



User Manual V1.1

Smart Engineering Smarter Future



SGP-66 Vibrating Wire Piezometer

Designed in Singapore

Disclaimer

Read this user manual carefully before using the product to ensure that you completely understand the product and can correctly use it. After reading this user manual, keep it properly for future reference. Improper use of this product may cause serious injury to yourself or others, or cause product damage and property loss. Once you use this product, it is deemed that you understand, approve and accept all the terms and content in this document. Apogee is not liable for any loss caused by the user's failure to use the product in compliance with this user manual.

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1. Overview

The SGP-66 Real-Time Vibrating Wire Piezometer is adopts a mature international vibrating wire principle. Its core component, the steel wire, is imported from Germany. An integrated temperature chip provides temperature measurement, temperature compensation, and identification features, making it suitable for long-term and automated health monitoring of large-scale structures such as bridges.

It is ideal for measuring pore water pressure or liquid levels in geotechnical and hydraulic engineering applications, including roads, railways, slope foundations, dams, tunnels, and metros. It can also be installed in piezometer pipes, boreholes, dam pipelines, and pressure vessels. It offers high precision, sensitivity, waterproofing, corrosion resistance, and long-term stability. A built-in temperature sensor enables simultaneous monitoring of the site temperature with intelligent recognition. Signals are transmitted through a specialized 4-core shielded cable, unaffected by cable length, and suitable for harsh environments.

2. Technical Specifications

FEATURES	SPECIFICATION
Range	350 KPa/700KPa
Sensitivity	0.025% FS
Accuracy	≤0.01% FS
Working Temperature	−10°C to +80°C
°C Range	−50°C to +150°C (NTC3K)
°C Sensitivity	0.25°Cimum
°C Accuracy	±0.5°C
Ultimate Pressure	SY*(1.2x Range); SY*S(2x Range)
Maximum Cable	500–2000 meters (100~250 Ω)
Communication	2G/3G/4G
Protocol	MQTT
Upload Interval	0–48 hours (Adjustable),1–hour interval theoretical runtime of 180 days
Protection Rating	IP68
Data Platform	Feature value data curves, report summary and printing
Data Access	Cloud-based
Dimensions	208mm x 93mm x 68mm/128mm x 24mmD

3. Key Features

- *High accuracy and sensitivity
- *Corrosion-resistant and stable long-term performance
- *Built-in temperature sensor for automatic temperature compensation
- *Stable metal vibrating wire structure for long-term monitoring
- *Supports embedded, borehole, or surface mounting options

4. Product Accessories

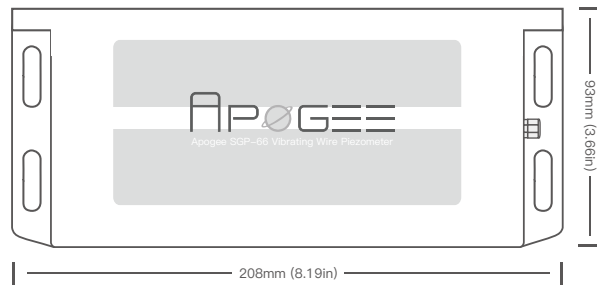
ACCESSORIES	QUANTITY	REMARKS
SGP-66 Piezometer Sensor	1	
SGP-66 4G Model	1	
Cable Wire	1	Length can be customized as required
User Manual	1	
Warranty Card	1	One year
Factory Inspection Report	1	
Extended Cable	Optional	
Gel Cel Battery	Optional	
Solar Controller	Optional	
Solar Panel	Optional	670mm x 530mm, 60W
Solar Panel Stand	Optional	15°angle, galvanized coating for rust resistance
Enclosure Box	Optional	
M2M Sim Card	Optional	

5. Product Instructions

Appearance

The product illustrated in the diagram is the SGP-66 Vibrating Wire Piezometer Set

Dimensions: 208*93*68mm (8.19* x 3.66* x 2.67in)



SGP-66 4G Model



SGP-66 Piezometer Sensor

Working Principle

The intelligent vibrating wire sensor consists of four main components:

- *Addressable temperature IC (DS18B20)
- *Excitation and receiving coil
- *Cable wire
- *Wire protection unit

Temperature IC (DS18B20): Uses a single-wire interface and single power supply (3.0V to 5.5V via data line), with a unique electronic ID (5-digit, e.g., 38923 for sensor ID), and two-byte modifiable EEPROM for type/model storage.

