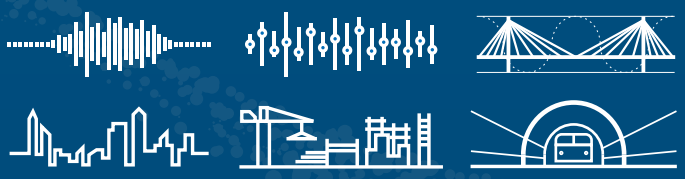
Sanlien Technology Corp.

Sanlien Technology

Comprehensive Environmental Monitoring Solutions



Be the frontier of environmental monitoring

Sanlien Technology

The heart of science is measurement.

- Erik Brynjolfsson, Stanford Professor

OUTLINE

PHILOSOPHY

Vision

Be the frontier of environmental monitoring

Mission

Be the Witness of Technology
Be the Historian of Industry

India / 2015 /
Panorama of Mussoorie mountain valley

About Us

As a young engineer, Mr.Lin left Taiwan Power Company and founded Sanlien Technology in 1967. Bringing with him his accumulated expertise and experience, Mr Lin's aimed to be at the frontier of environmental monitoring. With the increase frequency and intensity of natural disasters such as earthquakes, many types of structures need monitoring. Sanlien Technology is devoted to ensuring the safety and quality of human life for years to come.

For instance, we have developed Earthquake Early Warning System (EEWS) and Rapid Structural Health Diagnostic (RSHD) to help India and New Zealand provide early warnings; we have worked with academic in Taiwan to monitor the safety of bridges before catastrophic failure happens. At Sanlien Technology, we continuously develop new technology and work with more than 100 partners around the globe to help create a better world.

Milestones

1967

Sanlien Established

1971-1990

1980
Sanlien Kaohsiung Branch

1986
Taipei Headquarter
Office at Fushing South Road.

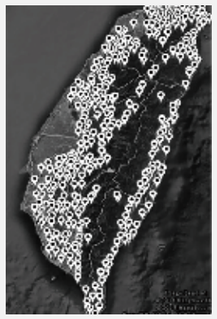
1988
Taichung Branch

1991-2000

1991
Taipei MRT Project
Undertook the safety monitoring of MRT Nangang and Xindian line.

1995
National Award of Outstanding SMEs
Received National Award of Enterprise from Small and Medium Enterprise Administration.

1996
TAF Linear Lab
Certified TAF Linear Calibration Laboratory.



1997
Kemitek Industrial
TAMA Chemical and Sanlien started joint venture project on building chemical factory that supply to semiconductor industry.

2001-2010

2003
Agnos Chemicals Singapore
Sanlien joint ventured with TAMA chemical to established Agnos Chemicals Singapore to supply to semiconductor industry.

2007
First EEWS in Taiwan
In collaboration with NTU professor Wu to create first-ever Earthquake Early Warning System in Taiwan

2009
Professor Wu 800 earthquake stations
Worked with Professional Wu from National Taiwan University and completed installation of Early Earthquake Warning System.

2011- Today

2015
Project of India
Cooperated with IIT, Roorkee to install EEWS

2017
Sanlien Technology celebrated its 50th Anniversary

2018
International Acquisition
OSMOS Group and Sanlien jointly acquired 100% shares of the SIAP+Micros Italy.

2019
Project of Nepal and Bhutan
Undertook Early Earthquake Warning System in Nepal, Bhutan, Philippines.

2023
Kinmen Bridge Monitoring, Taiwan
176 strain gauges deployed for stress and strain measurement on heavy-duty truck structure during load testing.

Project of Palau

Setting up a hybrid environmental monitoring system involves installing a hybrid data logger, rain gauge, seismic sensor.

Our Projects

Nepal

New Zealand

India

Indonesia

Our Projects

For decades, Sanlien has designed and developed real-time seismological network on both domestic and international level. Sanlien offers a turn-key seismic monitoring solution to people around the world.

To name a few, we have worked in India and New Zealand to provide early warning to prevent loss of human life and safeguard infrastructure.

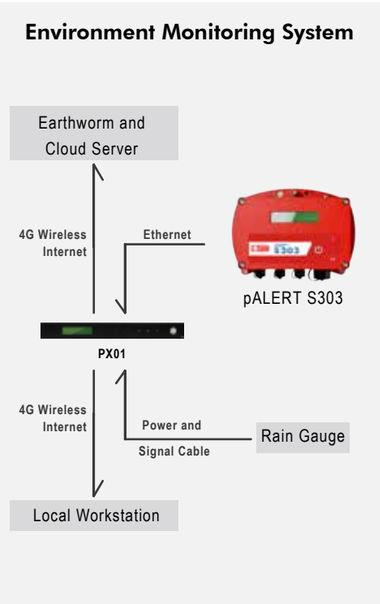
Introduction

Nepal is a South Asia country with a very diverse geography, including the world's tallest mountain, Mount Everest. Due to its geographic location, Nepal is prone to disasters such as earthquakes and floods.

We have helped the Nepal Center for Disaster Management (NCDM) to set up an Early Earthquake Warning System, with a precipitation and atmospheric sedimentation system between Cities of Kohalpur and Baijath. Our centralized data system has connected all 25 stations and uploaded data to NCDR cloud server simultaneously.

Unveiling Ceremony

Training Course

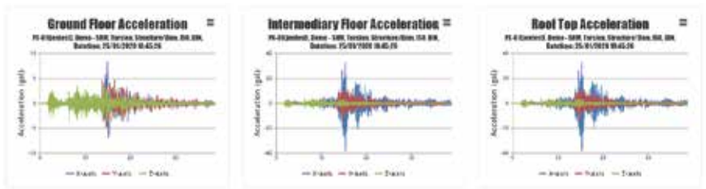


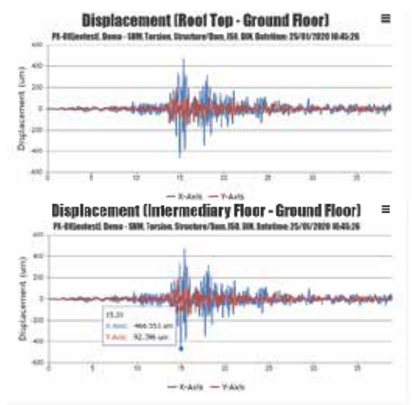
Equipments

Introduction

New Zealand is a country that relies on agriculture and tourism; earthquakes have always been nightmares to the local economy. In order to minimize the damages caused by earthquakes, Jenlogix and Sanlien have installed more than 160 stations for Wellington Water. The system is set for emergency control of the water gates as soon as earthquakes strike and shaking levels exceed their thresholds.

Monitoring of building integrity and safety have brought more attention to the public in New Zealand. By working with Sanlien to enhance the IoT service, Jenlogix is able to provide RSHD (Rapid Structural Health Diagnostics) cloud technology to issue warnings at the time when earthquakes damage structures. The 3-phase alert gives critical information for further actions whether the structures are damaged or not.

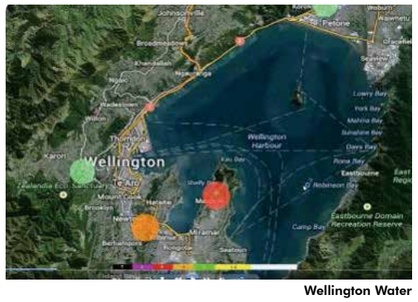




SHM

Hutt Valley Hospital

pALERT Server Systems



Wellington Water

Jenlogix in New Zealand

pALERT / pALERT S303 Units

- Hospitals
- KiwiRail
- Local Councils
- Meridian Energy
- Massey University
- Wellington Electricity
- Wellington Airport
- Wellington Water
- Utilities

Research group funded by the NZ Government Earthquake Commission (EQC)

- Jenlogix
- Massey University

Callaghan Innovation (Government tech incubator)

Jenlogix Earthworm Server

Jenlogix SMS Server

Joint Centre for Disaster Research, Massey University

SMS and Shakemaps — Alerts to customers

Rapid Alert — KiwiRail Alerting System

GeoNet — Government System run by GNS

Civil Defence

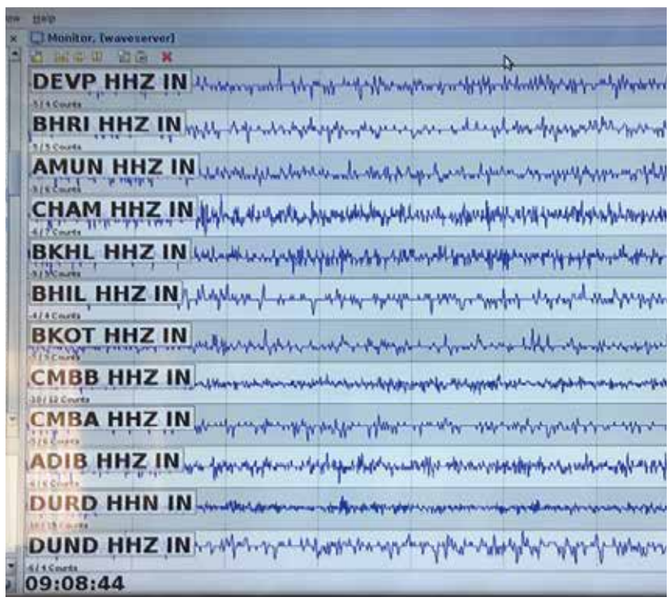
EQC

NZ Government

Introduction

Sanlien's involvement with India started in 2013 from a collaboration with the Indian Institute of Technology; the objective was to install seismic monitoring devices on the Indian Himalayas, near Roorkee. The project goal - to monitor tectonic plate movements between the Eurasian and Indian plates and to provide early warnings to Delhi residents, who reside 300-400km away should there be an earthquake. It was required to install around 200 units at 2,500m on the Himalayan ridge.

Although the project is primarily academic, with the involvement of the Indian Ministry of Earth Science, the system will provide residents of the Capital region with 60-90 seconds of warning.



Introduction

Despite heavy casualties suffered in the 2004 earthquake, Indonesia's earthquake detection systems were similar to Taiwan's Central Weather Bureau (CWB) before 2013 - devices that could pinpoint the areas but were not geared to provide public early warning.

In 2019, Indonesia's Agency for Meteorology Climatology and Geophysics (BMKG) agreed to purchase 200 units of Sanlien products for Indonesia's first ever earthquake early warning systems. Sanlien's product was very competitive price-wise, at one-fifth to one-tenth the price of other imported machinery ,and was in line with Indonesian expectations of spending relatively little to achieve their goals.

The units are installed at the Indonesian BMKG, primarily on Bali Island and the Western Java region, and Sanlien is still assisting with setting up the system, as well as testing and calibration. The project is expected to sell Indonesia up to 5,000-10,000 units.

INDUSTRIES

Industries

With profound experience in monitoring large-scale infrastructure projects around the globe, we continue to invest in research and development to help the world become a better place.

Earthquake Early Warning System

Structural Health Monitoring

Geotechnical Monitoring

Earthquake Early Warning System

Earthquake Early Warning System

Earthquake Early Warning System

Earthquake Early Warning System

Smartphone App:
Emergency text

Display:
Display earthquake information

Emergency Broadcasting System:
Broadcasts earthquake intensity information

Emergency Shutdown:
Emergency shutdown of elevators or other application

P-wave Onsite Earthquake Early Warning

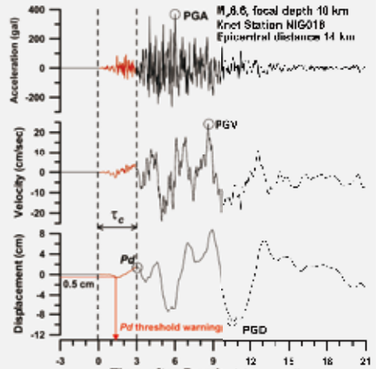
Emergency Shutdown

Before Earthquake

On-site Earthquake Early Warning P-wave Algorithm

pALERT S303, with embedded Earthquake Early Warning technology developed by Professor Wu Yih-Min from National Taiwan University, is capable of detecting P-waves of an earthquake, and to verify if a catastrophic earthquake is occurring using the P-arrival-3-second algorithm, thereby minimizing damage by sending out warning messages before S-waves arrive.

