

BeGo product and services description

Overview of the product

BeGo Vibration analysis bundle is a product designed for Industrial IoT use cases. It consists of Hardware, software and reports. This at first could be used to analyze vibration in all kind of moving and non-moving machinery. Product could be installed directly to the surface of the machines or vibration source. Vibration bundle is completely autonomous device that doesn't require the machine to be disassembled and therefore void manufacturer's warranty.

Easiness of the installation and affordable pricing was first thing to be considered when designing it, since today similar industrial bundles can cost more than 1000 euros and up. Vibration bundle already includes BeGo algorithms that analyze large amount of data gathered from machine (5 measurements/second) and provide easy understanding of machine health in reports that are sent to clients weekly or monthly basis. Bundle works 24/7 and gives real time instant notifications of critical vibration anomalies to machinery owners. Main purpose of the product is to monitor health of the machinery in real time and prevent expensive failures of machines that can lead to unexpected delays in production line and cause losses for machine owners.

Product content

BeGo solution is a complete E2E solution that doesn't require any extra development for users.

Furthermore, it is possible to add additional modules to combine different data with vibration data to see correlation and have better predictions. For example, vibration data could be combined with pressure and temperature data in Heat exchangers or hydraulic systems. Bundle is based on modular IoT platform that was designed by BeGO inhouse. This gives a full control and understanding of the hardware making customization lead times shorter.

Hardware consist of 2 parts sensor platform and Gateway. BeGo uses only certified open source gateways from trusted partners. Using open source devices helps the whole system to be independent of other stake holders and makes possible to change any hardware parts without losses.

BeGo custom bundle uses either a contact microphone inclinometer. Entire bundle requires 5V power supply provided by a battery or the voltage can also be received via USB cable. The data is gathered via gateway to a cloud platform. Contact microphone detects vibrations(oscillations) with sensitive black rubber. The oscillations are then transferred through a low-noise amplifier to enhance the data quality.

Thanks to its broad bandwidth, high sensitivity and strong impact resistance, this sensor is an excellent choice for detecting vibrations. The second option for sensor is a dual axis inclinometer that uses the change in gravitational fields on two masses (one for each axis) inside the sensor to detect oscillations. The immediate data is in degrees; however, it is then converted to voltages.

After detecting data, sensor transmit the information using a gateway device into the cloud. The gateway, or industrial computer, is manufactured in EU assuring the customer high quality. Due to its fully configurable feature, the device can be suited to each customer needs. The platform supports Wi-fi, ZigBee, Bluetooth, GPS, LTE/3G and GPRS.

Service operation

Bego vibration detection bundle is offered as a full package to customers. Package includes, sensor platform with preinstalled vibration sensor, gateway, cloud integration and unique vibration analysis algorithms. Price of the bundle is fixed. It is also possible to rent the devices with monthly installments for a fixed period. Leasing is for minimum a year and it is possible to renew contract on yearly basis.

There is always xx number of bundles in the stock that are available for immediate shipping to customer. For larger volumes starting from XX pcs, pre-order should be placed. Lead time is around 8-10 weeks after receiving a payment from the customer.

Installation of the bundle could be done by 3rd party companies in customers region using BeGo installation guide. It is also possible for BeGo member to do installation at customer premises if the travelling expenses are covered. Installation is fast and doesn't require any deep technical knowledge. This is how installation process looks like in short:

- After payment is received BeGo send bundle with express shipping to customer. All hardware is assembled together and software pre-installed and tweaked if there are special requirements from the customer. If the customer is located far away, then BeGo offers a local company which can install it.
- Installation doesn't take a lot of time. Most important is to place the sensor on the right part of the machine and make sure that it is well connected to the surface with the mounting solution provided in the package.
- Bundle should be connected to power source. It is customer responsibility to make sure that there is a power socket near the installation place.
- After the sensor is mounted and the gateway powered up, the system starts automatically and instantly begin reading and pushing vibration data to the cloud.

- During the installation support is available online to help the installation process go smoothly and run tests. After the tests are done successfully the installation is completed.

All the data that is generated is owned by customer and BeGo is not able to share it with third parties without customer permission. Data is analyzed in the cloud in real time using BeGo vibration analysis algorithms. In case if the vibration exceeds the normal levels, notification is instantly sent to machine owner or maintenance company that can take further actions for preventive maintenance.

As an additional service it is possible to get machine health reports weekly or monthly. Reports include graphs and numbers that can help to see current machine condition and to adjust machine maintenance in right time.

