\pm 1.0\%$ of Full Range	STD. 3M/MAX.16M	SUS304	COPPER	SUS304 WITH P.V.C COATING	PBP/ SUS316L

Please consult with factory when other condition are required

Installation of content gauge



Outline / dimensions



Level Gauges

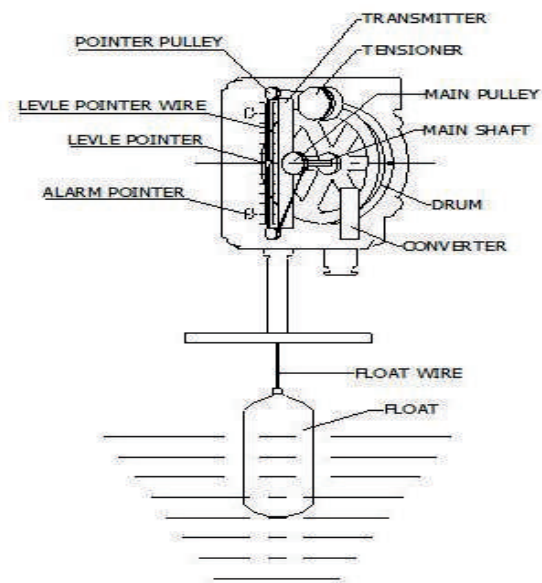
Dial Type Float Level Gauge

Model : FW-DF Series FW-DF-T-C

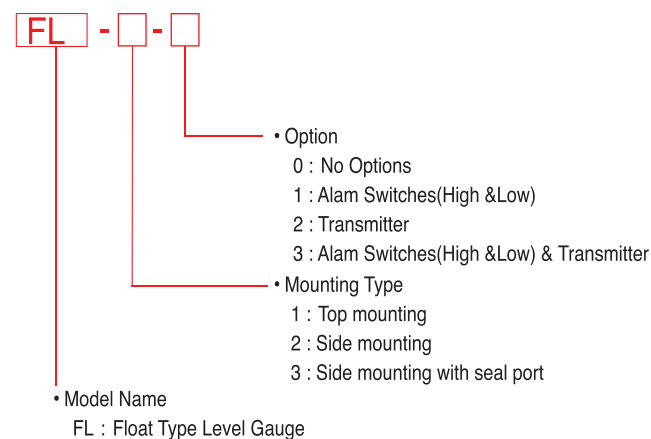


Operating principle

A float type level gauge is composed of a float, a float wire and a head. The drum and the float wire are connected to the float. It moves along on the liquid level inside a tank. The drum and the main pulley are directly connected to the main shaft. So, the drum, and the main pulley rotate together. The level pointer is connected with the main pulley and the pointer wire. It visually informs the tank liquid level to user. According to the installation height, the main pulley of the different size is applied for.



Model number code system



Application

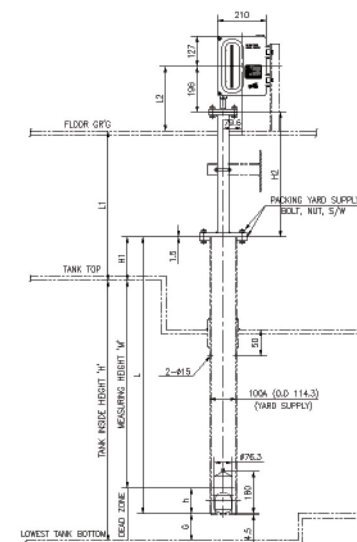
The float type level gauge is used for H.F.O / D.O / L.O tanks, Water tanks, and Sewage collecting tanks etc. Product structure is simple and maintenance is easy. Also, HIGH/LOW SWITCH, TRANSMITTER functions are applicable by the user as an option.

Product Information

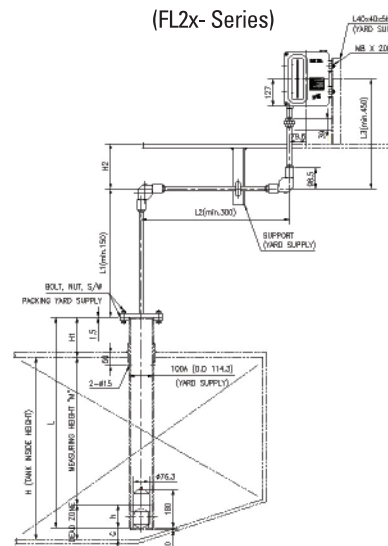
Model	Mounting type	Measuring Range	Indication system	Specific gravity	Accuracy (Full range)	Material		
						Head	Float wire	Float
FL1x	Top	0~6m	One point	0.7~1.5	±1.5%	ADC	SUS316	SUS304
FL2x	Side	0~6m	One point	0.7~1.5	±1.5%	ADC	SUS316	SUS304
FL3x	Side with Seal pot	0~6m	One point	0.7~1.5	±1.5%	ADC	SUS316	SUS304

Outline / Dimensions

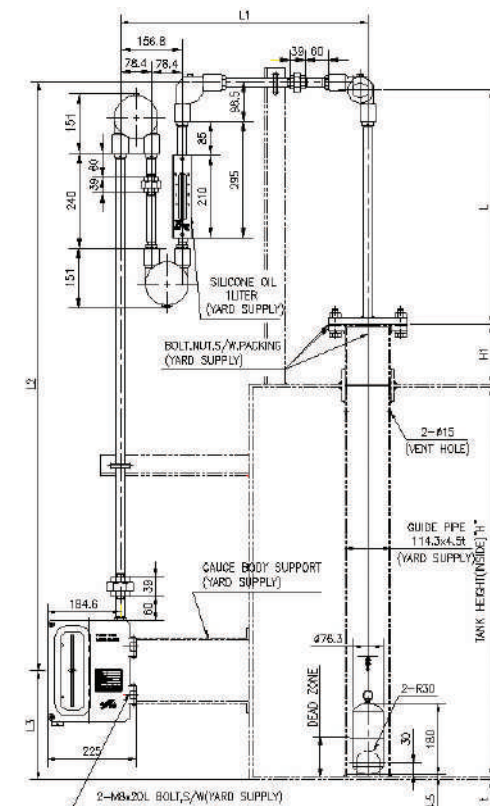
TOP MOUNTING (FL1-Series)



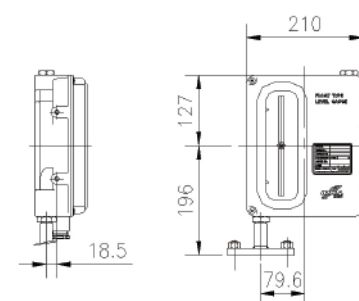
SIDE MOUNTING (FL2x-Series)



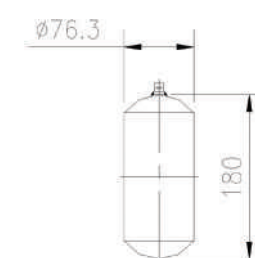
SIDE MOUNTING WITH SEAL PORT (FL3-Series)



Detailed dimensions for indicator body



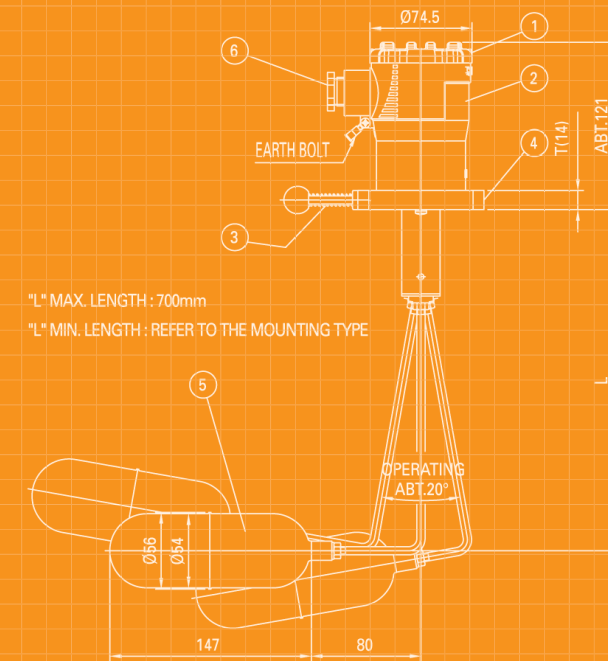
Detailed dimensions for float



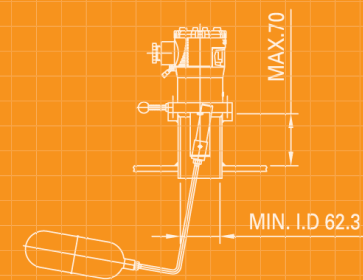
Level Measurement Systems & Instrumentations

Level Switches

- Micro Switch Type Float Switch
- Displacement Type Level Switch
- Float Operated Type Level Switch
- Reed Switch Type Float Level Switch
- Pneumatic Type Level Switch
- Float Operated Type Level Switch
- Quick Float Type Level Switch
- Capacitance Type Oil Detector
- Vibration Type Level Switch For Liquid And Solid
- Paddle Type Level Switch For Solid



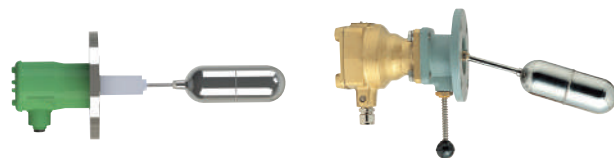
SLIP-ON FLANGE MOUNTING



Level Switches

Micro Switch Type Float Switch

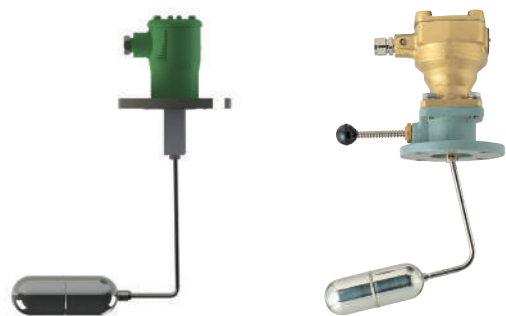
Horizontal type : FMS-H Series



Standard type

Explosion proof type

Vertical type : FMS-V Series



Standard type

Explosion proof type

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.

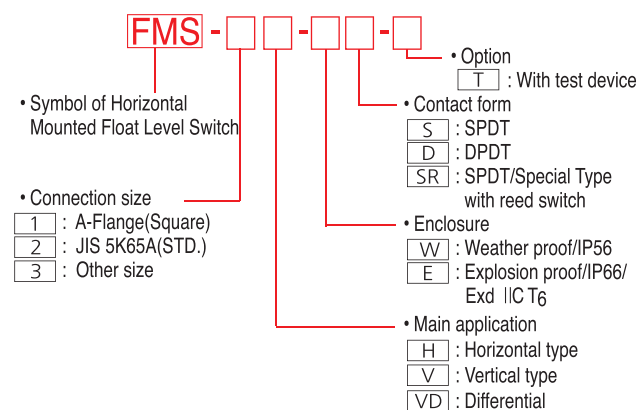
Features

- 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.

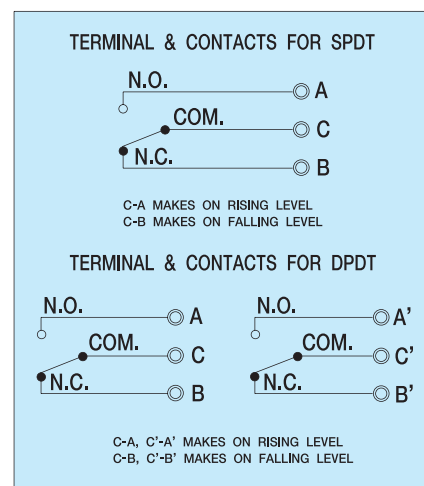
Application

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.

Model number code system



Contact form

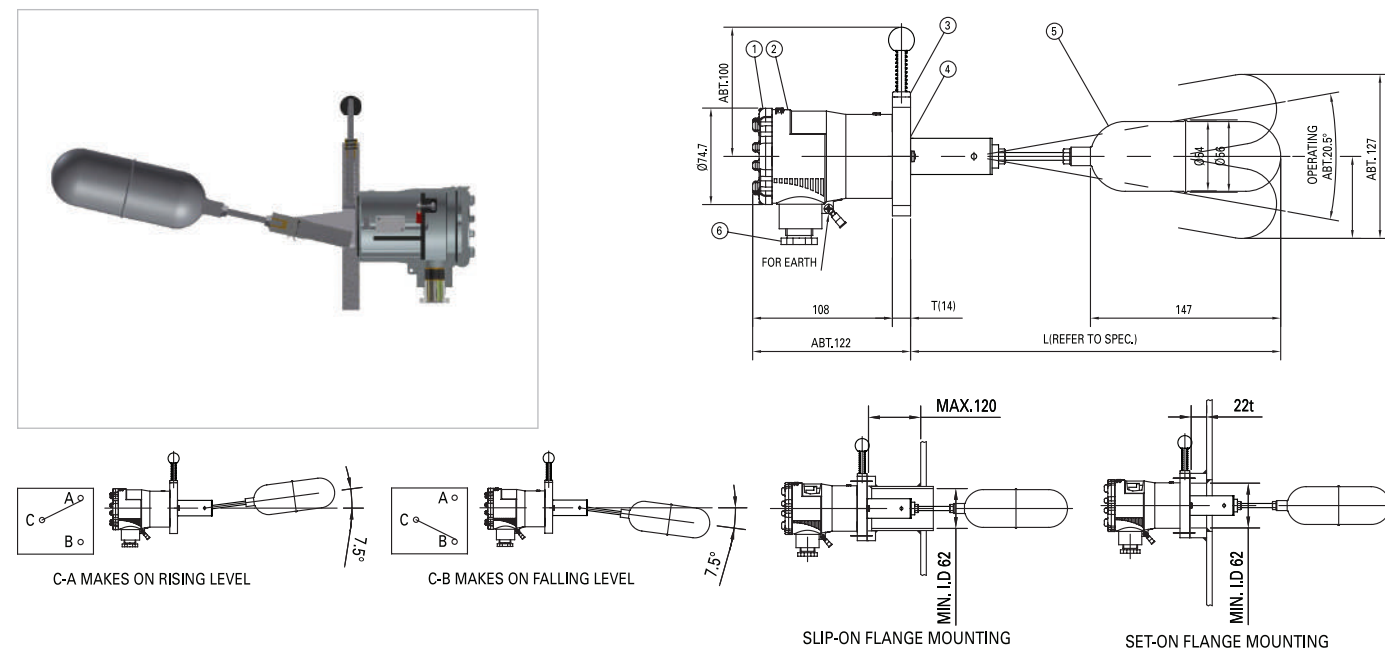


Standard model and specification

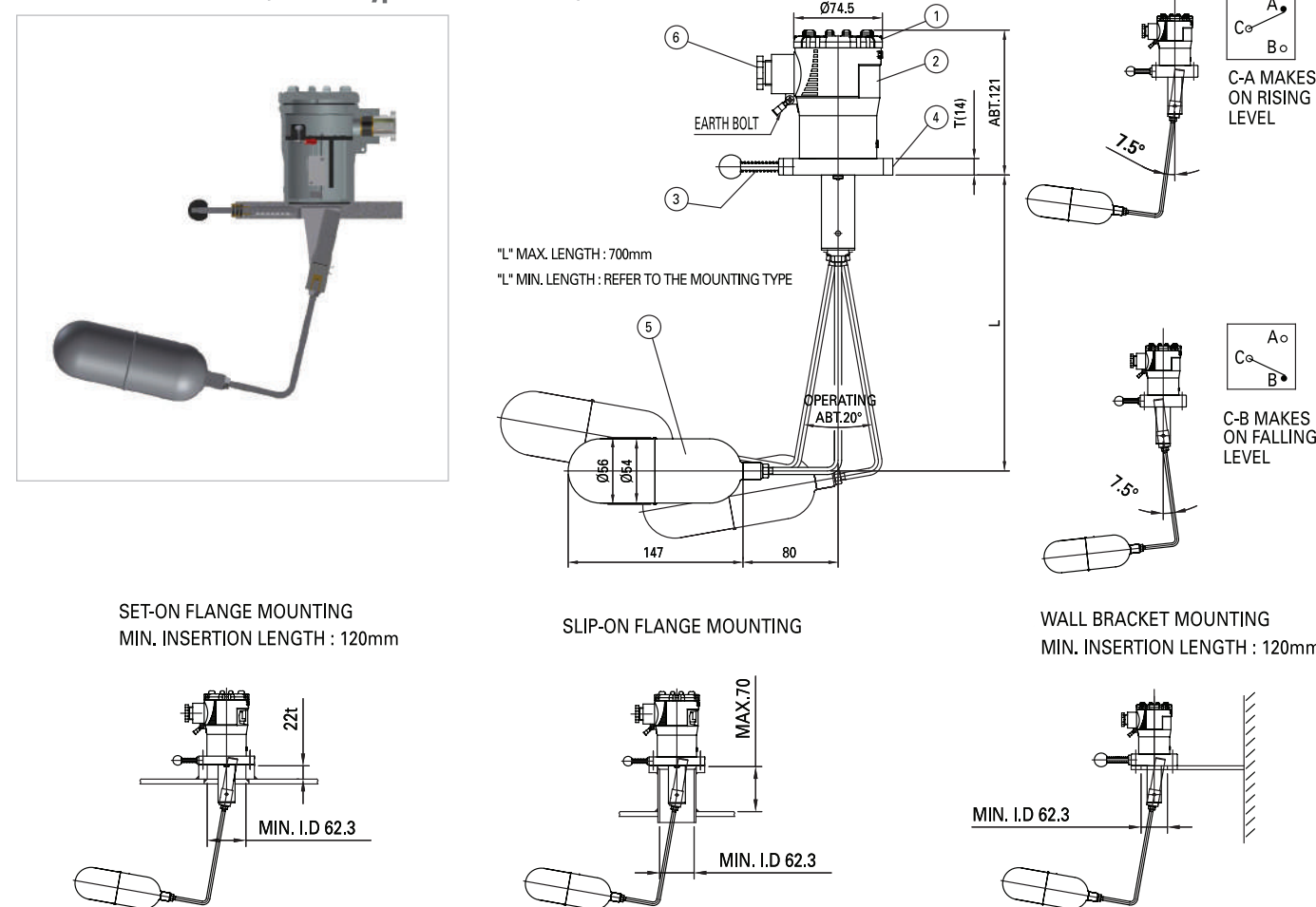
Type	Application	Max. pressure (kg/cm ²)	Max. temperature (°C)	Switch contact rating	Min. Sp.Gr	Cable entry	Material		
							Float	Flange	Switch body
Standard Type	General liquid	10	180	250VAC,5A	0.78	15b (PF1/2")	SUS304	ADC	ADC
Differential Type	Widely Differential	10	180	250VAC,5A	0.8	15b (PF1/2")	SUS304	ADC	ADC
Explosion Proof Type	Hazardous area	10	180	250VAC,5A	0.78	NPT1/2"	SUS304	SUS304	SCS13

- 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 (Horizontal type : FMS-H Series)



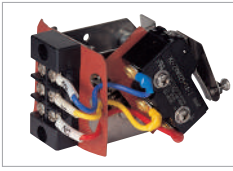
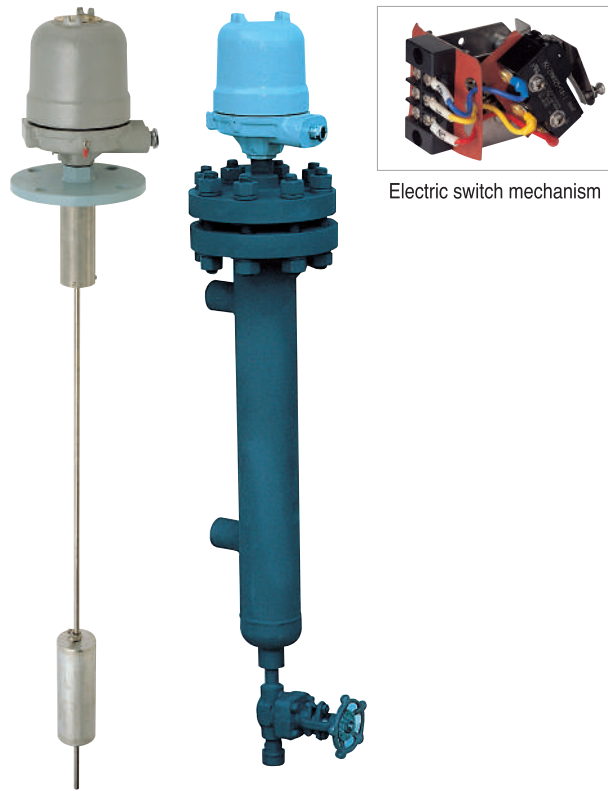
Outline / Dimensions (Vertical type : FMS-V Series)



Level Switches

Displacement Type Level Switch

Model : DMS-Series



Electric switch mechanism

Features

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

Application

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

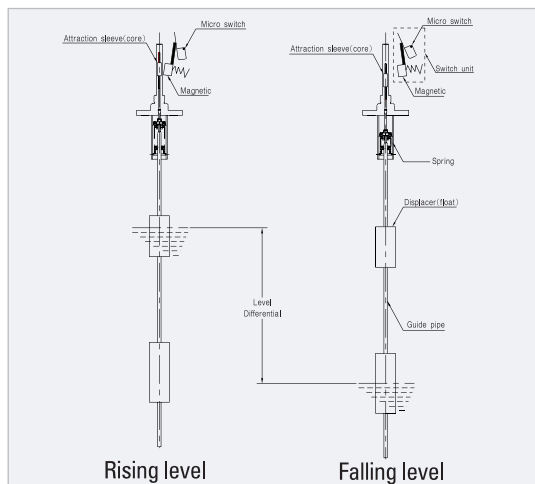
Operating principle

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

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

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

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



Model number code system

- DMS -** [] - [] - [] - []
- Symbol of Displacement Type Level Switch
 - Connection size
 - 5 : JIS 5K 80A FF
 - 6 : JIS 10K 80A FF
 - 7 : JIS 5K 100A FF
 - 8 : JIS 10K 100A FF
 - 9 : JIS 5K 25A FF for SS Type (side-side mounting type)
 - Main application
 - 01A : High or low alarm
 - 01C : High or low control
 - 02A : High and low alarm
 - 02C : High and low control
 - 03AC : High alarm / Mid. and low control
 - 03CA : High and Mid. control/low alarm
 - Option
 - T : With test device
 - Enclosure
 - V : Weather proof(IP56)
 - E : Explosion proof/IP56/Exd IIC T₆
 - Internal Construction
 - G : Without float chamber
 - C : With float chamber
 - R : Guide wire
 - SS : With external float chamber (side-side mounting type)

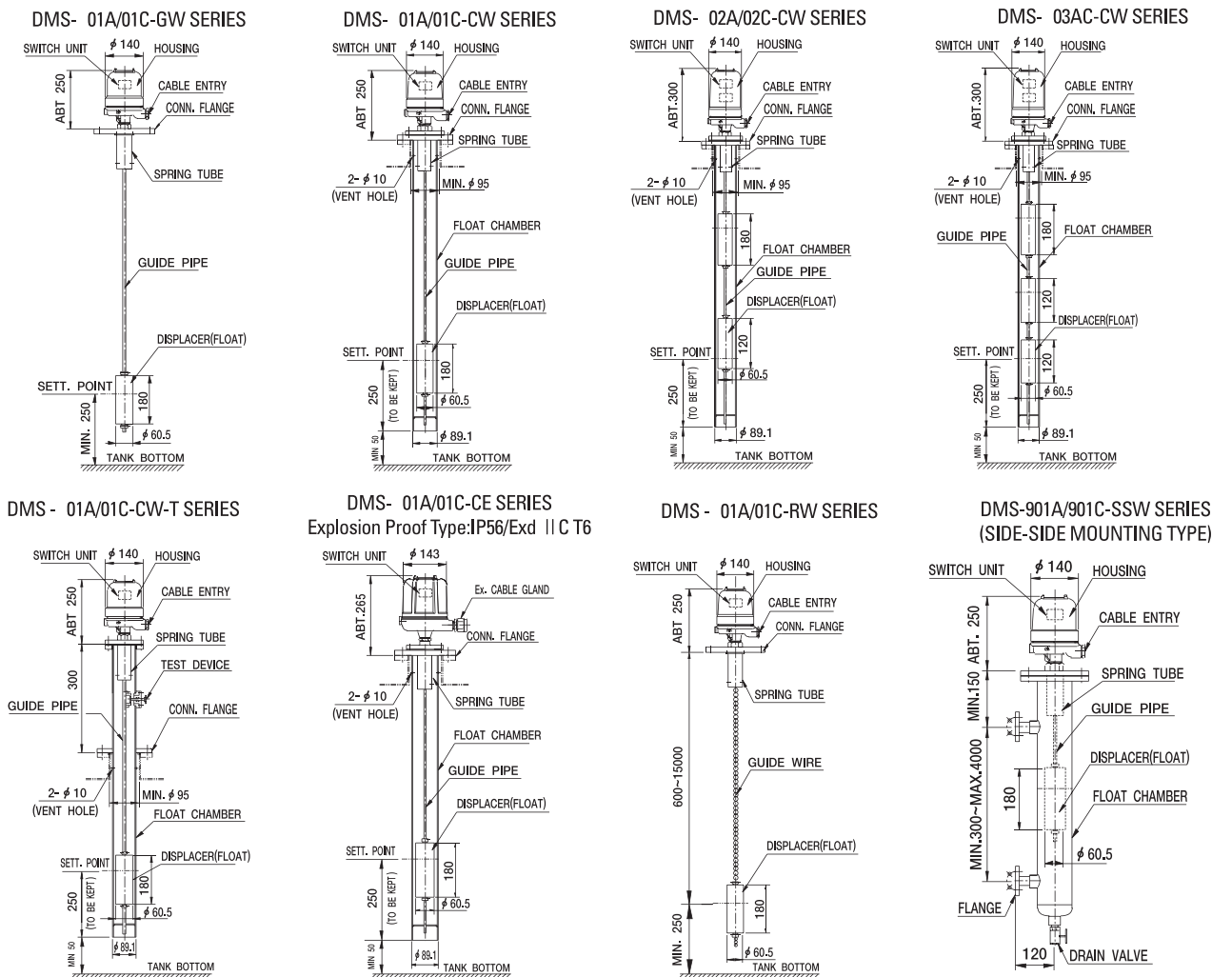
Standard model and specification

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 ~ 5000	± 8	0.85	10	180	250VAC, 15A	15b	ADC	SS41	SUS304	SUS 304
DMS- 01C	High or Low control												
DMS- 02A	High and Low alarm	Top flange type	220 ~ 4500	± 8	0.85	10	180	250VAC, 15A	15b	ADC	SS41	SUS304	SUS 304
DMS- 02C	High and Low control												
DMS- 03AC	High alarm/ Mid. and low control	Top flange type	220 ~ 4000	± 8	0.85	10	180	250VAC, 15A	15b	ADC	SS41	SUS304	SUS 304
DMS- 03CA	High and Mid. control / Low alarm												

