



# TRUE ECHO<sup>®</sup>

## CR-S Radar Level Sensor, 80GHz FMCW

The TRUE ECHO<sup>®</sup> CR-S Radar is a Frequency Modulated Continuous Wave (FMCW) radar operating at 76-81 GHz. It brings the accurate level readings of radar sensors to industrial liquid and bulk solid measurements. It can accurately measure in many adverse environments. The narrow beam angle can detect small targets and achieve precise positioning with high resolution. All TRUE ECHO CR-S sensors can be easily setup and field adjusted via the TRUE ECHO mobile app and onboard keypad.

### FEATURES

- Accurate level measurements in various adverse environmental conditions.
- Millimeter wave technology allows higher signal-to-noise ratio and a smaller blind zone.
- Measurement accuracy up to  $\pm 2$  mm
- Measures dielectric constants greater than 1.5.
- The antenna's narrow 3° or 8° beam angle reduces side interference and allows for ease of installation.
- False echo suppression
- Robust IP68 housing
- 4-20 mA (2 wire) and RS-485 (4 wire) outputs.
- Keypad and mobile communication to facilitate on-site setup and optimization.
- Ideally suited for liquid and bulk solid measurement applications.
- Multiple mounting and chemical resistant options.

# CR-S SPECIFICATIONS

## PERFORMANCE

- **Application:**
  - Liquid
  - Solid
- **Range:**
  - 0.3 to 32.8 ft (0.1 to 10 m)
  - 0.3 to 65.6 ft (0.1 to 20 m)
  - 0.3 to 98.4 ft (0.1 to 30 m)
  - 1 to 196.8 ft (0.3 to 60 m)
  - 2 to 393.7 ft (0.6 to 120 m)
- **Accuracy:**
  - Up to  $\pm 2$  mm (dependent on distance)
- **Response Time:**
  - Power up to first reading <5 seconds (depends on parameter settings)
- **Beam Angle:**
  - 3° (1.5° half angle)
  - 8° (4° half angle)
- **Measuring Frequency**
  - W Band, 76 to 81 GHz, 5 GHz FMCW bandwidth

## ENVIRONMENTAL

- **Process Temperature**
  - 40° to 248° F (-40° to 120° C) Standard
  - 40° to 392°F (-40° to 200°C) High temp option
- **Ambient Working Temperature\***
  - 40° to 158°F (-40° to 70°C)
- **Process Pressure**
  - 0.1 to 2 MPa (-14.5 to 290 psi)
- **Dielectric Constant of Measured Medium**
  - $\geq 1.5$
- **Protection Rating**
  - IP68

## ELECTRICAL

- **Operating Voltage:**
  - 4-20 mA: 12-28 VDC
  - Modbus/RTU (RS-485): 12-28 VDC
- **Reverse Voltage Protection:**
  - $\leq 30$ V
- **Spike Protection:**
  - <3kW

## CONNECTIVITY

- **Cable Entry**
  - 1/2" NPT
- **Smartphone with TRUE ECHO Radar App**
- **4 Button Keypad with Display**
  - LCD (128 x 64 dot matrix)
- **Fault Output (4-20 mA only)**
  - 3.8 mA, 4 mA, 20 mA, 20.2 mA, Hold Last
- **Output**
  - 4-20 mA (2 wire)
  - RS-485 Modbus RTU (4 wire)
  - RS-485 + 4-20 mA (4 wire)
  - RS-485 + 4-20 mA + 2 Relays (4 wire + relay wires)
- **Relays**
  - 2 SPST
  - 250VAC / 30VDC
  - Max switching current 5A (recommended <2A)