Onsite Early Warning	Regional Early Warning
3-second blind zone (approximately 12 km)	13-18 seconds blind zone (approximately 50-70 km)



Onsite Early Warning

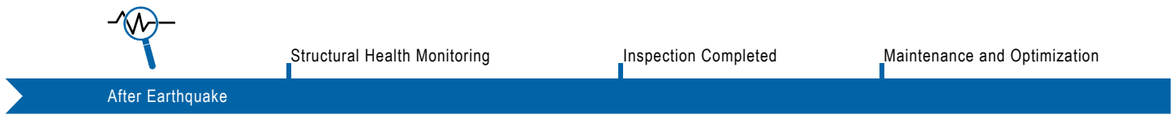
- P-wave early warning
- Device is at user locality
- Regardless of epicenter, magnitude and depth of earthquake
- P-wave 3s displacement
- pALERT S303 calculation
- Local intensity

Regional Early Warning

- Earthquake occurs at remote location
- Seismographs installed around epicenter
- Primary wave travels faster than seismic wave
- Epicenter, magnitude, depth
- Central computer calculation
- Attenuation formula for location/site effects
- Intensity estimation and countdown seconds

Advantages of Sanlien Technology's Earthquake Early Warning System

Because the calculations performed by the Central Weather Bureau's Regional Warnings (in Taiwan's case, as an example) take around 13-18 seconds, they cannot provide an early warning effect to areas within a distance of 50-70 km from the epicenter. This is where local monitoring and warning devices make a crucial difference. Sanlien Technology products provide regional and local early warning services, which shorten the blind zone from 70 km to 12 km.
They can also be automated (optional) through pairing with electronic facilities.

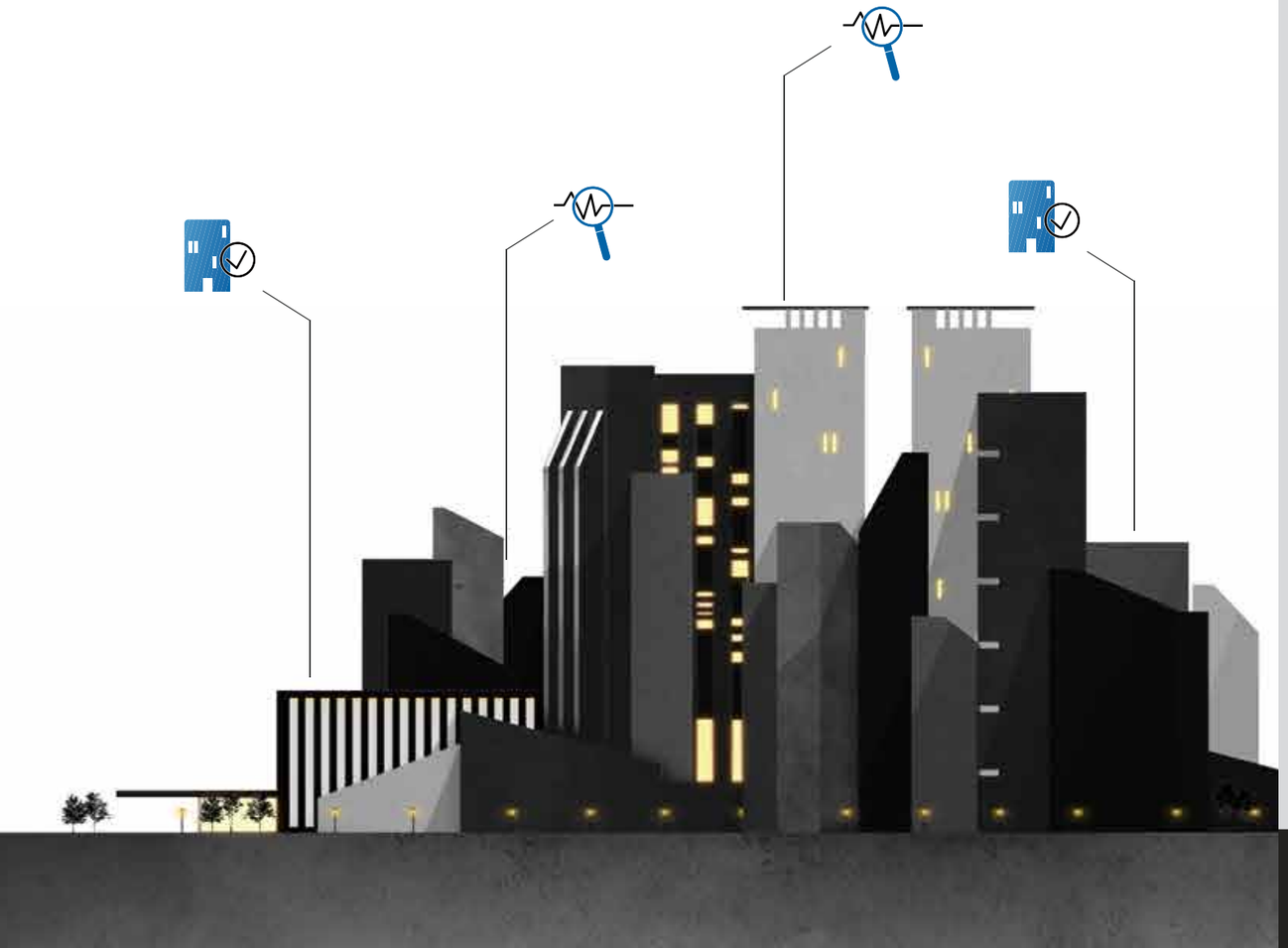


SHM
Structural Health Monitoring

Vibration monitoring and data collection

Real-time data upload and download

Safety of structure



Earthquake Early Warning System

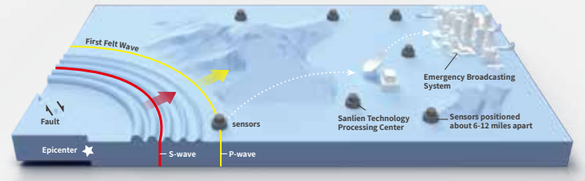
Every second counts. The Earthquake Early Warning System (EEWS) developed by Sanlien can detect earthquake before it arrives. The advance warning allows people to take action and escape from disasters.

Ethernet

CUBE

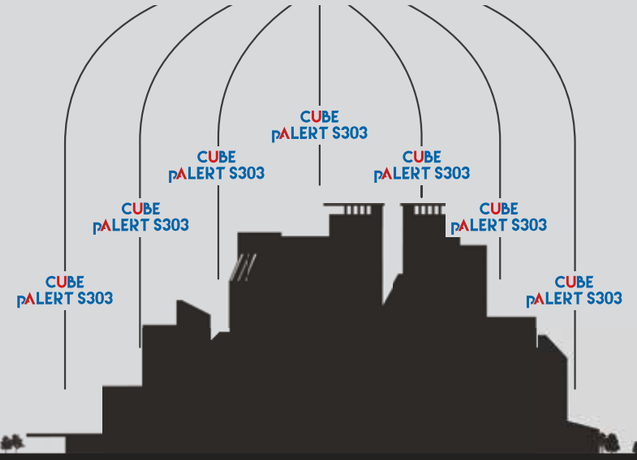
Ethernet

pALERT S303



Earthquake Early Warning System

Earthquake Early Warning System



Structural Health Monitoring

Bridge

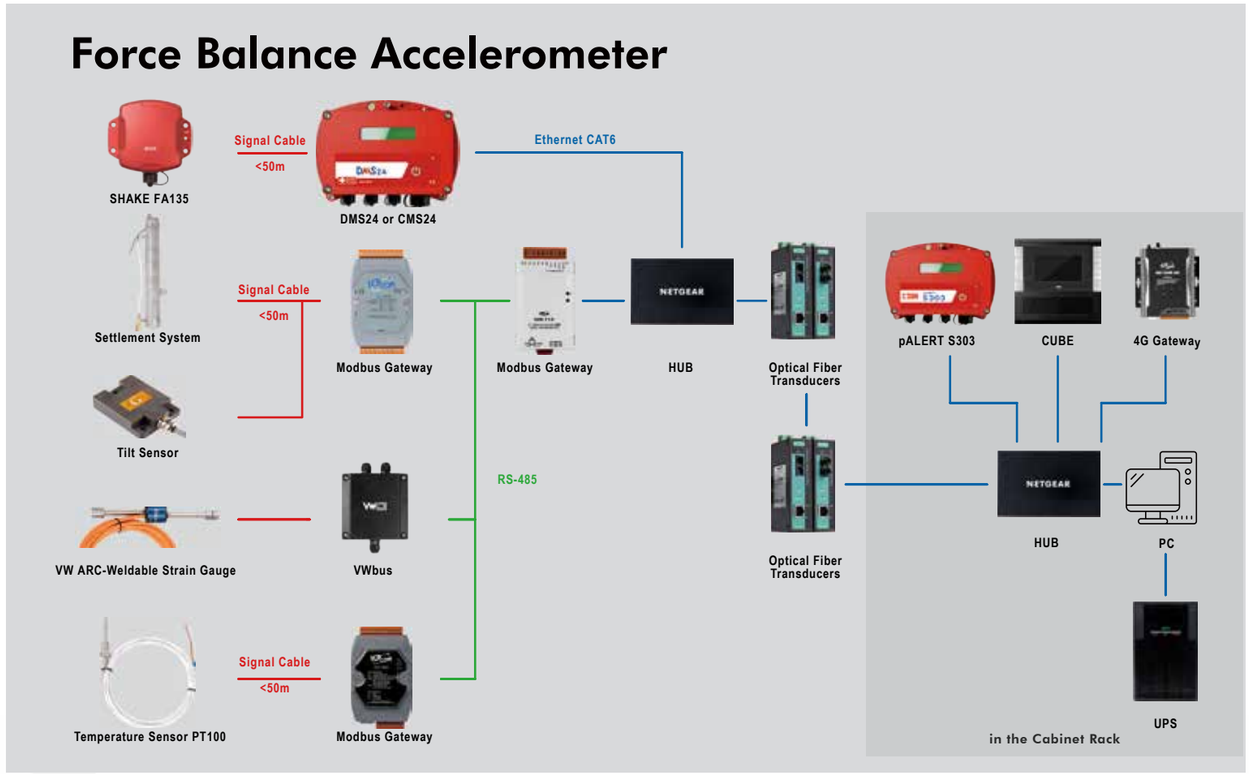
Building

Dam

Bridge

Bridges is an important part of the transportation system and represent major investment for government and society. Safety of bridges is a priority in maintaining the integrity of transportation system. The failure of bridges can lead to severe consequence.

The advancement of technology has enabled us to collect real-time data and has allowed for real-time assessment of data. Vibration measurement helps us to monitor and diagnose the health status of bridges; which allows us to prevent major failures before it happens.