Optional informations

1. Material (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



Differential range and contact form

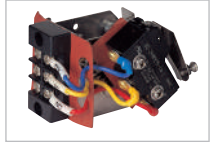
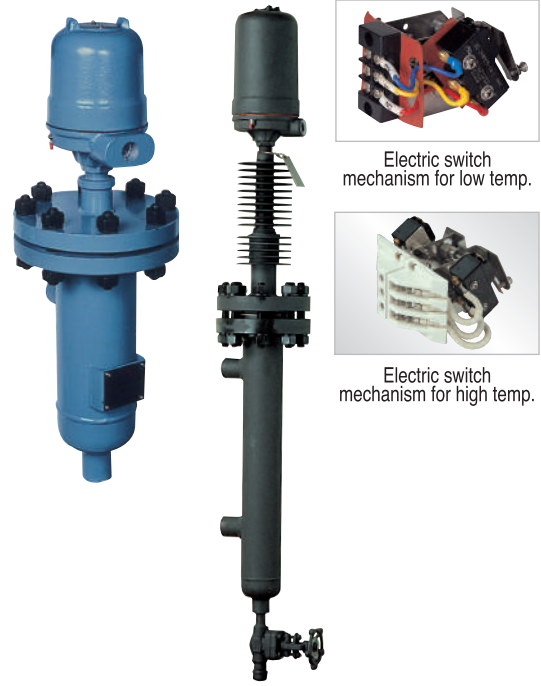
NUMBER OF SWITCH UNIT	ONE(1)	TWO(2)		
		DMS-□01A/01C	DMS-□02A/02C	DMS-□03AC
MAIN MODEL	DMS-□01A/01C	DMS-□02A/02C	DMS-□03AC	DMS-□03CA
DIFFERENTIAL(mm) * 1	30 TO 50	UPPER:30 TO 50 LOWER:30 TO 50	UPPER:30 TO 50 LOWER:200 TO 4500	UPPER:200 TO 4500 LOWER:30 TO 50
CONTACT OPERATION				
CONTACT CONFIGURATION	SPDT			
	DPDT			

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

Level Switches

Float Operated Type Level Switch

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

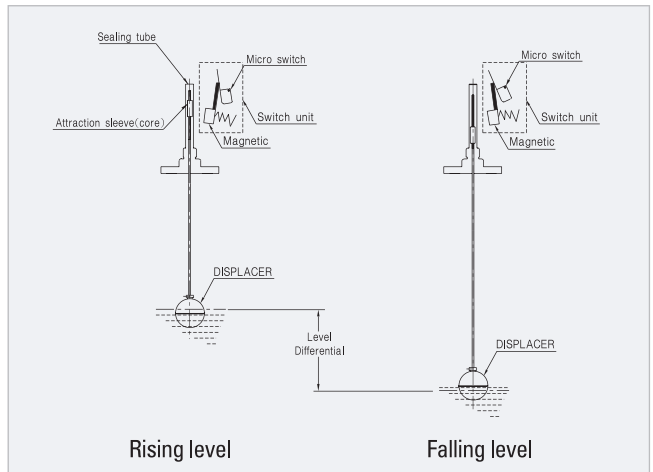
OMS - [] - [] - [] - []

- Main application
 - F401 Flanged external chamber
 - F402 Flanged external chamber
 - F301 Flanged external chamber
 - F302 Flanged external chamber
 - S401 Sealed external chamber
 - S301 Sealed external chamber
 - S302 Sealed external chamber
 - S303 Sealed external chamber
 - SF Side flange type
 - TF Top flange type
- 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 CT6)
- Connection size
 - S1 : 1" Socket weld
 - S1 1/2 : 1-1/2" Socket weld
 - S2 : 2" Socket weld
 - F1 : JIS 5K 25A
 - F2 : JIS 16K 25A
 - FS : Special flange (ANSI, DIN)

Connection method

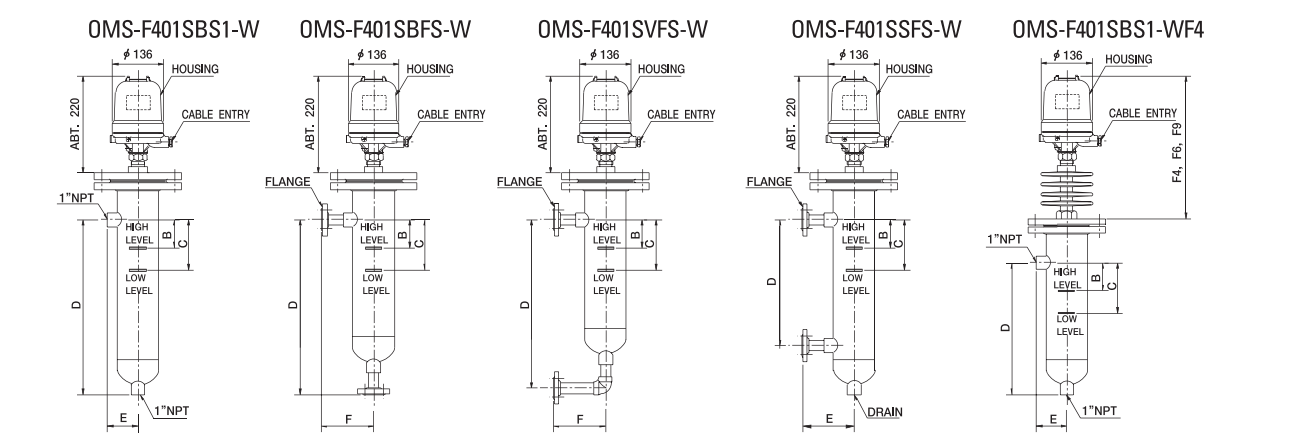
- SS Side-side
- SB Side-bottom
- SV Side-bottom side



Standard model and specification

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

Outline / Dimensions for flange external chamber type

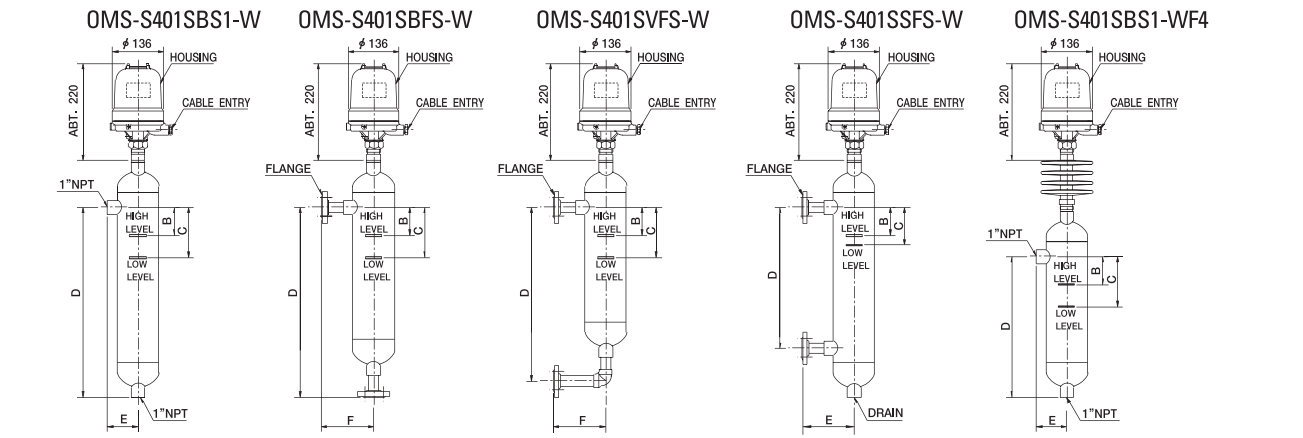


Model	B(1)		C(1)		D(2)		E(2)		F	
	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.
OMS-F401	3	76	4	102	10 1/2"	267	3 11/16"	94	6 1/2"	165
OMS-F402	2 1/2"	64	3 1/4"	83	10 1/2"	267	3 11/16"	94	6 1/2"	165
OMS-F301	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152
OMS-F302	3	76	4 1/4"	108	9	229	3 3/16"	81	6	152

(mm)

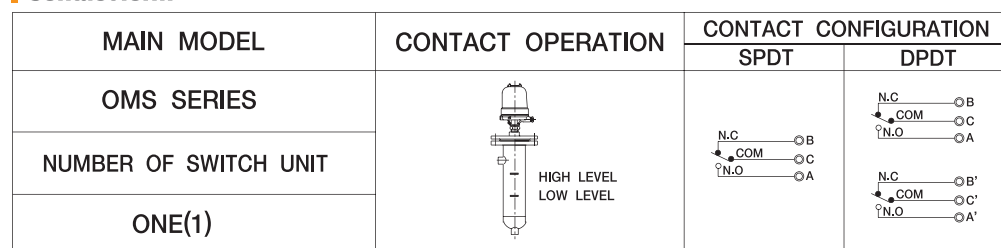
Height of housing(single switch function)			
Number of radiation fins			
0(F0)	4(F4)	6(F6)	9(F9)
250	357	407	467

Outline / Dimensions for sealed external chamber type



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

Contact form



Note

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

Level Switches

Reed Switch Type Float Level Switch

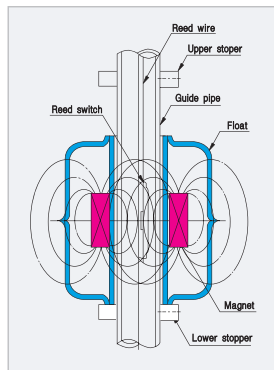


Explosion proof type

With test device

Operating principle

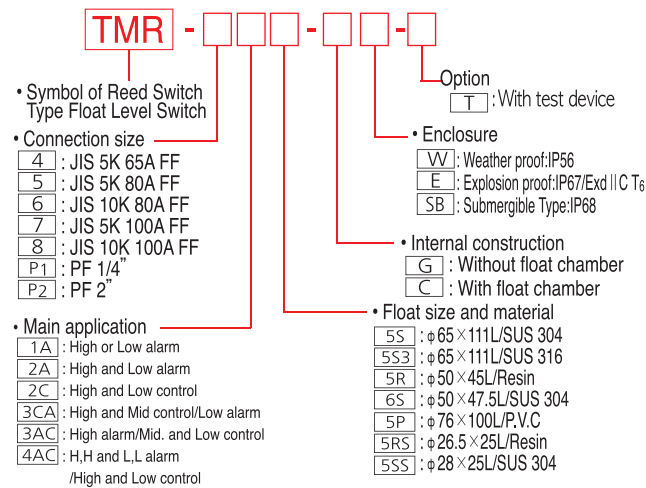
Reed switch type float level switches have a magnet built in the float and a reed switch set inside guide pipe. The reed switch is turned on and off with the up-and-down liquid level. The two stoppers located above and below enable float shift range to limit, thereby providing a self-hold reed switch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



Features

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

Model number code system



Application

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

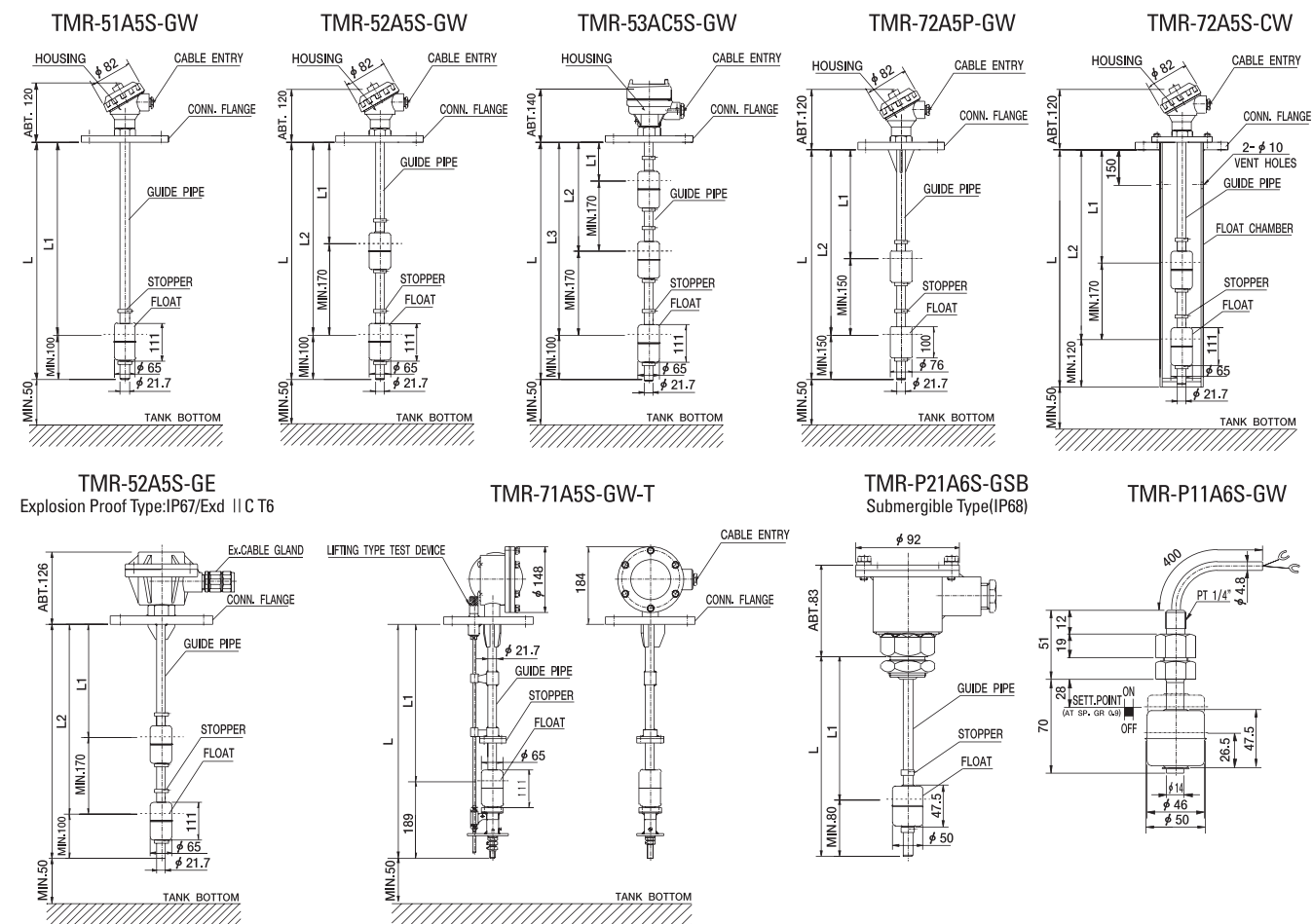
Standard model and specification

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

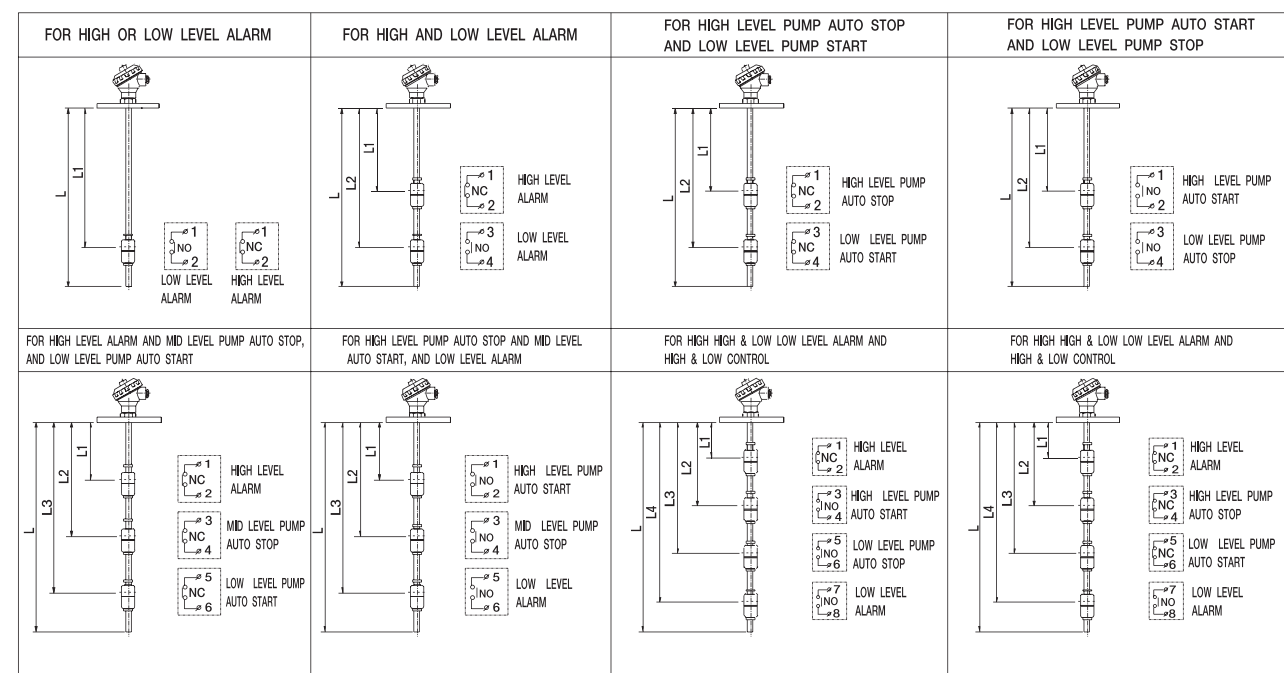
OPTIONAL INFORMATIONS

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

Outline / Dimensions



Contact form



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

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

Level Switches

Pneumatic Type Level switch

Model : HPS

Diaphragm type Alarm specially for High-Viscosity liquid sewage, bilge, oil etc.



General

The pneumatic alarm switch can be used for all sort of liquids and is specially suitable for sludgy and high-viscosity liquid. Because it is a non-contact type alarm switch without a float unit. If liquid pressure is transferred through a pipe, the diaphragm is moved by difference with air pressure. and then switch works on/off.

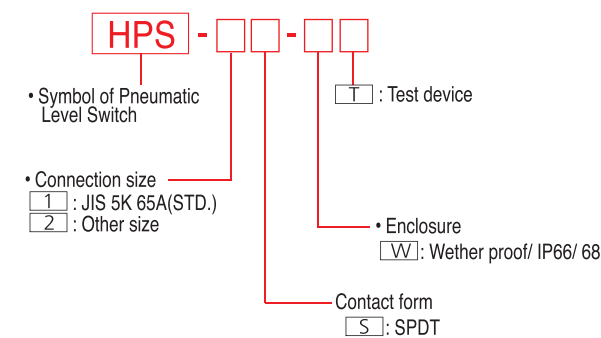
Features

- High reliability and durability by pleated diaphragm.
- Stabilized behavior.
- Care free from such troubles as corrosion and adhesion.
- Designed for all kind of liquid
- Compact and cost saving design.
- Easy to install and maintenance.
- Lifting type manual test device which can check the function.

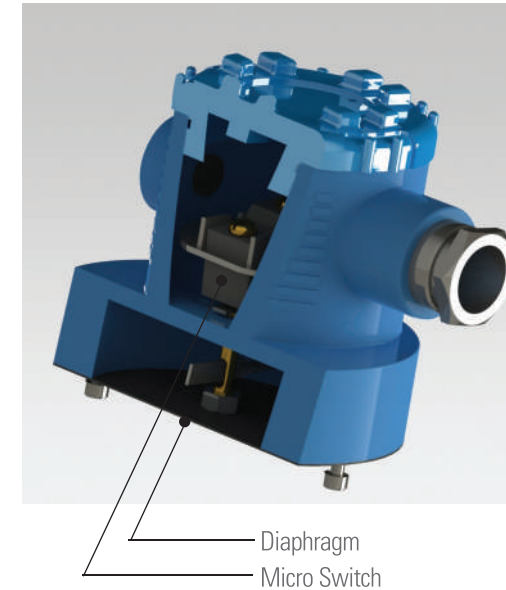
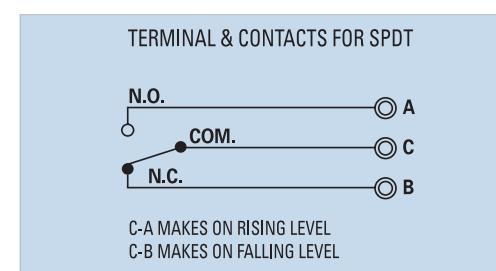
Application

Various chemical equipment for industrial use, Water disposition equipment. Air conditioning equipment, Asphalt plant, Transportation equipment, Various equipment for ships.
Heavy oil tank, Lubricant tank, Centrifugal separator, Stirring tank, Water making equipment, Foodstuff & Beverage manufacturing machine, Filler, Cleaner Water heater, Washer, etc.

Model number code system



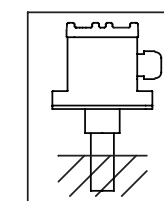
Contact form



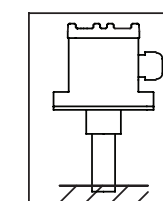
Technical specifications

- Model : HPS
- Material : - Cover : Al. Die-Casting
- Main body : Al. Die-Casting
- Low body : SUS304
- Diaphragm : NBR
- Pipe : SUS304
- Contact Form/rating : SPDT/250VAC, 15A
- Accuracy : ±5mm on level rise of fall
- Max. working pressure : 1Kg/cm²
- Max. working Temp. : 80°C
- Paint Color : 7.2BG 7/2 K-type
- Working point : 65mm
- Reset point : 45mm
- Differential : 20mm
- Min. pipe length : 100mm
- Enclosure : IP 66/68

Wiring diagram

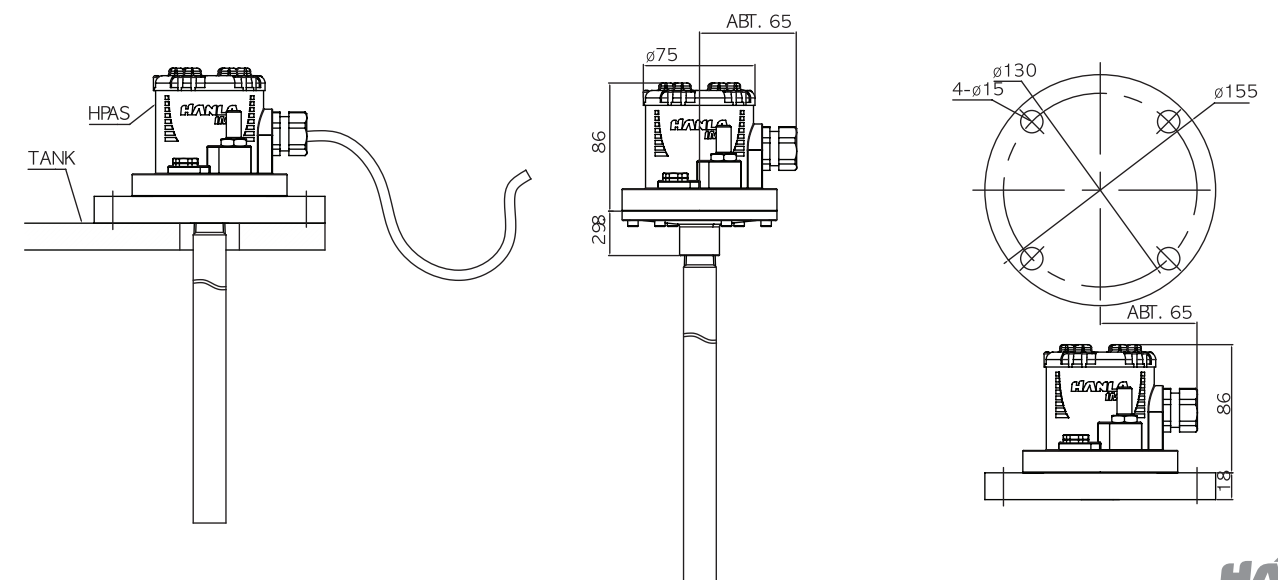


C-A MAKES ON RISING LEVEL



C-B MAKES ON FALLING LEVEL

Outline / Dimentions



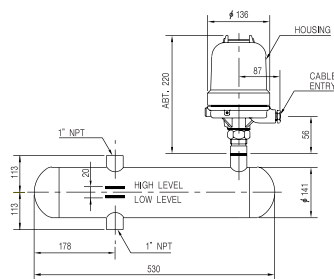
Manufacturing Line Authorized by the Quality

Level Switches

Float Operated Type Level Switch

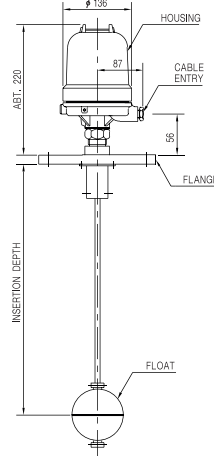
Outline / Dimension for Sealed external chamber type

Model : OMS-S303 Type



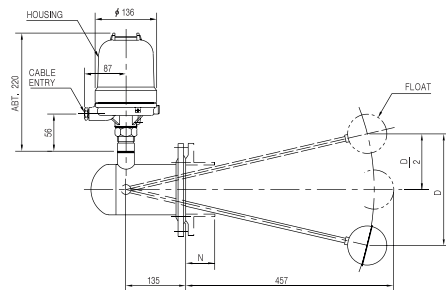
Outline / Dimension for Sealed external top mounted

Model : OMS-TF Type



Outline / Dimension for Sealed external side mounted

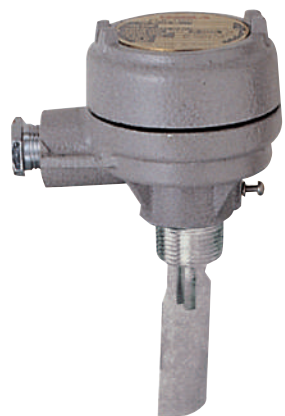
Model : OMS-3F Type



Insertion depth		Min.level differential (D)		Maximum differential(D) for 4" sch.40 pipe with nozzle length(N)													
IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.		
18	457	2	51	2	51	4	102	6	152	8	203	10	254	12	305	14	365
10	254	1	25	7	178	5	127	4	102	-	-	-	-	-	-	-	-

Flow Detection Switch

Model : FWS-3P

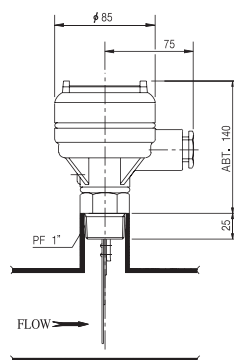


Introduction

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.
- Process Temp. : - std.:60°C - option:120°C
- Enclosure: Weather proof/IP56
- Material - Head : AC
- Connector : BS
- Paddle : SUS304
- Output : 1x 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.

Quick Float Type Level Switch

Model : HTUM Series



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.

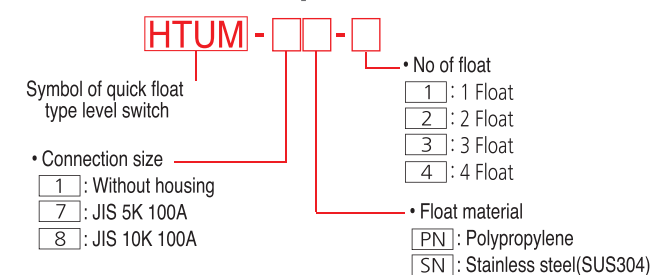
Application

- This product is used for atmospheric pressure and ambient temperature applications.
- Wells, locks, rivers etc.
- Waste water, sewage, drain, sludge tank etc.