## PHYSICAL

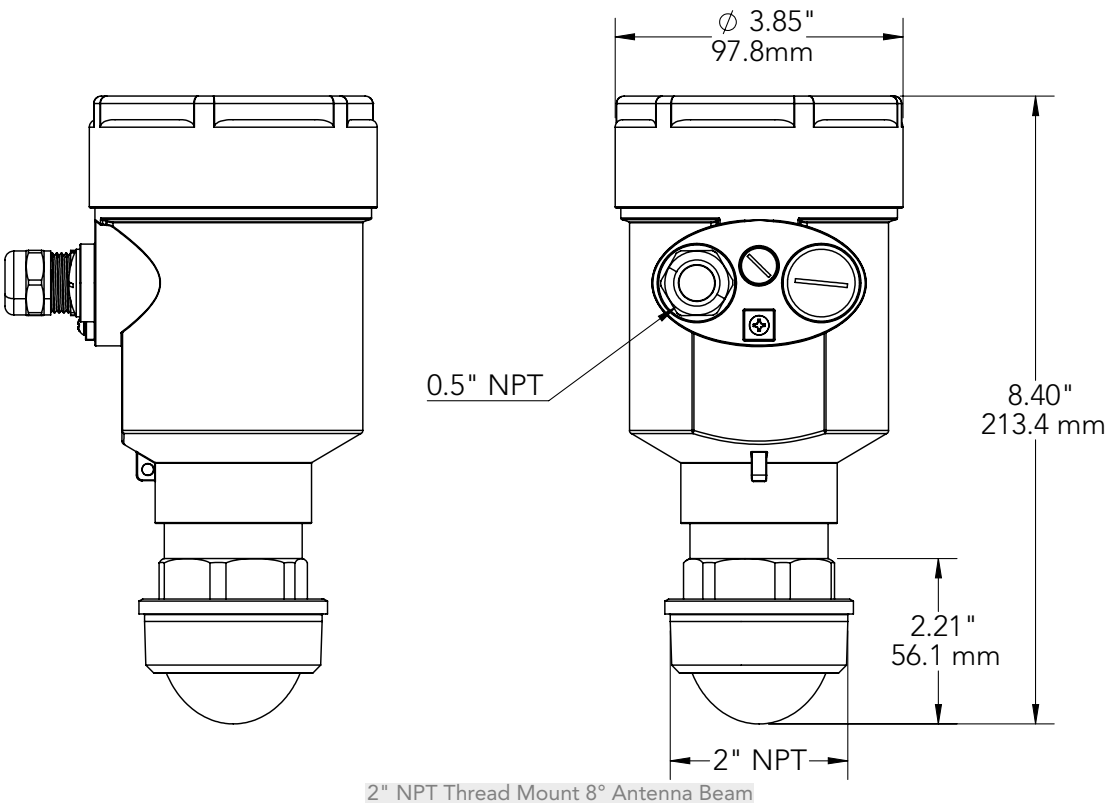
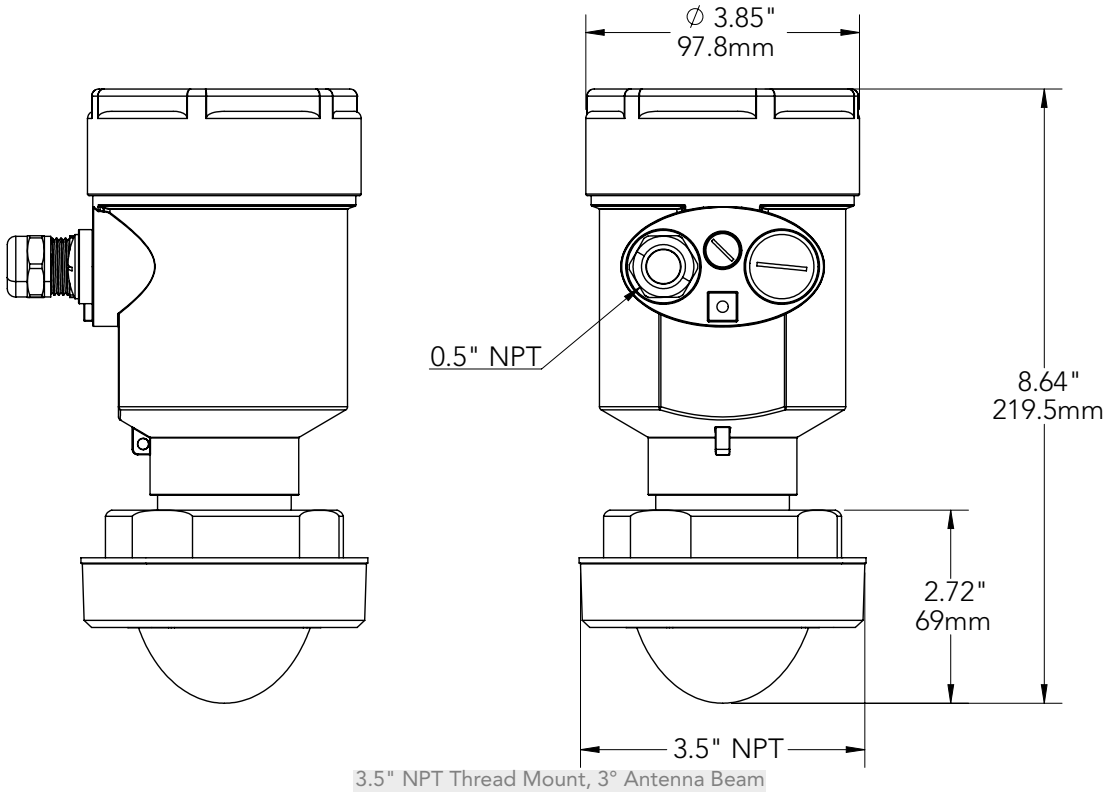
- **Housing:**
  - Die cast aluminum
- **Lens Material:**
  - PTFE
- **Process Fitting**
  - NPT Mount, Stainless Steel
  - NPT Mount, PTFE
  - Flange Mount, Stainless Steel
  - Flange Mount, Stainless Steel with PTFE Liner
  - Flange Mount, Stainless Steel, Swivel with Purge Port
- **Weight (varies with mounting type):**
  - 2" NPT: 4.37 lbs (1,983 g)
  - 3.5" NPT: 5.13 lbs (2,325 g)

