

FLUKE®

Reliability

Deployment Planning Guide

Before you buy



**Fluke 3562 Screening
Wireless Vibration Sensor**

Deployment Planning Checklist:

- ✓ **Step 1:** Select your assets (equipment) for remote monitoring
- ✓ **Step 2:** Determine test points for sensor installation
- ✓ **Step 3:** Determine location of gateway installation
- ✓ **Step 4:** Confirm availability of connectivity
- ✓ **Step 5:** Place your order

3562 Screening Vibration Sensor System

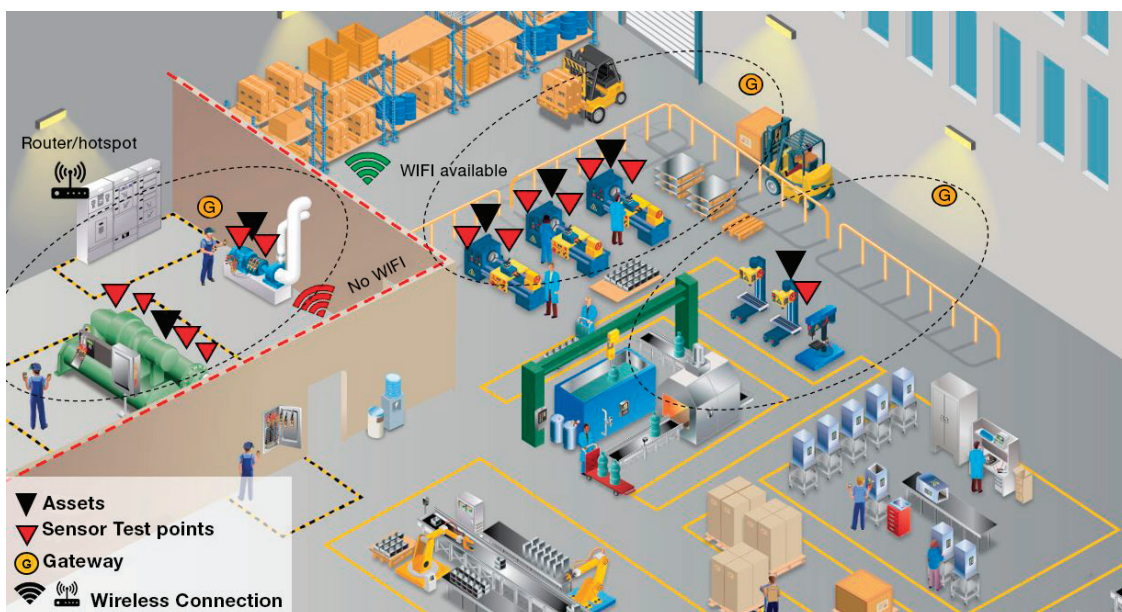
The Fluke 3562 Screening Vibration Sensor system lets maintenance teams add remote, continuous vibration monitoring to their machines, maximizing equipment uptime and minimizing unnecessary route-based maintenance.

With a frequency range of 6 - 1,000 hertz (Hz), the Fluke 3562 detects vibration changes and sends alert notifications, providing early warning of potential equipment failure. The batteryless sensors deliver virtually continuous operation with minimal upkeep requirements.