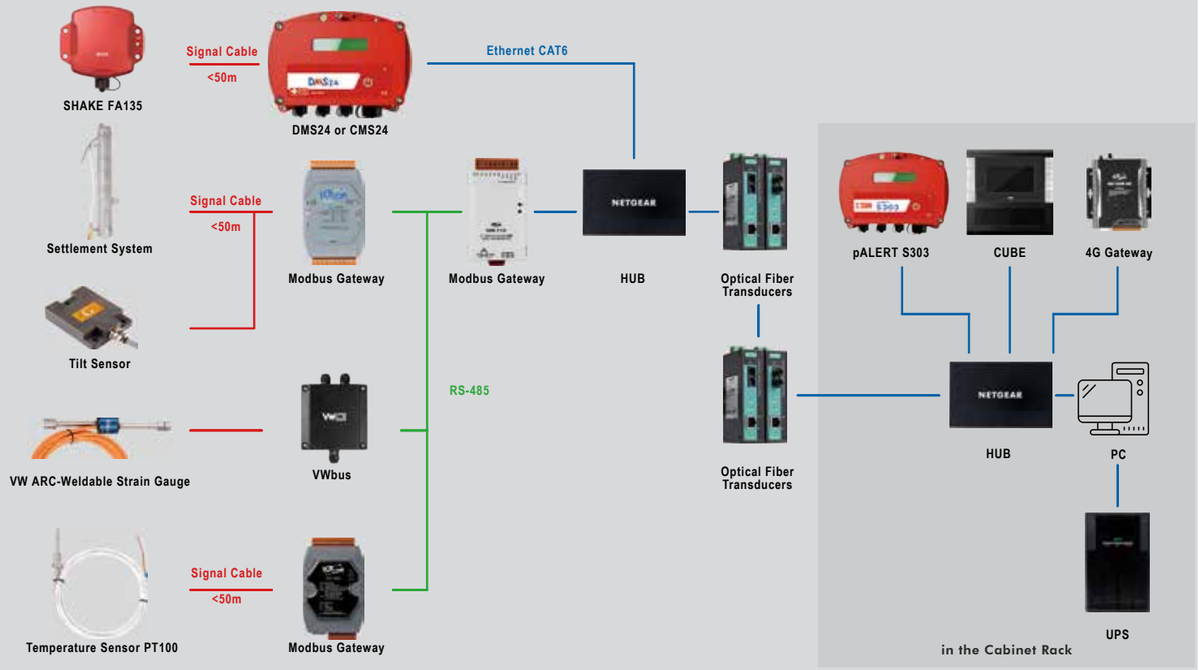


Prestressed Concrete Bridge

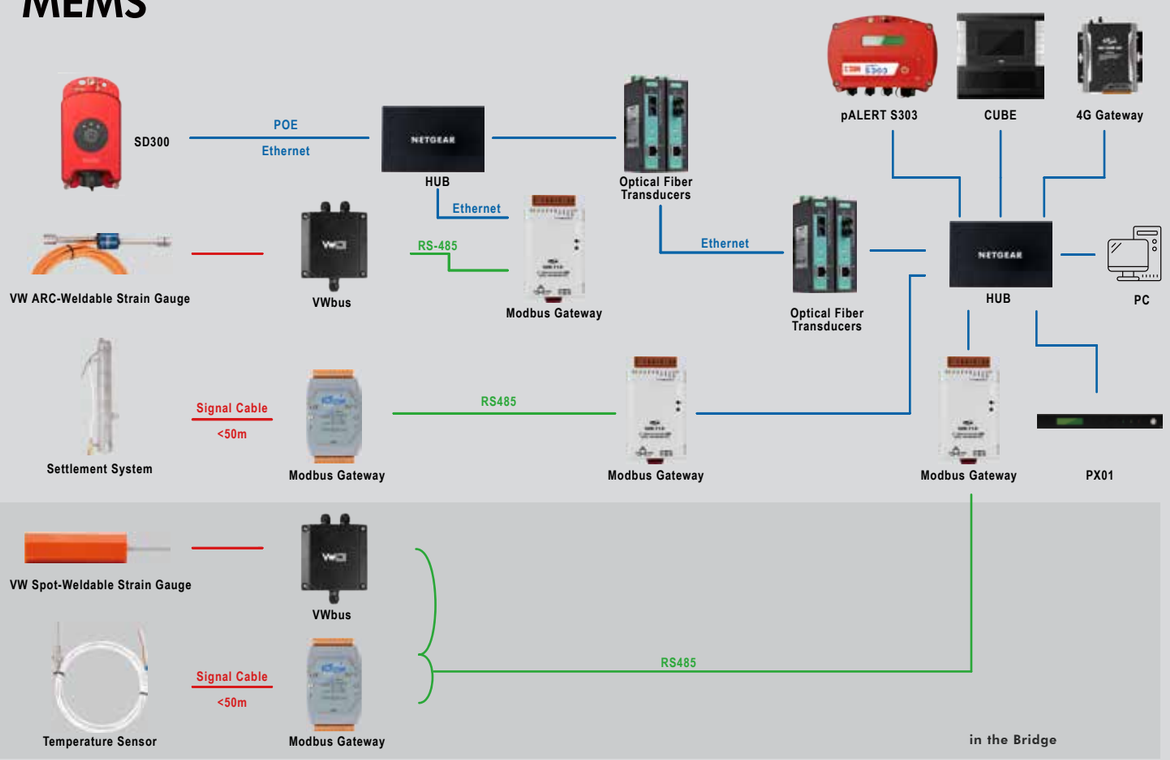
Signal Cable <50m Ethernet CAT6 or PoE Ethernet RS-485

