

# Ultrasonic Non Contact Sensors



**Measuring Principle** - An ultrasonic pulse is transmitted from the ABM sensor . The pulse 25 - 148 KHz travels to the surface being monitored and is reflected off this surface back to the sensor face. The time of flight is divided in half, corrected with temperature and converted to an output current directly proportional to the material level . Due to sensor's dead band, don't get closer than minimum distance with material. ABM sensors monitor environmental conditions and adjust sensor's transmitters and receivers to match the sensors to any condition, to receive one echo only from measured material and to eliminate any false echoes. No other brands of level measurement devices offer this feature.

## **Applications -**

### **Monitoring Liquid Levels - Page 5 & 6**

To monitor Stable liquids with no gases or volatile surfaces.  
Pick a sensor with the range for your application. This will determine the Frequency of your sensor. For corrosive applications the Sensor's material can be chosen that is compatible with the liquid.

### **Monitoring Solid Material Levels - Page 7 & 8**

To monitor Solid material; the lower operating frequency helps to penetrate dusty atmosphere found in solids level storage vessels, tanks & bins. They are usually larger in size and require the larger and more powerful Transducers for reliable measurement.

### **High Temperature Applications - Page 9**

To monitor applications with elevated temperatures sensor material selection is important. Special sensor design with Thermal isolation is required. Temperature in environment does not effect the ABM sensors performance, because of special and innovative construction of the sensor's drivers.

### **Sanitary Applications - Page 10**

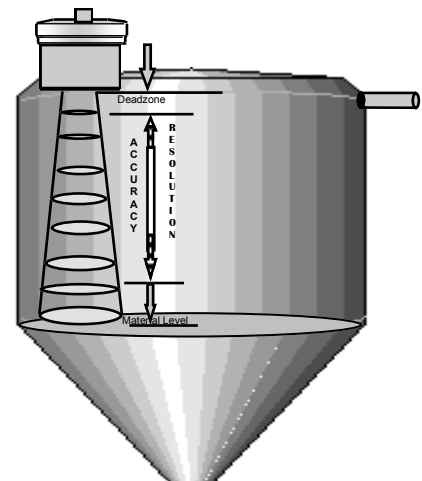
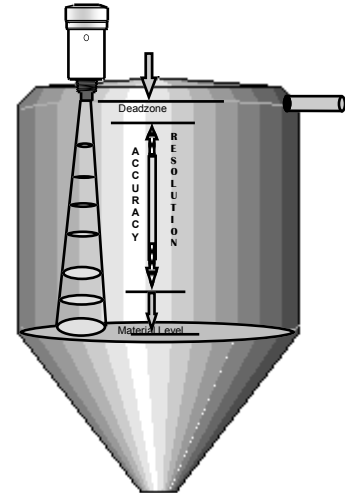
Monitoring sanitary applications with sanitary ferrule mounting sensors with continuous ultrasonic transmitter are available. ABM Offers 1 1/2" and 2" tri-clamp mounting. For the food industry the sensor's must withstand steam cleaning and be quickly removable and easy to re-install. For high pressure and /or temperature applications special material mtg. sensors are available.

### **Belt Conveyor and Motion Tracking Applications -**

Monitoring fast moving objects is possible with the revolutionary " Fast Response Time Design". ABM Ultrasonic Sensors are the fastest response sensors in the market. This allows measurement of any solid material profile.

### **Ultrasonic Guided Contact Sensors - Page 11**




Can be used on very narrow tanks, and also where no blanking inside tank is required.