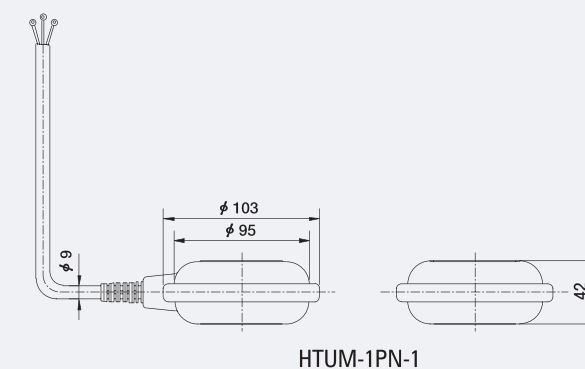
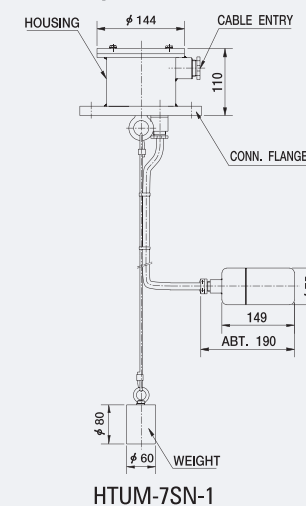
Features

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

Model number code system



Outline / Dimensions



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

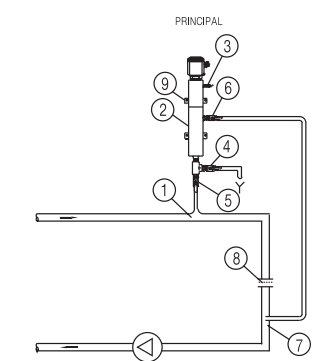
Level Switches

Capacitive Type Oil Detector

• OIL CONTAMINATION DETECTOR ON THE PIPING LINE



PRINCIPAL PIPING DIAGRAM



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

General

This device is installed in the cooling water line of ship and is designed to detect oil in cooling water. This system consists of oil detection pot, capacitive compact switch and control unit. Oil detection pot for separating oil and water has not cock valve for isolating the input and output line. Capacitive type oil detector is installed in oil detection pot, detecting oil isolated from water on the top of oil detection pot. Control unit receive whether it is detected or not in signal from the capacitive compact switch and convert point of contact to relay contact.

Technical specification

- Max. Pressure : 5kg/cm²
- Max. Temp. : 110°C
- Flow : 100~300ℓ /h
- Sensitivity : Approx. 50ml oil
- Power supply : AC 110/220V
- Output : Relay output(DPDT)

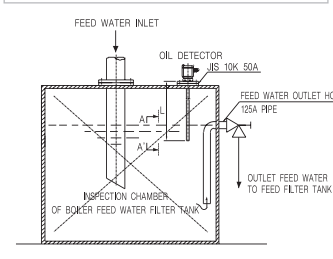
• OIL DETECTOR ON THE TANK



General

Boiler feed filter tank have a inspection chamber or devide area in tank to accumulate oil when oil contamination in boiler water. When incoming oil contaminated water in inspection chamber, the feed water only go out to feed filter tank and oil with be accumulate in inspection chamber until drainage. When the normal conditions, the end part of electrode will be in water level always. But the water contaminate oil that the oil is accumulate top level in inspection chamber, the electrode will be in oil level instead of water level. The oil detector will activate alarm. After drain oil in inspection chamber, the oil detector return to normal condition.

INSTALLATION ARRANGEMENT



Technical specification

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

Vibration Type Level Switch for Liquid and Solid

Model : SWING Series



Model : HVPS Series



Introduction

VEGASWING, the vibrating sensor which uses tuning fork technology, finds almost universal applications in industrial liquid level switching, and offers the choice of four output options from compact electronics. Innovative design has produced several practical, user-orientated features, such as the 'universal' power input and modular electronics incorporating self-diagnostics. Attention to quality in design and production has created a level switch of unparalleled sensitivity and reliability, even for 'heavy-duty' installations.

Specifications

- Power source:20~250VAC, 20~250VDC
- Power consumption:Max. 3N
- Output: - Relay output/1x SPDT
 - Transistor output
 - Non-contact switch
- Viscosity range:0.2~10,000mPas
- Density range:0.7~2.5g/m³
- Protection:IP66

Operating principle

The piezo-electrically stimulated oscillating prove vibrates at its mechanical frequency of resonance of 125Hz. If the probe is covered by the bulk material, the damping thus generated is registered electronically and a corresponding signal output is actuated. The oscillation of the device ensures that it features certain self-cleaning properties. The device is used for level detecting in all types of containers and silos, it can be used with all powdery and granulated bulk materials that do not show a strong propensity to form crusts or deposits.

Standard specifications

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

Model number code system

HVPS - [] - [] - [] - []

- Symbol of Vibration Type Level Switch
- Shape of vibration
 - 2020 : Standard design
 - 2030 : Extension probe(up to 4M)
 - 2050 : Extension cable(up to 20M)
- Connection size
 - TF : PF 1 1/2" Thread
 - TT : PT 1 1/2" Thread
 - FA : JIS 10K 50A FF/ANSI 150# 2RF
 - FB : JIS 10K 80A FF/ANSI 150# 3RF
 - FC : ANSI 300# 2RF
 - FD : ANSI 300# 3RF
 - FF : Other size
- Product temp
 - NT : Up to 100°C
 - HT : Up to 150°C
 - AT : Up to 200°C (With air cooling device)
- Ext. length (Applied To 2030, 2050 Type)

1	250-499mm	4	2000-3999mm
2	500-999mm	5	4000-9999mm
3	1000-1999mm	6	10000-20000mm
- Option
 - [] : Locking device
 - [W] : Weather proof(IP56)
 - [E] : Explosion proof-/IP56/Exd IIC T6

Level Switches

Paddle Type Level Switch for Solid

Model : RN 3000 Series



Application

It is used wherever

- Dustlike
- Powdery
- Granulated
- Granular

Standard specification

Mechanical data

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

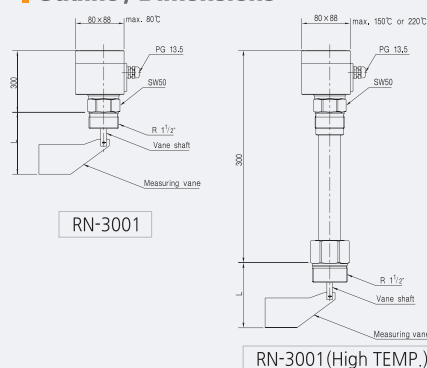
Electrical data

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



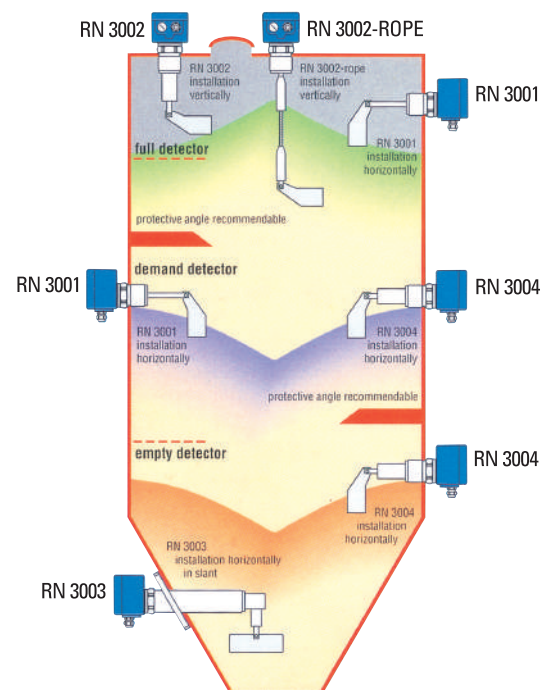
Operating principle

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

Application	Type	RN 3001	RN 3002	RN3002-ROPE	RN 3003	RN 3004	RN 3005	RN 3006
full detector		×	×	×	×	×		×
demand detector		×		×	×	×		×
empty detector		×		×	×	×		×
loading telescope							×	
vertical		×	×	×		×	×	×
oblique from the top		×				×		×
horizontal		×			×	×		×
oblique from the bottom		×				×		×
dust Ex zone 10/11		×	×	×	×	×	×	×
temperature up to 220°C**		×	×	×	×	×	×	×
container over pressure 1 up to 10bar		×	×	×	×	×	×	×

* not for zone 10/11

** zone 10/11 upto 200°C

Electric Pressure Type Level Transmitter

Model : PL-40



Operating principle

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

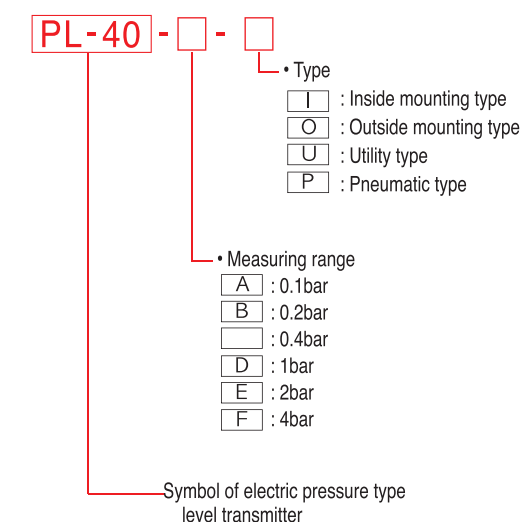
Technical specification

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

Application

- 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



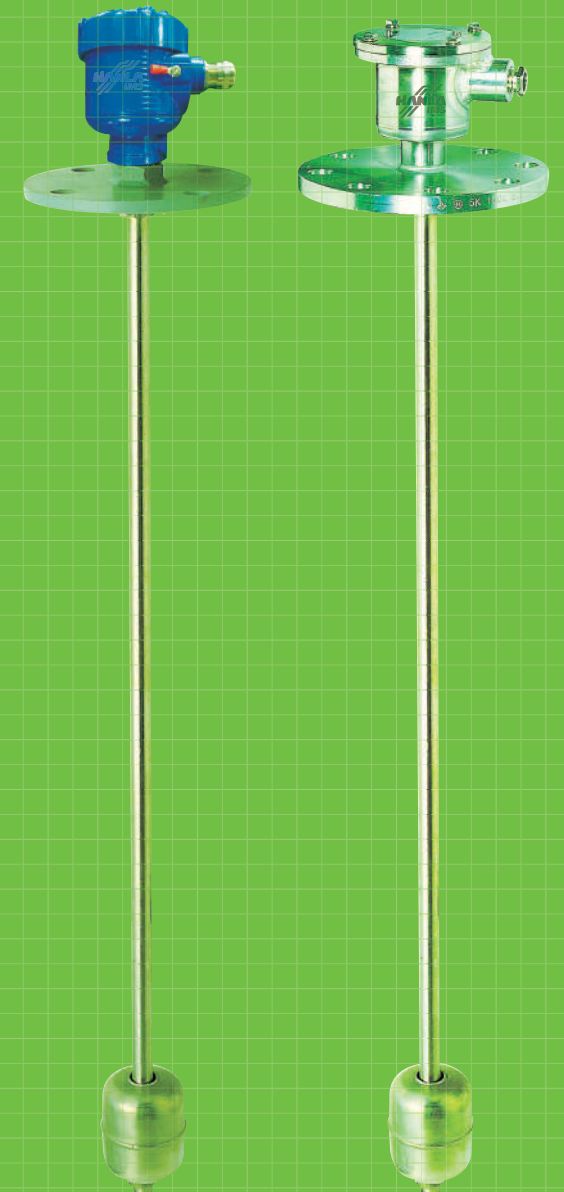
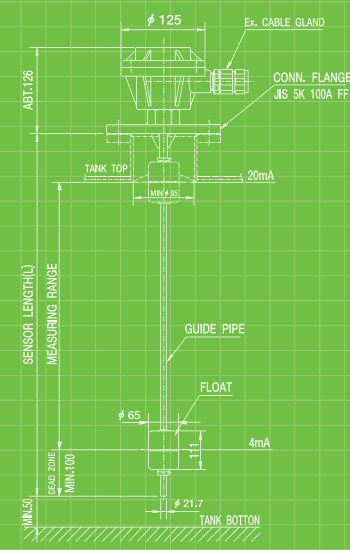
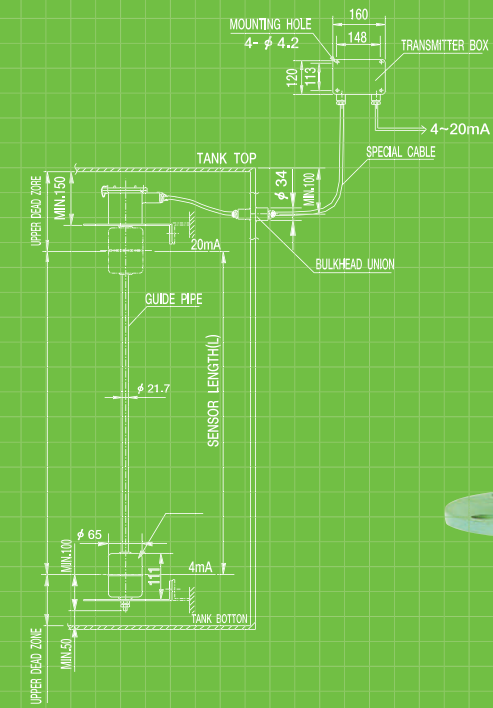
Features

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

Level Measurement Systems & Instrumentations

Level Transmitters

- Electric Pressure Type Level Transmitter
- Microwave Type Level Transmitter
- Capacitive Level Measurement
- Magnetic Float Type Level Transmitter



Level Transmitters

Microwave Type Level Transmitter

Model : Vegapuls Series



Introduction

Radar is a sophisticated level measuring principle. VEGA's new design of small, compact and price favourable radar sensors VEGAPULS are in its function as loop powered sensors a sensation in radar level measuring technology. First, radar sensor in two-wire technology supply voltage and output signal(4-20mA analog or digital);connectable with max. 15 sensors on a two-core line. VEGAPULS radar sensors offer benefits which meet the technicians requirements:Pressure and temperature independent, Ex-approved, small housing dimensions and process connections(1 1/2" or DN 50);integrated analog and digital display;convenient connection form to all BUS systems. Radar technology can also be realized in low budget applications. The sensors are very informative and can be operated optionally with check card-sized and detachable adjustment module, HART® handheld or self explanatory operating program on PC, hence the operation at any place e.g. signal line, directly on the sensor, switch cabinet or DCS is possible.

Application

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

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

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

Features

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

Standard model and specification

	PULS 61	PULS 62	PULS 63	PULS 65	PULS 66	PULS 68
Application	Aggressive liquids in small vessels under easy process conditions	Storage and process vessels under arduous process conditions	Aggressive liquids under arduous process conditions	Aggressive liquids under easy process conditions	Storage and process vessels under arduous process conditions	Large solid vessels under arduous process conditions
Measuring range	up to 35m	up to 35m	up to 35m	up to 35m	up to 35m	up to 75m
Process temperature	-40..80°C	-200..450°C	-200..200°C	-40..150°C	-60..400°C	-200..450°C
Process pressure	-1..3bar	-1..160bar	-1..16bar	-1..16bar	-1..160bar	-1..160bar
Accuracy	±2mm	± 2mm	± 2mm	± 8mm	± 8mm	± 2mm

Model : Vega flex Series



Specification

High frequency microwave pulses are coupled on a cable or rod and guided along the probe. The pulses are reflected by the product surface and received by the processing electronics. A microcomputer identifies these level echoes which are measured, evaluated and converted into level information by using the ECHOFOX software. Thanks to this measuring principle, the adjustment with medium in no longer necessary. The sensors are preset to the ordered probe length. The cable and rod versions(can be shortened) can be adapted in an ideal way to the individual conditions on site.

Application

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

Capacitive Level Measurement

Model : Vegacal Series



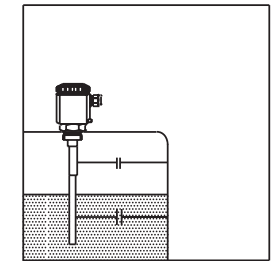
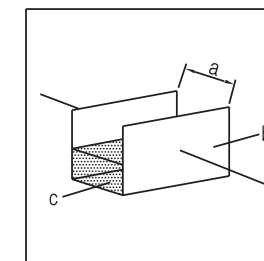
Application

Capacitive electrodes of series detect levels of virtually every product, such as liquid, power, granule or pasty. 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.

Level detection

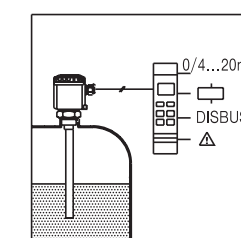
Level switches should signal the reaching of certain levels, e.g. max. or min. level. These levels are detected at a fixed point and converted into a switching signal. For level detection the capacitive electrodes type A switching signal can be either triggered when the electrode is covered or when the electrode is uncovered(adjustable mode).

Continuous level measurement

With continuous level measurement the product level is continuously monitored and converted into a level proportional signal which is either indicated directly or further processed. A capacitive electrode of series with oscillator and a VEGAMET signal conditioning instrument converting the proportional current of the oscillator into standardized current and voltage signals is required. The continuous measurement requires a constant dielectric value ϵ r.i.e. the product should have steady features. The floating measuring signal of the electrode electronics is in the range of 4...20mA and be therefore connected to other processing systems without providing an additional potential equalization. In addition to the continuous measurement, also levels can be detected.

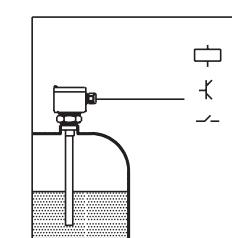
Configuration of the measuring system

Electrode with signal conditioning instrument



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

Compact level switch VEGACAP



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

Level Transmitters

Magnetic Float Type Level Transmitter

41

HANLA IMS
Level Measurement Systems
& Instrumentations

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



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.

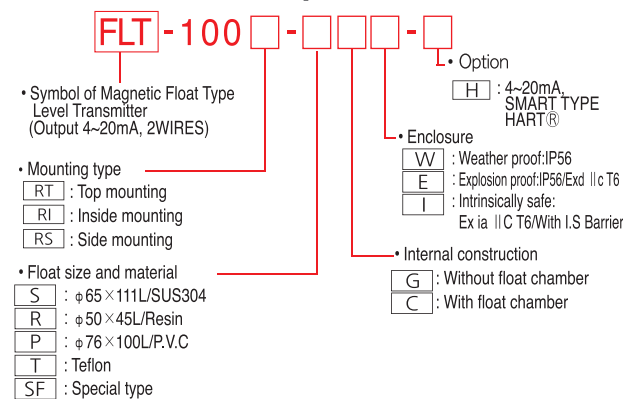
Features

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

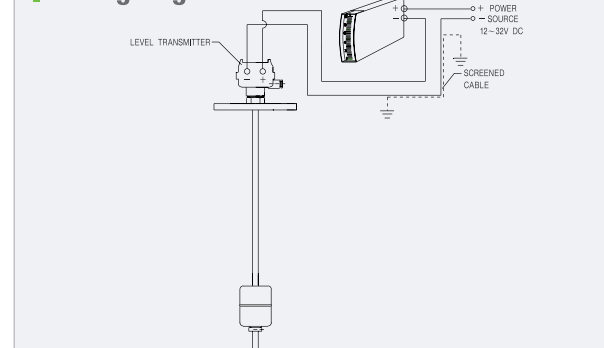
Application

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



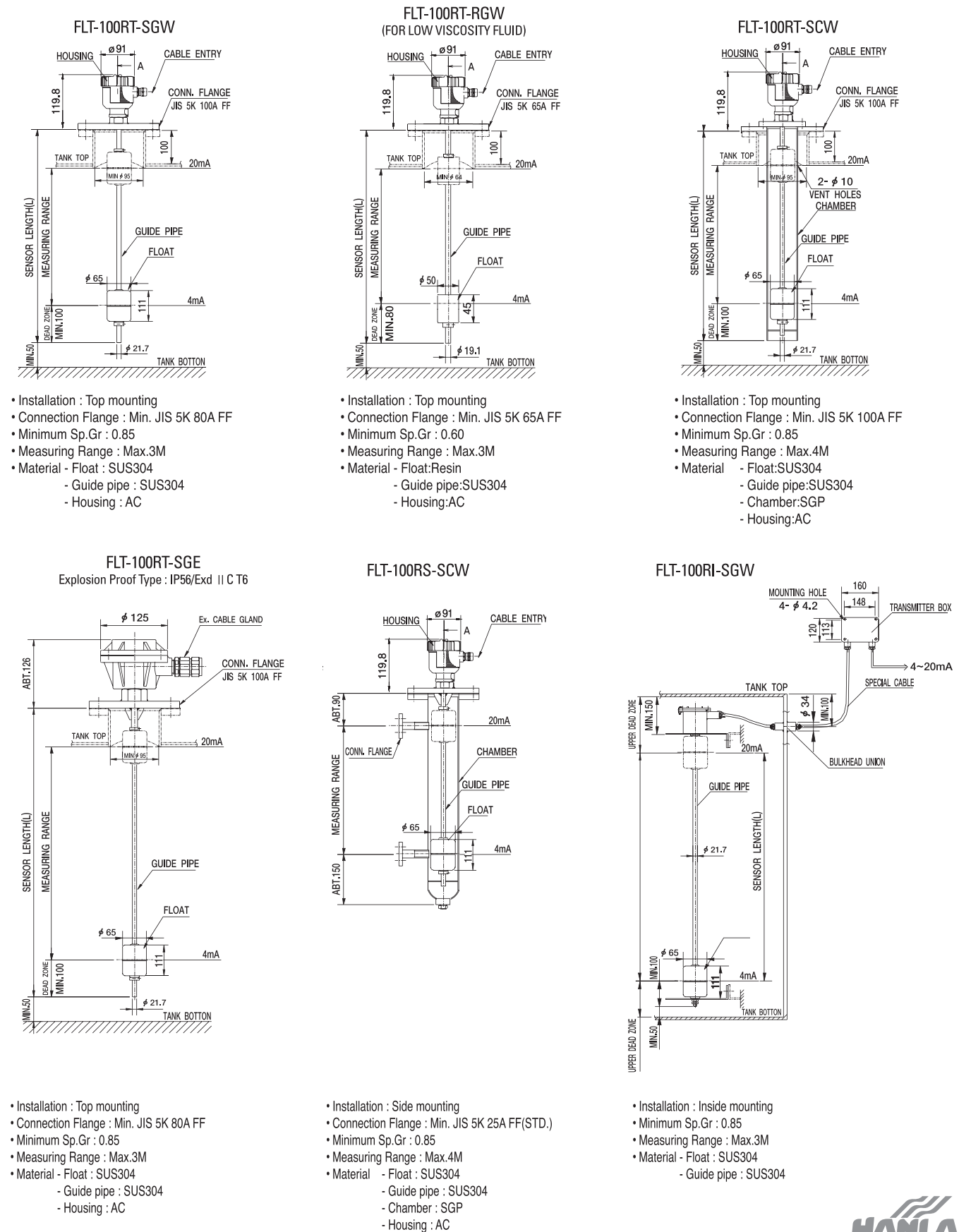
Wiring diagram



Standard specifications

- Connection size : JIS 5K 80A, 100A
With float chamber type: JIS 5K 100A only
- Max. pressure : 10kg/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. 5m (Option : up to 30m)
- Sensor resistance : about 1k Ω
- Max. current : 25mA
- Power source : 12~32VDC
- Output : 4~20mA DC
- 2 Wire system balancing type
- Cable entry : 15b
- Enclosure : Weather proof/IP56
- Material - Housing : AC and SUS 304
- Flange : Carbon steel
- Float : SUS 304
- Guide pipe : SUS 304
- Accuracy : $\pm 1.5\%$ of F.S

Outline / Dimensions



Manufacturing Line Authorized by the Quality



Level Measurement Systems & Instrumentations

Electric Equipments

- Alarm & Control Unit
- Indicator
- Salinometer



Model : AU-100



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

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

Model : AU-240L



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

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

Model : AU-160



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

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

Model : OVMS-50



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

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

Indicator

Model : SIL-100



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

Model : HDI-100/200



- Input: 4-20mA
- 16bit A/D conversion
- Range and Scale: -9999-9999
- 2point alarm(AL1, AL2) and Dead band
- Alarm outputs: NC or NO(ONLY HDI-100/200)
- Optional output: 4-20mA
- 10 points linearized transform function
- Accuracy: +/- 0.2%F.S
- Power: DC24V 4Watt
optional AC100-240
- Internal Buzzer
- Dimension: 96x48x112mm
- Dimming function

Model : SIL-200



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

Model : HDU-100



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

Model : HBI-100



- Model: HBI-100
- Size: 36(W) × 144(H) × 101.5(D)
- Mounting method: Panel front mounting
- Display: Bar-101 segment LED
- Digit: 4 digit
- Power source
- Input signal: 4-20mA
- Accuracy: ± 0.2%(Digit) and ± 1.0%(Bar) of F.S
- Scale range: 0-100%
- Option: output alarm(2 or 4points)
output signal dry contact

Model : HLI-110A



- 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

Model : KFDO-TP



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

Model : HIC-100/200



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

Model : SS-1600



- Model : SS-1600
- 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

Model : SS-1500



- Model : SS-1500
- Size : 50.7 × 152.3mm
- Mounting method : Panel front mounting
- Supply voltage : 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

Model : AD-82

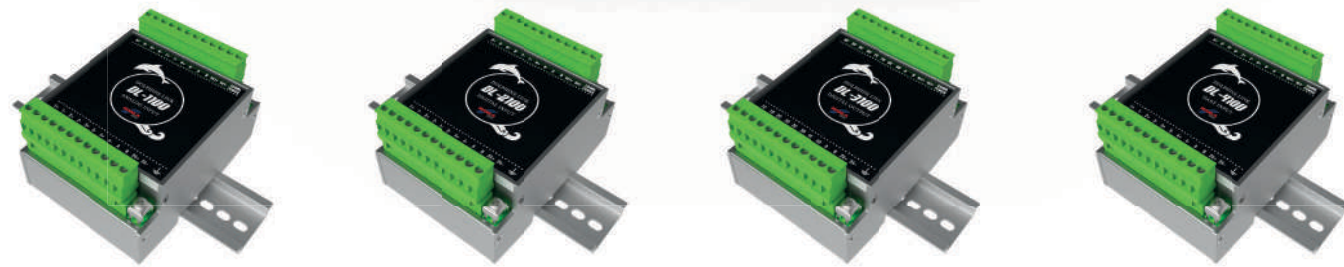


- Analog to Digital Converter
- Channel number: 8
- Input: Current 4-20mA
- Output value: 400-2000 (default)
Long Integer Type
- Serial Communication: RS-485 MODBUS RTU
- 24bit A/D conversion
- Scaling: -999999-999999
- Accuracy: +/- 0.2%F.S
- Supply voltage: 24VDC(18-32 VDC)
- Indication LEDs : 1x red, 2x green
- Menu Button: 4
- Display by LCD(8 character × 2 line)
- Unit display
- Channel setting: by menu button
by windows setting program
- Power consumption: Max. 6.6 Watt at 220VAC
- Operating temperature: -5°C to +55°C
(10-90%)
- Weight: Approximately 230g
- Dimension: 70x110x109.5 mm

Model : DA-82



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



Model DL-1100

- Supply Voltage : 24VDC
- Power Consumption : Max.6W at 24VDC
- INPUT : 8 x 4-20mA Input
- Accuracy : ±0.2% Full Scale
- Serial Communication : 2 x RS485 Modbus RTU
- Operating Temperature : 0~70°C
- Storage Temperature : -20~70°C
- Installaion : DIN Rail mounting (35mm)
- Dimension : 105x27x74mm

Model DL-2100

- Supply Voltage : 24VDC
- Power Consumption : Max.1W at 24VDC
- INPUT : 8 x Digital Input
- Accuracy : ±0.2% Full Scale
- COM : 2 x RS485 Modbus RTU
- Operating Temperature : 0~70°C
- Storage Temperature : -20~70°C
- Installaion : DIN Rail mounting (35mm)
- Dimension : 105x27x74mm

Model DL-3100

- Supply Voltage : 24VDC
- Power Consumption : Max.3W at 24VDC
- INPUT : 8 x Dry Contact
- Accuracy : ±0.2% Full Scale
- COM : 2 x RS485 Modbus RTU
- Operating Temperature : 0~70°C
- Storage Temperature : -20~70°C
- Installaion : DIN Rail mounting (35mm)
- Dimension : 105x27x74mm

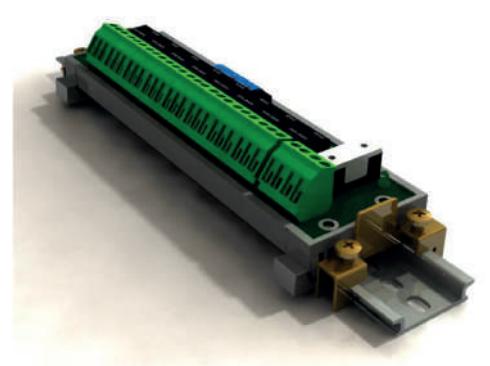
Model DL-4100

- Supply Voltage : 24VDC
- Power Consumption : Max.2W at 24VDC
- INPUT : 8 x 4-20mA Hart(2Wire)
- Accuracy : ±0.2% Full Scale
- COM : 2 x RS485 Modbus RTU
- Operating Temperature : 0~70°C
- Storage Temperature : -20~70°C
- Installaion : DIN Rail mounting (35mm)
- Dimension : 105x27x74mm



Model DIMMER-AC

- Supply Voltage : 24VDC
- Power Consumption : Max. 120W at 24VDC
- Operating temperature : -40~85°C
- Enclosure : 95 x 95 x 134 mm
- DIN rail mounting, width 45 mm
- ABS
- Feature
- Dimming for Indicator
- Output : 80VAC, 2kHz
- A number of available indicator : Max. 33EA



Model SRY-80

- Supply Voltage : 24 VDC
- Power Consumption : Max. 150W at 24VDC
- Operating temperature : -10°C to +55°C
- Dimension : 170 x 55 x 55 mm
- Feature
- Relay Output Unit
- Relay Output : 8 x NO/NC
- Max Range : 125 VAC / 60 VDC
- Max switching current : 0.8A, 60VA, 30W"
- MODBUS protocol based interface with the Master
- Baud Rate : 9600 bps

Salinometer



General

- This is a microprocessor transmitter / controller for electrolytic conductivity.
- The instrument features two 4-digit 7-segment displays for indicating the conductivity and the temperature (both red).
- Standard supply voltage is AC 100~240V, DC 24V as an option.
- Be increased reliance by using a high accuracy 16bit A/D converter and microprocessor.
- It is available to alarm power failure, sensor failure, and dangerous value of salinity.
- You can set a salinity alarm point
- Current output(DC 4 to 20mA) is available.
- Serial interface RS485 is available with MODbus protocol.
- Dimming function is available.