Bridge

Force Balance Accelerometer



MEMS

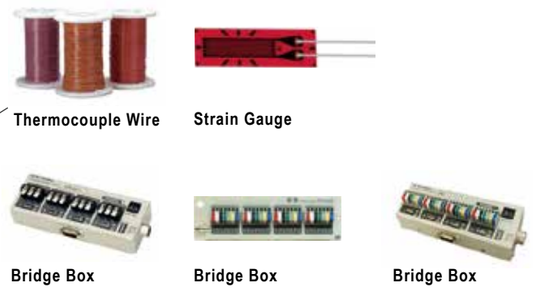


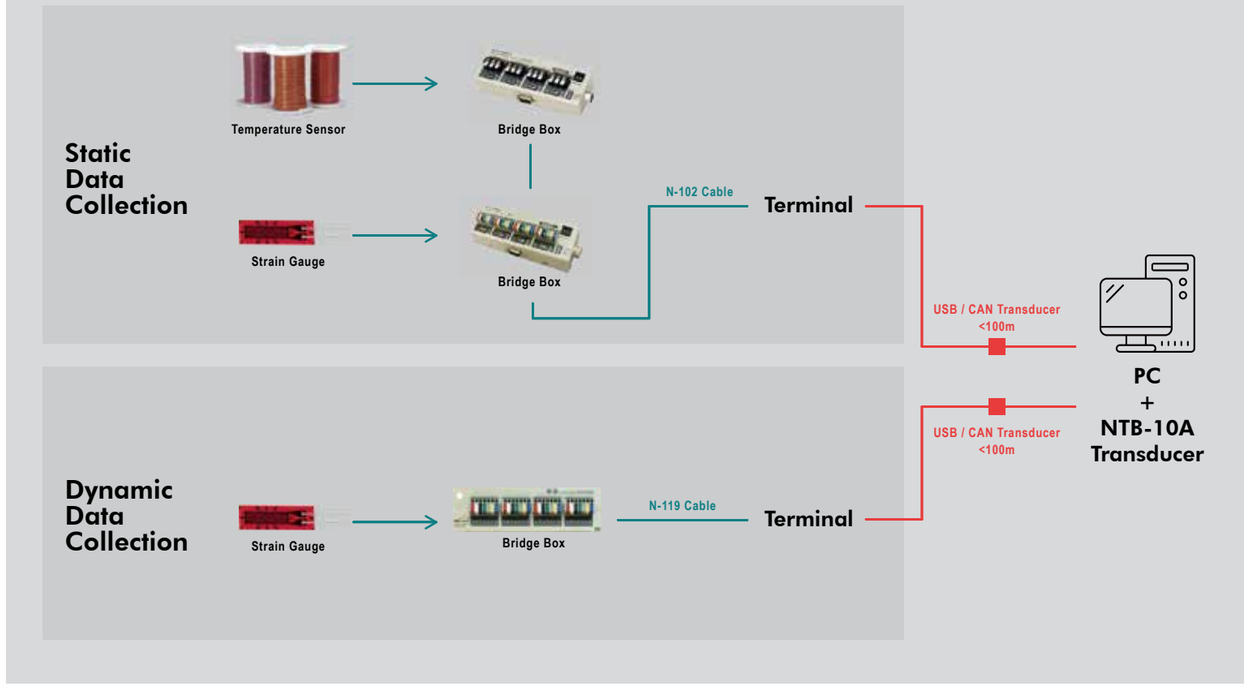
Bridge

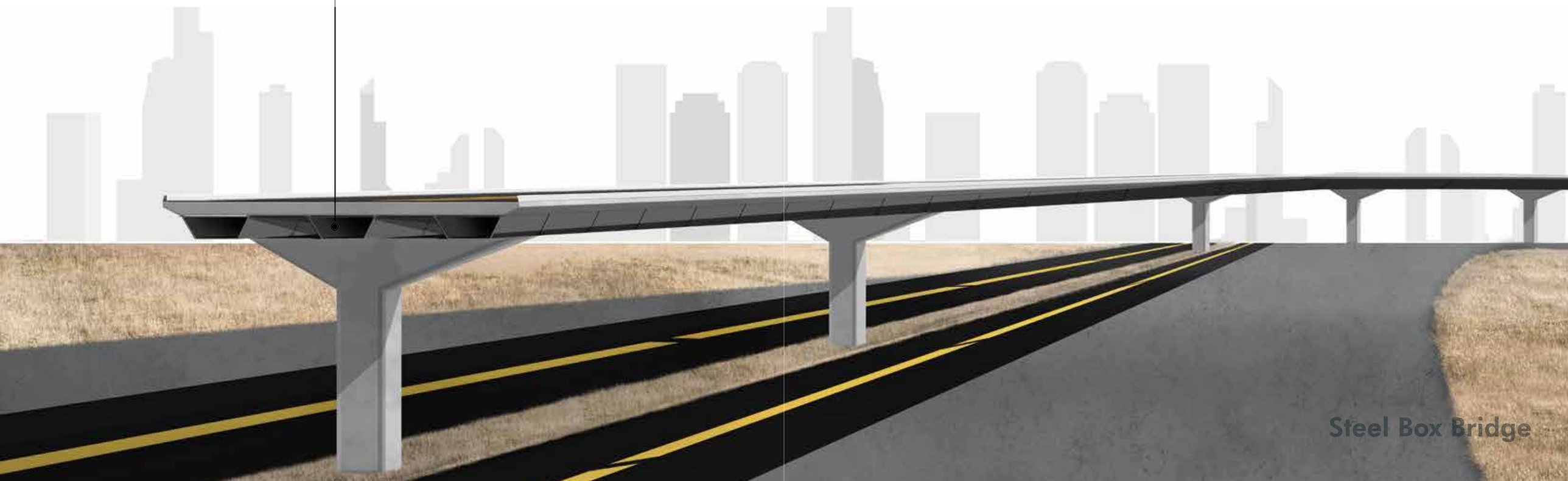
Strain Monitoring System

Bridge Cross-section View

● Strain Gauge

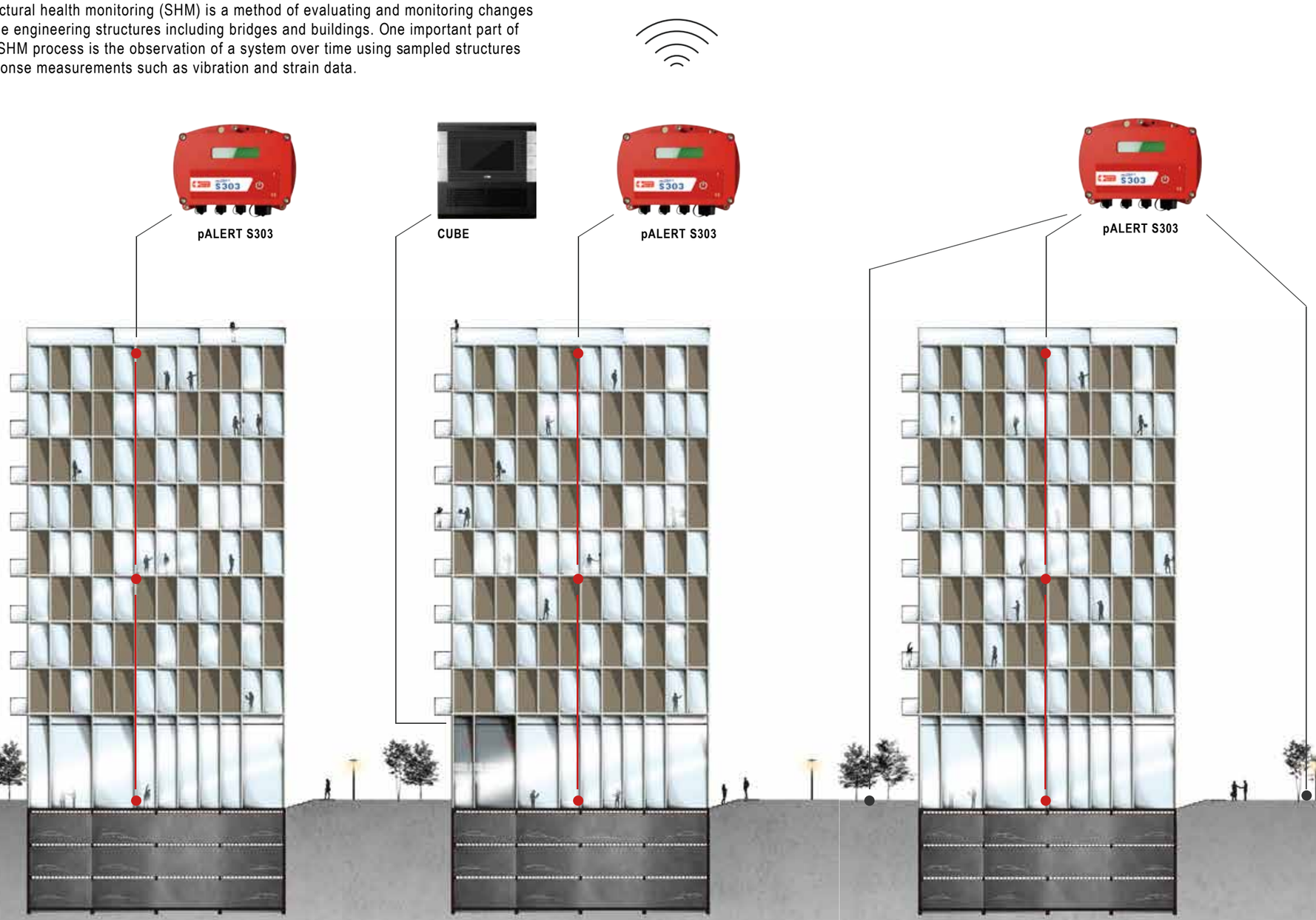






Building

Structural health monitoring (SHM) is a method of evaluating and monitoring changes to the engineering structures including bridges and buildings. One important part of the SHM process is the observation of a system over time using sampled structures response measurements such as vibration and strain data.



NB-IoT wireless transmission technology

VWdot

VWdot4

in the Residential Buildings

AA222/SHAKE FA335

SHAKE QD332

pALERT S303

pALERT Q332

in the Security Room

PX01

CUBE

Dam

The monitoring of static and dynamic behavior of a dam structure in real-time has become important because it affects not only the social and economic benefits but also safety of residents around the reservoir area.

Geotechnical

Slope (Landslide)

Vibration

Foundation Construction

Slope (Landslide)

Being at the frontier of environmental monitoring, we provide various monitoring equipment suited for landslide stability, water level, tilt, and stress deformation in order to provide faster response time. The use of NB-IoT network also provides real-time monitoring.

NB-IoT wireless transmission technology

Vibration

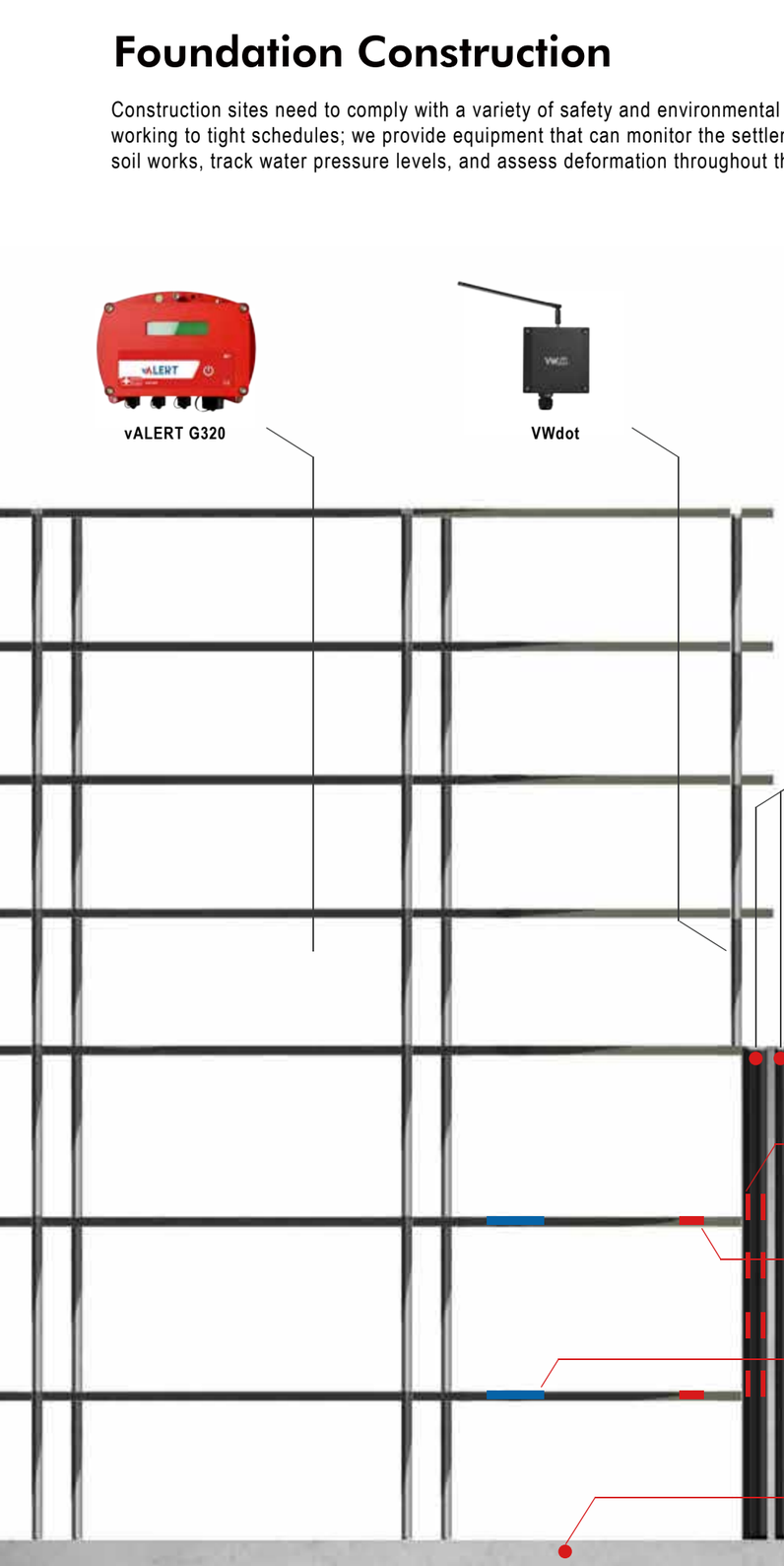
Vibration caused by construction can bring uncomfortableness to residents around. pALERT series embeds DIN and ISO standards that allow constructors to monitor and control construction vibration or noise levels to reduce the impact to human daily lives.

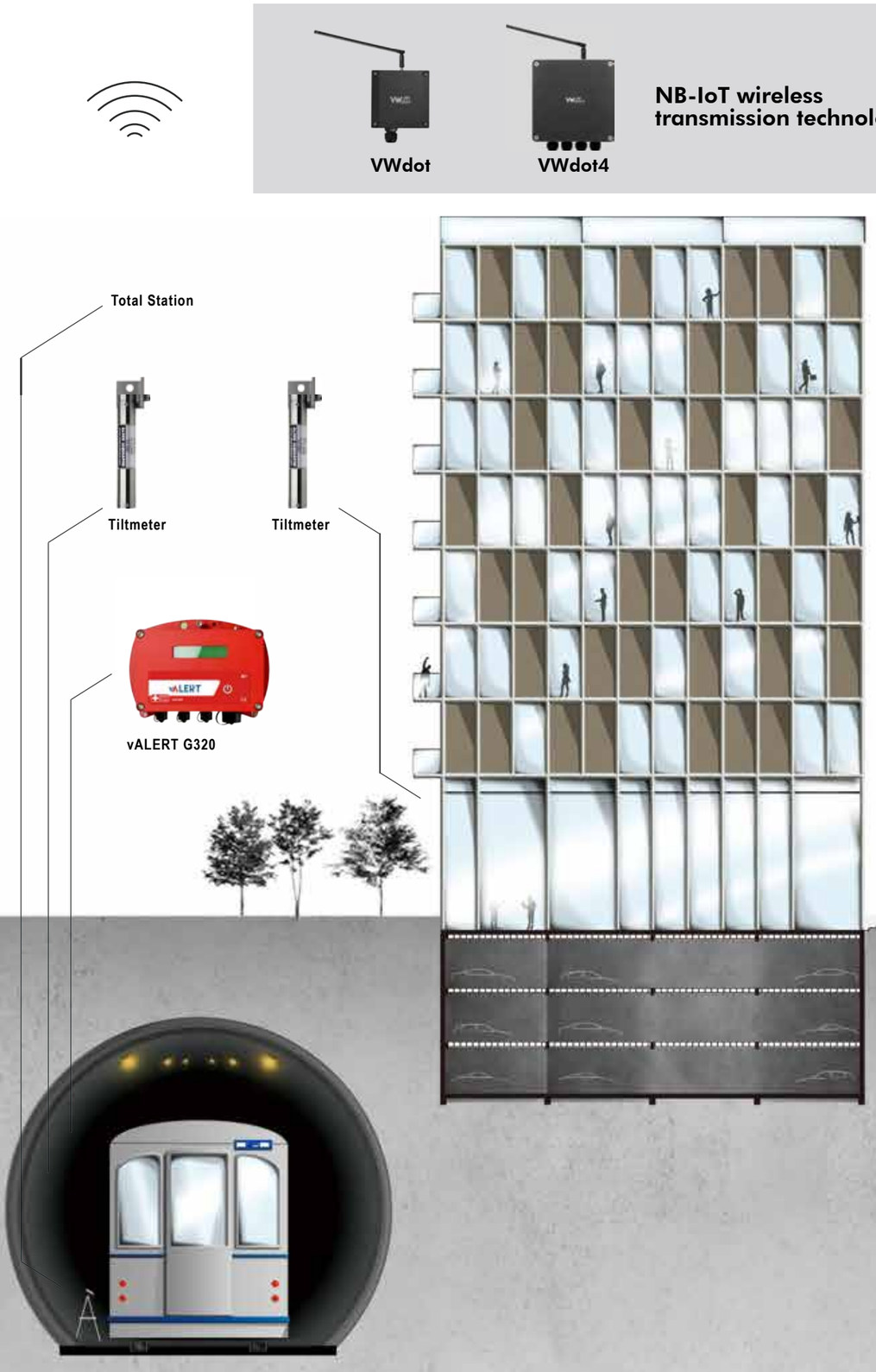
As cities are expanding

More rapid transit service routes are being built or in operation. The noise and vibration caused by trains can easily affect citizens' daily lives. The pALERT/vALERT series not only monitor the level of effect, but also the safety of tracks. With cloud services, warnings are sent via SMS, email, or APPs when danger happens

Foundation Construction

Construction sites need to comply with a variety of safety and environmental regulations while working to tight schedules; we provide equipment that can monitor the settlement process during soil works, track water pressure levels, and assess deformation throughout the construction phase.





