

# pALERT S303

## Quick Start Guide



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# 1 Hardware Requirement

## 1.1 Sensor and Accessories

### Sensor



### Power Cable & GPS Antenna Sets



### Ethernet Cable & Connector

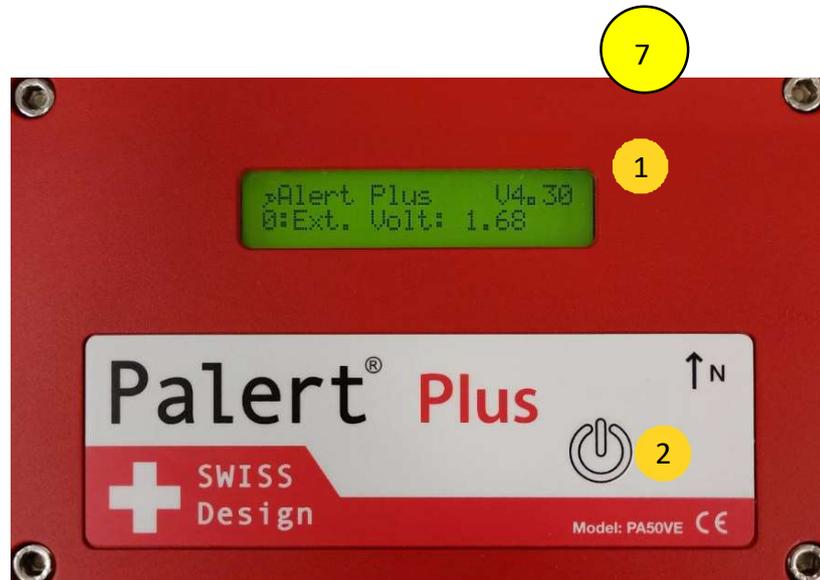


### Server & Hub



# Sensor Outlook

1. LCD Monitor : Live status presentation.
2. Button Function : Delay time in seconds for function.
3. Ethernet Port : Connecting Ethernet.
4. Power Port : DC Power connector.
5. AUX Port : Auxiliary port for digital output and GPS antenna.
6. Sensor Port : Additional port for external velocity sensor.
7. GPS Antenna Port : Connector for GPS antenna.



## 1.2 Delay Time Functions from Button

1 Second	IP Showing
2 Seconds	NTP restart
3 Seconds	Exercise cancel function
4 Seconds	Hardware part reloading parameters
5 Seconds	Firmware version showing
6 Seconds	Reloading parameters without IP check (for saving time)
7 Seconds	Firmware upgrading via internet
8 Seconds	<ol style="list-style-type: none"> <li>1. Global recoding mode</li> <li>2. Confirm this mode by following 2 seconds pressing</li> <li>3. Stop this mode by following 3 seconds pressing</li> </ol>
9 Seconds	Test mode
	■ Following 4 seconds : EEW Exercise in 30 seconds
	■ Following 3 seconds : Warning cancel
	■ Following 9 seconds : Back to normal mode
	■ Following 10seconds : Relay self-test
12 Seconds	Power off

Factory Reset : Time delay in seconds from sensor button following the sequence 1→5→1→6→2→6→1→2

