



**ISA Delhi Section**

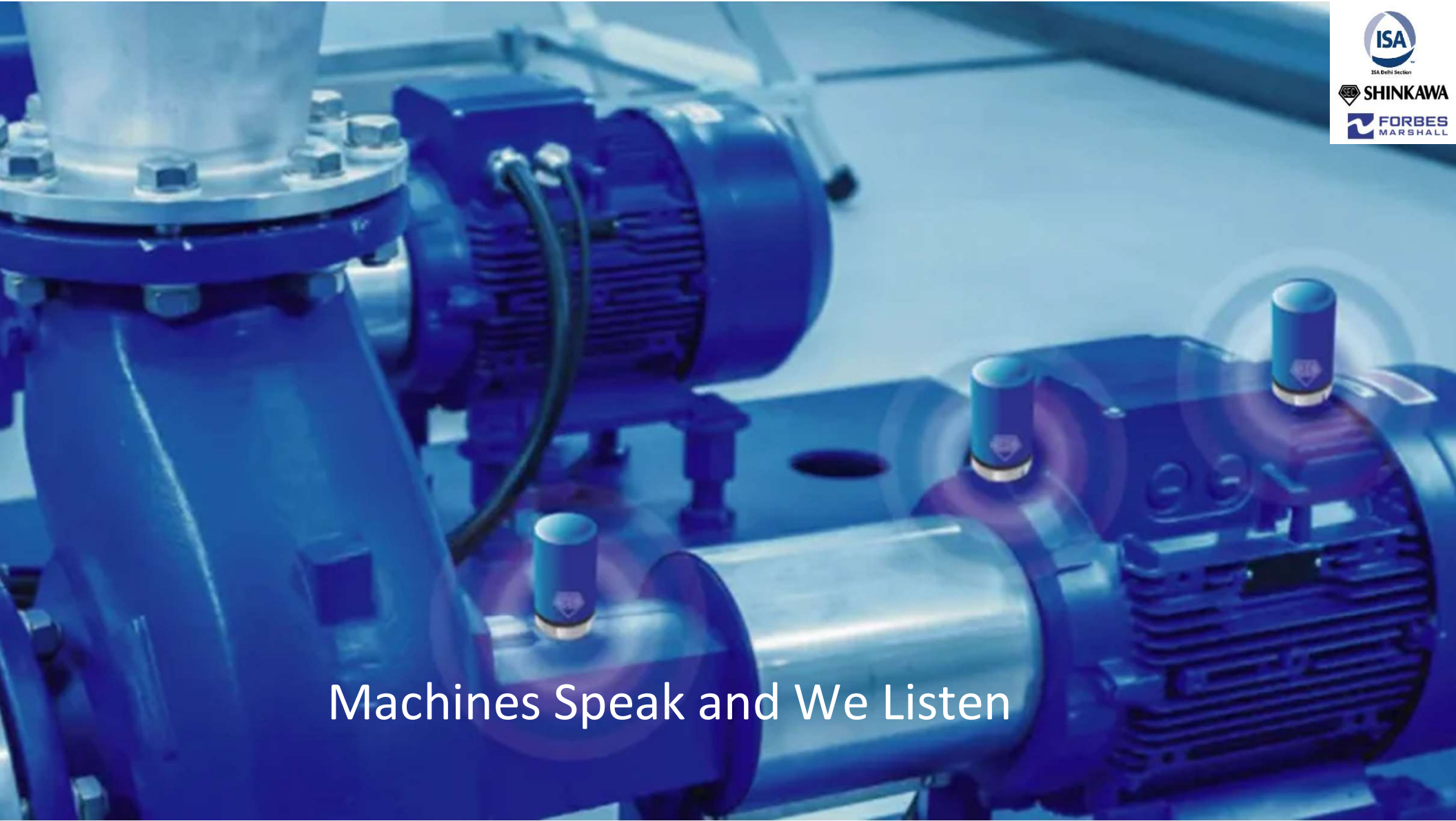
*Setting the Standard for Automation™*

# Forbes Marshall

Wireless Vibration Package

ISA-D: "Fertiliser , Food and Pharma Symposium-2022"

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Machines Speak and We Listen





Machine

Introduction to Machine Dossier



Global  
Reliability  
Collective



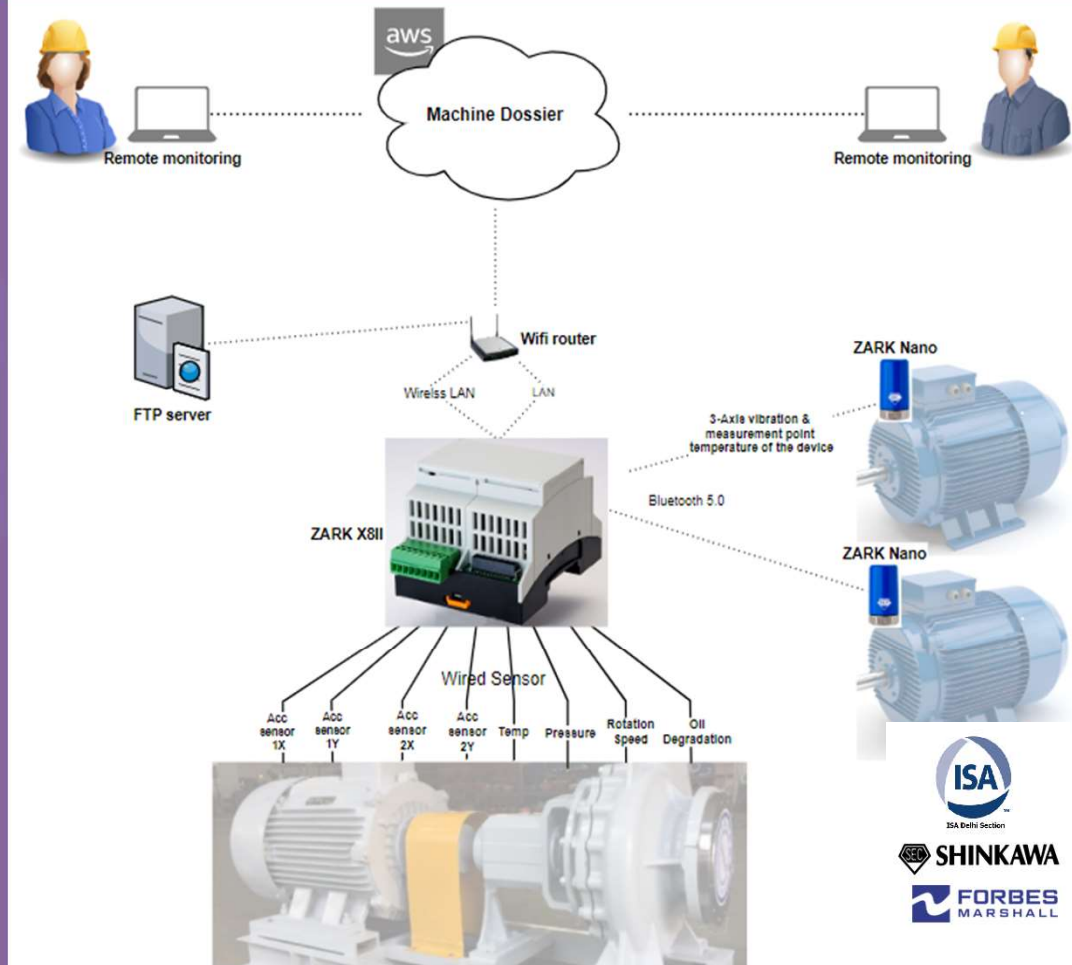
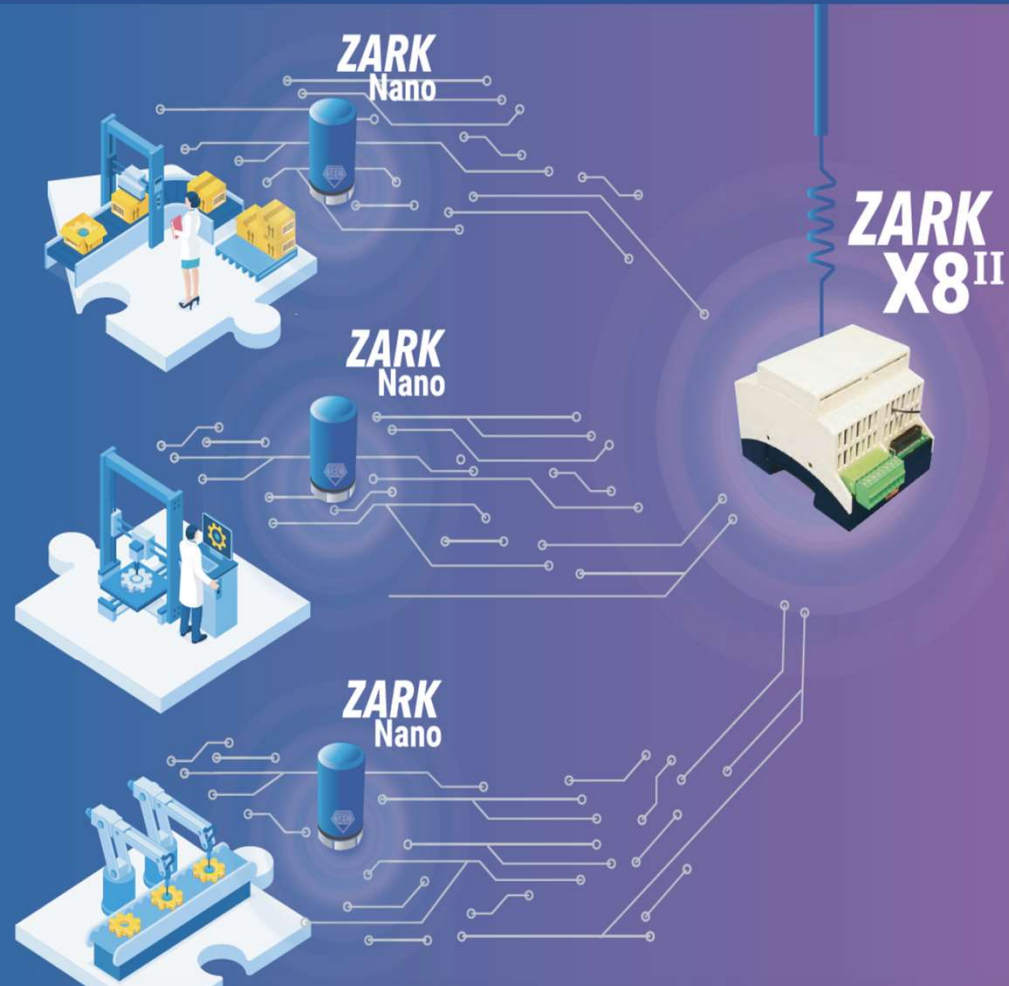
ZARK Wireless  
Machinery  
Health Device

