APT 1000 Intelligent Hydrostatic Level Transmitter for Marine Tank Gauging

KEY FEATURES

- Robust all welded submersible construction
- Choice of construction materials compatible with all common marine liquid measurement applications
- Process connections and fixings for side of tank or submersible installation
- Simple to install, accurate and stable, robust and reliable
- Gauge or Absolute options with a wide measuring span and 0.1% performance
- Dual -mode operation provides outputs as 4-20mA and RS485 Modbus
- Fully Programmable for calibrated range and application parameters
- DNV Type Approved and IEC Ex /ATEX certified for hazardous areas (Zone 0)

Email: instrumentation@hmagrp.com **Tel:** +61 (0)2 9428 7300 **Fax:** +61 (0)2 9428 7399

APT 1000 Intelligent Transmitter

DESIGNED AND CONSTRUCTED FOR MARINE TANK GAUGING

We have drawn upon nearly 40 years of global marine application experience in developing the APT 1000 to provide a liquid level transmitter that delivers the highest possible standards in terms of performance, versatility, functionality and reliability.

The APT 1000 provides a reduced weight and size compared to previous generations and takes full advantage of advances in electronic design and sensing technology to provide enhanced accuracy and stability under varying operating temperatures. Body construction is all laser welded and internally encapsulated, eliminating any possibility of leaks, and all versions are IP68 certified suitable for full immersion to a minimum of 50 Metres WG. A choice of construction materials, Stainless Steel, Titanium, and Hastelloy, ensure corrosion resistance in all applications and all measurement ranges will tolerate an overload of 2 x nominal range with no adverse effects to performance or calibration.

The transmitters electronics are fully integrated within the body and encorporate a powerful micro-controller to precisely monitor and process the output of the pressure cell. On-board non-volatile memory allows each transmitter to be fully configured for its intended duty either during manufacture or subsequently while in operation. The transmitter is certified according to ATEX and IECEx regulations for installation in a hazardous area and Type Approved by DNV-GL as suitable for use in marine applications.

DIGITAL AND ANALOGUE OPERATION

The APT 1000 is a duel-mode transmitter providing an analogue 4 -20 mA signal and a multi-drop RS485 Serial communication based on industry standard Modbus RTU protocol. Either or both outputs can be used in normal operation The unit is fully programmable using the ACU1000 application available as free download.

SAVE MONEY AND TIME WITH DIGITAL OPERATION IN MULTI-TANK INSTALLATIONS

When installing multiple digital mode enables significant cost and weight savings, removing the need for separate cable runs to each transmitter by utilising a single Multi-drop cable for both power and RS485 network. PSM RFM series termination and Safety barrier modules are used to save typically more than 50% of installation time and costs.

COMPLETE SOLUTIONS

Partnering the APT 1000 PSM can offer display options to provide a complete tank gauging solution. The VPM4300 Series touch screen display provides a clear presentation of all tank data for smaller tank gauging systems, while our VPM+ and VPMS based packages provide comprehensive functionality for larger Vessels. All systems provide full configuration capability for the APT1000 eliminating the need for specialist calibration equipment and both are capable of delivering tank level status via serial link to other onboard systems such as Load Computers or Alarm Monitoring Systems.