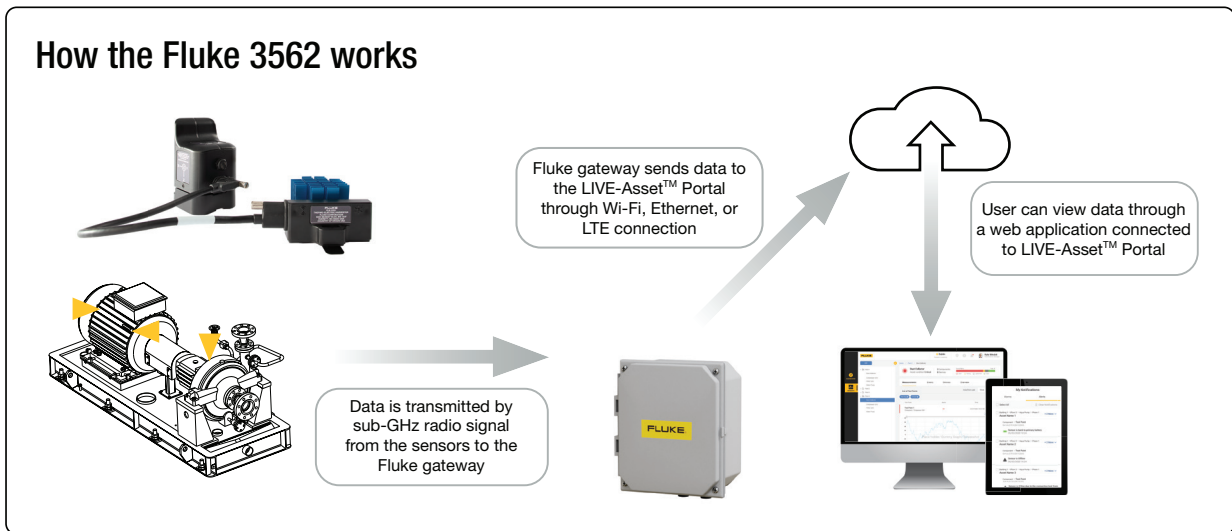
- An ultra-penetrating, sub-GHz radio signal allows the Fluke 3562 sensors – thanks to the Everactive® Edge self-powered circuit and networking technology – to communicate with a gateway over extremely long distances, requiring fewer gateways throughout a facility.
- The Fluke 3562 system offers an easy and accurate condition monitoring system for tier II and tier III assets and delivers always-on screening of semi-critical and important machines.
- Vibration data is transmitted wirelessly to the Fluke 3504 Gateway and the cloud via LTE, Wi-Fi, ethernet, or a hybrid of all three.
- The associated LIVE-Asset™ Portal software displays overall vibration trends and FFT charts using user-generated parameters.

Planning Your Vibration Monitoring Program

A little planning and preparation will help you smoothly install the Fluke 3562 vibration sensor system. With this guide, you'll be able to quickly and easily plan the deployment of your wireless vibration monitoring program. You'll learn how to select your assets, sensor locations, gateway locations, and network connectivity options. You can also perform a site survey with the worksheet titled "Asset Information Table" (Appendix) to help gather the information needed for deployment planning, ordering the right hardware, and preparing for vibration sensor installation. Print out pages 9 and 10 of the Appendix to take with you on your site survey.



3562 Wireless Vibration System – At a glance:



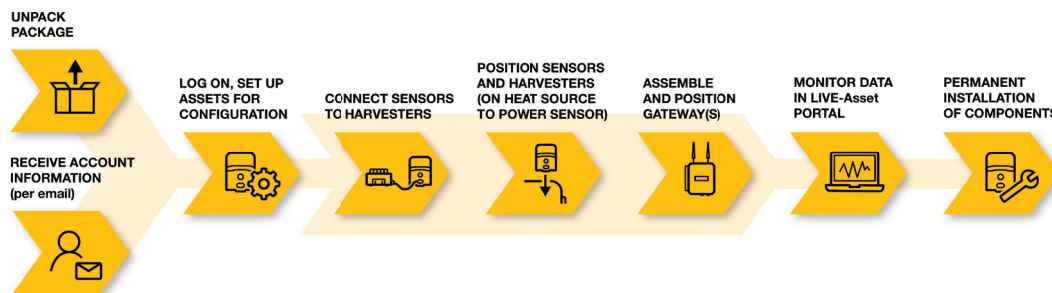
- Fluke 3562 screening sensor mounted on machine bearings
- Energy harvester mounted on machine – thermoelectric (TEG) harvester or add photovoltaic (PV) harvester if needed
- Data is measured every 60 seconds as a default (interval is configurable) and sent via long-range signals to gateway
- Gateway transfers data for many sensors via Wi-Fi, Ethernet or LTE to the cloud-based LIVE-Asset Portal

Phases of Program Success

1. Survey your plant and order the initial system components

A little planning and preparation will help you smoothly install the Fluke 3562 Screening Vibration Sensor system. By following the steps in our Deployment Planning Guide, you'll learn how to select your machines, the sensor and gateway locations following that, and then your network connectivity options.