Customer Value

1. Cost/efficiency ratio

Bego bundle cost scientifically less comparing to other industrial vibration bundles on the market while offering similar quality of vibration measurements and services.

2. Highly sensitive sensor

Product uses highly sensitive sensor comparing to gyroscope. It is mounted directly to surface of the object and provides great measurements even at very low vibrations.

3. Outdoor and indoor usage

There is option for an outdoor version of the product.

4. Works out of the box

There is no need for any additional development or technical knowledge during installation. All the guidelines are provided together with the package and full online support available during installation process.

5. Customization possibilities

It is possible to add additional sensors like for example: temperature and pressure sensors.

BeGo vibration bundle is completely ready product that fits most of the industrial use cases where vibration levels are critical. Since the sensor is attached directly to the surface it can detect even smallest vibration levels. This technology gives a greater advantage over the gyroscope based sensors that are widely used in Industrial sector.

Main value of the product comes from its operational cost savings, maintenance planning of the machines and 24/7 analysis of machinery.

Service characteristics

- **Procurement:** first step is to discuss with the client what would be the best possible option in terms of what kind of sensors, how many bundles, where to install.
- **Logistics:** after the order has been placed, the HW is shipped and delivered worldwide to the customer within 6-8 weeks depending on volumes. Note that additional shipment cost applies depending on the number of devices.
- **Installation:** installing and setting up devices shall be done by a 3rd party service provider on the basis that a local service provider is procurable. If not, hourly rate of travel and accommodation will be added to the price.
- **Maintenance:** after installation, the devices are in working condition and require maintenance when necessary. This is carried out by some on-site personnel included in the bundle cost. If client is responsible for any damage, they shall cover the expenses.
- **Monthly service fee:** includes online support, Monthly machine health reports, software updates, handling warranty issues, battery replacements if applicable, license fees for SW including cloud integration unless the client requires custom cloud service.

Product cost

There are two pricing models available for the product:

1. Hardware cost + monthly fees.

With this model customer pays the full price for the hardware and becomes fully owner of the hardware. Client is able to choose who he wants to choose for installation: 3rd party company or BeGo. It is also possible to conduct installation with own resources using BeGo installation guidelines and online support. In this case client takes a full responsibility for the results. Product has a 5 year warranty included and it is possible to extend warranty after that period of time with additional fee of 3% of hardware price per each calendar month.

In addition to that there are monthly fees of 8-20 euros depending on the software package and use case. This price is based on the level of the services and analysis complexity of the use-case. For example a service fee for a mid-range freezer or ice machine would be 8 euros/month and a service fee for a complex hydraulic system or industrial heat exchanger around 20 euros/month.

2. Leasing model

If the customer doesn't want to pay a full price for a hardware it is possible to start a sensor leasing contract. With this model all hardware belongs to BeGo, but client is still responsible for any damage caused to it. When the leasing contract is finished the hardware should be returned to BeGo in fully working condition.

Leasing price starts from 25 eur/month and up to 50 eur/month depending on the complexity of analytics and hardware requirements.

Customer can choose whether he wants to pay on monthly/quarterly or annual basis.

3. Consulting/procurement.

In some cases, BeGo can offer consulting services if there are complex analysis required or hardware customization needed. Hourly price for engineering consulting starts from 60 eur/hour.

Eco System

BeGo product includes following products and services provided by 3rd party companies:

1. Gateway

There are certain requirements that are followed when partnering with gateway provider. These requirements are tested and documented. If the client is in another continent, BeGo will find a suitable gateway provider for that region if the volumes are good enough. BeGo follows strict procedure when sourcing new gateway provider to ensure product overall quality.

2. Cloud connectivity

By default, BeGo product has Azure cloud connectivity out of the box, where all the customers vibration data is stored and analyzed in real time. There are no additional fees coming from the Cloud connectivity and data storage as it is already included in the monthly fees. There is a possibility to have alternative cloud connectivity by customer request. In this case a hourly based fee is added to the order according to the price list.

3. Manufacturer

Company has few manufacturing partners that are used depending on the required volumes and lead times. For low quantities under 50pcs and faster lead time that might be beneficial during POC, BeGo offers local manufacturers that are in EU and Russia.

For larger quantities over 50 pcs Chinese manufacturers are used. Lead times usually vary from 4-10 weeks, depending on the order volumes and component availability.