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Specifications		
Materials	Sensor body	316L Stainless Steel or Titanium. Hastelloy C276 option for Wetted parts for external (to tank) mounting.
	Diaphragm	316L or Titanium to match body material. Hastelloy C276 process ports use Tantalum diaphragm.
Standard Measurement Ranges (Bar)	0.2, 0.5, 1.0, 2.5, 4.0, 10, 25, 40, 60.	
Measurement type	Vented Gauge or Absolute (Absolute version minimum range 1 bar)	
Overload	2 x Nominal range with no effect	
Burst Pressure	15 x Nominal range up to 10 Bar. 7 x Nominal range above 10 Bar	
Turndown	5:1 from Nominal range (relevant to 4-20mA scaling only)	
Temperature measurement span / accuracy	0 to +85°C +/- 1°C (reading only available in digital mode)	
Total Error Band (pressure monitoring	+/- 0.1% of Nominal range including thermal effect	
Thermal compensation	No thermal effect within the range 0 to 70°C	
Long term stability	Error not exceeding +/- 0.1% Per Annum	
Max / Min process temperature	-35 to +85°C	
IP Rating	IP68 suitable for continuous immersion	
IECEx certification	IECEx ITS 19.00023X Ex ia IIC T4 Ga -35°C≤Ta≤+85°C	
ATEX certification	ITS19ATEX204962X Iss.0 Ex ia IIC T4 Ga -35°C≤Ta≤+85°C	
Signal Output / Power supply	4-20mA & RS485 Modbus RTU / 10 to 30V DC	
Maximum load	Supply dependant. Vs-10/0.02 = Load in Ohms	
Reverse polarity protection	Yes	
Weight	0.3Kg typical for body. Cable 0.1Kg / metre	

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APT1000 Level / Pressure Transmitter

1000S	APT 1000 Dual Mode 4-20mA & RS485 Modbus Intelligent Transmitter - Submersible construction with cable
1000D	APT 1000 Dual Mode 4-20mA & RS485 Modbus Intelligent Transmitter - DIN Plug Type 43650 connection
1000H	APT 1000 Dual Mode 4-20mA & RS485 Modbus Intelligent Transmitter - Terminal Head

Certification

S	Hazardous Area Approval NOT APPLICABLE
I	Certified Intrinsically Safe to ATEX - Hazardous Area Approved
X	Certified Intrinsically Safe to IECEx - Hazardous Area Approved
IX	Dual Certification ATEX / IECEx - Hazardous Area Approved

Measurement Type

A	Absolute
G	Gauge

Nominal Range

	Absolute				Gauge			
	TI	**SS**	**HT**		**TI**	**SS**	**HT**
A	N/A	N/A	N/A	**A**	N/A	0.2 Bar	N/A
B	N/A	N/A	N/A	**B**	0.5 Bar	0.5 Bar	0.5 Bar
C	N/A	N/A	N/A	**C**	1.0 Bar	1.0 Bar	1.0 Bar
D	2.5 Bar	2.5 Bar	2.5 Bar	**D**	2.5 Bar	2.5 Bar	2.5 Bar
E	4.0 Bar	4.0 Bar	4.0 Bar	**E**	4.0 Bar	4.0 Bar	4.0 Bar
F	10 Bar	10 Bar	10 Bar	**F**	10 Bar	10 Bar	10 Bar
H	25 Bar	25 Bar	25 Bar	**H**	25 Bar	25 Bar	25 Bar
I	40 Bar	40 Bar	40 Bar	**I**	40 Bar	40 Bar	40 Bar
J	60 Bar	60 Bar	60 Bar	**J**	60 Bar	60 Bar	60 Bar

Process Connections & Fitting Options - options marked ** are not available for Ti versions

1	1/2" BSP Male (Standard connection). Material is as specified for the main body
3	G1" Male Adapter in 316 Stainless Steel
6	G1/2" to DIN EN837 Stainless Steel (Special order, refer for delivery time)
7	Pole Adapter Threaded G 1/2" Female Adapter in 316 Stainless Steel**
8	Pole Adapter Threaded G 3/4" Female Adapter in 316 Stainless Steel**
11	St.Steel Sensor with Drain wire adapter - Specify drain wire length in Metres
14	Titanium Sensor with Drain wire adapter - Specify drain wire length in Metres
15	1" ANSI 150 lb St. Steel Flange (Supplied loose)
17	Stilling Pipe Flexible Stainless Steel Cage pipe Installation. Suitable for Stilling Pipe I.D. of 2" to 3" (applicable for all sensor materials).
18	Pole Adaptor Threaded G1/2" Female - replacement for PSM ICT1000**
19	2" ANSI 150lb Flange
20	3" ANSI 150lb Flange
21	1/2" NPT Male Threaded Adaptor