2. Follow the simple process for a successful setup



3. Monitor your success and grow the program to cover more assets

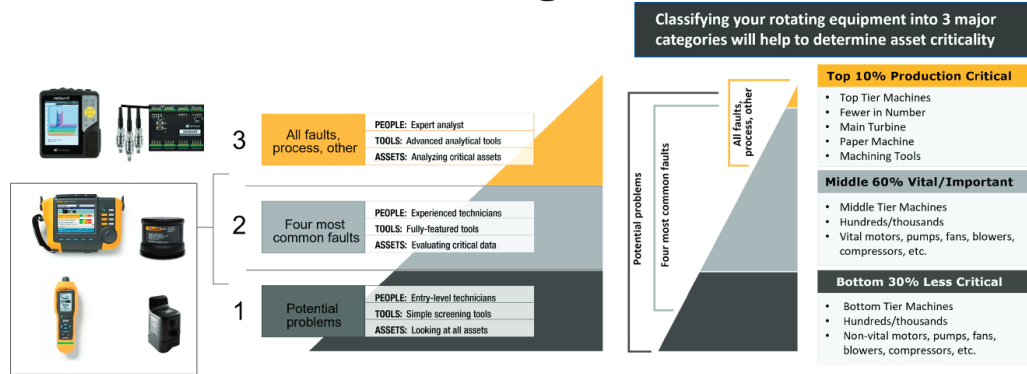
Document your saves to get buy-in and support from managers to purchase components for the next implementation phase. The process of starting small and growing is a proven method to implement a new program successfully. Remember to use Fluke 3562 Screening Vibration Sensor and Fluke 3563 Analysis Vibration Sensor systems to build a complete, connected, condition-based monitoring system.

4. Sustain the reliability program over the years to come

Reliability is a journey, not a destination. Ensure that you continue to document saves and accomplishments, then report to upper management so that they will not forget the reason for your success. Reliability is an investment in the future, not a cost of doing business.

Step 1

Select your assets (equipment) for remote monitoring



A. Determine scope and goals of pilot program and phases

It is very important to set realistic expectations for the success of the growing program and sustainment over many years:

- Don't start too big—instead start small, show success, get buy-in and budget, then grow the program.
- Select matrixes to validate the success of the new program along with targets and tollgates for reviews, assessments, and evaluation.

B. Asset Selection

Survey the machine space where you plan to deploy the vibration sensors and select the assets to monitor. The sensors notify teams when faults start developing, enabling them to take further testing or plan repair actions.

C. Record Asset Information—Asset Hierarchy (machine tree)

Collect the basic information about your assets and complete the 1st section of the Worksheet (in the Appendix). See the example below.

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors and TEG	PV / Long cable	Gateway
Boiler Room	Horizontal Water Pump 1	Motor Drive End	Top of motor bearing, no fins	1	1 PV	1
Boiler Room	Horizontal Water Pump 1	Pump Drive End	Top of pump bearing, center	1	1 PV	
Boiler Room	Horizontal Water Pump 2	Motor Drive End	Top of motor bearing, no fins	1	1 LC	
Boiler Room	Horizontal Water Pump 2	Pump Drive End	Top of pump bearing, center	1		
Boiler Room	Horizontal Water Pump 3	Motor Drive End	Top of motor bearing, no fins	1	1 LC	
Boiler Room	Horizontal Water Pump 3	Gearbox Input	Top of gearbox, motor input	1	1 LC	
Boiler Room	Horizontal Water Pump 3	Pump Drive End	Top of pump bearing, center	1	1 LC	
Boiler Room	Vertical Water Pump 1	Motor Free End	Side of lower motor bearing	1		
Boiler Room	Vertical Water Pump 2	Motor Drive End	Side of lower motor bearing	1		
Boiler Room	Blower 1	Motor Drive End	Top of motor bearing, near fan	1		
Boiler Room	Blower 2	Motor Drive End	Top of motor bearing, near fan	1		
Compressor Room	Air Compressor 1	Motor Drive End	Top of motor bearing, near belt	1		
Compressor Room	Air Compressor 1	Compressor Drive End	Top of compressor bearing, near belt	1	1 LC	
Compressor Room	Fan 1	Motor Drive End	Top of motor bearing, near belt	1	1 PV	
Compressor Room	Fan 1	Fan Drive End	Top of fan bearing, near belt	1	1 PV / 1 LC	
Compressor Room	Fan 1	Fan Free End	Top of fan bearing, near fan	1	1 PV / 1 VC	
				16 / 16	5 PV / 7 LC	1

Step 2

Determine test points for sensor installation

Next, determine how many test points are required on each monitored machine for sensor installation.

Machine basics for rotating machines

For vibration monitoring, we can simplify a machine to one or two shafts with two bearings each, something connecting the shafts, and something hanging off the end. Look at your machine and identify the shaft(s), bearings, coupling, and driven component. We recommend one sensor per bearing.

