

TILTdot

Wireless Tiltmeter



User Manual

Model: TD-1001

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I. Introduction

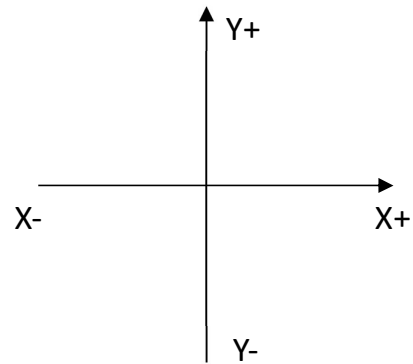
TILTdot is a digital tiltmeter with NB-IoT and LTE- M wireless transmission capability, providing dual-axis angle and temperature measurement functions. TILTdot features a sturdy waterproof enclosure and low power consumption design. Using two 18650 lithium batteries, it can provide long-term measurement recording and data upload to the dot cloud web service. Its built-in 32 GB Micro SD card can backup and store over one million records. It is suitable for monitoring inclinations in urban civil engineering, river and water conservancy projects, bridge engineering, slope stability, and other structures such as buildings, structures, and retaining walls.

Applications:

- Inclination monitoring of building structures.
- Inclination monitoring of columns and piers in metro, high-speed rail, and bridge projects.
- Inclination monitoring of tunnel structures in metro, high-speed rail, and other projects.
- Inclination monitoring of retaining walls.
- Monitoring of ground surface sliding.

II. Specification

Description	Note
Measurement Type	MEMS Accelerometer
Axial Module	Biaxial
Measuring Range	$\pm 90^\circ$
Accuracy	$\pm 0.01^\circ$, calibrated to $\pm 30^\circ$
Operating Temperature	- 30°C ~ +85°C
Storage	32 GB Micro SD card
LPWAN	NB-IoT / LTE-M (CAT M1)
Network Protocol	MQTT
Temperature Sensor	Thermistor (Resolution 0.1°C)
Power Supply	18650 Li-Ion Battery x2 (Provides 5-18 Vdc battery recharging function, can be connected to solar panel or external power supply)

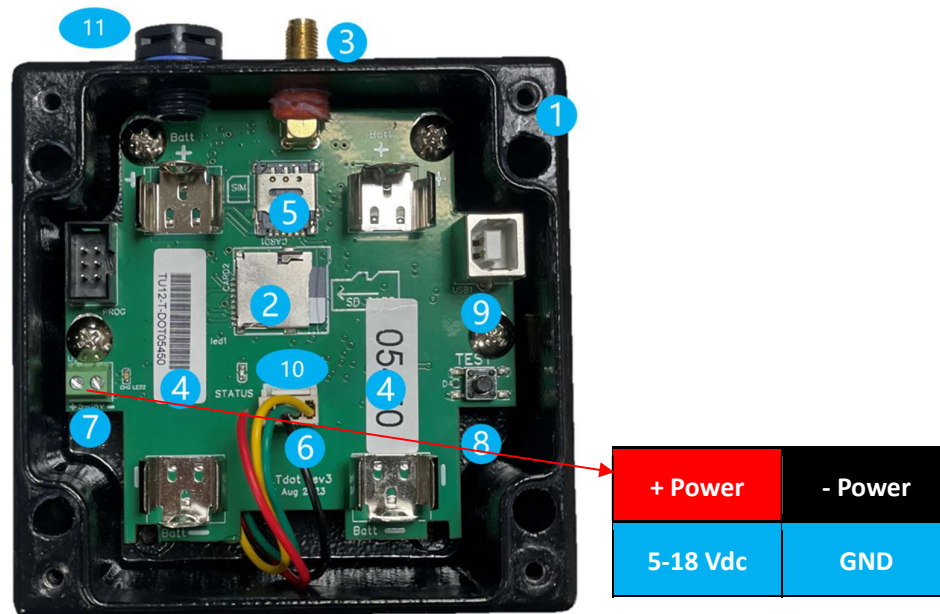


III. Accessory

TILTdot standard package includes:

- (1) TILTdot main unit (x1) + antenna (x1)
- (2) 32 GB micro-SD card (x1)
- (3) NB-IoT / LTE-M SIM card (customer to purchase separately)
- (4) 18650 rechargeable lithium batteries (x2, excluded)
- (5) Sanlien dot cloud platform license key

#	Description
1	Enclosure
2	SD Card Slot
3	Antenna Port
4	Battery Holder (x2)
5	SIM Card Slot
6	Tiltmeter Signal
7	5-18 Vdc External Power Charging Terminal
8	Test Button
9	Com Port
10	LED Indicator Light
11	Vent Valve or Charging Cable Gland



IV. SD Card Setup

The SD card utilizes a storage space of 32 GB and needs to be formatted to FAT32 with a unit size of 64 KB. The SD card can be configured and data downloaded via computer access. It contains three files:

- (1) TI_setup.txt: This file is for configuring parameters related to TILTdot measurement and data transmission. Customers need to set this up themselves.
- (2) TI_DATA.txt: This file serves as a backup for measurement reading data. When the system operates normally, it automatically generates this file. In case of unsuccessful data upload due to communication or MQTT server interruption, this file provides backup for measurement reading data and 20 data supplements.
- (3) TI_ERROR.txt: This file records system execution error messages. When errors occur during system operation, the system automatically generates the TI_ERROR.txt file to record the error messages for user inspection and debugging purposes.
- (4) SETUP2.txt: This file is generated automatically by the cloud software using the Device Setting feature to modify the measurement frequency. SETUP2.txt has a higher execution priority than TI_setup.txt. Therefore, when modifying the configuration file via the SD card, SETUP2.txt must be deleted if necessary.