## CERTIFICATION

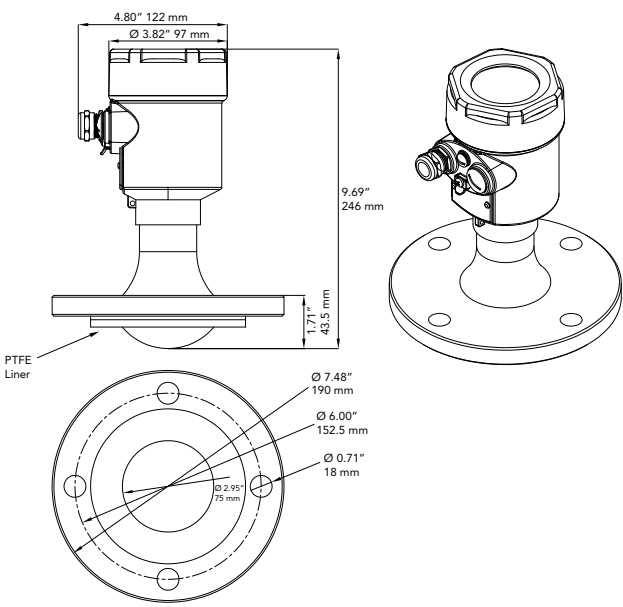
- FCC ID: VPK-APGCRS
- ISSED IC: 7385A-APGCRS
- CE

\* The liquid crystal display gets sluggish below 32F (0 C) and will darken or freeze around -4 F (-20 C). Damage to the display can occur at temperatures below that. The radar will continue to work over its full temperature range.