Excitation/Receiving Coil: Also known as plucking or signal coil, it works in 1/4 magnetic excitation and 3/4 signal pickup cycles. Coil resistance ranges from 85–400 Ω . During the T1 excitation phase, a strong magnetic field is generated, pulling the steel wire downward. When T2 begins, the magnetic field ceases, and the wire vibrates based on its own elasticity. The coil picks up the frequency.

Steel Wire and Protection: Depending on sensor type, different wire lengths and thicknesses are used (typically 0.2mm or 0.3mm high-strength alloy). The design must consider the K-value impact.

Calculation Method

*Frequency Modulus: $F = \text{Hz}^2 \times 10^{-3}$

*Stress-Frequency Formula: $\text{MPa} = K \times F$

Where:

MPa: Pressure value

F: Real-time frequency

K: Calibration factor (default 1)

*With Zero Offset: $\text{MPa} = K \times (F - F_0)$

*With Temperature Compensation: $\text{MPa} = K \times (F - F_0) + K_t \times (T - T_0)$

Where:

K_t : Temperature compensation factor (1.3 for stainless iron diaphragm)

T: Current temperature

T_0 : Initial temperature

Note: 10m water depth $\approx$ 0.1 MPa

6. Cloud Platform Instructions

Logging into the Cloud Platform

Access Apogee Cloud Platform

[<http://8.219.208.124>]

Use your account and password to login.

Login

Username

Password

OK

Click on the avatar/username in the top right corner to display the options menu. to modify your account password and clear the system cache here.

Project Management

Add New Project: After login, go to the [Dashboard](#) page, where you may add, edit or end aongoing projects. Click **+ Add** icon to enter project setup page and setup details such as project name, Project images, Start time and Descriptions, click **Submit** to add this new project.

Complete Project: When a project is completed, you may click **End** on the Project Card to release linked devices and setup them in new projects. The pervious data remains available for viewing on completed projects.

Dashboard

+ Add

Project Name

A

Project ABCD

Status:

Active

Edit | End

Project Information

* Project Name:

Please enter the project name

Project images:

+

Owner:

Please enter the Total units

Start Time:

Select date

Total units:

Please enter the Total units

Team in Charge:

Please enter the person in charge of monitoring

Project Description:

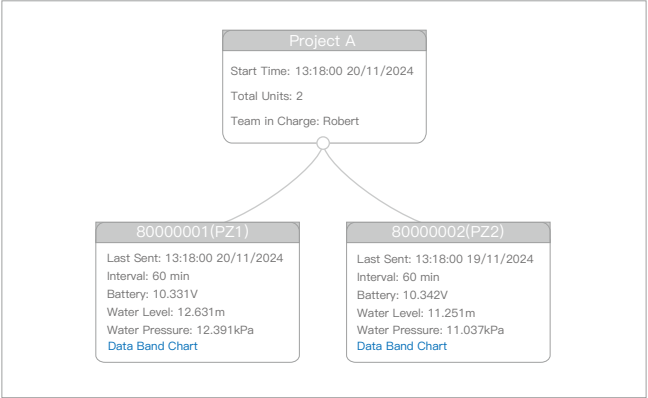
Please provide a complete project description, which will be reflected in thereport!

Submit

Device Review

Topology Display: Click a project card to access the [Project Info](#) page. A diagram shows the total number of devices under the current project, device working status, voltage and latest data sending time.