Solution for Rotating Machine Condition  
Monitoring



Zero  
Infrastructure  
Architecture

# Cloud Based VMS Solution



# Wireless Condition Monitoring IIoT Technology - Industry 4.0



**Triaxial vibration and temperature sensor**



**Bluetooth 5.0 communication**



**Alerts via text message and email**



**Quick and easy to install**



**Low cost**



# Agenda

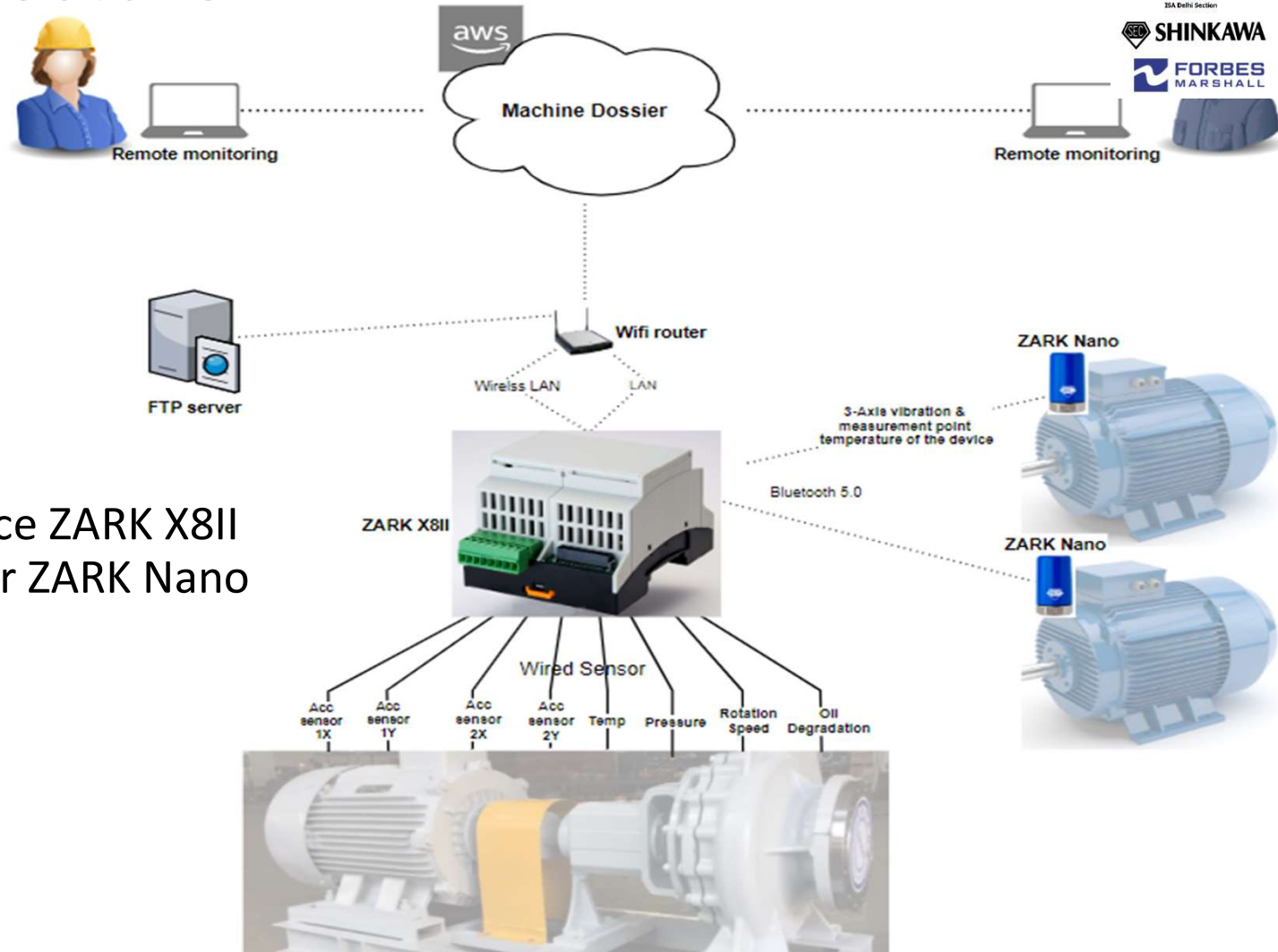
- System architecture
- ZARK X8II
- ZARK Nano
- Configuration Tool
- Tera Term (installation and use)
- X8 User Configuration Tool (installation and use)



ISA Delhi Section



# System architecture

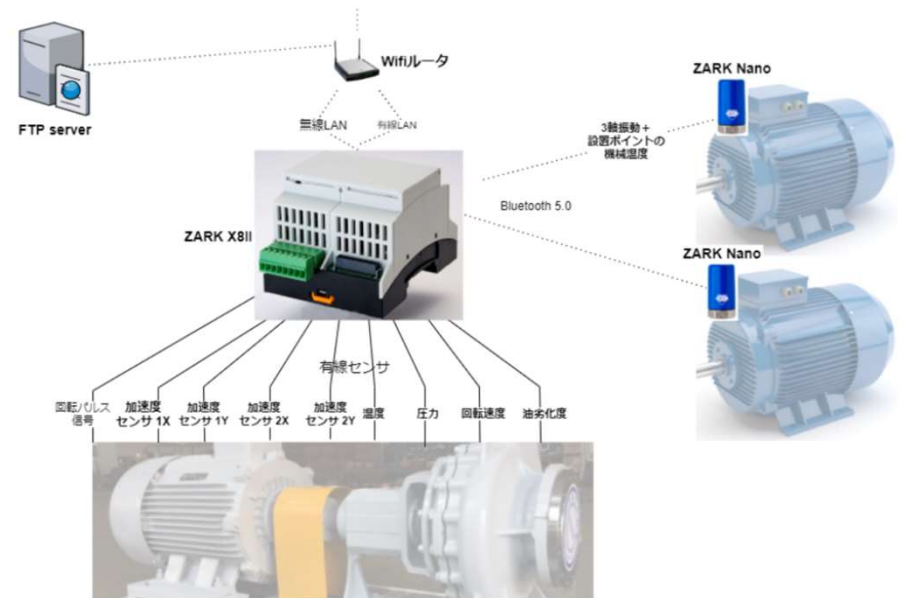


- Data measurement device ZARK X8II
- Wireless vibration sensor ZARK Nano
- AWS hosted web portal