<input type="checkbox"/> 名稱	修改日期	類型	大小
 TI_setup.txt	2023/6/26 上午 10:59	文字文件	1 KB
 TI_ERROR.TXT	2000/1/1 上午 01:00	文字文件	67 KB
 TI_DATA.TXT	2000/1/1 上午 01:00	文字文件	553 KB
 SETUP2.TXT	2000/1/1 上午 01:00	文字文件	1 KB

V. TI_setup Configuration

Write "TI_setup.txt" file commands with the symbol "#" as the parameter's end, and information after the symbol "\$" as comments. The contents and instructions are as follows:

disable_NBIOT=no#\$ **Must enter "yes" or "no"**

Remark: Whether to disable the NB-IoT/LTE-M real-time data transmission function. To enable NB-IoT/LTE-M, enter "no". To disable NB-IoT/LTE-M, enter "yes" and configure the date_time setting.

catm_band=3#\$ **LTE-M band for Wireless service**

nbiot_band=8#\$ **NB IoT band for Wireless service**

Remark: The nbiot_band and catm_band commands are used to set the wireless service frequency band. If users want to use NB-IoT communication, the relevant settings for nbiot_band should be used. If users want to use LTE-M communication, the catm_band command should be used. Please inquire with the telecommunications service company for these parameters.

APN=internet.iot #\$ **Access Point Name for Wireless service**

Remark: NB-IoT wireless service Access Point Name. Please inquire with the NB-IoT telecommunications service provider.

server_IP=SANLIEN#\$ **MQTT Server Name or IP address**

Remark: IP address of the MQTT server for data upload. If using the Sanlien dot web service, set it to "SANLIEN". For a self-built MQTT server, additional settings are required:

server_port=????#\$

user_name=????#\$

password=????#\$

data_path=????#\$ (MQTT subscription topic, example:
data_path=TILTdot/test#\$)

interval_hr=0#\$ **Unit: hours. Minimum must be 1. Maximum is 1000.**

Remark: Recording frequency, measured in hours. Minimum is 1 hour; maximum is 1000 hours.

interval_min=5#\$ **Unit: minutes. Minimum 5. Maximum 59.**

Remark: Recording frequency, measured in minutes. Input multiples of 5: 5, 10, 15, 20, 30 minutes.

Note: If the recording frequency is less than 1 hour, set interval_hr to "0"; if it is more than 1 hour, set interval_min to "0".

date_time=network#\$ **Must enter "network" or "date_time=23/01/30/10/00/00"**

Remark: Time synchronization method. Use "network" for network synchronization. If network synchronization is unavailable, manually enter the time in the format "yy/mm/dd/hh/mm/ss". Time must be manually set each time the power is restarted.

GMT_offset=+0#\$ **Local Offset +/- in minutes from GMT**

Remark: Network time calibration, the new TILTdot will be linked to the corresponding time zone, so please enter "0"

wakeup_LED=yes#\$ **Must enter "yes" or "no"**

Remark: Choose whether to enable the LED indicator function during frequency measurement. Input "yes" to turn on the LED indicator light. Input "no" to turn off the LED indicator light during frequency measurement. This setting does not affect the operation of the LED indicator light during initial boot and when using the TEST button.

encryption=yes#\$ **Must enter "yes" or "no"**

Remark: Specify whether the cloud (remote) modified settings service should be encrypted. Input "yes" if using the Sanlien dot web service.

new_key=no#\$ **Must enter "yes" or "no"**

Remark: Encryption password setting. Input "no" if using the Sanlien dot web service. If using a self-built MQTT server, set according to encryption requirements. When set to "yes", create a key.txt file on the SD card.

sub_path=sanLienmq/Tldot/01234#\$

Remark: Publish new subscription topics from the web to TILTdot via the MQTT

Server. Total limit of 35 characters. If using the Sanlien dot web service, set sub_path to sanLienmq/Tldot/01234, where 01234 is the TILTdot serial number; ensure the serial number is correct.

conf_path=sanLienconf/Tldot/01234#\$

Remark: After Tldot receives new subscription topics from the web, reply via the MQTT Server. Total limit of 35 characters. If using the Sanlien dot web service, set conf_path to sanLienconf/Tldot/01234, where 01234 is the Tldot serial number; ensure the serial number is correct.

“TI_setup.txt” Example

```
nbiot_band=8#$
APN=internet.iot#$
server_IP=SANLIEN#$
interval_hr=0#$
interval_min=5#$
date_time=network#$
GMT_offset=+0#$
disable_NBIOT=no#$
wakeup_LED=yes#$
encryption=yes#$
new_key=no#$
sub_path=sanLienmq/Tldot/01234#$
conf_path=sanLienconf/Tldot/01234#$
```

VI. TI_DATA Content Descriptions

The data values in TI_DATA are separated by commas, and their meanings in sequence are as follows:

TILTdot serial number, Date, Time, S1 (Channel 1), X-axis Angle (Degrees), Y-axis Angle (Degrees), Temperature (°C), Battery Capacity (%), RSSI strength, and Error code.

For example:

05436, 20/10/2023, 00:00:17, S1, 0.7914, 0.9639, 26.4, 10, 21, !REG.

Note:

The X-axis value corresponds to the Sanlien "dot" Web Service's 2-1 channel.