# Ultrasonic Non Contact Sensors



## Overview

ABM Sensor	Max. Measuring Range -in Liquids (Solids x .5) Accuracy : +/- 0.1% Range (max.)	Mounting Fitting - Male thread	Temperature Range for Sensor	Pressure Rating @ Sensor Face										
<b>ABMXXX-YYY</b> Liquid Range to 50 Ft. - Sensor Frequency 148 KHz Sensor 081 " " 080 " " 070 " " 052 " "	 Sensor 148 KHz : 9 ft ( 0.4 m) " 081 " : 16 ft ( 4.9 m) " 080 " : 20 ft ( 6.1 m) " 070 " : 30 ft ( 9.1 m) " 052 " : 50 ft (15.2 m)	3.0" / 1.0" NPT 3.0" / 1.5" NPT 3.0" / 2.0" NPT 3.0" / 2.0" NPT 3.0" / 2.0" NPT	PVC : - 40 -140 °F (-40 to 60°C) Teflon : - 40 - 266°F (-40 to 130°C) S.S.316L: - 40 - 266°F (-40 to 130°C)	PVC Max. 2 bar S.S.316L Max. 5 bar										
					Note - Sanitary Ferrule Mtg. Is available for all except 052									
					<b>ABMXXX-YYY</b> Liquids and Bulk Solids in all industries -Sensor Frequency 045 KHz Sensor 025 KHz Sensor	 Sensor 045 KHz : 60 ft ( 18.2 m) " 025 " : 90 ft ( 27.4 m)	3.0" NPT 6.0" / 1.0" NPT	PVC : - 40 -140 °F (-40 to 60°C) Teflon : - 40 - 266°F (-40 to 130°C) (for 45 KHz only)	PVC Max. 2 bar Teflon " "					
										<b>ABMXXX-YYY</b> Bulk Solids in Large containers -Sensor Frequency 025 KHz Sensor	 Sensor 025 KHz : 100 ft ( 30 m)	6.0" / 1.0" NPT	PVC : - 40 -140 °F (-40 to 60°C)	PVC Max. 2 bar

Approvals - For ABM200/ABM300 Ultrasonic Sensors:

**FM(USA):**

FM3810 (2005) Electrical Electronic Test,  
 Measuring and Process Control Equipment  
 ANSI/NEMA 250 (1991) :Enclosures for Electrical Equipment

**FM(CAN.):**

CSA C22.2 No. 1010.1 (2004)  
 Safety Requirements for Electrical Equipment for  
 Measurement, Control and Laboratory Use -  
 Part 1: General Requirements  
 CSA C22.2 No. 94 (2011) Special Purpose Enclosures

# Ultrasonic Non Contact Sensors For Liquid Applications



**Model - ABMXXX - YYYUC - HS**

**Applications -**

This range of sensors are used in liquid applications such as Food & Beverage processing. It is also ideal for Water/ Wastewater due to their maintenance free nature, any build up on the Transducer face is being eliminated (continuously cleaned). False echoes from tanks walls are eliminated by automatic adjustment of power and sensitivity. Other ideal applications are Pharmaceutical and Chemical as the Sensors adapt to any condition automatically without user involvement.

**Benefits -**

- Enclosures are suitable for IP68 environmental conditions.
- Self adjusting, Monitors inside tank's environment and adjusts power and sensitivity.
- Self cleaning due to its non contact measuring operation.
- One echo system for measured material. No list of hundreds of parameters to be downloaded.
- Enclosures are available in different materials to withstand any environment.
- Works At any Temperature.
- Fits to Any Mounting and no mounting influence even at very low temperatures.
- Sanitary mounting, 1 1/2" and 2" Tri-clamp very short blanking.



**Technical data -**

Measuring Range : 0.4 to 50 Ft (0.12 to 15.2 m)  
 Temperature : PVC - 40 to 140°F (-40 to 60 °C)  
 Teflon/ SS316L - 40 to 266°F (-40 to 130°C)  
 Pressure Rating : 1 to 2 bar Std. Sensor for 5 bar SS316L Ferrule or Special Sensor (HP) in PVC Enclosure  
 Mounting Thread : 1" - 6" NPT Male Thread (Std. Mtg. Sensors)

**Catalogue # Ordering -**

**Supply Voltage:**

XXX = 2 Wire (loop powered with HART)  
 3 Wire 24 Vdc  
 4 Wire 120 Vac or 230 Vac