Cable Length mtrs (only applicable to APT 1000 versions)

* *	Heavy Duty Vented Cable
Q* *	As above but cable outer jacket PTFE coated (Subject to Availability)
R* *	As above but cable outer jacket Flame Retardant (Subject to Availability)
S* *	As above but cable outer jacket FEP Coated (Subject to Availability)
Z* *	Custom cable (refer to discuss requirements)

Transmitter Body Material

TI	Titanium (Body & Diaphragm)
SS	Stainless Steel (Body & Diaphragm)
HT	Hastelloy / Tantalum wetted parts (St. Stl. Body)

Transmitter Orientation

☒	Horizontal
☒	Vertical - Diaphragm facing down
☒	Vertical - Diaphragm facing up

Example:	**1000S**	**S**	**A**	**E**	**1**	**30**	**TI**	**H**
Written as	**1000S/SA/E/1/30/TI/V**							

Note: Transmitter will be calibrated for 4-20 mA over Nominal range as standard Where a specific calibration range is required this must be advised separately Actual calibration can can be a maximum of 5:1 turndown from Nominal range.

Note: The above table shows only common variants.
Alternative DIN / ANSI mounting flange sizes and adaptors are available.
Pole assemblies complete with tank top closing flange can be supplied.
Consult PSM for specific requirements

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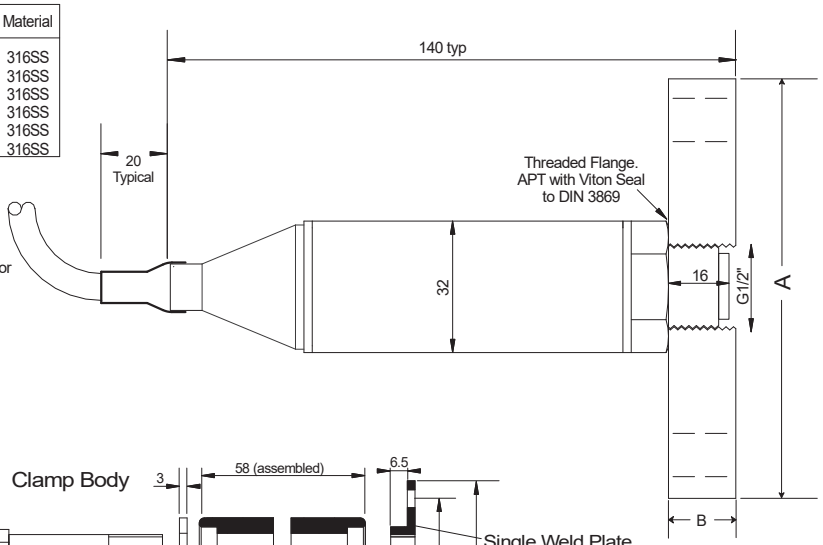
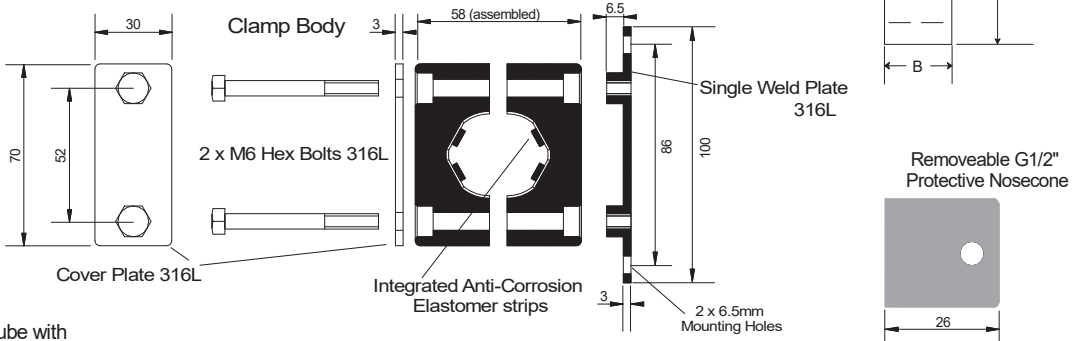
DIMENSIONS