The Y-axis value corresponds to the Sanlien "dot" Web Service's 2-2 channel.

```
05436,19/10/2023,00:00:17,S1,0.7899,0.9659,25.5,10,21
05436,19/10/2023,01:00:17,S1,0.7898,0.9638,25.8,10,21
05436,19/10/2023,02:00:17,S1,0.7906,0.9651,25.5,10,21
05436,19/10/2023,03:00:17,S1,0.7907,0.9659,25.2,10,21
05436,19/10/2023,04:00:17,S1,0.7897,0.9647,24.9,10,21
05436,19/10/2023,05:00:17,S1,0.7909,0.9664,25.0,10,21
05436,19/10/2023,06:00:17,S1,0.7893,0.9665,24.6,10,21
05436,19/10/2023,07:00:17,S1,0.7892,0.9662,24.7,10,21
05436,19/10/2023,08:00:17,S1,0.7901,0.9656,25.5,10,20
05436,19/10/2023,09:00:17,S1,0.7913,0.9647,26.4,10,20
05436,19/10/2023,10:00:17,S1,0.7930,0.9642,28.1,10,20
05436,19/10/2023,11:00:17,S1,0.7928,0.9625,28.6,10,20
05436,19/10/2023,11:00:17,S1,0.7928,0.9625,28.6,10,20
05436,19/10/2023,13:00:17,S1,0.7943,0.9621,29.6,10,23
05436,19/10/2023,14:00:17,S1,0.7951,0.9629,29.9,10,22
05436,19/10/2023,15:00:17,S1,0.7946,0.9607,29.4,10,21
05436,19/10/2023,16:00:17,S1,0.7937,0.9616,28.8,10,22
05436,19/10/2023,17:00:17,S1,0.7951,0.9616,28.2,10,20
05436,19/10/2023,18:00:17,S1,0.7917,0.9619,27.6,10,21
05436,19/10/2023,19:00:17,S1,0.7932,0.9619,27.5,10,21
```

VII. TI_Error Content Descriptions

The remarks in the TI_DATA file are also recorded in the TI_ERROR event log, with the following codes representing their meanings:

- (a) !PWRx: NB-IoT / LTE-M module power supply problem.
- (b) !CPIN: Issue with the NB-IoT / LTE-M SIM card.
- (c) !REG: NB-IoT / LTE-M communication failure or no signal RSSI.
- (d) !RSSI: NB-IoT / LTE-M signal RSSI too low or error.
- (e) !RST: Problem encountered during NB-IoT / LTE-M module reset.
- (f) !QNEW: No response from MQTT server.
- (g) !QCON: MQTT server available, but login failed (incorrect username or password).
- (h) !QPUB: MQTT server available and login successful, but data upload failed.
- (i) !QSUB: Problem encountered when retrieving data from subscribed topics while connecting to MQTT server.
- (j) !USUB: Problem encountered when unsubscribing from topics while connecting to MQTT server.
- (k) !SDx: SD card installation failed.
- (l) !LOWB: Battery voltage is too low, please replace the battery.
- (m) !OFFB: Automatically shuts down due to low voltage, until the battery is replaced.

VIII. TILTdot Installation

- (1) Connect the antenna, please avoid applying excessive force during installation.
- (2) Insert the NB-IoT / LTE-M SIM card after ensuring that the SIM card has been activated for service.
- (3) Insert the SD card and ensure that the TI_setup.txt file is correctly configured and stored on the SD card. Note: The system will not verify whether the content of the TI_setup.txt file is correct.
- (4) Insert the lithium battery, ensuring the correct polarity. Wait for 3 seconds before reinserting the battery if it is removed. If an external power source is needed to charge the 18650 batteries, please replace the vent valve with the charging cable fixed head and provide a 5-18 Vdc power supply, paying attention to the Power (+) and Power (-) positions.
- (5) The green LED indicator will remain steady until data is successfully uploaded to the MQTT server. The green LED will then turn off. During the initial use of a new NB-IoT SIM card, the wireless network registration may take approximately 2 to 3 minutes.
- (6) If the green LED indicator turns off without flashing before, it indicates successful startup and data upload. If the green LED indicator flashes, please refer to Chapter IX for further instructions.
- (7) After successful startup, TILTdot will automatically measure and upload one set of data to the MQTT service platform. After uploading, TILTdot enters sleep mode awaiting subsequent measurement and data upload according to the configured frequency.
- (8) Check on the Sanlien MQTT service platform to confirm if the data has been correctly uploaded. If confirmed, the initial setup is complete.
- (9) During the period when TILTdot successfully uploads one set of data and enters sleep mode, pressing the TEST button once will illuminate the green LED indicator. This action triggers an immediate measurement and upload of one set of data to the MQTT service platform before returning to sleep mode. If any system errors are detected, the green LED indicator will flash.

IX. LED Light Indicator

TILTDot reports various errors as follows: (1) Recorded in the remarks column of the TI_Data file and sent to the MQTT server. (2) Recorded in the TI_ERROR file. (3) Displayed through LED green light flashing messages. If the green light starts flashing (approximately 15 seconds) after installing the battery, it indicates operation failure, and the system will shut down automatically. Users can verify the corresponding situation based on the flashing pattern.

(a) If the LED green light remains steady for 2-3 minutes before turning off, it indicates normal operation of the device. Users can check the MQTT service platform to confirm if the data has been successfully transmitted.

(b) If the LED green light flashes at intervals of 0.5 seconds (.....), it may indicate an SD card reading issue or incorrect parameters set in the TI_setup.txt file.

(c) If the LED green light flashes continuously twice, followed by two seconds off (··____··____··____··), it indicates that there is no issue with SD card reading, but there may be a problem with the SIM card or NB-IoT / LTE-M module.