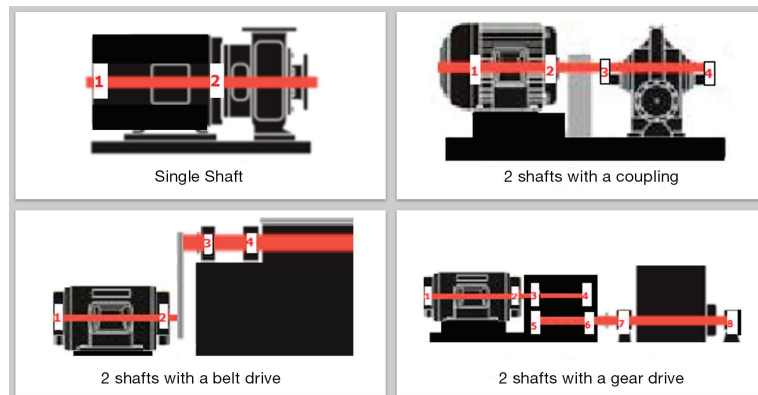
How to select locations for mounting sensors?

A. Machine survey

Break your machine down to basic parts:

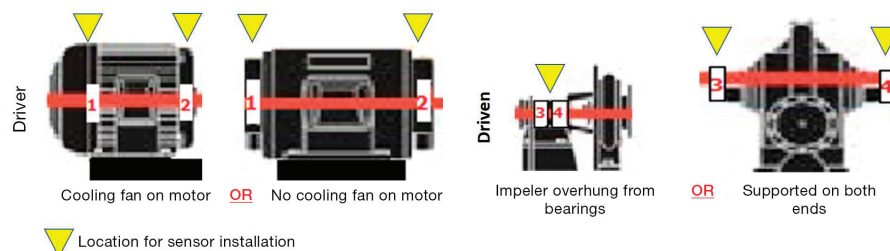
- Shaft(s)
- Bearings, coupling, belt, or gearbox
- Driven element (pump, fan, compressor, blower, etc.)

Find the configuration of your machine to determine bearing location for sensor installation.



B. Sensor location identification

Determining the bearing location depends on the driving element (motor) type and the driven element (such as a pump).



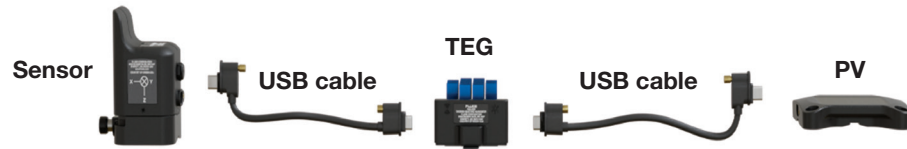
C. Determine number of sensors depending on size

Vibration transmits about 36 inches (1 meter) before it is lost through the machine. There is no need to measure every bearing on small machines. Transmission path should be as short and solid as possible— from rotating shaft, to bearing, to bearing housing and into the sensor.



D. Determine the Type and Number of Energy Harvesters

Each sensor is accompanied by an an energy harvester.



To harvest from heat, you need a thermoelectric generator (TEG), which generates current from a temperature differential between two sides of the bimetallic device. The sensor only needs a 15°F (-9°C) difference between either side of a Scrabble tile-sized Peltier device within the TEG. The TEG is placed on the warmest part of the machine to provide maximum power.

To harvest from light, you need a photovoltaic (PV) harvester and need a minimum ~200 Lux to power the sensor—roughly the light in a dimly lit facility. Outdoors, where sunlight is exponentially brighter, we are exposed to more than enough energy to power the sensor during daylight hours.

E. Record the Sensor Information

Using the above information, determine the test points for sensor installation and fill in Sections 2 and 3 of the Worksheet (in Appendix). See the example and blank worksheet in the Appendix.

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors and TEG	PV / Long cable	Gateway
Boiler Room	Horizontal Water Pump 1	Motor Drive End	Top of motor bearing, no fins	1	1 PV	1
Boiler Room	Horizontal Water Pump 1	Pump Drive End	Top of pump bearing, center	1	1 PV	
Boiler Room	Horizontal Water Pump 2	Motor Drive End	Top of motor bearing, no fins	1	1 LC	

F. Sensor mounting options

Fluke 3562 sensors have three mounting options: stud mount, epoxy, or the included magnet.



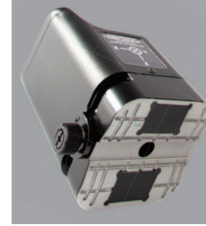
Stud mount

- Best frequency response
- Most work needed to install
- Must drill a hole in surface



Adhesive mount

- Better frequency response
- No drilling, yet permanent



Magnet mount

- Low frequency response
- Convenient
- No drilling or glue needed

G. Energy Harvester mounting options

The harvesters can also be mounted via three options: adhesive, plastic tie-wrap, or through the included magnet.