**Operating Frequency:**

YYY = 148 — 148 KHZ  
 080 — 80 KHZ  
 081 — 81 KHZ  
 070 — 70 KHZ  
 052 — 52 KHZ



**Operating Mode:**

U = UL - Ultrasonic Sensor  
 UM - Mini Sensor

**Communication:**

C = C4 - RS485  
 C2 - RS232  
 CH - Hart (2 Wire only)  
 C0 - No Communications

**PCB Housing Material:**

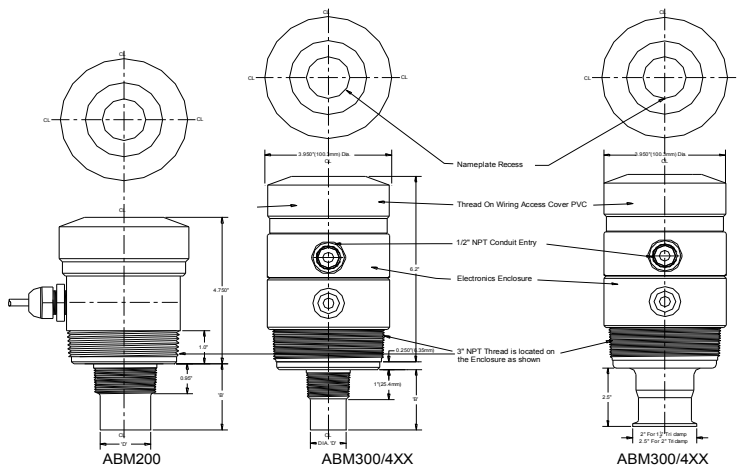
H = PV — PVC Std. Enclosure Housing  
 HP — PVC Special Enclosure Housing  
 AL — Aluminum Enclosure Housing  
 SS. — SS 316L Enclosure Housing

**Sensor Material: Std. Thread Mtg. Sensor**

S = PVC — PVC Sensor  
 TEF — Teflon Sensor

**Sanitary Mtg. Sensor: 316 SS. Tri-Clamp Mtg.**

S15 — 1.5" Sanitary Sensor  
 S20 — 2" Sanitary Sensor  
 S15- HTP — 1.5" High Temp./High Pressure  
 S20- HTP — 2" High Temp./High Pressure



# Mini Ultrasonic Non Contact Sensors For Liquid Applications



**Model - ABM300 - 148UMC4 - HS - R**

## Applications -

The ultrasonic Mini sensors are used in liquid applications such as Food & Beverage processing, and in small tanks such as barrels due to their mounting and maintenance free nature. Any build up on Transducer face is being eliminated (continuously cleaned). False echoes from tanks walls are eliminated by automatic adjustment of power and sensitivity. Other ideal applications are Pharmaceutical and Chemical as the Sensors adapt to any condition automatically without user involvement.



## Benefits -

- Enclosures are suitable for IP68 environmental conditions.
- Self cleaning due to its non contact measuring operation.
- One echo system for material. No list of hundreds of parameters to be downloaded.
- Very small enclosure, no need for big overhead.
- Works At any Temperature.
- Mounting 1" NPT with adaptor to 3/4" or 1/2" NPT.
- Mounting 1 1/2" or 2" Sanitary tri-clamp.
- Belt conveyors, with fast response measures material profile.
- Pump control, Alarm in models with Relay.
- Extremely short blanking.

## Technical data -

Measuring Range : 0.4 to 6 Ft (0.12 to 1.8 m), custom design to 30 FT (9 m)  
 Temperature : PVC - 40 to 140°F (-40 to 60°C)  
 TEFLON / SS316L - 40 to 266°F (-40 to 130°C)  
 Pressure Rating : 1 to 2 bar (Std. Sensor) for 5 bar (SS316L Ferrule)  
 Mounting Thread : 1" NPT Male Thread