(d) If the LED green light flashes continuously three times, followed by two seconds off (...____...____...____...), it indicates that there are no issues with SD card or SIM card installation, but there may be a problem with network registration. Please check if the RSSI signal strength is greater than 0 and if the SIM card account is activated.

(e) If the LED green light flashes continuously four times, followed by two seconds off (····____····____····____····), it indicates that there are no issues with SD card or SIM card installation, and successful network registration has been achieved. However, there is a failure to connect to the MQTT Server. Please check for any issues with the MQTT service platform-related user parameters (IP address, network port, password, path) settings.

X. Battery Power

TILTDot requires two 18650 lithium-ion batteries with a working voltage range of 3.5 V to 4.2 V. It is recommended to use PANASONIC NCR18650GA batteries with a capacity of 3450 mAh or higher. The battery power is expressed as a percentage (%), indicating the remaining charge level:

bat_volt > 4.149 bat_%=99

bat_volt <=4.15 bat_%=90

bat_volt <= 4.03 bat_%=80

bat_volt <= 3.88 bat_%=70

bat_volt <= 3.75 bat_%=60

bat_volt <= 3.70 bat_%=50

bat_volt <= 3.68 bat_%=40

bat_volt <= 3.65 bat_%=30

bat_volt <= 3.60 bat_%=20

bat_volt <= 3.56 bat_%=10

bat_volt <= 3.48 bat_%=5 // The message "!LOWB" indicates that the battery voltage is low, prompting the user to replace the batteries.

bat_volt <= 3.35 bat_%=2 // The message "!OFFB" indicates that the system has automatically shut down due to low voltage, and it prompts the user to replace the batteries.

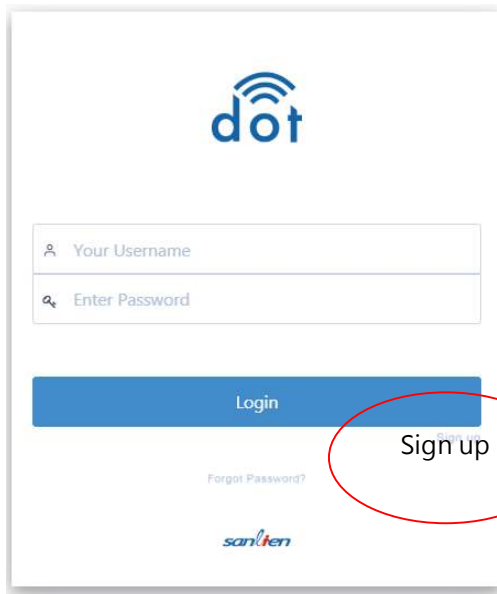
XI. SANLIEN “dot” Web Service

This section is the explanation for using the Sanlien Technology MQTT server dot web service platform. If users wish to set up their own MQTT server platform, please contact Sanlien Technology technical staffs.

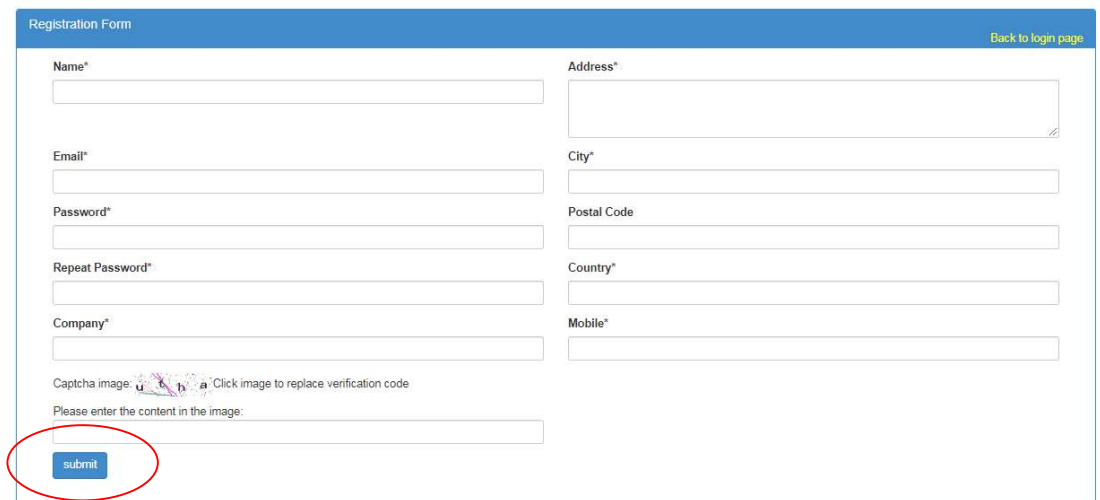
Sanlien Technology dot web service platform link: <http://wms.sanlien.com.tw/dot>

(1) For the first login, please sign up to register a new account.

(2) After filling out the information, click on ‘submit’. The system will send an email with the Sanlien Technology dot service platform link to the registered email address. Users need to access the platform through the login link in the email to activate the account.



The image shows the login page for the Sanlien dot web service. At the top is the 'dot' logo. Below it are two input fields: 'Your Username' and 'Enter Password'. A blue 'Login' button is positioned below these fields. To the right of the 'Login' button, the text 'Sign up' is circled in red. Below the 'Login' button is a link that says 'Forgot Password?'. At the bottom of the page is the Sanlien logo.