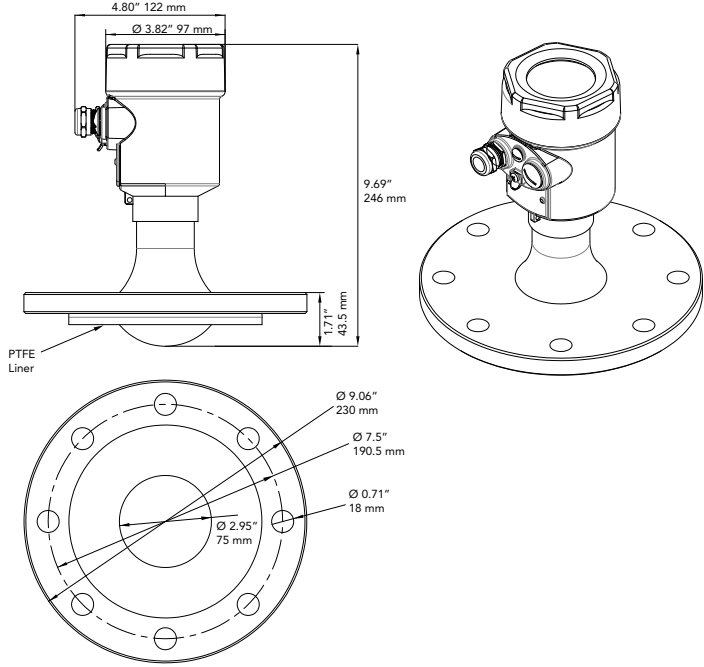
CR-S DIMENSIONS



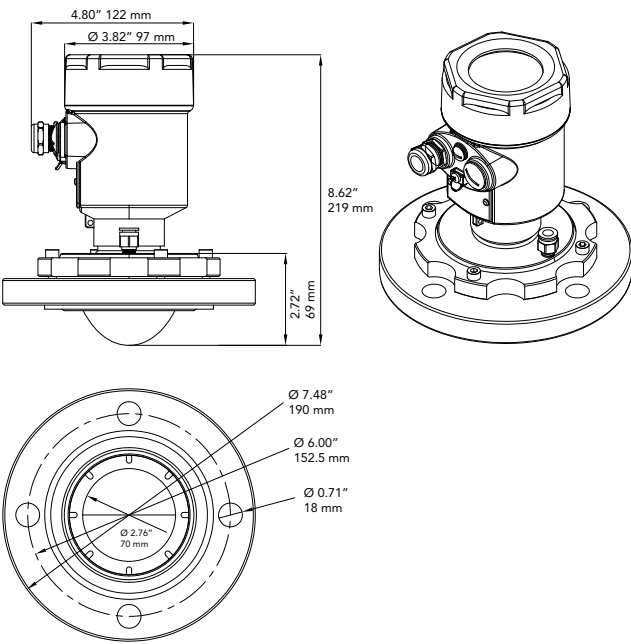
CR-S DIMENSIONS CONT.



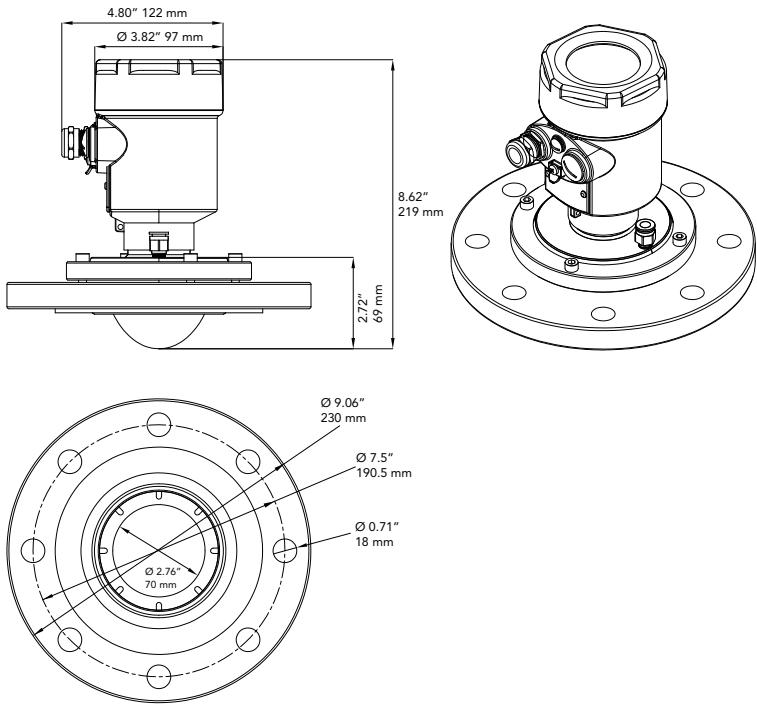
ANSI Flange with PTFE Liner, 3"



ANSI Flange with PTFE Liner, 4"



Swivel Flange with Air Purge, 3"



Swivel Flange with Air Purge, 4"