Mini Sanitary Sensor

## Catalogue # Ordering -

### Supply Voltage:

XXX = 3 Wire 24 Vdc

### Operating Frequency:

YYY = 148 — 148 KHz (standard)  
 080 — 80 KHz } custom  
 070 — 70 KHz } design

### Operating Mode:

U = UM - Mini Sensor

### Communication:

C = C4 - RS485

### Housing Material:

H = PV — PVC Enclosure Housing

### Sensor Material: Std. Thread Mtg. Sensor

S = PVC — PVC Sensor

TEF — Teflon Sensor

### Sanitary Mtg. Sensor: 316 SS. Tri-Clamp Mtg.

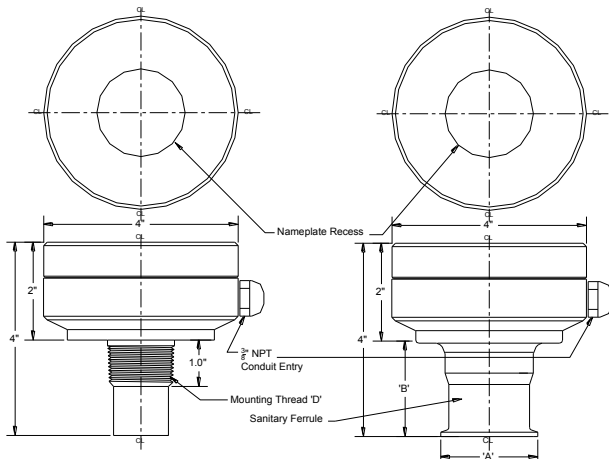
S15 — 1.5" Sanitary Sensor

S20 — 2" Sanitary Sensor

S15- HTP — 1.5" High Temp./High Pressure

S20- HTP — 2" High Temp./High Pressure

**Relay:** relay with a form C contact, 8A at 240 Vac



### Mini Std. Mounting

ABM300- 148 NPT Mtg. Thread 1"  
 ABM300- 080 NPT Mtg. Thread 2"  
 ABM300- 070 NPT Mtg. Thread 2"

### Mini Sanitary Mounting

ABM300/148/080/070  
 'A' - 1 1/2" Ø = 1.978" 'B' - 2.17"  
 'A' - 2" Ø = 2.516" 'B' - 2.31"

# Ultrasonic Non Contact Sensors For Liquids and Solids Applications



**Model - ABMXXX - 045VW - HS**

**Applications -**

Solids/Liquids materials, liquids up to 60 Ft. tanks height, solids with low dust (plastic pellets) up to 50 FT, high dust up to 30 Ft.

**Benefits -**

- Enclosures are suitable for IP68 environmental conditions.
- Works in any conditions, in narrow tanks.
- On materials with steep angle of repose.
- No dust influence.
- Works at any temperature (- 40°C to 130°C)
- Very short blanking.
- TEFLON, PVC transducer materials.
- No influence of mounting and tank's walls ( self adjusting mode).

**Technical data -**

Measuring Range : 1.0 to 60 Ft (0.3 to 18.2 m)

Temperature : PVC - 40 to 140°F (-40 to 60°C),

TEFLON - 40 to 266°F (-40 to 130°C)

Pressure Rating : 1 to 2 bar Std.Sensor

Mounting Thread : 3" NPT Male Thread



**45 KHz Sensor**

**Catalogue # Ordering -**

**Supply Voltage:**

XXX = 2 Wire (loop powered with HART)

3 Wire 24 Vdc

4 Wire 120 Vac or 230 Vac

**Operating Frequency:**

YYY = 045 — 45 KHz

**Operating Mode:**

V = UL - Ultrasonic Sensor

**Communication:**

C = C4 - RS485

C2 - RS232

CH - Hart (2 Wire only)

C0 - No Communications

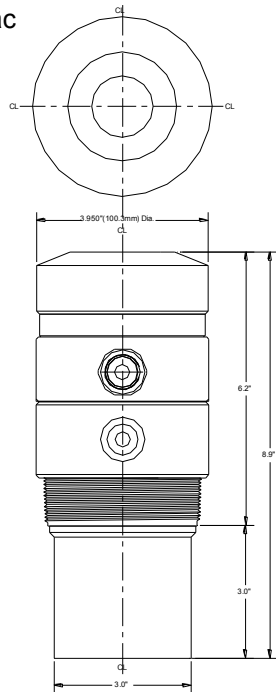
**Housing Material:**

H = PV — PVC Enclosure Housing

**Sensor Material:**

S = PVC — PVC Sensor

TEF — Teflon Sensor



**2/3/4 Wire 45 KHz Sensor**

# Ultrasonic Non Contact Sensors For Solid Material Applications



## Model - ABMXXX - 025VW - HS

### Applications -

Solids/Liquids materials, liquids up to 100 Ft. tanks height, solids with low dust up to 80 FT (plastic pellets), high dust up to 50 Ft.