The image shows the registration form for the Sanlien dot web service. The form is titled 'Registration Form' and has a 'Back to login page' link in the top right corner. The form is divided into two columns. The left column contains fields for 'Name*', 'Email*', 'Password*', 'Repeat Password*', and 'Company*'. The right column contains fields for 'Address*', 'City*', 'Postal Code', 'Country*', and 'Mobile*'. Below these fields is a 'Captcha image' section with a small image and a link that says 'Click image to replace verification code'. Below the captcha image is a text input field with the label 'Please enter the content in the image:'. A blue 'submit' button is located at the bottom left of the form, circled in red.

(3) After creating an account, users can log in to the dot web service platform. Here are the main functions:

- (a) Latest Record: Displays the latest data records.
- (b) Record Query: Allows for data query and download services.
- (c) Chart Query: Provides curve query and download services.
- (d) Map: Displays location and measurement-related information on a map.
- (e) Company Setting: Configures basic information, including company name and project name.
- (f) FTP Setting: Enables automatic data transmission via FTP.
- (g) FTP Log: Records errors that occur during FTP transmission.
- (h) SMS Setting: Provides SMS notification for values exceeding certain thresholds.
- (i) Project User Setting: Allows adding client accounts for remote login.
- (j) Device Setting: Allows cloud-based modification of the device settings.
- (k) Admin: Configures the device information.



Status	Company	Project	Sensor Name	logger_SN	Date	Time	Raw data	unit	Engineering units	unit	Temperature(°C)	Rssi	Battery(%)	Remark	Server received time	Type
●	sanlien	Slope Monitoring	PZ-11	05656	2024/01/29	13:45:01	3,065.8	Hz	-8.98	GL-m	17.2	25	30		2024-01-29 13:45:24	VWdot
●	sanlien	Slope Monitoring	05451-X	05451	2024/01/10	14:25:15	-0.1588	deg.	-4.68	SEC	21.9	25	90		2024-01-10 14:25:48	Tldot
●	sanlien	Slope Monitoring	05451-Y	05451	2024/01/10	14:25:15	0.1697	deg.	42.12	SEC	21.9	25	90		2024-01-10 14:25:48	Tldot

(4) When logging in to the dot web service platform for the first time, users need to set up their device information through “Company Setting” and “Admin” to use related services on the platform.

(A) Company Setting

- (a) Click on ‘Company Setting’.
- (b) Click on ‘Add’ to add new data.
- (c) Enter the Company name.
- (d) Enter the Project name.

(e) Click on 'save' to add the data.

The screenshot shows the Sanlien monitoring system interface. At the top, there is a navigation bar with various icons and labels: Latest Record, Record Que, Chart Que, Map, **Company Setting** (highlighted with a red circle), FTP Setting, FTP Log, SMS, Project User Setting, Device Setting, and Admin. Below the navigation bar is a table with the following columns: Status, Company, Project, Sensor Name, logger SN, Date, Time, Raw data, unit, Engineering units, unit, Temperature(°C), Rssi, Battery(%), Remark, Server received time, and Type. The table contains three rows of data. Below the table, there is a 'Company Setting' dialog box with the following fields: Company (dropdown), Project (dropdown), Enable (checkbox, checked), and a 'save' button. A 'Close' button is also present in the bottom right corner of the dialog box.

Status	Company	Project	Sensor Name	logger SN	Date	Time	Raw data	unit	Engineering units	unit	Temperature(°C)	Rssi	Battery(%)	Remark	Server received time	Type
Yellow	sanlien	Slope Monitoring	PZ-11	05656	2024/01/29	13:45:01	3,065.8	Hz	-8.98	GL-m	17.2	25	30%		2024-01-29 13:45:24	VWdot
Green	sanlien	Slope Monitoring	05451-X	05451	2024/01/10	14:25:15	-0.1588	deg.	-4.68	SEC	21.9	25	90%		2024-01-10 14:25:48	Tldot
Green	sanlien	Slope Monitoring	05451-Y	05451	2024/01/10	14:25:15	0.1697	deg.	42.12	SEC	21.9	25	90%		2024-01-10 14:25:48	Tldot

(B) Admin Setting

(a) Click on 'Admin'.

(b) Click on 'Add' to add new data.

(c) Type: Select the type of instrument, choose the option Tldot.

(d) S/N: Enter the device serial number, please input a 5-digit serial number, for example, 01234.

(e) License key: Enter the license key for the service platform provided by Sanlien Technology.

(f) Company: Select the company name from the dropdown menu.

(g) Project: Select the project name from the dropdown menu.

(h) Sensor Name: Enter the instrument identifier directly, for example, OW-01.

(i) After completing the entries, click 'save' to add the new configuration to the data table.

Latest Record | Record Que | Chart Que | Map | Company Setting | FTP Setting | FTP Log | SMS | Project User Setting | Device Setting | Admin

Status	Company	Project	Sensor Name	logger SN	Date	Time	Raw data	unit	Engineering units	unit	Temperature(°C)	Rssi	Battery(%)	Remark	Server received time	Type
	sanlien	Slope Monitoring	PZ-11	05656	2024/01/29	13:45:01	3,065.8	Hz	-8.98	GL-m	17.2	25			2024-01-29 13:45:24	VWdot
	sanlien	Slope Monitoring	05451-X	05451	2024/01/10	14:25:15	-0.1588	deg.	-4.68	SEC	21.9	25			2024-01-10 14:25:48	Tldot
	sanlien	Slope Monitoring	05451-Y	05451	2024/01/10	14:25:15	0.1697	deg.	42.12	SEC	21.9	25			2024-01-10 14:25:48	Tldot

dot information

Add

File Browse Import

Type	S/N	License key	Channel	Company	Project	Sensor	Expiration date	Use engineering units				
VWdot	05655	MXwF3WwnUzPNcP3D	1-1	三聯科技	土城寨	SG-1001	2021/05/27	Yes				

Type: VWdot

S/N:

License key:

Company: 三聯科技

Project: 新店案

Sensor Name: 1-1

Sensor Name:

Save Close

(C) After completing the configuration, users may use the functions on the right side of the table, such as modify, settings, delete, renew, etc.