# ZARK X8II Features

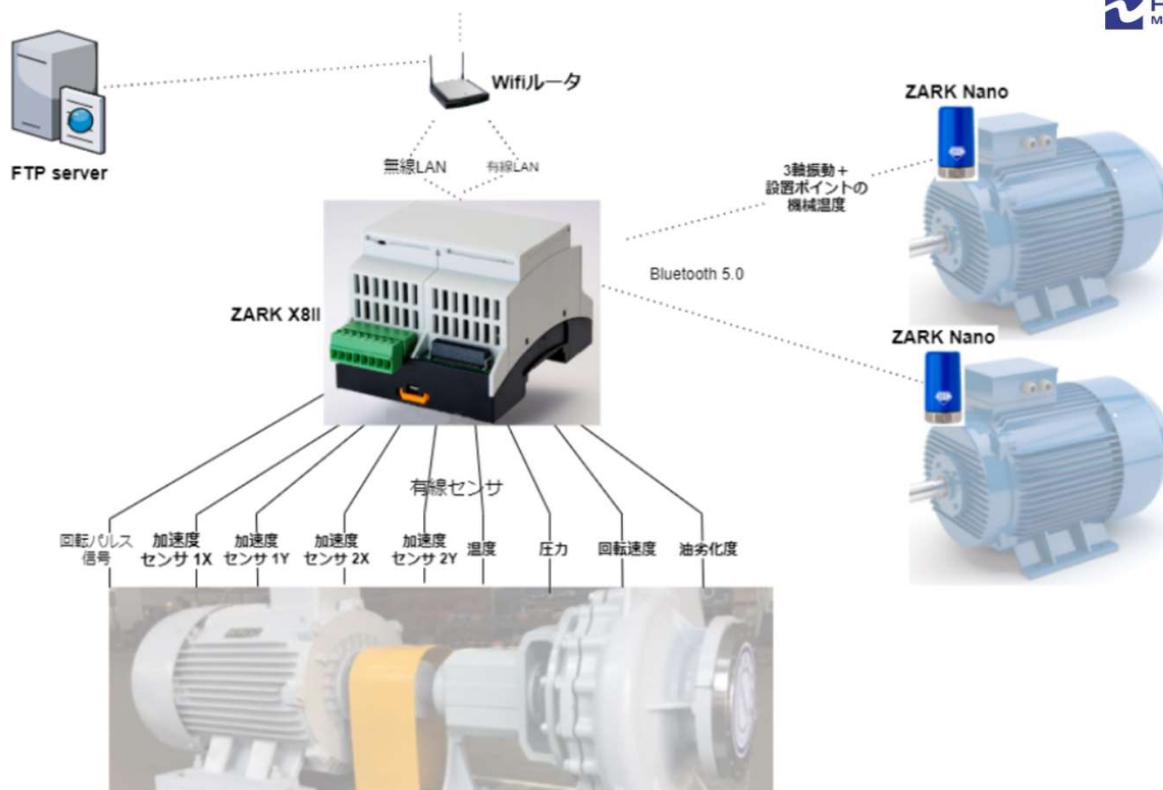
- Scanning & relaying hub
- Up to 8CH wired sensors measurement
  - IEPE (Integrated Electronics Piezo-Electric) power supply
  - 1-5 V analog signal
- Up to 16 ZARK Nano data transfer hub





# ZARK X8II Features

- Bluetooth 5.0 for ZARK Nano communication
- LAN/Wireless LAN for communication with MD
- Data transfer to FTP server (local or private cloud) with format of
  - infiSYS-Lite



# ZARK X8II Brief Specification



## Input

- Up to 8 Ch, vibration (e.g. CA-302) and process analog (1-5V)
- Pulse voltage for measuring rotation speed (9th Ch)

## Vibration data

- Acceleration: OA, peak
- Velocity: OA, peak
- FFT: Acc or Vel upon selection)
- FFT line: 3,200, 1,600, 800
- FFT band: 1X, 2X, 3X, 4X, Sub 1X, Over 1X
- Waveform data: 8,192 Points

## Hub

- 8 to 16 ZARK Nano data transfer

## Power

5 Vdc

## Operation temperature

-20 to 60 Degree C

## ZARK Nano Sensor brief specifications:

- Tri-axial measurement
- Fmax: 2KHz
- OA: Acc, Vel
- Vel FFT: 3,200, 1,600, 800 Lines
- Waveform: 2048 points
- Temperature Measurement: -40 to 85 C
- Communication: Bluetooth 5.0
- Battery: Lithium
- Estimated life time: 4 times/day, 2.5 Years
- Weight: around 80g
- Diameter: @ 3 cm



# Machine Dossier Customer Portal Layered List

•e.g.

- Business Unit
- Plant
- Department
- Process
- Section

## Details

Cancel Previous Step Next Step

Parent Node  
00\_SOGA

Name \*

Type \*

Business Unit	▲
Organization	
<b>Business Unit</b>	
Plant	
Department	
Process	
Section	

\* - required field



Cancel Previous Step Next Step



# Machine Dossier Customer Portal Layered List

Target:

- Machine
  - Measurement point

The screenshot displays the 'Machine Dossier' customer portal interface. The main header is blue with the 'Machine Dossier' logo and navigation icons for 'Dossier', 'Collective', and 'Sparks'. A left sidebar shows a tree view under 'Dossier' with the following items: 'Shinkawa Japan Demo Site BETA' (expanded), 'FUKUYAMA DEMO1', 'Gr会社A', 'H1', 'SHINKAWA DEMO', 'SHINKAWA Sensor Technology', 'ST営業統括 推進Gr/関西', 'ST営業統括本部', 'ST泉北 DEMO', 'Shanghai', 'Singapore', 'soga test', 'お客様デモ (千葉)', 'レンゴー 金津工場', '中国営業本部', and '九州営業本部'. The main content area is titled 'Shinkawa Japan Demo Site BETA' and includes an 'Add' button and a menu icon. Below this are tabs for 'Details', 'Sparks', 'Events', and 'Devices'. The 'Details' tab is active, showing 'Organization Unit Details' with a 3D rendering of a machine and the following information:


Name *	Shinkawa Japan Demo Site BETA
Type *	Process
Description	

# Adding Target Machine for Monitoring

- Type
- Size
- RPM
- Data collection rate(  $\geq$  1hour)