### Benefits -

- Enclosures are suitable for IP68 environmental conditions.
- Works in any conditions, narrow tanks.
- Very narrow radiating beam (it can work in narrow tanks, close to tank walls).
- No dust influence.
- Works on materials with steep angle of repose.
- Short blanking, self adjusting mode - no influence of mounting and tank's walls.



### Technical data -

Measuring Range : 1.4 to 100 Ft ( 0.4 to 30 m)  
 Temperature : PVC - 40 to 140°F (- 40 to 60°C)  
 Pressure Rating : 1 to 2 bar Std.Sensor  
 Mounting Thread : 1" - 6" NPT Male Thread

### Catalogue # Ordering -

#### Supply Voltage:

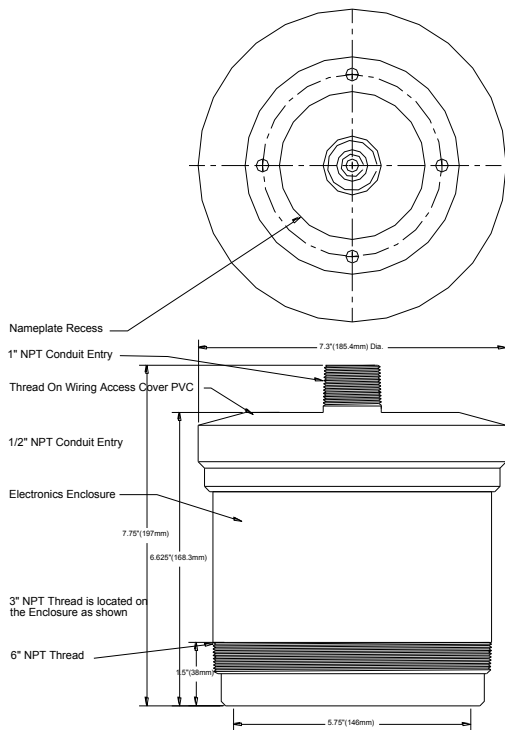
XXX = 2 Wire (loop powered with HART)  
 3 Wire 24 Vdc  
 4 Wire 120 Vac or 230 Vac

#### Operating Frequency:

YYY = 025 — 25 KHz



25 KHz Sensor



2 3/4 Wire 25 KHz Sensor

#### Operating Mode:

V = UL - Ultrasonic Sensor

#### Communication:

C = C4 - RS485  
 C2 - RS232  
 CH - Hart (2 Wire only)  
 C0 - No Communications

#### Housing Material:

H = PV — PVC Enclosure Housing

#### Sensor Material:

S = PVC — PVC Sensor



# Ultrasonic Non Contact Sensors with Remote Sensor for Liquids & Solids High Temp. Application



## Model - ABMXXX - YYYULC - HS (TEF)

### Applications -

These sensors with de-tachable TEFLON transducers operate in very high temperature environments for Liquids and Solids.

### Benefits -

- Enclosures are suitable for IP68 environmental conditions.
- Self adjusting monitors inside tanks environment and adjusts power and sensitivity.
- Self cleaning due to its non contact measuring operation.
- One echo system for measured material. No list of hundreds of parameters to be downloaded.
- Enclosures are available in different materials to withstand any environment.
- Works at very high temperatures.
- De-tachable TEFLON transducer with short blanking and narrow beam which can work on Liquids and Solids.
- very short blanking.