(a) Modify function: Modify the Company or Project data.

(b) Settings function: Configure measurement physical quantities, threshold values, Email notifications, SMS notifications, etc.

(c) Delete function: Each TILTdot data provides only one service platform account. If users want to change to another account, the original account needs to delete the configured setting first.

(d) Renewal function: Purchase the rental service before the expiration of the platform rental period, and enter the key to extend the platform rental period.

dot information

Add

File Browse Import

Type	S/N	License key	Channel	Company	Project	Sensor	Expiration date	Use engineering units				
VWdot	05655	MXwF3WwnUzPNcP3D	1-1	三聯科技	土城寨	SG-1001	2021/05/27	Yes				

(D) Settings Function:

(a) Physical Quantity Calculation: Check 'Use engineering units' to perform physical quantity calculation for measured values. Enter the units in the "Units" field. Enter coefficients A~F for the instrument. Enter the initial reading value (R0), the measured reading (Ri), and the offset value (M).

- Engineering unit (Hi)=A(Ri)⁵+B(Ri)⁴+C(Ri)³+D(Ri)²+E(Ri)+F
- Engineering unit Change= Current Engineering unit (Hi)- Initial Engineering unit (H0) +M

(b) Alert notification configuration: Check the 'Alert notification' box to configure management values. The colors of the indicator lights represent the following:

Value < Level 3	Value < Level 2	Value < Level 1	Normal Value	Value > Level 1	Value > Level 2	Value > Level 3
--------------------	--------------------	--------------------	-----------------	--------------------	--------------------	--------------------

(c) Email notification setup: Check the 'Mail notification' box to configure email notification. When the physical change exceeds the set Level 1 to Level 3 thresholds, the system will automatically send notifications to the specified email addresses.

(d) SMS notification setup: This feature requires the purchase of SMS sending services for mobile phones. Before using it, users need to configure various settings in the "SMS Setting" section (details in section 5). Check the 'SMS notification' box to configure SMS notification. When the physical change exceeds the set Level 1 to Level 3 thresholds, the system will automatically send notifications to the specified mobile phone numbers.

(e) The "SMS Remaining" field indicates the remaining number of SMS notification service instances, which the system calculates automatically. The "Phone Number" field is where users input the mobile phone number. Phone number settings need to be configured in the "SMS Setting" section.

Use engineering units ☒

Type: VWdot S/N: 76279 Sensor Name: PZ-2

Formula: Raw data(Hz) 5th order polynomial

$$H=A(R_i)^5+B(R_i)^4+C(R_i)^3+D(R_i)^2+E(R_i)+F$$

H:Converted data in units
R_i:Current reading
 $\Delta = H_i - H_0 + M$

Units:(ie:kg/cm²,mm)

psi	A:Polynomial gauge factor 0	B:Polynomial gauge factor 0
C:Polynomial gauge factor 0	D:Polynomial gauge factor -0.0000179221	E:Polynomial gauge factor 0.0196004
F:Polynomial gage factor 111.006	R ₀ :Initial reading 3100	M:Offset 0

Alert notification ☒

Alert level 1(<) -1	Alert level 1(>=) 0
Alert level 2(<) -25	Alert level 2(>=) 0
Alert level 3(<) -30	Alert level 3(>=) 0

Mail notification (Alert level 1) ☐ Mail notification (Alert level 2) ☐ Mail notification (Alert level 3) ☐

Notification mail(1): sanlienbu1cs@gmail.com

Notification mail(2):

Notification mail(3):

Notification mail(4):

Notification mail(5):

SMS notification (Alert level 1) ☐ SMS notification (Alert level 2) ☐ SMS notification (Alert level 3) ☐

SMS Remaining: 0

(5) To set up SMS sending phone numbers, click on "SMS Setting."