Communication protocol

Slave MODbus RTU Protocol Communication

The STD-20 communicates with Ship's Loading Computer, Cargo Monitoring System, Alarm Monitoring System and etc. by RS-485 ports. Communication setting is 9600BPS/8Data bit/1 Stop bit/No Parity.

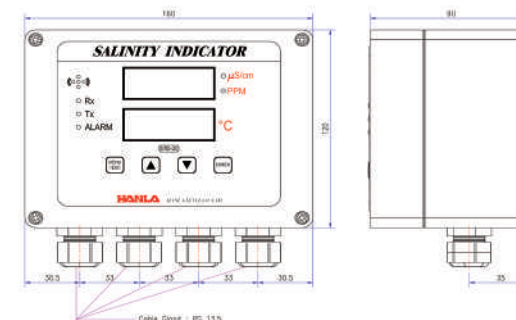
All Slave address is initialized by 0x01. (User can change slave address on MODbus address Menu.)

Specifications

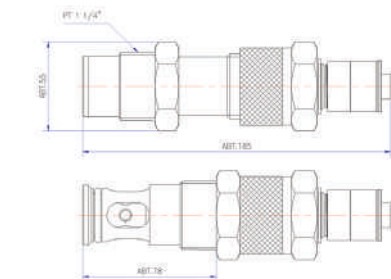
Weight	Transmitter	705g (Except Cable)
	Sensor	1,095g
Materials	SUS316L, NAVAL BRASS, POM	
Supply Voltage	AC100~240V, 0.25A, 50/60Hz (Option: DC24V, 0.42A~1.37A)	
Fuse Rate	250V, 0.5A	
Features of Sensor	Electrode cell for conductivity measurement, Isolated Pocket Type	
Cell constant (K)	0.1	
Resistance Thermometer	PT100	
Allowable Pressure	20BAR	
Display with configured measurement(Salinity)	PPM, μ S/cm	
Display with configured measurement(Temperature)	°C	
Range of measurement	Salinity	0 ~ 200ppm (accuracy within less than ±5% of full-scale)
	Temperature	0 ~ 100°C (accuracy within less than ±0.5°C)

Outline / Dimensions

• Transmitter



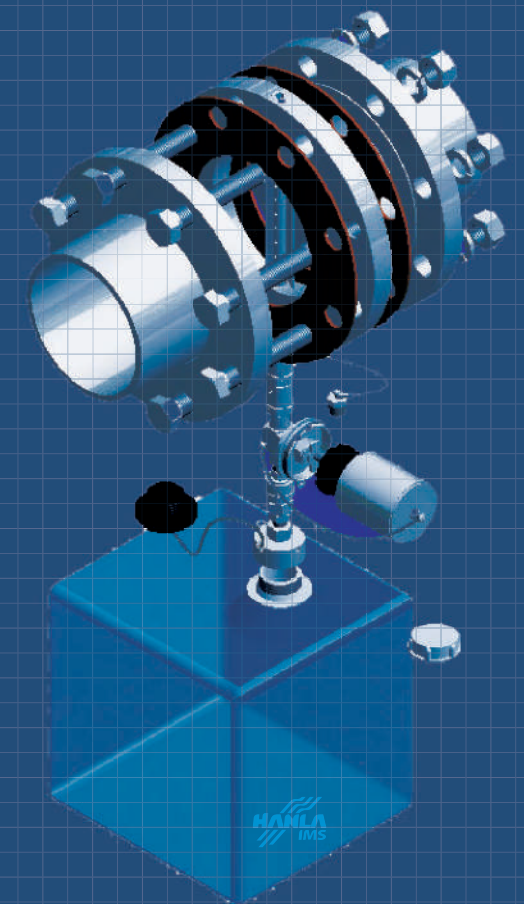
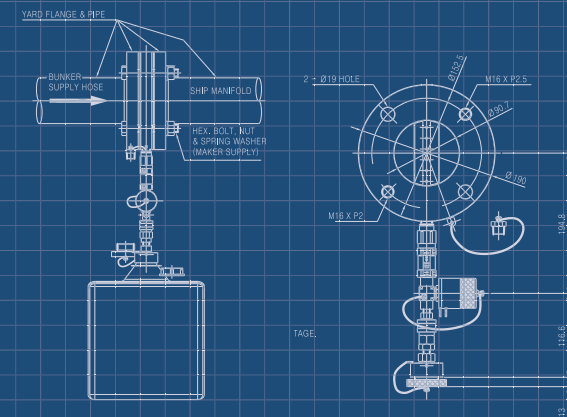
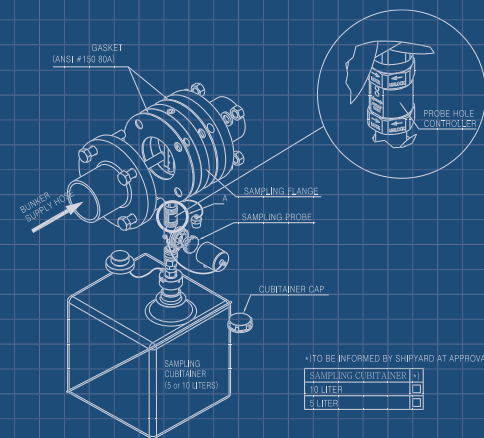
• Sensor



Level Measurement Systems & Instrumentations

Oil Sampler

- FO / DO Sampler



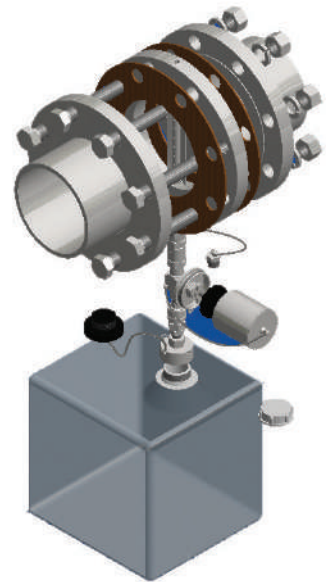
Oil Sampler

FO/DO Sampler

53

HANLA IMS
Level Measurement Systems
& Instrumentations

FO/DO SAMPLER



General

The basis for these guidelines is regulation 18(6) of annex VI to MARPOL 73/78, which provides that for each ship subject to regulations 5 and 6 of that annex, details of fuel oil for combustion purposes delivered to, and used on board the ship, shall be recorded by means of a bunker delivery note which shall contain at least the information speci V to that annex. In accordance with regulation 18(6) of annex VI, the bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered.

Application

Samplers can apply to a continuous collection of drip sample throughout the delivery of the diesel and heavy fuel oil covering each bunker delivery note at ship's manifolds.

Features

- Compact design
- High reliability for a long-time operation
- Certified by major classification societies
- Designed for all kind of liquids
- Simple installation
- Stainless steel & anti-corrosion material

Sampling location

A sample of the fuel oil delivered to the ship should be obtained at the receiving ship's inlet bunker manifold and should be drawn continuously throughout the bunker delivery period.

Retained sampling handling

The retained sample container should be clean and dry. Immediately prior to filling the retained sample container, the primary sample quantity should be thoroughly agitated to ensure that it is homogenous.

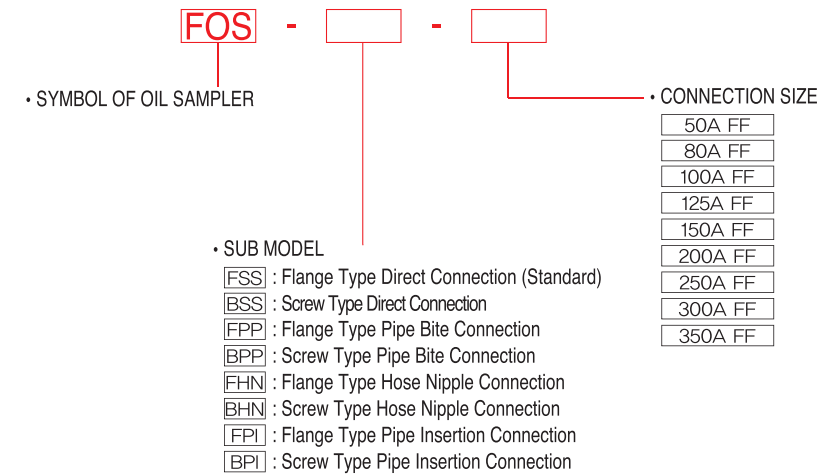
The retained sample should be of sufficient quantity to perform the tests required but should not be less than 400ml. The container should be filled to 90%+/-5% capacity and sealed.

The retained sample should be kept in a safe storage location, outside the ship's accommodation, where personnel would not be exposed to vapors which may be released from the sample.

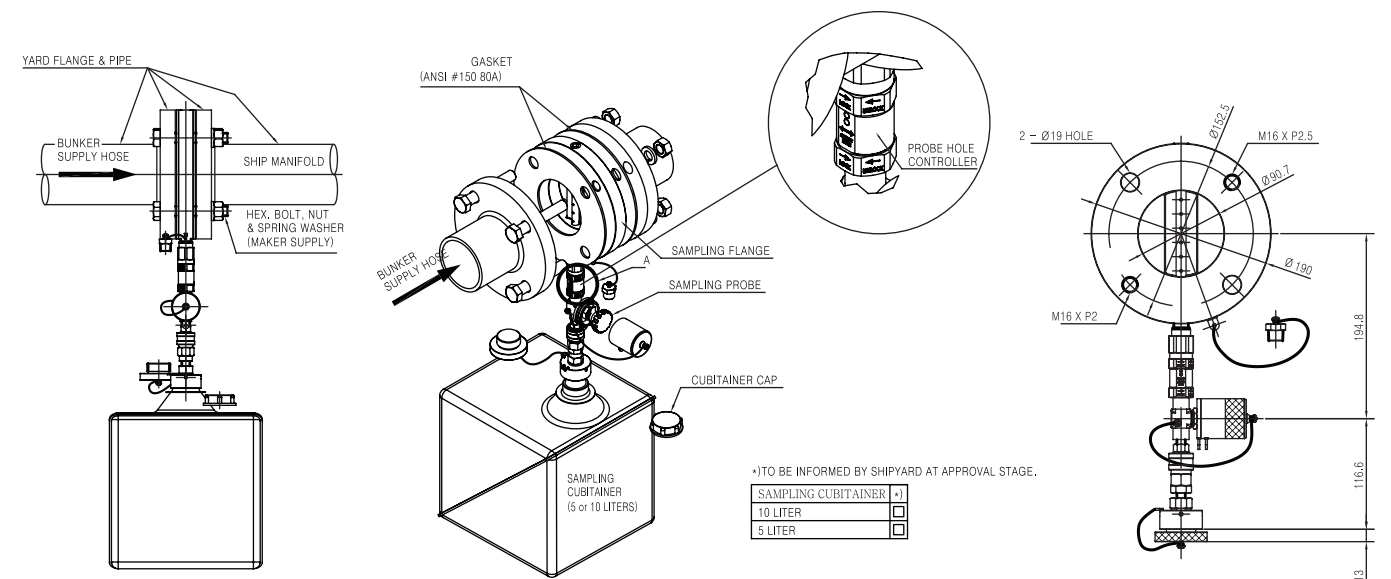
The retained sample should be stored in a sheltered location where it will not be subject to elevated temperatures, preferably at a cool/ambient temperature, and where it will not be exposed to direct sunlight.

Pursuant to regulation 18(6) of annex VI of MARPOL 73/78, the retained sample should be retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.

Model number code system



Outline / Dimensions



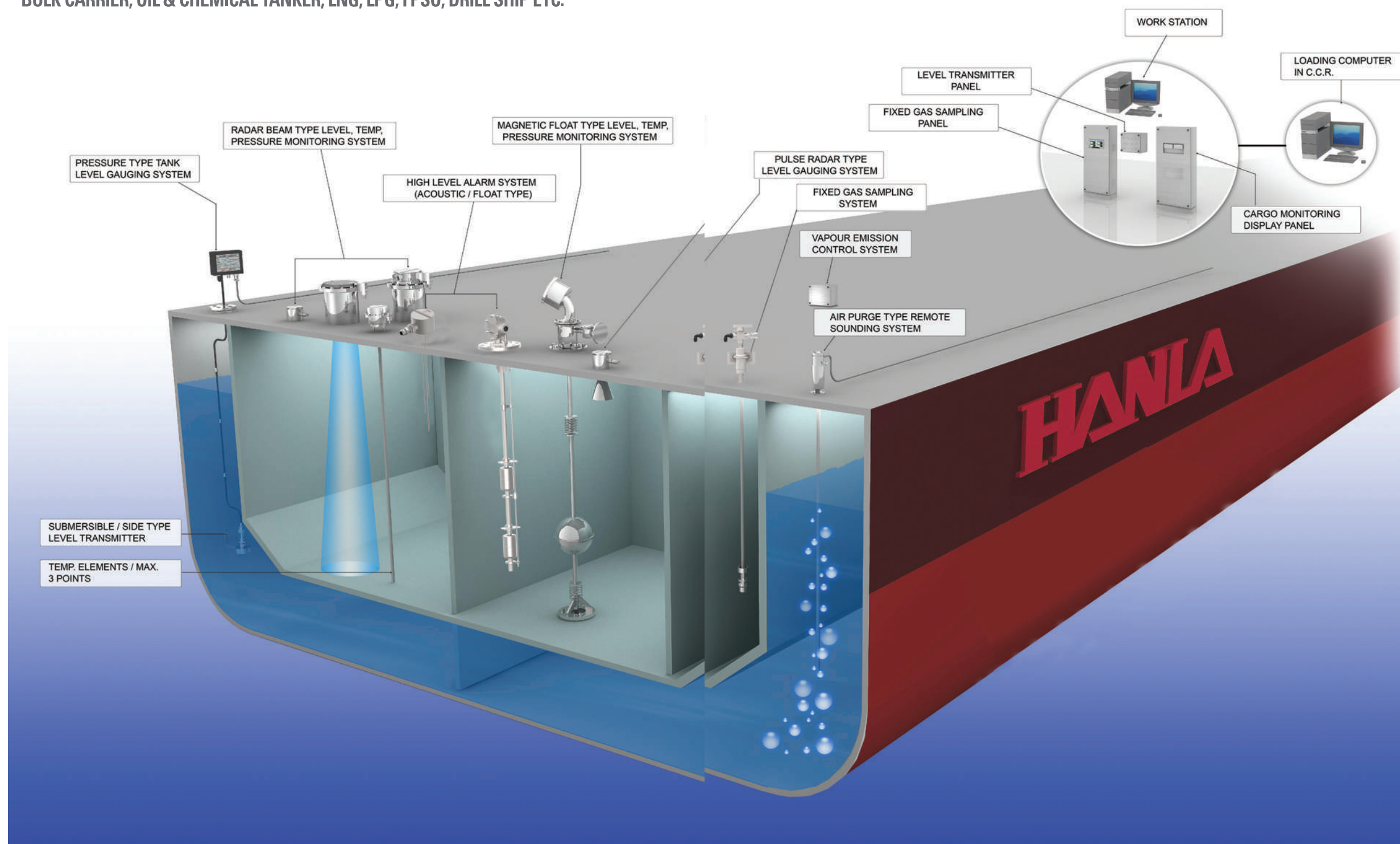
Tank monitoring system

Tank Monitoring System



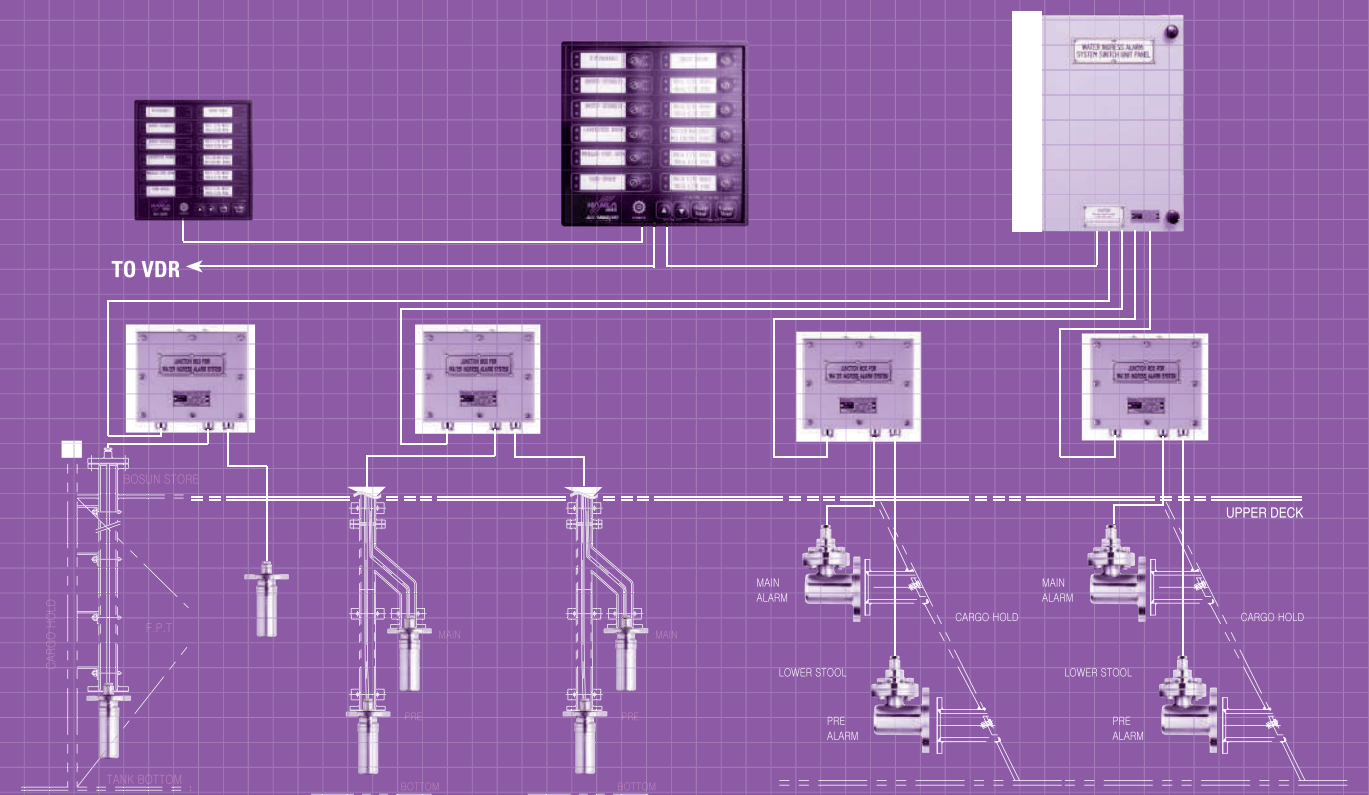
CARGO MONITORING SYSTEM, BALLAST TANK, DRAFT LEVEL GAUGING SYSTEM,
FIXED GAS SAMPLING SYSTEM, OIL WATER INTERFACE LEVEL GAUGING SYSTEM,
BULK CARRIER, OIL & CHEMICAL TANKER, LNG, LPG, FPSO, DRILL SHIP ETC.

INDEPENDENT HIGH & OVERFILL ALARM SYSTEM,
VAPOUR EMISSION CONTROL SYSTEM,



Level Measurement Systems & Instrumentations
Water Ingress Detection System

- Water Ingress Detection System



Water Ingress Detection System

General & Application

This system has been specially designed, manufactured for detecting the presence of water in the **cargo holds** and **closed dry or void space** where the volume exceeds 0.1% of the ship's displacement volume on summer load water line, located partially or totally forward of the foremost card hold, and **ballast tanks** located forward of the foremost cargo hold, collision bulkhead of Bulk carrier in conformity with SOLAS regulation XII/ 12 rule requirements.

The position of detection

- A reliable indication of water reaching a present level will be supplied on our water ingress detection system according to following installation position required by SOLAS regulation XII/ 12.
- These level switches should be installed either in the aft part of each cargo hold or in the lowest part of the spaces other than cargo holds to which these requirements apply.

For Cargo Hold :

- 1) An alarm, both visual and audible for which the space is identified on the main alarm panel will be activated when the depth of water at the level sensor reaches the pre-alarm in the space being monitored.
- 2) An alarm, both visual and audible on the main alarm panel will be activated when the level of water at the sensor reaches the main alarm level, indicating increasing water level in a cargo hold. In addition, the both alarms will identify the space and the audible alarm should not be the same as that for the pre-alarm level.

For compartments other than cargo holds:

- 1) An alarm, both visual and audible, indicating the presence of water in a compartment other than a cargo hold on the main alarm panel will be activated when the level of water in the space being monitored reaches the sensor. The visual and audible characteristics of the alarm indication will be the same as those for the main alarm level in a hold space.

Features

- Intrinsically safe detection can be applicable to all of inflammable area, if required.
- Available for any number of detecting points
- Available for applying various type level switch according to configuration of the tank
- Available for the overriding device for which the alarm can be deactivated or reactivated

Operating principle

This system consists of the Main alarm panel / Repeat alarm panel on which the audible and visual alarms are activated and Electrode Type Level Switch operated by detecting the conductivity in the liquid and Intrinsically Safety barrier according to purpose or the position of the installation. When the presence of water has reached the detecting point of level switch installed on the preset detection level in the cargo holder or other space, the electric signals which is activated on the level switches are transmitted to the main alarm panel provided with alarm unit, power supply unit and alarm buzzer, malfunction alarm as well as overriding device. At the same time, the audible and visual alarms are activated on the main alarm panel installed on the Navigation bridge and the repeat alarm panel installed on the bridge.

The overriding device for which the alarm can be deactivated or reactivated for the detector installed in the tank and holds used for carriage of water ballast will be provided on the alarm panel according to the SOLAS regulation XII/ 12.1.

An override visual indication should be continuously provided throughout deactivation of the water level detector for the hold or tanks used for carriage of water ballast. Where such an override function is provided, the override condition should be automatically reactivated after the hold or tank has been deballasted th a level below lowest level alarm indicator level.

When the fault is detected on water level detector, **the malfunction alarm** having visual and audible alarm the same as detection alarm on the main alarm panel should be activated to monitor continuously the system. The audible alarm should be capable of being muted but the visual indication should remain active until the malfunction is cleared.

The main power and standby power should be prepared on this system and if the main power is failed, the standby power should be supplied to the main alarm panel so as to monitor continuously. When the main power is failed, the power failure alarm having audible and visual alarm should be operated. The water ingress detection system should be continuously operated while the ship is at sea.

The Electrode Type Level Switch installed in appointed space should be satisfied with the intrinsically safe type with the I.S barrier.