### Technical data -

Measuring Range : 0.4 to 60 Ft (0.12 to 18 m)  
 Temperature : Teflon - 40 to 266°F (-40 to 130°C)  
 Pressure Rating : 1 to 2 bar Std.  
 Mounting Thread : 1" - 2" NPT Male Thread

### Electronics Housing

### TEFLON Remote Sensor



### Catalogue # Ordering -

#### Supply Voltage:

XXX = 2 Wire (loop powered with HART)  
 3 Wire 24 Vdc  
 4 Wire 120 Vac or 230 Vac

#### Operating Frequency:

YYY = 148 — 148 KHz  
 080 — 80 KHz  
 081 — 81 KHz  
 070 — 70 KHz  
 052 — 52 KHz  
 045 — 45 KHz

#### Operating Mode:

V = UL - Ultrasonic Sensor

#### Communication:

C = C4 - RS485  
 C2 - RS232  
 CH - Hart (2 Wire only)  
 C0 - No Communications

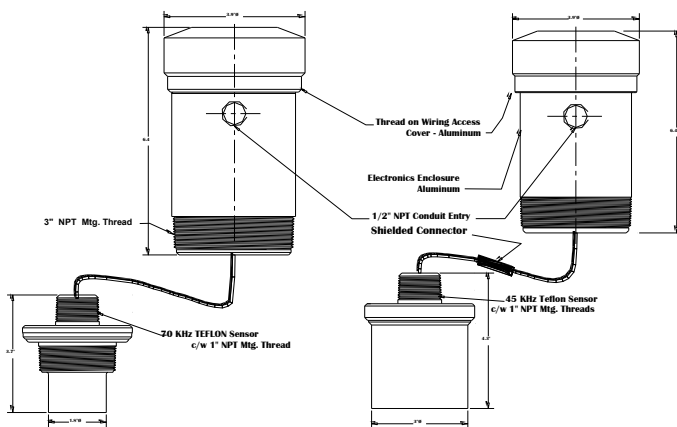
#### Housing Material:

H = PV — PVC Enclosure Housing  
 AL — Aluminum Enclosure Housing  
 S.S. — SS 316L Enclosure Housing

#### Sensor Material: Std. Thread Mtg. Sensor

S = TEF — Teflon Sensor

TEFLON Cable Length: As Required



Ultrasonic Sensor  
c/w Remote 70 KHz Xducer.

Ultrasonic Sensor  
c/w Remote 45 KHz Xducer.

# Ultrasonic Non Contact Sensors For Sanitary Applications



**Model - ABMXXX - YYYUMC4 - HS**

## Applications -

The Sanitary Sensors are used in liquid applications such as Food & Beverage processing. Where Food Grade Antenna and Mounting base are required. Also in small tanks such as barrels due to their mounting and maintenance free nature. Any build up on Transducer face is being eliminated (continuously cleaned). False echoes from tanks walls are eliminated by automatic adjustment of power and sensitivity. Other ideal applications are Pharmaceutical and Chemical as the Sensors adapt to any condition automatically without user involvement.

## Benefits -

- Enclosures are suitable for IP68 environmental conditions.
- Self cleaning due to its non contact measuring operation.
- One echo system for measured material. No list of hundreds of parameters to be downloaded.
- Works At any Temperature.
- Mounting 1 1/2" or 2" Sanitary tri-clamp.
- Extremely short blanking.

## Technical data -

Measuring Range : 0.4 to 30Ft (0.12 to 9 m)  
 Temperature :  
 Std. Sanitary Sensor :- 40 to 140°F (- 40 to 60°C)  
 No Steam Cleaning (CIP)  
 SS316L Sanitary Sensor :- 40 to 266°F(- 40 to 130°C) for 1/2 Hr.  
 Steam Cleaning. Removed sensor for longer Cleaning cycle ,recommended.  
 Not for Continuous Operation  
 Pressure Rating : 5 bar Max. using High Temperature  
 and High Pressure Sensor  
 Mounting : 1 1/2 " or 2" Tri -Clamp