NB-IoT wireless transmission technology

PRODUCTS

Products

Earthquakes and man-made vibration are two main types of environmental vibrations. Countries that are in seismic zones can all benefit from environment monitoring solutions.

Sensor

Data Acquisition System

Sensor

Vibration

SHAKE Series

SHAKE FA135
SHAKE FA335
SD300 QD332
SS300

pALERT Series

S303 Q332
F330

vALERT Series

G320

ADC Daisy Chain

DATUM EF410

Geotechnical

Solid Load Cell

VW Piezometer
VW Arc-Weldable Strain Gauge
VW Rebar Strain Gauge
VW Spot-Weldable Strain Gauge

Inclinometer Casing

SHAKE
FA135

SHAKE FA135 is a uni-axial force balance accelerometer designed for structural health on buildings or cable force measurement on steel-cord bridges. The lightweight and IP67 waterproof housing brings quick development on the surface of objects. The voltage outputs of SHAKE FA135 are compatible with digitizers manufactured by Sanlien or any other brands with easy integration.

Features

- Applicable to Various Recorders
- Voltage Output
- Waterproof IP67

Best Suited

- Steel Cord Vibration Monitoring
- Structural Vibration Monitoring
- Strong-motion Monitoring

Application

- ☑ 1. Bridge Safety & Cord Health
- ☑ 2. Short/Long-term Building Health
- ☑ 3. Earthquake Regional Array & Local Standalone Station

Specification — SHAKE FA135

Sensor Type	Uni-axial FBA
Measuring Range	±2 g
Dynamic Range	> 150 dB (from 0.1 Hz to 20 Hz with 2g full scale)
Bandwidth	DC ~ 100 Hz
Output	±10V fully differential
Sensitivity	5 V/g
Nonlinearity	<0.1%
Cross Axis Sensitivity	<0.5%
Power Supply	10 - 30 VDC
Power Consumption	50mA@12 VDC
Waterproof	IP67
Operating Temperature	-20 °C ~ 70 °C
Weight	611 g
Dimension (LxWxH)	109 x 88 x 54 mm

*All prices, features, and specifications are subject to change without prior notice.

SHAKE
FA335

SHAKE FA335 is a tri-axial force balance accelerometer suitable for bridge deck vibration monitoring. The high-dynamic resolution provides accurate data generated by micro-tremors, loading of heavy traffic, structural vibration as well as earthquakes. SHAKE FA335 can be also applied into high-rise building health and strong-motion monitoring. The voltage outputs of SHAKE FA335 are compatible with digitizers manufactured by Sanlien or any other brands with easy integration.

Features

- Applicable to Various Recorders
- Voltage Output
- Waterproof IP67

Best Suited

- Steel Cord Vibration Monitoring
- Structural Vibration Monitoring
- Strong-motion Monitoring

Application

- ☑ 1. Bridge Safety & Cord Health
- ☑ 2. Short/Long-term Building Health
- ☑ 3. Earthquake Regional Array & Local Standalone Station

Specification — SHAKE FA335

Sensor Type	Tri-axial FBA
Measuring Range	±2 g
Dynamic Range	> 150 dB (from 0.1 Hz to 20 Hz with 2g full scale)
Bandwidth	DC ~ 100 Hz
Output	±10V fully differential
Sensitivity	5 V/g
Nonlinearity	<0.1%
Cross Axis Sensitivity	<0.5%
Power Supply	10 - 30 VDC
Power Consumption	80mA@12 VDC
Waterproof	IP67
Operating Temperature	-20 °C ~ 70 °C
Weight	2.6 kg
Dimension (LxWxH)	158 x 145 x 74 mm

*All prices, features, and specifications are subject to change without prior notice.

SHAKE

SD300 QD332

SD300

QD332

SHAKE SD300/ SHAKE QD332 is a tri-axial MEMS digital accelerometer. SD300 embeds a MEMS sensor, while QD332 is equipped with quartz one. Both are designed for structural health diagnostics (SHD) and vibration monitoring. The IP67 waterproof enclosure allows it to be deployed in challenging outdoors. By advancing CPU capability, SD300/QD332 is superior in processing Real-time Data Stream. Multiple SD300/QD332 can be connected to a PX-01/PX-01 Cube, a data logger for real-time data recording and event forwarding, or by SanDAS software on a PC/laptop for waveform viewing and data recording. The algorithms in PX-01/PX-01 Cube provide first-hand structural stiffness or drift ratio values for evaluating the safety of structures after earthquakes. SanDAS offers modules for post-event analysis. The configuration of SD300/QD332 is accessible through its web interface. The user-friendly plug-n-play feature makes SD300/QD332 a flexible digital accelerometer in elevating risk management to structures, monitoring early-stage fatigues, and protecting residents and commuters.

Features

- Built-in Web GUI
- Waterproof IP67
- Time Synchronization via NTP
- SanDAS Software for Data Analysis
- Support Ethernet PoE for Plug-n-play
- Ideal for Building or Bridge Monitoring

Best Suited

- Structural Monitoring
- Vibration Monitoring
- Infrastructure Life-cycle Assessment

Application

- 1. Structural Health Monitoring (SHM)
- 2. Cable-stayed Bridge Monitoring

Specification

Specification	SD300	QD332
Sensor Type	Tri-axial MEMS Digital Accelerometer	Tri-axial QUARTZ MEMS Accelerometer
Measuring Range	±2 g, ±4 g (factory configured)	±2 g, ±4 g (factory configured)
Dynamic Range	100 dB	132 dB
Sample Rate	100 SPS, 200 SPS, 500 SPS, 1000 SPS	100 SPS, 200 SPS, 500 SPS, 1000 SPS
Self-Noise	22.5μg / √Hz	0.5μg / √Hz
Shock Resistance	5000 g (0.1 ms)	1000 g (0.2 ms)
Digital Resolution	24-bit	24-bit
Communications	RJ-45 PoE	RJ-45 PoE
LED Display	Power, status, link	Power, status, link
Mount Mode	Horizontal / vertical (adjustable with PX01)	Horizontal / vertical (adjustable with PX01)
System Configuration	Via web interface	Via web interface
Time Synchronization	NTP (Network Time Protocol)	NTP (Network Time Protocol)
Power Supply	PoE (Power over Ethernet,12VDC)	PoE (Power over Ethernet,12VDC)
Power Consumption	≦1 Watt	≦1 Watt
Operating Temperature	-20 °C ~ 70 °C	-20 °C ~ 70 °C
Relative Humidity	5% ~ 90% RH (Non-condensed)	5% ~ 90% RH (Non-condensed)
Waterpoof	IP67	IP67
Dimension (L x W x H)	137 x 75 x 55 mm	137 x 75 x 55 mm
Weight	550 g	660 g

*All prices, features, and specifications are subject to change without prior notice.

SHAKE

SS300

SHAKE SS300 is an advanced seismic switch with a tri-axial MEMS accelerometer to help with earthquake disaster mitigation. The unit has three sets of fully isolated mechanical relays. Using Modbus RTU communication, the device can be connected to other systems to activate emergency processes in the event of an earthquake. Equipped with a 100dB MEMS accelerometer and flash to store the last earthquake information, SHAKE SS300 two sets of DI inputs make set-up and use simple. The sampling rate of SHAKE SS300 is fixed at 200 SPS to ensure accurate data. Along with the low-pass filter, artificial vibration noise can be effectively filtered out. The dynamic offset allows SHAKE SS300 to be installed on the ground or wall. The three sets of relay can be activated through different settings, such as PGA, PGV and seismic intensity scales, including MMI, KMA, JMA, GBT and CWB standards. Users can also monitor, test or reset relays through Modbus RTU.

Features

- Support International Standard of Intensity Scale
- Modbus Protocol
- Dynamic Offset
- Datalogger with LCD Display of Real-time Parameters

Best Suited

- Seismic Hazard Control
- Emergency Shutdown

Application

- Safety Switch for Elevators
- Automatic Shutdown of Gas Valves or Pipelines
- Earthquake Protection of Production Lines

Specification

Specification	SHAKE SS300
Sensor Type	Tri-axial Accelerometer
Measuring Range	±2 g
Dynamic Range	100 dB
Sample Rate	200 SPS
Frequency Response	0.1 ~ 20 Hz
Self-Noise	22.5 ug / Hz^0.5
Shock Resistance	5000g 0.5ms
Digital Resolution	16-bit
Trigger Algorithm	PGA, PGV, STA/LTA
Communications	Modbus RTU (RS-485)
Number of Relays	3 (FormA/FormB)
Relay Active Mode	PGA, PGV, Seismic Intensity Scale
Contact Rating	0.3A @60VDC
Event Reset	Auto / Manual
Voltage	10 ~ 26 VDC
Power Consumption	1W @12VDC
Working Temperature	-10 °C ~ 60 °C
Weight	0.75 kg
Dimension (WxLxH)	153 x 117 x 54 mm

*All prices, features, and specifications are subject to change without prior notice.

pALERT S303 Q332

S303

Q332

pALERT S303 / pALERT Q332 is an advanced version of pALERT network accelerometer. It is reinforced in device protection to IP67,upgrading CUP computing speed, and increasing internal memory for waveform storage. pALERT S303 / pALERT Q332 embeds with Pd technology developed by Prof. Yih-Min Wu of National Taiwan University (NTU). Designed to reduce earthquake damages and by Pd technology, pALERT S303 / pALERT Q332 can determine a seismic event within 3 seconds after P waves are first captured and then issue warnings depending on that estimated S waves are devastating or not. pALERT S303 / pALERT Q332 provides three triggering algorithms: Pd, PGA, and STA/LTA. pALERT S303 / pALERT Q332 offers 10Hz, 20Hz and 40Hz low pass filters which are user configurable to filter out high-frequent noise generated by non-seismic vibrations. In addition, the conventional STA/LTA algorithm is available in pALERT S303 / pALERT Q332, too. Intensity scales for MMI US, KMA Korea, JMA Japan, CWB Taiwan, and CEA China are available for displaying upon users' configuration. The event information is stored and ready for acquiring from pALERT S303 / pALERT Q332 , e.g. triggering time, maximum intensity, PGA in each component and 3-component acceleration in vector. pALERT S303 / pALERT Q332 is also equipped with an RTC synchronized by NTP or GPS. The powerful networking capability features streaming real time data to two servers automatically for acting as a front-end device for earthquake early warnings and executing emergency shutdown procedures to vital equipment.

