

The KST33 Series is a family of Distance Sensors - patent pending devices capable of contact-less measurement of solid and liquid levels within 10mm resolution. All devices within the series are capable of transmitting that information over short ranges using *Bluetooth* Low Energy or long range using a variety of Low-Power Wide Area Network (LP-WAN) or Cellular radios. Since the KST33 Series is powered by our flexible *Unity V4 Engine* (KST1120), we are able to offer customization services to meet your particular data or transmission needs. And since the device is generally capable of measuring virtually any object within this accuracy and up to 4-meters away, the KST33 Series is an ideal sensor choice for a variety of Internet-of-Things applications.

The KST33 Series has the following measurement capabilities -

- Distance from sensor to within 10mm resolution up to 4-meters away
- Accelerometer that allows orientation measurements in all three axes with 1/1000th g-force accuracy up to 8-g's
- Temperature and humidity in environments ranging from -20°C to +50°C
- Location from GPS sensor
- Pressure sensor

You can mount the KST33 Series using our bracket. Optionally, KST's engineering team can customize a mounting solution for you or provide you with the CAD models needed for you to develop your own mounting strategy. The IPx6 rating carried by the device makes it suitable for indoor or outdoor environments.

The *Bluetooth* Low Energy radio can be used for local characterization, device status checking, connection to BLE Gateways, and even beaconing, which allows the KST33 Series to be located via the

use of a mobile app or Gateway's known location. It also serves as the entry point into *Covalence*, our IoT Platform that works seamlessly with mobile apps and cloud endpoints. The *Bluetooth* radio supports other protocols as well, including 802.15.4, *Bluetooth* 5 Mesh, Thread, and your own proprietary protocol. BLE also provides a secure and easy path for firmware updates.

Two C-Cell Alkaline batteries (options to Alkaline include industrial Lithium Thionyl Chloride for outdoor or extreme temperature applications) are used to provide power to the device. KST recommends the use of [Energizer Industrial C-Cell](#) battery replacements; typical deployment situations result in 18-months of battery life, and this can be tuned depending on your particular needs.

At the heart of the KST33 Series is the KST1120, our *Unity V4 Engine*. This workhorse Internet of Things Module carries its own FCC certification and is the heart of an emerging platform of edge sensors produced by KST. It accesses an accelerometer, pressure, temperature, and humidity sensor, giving it broad application. Its floating point processor allows calculations and algorithms to act on your data right at the very edge, without the need to transfer raw sensor data to the Cloud via a gateway or cellular connection.

We have seen a number of key vertical markets emerge that are ideally suited for the KST33 Series, including measuring the fluid depth in controlled



bins, the amount of grain remaining in a silo, the percentage full of trash cans in smart cities, and so much more. The KST33 Series is suitable for counting cars, people, or producing gesture detected beacon advertisements.

Because the KST33 Series is powered by the KST1120 module, high volume companies interested in customizing the KST33 Series devices or wrapping it around a different enclosure have the option to leverage KST's Engineering Services. We've designed the KST33 Series from the ground up with customization in mind. Lowering time to market while getting what you want with low engineering NRE makes the KST33 Series a great launching point for your own custom sensor.

KST offers a proof-of-concept device that includes batteries, a Covalence account, and access to a web-based dashboard for 90 days. Contact us today for ordering information and pricing.

KST offers engineering services to customize the KST33 Series enclosure or to integrate into your own project. [Contact](#) us today to learn more about our integration with cellular, Low-Power Wide Area Networks, and other long-range radio technologies.

The KST33 Series provides the following options for cloud connectivity:

KST3300	SigFox
KST3310	ZigBEE
KST3320	LoRa
KST3330	WiFi
KST3340	Cat M1
KST3350	BLE Only

Note that battery life varies depending on choice of cloud connectivity.

Specifications

Sensors

Distance	-20°C to +50°C Operating Temperature
	10mm resolution
	4-m Range
	Calibration-Free
Accelerometer	
	Changeable Scale: +/- 2g up to +/- 16g
	Triple Axis: x, y, and z
	Free Fall Interrupt Support
	Motion Detection / Double Tap Support
	-20°C to +50°C temperature range
Temperature	
	-20°C to +50°C temperature range
	+/- 0.3°C accuracy
	Calibration-Free
	0.1°C resolution
Humidity	
	0 to 100% Relative Humidity range
	+/- 2%RH accuracy
	Calibration-Free
	+/- 0.1%RH resolution
Pressure	
	300 - 1100 hPa range
	Relative accuracy ± 0.12 hPa, equiv. to ±3.3 feet

	Absolute accuracy $\pm 1\text{hPa}$
GPS	
	GPS, Galileo and GLONASS
	< 3m horizontal accuracy
	30sec lock time
	< 0.1m/s velocity accuracy

Bluetooth

Eddystone (Optional)	
	1285ms Advertisement Interval
	URL Support ⁽²⁾
	UID Support ⁽²⁾
	Telemetry Frames
iBeacon (Optional)	
	100ms Advertisement Interval
	UUID, Major ID, Minor ID ⁽²⁾
	Tx Power (8 Settings) ^(2, 3)
	Measured Power ⁽³⁾
Protocols	
	Thread
	802.15.4
	Proprietary
	Bluetooth 5 Mesh

Battery

Type	2x C Cells
Capacity	8000 mAh

Contact KST To Learn About Industrial Battery Options

⁽²⁾Configurable through free iOS and Android Commissioner App and made available to you through our Unity Engine v1.0 API

⁽³⁾Power settings affect battery life as well as transmission distance. Contact KST for battery calculator and signal strength / RSSI information

Limited Warranty

KS Technologies, LLC, warrants this product to be free from defects in material and workmanship for a period of 1 year from purchase. This product is sold with the understanding that the purchaser has independently determined the suitability of this product. This warranty is offered to the original purchaser of the product only. This warranty does not cover the product if physically damaged, subject to negligence or misuse, abuse, alteration, accident, or an Act of God. This warranty does not apply to product which has been exposed to water or physically damaged by accident, misuse, alteration, or disassembly.

The original dated purchase order will establish warranty eligibility. If the product should prove defective within the warranty period, return the product to KST. KST, at its discretion, will repair or replace the product free of charge with return postage paid. In no event shall KST be held responsible for claims beyond the replacement value of the defective product or in any way be liable or responsible for consequential or incidental damages.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC / IC Authorization

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio
empts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

KS Technologies, LLC

Model: Distance Sensor

PN: KST3300

Contains FCC IDs:

HSW2832 and 11534ASFM10R2

Contains ICs:

4492A-2832 and 2ABA2SFM10R2



MADE IN USA

KS Technologies, LLC

Model: Distance Sensor

PN: KST3320

Contains FCC IDs:

HSW2832 and VPYCMABZ

Contains ICs:

4492A-2832 and 772C-CMABZ



MADE IN USA

Mechanical Drawings

Units are in mm