System selection for order conformation

HWID - [] - []	
Number of detection point	Enclosure of sensor
P16 : 1 to 16	[E] : Ex-type
P32 : 17 to 32	[W] : Weather proof
POV : Over 32	

Technical specification

Conductive electrode type Level switch

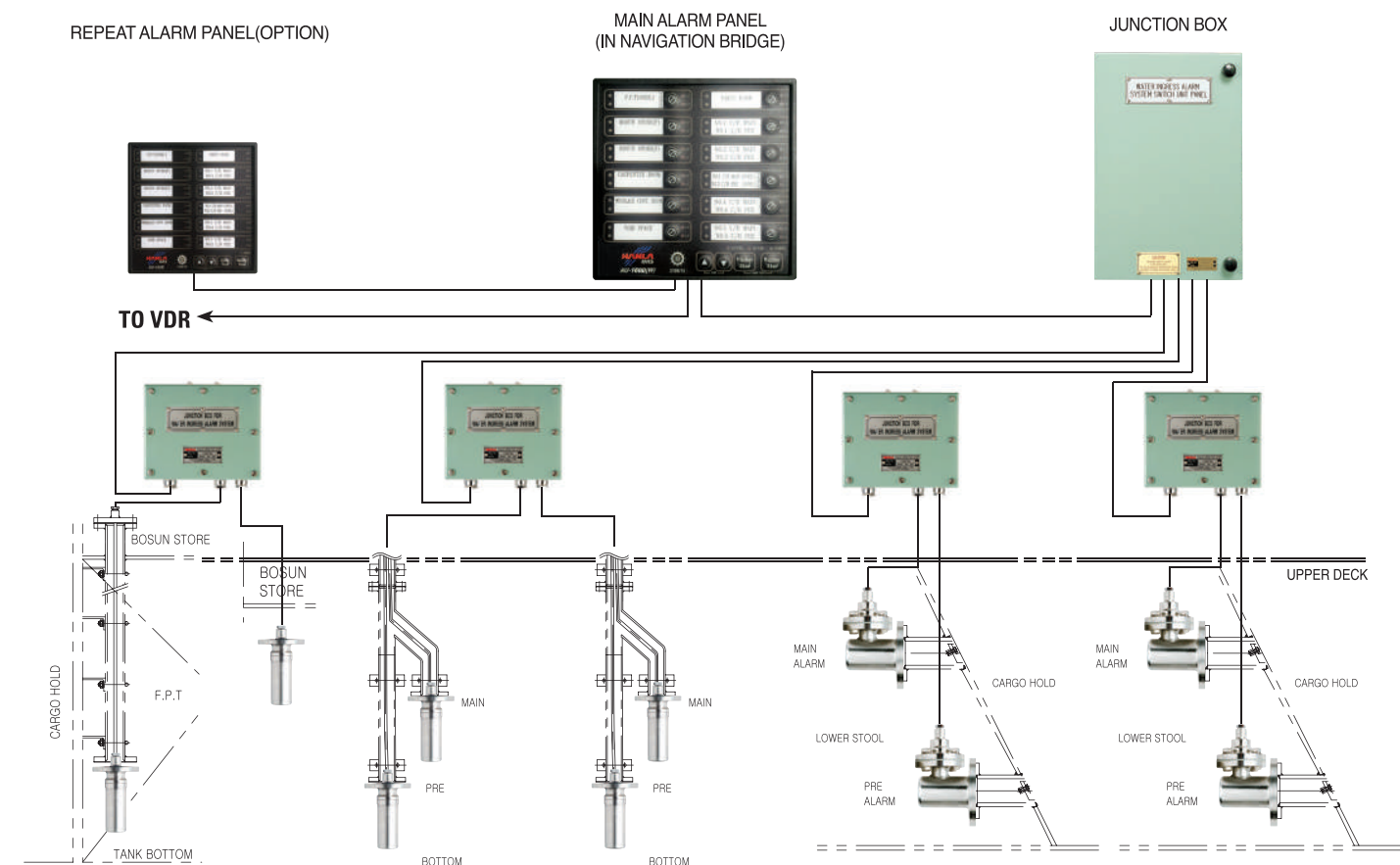
- **Function :**
When the electrodes is touched by an electrically conductive liquid, the low value A.C circuit detected on the electrodes is transmitted to the signal conditioning instrument on which the relay output contact signal is offered. This appropriate contact signal is transmitted to main alarm panel on which the audible and visual alarm is provided.
- **Signal conditioning instrument(alarm unit) :** I.S type, EEx ia II C
- **Operating voltage :** 20~250VAC, 50/60 Hz,
- **Input of response resistor :** 1~200KΩ
- **Relay output :** 2A AC or 1A DC
- **Enclose protection :** IP 66/68
- **Working pressure :** 0~5 kg/ cm²
- **Working temperature :** -20℃ ~80℃
- **Model number code system**

Technical specification

Main alarm panel

- **Power supply :** AC 110/220V 60Hz
- **Stand-by power supply :** DC 24V
- **Number of detection point :** No limits
- **Accuracy of detecting :** ±3mm
- **Function :**
 - Visual alarm LED lamp for individual detection
 - Audible main & pre-level alarm for individual detection
 - Output signal for repeat alarm panel
 - Overriding device, -common alarm buzzer
 - AC/DC power fail alarm & alarm reset
 - Lamp test, -malfunction alarm
 - Main power and standby power
 - Navigation function, -time delay:0-99 seconds
 - Dimming function, -flicker stop
- **Mounting :** wall or console mounting type

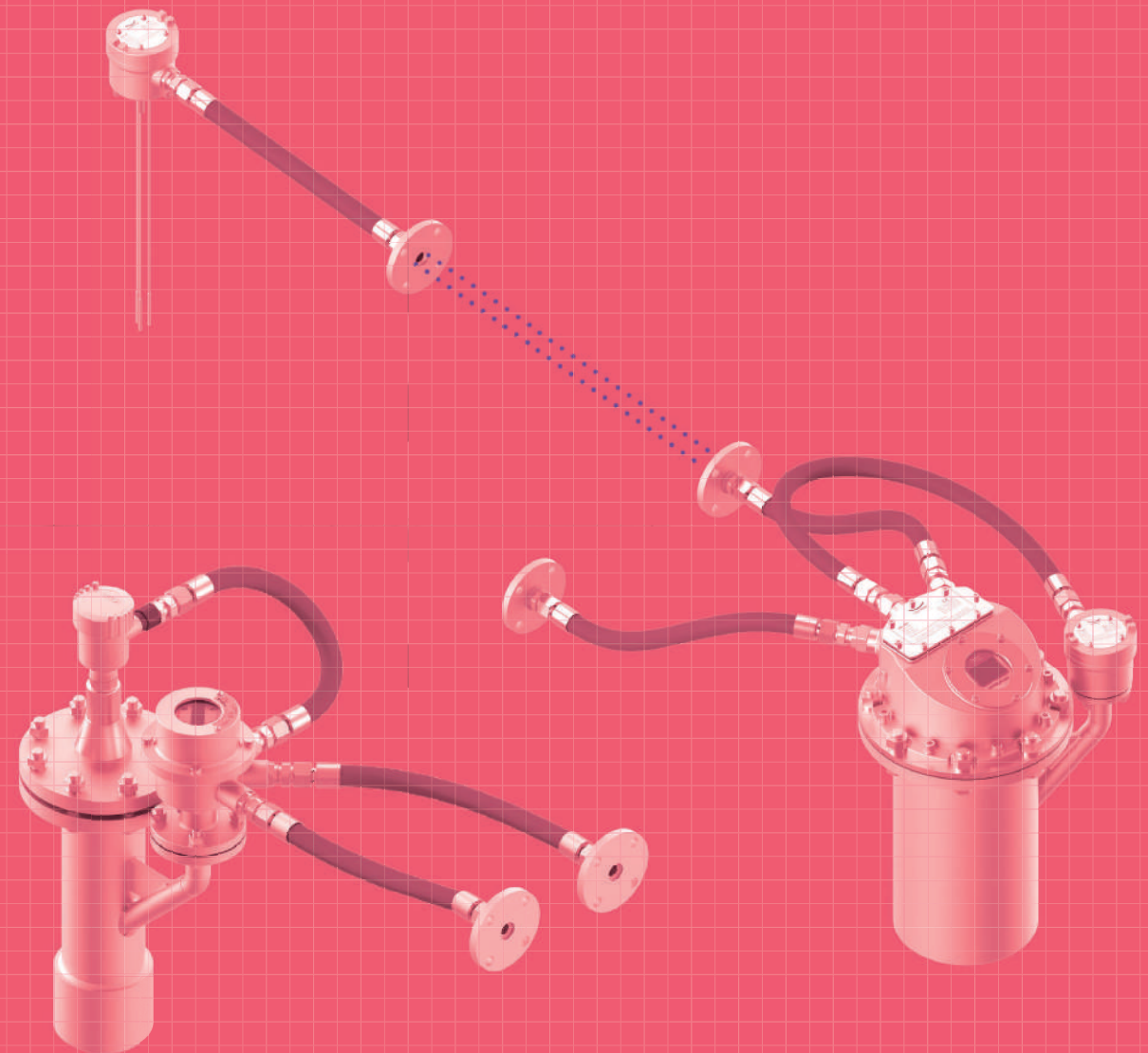
System diagram



Level Measurement Systems & Instrumentations

Tank Measuring System

- Puls Radar Type(Ps60 Series) For Cargo Tank Monitoring System (Hanla-Vega)
- FMCW Radar Type(HRD-28) For Cargo Tank Monitoring System(Hanla)
- Magnetic Float Type For Cargo Tank Monitoring System(Hanla)
- Independent Type Tank High / Overfill Alarm System (Magnetic Float Type)
- Independent Type Tank High/Overfill Alarm System (No Movement Type)
- Vapour Emission Control System
- The Fixed Gas Sampling System For Pump Room, Ballasts And Void Space
- Pump And Manifold Pressure Monitoring System
- Tank Level Monitoring System
- Loading Computer



• PULS RADAR TRANSMITTER



| Application

Two different emitting frequencies are available for these applications, the compact, high frequency sensors are particularly suitable for applications for which high accuracy is reached. Low frequency C band sensors can penetrate foam and strong condensation and are thus particularly suitable for arduous process conditions. Unaffected by steam, gas composition, pressure and temperature changes the sensors detect the product surface of different products reliably.

| Features







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

| General

Extremely short microwave impulses are emitted by the antenna system to the measured product, reflected by the product surface and received again by the antenna system. They spread with high velocity and the time from emission to reception of the signals is proportional to the level in the vessel. A special time spreading procedure enables the reliable and precise measurement in extremely short times.

The radar sensors work with low emitted power in the C and K-band frequency range. The proven ECHOFOX signal processing selects the correct level echo reliably from a number of false reflections. An adjustment with empty and full vessel is not necessary.

| Standard model and specification

Model						
	PULS61	PULS62	PULS63	PULS65	PULS66	PULS68
Application	Aggressive liquids in small vessels under easy process conditions	Storage and process vessels under arduous process conditions	Aggressive liquids under arduous process conditions	Aggressive liquids under easy process conditions	Storage and process vessels under arduous process conditions	Large solid vessels under arduous process conditions
Measuring range	up to 35m	up to 35m	up to 35m	up to 35m	up to 35m	up to 75m
Process temperature	-40..80°C	-200..450°C	-200..200°C	-40..150°C	-60..400°C	-200..450°C
Process pressure	-1..3bar	-1..160bar	-1..16bar	-1..16bar	-1..160bar	-1..160bar
Accuracy	± 2mm	± 2mm	± 2mm	± 8mm	± 8mm	± 2mm

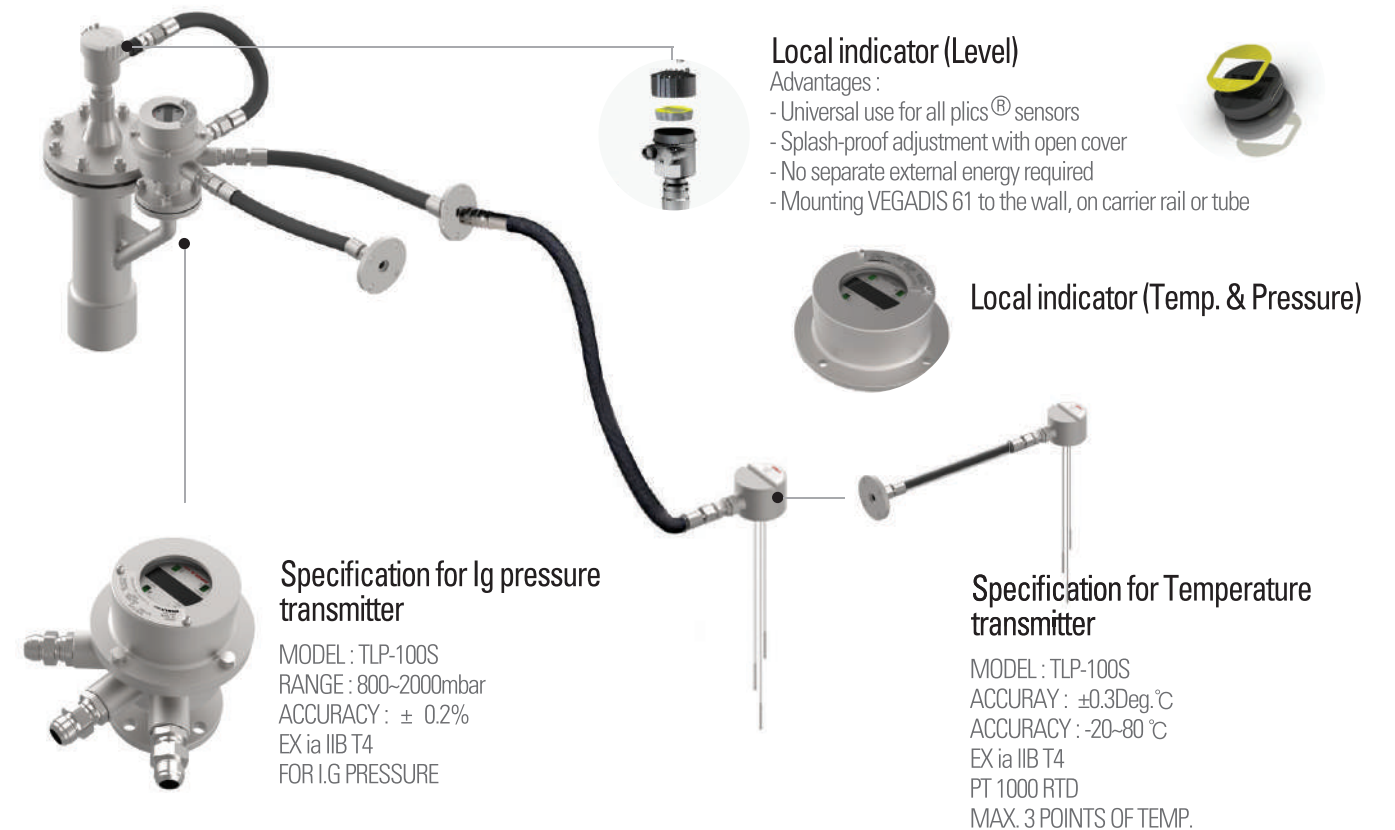
• COMMUNICATION AND SAFETY UNIT



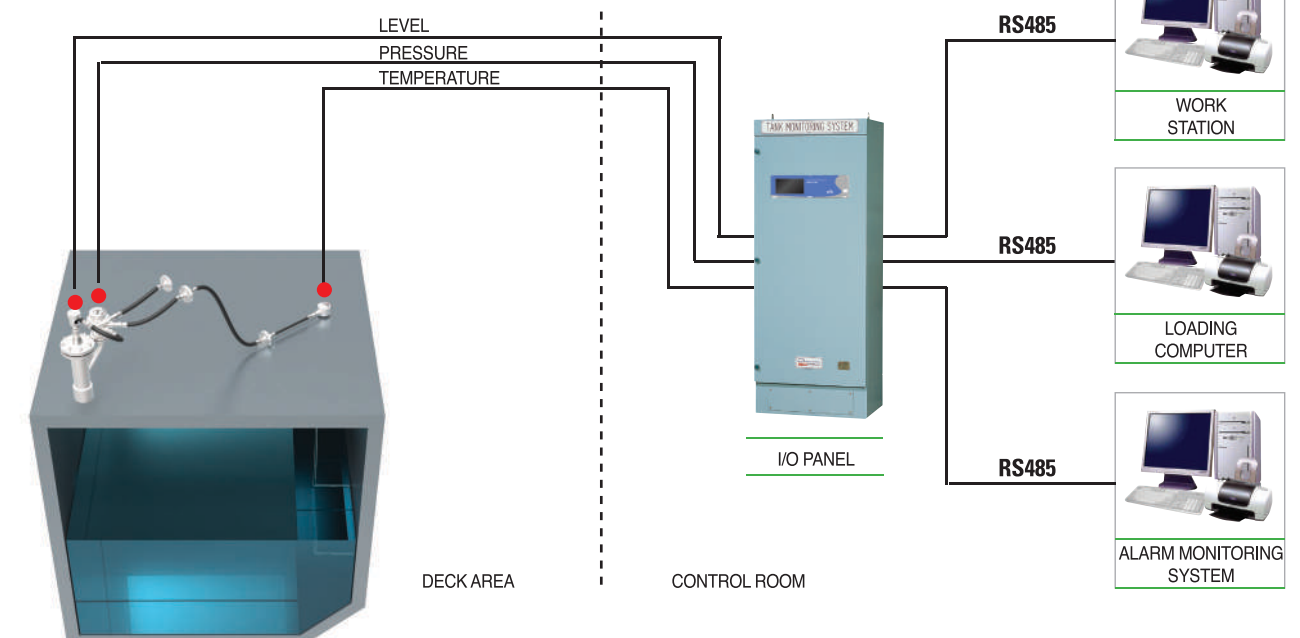
| Specifications

- Power Supply : 24VDC
- Cargo Tank : Up to 24 (Radar)
- Ballast & Other Tank : Up to 31
- Communication : 1 X RS232 / 485 / 422 (Input)
3 X RS232 / 485 / 422 (Output)
- Relay output : 4 X NO / NC
- Protocol : Modbus RTU
- Operating temperature : 0-60°C

• DECK MOUNTING METHOD FOR RADAR, TEMPERATURE AND PRESSURE SENSOR



• OUTLINE SYSTEM DIAGRAM



• FMCW RADAR TRANSMITTER



I General

The radar type level, pressure and temperature transmitter(HRD-28R, HRD-28P, HRD-28T) of radar type cargo monitoring system(HRD-28 system) are intrinsically safe apparatus that are applied in hazardous area, which are used for measurement of level, pressure and temperature in cargo tanks.
The radar type level transmitter (HRD-28R) measures level by using FMCW(Frequency Modulation /Continuous Wave) radar.
The pressure transmitter (HRD-28P) measures pressure by using a pressure sensor.
The temperature transmitter (HRD-28T) measures temperature by using RTD sensors.

I Application

The HRD-28 system is specially developed for tanker applications such as chemical, products and etc. It also covers temperature measuring and pressure measuring in cargo tanks.
HRD-28 system is consist of the HRD-28R, HRD-28P, HRD-28T, HRD-28B and the HRD-28C.
HRD-28R is FMCW RADAR level transmitter for measurement of the cargo tank level, measurable product is gasoline, diesel oil, heavy oil, kerosene and etc.. HRD-28P is pressure transmitter for measurement of the pressure of the inert gas in the cargo tank, HRD-28P is installed various place demand on the buyers.
HRD-28T is temperature transmitter for measurement of the product temperature in the cargo tank, generally maximum measurement point is 3(tank top, tank middle, tank bottom). HRD-28B is safety module for power supply and communication to the sensor in hazardous area. HRD-28C is communication unit for receive and display tank value of the level, pressure, temperature from HRD-28R and it transfers to the tank value at monitoring computer or loading computer.

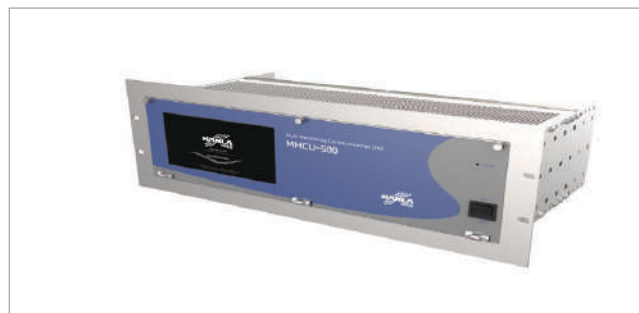
The energy supplied to HRD-28R shall be limited within maximum permissible entity parameters (Ui, Ii, Pi) and shall be connected to certified intrinsically safe circuits(barriers) to satisfy with the conditions.
The energy supplied to HRD-28P/HRD-28T shall be limited within maximum permissible voltage (Ui) to each port and maximum permissible total current($\sum I_i$)/power($\sum P_i$) to all ports of each transmitter and shall be connected to HRD-28R or certified intrinsically safe circuits(barriers) to satisfy with the conditions.

• TECHNICAL SPECIFICATION

- Range : Up to 35m.
- Display Resolution : 0.1mm.
- Sensor Accuracy : Up to ± 3 mm.
- Antenna Beam Angle(HPBW) : 12°.

- LCD Indicator : 2.5 inches Graphic LCD
- Operating Temperature : -35 °C to +70 °C
- Storage Temperature : -40 °C to +85 °C
- Communication : RS-485 Modbus RTU

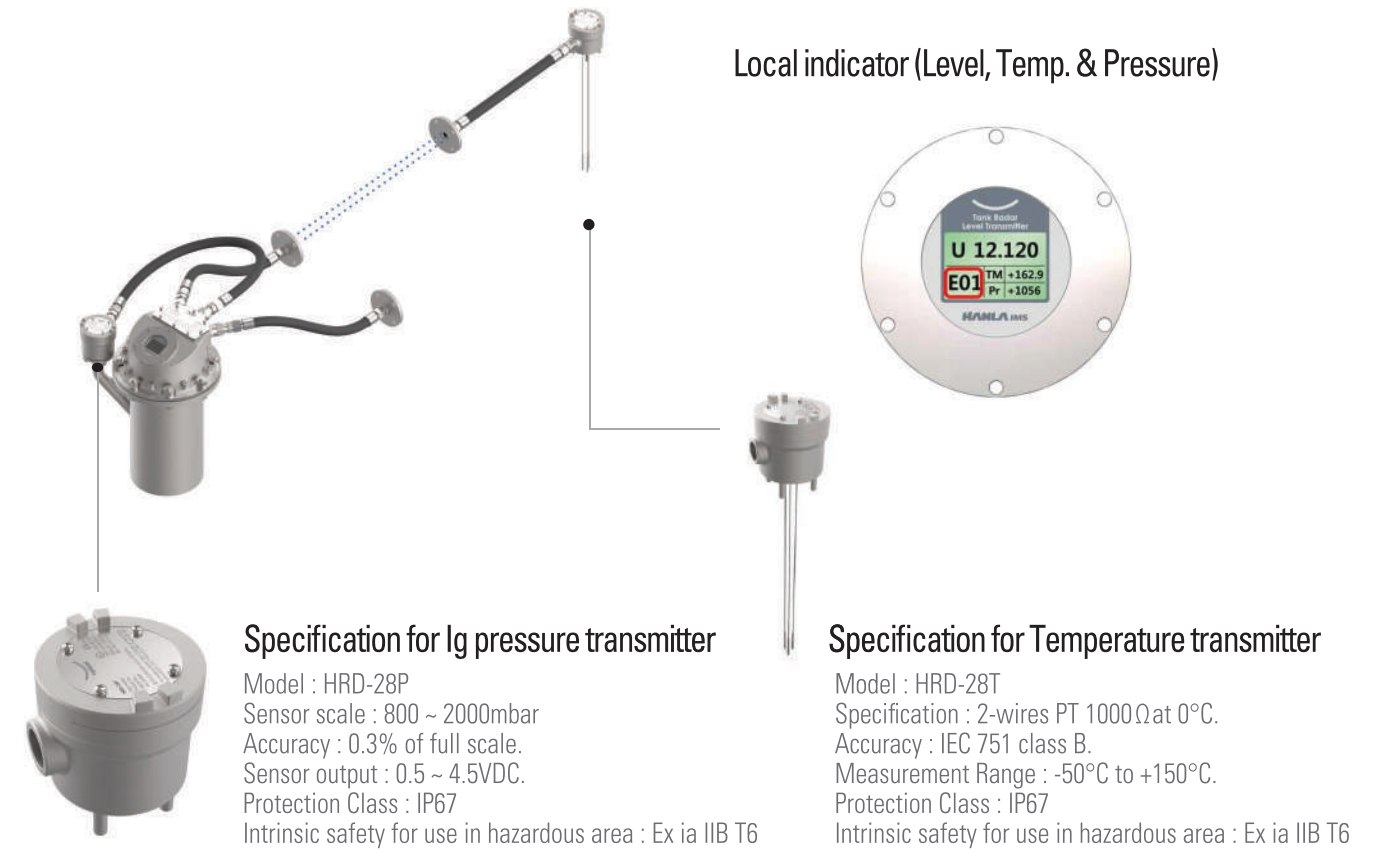
• COMMUNICATION AND SAFETY UNIT



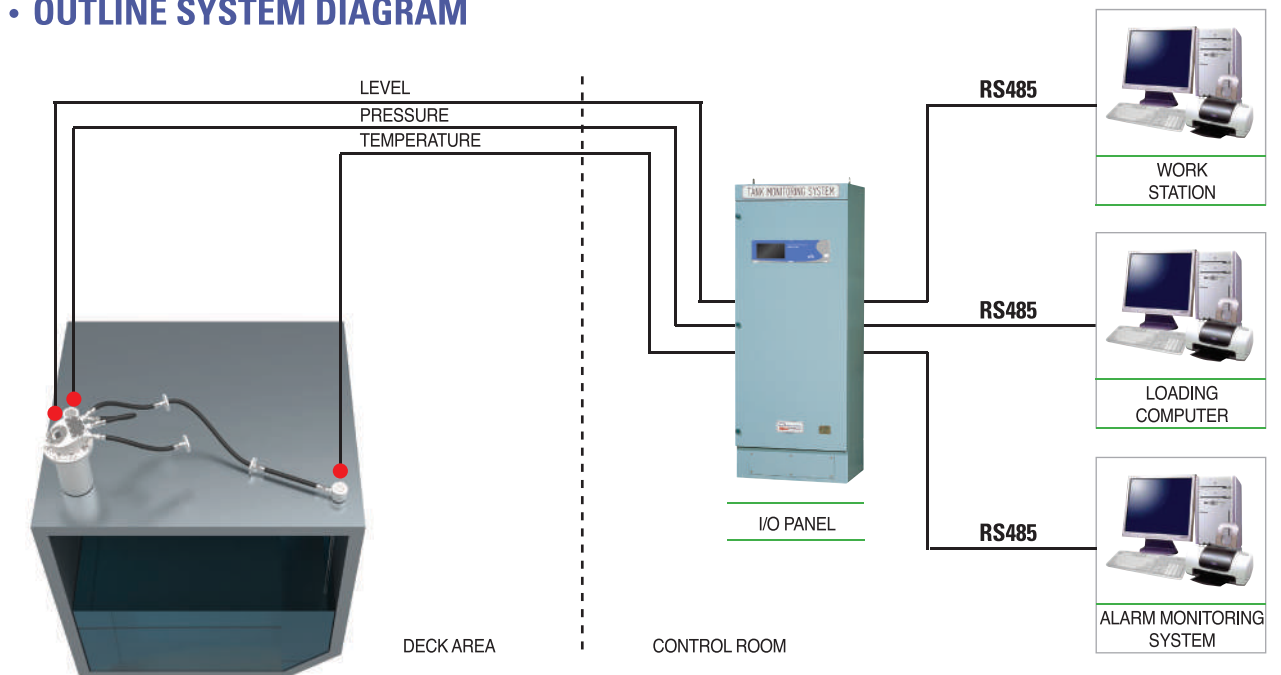
I Specifications

- Power Supply : 24VDC
- Cargo Tank : Up to 24 (Radar)
- Ballast & Other Tank : Up to 31
- Communication : 1 X RS232 / 485 / 422 (Input)
3 X RS232 / 485 / 422 (Output)
- Relay output : 4 X NO / NC
- Protocol : Modbus RTU
- Operating temperature : 0~60 °C

• DECK MOUNTING METHOD FOR RADAR, TEMPERATURE AND PRESSURE SENSOR



• OUTLINE SYSTEM DIAGRAM



MAGNETIC FLOAT TYPE CARGO TANK MONITORING SYSTEM WITH LOCAL AND REMOTE INDICATOR

Cargo Tank Measuring System

General

The TLP-100, LIQUID LEVEL is the newest version of magnetic float level gauge for marine tankers which has been developed based on the long time field experience. The detection of float position is conducted by Hall IC elements to eliminate problem of contact fusing and/or accuracy failure caused by existing reed switch system.

By this remarkable sensing system, long time stability and maintenance free operation have been achieved.

The measurement is free from the conductivity and/or dielectric constant of the cargo liquids.

Thus TLP-100 is widely suitable for measurement and control of cargo liquid levels at crude oil carriers, coaster tankers, product carriers chemical carrier, etc.