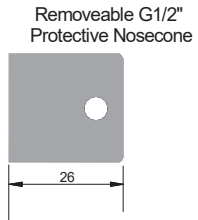
Common Flange Sizes - refer to PSM for specific requirements not listed

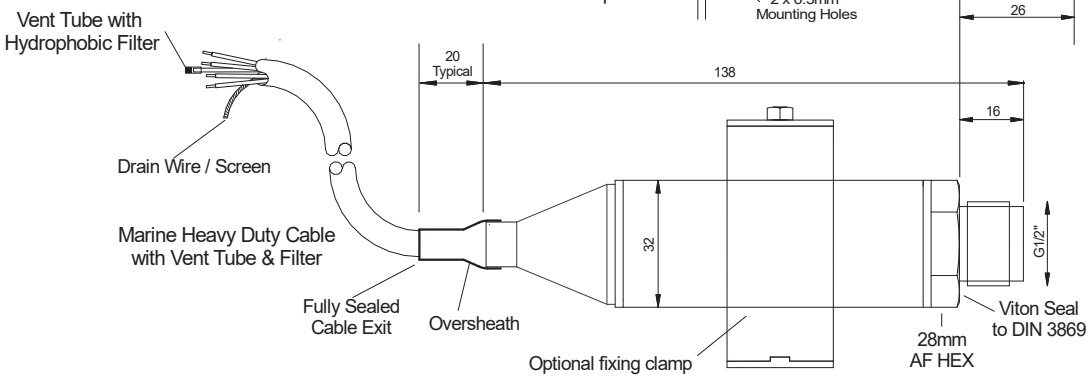
Flange	Holes	PCD	Bolt Size	A	B	Material
DN20 PN16	4	75	M12	105	18	316SS
DN25 PN16	4	85	M12	115	18	316SS
DN40 PN16	4	110	M16	150	18	316SS
DN50 PN16	4	125	M16	165	18	316SS
1" ANSI 150lb	4	79	1/2"	108	18	316SS
2" ANSI 150lb	4	120.7	5/8"	152	18	316SS

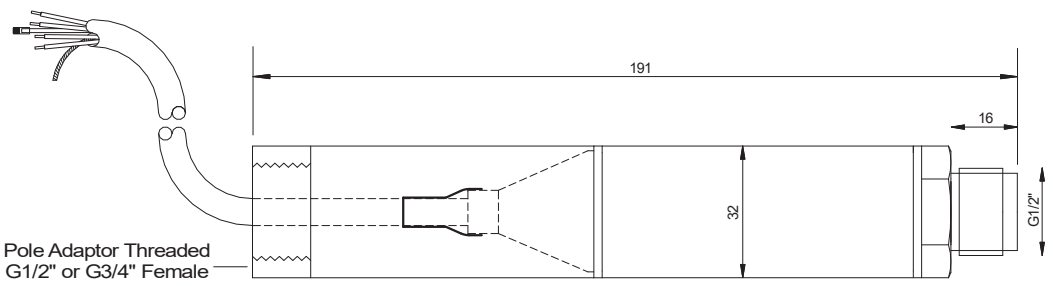
Note:
Flange Thickness (B) Must be Minimum 18mm to Provide Protection for Sensor Diaphragm. All Flanges Supplied Loose for Customer to Fit.
Refer to Instruction Drawing P19051-APT-GA
Other Flange Sizes are Available. Refer to PSM











www.hmagrp.com **Email:** instrumentation@hmagrp.com **Tel:** +61 (0)2 9428 7300 **Fax:** +61 (0)2 9428 7399