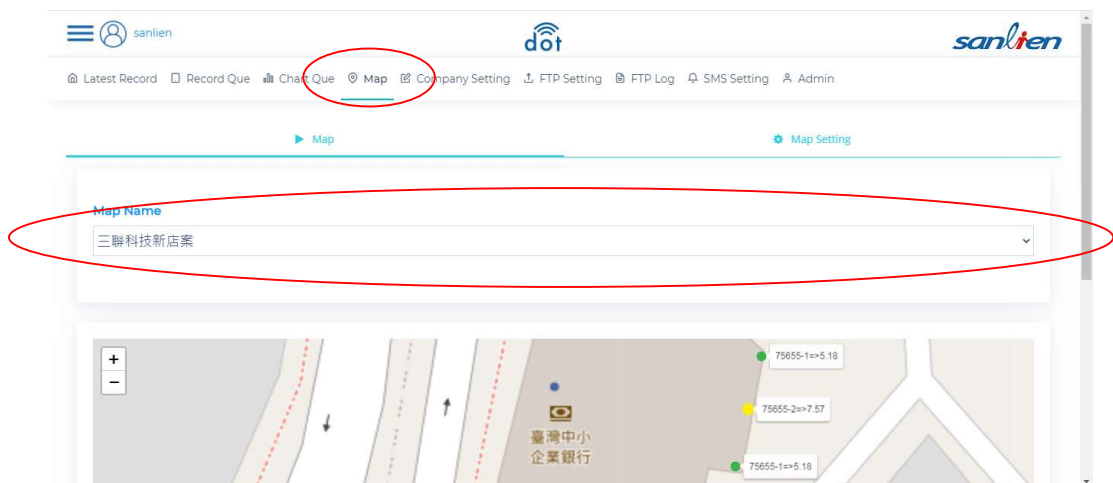
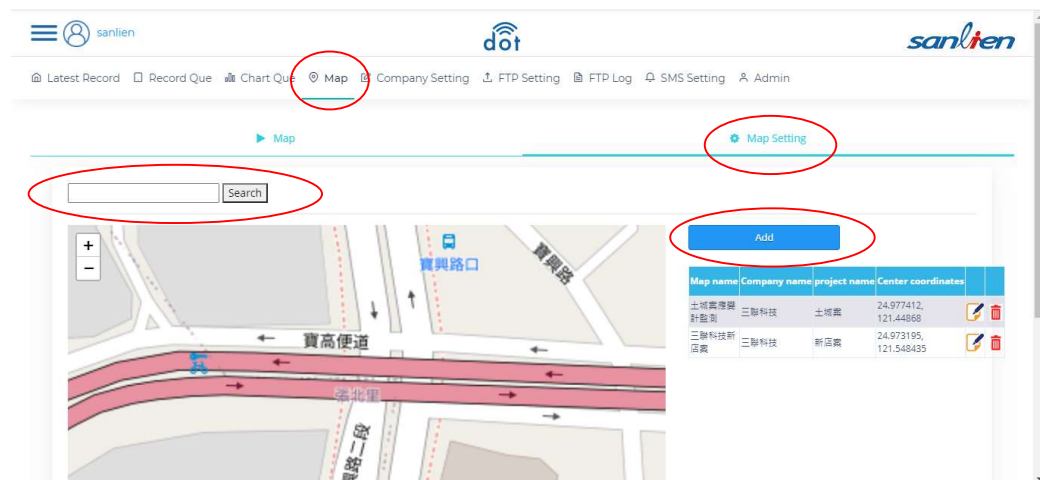
- (a) SMS Recharge: This is an additional SMS service value-added function. Click on 'Add' to enable SMS value-added service. "Card Number" and "PIN Code" are the key numbers provided on the purchased SMS card.
- (b) SMS Setting: Configure SMS transmission settings. Click on 'Add' to enter the phone numbers for SMS transmission. Do not include the first digit "0" in the "Phone Number" field. For example, for the phone number 0912-345678, only enter 912345678.
- (c) SMS Sent Record: Records of SMS transmissions.

(6) To set up map display information, click on 'Map' to configure the settings.

Map Setting: Configure map settings.

- (a) Enter the location name or coordinates in the search field to search for the desired location.

- (b) Use the map zoom, pan, and move functions to select the desired map area.
- (c) Click on 'Add' to set the map name, company name, project name, etc., and then save the map information.
- (d) Left-click on the map with the mouse to set the instrument position and number.
- (e) Once the settings are completed, users can view the status of the instruments in the "Map" function.



(7) To configure FTP data transmission settings, click on 'FTP Setting'.

- (a) Company: Select the data to be transmitted.
- (b) FTP Server: Enter the FTP login IP.
- (c) FTP Port: Enter the FTP login port.

(d) User Name: Enter the FTP login username.

(e) Password: Enter the FTP login password.

(f) FTP Path: Enter the data storage location. If no subdirectory is set, leave this field blank. If storing in a subdirectory, enter the subdirectory name followed by a slash, for example, "TILTdot/".

(g) ENABLE: Check to enable. Leave unchecked to disable.

(h) Once the entries are completed, click 'save' to finalize the FTP transmission settings.

The screenshot shows the Sanlien web interface with the 'FTP Setting' menu item circled in red. Below the navigation bar, there are dropdown menus for 'Company' and 'Project'. The main section is titled 'User FTP Server Setting' and contains the following fields:

- *FTP Server: [Text input field]
- *User Name: [Text input field]
- *Password: [Text input field]
- FTP Path: [Text input field with value 'vwdot/']
- *FTP Port: [Text input field]
- ENABLE: ☐

(8) For data query and download, click on the 'Record Query' function. Select the company name, project name, instrument name, and query date. Then, click the 'Display data' button. The queried data will appear below, and users can export the data using the "Export Excel" function.