Overview Conditions **Details** Spectrum Sparks Events Alerts

Machine Details



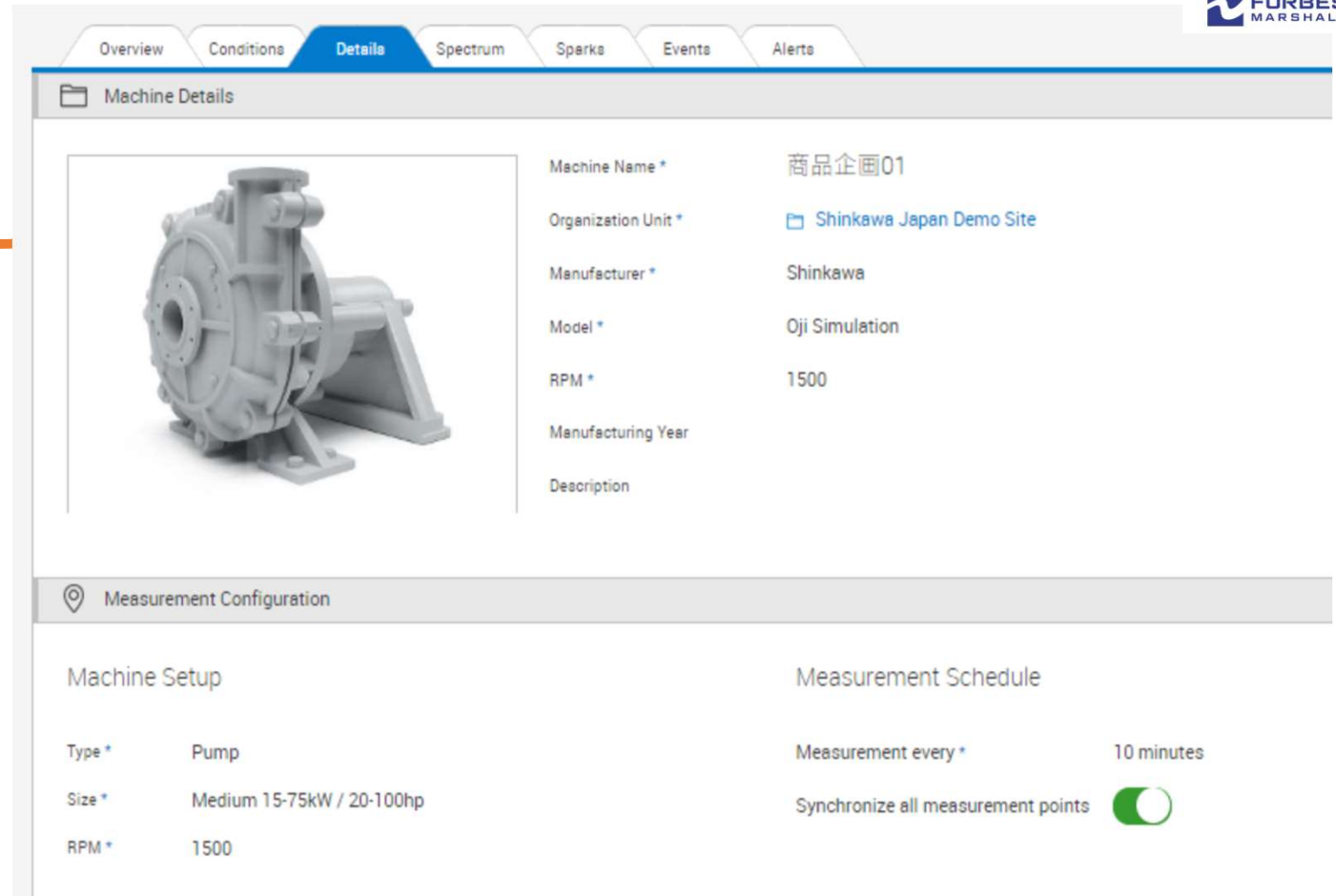
Machine Name *	商品企画01
Organization Unit *	<a href="#">Shinkawa Japan Demo Site</a>
Manufacturer *	Shinkawa
Model *	Oji Simulation
RPM *	1500
Manufacturing Year	
Description	

Measurement Configuration

Machine Setup		Measurement Schedule	
Type *	Pump	Measurement every *	10 minutes
Size *	Medium 15-75kW / 20-100hp	Synchronize all measurement points	<input checked="" type="checkbox"/>
RPM *	1500		

# Machine monitoring

- Type
- Size
- RPM
- Data collection rate
- Alarm threshold: default setting based on ISO 10816-1



The screenshot displays a web-based interface for machine monitoring. At the top right, there are logos for ISA (ISA Delhi Section), SHINKAWA, and FORBES MARSHALL. The interface has a navigation bar with tabs for Overview, Conditions, Details (selected), Spectrum, Sparks, Events, and Alerts. Below the navigation bar is a section titled 'Machine Details' which includes a 3D model of a pump and a list of machine attributes:

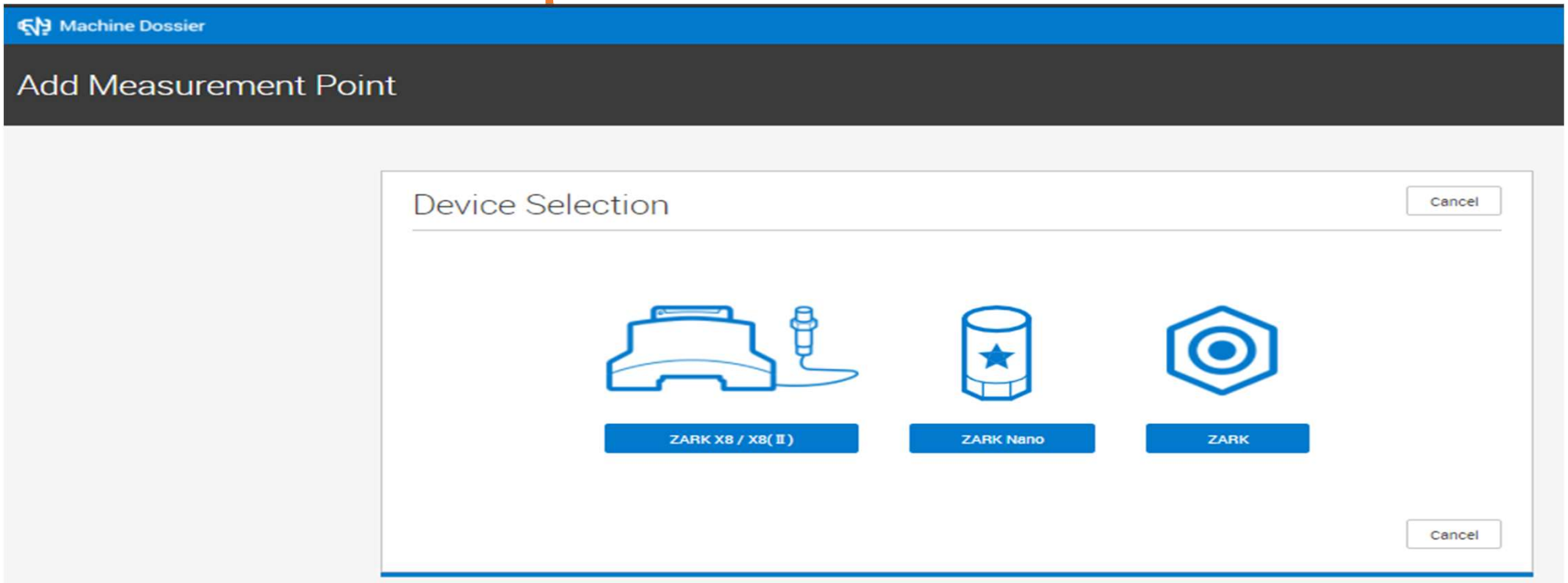
Attribute	Value
Machine Name *	商品企画01
Organization Unit *	Shinkawa Japan Demo Site
Manufacturer *	Shinkawa
Model *	Oji Simulation
RPM *	1500
Manufacturing Year	
Description	

Below the machine details is a section titled 'Measurement Configuration' which is divided into two columns: 'Machine Setup' and 'Measurement Schedule'.