Adhesive mount

- Most secure mounting
- Most work needed to install
- May be tough to remove



Plastic tie-wrap

- Very secure mounting
- No gluing, yet permanent
- Easy to remove later



Magnet mount

- Least secure mounting
- Bend tabs for better holding
- Convenient

Please refer to the **Fluke 3562 FAQ** for more information on sensors and harvester mounting options.

Step 3

Determine the location of the Gateways

The system gateway is the central bridge between any 3562 Screening Vibration Sensor system and the LIVE-Asset Portal software.

The gateway receives vibration data from up to 1,000 sensors via proprietary long-range sub-GHz ISM band and sends data to the LIVE-Asset Portal via ethernet, Wi-Fi, and/or LTE. The ultra-long-range radio signal allows a maximum distance between the sensors and gateway up to 1 Km (line of sight) and up to 250 meters non-line of sight if metal, concrete, or walls blocks the signal. The ultra-signal penetration allows it to penetrate physical obstructions more easily than protocols like Wi-Fi or Bluetooth that operate in the 2.4 GHz band. Check for a trusted electrical service outlet near a central location to mount the gateway and confirm the connectivity between the many sensors and gateway during the setup process.



In many installations, one gateway is enough to cover most assets in a single area, building, or process line.

Step 4

Confirm availability of connectivity

The gateway requires connectivity to stream vibration data to the cloud. Ensure availability of network connection in the installation location via one of the three options described below:

Option 1: Use LTE (most common) at the installation location.

1. Carrier-independent onboard modem connects to AT&T, Verizon, Sprint, or T-Mobile
2. Transmissions are sent via secure MQTT with standard TLS-based encryption. Cloud data stored on Amazon Web Services (AWS) supports encryption-at-rest.

OR

Option 2: Use ethernet cable at the installation location.

If the installation location already has ethernet cables routed to the site of the gateway, then simply use the existing cable.

OR

Option 3: Use Wi-Fi connectivity (2.4 GHz) at the installation location.

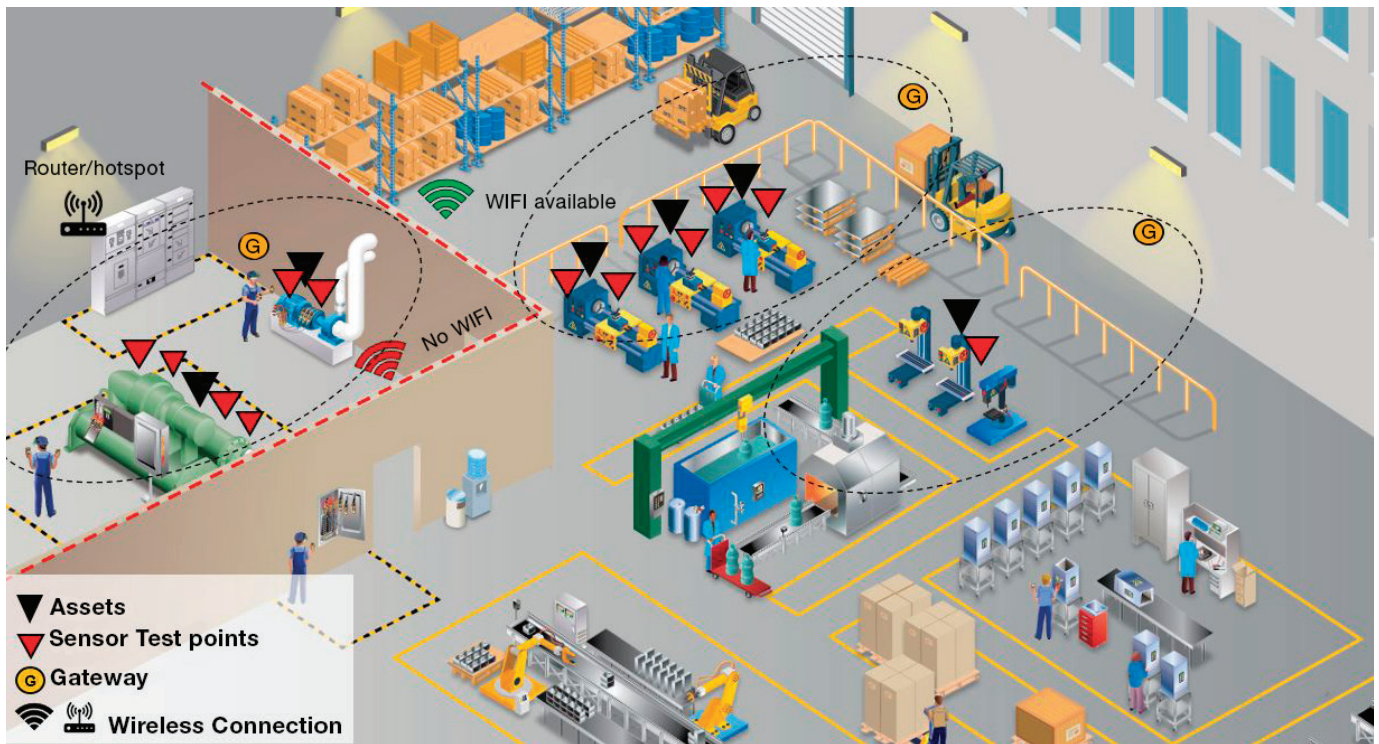
1. Obtain the Wi-Fi network name and password.
2. Make sure your network complies with requirements of the Wi-Fi article.