Features

- Built-in Back Up Power (18650 Battery)
- Bulit-in Web GUI
- Edge Computing Capability
- Modbus Protocol
- Time Synchronization via NTP or GPS
- Support International Standard of Intensity Scale

Best Suited

- Residential Buildings
- Factories and Plants
- Schools and Public Facilities

Application

1. Seismic Monitoring Array
2. Industrial Disaster Prevention
3. Earthquake Early Warning (EEW)
4. Rapid Structural Health Diagnostic (RSHD)

Specification

Specification	pALERT S303	pALERT Q332
Sensor Type	Tri-axial MEMS Accelerometer Optional: 4th-axial vertical Geophone (built-in / externally)	Tri-axial QUARTZ MEMS Accelerometer Optional: 4th-axial vertical Geophone (built-in / externally)
Measuring Range	±2 g, ±4 g (customized)	±1 g, ±2 g, ±4 g, ±15 g
Dynamic Range	> 100 dB	>132 dB
Sample Rate	100 SPS, 200 SPS, 500 SPS, 1000 SPS (configurable)	100 SPS, 200 SPS, 500 SPS, 1000 SPS (configurable)
Frequency Response	0.05 ~ 40 Hz (with 10 Hz / 20 Hz / 40 Hz digital filters)	DC - 460Hz
ADC	4 channels @24-bit	4 channels @24-bit
Trigger Algorithm	Pd, PGA, STA / LTA	Pd, PGA, STA / LTA
Data Format	CSV / miniSEED	CSV / miniSEED
RTC Accuracy	±60 sec/year, supporting NTP synchronization. Optional: GPS model available upon request	±60 sec/year, supporting NTP synchronization. Optional: GPS model available upon request
LED Display	LED 2 lines x 20 characters	LED 2 lines x 20 characters
Storage	16GB microSD Card (expandable)	16GB microSD Card (expandable)
Power Supply	10 ~ 30 VDC	10 ~ 30 VDC
Power Consumption	2W@12 VDC	2W@12 VDC
Operating Temperature	-20°C ~ 70°C	-20 °C ~ 70 °C
Waterpoof	IP67	IP67
Dimension (L x W x H)	205 x 160 x 80 mm	205 x 160 x 80 mm
Weight	1.8 kg	1.8 kg

*All prices, features, and specifications are subject to change without prior notice.

pALERT F330

pALERT F330 is the latest model of Sanlien vibration family and complied USGS Class A force balance accelerograph standard. Joining MEMS and Quartz sensor technology, pALERT F330 embeds a tri-axial force balance accelerometer with a new designed 24-bit digitizer, elevating its performance to better than 130dB. pALERT F330 inherits the features from pALERT family, such as Pd algorithm for on-site early warning, along with PGA and STA/LTA trigger modes to capture natural vibration signals. pALERT F330 also keeps AUX port for direct control signal output for industrial usage on disaster mitigation. Besides being a scientific instruments, pALERT F330 can play significant roles for emergency shutdown, structural monitoring, or national seismic observation. Modbus streaming and Seedlink protocol are both available in pALERT F330. Recording data formats can be opted in CSV or miniSEED. International intensity standards are supported in pALERT F330 for real-time display on its LCD screen, including MMI US, KMA Korea, JMA Japan, CWB Taiwan, and CEA China.

Along with SanDAS (Sanlien Data Acquisition Software) software, pALERT F330 is an ideal strong-motion accelerograph for regional array in seismic observation, bridge or dam integrity monitoring, and building damage assessments.

Features

- Edge Computing Capability
- High Dynamic Range (>130dB)
- Event Recording & Continuous Recording
- SeedLink Protocol
- Pd Algorithm
- Modbus Protocol

Best Suited

- Seismic Hazard Control
- Vibration Monitoring
- Infrastructure Life-cycle Assessment

Application

1. Earth Early Warning (EEW)
2. Structural Health Monitoring (SHM)
3. Bridge and Dam Monitoring
4. National Strong-motion Array

Specification

Specification	pALERT F330
Sensor Type	Tri-axial Force Balance Accelerometer
Trigger Algorithm	Pd, PGA, STA / LTA
Measuring Range	±2g, ±4g (Selectable)
Bandwidth	DC ~ 200 Hz
Instrument Noise (USGS CPSD method)	> 130 dB (above 1 Hz with ±2g full scale) > 124 dB (above 1 Hz with ±4g full scale)
Instrument Noise (RMS Dynamic Range)	> 135 dB (Full Scale RMS sine wave to RMS noise, 0.01--500Hz band)
Sampling Rate	100 SPS, 200 SPS, 500 SPS, 1000 SPS (With Anti-Aliasing LPF)
Embedded Filter	LPF, HPF
Resolution	24-bit
Data Format	CSV / miniSEED
Storage	32GB microSD Card (Expandable)
Time Synchronization	NTP (GPS model available upon request)
Display	OLED (2 lines x 20 characters)
Power Supply	10 - 30 VDC
Power Consumption	3W
Operating Temperature	-20 °C ~ 75 °C
Waterproof	IP67
Dimension (L x W x H)	210 x 175 x 113 mm

*All prices, features, and specifications are subject to change without prior notice.

vALERT G320

vALERT G320 is a 24-bit velocity sensor designed for vibration applications in construction or structural health. Its built-in geophone sensors are at a high dynamic range of 130dB. The IP67 protection allows users to apply it to vibration research applications, as well as geological surveys.

vALERT G320 provides DIN4150-3 German vibration standard which is able to perform on-site calculation and give instant reports with its edge computing capability. vALERT G320 has an open platform for those who have established self vibration algorithms but have had hard time finding a suitable hardware to put into practice. vALERT G320 supports cloud service – G320 Cloud, by which users have easy and quick accesses to upload or download data remotely.

vALERT G320 also comes in a 4G model that makes on-site transmission to be more convenient and easier.

Features

- Built-in or External Geophone Sensors
- DIN-4150-3
- Open Platform
- On-site Calculation and Cloud Services
- Edge Computing Capability
- 4G Mobile Communication

Best Suited

- Manufacturing Factories
- Residential Buildings
- Vibration Monitoring of Tunnel Structures
- Adjacent and Neighboring during construction works

Application

- Construction Site Vibration Monitoring
- Structural Health Monitoring (SHM)
- Microtremor Assessments for Sensitive Structures
- Geological Survey

Specification — vALERT G320

Sensor Type	Tri-axial geophone (built in or externally connected)
Measuring Range	28.8 V/m/s ±7.5%
Dynamic Range	130 dB
Sample Rate	100 SPS, 200 SPS, 500 SPS, 1,000 SPS
Frequency Response	1 ~ 500Hz
ADC	3-channel @ 24-bit
Algorithm	DIN 4150-3
Time Synchronization	NTP or GPS
Output	Ethernet, Compatible with Modbus Protocol (RTU or TCP / IP)
Built-in Watch Dog Function	±10s
Network Module	10/100 Base -TX Ethernet Controller
LCD Display	2 x Lines & 2 x Characters
CPU	ARM1176JZF-S 700 MHz
Storage	16 GB Micro SD Card (expandable)
Power Supply	12 ~ 30 VDC
Power Consumption	3W @ 12 VDC
Operating Temperature	-20 °C to 70 °C
Waterpoof	IP67
Dimension (L x W x H)	217 x 168 x 80 mm

*All prices, features, and specifications are subject to change without prior notice.

DATUM EF410

DATUM EF410 is a distributed digitizer adopting EtherCAT (Ethernet for Control Automation Technology) technology. The daisy chain design of DATUM EF410 allows on-site cable-saving for long-span infrastructures, such as bridges or reservoirs. Along with high signal to noise performance, DATUM EF410 is capable of integrating with high dynamic-range force balance accelerometers (FBAs).

EtherCAT is also ideal for distributed time synchronization, fulfilling low drifting accuracy (≤ 1 μs). The precision of time synchronization is mandatory for Structural Health Monitoring algorithms to be achieved in the on-site systems. Pairing with SanDAS (Sanlien Data Acquisition Software), it is able to display and record streaming data in real time and perform signal processing algorithms. More product specifications and site applications will be launched soon.

Features

- Daisy Chain with EtherCAT Transmission
- Distributed Clocks, Accuracy < 1μs
- >135 dB — High Dynamic Range (RMS)
- Waterproof IP67

Best Suited

- Accurate Synchronization Systems
- Long-Span Structures
- Dam Monitoring

Application

- 1. Cable-stayed Bridge Monitoring
- 2. Structural Health Monitoring (SHM)
- 3. Dam Monitoring
- 4. Integrated Geotechnical Monitoring

Specification — DATUM EF410

Application	Best for FBA sensor
Measuring Range	±10 V
Bandwidth	DC - 500 Hz
Instrument Noise (RMSDynamic Range)	>135 dB (Full Scale RMS sine wave to RMS noise, 0.01 - 500 Hz band)
Instrument Noise (USGS CPSD method)	>130 dB (above 1 Hz with 5 V full scale) >124 dB (above 1 Hz with 10 V full scale)
Embedded Filter	Notch (High Pass Filter, Low Pass Filter)
Interface	EtherCAT network(100 Mbps)
Sampling Rate	1000 SPS
Sampling Time Accuracy	Greater than 1 ms
Channels	4-channel simutaneous sampling
Resolution	24-bit
Power Supply	10 - 30 VDC
Power Consumption	2W@12V
Operating Temperature	-20 °C to 75 °C
Waterpoof	IP67
Dimension (L x W x H)	180 x 112 x 47 mm
Weight	0.9 kg

*All prices, features, and specifications are subject to change without prior notice.

LOAD CELL

Applicable to Various Recorders

High Accuracy

10-1000 ton

Load Range from 10-1000 ton

Resistance to Side Load and Bending

Introduction

Load cell is widely used in various applications such as oil and gas, transportation, and construction. We have been supplying load cells to customers for a long time. This load cell consists of 4 resistors with strain gauges evenly attached. It provides users reliable and accurate readings.

The solid and annular load cell consists of 4 active resistors, 350-ohm strain gauges evenly attached to the sensing element. The serial bridge gives an output signal of the axial force measurement system, applicable to load tests of respective stresses.

Application

- Measurement of sectional stress of anchor bolt loading
- Measurement of sectional stress of prestressed anchors
- Measurement of sectional stress of tunnel bolts

Specification

Inputs Resistance	: 350Ω ± 3.5Ω	Output Resistance	: 350Ω ± 5Ω	Nonlinearity	: ±1% R.O.
Insulation Resistance	: 2000MΩ	Rated Output	: 2mV/V ± 1%	Repeatability	: 0.3% R.O.
Max Pressure	: 150%	Recommended Voltage	: 2 ~ 10V	Sensor Type	: Resistant
Measuring Range	: 10~1000 ton			Working Temperature	: -20°C ~ +100°C

*All prices, features, and specifications are subject to change without prior notice.

LOAD CELL SERIES

Solid Load Cell

Product Model

	GHL-10T	GHL-50T	GHL-100T	GHL-200T	GHL-300T	GHL-500T	GHL-600T	GHL-1000T
Range (ton)	10	50	100	200	300	500	600	1000
OD (mm)	67	102	102	144	166	202	202	272
Height (mm)	80	85	100	120	130	150	160	200

Annular Load Cell

Product Model

	SLC-10T	SLC-20T	SLC-50T	SLC-100T	SLC-200T	SLC-300T	SLC-500T
Range (ton)	10	20	50	100	200	300	500
ID (mm)	30	30	60	90	100	100	100
OD (mm)	75	102	102	144	166	201	201
Height (mm)	80	80	80	100	120	120	150

VW PIEZOMETER

Alloy Pressure Sensor

Mechanical Locking

Multi Layers Cable Sealed

Temperature Sensor

The VW Piezometer consists of a set of sensing cords fixed at both end inside a stainless-steel cylinder. A magnetic coil is used to detect vibrations from the steel cord, and the measuring of its vibration frequency can be translated into meaningful data.

Application

- Measurement of groundwater levels
- Monitoring of borehole pressure
- Suitable for monitoring dams, ducts, wells, mining wells, tunnels, road construction and soft ground surfaces.

Specification

Accuracy	: ±0.1% F.S.
Filter	: 50-micron sintered stainless steel
Material	: SUS316 Stainless Steel
Max Pressure	: 150%
Measuring Range	: 50psi or 100psi
Resolution	: 0.025%FS
Sensor Type	: Vibrating Wire Sensor
Signal Cable	: 4 wire
Temperature Type	: Thermistor resolution 0.1°C
Working Temperature	: -40°C ~ +125°C
Dimension	: 20 X 115 mm

*All prices, features, and specifications are subject to change without prior notice.