# MODEL CONFIGURATION OPTIONS

**MODEL NUMBER:** CR -  $\frac{S}{A}$  -  $\frac{GP}{B}$  -  $\frac{C}{C}$  -  $\frac{D}{D}$  -  $\frac{A}{E}$  -  $\frac{F}{F}$  -  $\frac{G}{G}$  -  $\frac{H}{H}$  -  $\frac{I}{I}$  -  $\frac{J}{J}$  -  $\frac{K}{K}$  -  $\frac{L}{L}$  -  $\frac{B0}{M}$

## A. Application

- ☐ **S\*** Solid / Liquid

## B. Rating

- ☐ **GP\*** General Purpose

## C. Measuring Range

- ☐ **32** 32.8 ft (10 m) (4-20mA, Standard Temp only)
- ☐ **65** 65.6 ft (20 m) (4-20mA, Standard Temp only)
- ☐ **98\*** 98.4 ft (30 m)
- ☐ **196** 196.8 ft (60 m)
- ☐ **393** 393.7 ft (120 m)

## D. Output

- ☐ **L1\*** 4-20 mA (2 wire)
- ☐ **L31** RS-485 Modbus RTU (4 wire)
- ☐ **L48** RS-485 Modbus RTU + 4-20 mA (4 wire)
- ☐ **L50** RS-485 Modbus RTU + 4-20 mA + 2 Relays (4-8 wires)

## E. Housing Material

- ☐ **A\*** Aluminum Alloy / IP68

## F. Process Temperature

- ☐ **T0\*** -40° to 120° C (Standard Temperature)
- ☐ **T2** -40° to 200° C (High Temperature)

## G. Beam Angle

- ☐ **3\*** 3 degree beam angle
- ☐ **8** 8 degree beam angle

## H. Mounting Material

- ☐ **4** 304 SS
- ☐ **6\*** 316 SS
- ☐ **7** PTFE (8 degree beam angle only)

## I. Mount Type and Size

### 3° and 8° Beam Angle

- ☐ **F3** 3" Flange
- ☐ **F4** 4" Flange

### 3° Beam Angle only

- ☐ **N3.5** NPT 3.5" Taper Pipe Thread
- ☐ **L3** 3" PTFE Lined Flange
- ☐ **L4** 4" PTFE Lined Flange
- ☐ **S3** 3" Swivel Flange with Air Purge Port
- ☐ **S4** 4" Swivel Flange with Air Purge Port

### 8° Beam Angle only

- ☐ **N1.5** NPT 1.5" Taper Pipe Thread
- ☐ **N2** NPT 2" Taper Pipe Thread
- ☐ **F2** 2" Flange

## J. Flange Standard

- ☐ **A15** ANSI Class 150
- ☐ **N** No Flange

## K. Cable Inlet

- ☐ **N1\*** Cable gland, NPT 1/2" x1
- ☐ **N2** Cable gland, NPT 1/2" x2

## L. Keypad

- ☐ **K\*** Keypad
- ☐ **N** No Keypad

## M. Customer Label

- ☐ **B0\*** APG

\* Indicates this option is standard.

Note: Not all configuration combinations are possible. See the product page at [apgsensors.com/product/cr-s](https://apgsensors.com/product/cr-s) or contact us to learn more.

## ACCESSORIES

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### Your Gateway to Smarter Monitoring

Settler, APG's next remote monitoring gateway, makes getting real-time level data easier than ever.

Settler seamlessly connects Modbus and 4-20 mA sensors—transmitting encrypted data securely to Explorer, APG's cloud-based interface. View tank and well levels anytime, anywhere, with reliable connectivity and robust data security powered by MQTT with AES (Advanced Encryption Standard). Plus, with over-the-air (OTA) firmware updates, your system stays up to date without hassle.

Explorer makes monitoring simple. Access real-time readings, enable datalogging, and set up alarms so you're always informed of critical changes—right from your smartphone, tablet, or desktop.

Save time, reduce costs, and gain peace of mind with remote monitoring powered by Settler and Explorer. Contact us today to learn more or visit

[apgsensors.com/settler-remote-monitoring-gateway/](https://apgsensors.com/settler-remote-monitoring-gateway/).