**3/4 Wire Sanitary Sensor**



**Mini Sanitary Sensor**

## Catalogue # Ordering -

### Supply Voltage:

XXX = 2 Wire (Loop Powered )  
 3 Wire 24 Vdc  
 4 Wire 120 Vac or 230 Vac

### Operating Frequency:

YYY = 148 — 148 KHZ  
 081 — 81 KHZ  
 080 — 80 KHZ  
 070 — 70 KHZ

### Operating Mode:

U = UL - Ultrasonic Sensor  
 UM - Mini Sensor

### Communication:

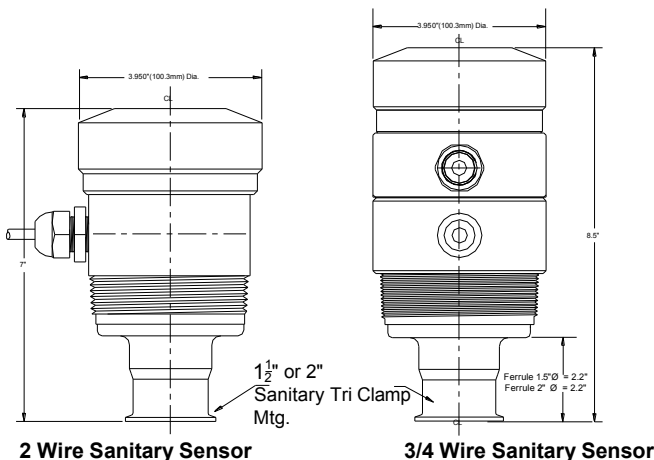
C = C4 - RS485  
 C3 - RS232  
 CH - HART  
 C0 - No Communications

### Housing Material:

H = PV — PVC Enclosure Housing  
 AL — Aluminum Enclosure Housing

### Sensor Material:

Sanitary Mtg. Sensor: 316 SS Tri-Clamp Mtg.  
 S15 — 1.5" Std. Temp. PVC c/w SS316L Face  
 S20 — 2" Std. Temp. PVC c/w SS316L Face  
 S15- HTP — SS316L 1.5" High Temp./High Pressure  
 S20- HTP — SS316L 2" High Temp./High Pressure





# Ultrasonic Guided Contact Sensors For Liquid Applications



## Model - ABMXXX - YYYVW - HS - Pipe

### Applications -

ABM ultrasonic sensors due to advanced ultrasonic transducer designing, can propagate an ultrasonic wave inside Plastic or Metal pipes. Termination of 45° on the pipes allows perfect (no-mismatch) transition between pipe's environment and open space environment. All ABM non-contact sensors can be used to propagate the ultrasonic wave inside pipes. Pipe's I.D. has to be at least 1/4" inch bigger than the transducers nozzle. Ultrasonic with pipes are recommended for liquids in environment with obstacles such as a ladder, cross beams and wires.

### Benefits -

- Enclosures are suitable for IP68 environmental conditions.
- Works in any conditions, no influence of tank's environments.
- Very narrow radiating beam, the ultrasonic wave propagates inside the pipe.
- No waves/turbulences influence.
- Short blanking, self adjusting mode - no influence of mounting in small pipes.
- 45° pipe termination at any length inside tank.

### Technical data -

Measuring Range : 0.4 to 50 Ft (0.12 to 15.2 m)

Temperature : PVC - 40 to 140°F (- 40 to 60°C)

TEFLON - 40 to 266°F (- 40 to 130°C)

Pressure Rating : 1 to 2 bar Std. Sensor

Mounting Thread : 1" - 3" NPT Male Thread



Vent Holes

### Catalogue # Ordering -

#### Supply Voltage:

XXX = 2 Wire (loop powered with HART)

3 Wire 24 Vdc

4 Wire 120 Vac or 230 Vac

#### Operating Frequency:

YYY = 148 — 148 KHz

080 — 80 KHz

081 — 81 KHz

070 — 70 KHz

052 — 52 KHz

#### Operating Mode:

V = UL - Ultrasonic Sensor

UM - Mini Ultrasonic

#### Communication:

C = C4 - RS485

C2 - RS232

CH - Hart (2 Wire only)