Machine Setup	Measurement Schedule
Type * Pump	Measurement every * 10 minutes
Size * Medium 15-75kW / 20-100hp	Synchronize all measurement points <input checked="" type="checkbox"/>
RPM * 1500	

# Adding Measurement point

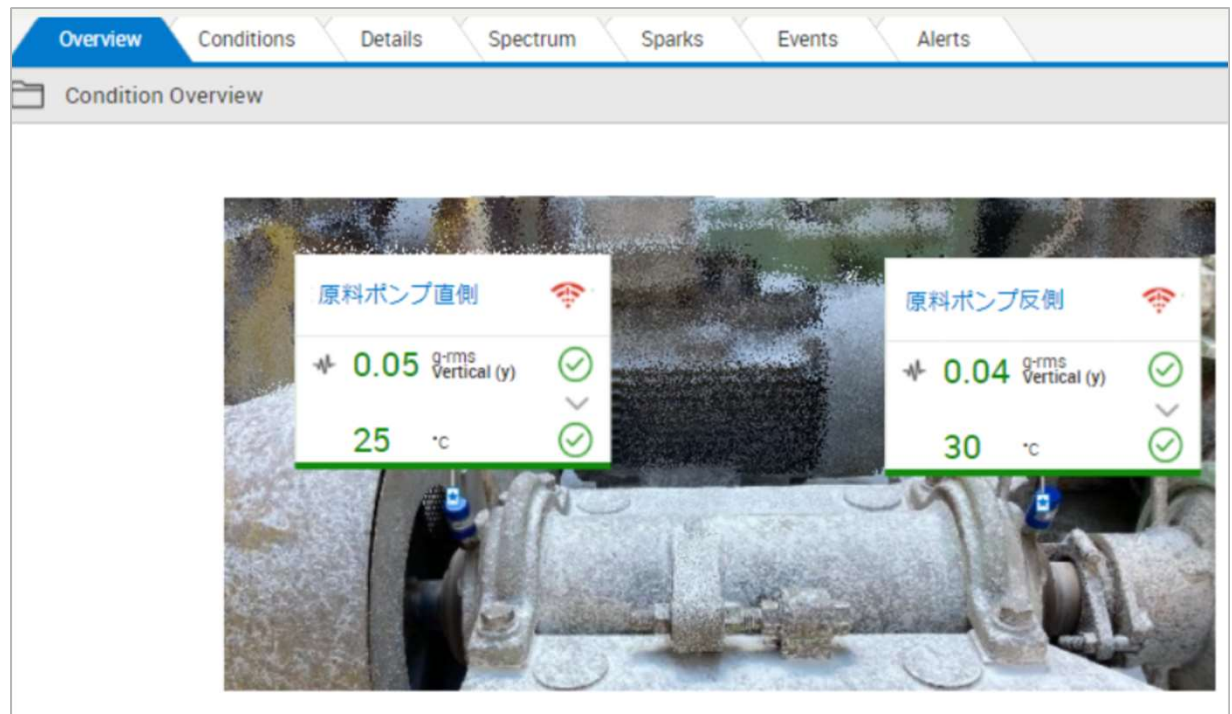
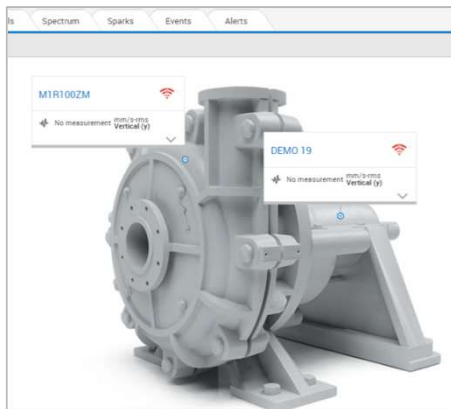
- ZARK X8/X8II
- ZARK Nano
- ZARK





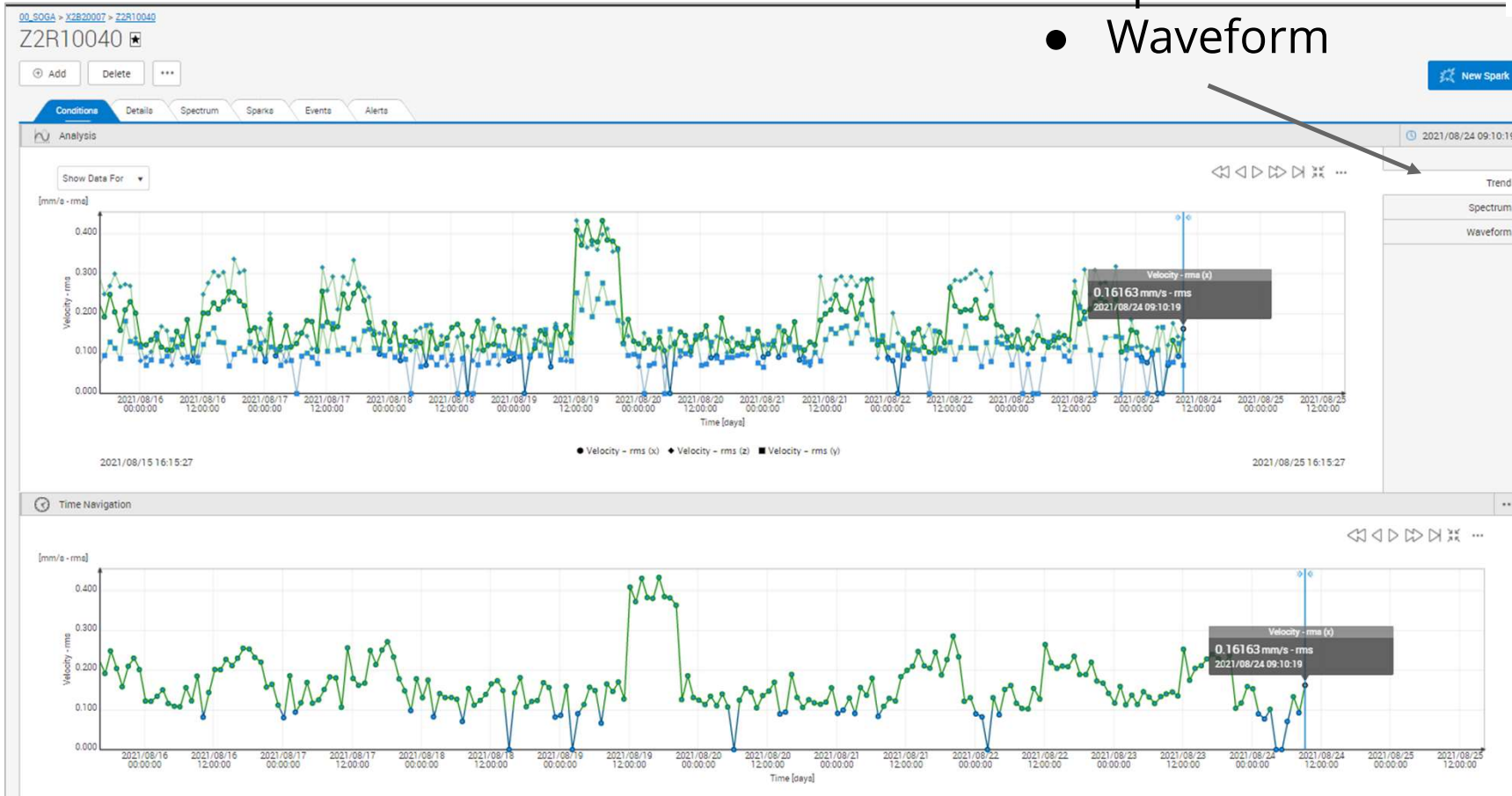
# Measurement Point: Basic data collection unit