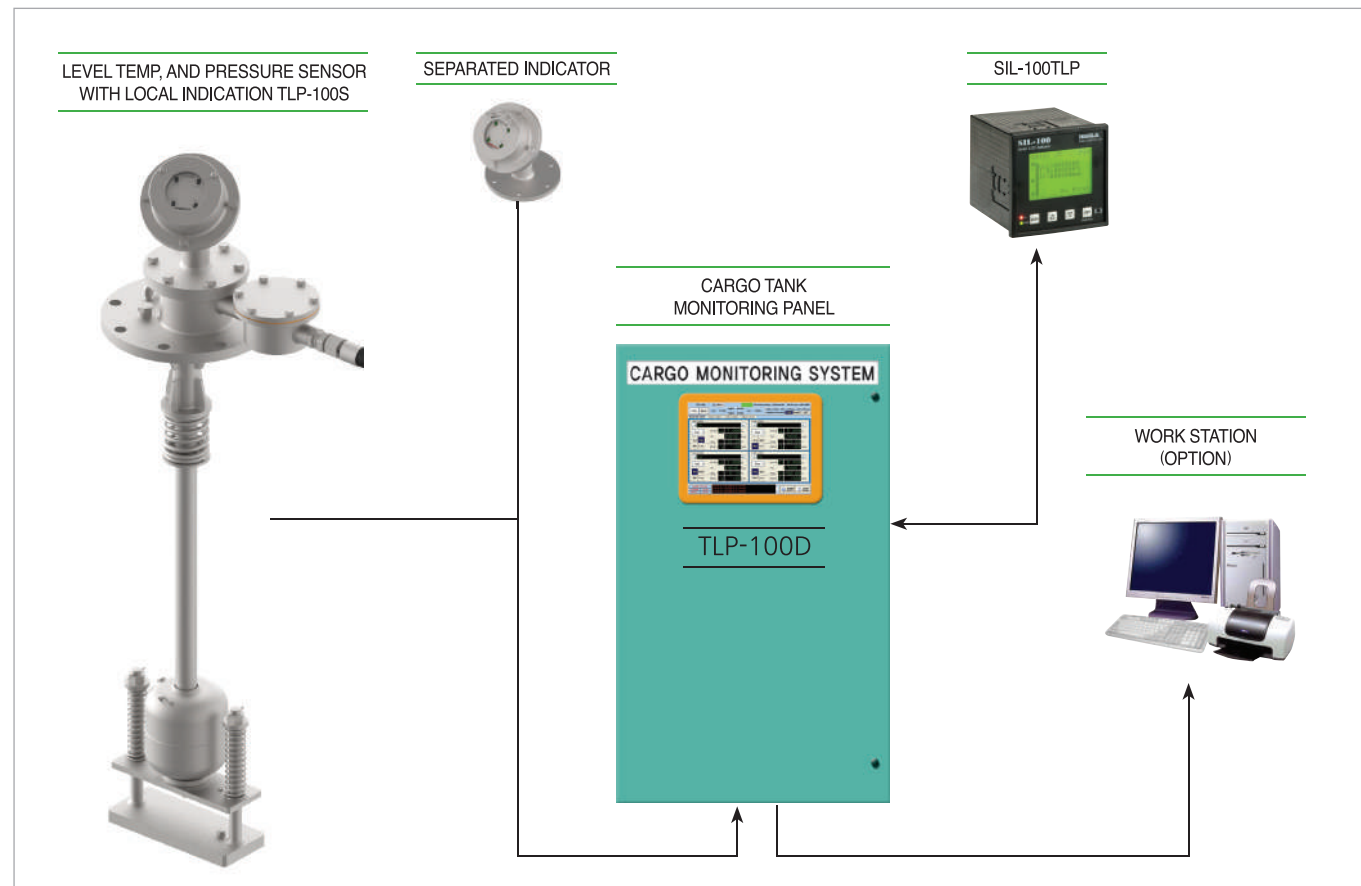
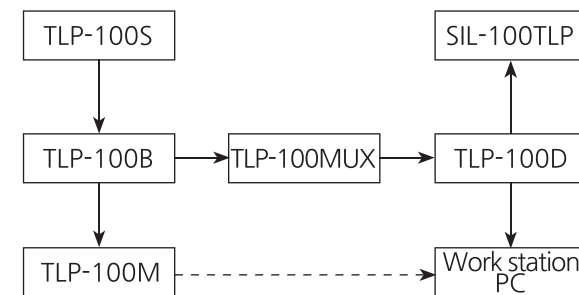
System construction

System	Model	CARGO MONITORING SYSTEM (TLP-100)
DESCRIPTION		INTRINSICALLY SAFE LEVEL TEMP. AND PRESSURE MONITORING SYSTEM
LEVEL SENSOR		LOCAL GAUGE TLP-100S
SAFETY BARRIER		TLP-100B
MAIN CONTROL PANEL		• MULTI-TANK MONITOR TLP-100D (TOUCH SCREEN COMPUTER) • TLP-100MUX

Features

- Compact and cost saving design.
- Hall IC Elements, pure electric position detection:
 - Grade up from existing reed switch system.
 - Highly reliable and stable for long time operation.
 - Highly precision for operation.
- 3 Point of temp. measurement and transmission.
- Separatable LCD indicator.
 - LCD indicator may be separated from the sensor.
- 2 Core cable data transmission and easy wiring:
 - Liquid level and maximum 3point temp. data are sent to CCR by serial BCD signal through 2 core cable only including power supply to the deck.
- Full line up of CCR indication system
 - Full line up from individual indicator to computer based system is ready to meet for requirements.

Block diagram



MAGNETIC FLOAT TYPE CARGO TANK MONITORING SYSTEM WITH LOCAL AND REMOTE INDICATOR (TLP-100S, TLP-100B, TLP-100MUX, TLP-100D, TLP-100M, SIL-100TLP)

Application

This system is for monitoring for level, alarm and temperature of the liquid in cargo tanks.



Local gauge : TLP-100S

Specification

- Detection unit : Level : by magnetic float and Hall IC element
Temp : by PT-100RTD
Pressure : ceramic sensor
- Accuracy : Level : every 10mm (standard)
: every 5mm (option)
Temp : $\pm 1.0^{\circ}\text{C}$
- Measuring range : Level : max. 20M
Temp : $-25^{\circ}\text{C} \sim +125^{\circ}\text{C}$
Pressure : 900 ~ 1300mBar
- Indication : By selector type LCD 6 digit indication
1) Level : 5mm unit (0~ 20.000 M)
2) Temp. (U : Upper) $^{\circ}\text{C}$ or $^{\circ}\text{F}$ unit
(M : Middle) $^{\circ}\text{C}$ or $^{\circ}\text{F}$ unit
(L : Lower) $^{\circ}\text{C}$ or $^{\circ}\text{F}$ unit
- Output : Digital serial code pulse (2 wire system including power supply, exclusive receiving unit is required)

Indicator : SIL-100TLP



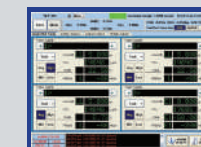
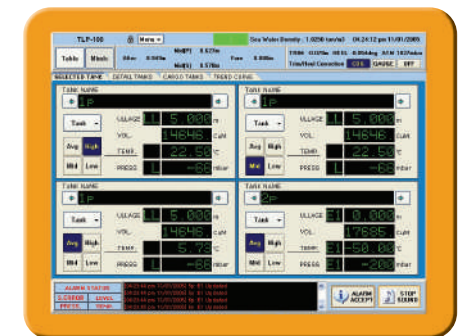
Specification

- Indication : Individual tank LCD indicator
- Tank selector and temp. element selector keys are provided.
- Level : 0 ~ 20.000M a
(ullage or sounding selectable)
- Level status : 2 digits
- Alarm setting and monitoring :
 - 1) 4 level alarms(HH, H, L, LL) for 24 tanks
 - 2) 2 temp. alarms(H, L) for each element of tanks (U, M, L)
 - 3) 4 Pressure alarm(HH, H, L, LL) for 24 tanks
- Input : RS485 port for indicator (MODBUS PROTOCOL)
- Common or Individual Indicator

Multi-tank monitor : TLP-100D

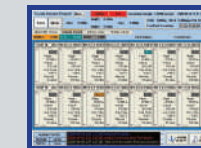
The cargo monitoring panel will be designed and arranged for level alarm, high temp. alarm, and temp. level measurement based on the number of tanks and tank location etc..

The cargo tank monitoring panel gives audible and visible alarm as well as cargo tank level, temp. indication on the mimic board, and also external alarm for high an high-high level shall be provided by cargo monitoring panel.



Selected tank

Easy Operation by the Touch screen.



Total tanks

Mimic diagram display Of Total tanks information.



Detail tank

Calculation of Level, Pressure, Volumes and Average Temperature.



Trends curve

Saving of Tank loading, Discharging information.

Specification

- Indication : 10.4" Touch screen LCD
- Serial Port : Two RS232 and selectable RS232 / 422 / 485 serial ports
- Built-in multiplexer Board TLP-100MUX :
 - Input : 8 Port 4 ~ 20mA
24 Tank sensor(Level,Temp.Pressure)
 - Output : 13 Relay Contact
RS485 or RS232 COMMUNICATION (MODBUS PROTOCOL)

HANLAs' cargo tank high/overflow alarm system is thoroughly designed according to USCG latest requirements, and are to be required by IBC code.

General

This alarm system consists of level alarm sensor, I.S barrier and alarm panel. When the liquid level reaches a set point, the reed switch in the alarm sensor is actuated by magnetic float. This signal is connected to alarm annunciator through safety barrier. At the same time, we can get audible and visible alarm on the main alarm panel as well as external alarm on the bridge top. The 95% of volume is normally for high alarm and 98% of volume is normally for overflow alarm.

Features

- Most advanced electric technology for high reliability and durability.
- Certified by major certifying authorities.
- Designed for all kind of liquid.
- Simple for construction.
- Intrinsically safe designed unit is applicable to all kind of inflammable fluids.
- Lifting type manual test device which can check the function.

Application

These systems are used for the level alarm in cargo tanks of all kind of oil and chemical carriers.

Technical specification

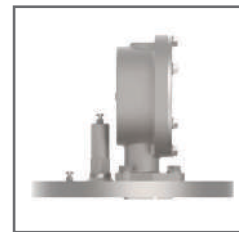
Alarm sensor

- Model : High alarm:TMR-701T
High and overflow alarm:TMR-702T
- Conn. size : JIS 5K 100A(standard)
- Conduit conn. size : JIS 5K 32A(standard)
- Material : - Housing - SUS304
- Flange - SUS304 or SUS316
- Guide pipe - SUS316
- Magnetic float - SUS316
- Contact form/rating : SPST/250VAC, 0.5A
- Accuracy : ± 5 mm on level rise or fall
- Specific gravity : 0.65~1.5
- Max. working temp : -25~+100°C
- Alarm point : 95% of volume for high level alarm
98% of volume for overflow alarm
- Protection : IP56 over
- Safety : Ex ia II C T6

Level alarm panle

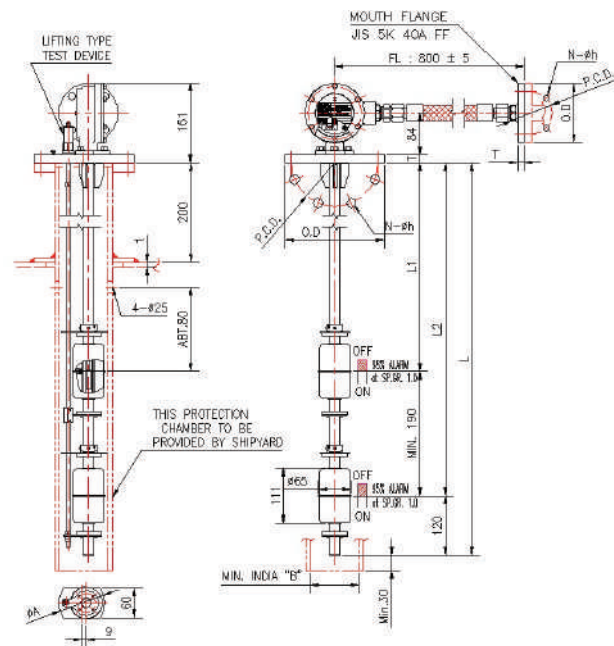
- Power supply : AC 110/220V(Main)
DC 24V(Back up)
- Consist of : - Alarm annunciator - I.S Barrier
- Power lamp - DC power fail alarm
- Alarm buzzer
- External alarm : Horn & Light

HIGH AND OVERFILL ALARM SENSOR



MANUAL TEST DEVICE

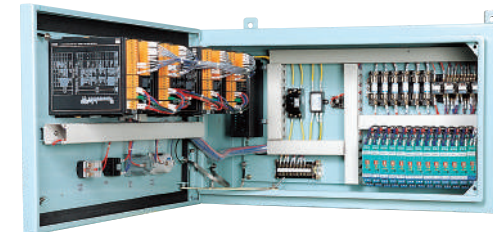
DIMENSION FOR HIGH AND OVERFILL ALARM SENSOR/TMR-702T



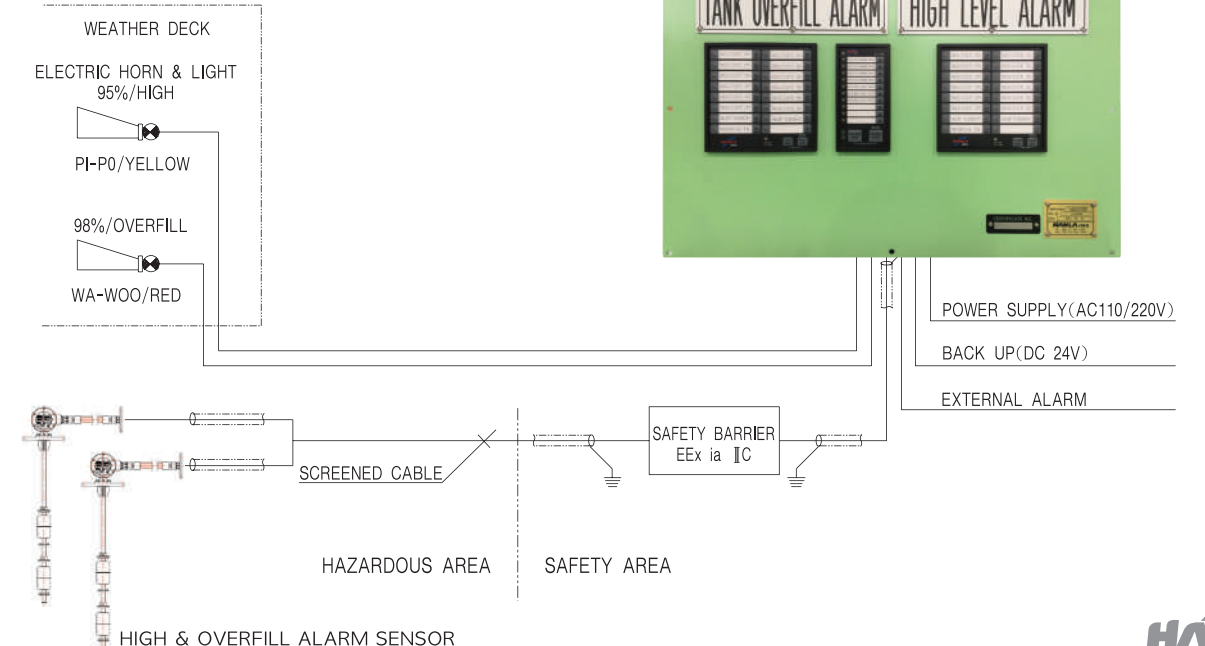
HIGH AND OVERFILL ALARM PANEL



INTERNAL VIEW



ONE LINE BLOCK DIAGRAM FOR HIGH AND OVERFILL ALARM SYSTEM



ALARM MODULE



- Channel number : 16 contacts.
- Alarm Input time delay : 0~99 sec.
- Alarm escape time delay : 0~99 sec.
- Channel outputs : NC or NO.
- Common relay output.
- Internal Buzzer.
- Buzzer Stop button.
- Flicker Stop button.
- Supply voltage : 24 VDC(18~32 VDC).
110V or 220VAC
- Indication LEDs : 16 × red/green, 1 × yellow, 1 × green
- First alarm flashing.
- Serial Communication : RS-485.
- Channel setting : by internal rotary switch.
by windows setting program.
- Power consumption : Max. 4.5 Watt at 24 VDC.
- Operating temperature : -10°C to +55°C(70°C peak).
- Alarm module enclosure : standard DIN 144× 144× 86 mm.
- Type code selection : AU-160D-AB.
A : Channel Output.
0 : None.
1 : Isolated Output.
B : Power.
0 : 24VDC.
1 : 100~240VAC
- AU-160D : High Level Alarm, Overflow Alarm application.
Inhibit buttons for each channel.
Navigation function.
- Optional repeater unit : AU-160R by RS-485.



POWER SUPPLY (AC110/220V)
BACK UP (DC 24V)
EXTERNAL ALARM

General

Vapour emission control system is intended for analyzing the waste vapour gas for oxygen gas content. The system also includes the pressure transmitter which can monitor the pressure on the waste vapour line. This system consists of two cabinets ;a detector cabinet in which the pressure transmitter, oxygen sensor, flow alarm sensor, sample selector valve and purge valve are included, and the monitoring & alarm panel on which the alarm unit, oxygen indicator are provided. The detector panel in steel is installed on deck nearby the vapour manifolds and the monitoring & alarm panel is mounted in the cargo control room.

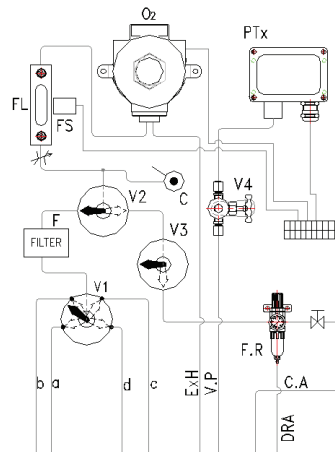
Principle of operation

The sample tubes in the detector cabinet run from the sample point inlets to oxygen sampling selector valve and mode selector valve. Exiting from this single tube is leading the chosen sample gas through filter between oxygen sampling selector valve and mode selector valve, and then finally passes the oxygen sensor, exhausted through the exhausting line on the cabinet panel. The display shows the O2 concentration from 0.0 to 25.0V% O2 on the oxygen monitor and the " High oxygen content alarm" is activated at 8V% O2. The " Flow failure" is also operated when the flow is stopped. The display shows the pressure transmitted from waste vapour line on the vapour pressure indicator from 0 to 200mbar. The " Low pressure alarm" is also activated at 10mbar and the " High pressure alarm" ;at 120mbar. It is possible to increase or decrease the pressure alarm value freely and the external alarm output relay for all alarm can be provided as optional items.

Features

- Intrinsically safe detecting is applicable to all of inflammable fluids
- All stainless steel material pressure sensor
- Individual adjustable alarm for oxygen and pressure
- Most advanced electronic technology for high reliability and durability.

DIAGRAM FOR DETECTION PANEL INSIDE



- FL : Flow indicator
- F : Filter
- F.R : Filter & Regulator
- PTx : Pressure transmitter
- V1 : Oxygen sampling line (selecting valve)
- V2 : Mode selection
- V4 : Test valve for press. transmitter
- a : Port(F)
- b : Port(A)
- C.A : Cleaning air inlet
- ExH : Exhaust
- FS : Flow alarm sensor
- C : Calibration gas connector
- O2 : Oxygen sensor
- V3 : Cleaning air stop valve
- c : ST'BD(F)
- d : ST,BD(A)
- V.P : Vapor collecting main press.
- DRA : Drain line

Technical specification

System

- Main power supply : AC 110/220V, 50~60Hz
- System power : DC 24V
- Air supply : 4~7bar
- Function : - Inert gas pressure display(0~200mbar)
- Inert gas high pressure alarm(120mbar)
- Inert gas low pressure alarm(10mbar)
- Oxygen content display(0~25% V% O2)
- Oxygen content high alarm(8 V% O2)
- Flow failure alarm(If the flow is stopped)
- External alarm(option)
- Enclosure : Ex ia II C T4

Pressure transmitter

- Range : 0~200mbar
- Output : 4.....20mA
- Accuracy : ± 0.2% of F.S
- Power supply : 17~28vdc
- Safety : Ex ia II C T4

Digital indicator

- Size : 48Hx 96Wx 112D
- Output contact : H and L alarm
- Input : 4.....20mA

Oxygen sensor

- Range : 0~25% O2
- Output : 4.....20mA
- Accuracy : ± 2% of F.S
- Power supply : DC 24V
- Safety : Ex ia II C T4

Alarm annunciator

- 10 channel type
- Function : Accept horn, Accept flash, Test function
- Power supply : DC 24V

OXYGEN SENSOR



VAPOUR PRESSURE TRANSMITTER

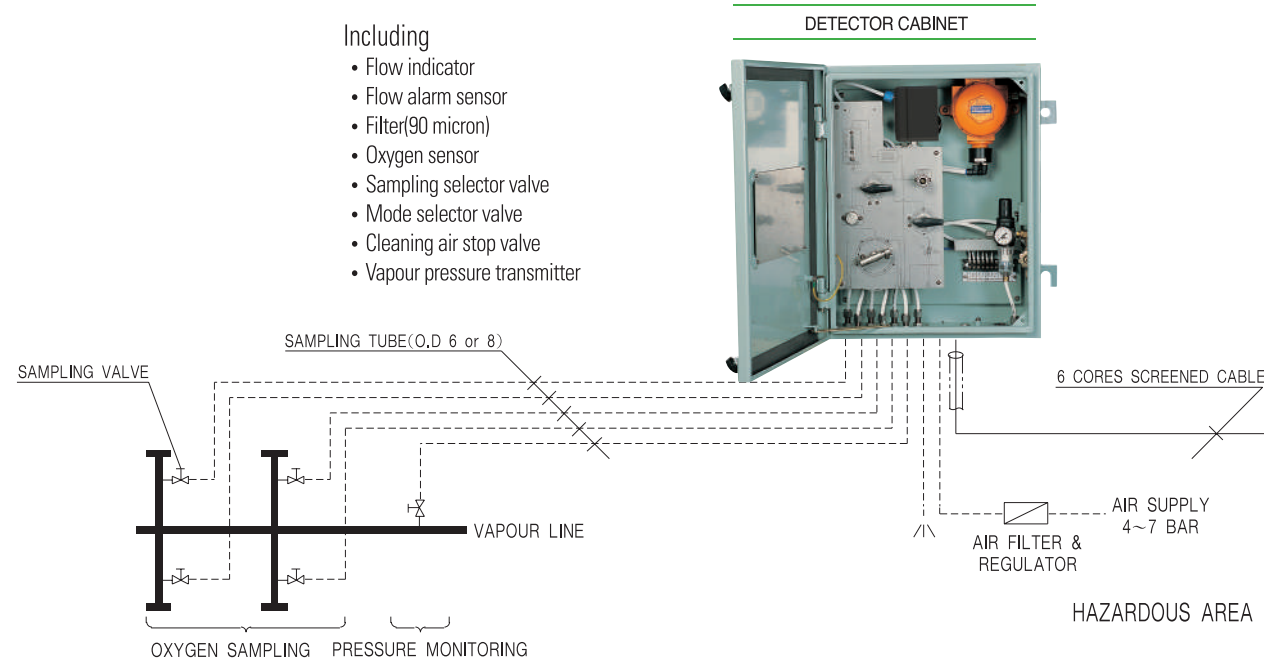


DISPLAY & ALARM UNIT OVMS-50



Including

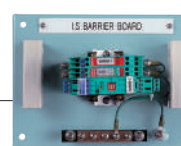
- Flow indicator
- Flow alarm sensor
- Filter(90 micron)
- Oxygen sensor
- Sampling selector valve
- Mode selector valve
- Cleaning air stop valve
- Vapour pressure transmitter



Function

- Oxygen content display & high oxygen content alarm
- Pressure display high & low pressure alarm
- Flow failure alarm
- Alarm buzzer

I.S BARRIER BOARD



SAFETY AREA

MONITORING & ALARM PANEL



POWER SUPPLY(AC110/220V)

EXTERNAL ALARM

General

The Fixed gas sampling system is dedicated to the Gas Control in all Tanks, Void Spaces, Pump room or Houses adjacent to Cargo Storage Tanks and Handling Systems. In order to detect any Gas Concentration level over programmable limits and to monitor visible and audible alarms consequently, these areas are controlled by the suction process sampling on one or more common sensor(s) as well as by individual local sensors.
This system complies with ISGOTT regulation chap. 7.8 and 8.2.

System description

The Fixed gas sampling System is composed of :

Analysing unit

A cabinet named Analyzing Unit includes suction process sampling gas sensor(s) and pneumatic components for up to 48 channels (pumps, solenoid valves, water trap filter, pressure sensor, ...).
A modular arrangement of solenoid valves allows easy sizing of channels number, easy extension as well as easy maintenance.

An electronic module manages above parts, monitors up to 7 gas sensors dispatched either in suction process or as local sensor, performs all gas measurements from above sensors, and monitors the alarms on dry contact outputs. It comprises 4 digital RS485 communication ports Unit(s) as described hereunder, and/or an external Monitoring System using MODBUS RTU protocol. The Unit is powered equally by 220 or 110 VAC.

Control unit

One or more panel(s) named Control Unit include an electronic module managing a LCD screen for measurement and alarms display, status lamps, buzzer/dry contact output for alarms monitoring and keyboard for System operation and configuration.
The large LCD screen increases the data availability and the man-machine interface is simplified for easy access to functions and configuration using spread menus.

One Control Unit can be incorporated in the Analyzing Unit or located in a remote box, another one can be located in another place. The Control Unit is powered by 24VDC from the Analyzing Unit, and communicates with it by RS485 link.

ANALYZING UNIT WITH CONTROL UNIT



Suction sampling accessories

A set of suction sampling accessories is composed of safety chamber, non-return valves, flame-arrestors, shut-off valves. On each channel, a flow regulating valve allows to get an identical flow whatever is the length of the line, for best efficiency of the system.

Local gas sensors

When required, a set of local gas sensors of infra-red, catalytic, electro-chemical or any other type, 4-20mA output, can be connected to the Analyzing Unit.