C0 - No Communications

#### Housing Material:

H = PV — PVC Enclosure Housing

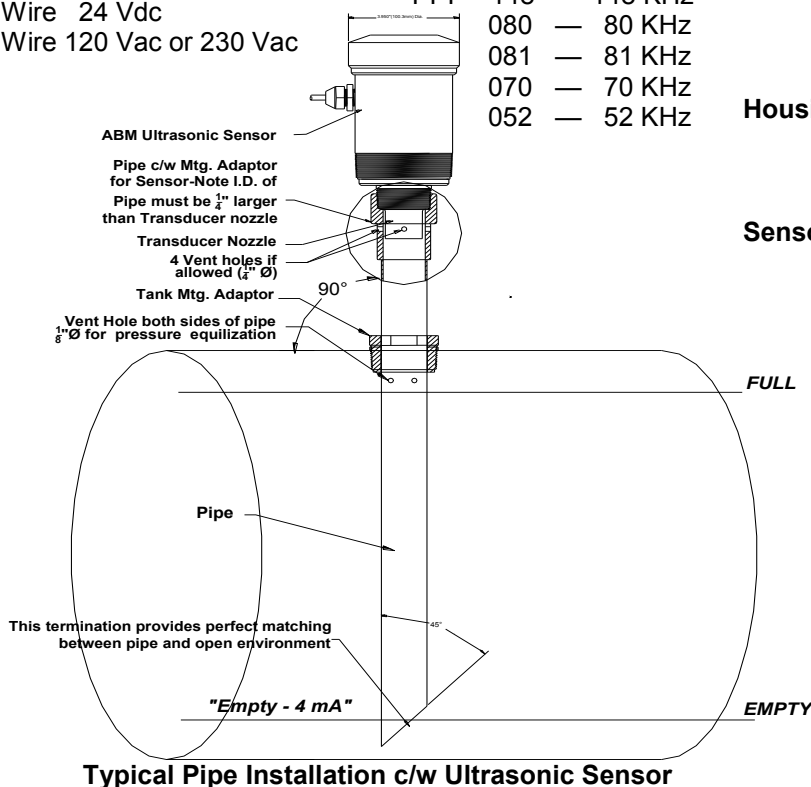
AL — Aluminum Enclosure Housing

SS — SS316L Enclosure Housing

#### Sensor Material: Std. Thread Mtg. Sensor

S = PVC — PVC Sensor

TEF — Teflon Sensor



Typical Pipe Installation c/w Ultrasonic Sensor

# Ultrasonic Non Contact and Contact Sensors



## CATALOGUE NUMBER STRUCTURE - Ultrasonic Sensors

ABM	1) XXX	2) -XXX	3) YY	4) CX	5) - XX	6) YYY	- IP68	7) - XXXX	8) - Pipe
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- 1) Supply Voltage - 200/300/400/430 (Note #1)
- 2) Ultrasonic Frequency - 148/081/080/070/052/045/025 (KHz)
- 3) Operating Mode - UL (Ultrasonic)/UM (Mini Ultrasonic)
- 4) Communications - 4 (RS485)/ 2 (RS232)/ 0 (None)/ H (Hart - 2 Wire only)
- 5) Electronics Body Material - PV (PVC)/ AL (Aluminum)/ SS (stainless steel)
- 6) Transducer Sensor Material - PVC (PVC)/ TEF (Teflon)\* STM / S15 (Sanitary Mtg.)  
/S20 (Sanitary Mtg.)/S15-HTP / S20-HTP (High Temp./Press. San.) / HP (PVC High Pressure)
- X) Ingress Protection - IP68 for Submersible
- 7) Swivel Aiming Mount / Flange Mounting - AIM3 (Swivel Mounting)
- 8) Pipe Mtg.

Note 1) ABM Code 200 = 12-30 Vdc  
 300 = 12-30 Vdc  
 400 = 115 Vac  
 430 = 230 Vac

\* STM = Standard Thread Mounting Sensors