- ZARK Nano
- ZARK
- ZARK X8(II) sensor Channel



# Measurement Point: Trend

- Trend
- Spectrum
- Waveform

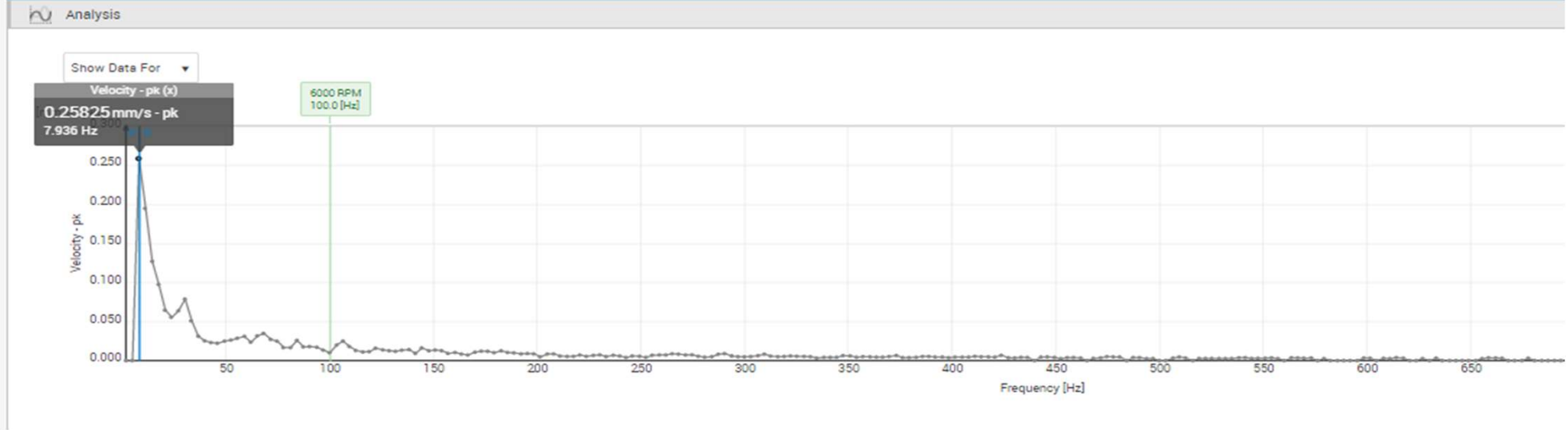


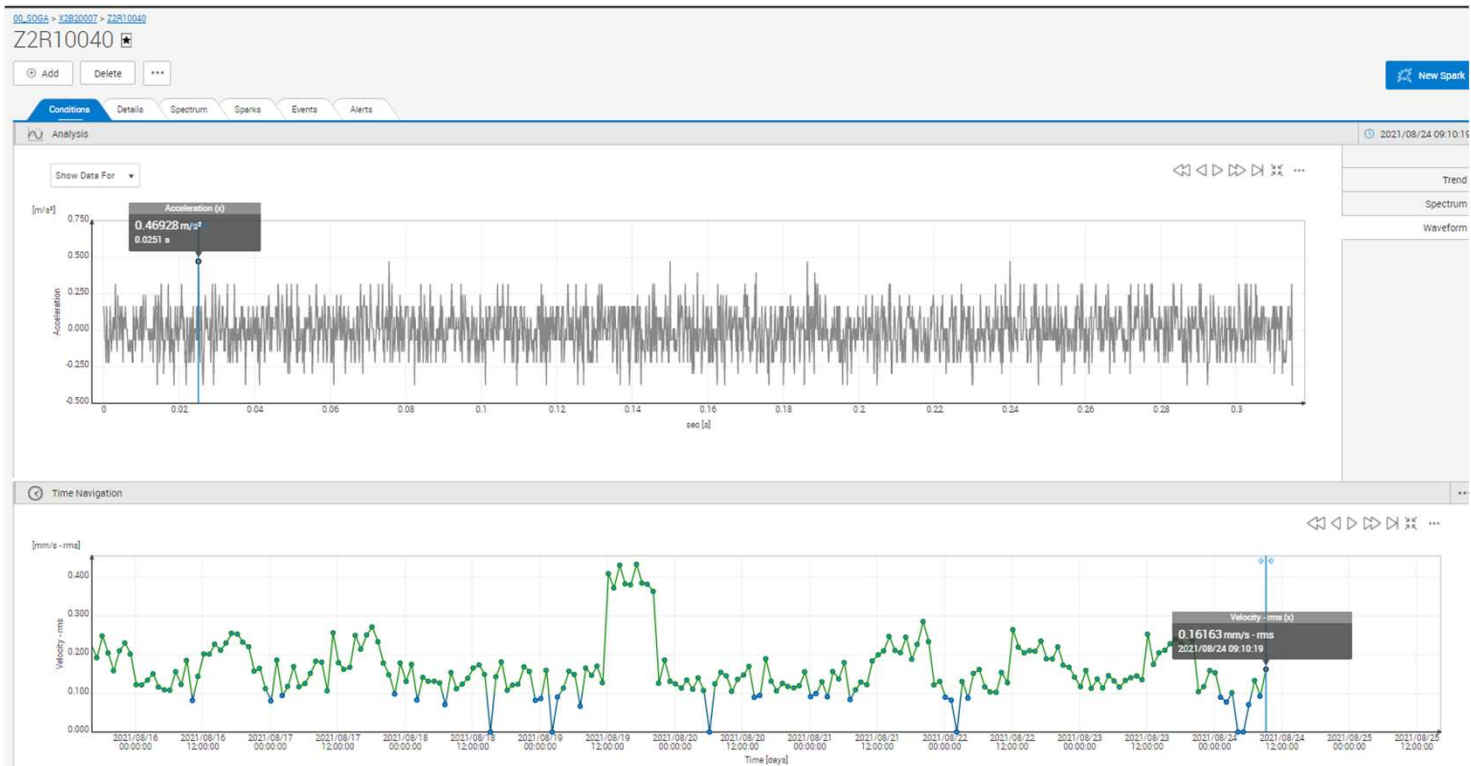
00\_SOGA > X2B20007 > Z2R10040

# Z2R10040

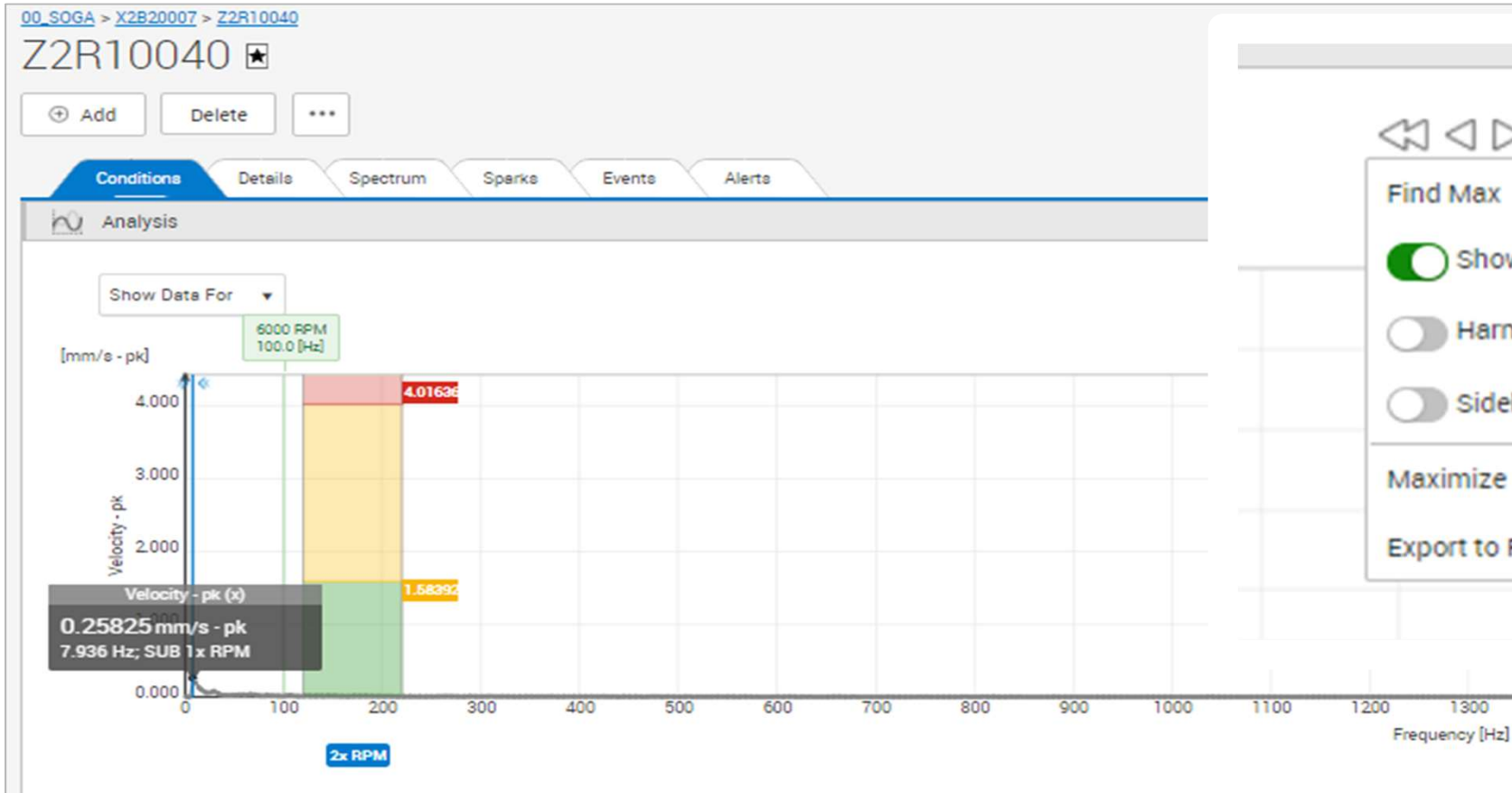
⊕ Add   Delete   ⋮

Conditions   Details   Spectrum   Sparks   Events   Alerts

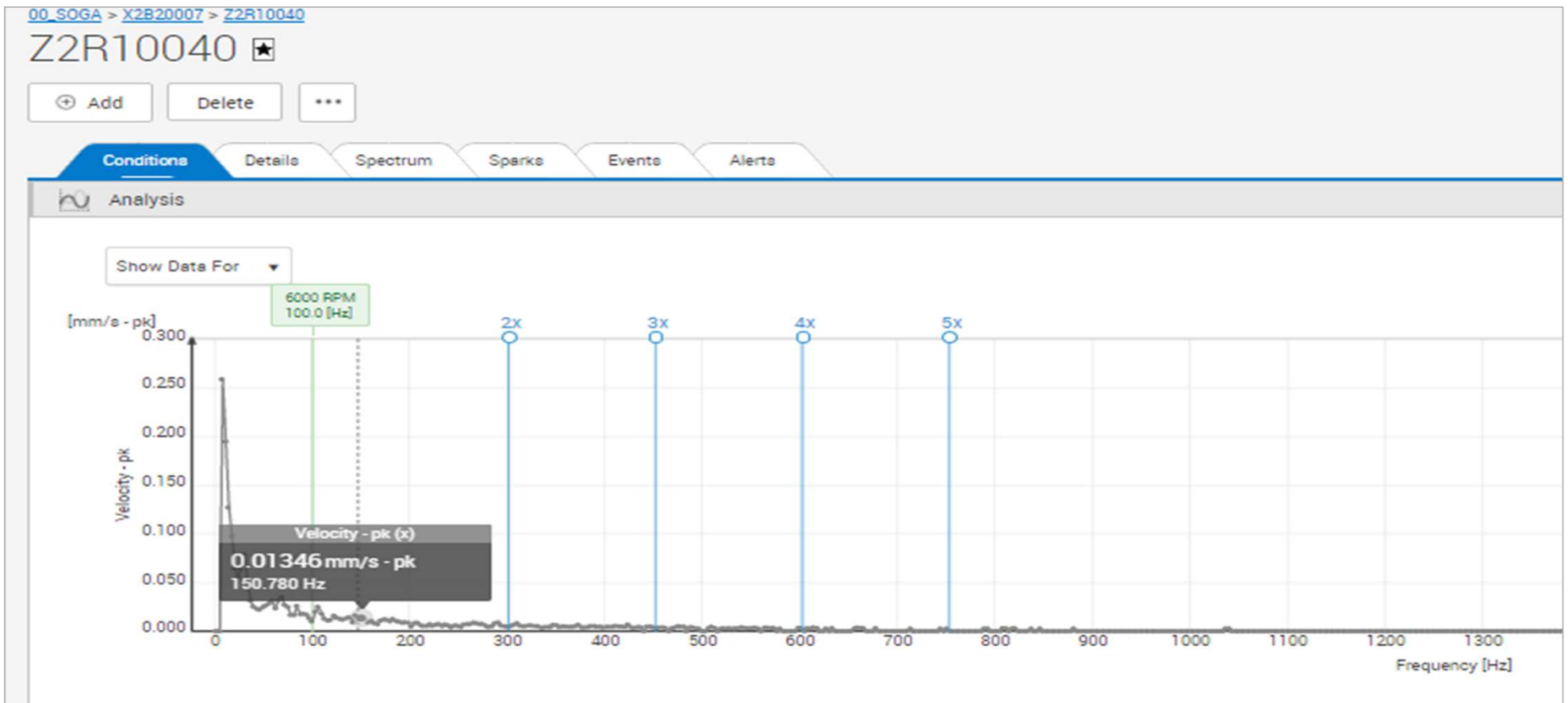




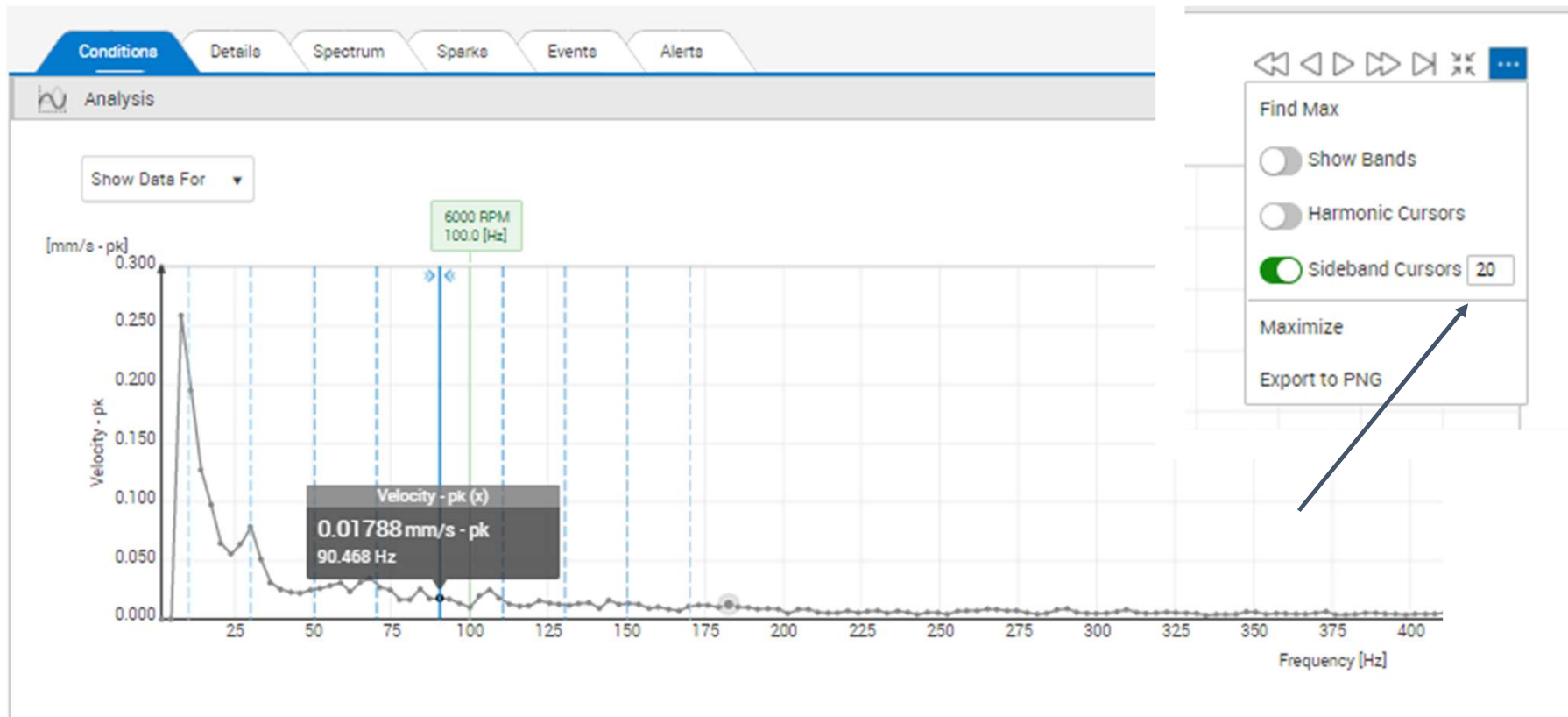
# Measurement Point: Spectrum band display



# Measurement Point: Spectrum Harmonic Cursors



# Measurement Point: Spectrum Sideband Cursors



# Spectrum band setting

- 1X, 2X, 3X, 4X, Over 1X, Sub 1X

	Lower Frequency Limit	Upper Frequency Limit	
CIV 1x RPM Band - Velocity Spectrum - max pk	0.8	1.2	<input checked="" type="checkbox"/> Relative
CIV 2x RPM Band - Velocity Spectrum - max pk	1.2	2.2	<input checked="" type="checkbox"/> Relative
CIV 3x RPM Band - Velocity Spectrum - max pk	2.2	3.2	<input checked="" type="checkbox"/> Relative
CIV 4x RPM Band - Velocity Spectrum - max pk	3.2	4.4	<input checked="" type="checkbox"/> Relative
CIV Sub 1x RPM Band - Velocity Spectrum - rss	0.0	0.8	<input checked="" type="checkbox"/> Relative
CIV Over 1x RPM Band - Velocity Spectrum - rss	1.2		<input checked="" type="checkbox"/> Relative



# Measurement Point: Alarm setting

- Machine Operating Condition
  - Off
  - Good
  - Warning
  - Alarm
- ZARK Nano
  - All 3 axis setting

Conditions Details Spectrum Sparks Events Alerts

Measurement Point Thresholds Configuration

Currently the custom set threshold values are used in the Machine Dossier.  
Any modification within the Measurement Configuration will result in the custom set threshold values being overwritten.