SAFETY CHAMBER (Option)



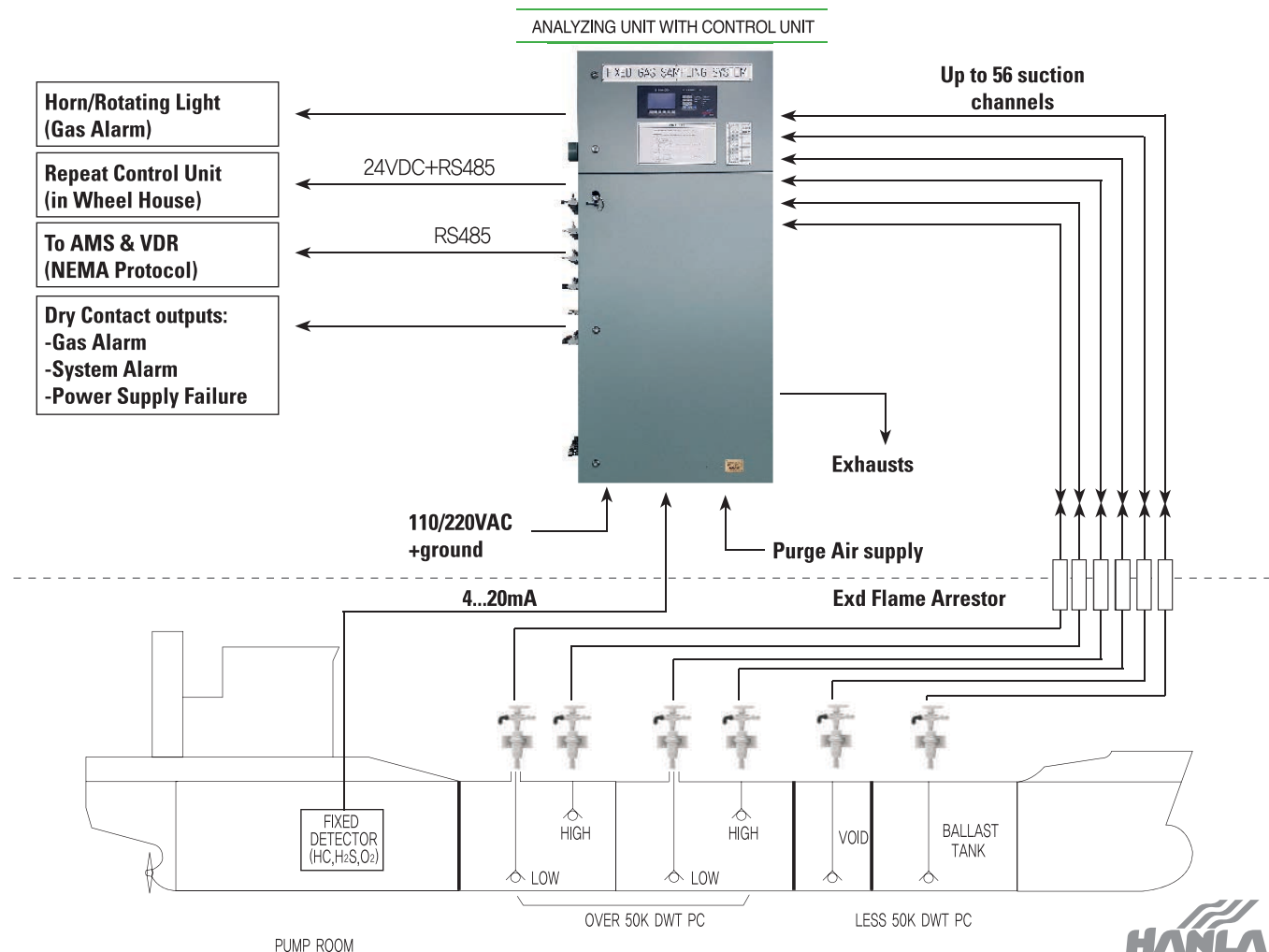
Water check unit (Float type)

- Type : Flange mounting type
U bolt mounting type
- Material : Stainless Steel
- Size : JIS 5K 20A..JIS 5K 40A

Specifications

- Suction channels number : up to 56, connections for O.D. 8 mm copper pipes
- Suction capacity : O.D. 8 mm pipes
- Sampling exhaust output : connection for O.D. 10 mm copper pipe to safe area
- circulation exhaust output : connection for O.D. 10 mm copper pipe to safe area
- Drain water trap output : connection for O.D. 10 mm copper pipe to safe area
- 4-20mA Analog calibrated inputs for sampling or local sensors : up to 16
- Gas concentration alarm levels : 2 adjustable, Pre-Alarm and Main alarm
- Alarm form Analyzing Unit, dry contact outputs : 1 for Gas alarm
1 for System alarm
1 for remote Horn / Rotating Lamp
1 for Power Supply failure
- Alarm from Control Unit : 1 internal buzzer + 1 dry contact output
- Communication ports : 6 RS485, 1 RS232 (Analyzing Unit)
1 RS232 or RS485 (Control Unit)
- Output power supply for sensors : 24 VDC
- Instrument air supply for purge : 7 / 10 bars, connection for O.D. 10 mm copper pipe
- Sensors : miscellaneous type according to gas type Safety class according to their location
- Operating temperature for Analyzing and Control Units : 0 °C to + 70 °C
- Location for Analyzing and Control Units : Safe area in enclosed space (Control Room, accommodation, bridge, ...)
- Power Supply : 110/220 VAC and Other voltages on request

General diagram for fixed gas sampling system



• **PRESSURE SENSOR FOR SUBMERSIBLE TYPE**



• **PRESSURE SENSOR FOR DECK MOUNTING TYPE**



General

- 1) Vapour pressure monitoring
The Cargo tank ullage space pressure monitoring with high & low pressure is required by SOLAS 74, Chapt. II-2 Req. 59. This monitoring system is required to preventing serious deformation of the tank structure such over and under pressurization when the tank venting system is in failure.
- 2) Manifold pressure and Pump suction and discharge pressure monitoring
The Manifold pressure and pump suction & discharge pressure shall be indicated from CCR. Pressure transmitter will be installed on the dry space and in ballast tank.
- 3) Vapour return pressure monitoring
This transmitter is required for remote monitoring and high/low alarm from CCR. The pressure transmitter will be installed near in cargo manifold.

Features

- Intrinsically safe detecting is applicable to all of inflammable fluids
- Individual pressure displays
- Anti-corrosion material of pressure sensing part
- High accurate reading vacuum pressure
- Easy calibration and maintenance
- Very strong flash mounting diaphragm
- Zero and span internal adjustable
- All stainless steel material
- Intrinsically safe Ex ia II C T5
- Self-diagnostic function

Principle of operation

The Intrinsically Safe Type Vapour Pressure Monitoring System is intended for Cargo tank pressure monitoring. This system consists of pressure transmitter which has a high quality, accuracy, durable construction suited for excessive pressure and I.S barrier. The output signal which arise by pressure transmitter is transmitted to indicator panel or alarm monitoring system through I.S

barrier located in safety area. The high and low pressure alarm can be classified into two types which are on-deck mounting type and submersible mounting type in accordance with detection position of pressure.

Applications

- Cargo pump pressure
- Cargo manifold pressure
- Vapour return line pressure
- Tank cleaning pump pressure
- Fire main line pressure
- Ballast pump pressure

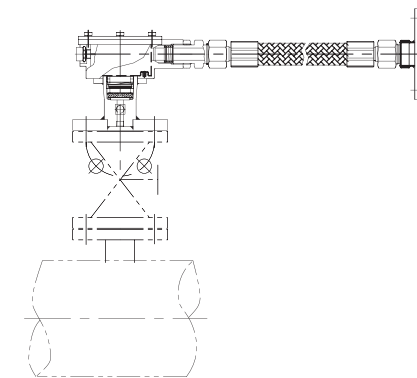
Technical specification

Pressure sensor

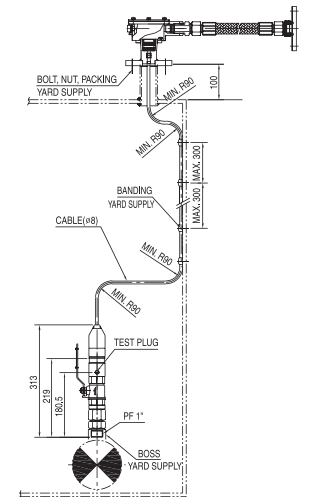
- Accuracy : $\pm 0.2\%$ F.S. at 20°C
- Environmental protection :
 - Transducer : IP68, 10Bar~40Bar
 - Indoor amplifier box : IP66
 - Outdoor amplifier box : IP67
- Operating temperature :
 - P.E. cable : -40~+80°C
 - FEP cable : -40~+120°C
- Diaphragm material : Ceramic Al2O3
- Material :
 - Sensor body : SUS316L
 - Indoor amplifier box : PC
 - Outdoor amplifier box : SCS14

Dimension / Installation

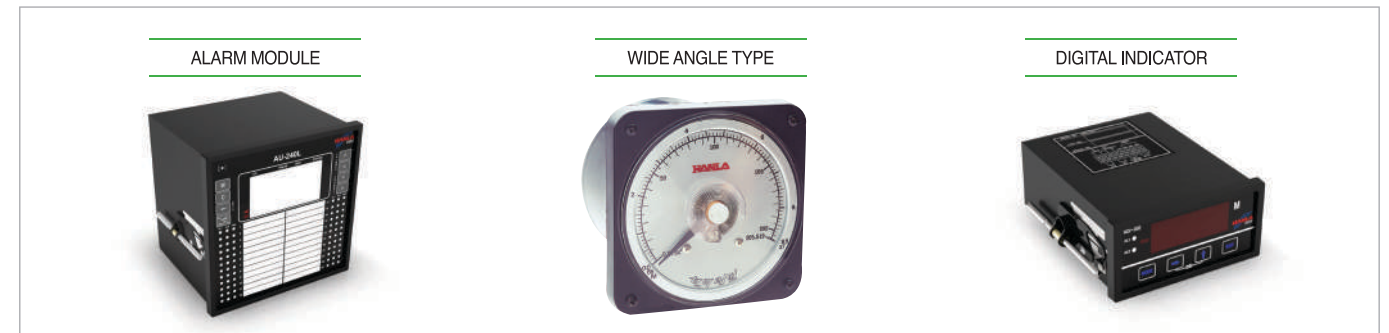
On-deck mounting type



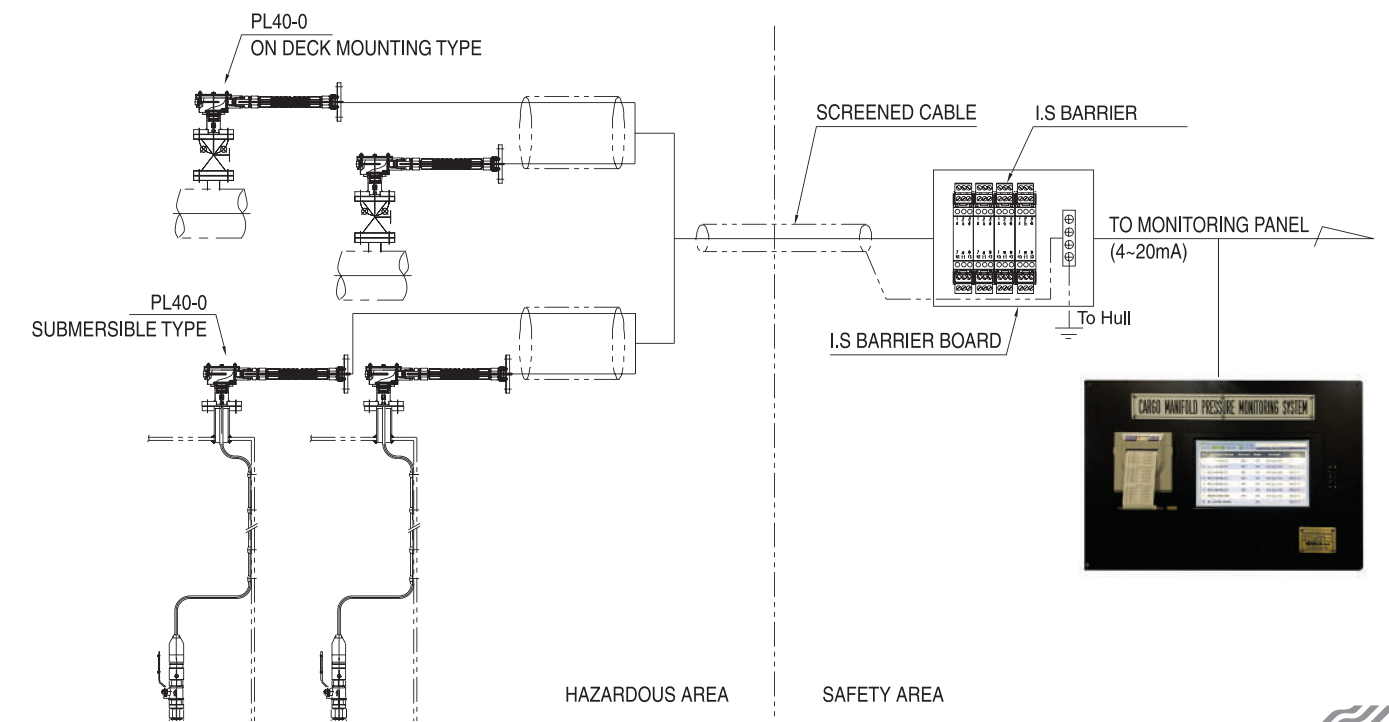
Submersible type



Technical specification

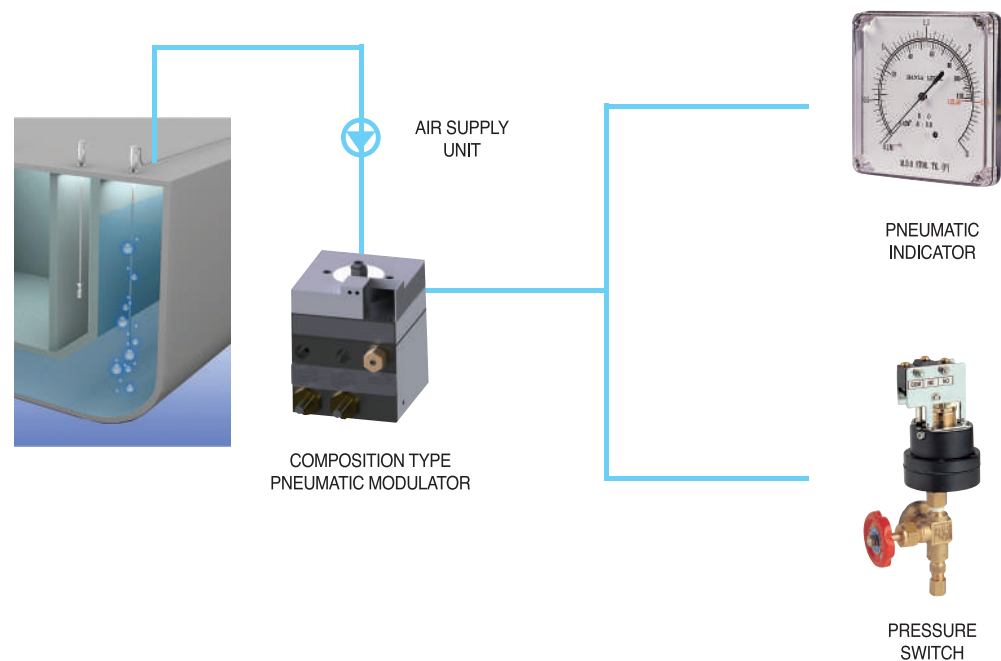


ONE LINE BLOCK DIAGRAM



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

Model : CT - 180 - OPN



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 purpose.
- The air supply valve is used for isolation from other channel without any influence.
- Principle Diagram

Standard specification

- System type : One line type air purge system
- Flow rating : 10-80NI/hour
- Working temp. : -30°C ~70°C
- Supply air setting pressure : 4.5kg/cm²

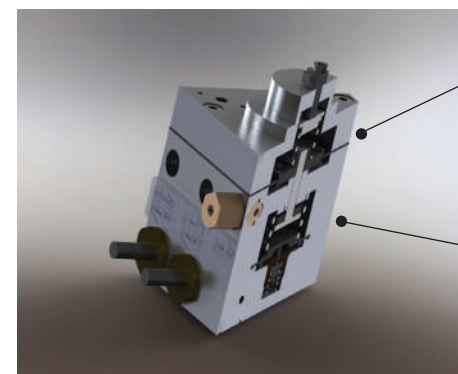
Features

- 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 measure 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

- OPEN TANK-Ballast tank remote reading
 - Draft remote reading
 - Heeling and trim remote reading
 - Fuel oil tank remote reading
- 400m Max. distance of signal line and indicator
- Signal line size : OD8 or OD10
- Range : 1 to 40 meter
- Accuracy : ± 0.5% os F.R(optional)
± 1.0% os F.R

DUAL CHECK TYPE SAFETY CHAMBER(AIR PURGE HEAD)



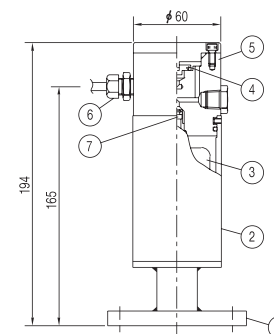
PNEUMATIC MODULATOR Part.

- AIR PRESSURE : 4.5kg/cm²
- FLOW PATING : 10-80 NI/h
- BLOWING PRESSURE : 4.5kg/cm²
- CONNECTION SIZE : -AIR SUPPLY PT 1/8"
-SIGNAL LINE PT 1/8"
- INCLUDING THE FLOW RATE ADJUSTER AND MAIN AIR NON-RETURN CHECK VALVE

GAUGE SAVER Part.

- DIFFERENTIAL : 0.01kg/cm²
- INCLUDING THE RANGE ADJUSTER

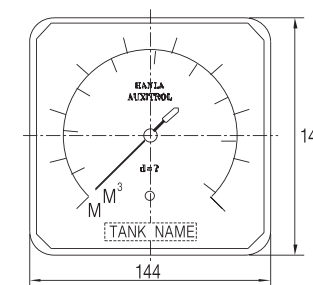
DUAL CHECK TYPE SAFETY CHAMBER(AIR PURGE HEAD)



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.

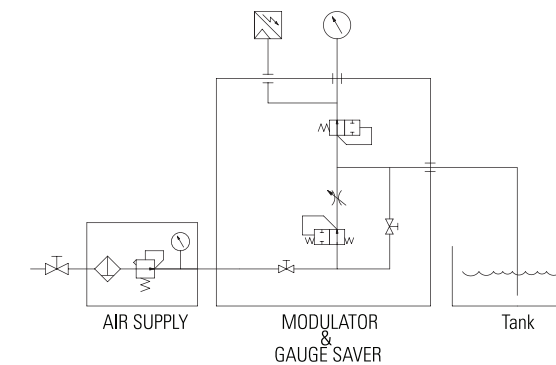
LEVEL INDICATOR WITH GAUGE SAVER



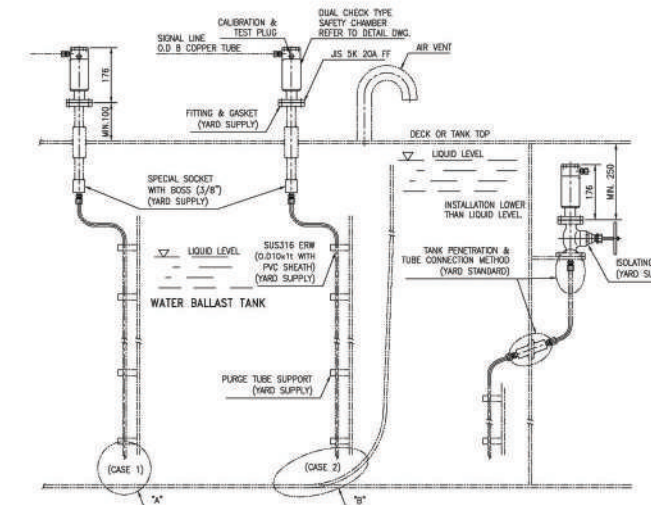
LEVEL INDICATOR

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

PNEUMATIC DIAGRAM

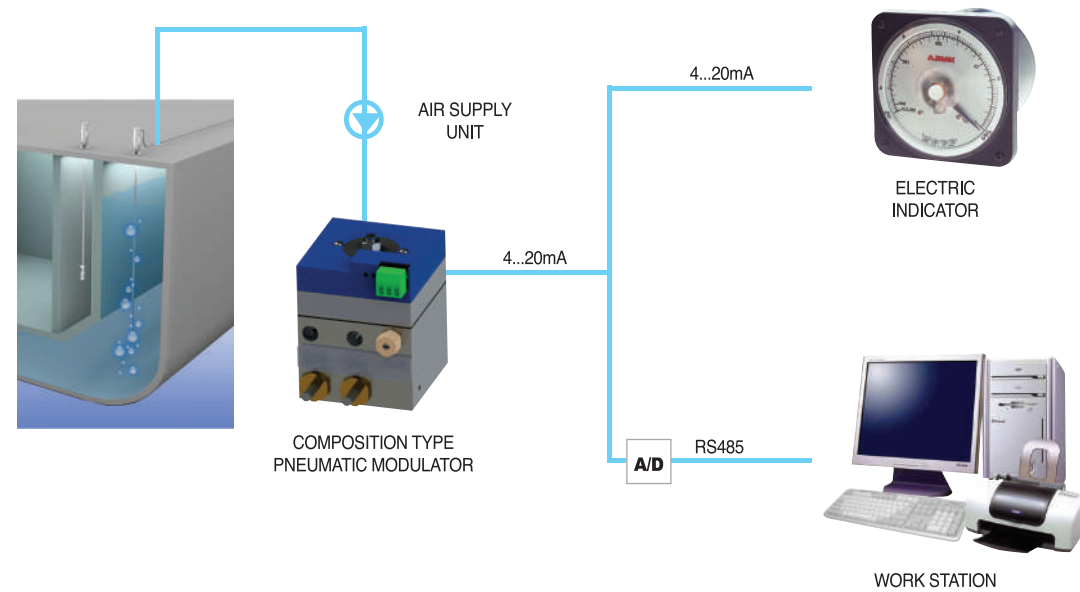


INSTALLATION



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

Model : CT - 180 - EPN



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.

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.

Features

- Liquid level of measuring depth pressure is indicated for direct reading, and then the high precision is achieved.

Applications

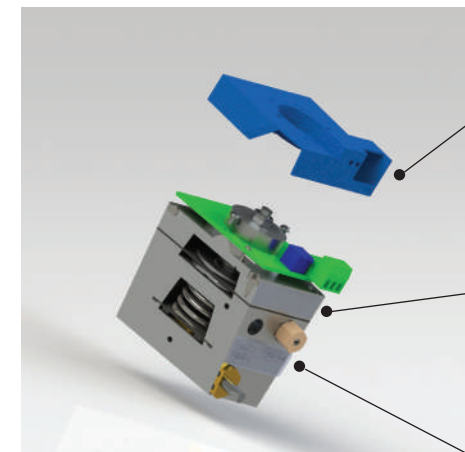
- Ballast tank remote reading
- Draft remote reading
- Fuel oil tank remote reading
- All liquids even viscous ones (molasses, bitumen etc...)

Standard specification

- System type : One line type air purge system
- Flow rating : 10~80NI/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 32V DC
- Accuracy : ± 0.5% of F.R
± 0.2% of F.R(optional)

- The construction is simple and the handling, and maintenance is easy.
- 4~20mA output signal/Two wires.

COMPOSITION TYPE MODULATOR



P/I CONVERTER Part.

- THE TRANSMITTER IS LINKED TO AN INTEGRAL AIR REGULATOR AND CONSISTS OF :
 - A SENSYN PIEZORESISTANT 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 (WIRE)

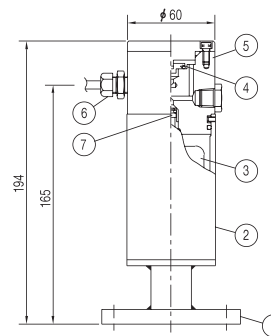
PNEUMATIC MODULATOR Part.

- AIR PRESSURE : 4.5kg/cm²
- FLOW PATING : 10-80 NI/h
- BLOWING PRESSURE : 4.5kg/cm²
- CONNECTION SIZE : -AIR SUPPLY PT 1/8"
-SIGNAL LINE PT 1/8"
- INCLUDING THE FLOW RATE ADJUSTER AND MAIN AIR NON-RETURN CHECK VALVE

GAUGE SAVER Part.

- DIFFERENTIAL : 0.01kg/cm²
- INCLUDING THE RANGE ADJUSTER

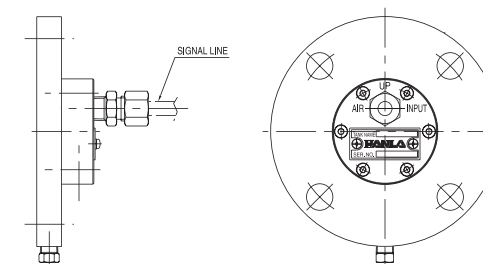
DUAL CHECK TYPE SAFETY CHAMBER(AIR PURGE HEAD)



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.

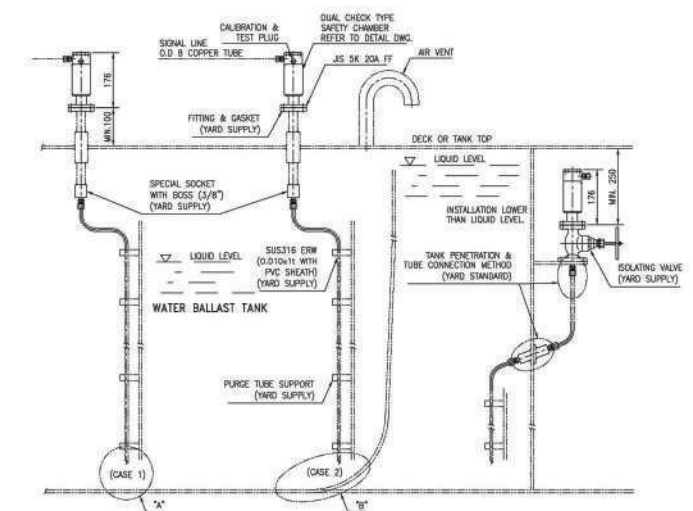
SPECIAL PURGE UNIT (Option)



TRANSMITTER PANEL



INSTALLATION



• ELECTRO-PNEUMATIC TYPE REMOTE LEVEL GAUGING SYSTEM

Model : PL-40P



The PL-40P transmitter is designed to be mounted on the top of the tanks.
The PL-40P transmitter allows a remote level measurement using a 4~20mA analog output, while keeping the principle of bubbling.