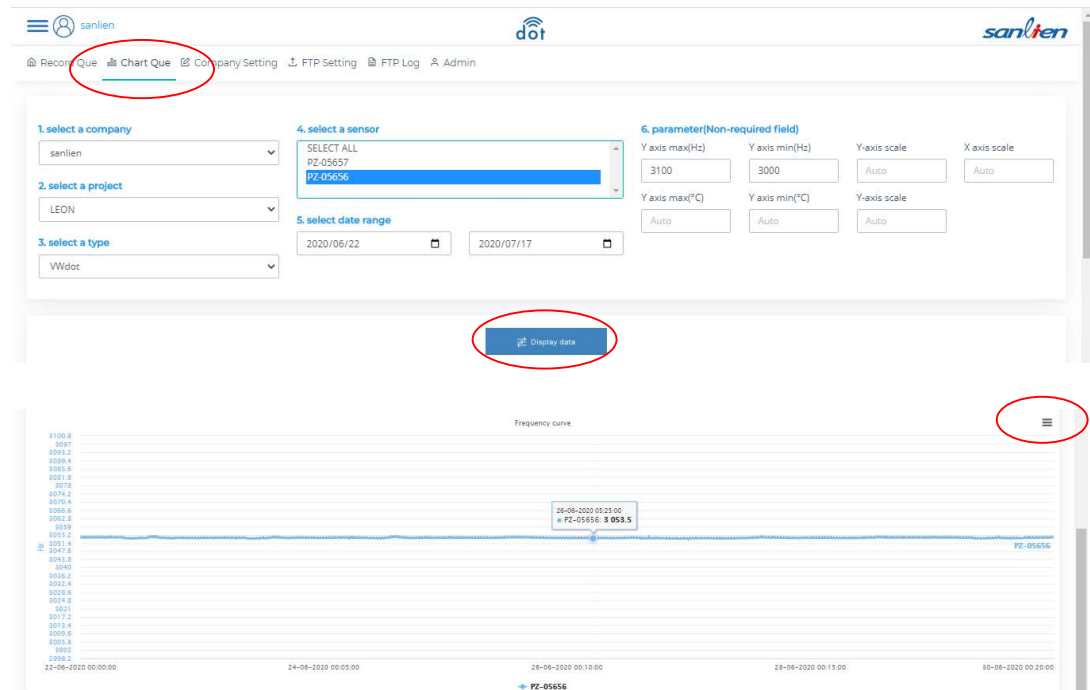
The screenshot shows the Sanlien web interface with the 'Record Query' menu item circled in red. The form contains the following elements:

- 1. select a company: [Dropdown menu with value 'sanlien']
- 2. select a project: [Dropdown menu with value 'LEON']
- 3. select a type: [Dropdown menu with value 'VWdot']
- 4. select a sensor: [Dropdown menu with values 'SELECT ALL', 'PZ-05657', 'PZ-05656']
- 5. select date range: [Date range picker with values '2020/06/01' and '2020/07/17']

Below the form, there is a 'Display data' button and a table of data. The 'Export Excel' button is circled in red.

Date	Time	Company	Project	Sensor Name	logger_SN	Frequency(Hz)	Temperature(°C)	Rssi	Battery(%)	Remark	Server received time
2020/06/30	00:20:00	SANLIEN	LEON	PZ-05656	05656	3,054.4	27.5	19	2	IOFFB	2020-06-30 00:20:59
2020/06/30	00:15:00	SANLIEN	LEON	PZ-05656	05656	3,054.0	27.5	0	5	I REG	2020-06-30 00:20:59
2020/06/30	00:10:00	SANLIEN	LEON	PZ-05656	05656	3,054.0	27.4	0	5	I REG	2020-06-30 00:20:58

(9) For curve query and download, click on the 'Chart Query' function. Select the company name, project name, instrument name, and query date. Then, click the 'Display data' button. The queried data will appear below. Users can also use the functionality in the upper right corner of the graph to save it as various image files.



(10) To modify device settings from the cloud, access the "Device Setting" function. Click on 'Add', then select the instrument serial number to be modified. Users can adjust settings such as sweep, interval, and GMT_offset. After entering the details, click 'Save' to complete the process. Users can view the setting information and the effective modification time in the "Device Setting" screen.

Note: All modified settings will take effect after the next measurement by the device.

Type	S/N	Channel	sweep	interval	interval_min	GMT_offset	data_path	sub_path	conf_path	effective date	date
WBdot	05740	1-1	C	1	0	+480	sanLien/wBdot/05740	sanLienmq/WBdot/05740	sanLienconf/WBdot/05740	2022-08-23 17:45:39	2022-08-23 17:41:34
VWdot	05656	1-1	C	0	5	+480	sanLien/vWdot/05656	sanLienmq/VWdot/05656	sanLienconf/VWdot/05656	2022-08-31 09:12:45	

Type: VVdot

S/N: 05656

	Item	Value
<input checked="" type="checkbox"/>	sweep_1	C
<input checked="" type="checkbox"/>	interval_hr_1	0
<input checked="" type="checkbox"/>	interval_min_1	5
<input checked="" type="checkbox"/>	GMT_offset	+480
<input checked="" type="checkbox"/>	server_IP	sanlien
<input checked="" type="checkbox"/>	server_port	xxxx
<input checked="" type="checkbox"/>	user_name	xxxx
<input checked="" type="checkbox"/>	password	xxxx
<input checked="" type="checkbox"/>	data_path	sanLien/vvDot/05656
<input checked="" type="checkbox"/>	sub_path	sanLienmq/VVdot/05656
<input checked="" type="checkbox"/>	conf_path	sanLienconf/VVdot/05656

Buttons: save, Close

(11) To add a client for remote login, access the "Project User Setting" function. Select the Company and Project wanted to be shared, then click on 'Add'. Fill in the required information and click 'SAVE'. The system will send the link to the Sanlien dot client platform to the specified email address. Upon receiving the email, clients can use the provided link.

Note: The remote connection URL is

<https://wms.sanlien.com.tw/dot/index.php?item=client>

Please be aware that this remote connection URL is different from the original Sanlien dot management web service platform URL.

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dot

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Latest Record

Record Que

Chart Que

Map

Company Setting

FTP Setting

FTP Log

SMS

Project User Setting

Device Setting

Admin

Company

sanlien

Project

Slope Monitoring

Project User Setting

Add

Company	Project	Name	Email	Remark	Enable		
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Name

EMAIL

Password*

Confirm Password*

Remark

After saving, send the account and password to the user. ☒

SAVE

Close



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Be the frontier of environmental monitoring

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