### Velocity - rms

Operating Condition	Horizontal (x)	Vertical (y)	Axial (z)
Off	0,0 mm/s - rms	0,0 mm/s - rms	0,0 mm/s - rms
Good Threshold	0,1 mm/s - rms	0,1 mm/s - rms	0,1 mm/s - rms
Warning Threshold	2,8 mm/s - rms	2,8 mm/s - rms	2,8 mm/s - rms
Alarm Threshold	7,1 mm/s - rms	7,1 mm/s - rms	7,1 mm/s - rms

### Velocity - cal. pk

Operating Condition	Horizontal (x)	Vertical (y)	Axial (z)
Off	0,0 mm/s - cal. pk	0,0 mm/s - cal. pk	0,0 mm/s - cal. pk
Good Threshold	0,1 mm/s - cal. pk	0,1 mm/s - cal. pk	0,1 mm/s - cal. pk
Warning Threshold	4,0 mm/s - cal. pk	4,0 mm/s - cal. pk	4,0 mm/s - cal. pk
Alarm Threshold	10,0 mm/s - cal. pk	10,0 mm/s - cal. pk	10,0 mm/s - cal. pk

### Acceleration - rms

Operating Condition	Horizontal (x)	Vertical (y)	Axial (z)
Off	0,0 m/s <sup>2</sup> - rms	0,0 m/s <sup>2</sup> - rms	0,0 m/s <sup>2</sup> - rms
Good Threshold	0,0 m/s <sup>2</sup> - rms	0,0 m/s <sup>2</sup> - rms	0,0 m/s <sup>2</sup> - rms
Warning Threshold	500,0 m/s <sup>2</sup> - rms	500,0 m/s <sup>2</sup> - rms	500,0 m/s <sup>2</sup> - rms
Alarm Threshold	500,0 m/s <sup>2</sup> - rms	500,0 m/s <sup>2</sup> - rms	500,0 m/s <sup>2</sup> - rms



ISA Delhi Section



# Devices of the portal or business unit

- Location
- Battery status
- Communication status
- Condition status
- Last measurement
- Temperature
- Firmware version

Shinkawa Japan Demo Site BETA

ISA  
ISA Delhi Section

SHINKAWA

FORBES MARSHALL

New Spark

Details Sparks Events **Devices**

Devices Summary

<b>38</b> Device				<b>58</b> Measurement Point				<b>0</b> Alert in 24 Hours		<b>35</b> Action Required			
ZARK	X8	X8(II)	NANO	ZARK Ring	X8	X8(II)	NANO	WARNING	ALARM	High/Low Temperature	Low Battery	Communication Issue	Operating Condition
35	3	0	0	38	20	0	0	0	0	0	9	3	23

Devices List

Search for device, location or condition... Search

SN	Location	Battery	Communication	Last Measurement	Condition
Z1R100LO	処理水PUMP用MOTOR > 処理水PUMP用モーター振動(垂直方向)	! 🔋	📶	2019/09/27 14:52:25	! 🚫
Z1R1002L	A3 FAN MOTOR > MOTOR LOAD SIDE	! 🔋	📶	2019/07/27 14:45:50	✅

Device Details

**Z1R100LO** 📶

Location: 処理水PUMP用MOTOR > 処理水PUMP用モーター振動(垂直方向)

Battery: 0% 🔋

Device Temperature: 34°C 🌡️


Communication: 📶

Last Measurement: 2019/09/27 14:52:25 ! 🚫

# Organization Collective

- Team members for machine condition monitoring
- Notification setting

Personal Details



Location \* Japan / Hiroshima  
Account Status Active  
E-mail \* [redacted]@m  
Mobile +81 [redacted]

<b>0.0</b> ☆☆☆☆ RECOGNITION POINTS	MACHINE DOSSIER	SPARKS
1 year and 6 months		0

Summary

*Add Summary. Collective Members are more likely to reach out to members with an experience description.*

Company Address

Company	00_SOGA	Phone *	+81 [redacted]
Address *	Naka-ku	Fax	
City *	Hiroshima	WWW	
Zip Code *	7300811	E-mail	
Country *	Japan		

Recognition Points

Average score ☆☆☆☆☆ (0.0)  
*No Recognition Points have been granted yet.*

Notification Settings

	E-mail	SMS
Notify on Warning conditions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Notify on Alarm conditions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Notify on System events	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Watched dossier elements

X1B2B050

# Organization setting

- Timezone
- Unit
- Date format
- Login security level

Dossier Collective Sparks

[Shinkawa Japan Demo Site](#) > [Organization Settings](#)

## Organization Settings

Details

Units & Time

Security

### Units

Displayed Value	Unit *	Precision *	Example
Vibration Acceleration	m/s <sup>2</sup>	1	10.1 m/s <sup>2</sup>
Vibration Velocity	mm/s	1	10.1 mm/s
Vibration Displacement	μm	0	10 μm
Temperature	°C	0	10 °C
Frequency	Hz	1	10.1 Hz
Voltage	V	1	10.1 V
Strain	με	3	10.001 με
Speed	RPM	0	10 RPM

### Time

Time zone \* (GMT+09:00) Osaka, Sapporo, Tokyo

Date time format \* Japan - yyyy/MM/dd HH:mm:ss

# Sparks: Teamwork problem solving function

- Who raise the flag?
- When it happened?
- What's the issue?
- Latest status
- Location of the issue ( What machine)

Sparks

Sparks List

Filter results with ...

Occurrence Date	Key	Summary	Status	On Time	Dossier Node	Owner
2019/09/04 09:11:14	SPA-28	test	Closed		テスト機	Onishi Tetsuya

Summary\* test

Key\* SPA-28

Status\* Closed

Dossier Node\* テスト機

Spark Owner\* Onishi Tetsuya

Spark Team\* Onishi Tetsuya

Priority\* Normal

Occurrence Date\* 2019/09/04 09:11:14

Spark Start Date\* 2019/09/17 09:56:33

Spark End Date\* 2019/09/17 09:56:49

Description\* test

---

Spark Activities

Filter results with ...

- Onishi Tetsuya closed a SPA-28 Spark at 2019/09/17 09:56:49  
test
- Onishi Tetsuya resolved a SPA-28 Spark at 2019/09/17 09:56:33  
test
- Spark Start Date was updated from 2019/09/04 09:11:52 to 2019/09/17 09:56:33

# Sparks: Media data attachment

- Image
- File
- Video
- Audio

The screenshot shows a web application interface for managing media attachments. At the top, there is a breadcrumb trail: [00\\_SOGA](#) > [X2B20007](#) > [Z2R10040](#). Below this, the identifier **Z2R10040** is displayed with a star icon. A navigation bar contains tabs for **Details**, **Spectrum**, **Sparks** (which is active), **Events**, and **Alerts**. Above the tabs are three buttons: **Add** (highlighted in blue), **Delete**, and a three-dot menu icon. A dropdown menu is open from the **Add** button, listing four options: **Image** (with a camera icon), **File** (with a document icon), **Video** (with a video camera icon), and **Audio** (with a speaker icon). Below the navigation bar, there is a section titled **Point Sparks** with a search input field containing the text "Results with ...". At the bottom, a table header is visible with columns for **Date**, **Key**, and **Summary**. In the top right corner, there are logos for **ISA** (ISA Delhi Section), **SHINKAWA**, and **FORBES MARSHALL**.

Thank you !