VW ARC-WELDABLE STRAIN GAUGE

High Accuracy

High Resolution

VWdot Measurement

Waterproof

VW Arc-Weldable Strain Gauge has a steel cord with two ends fixed on a metal rod. When the metal rod sustains a micro deformation caused by an external force, the vibration frequency of the steel cord varies according to the deformation. Such gauges can be installed on rod elements of steel structures to monitor stress distribution.

Application

- Monitoring distribution of load in pile tests.
- Monitoring areas of concentrated stress in pipes.
- Measuring strain in tunnel linings and supports.
- Monitoring load in struts used to brace deep excavations.
- Monitoring structural members of buildings and bridges during and after construction.

Specification

Accuracy	: ±0.1% F.S.
Measuring Range	: 3000 micro-strain
Sensitivity	: 1 micro-strain
Sensor Type	: Vibrating Wire Sensor
Temperature Type	: Thermistor resolution 0.1°C
Working Temperature	: -30°C ~ +80°C
Dimension	: Gauge Length: 150 mm, Rod Length: 165 mm

VW REBAR STRAIN GAUGE

High Accuracy

High Resolution

VWdot Measurement

Waterproof

The Rebar Strain Gauge is used to measure strain in concrete structures, diaphragm walls and concrete piles. It is extremely robust, reliable and waterproof in order to provide reliable and accurate measurements.

Application

- Measuring strain of tunnel linings.
- Measuring strain of concrete foundation slabs and footings.
- Monitoring strain of diaphragm walls
- Measuring strain in concrete piles and caissons.

Specification

Accuracy	: ±0.25% F.S.
Measuring Range	: 3000 kg/cm^2
Nonlinearity	: ±0.5% F.S.
Sensitivity	: 0.08 kg/cm^2
Sensor Type	: Vibrating Wire Sensor
Temperature Type	: Thermistor resolution 0.1°C
Working Temperature	: -30°C ~ +80°C
Dimension	: 150 mm

*All prices, features, and specifications are subject to change without prior notice.

VW SPOT-WELDABLE STRAIN GAUGE

High Accuracy

High Resolution

VWdot Measurement

Waterproof

The Spot-Weldable Strain Gauge, as the name suggested, can be welded to load-bearing beams or tunnel segments to measure its strain. it can provide accurate, reliable, and stable data reading over long lengths.

Application

- Struts
- Tunnel segment
- Sheet pile walling

Specification

Accuracy	: ±0.1% F.S.
Measuring Range	: 3000 micro-strain
Sensitivity	: 1 micro-strain
Sensor Type	: Vibrating Wire Sensor
Working Temperature	: -30°C ~ +80°C
Dimension (LxWxH)	: 9.5x70x2.2 mm
Sensor Dimension (LxWxH)	: 2x30x80 mm

INCLINOMETER CASING

Available in 2.54", 2.75", 3.34"

High Accuracy

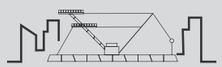
High Reliability

Low Spiral Effect
(Accurate Threads)

Introduction

ABS inclinometer casing is a grooved pipe used in the installation of inclinometers. It is typically used in boreholes or attached to structures. It provides access for the inclinometer probe in order to obtain the subsurface measurement. Our inclinometer casing has been proven reliable and accurate for many years.

Best Suited



construction site

Application

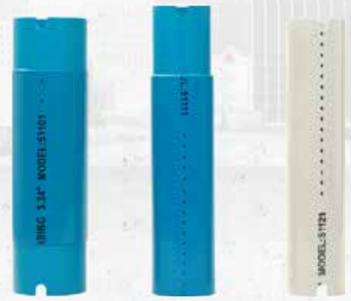
- Monitoring of landslide
- Monitoring of subsurface displacement
- Displacement monitoring of diaphragm walls, pile loading and retaining walls

Specification

Accuracy	: 4° / 30m	Material	: ABS	Three-size Option	: 2.54", 2.75", 3.34"
Load Test	: 320kgf	Shear Strength	: 220 psi		

*All prices, features, and specifications are subject to change without prior notice.

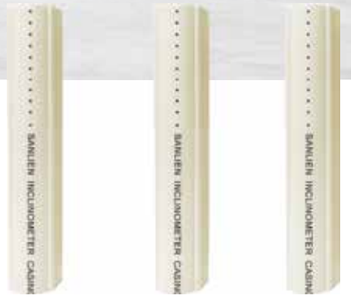
INCLINOMETER CASING SERIES



Standard Inclinometer Casing

Product Model

	51100100	51101100	IC-0254
Casing Diameter	3.34"	2.75"	2.54"
Length (mm)	3000	3000	3000
Outer Diameter (mm)	85	70	64.5
Inner Diameter (mm)	73	59	56.5



Inclinometer Casing

Product Model

	Inclinometer Casing	Coupling	End Cap
Model	IC0275	IC0275-1	IC0275-2
Length (mm)	3000	170	50
Outer Diameter (mm)	70	76	76
Inner Diameter (mm)	60	66	66
Max Thickness (mm)	3	5	5

Data Acquisition System

Vibration

- CUBE
- PX01

Geotechnical

- VWdot
- VWdot4
- WBdot
- VWbus
- TILTdot

Software

- SanDAS

CUBE

Easy Access by Built-in Web GUI

IoT

Modbus Protocol

Onsite Early Warning

Regional Early Warning

Time Synchronization via NTP

Introduction

CUBE is a powerful onsite earthquake early warning command center, alarm device and datalogger, featuring visual, voice, and dynamic text display via its 3-phase LED indicator, built-in speaker, and 7-inch touch screen.

Similar to PX-01, CUBE supports Modbus protocol for users to integrate into the SCADA, MES, or other management programs. The SeedLink protocol is also supportive in CUBE for 3rd-party accelero-graphs to integrate. The N-of-M voting algorithm is included in Cube, too. Therefore, CUBE ideal for as an onsite interface for earthquake early warning and emergency controls.

Beside, CUBE embeds quick structural damage assessment algorithm (a.k.a. RSHD). Within a minute after a felt earthquake event, CUBE is able to send out the inspection result based on the stiffness or inter-story drift ratio of a 3-accelerograph system. The RSHD cloud service is also available upon request.

Application

- Earthquake Early Warning System (EEWS)
- Structural Health Monitoring (SHM)
- Rapid Structural Health Diagnostic (RSHD)

Compatible with SeedLink protocol for connecting to 3rd party accelerographs for onsite early warning, earthquake monitoring, and event display.

... Guralp Kinemetrics Nanometrics Tokyo Sokushin ...

The user friendly touch screen provides real-time information such as rainfall, wind speed, and earthquake information.

Specification

Built-in	: Industrial class network-type touch interface	Indicator	: 4-color LED indicator	Speaker	: High-dB speaker 4Ω
		Relay	: 4 sets	Storage	: 32GB (up to 64GB)
Display	: Industrial-class 7" touch interface	RTC Accuracy	: ±60 sec/year, supporting NTP synchronization	Time Synchronization	: NTP

*All prices, features, and specifications are subject to change without prior notice.

Environment

Power Consumption	: 12W@24VDC	Weight	: 5.8 kg	Dimension (W x H x D)	: 300 x 350 x 122 mm
Relative Humidity	: 5~90% RH, no condensate	Working Temperature	: -20 ~ +70°C		

Easy Access by Built-in Web GUI

IoT

Modbus Protocol

Onsite Early Warning

Regional Early Warning

Time Synchronization via NTP

Introduction

PX-01 is a 1U rack-type smart earthquake central datalogger featuring dynamic voice alarms, relay control outputs with the ability to connect up to 5 Sanlien seismic sensors. PX-01 is equipped with an LCD screen for parameters, system state-of-health, and current activity value display. Moreover, it supports NTP time calibration, acting as both the server and client.

The N-of-M voting algorithm is built-in PX-01 by that the onsite earthquake early warning system is able to trigger emergency shutdown, voice alarm broadcasting, or text message delivering via SMS or LINE App. The flexible and open Modbus protocol is also provided for users to integrate PX-01 into the SCADA, MES, or other management programs easily.

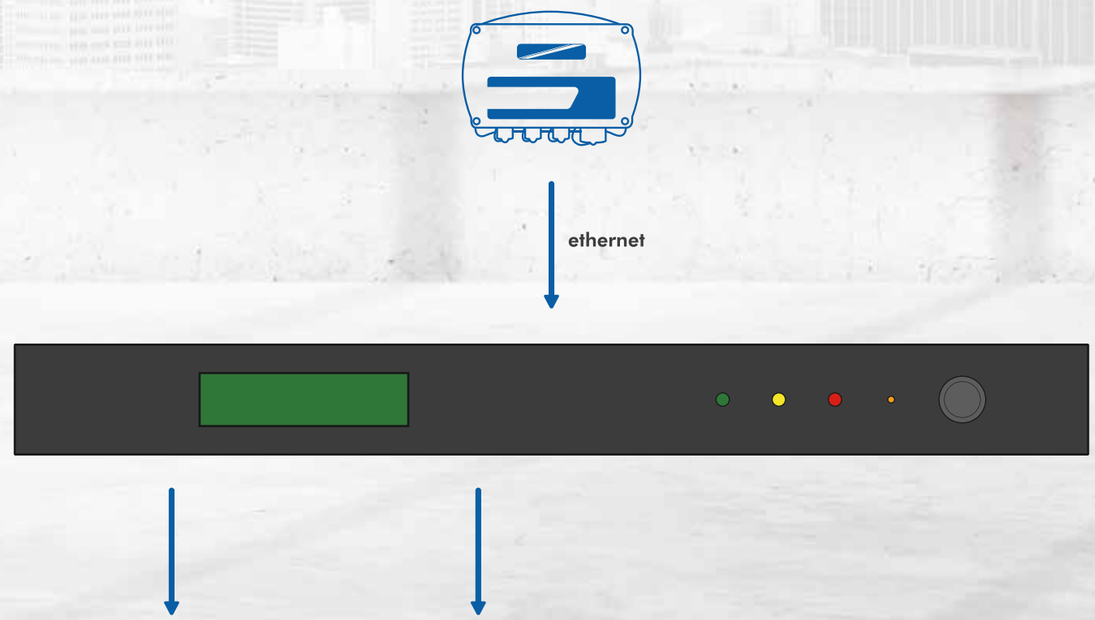
Not only Sanlien seismic sensors are able to feed data into PX-01 for real-time seismic monitoring and onsite control outputs, but also 3rd-party accelerographs can be integrated via the SeedLink protocol to achieve this purpose. Event data and logs are stored in PX-01 microSD card and feasible to be forwarded on to users cloud by its FTP function.

In sum, PX-01 is a cost-effective datalogger for regional/onsite earthquake early warning, structural health monitoring, and any vibration applications.

Application

- Earthquake Early Warning System (EEWS)
- Structural Health Monitoring (SHM)
- Rapid Structural Health Diagnostic (RSHD)

System Architecture



Specification

Built-in Watch Dog Function	: 10 sec	RTC Accuracy	: ±60 sec/year, supporting NTP
CPU	: ARM1176JZF-S 700MHz	Storage	: 32GB (expandable)
Display	: LCD, 2 lines x 20 characters	Time Synchronization	: NTP
Network Module	: 10/100 Base-TX Ethernet Controller	Relay	: 3 sets

Environment

Power Consumption	: 4W@110VAC
Power Supply	: 110 or 220 VAC
Relative Humidity	: 5~90% RH, no condensate
Working Temperature	: -20 ~ 70°C
Dimension (LxWxH)	: 550 x 425x 44.5 mm

*All prices, features, and specifications are subject to change without prior notice.