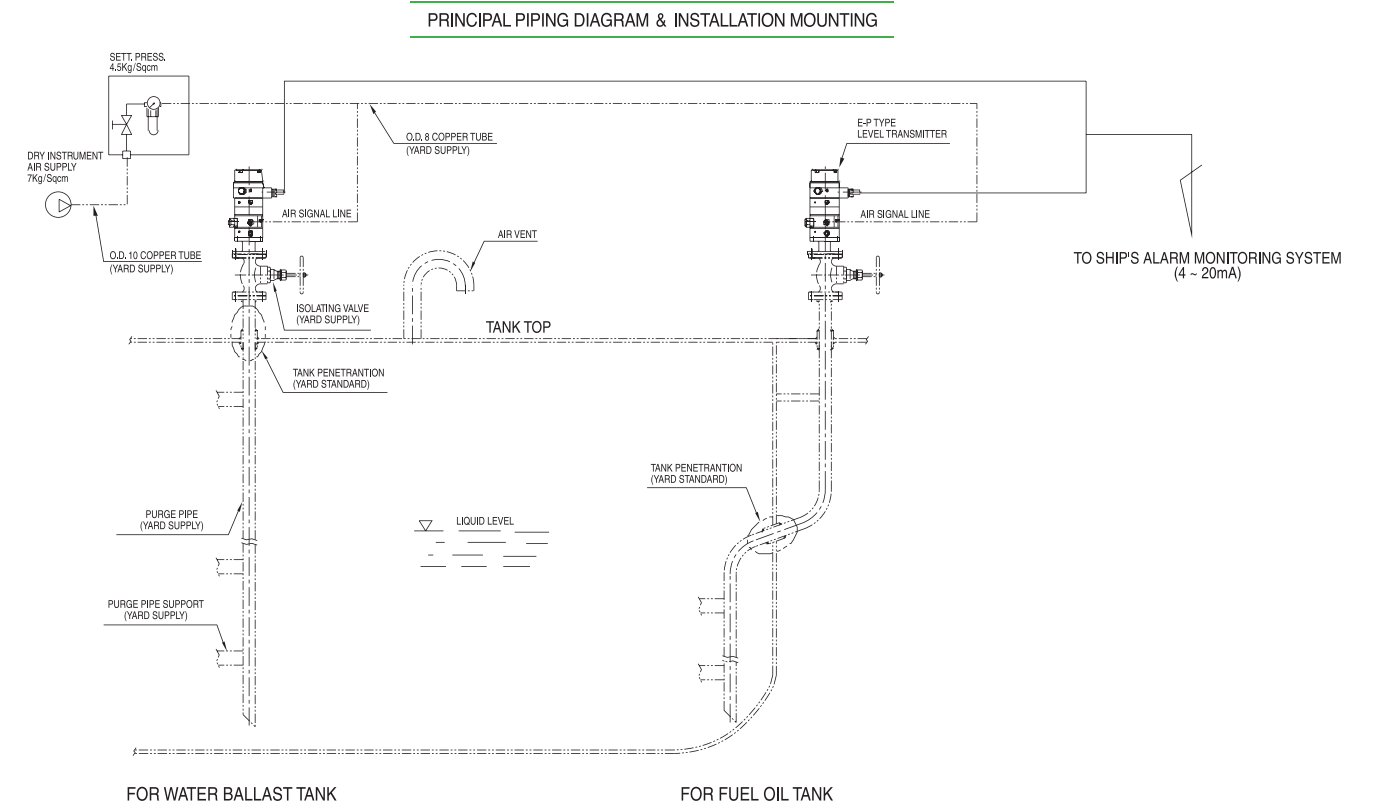
Technical features

- Transmitter : 2 wire 4~20mA
- Pressure scale : from 40 up to 4000 mbar.
- Pressure of supply : 4 to 10 bar.
- Accuracy : 0.2% of the measured scale.
- Power supply : 18 to 36VDC.
- Operating temperature : -20°C ~70°C
- Automatic bubbling line clearing.
- Ex ia IIC T6

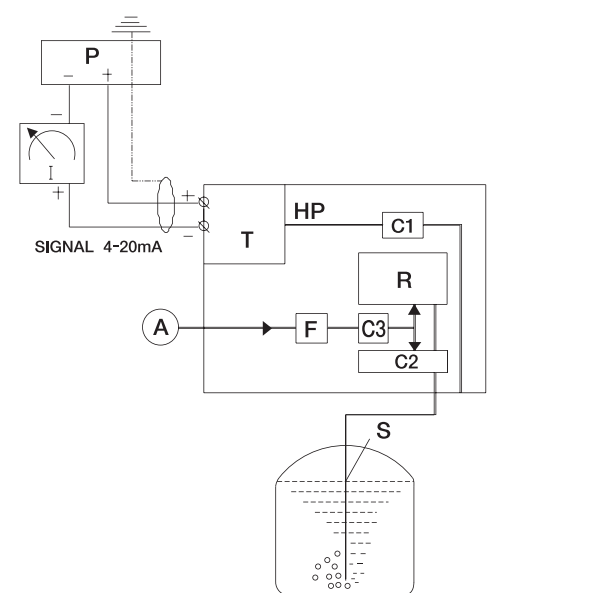
Data acquisition and display from analog signal(4-20mADC) with completely compatible PC(color screen)



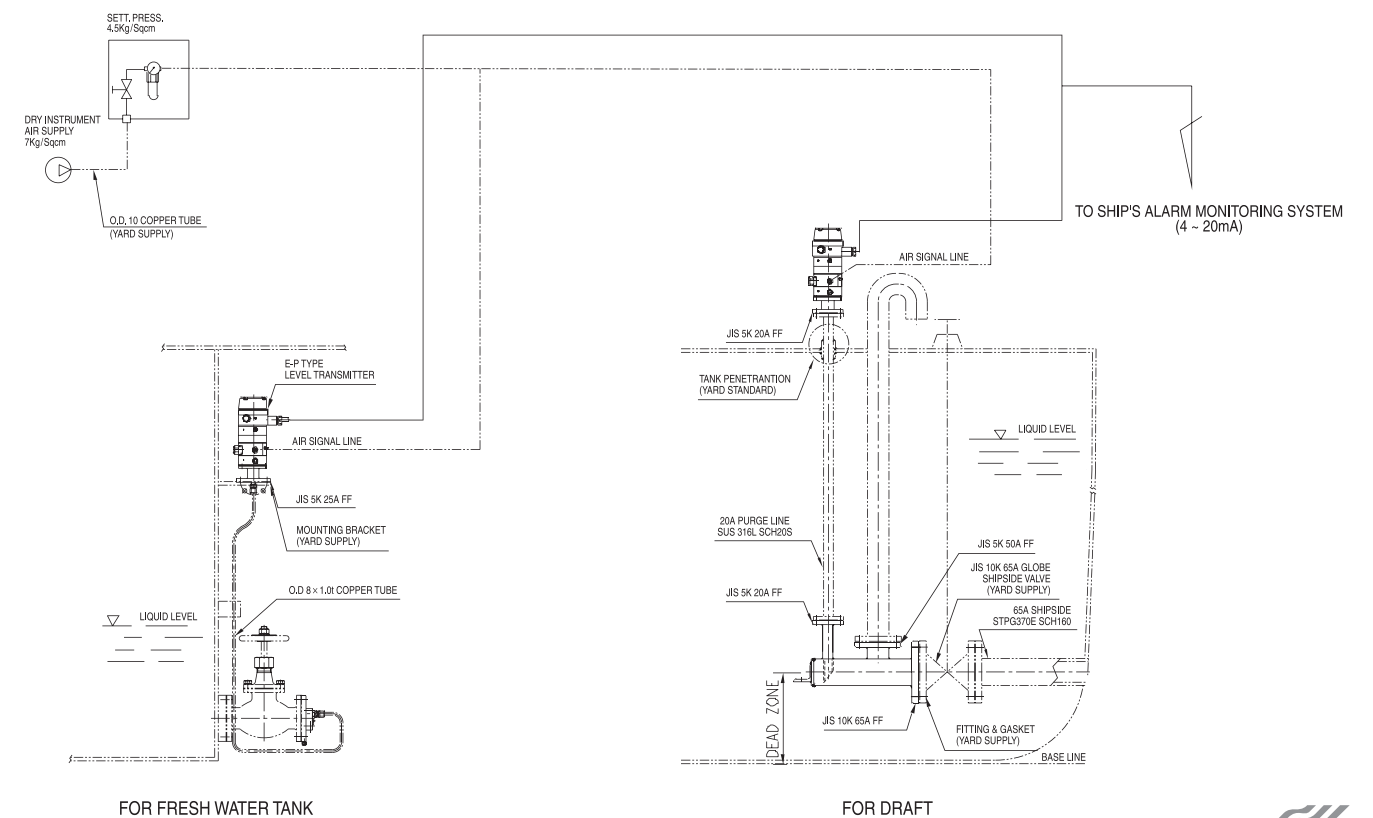
- Analog(bargraph) and numeric level display.
- Volume(tank table) display.
- Temperature display.
- Alarm status and warning signal.
- Analog or RS 485 transmission.



GENERAL WIRING DIAGRAM



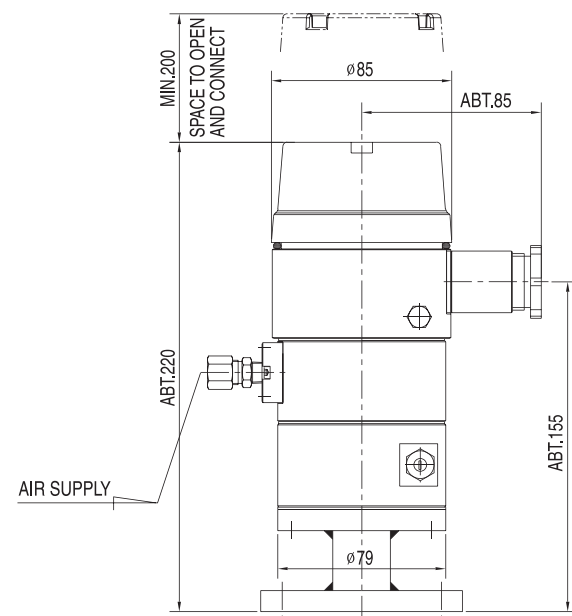
- | | |
|---|--------------------------------|
| A : Air pressure | T : Transmitter(4~20mA) |
| C1 : Over pressure safety valve | R : Automatic flow regulator |
| C2 : Safety valve through air supply pressure | S : Probe |
| C3 : Non return shut-off valve | P : Power supply (12 to 28VDC) |
| F : Filter | I : Indicator |



FOR FRESH WATER TANK

FOR DRAFT

DIMENSION



• ELECTRIC PRESSURE TYPE TANK REMOTE SOUNDING SYSTEM

Model : PL-40



Operating principle

The Hanla 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 PL-40 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 PL-40 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 features

- Output : 4 ... 20mA adjustable
- Accuracy : $\pm 0.2\%$ F.S at 20°C
- Supply voltage : 12 ... 28VDC
- Range : Gauge 175mbar to 4bar
Absolute 1400mbar to 4bar
- Overpressure : Gauge 6bar to 25bar
Absolute 10bar to 25bar
- Diaphragm cell : Capacitive transmitter with ceramic diaphragm
- Materials
 - Diaphragm : Ceramic
 - Sensor Body : Stainless steel 316L
 - Amplifier box : SCS 13(Indoor)/SCS 14(Outdoor)
 - Special cable : Sheathed polyethylene cable
- Operating temperature range
 - Transducer : -40~125°C
 - Amplifier : -25~85°C
- Protection class
 - Transducer : IP68/submersible
 - Amplifier : IP66(Indoor)/IP67(Outdoor)
- Intrinsic safety : Ex 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

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

PL - 40 - [] - []

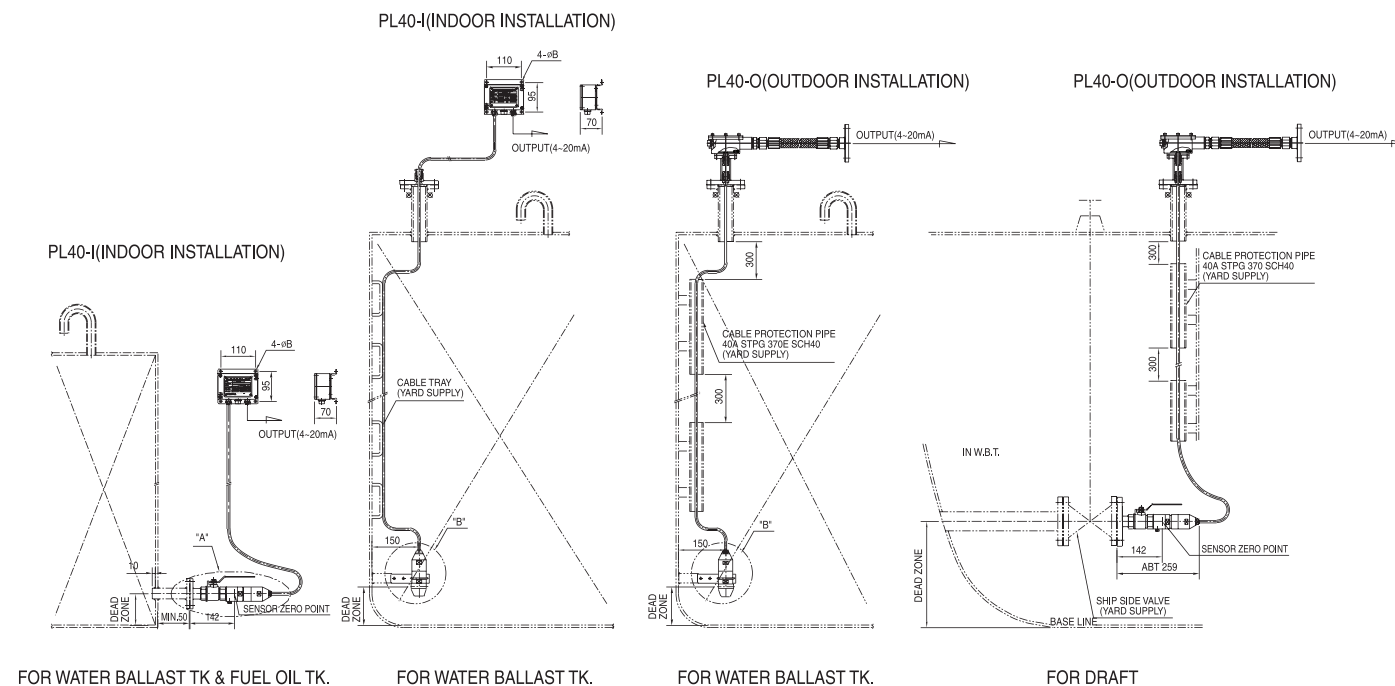
- Type
 - [I] : Inside mounting type
 - [O] : Outside mounting type
 - [U] : Utility type
 - [P] : Pneumatic type

Measuring range

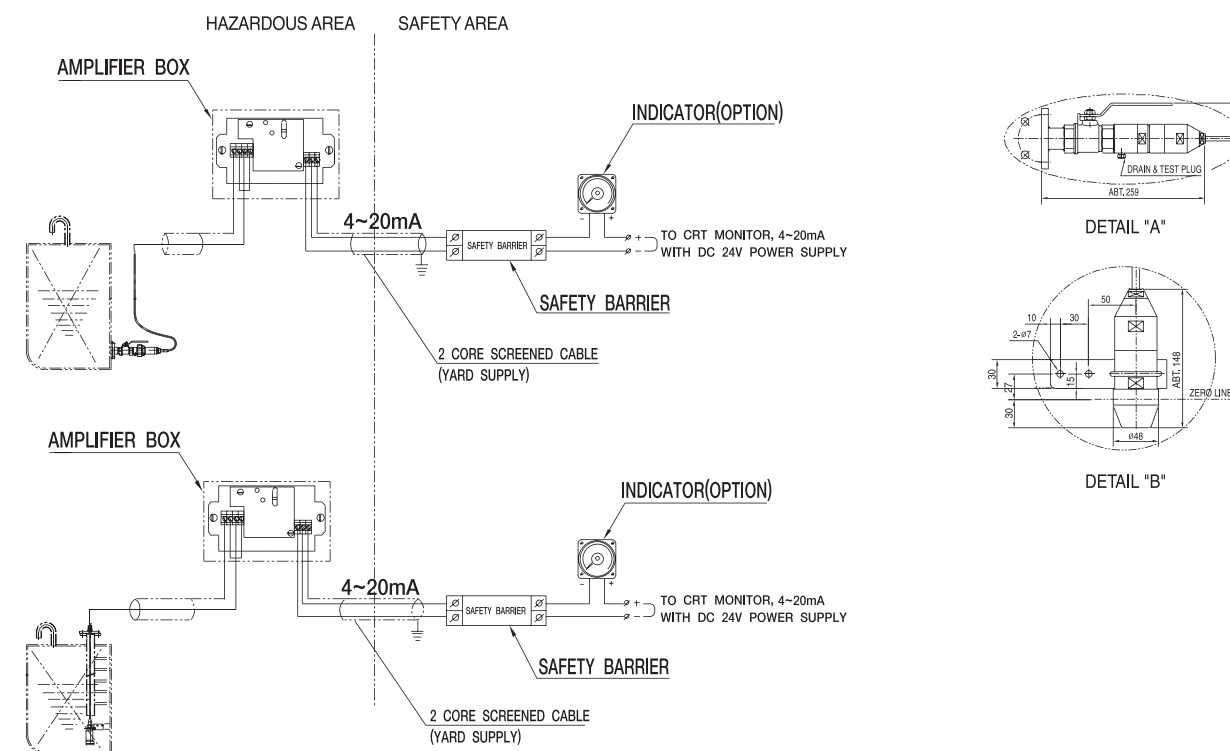
- [A] : 0.1 bar
- [B] : 0.2 bar
- [C] : 0.4 bar
- [D] : 1 bar
- [E] : 2 bar
- [F] : 4 bar

• Symbol of electric pressure type level transmitter

INSTALLATION METHOD



GENERAL WIRING DIAGRAM

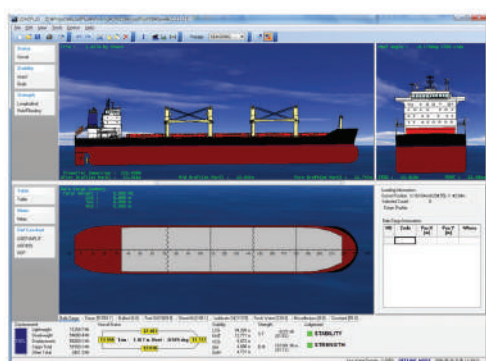
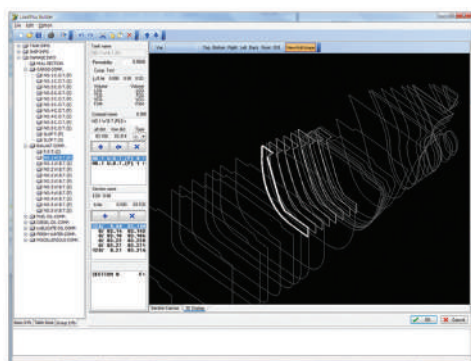


LOADING COMPUTER SYSTEM

LOADPLUS loading computer is an effective tool for the officer onboard to handle the loading and discharging of cargo as well having full control of the vessels loading condition during the operation.

LOADPLUS is reliable, accuracy, easy system for calculation and control of loading, ship's stability, strength & simulation of cargo distribution.

The LOADPLUS solution offers a wide range of benefits



- EASY MAKING LOAD PLAN

User operations, such as defining and editing loads, can be done simply by clicking on the tank plans on the graphics area or by using tables, This makes for effective load planning.

- SAVING OPERATION COST

Minimized time consuming tasks during port turnaround time. operator can reduces the workload onboard the vessel without special knowledge of computer system.

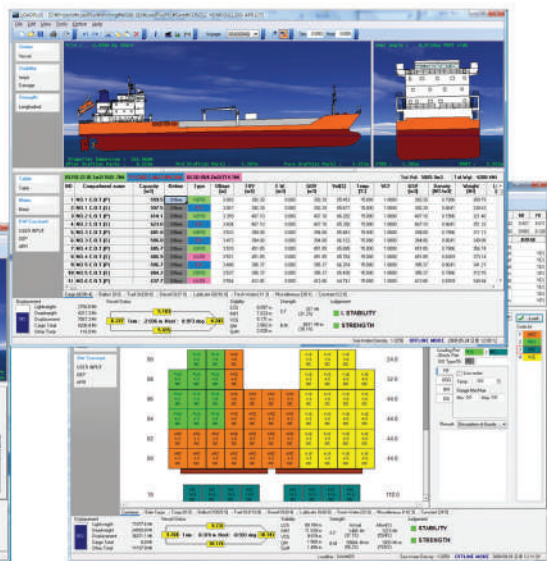
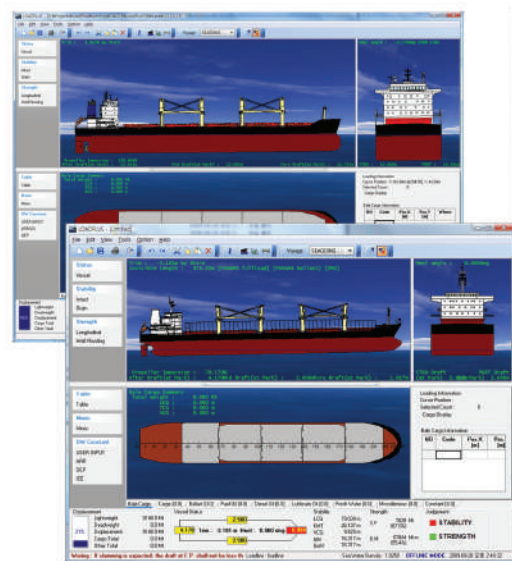
- HIGH EFFICIENCY PROGRAM

Optimises the loading and discharging of the vessel, enabling you to increase the cargo-carrying capacity.

- HIGH RELIABILITY

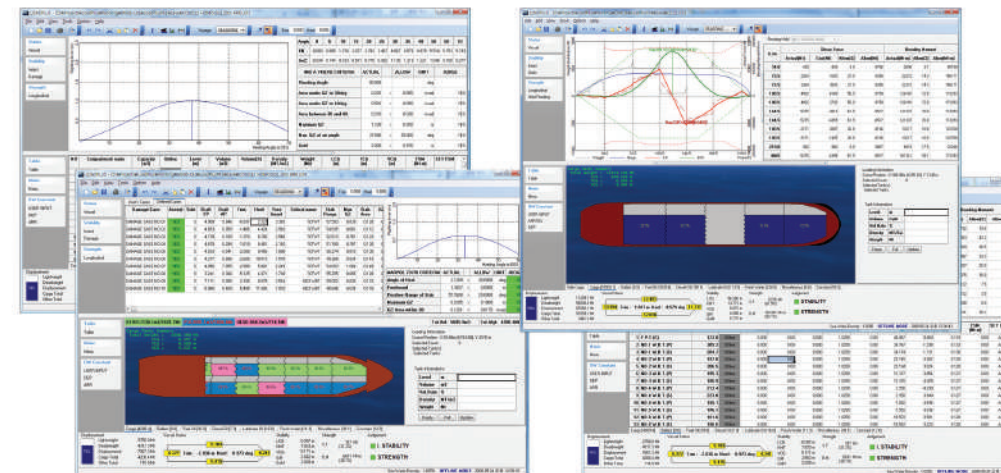
The whole system was designed to be used by non computer oriented user such as ship's officers and shore based cargo planners, and no specific knowledge about computer is required to run the system.

USER-FRIENDLY INTERFACE



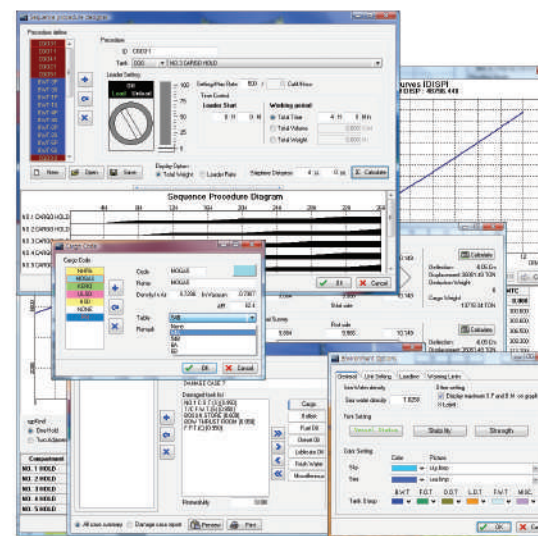
- Real performance in the status(profile, section, plan)
- Simple Graphic User Interface
- Easy operation

RELIABLE RESULTS



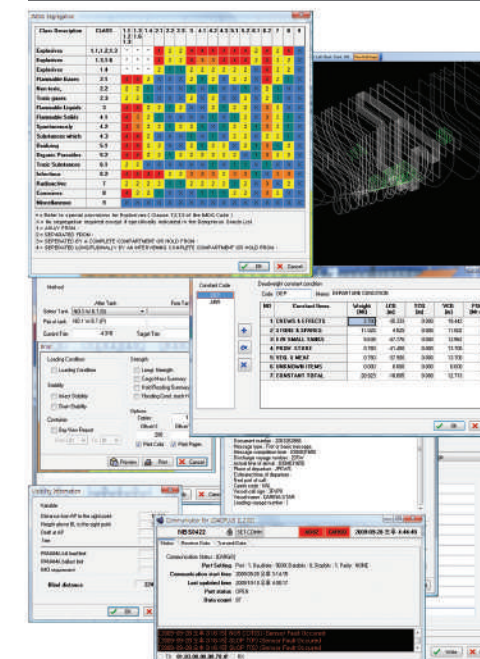
- Class approved documents
- Calculate items by rule(SOLAS, IMO,...)
- Automatic calculation

VARIOUS UTILITIES



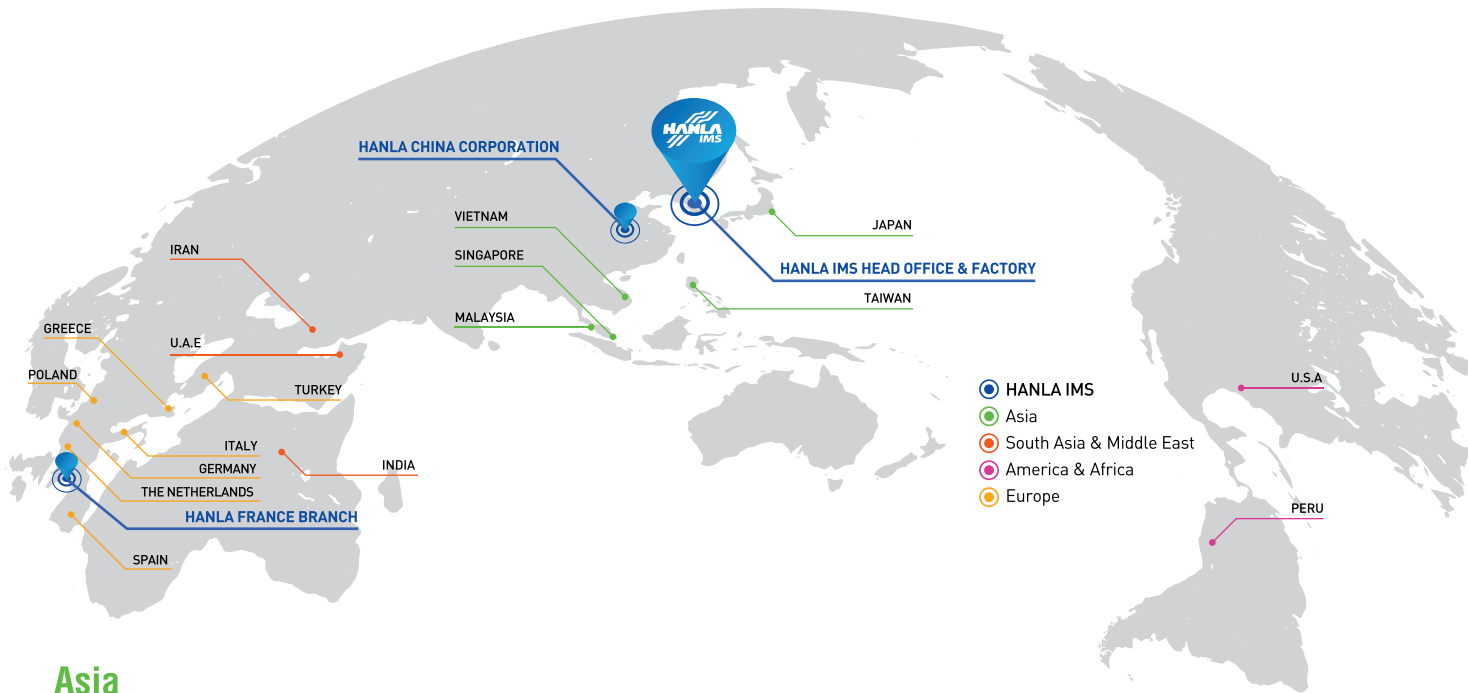
- Loading/Unloading sequence
- Hydrostatic calculator with graph
- Draft survey calculation
- User define damage case
- Visibility calculation
- Air draft calculation
- Cargo code define
- Variable reports printout
- Online interface with other equipments
- User define program environments

SPECIALISED FUNCTIONS



- Loading/Unloading sequence
- Hydrostatic calculator with graph
- Draft survey calculation
- User define damage case
- Visibility calculation
- Air draft calculation
- Cargo code definition
- Variable reports printout
- Online interface with other equipments
- User define program environments

Global Network



- HANLA IMS
- Asia
- South Asia & Middle East
- America & Africa
- Europe

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Certificate