Click [Data Band Chart](#) to see historical data curves

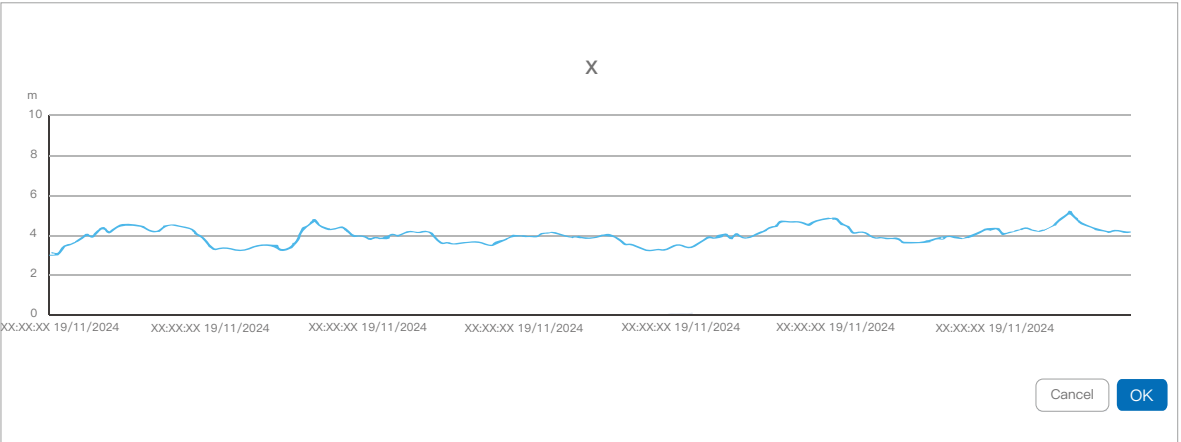


Data Review

Categorical Display: Shows complete data for each sensor or monitored parameter within the project. This includes:

*List View: Displays raw data, which is exportable.

*Chart View: Presents data as curves



Warning Alert and Offline Record

Click [Alert List](#) to access the alert records for both the current and past Alerts. Click [Offline Record](#) to check the offline record of the devices.

7. Troubleshooting

Please follow the FAQs to solve the issues. If the problem persists, feel free to contact us, and we will provide you with detailed assistance.

Hardware Issues

Check sensor wire resistance with multimeter:

*4-core cable:

Red & Yellow: 100~250 Ω

Blue & Green: ~0.5k Ω (diode mode)

Red/Black to White/Green/Bare: Insulation > 50M Ω (use 100V megger)

*Cable Testing:

Typical cable resistance: ~50 Ω /km

*No frequency reading:

Measure red/yellow (or bare/black) resistance

Normal: 100~250 Ω + cable

High or ∞ : Broken cable

Very low: Short circuit

*No temperature reading:

Measure blue/green (or bare/white) diode resistance

High or ∞ : Open circuit

Very low: Short circuit

*Unstable readings:

Check for water ingress, rewire if needed

Avoid interference (motors, antennas, AC lines)

Ensure sufficient battery power in reader

To prevent early aging or damage from improper maintenance, please review the following instructions

Hardware Maintenance

*Wrap the sensor with geotextile before placing it in water to prevent it from being clogged by debris.

*Store in dry, ventilated, non-corrosive areas (<85% RH)

*Clean with a damp cloth only; avoid alcohol/thinner

*Do not plug/unplug cables while powered on

8. Mobile DOQC Support

Access Apogee Mobile DOQC Page

[<http://8.219.208.124>]

Input device sensor ID here and click [Search](#)

This simple page may help you to easily check on your mobile device whether the device is functioning normally after installation. You can also check the status of the meter anytime through your mobile device.

Apogee
Device Online Quick Check

Your Sensor ID here [Search](#)

Once your instrumentation is set up, please wait about 10 minutes before searching with this page.

Sensor ID: 800000001
Status: Online
Total Sum: 1.6669 mm/s

Powered by Apogee SG

9. After-Sales Service

Warranty Terms

For products manufactured by our company, we offer the following warranty policies:

- *During the warranty period, any quality issues under normal use are repaired for free. After the warranty period, we offer long-term maintenance with a minimal service charge.
- *If damage results from improper use, regardless of warranty status, repair services are available with a service fee.
- *For assistance, contact after-sales support.
- *We are not liable for data loss or damage to programs or storage media. Please take care and be responsible for your data security.

10. Contact Information

Apogee Mgmt Private Ltd

Address: 53 Tuas South Link 1, Tuas South Connection, Singapore. S636797

Service Call : +65 96529565

Email : apogeesg24@gmail.com