Low-Power Consumption

Powered by two 18650 Li-ion batteries, VWdot is able to operate for at least 8 months when RSSI is < 15 and for 16 months when RSSI is ≥ 15 (with one measurement per hour).

NB-IoT Wireless

Using the latest NB-IoT technology, VWdot can upload data to the "dot" cloud server, achieving a real-time monitoring advantage.

MQTT Protocol

Supporting the MQTT protocol, VWdot allows for the acquisition and integration of various types of data.

Simple Operation

Measuring data can be uploaded to the "dot" cloud service through simple setups on the Micro SD card.

Introduction

Introducing the VWdot / VWdot4 datalogger - a robust and reliable solution for measuring frequency and thermistor temperature signals of vibrating wire sensors. With its IP65 compliant housing and low-power consumption, the datalogger ensures accurate and uninterrupted data collection even in challenging environments. The VWdot / VWdot4 datalogger is designed to meet the rigorous demands of civil engineering applications, making it a trusted choice for monitoring structural dynamics, geotechnical measurements, and more.

Equipped with a 32GB built-in Micro SD card, the VWdot / VWdot4 datalogger offers sample storage capacity for over 1 million data records. This extensive data storage capability enables comprehensive analysis and reference purposes, ensuring that no valuable information is lost during extended monitoring periods.

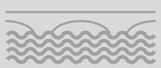
The VWdot / VWdot4 datalogger stands out for its cost-effectiveness and reliability. It has undergone rigorous testing and quality assurance procedures to deliver accurate and consistent measurements.

Application

- **Water level monitoring -** Water level transducers measurement
- **Water pressure monitoring -** Piezometers measurement
- **Stress monitoring -** Rebar strain gauges measurement
- **Strain monitoring -** Strain gauges measurement
- **Load monitoring -** Load cells measurement
- **Crack monitoring -** Crackmeters measurement
- **Landslide monitoring -** Displacement transducers measurement

Best Suited

New Construction for Site and Civil Engineering



Water Conservancy Construction

Bridge Engineering

Slope Safety

Specification

Measurement Type	: Vibrating Wire Sensor	LPWAN	: NB-IoT
Measuring Range	: 450 to 6000 Hz	Network Protocol	: MQTT
Accuracy	: ± 0.01 % @ 3000 Hz	Storage	: 32 GB Micro SD Card (expandable)
Channel	: 1	Power Supply	: 18650 Li-ion battery x2

Environment

Temperature Type	: Thermistor (resolution 0.1 °C)
Waterproof	: IP65
Dimension (L x W x H)	: 100 x 100 x 60 mm (Antenna height not included)

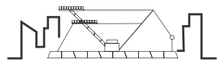
*All prices, features, and specifications are subject to change without prior notice.

VWdot SERIES

VWdot

VWdot4

Best Suited for



construction site

- Civil Engineering
- Developed for all kinds of vibrating wire sensors

Specification

	VWdot	VWdot4
Channel	: 1	: 4
Dimension (WxLxH)	: 100 x 100 x 60 mm	: 160 x 160 x 70 mm
Power Supply	: 18650 Li-ion rechargeable battery x1 8 months (RSSI <15) 16 months (RSSI ≥15) * with one measurement per hour	: 18650 Li-ion rechargeable battery x3 15 months (RSSI <15) 24 months (RSSI ≥15) *with one measurement per hour

dot

"dot" is a cloud data platform which links our on-site NB-IoT devices to the users. The users can view and collect their real time monitoring data via "dot".

Low-Power Consumption
Powered by two 18650 Li-ion battery, WBdot is able to operate for at least 8 months when RSSI is < 15; 16 months when RSSI is ≧ 15.(one measurement per hour).

MQTT Protocol
Supporting MQTT protocol, WBdot allows acquisition and integration of various types of data.

Digital signal output is applied to prevent from signal fade-out

Reduce the number of signal wires through RS-485 serial port

NB-IoT Wireless
Using the latest NB-IoT Technology, WBdot can upload data to "dot" cloud server, achieving real-time monitoring advantage.

Simple Operation
Measuring data can be uploaded to "dot" cloud service through simple set-ups on the SD card.

Industrial standard format: Modbus_RTU protocol

High accuracy of measurement with 0.01 Hz

Introduction

WBdot, our latest Wheatstone bridge datalogger with NB-IoT technology, is designed to meet the needs of modern monitoring systems. With its IP65-compliant housing, WBdot ensures reliable performance even in harsh environmental conditions. Its low-power consumption allows for data collection and seamless uploading to the cloud server, ensuring uninterrupted monitoring operations.

In addition to its advanced connectivity features, WBdot is equipped with a built-in 16GB SD card, enabling local data recording and storage. WBdot stands out as a dependable datalogger that excels in civil engineering applications.

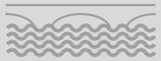
Its robust design, combined with its efficient data management capabilities, makes it an ideal choice for monitoring projects requiring accuracy, durability, and seamless data integration.

Application

- **Water level monitoring -** Water level transducers measurement
- **Water pressure monitoring -** Piezometers measurement
- **Stress monitoring -** Rebar strain gauges measurement
- **Strain monitoring -** Strain gauges measurement
- **Load monitoring -** Load cells measurement
- **Crack monitoring -** Crackmeters measurement
- **Landslide monitoring -** Displacement transducers measurement

Best Suited

New Construction for Site and Civil Engineering



Water Conservancy Construction

Bridge Engineering

Slope Safety

Specification

Accuracy	: ± 0.1 %	Measuring Range	: ±5000 micro-strain	Power supply	: 18650 Li-ion battery x2
Applicable Bridge Resistance	: 350 Ω (Full Bridge)	Network Protocol	: MQTT	Waterproof	: IP65
Channel	: 1	Resolution	: 0.1 micro-strain	Dimension (WxLxH)	: 100 x 100 x 60 mm (Antenna height not included)
LPWAN	: NB-IoT	Storage	: 16 GB Micro SD card		
Measurement type	: Strain gauge sensors				

Environment

*All prices, features, and specifications are subject to change without prior notice.

Introduction

VWbus is a highly specialized converter device that has been designed for transferring VW sensor frequency into data. Its two channels for temperature and VW readings make it a versatile tool that enables data conversion, performing real-time data processing allowing users to quickly detect potential issues and respond accordingly ensuring safety and stability of monitor assets.

The flexibility of VWbus is a key advantage for those who need to gather up-to-date data and information remotely from their workstation. This feature allows you to easily access and analyze data, even when not on-site. It's versatility, real-time data processing and conversion, and flexible monitoring system make it a valuable investment who needs to collect and analyze data related to vibrating wire signals.

Best Suited

Strain and Stress Measurement for Bridge

Strain and Stress Measurement for Tunnel

Application

- Civil Engineering
- Structural Health Monitoring (SHM) for Bridge, Dam, and Tunnel

Specification

Communication	: Modbus (RS-485)	Power Supply Current In Active Mode	: 15 mA max @12VDC	VW Reading Accuracy	: 0.01Hz
Excitation Voltage	: 5V / 12V	Power Supply Voltage	: 10 to 20VDC	Dimension (WxLxH)	: 100 x 100 x 60 mm
Frequency Range	: 400 to 6,000 Hz	Temperature Reading Accuracy	: 0.5 °C		
Power Down Mode	: 0.5 mA max	Temperature Sensor Type	: NTC 3K		

*All prices, features, and specifications are subject to change without prior notice.

TILTdot

San DAS

Sanlien Data Acquisition System

DATA ACQUISITION

SIGNAL ANALYSIS

Low-Power Consumption

Powered by two 18650 Li-ion rechargeable battery, it is able to be stand-alone for at least 8 months if RSSI <15; 16 months if RSSI ≧15.
(Based on measuring once per hour)

NB-IoT Wireless Transmission

Uploading data to the cloud by complying with latest NB-IoT wireless transmission technology for real-time monitoring

MQTT Protocol

Complied with MQTT protocol, it is easy to receive and integrate various data

Real-time Cloud Monitoring

Recorded data can be uploaded to cloud service for 24-hour real-time monitoring through simple set-ups on the SD card

Data Analysis

- Baseline Correction
- BS 7385
- CAV
- Damping
- Differential
- DIN 4150-2
- DIN 4150-3
- Effective Values
- FFT Magnitude Amplitude
- FFT Magnitude Phase
- HAZUS
- Bandstop Filter
- Band-pass Filter
- High-pass Filter
- Low-pass Filter
- H/V Spectra
- Power Spectra
- Response Spectra
- Terzband Spectra
- Integration
- Integration Displacement
- ISO 2631
- ISO 4866
- ISO 8041
- ISEE
- ISEE-USBM RI8507
- JIS
- JMA
- RHSD
- SN 640 312a
- STA/LTA Ratio
- SI Tokyo Gas
- Time-domain Filtering
- VC Curve
- Vector Sum

Introduction

TILTdot- the ultimate electronic dual-axis inclination sensor with advanced features and reliable performance. TILTdot is equipped with NB-IoT wireless transmission and temperature measurement capabilities, making it an ideal choice for various industries, including site and civil engineering, water conservancy construction, bridge engineering, slope safety for buildings, structures, and retaining walls.

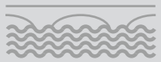
Designed with a robust and waterproof enclosure, TILTdot meets the IP65 standards. With its low-power 18650 Li-ion rechargeable battery, TILTdot can provide long-term measurement and instant data upload. Moreover, TILTdot can store more than 1 million recorded data with its built-in 32 GB Micro SD card and back up your data on dot cloud service.

Application

- Pier Tilt Monitoring for Mass Rapid Transit, High-Speed Rail and Bridges
- Structural Inclination Monitoring of Subway, High-Speed Rail and Tunnels
- Tilt Monitoring for Retaining Walls
- Slop Surface Displacement Monitoring

Best Suited

New Construction for Site and Civil Engineering



Water Conservancy Construction

Bridge Engineering

Slope Safety

Specification

Sensor Type	: MEMS Accelerometer	Operating Temperature	: -30 °C to 85 °C
Axial Module	: Biaxial	LPWAN	: NB-IoT
Measuring Range	: ±90°	Network Protocol	: MQTT
Measurement Accuracy	: ±0.01°	Storage	: 32GB Micro SD Card
Resolution	: 0.0001°		

Environment

Power Supply	: 18650 Li-ion Battery x2
Dimension (L x W x H)	: 100 x 100 x 60 mm (Antenna height not included)

*All prices, features, and specifications are subject to change without prior notice.

Introduction

SanDAS has been designed to meet all requirements with respect to almost every possible application. It covers all the best features of old Sanlien Tech software. The program for networking of local recorders, supporting network communications, including communication via Internet (TCP/IP protocol). These features provide flexible interfacing between Sanlien recorders and users irrespective of how far they are located from each other.

Additionally to the features above, SanDAS allows all the Windows standard functionality to be used in an easy and intuitive way. The program provides a perfect software interface between users (operators) and hardware based on Sanlien recorders of vibrating sensor product lines. Besides that, SanDAS provides data analysis, which has been developed mainly for civil engineering purposes and preliminary seismic analysis of recorded data. With SanDAS one can set any configuration of Sanlien recorders, which is supported by current versions of hardware. Furthermore, the program keeps compatibility with the previous versions of Sanlien recorders based on vibrating sensor product line as well as networks.

Simultaneously display up to 108 channels

AutoComplete in vAlert8 Editor

Modifying recording data setting in data stream platform

Application

- Setup of an instrument. One can change config files of an instrument with SanDAS software.
- Connection Monitor. SanDAS software performs permanent or periodical monitoring of an instrument status.
- Downloading of the event files form an instrument working as a recorder
- Off-line event data view and simple data analysis
- Support for serial data streams in several formats
- Real-time data viewer for an instrument in which provides serial data stream

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Sanlien Technology

sanlien

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