Appendix

Sitemap

For the area where you plan to install, refer to a sitemap to pictorially plan the deployment. If you don't have one, create a simple hand draw site map. This lets you plan gateway and network connectivity to ensure that there is optimal coverage and seamless data streaming.

Sample sitemap with deployment planning



Do's and Don'ts

- Mount the sensor on solid metal anywhere on or near the bearings but not on thin covers
- If the machine is small, mount a sensor on one motor bearing and one pump bearing
- Do not mount sensor on motor winding box – bearings only
- Do not mount sensor in the middle of motor – bearings only
- Do not mount sensor on pump casing – bearings only (flow noise)
- Do not mount sensor on thin cooling fan cover – solid metal only
- Do not mount sensor on thin cooling fins – solid metal only
- Do not mount sensor on a coupling or belt guard
- Do not mount sensor on seals – bearings only

WORKSHEET A - Asset Information Table - Sample

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
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Compressor Room	Fan 1	Fan Drive End	Top of fan bearing, near belt	1	1 PV / 1 LC	
Compressor Room	Fan 1	Fan Free End	Top of fan bearing, near fan	1	1 PV / 1 VC	
				16 / 16	5 PV / 7 LC	1

WORKSHEET B - Asset Information Table - For use by customer to fill in

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors needed	Adapters needed	Gateways needed
Totals:						

Step 5

Place Your First Order Using Numbers from the Worksheet

Contact your Fluke Solution Provider for Help

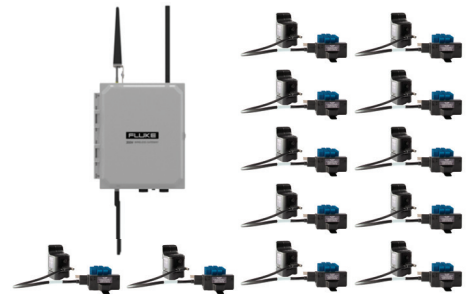
The complete solution Starter Kit has three components:

**1 3562 Screening Vibration Sensor and 3504 Wireless Gateway
Screening Vibration Sensor 16KIT***

Consists of:

- 16 3562 Screening Vibration Sensors
- 16 Thermoelectric (TEG) harvesters
- 16 1-ft USB-C 3.1 MTS Cables
- 1 3504 Wireless Gateway
- 1 Gateway Power Cord
- 2 Gateway Antennas
- 1 LTE Wand
- 1 Getting Started Manual

*32KIT also available for start up



2 Software

16 Screening Vibration Sensors Software Subscriptions (Year 1) – Year 1 included with purchase of starter 16KIT or 32KIT

3 Services

Onboarding (Required)

Optional additions

Hardware

- **Screening Vibration Sensor 8PK***
 - 8 Sensors
 - 8 Thermo-Electric Harvesters
 - 8 USB-c 3.1 MTS Cables, 1 FT
 - 8 software subscriptions



* Available for purchase following initial purchase of 16KIT or 32KIT

- **Photovoltaic (PV) harvesters**
 - Indoor PV harvester
 - Outdoor PV harvester
- **3-ft USB-C 3.1 MTS Cables**
- **Thermoelectric (TEG) harvester**

Software

Year 2+ Screening Vibration Sensor Software Subscription

Services

2-day Vibration Training (Optional)

Fluke Corporation

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