Default IP

Address : 192.168.255.1

Netmask : 255.255.255.0

Gateway : 192.168.255.254

Note : See the figures below

### 1.2.1 The IP Showing

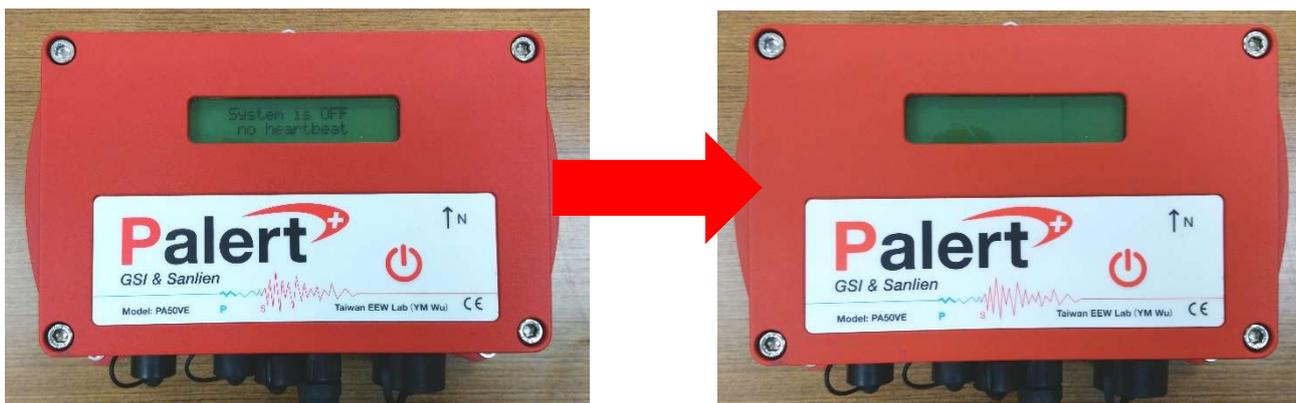
Press 1 second from button, LCD shows sensor IP.



### 1.2.2 The Power Off

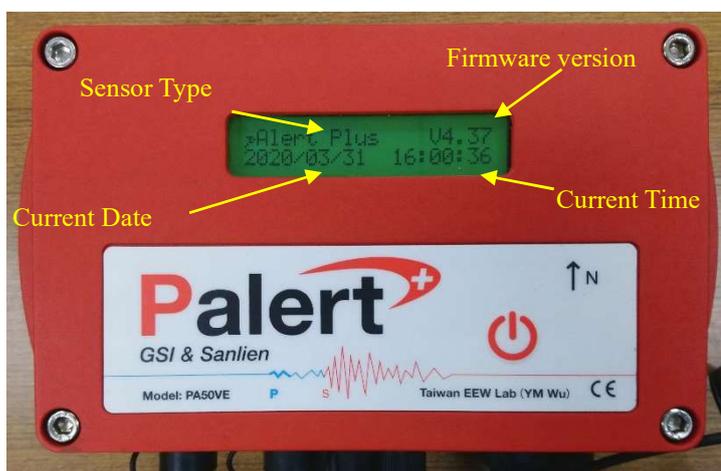
Press 12 seconds from button, LCD shows sensor “Power off” ->”System is off”. After that removing power connector, LCD will disappear message.





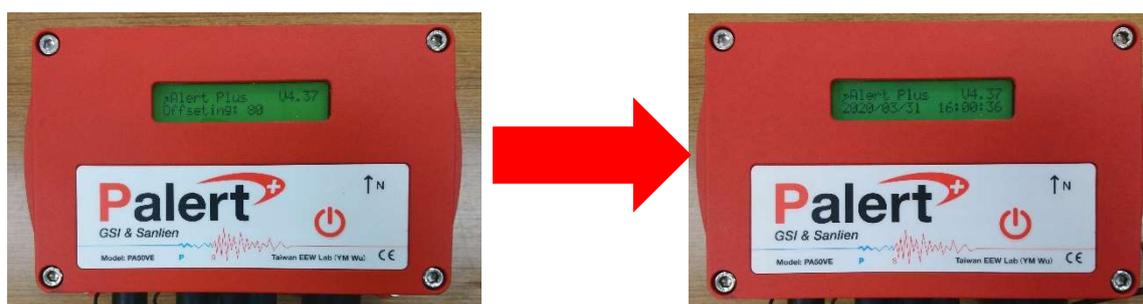
## 1.3 LCD Showing Description

### 1.3.1 Main Status Description



### 1.3.2 Booting Sequence

After the powering is on, the LCD will show “Booting” and “Offsetting”, if it keeps showing “Offsetting”, please put sensor to the more stable platform(ground) to avoid the background noise.



## 2 Installation

### 2.1 Installation Sequence

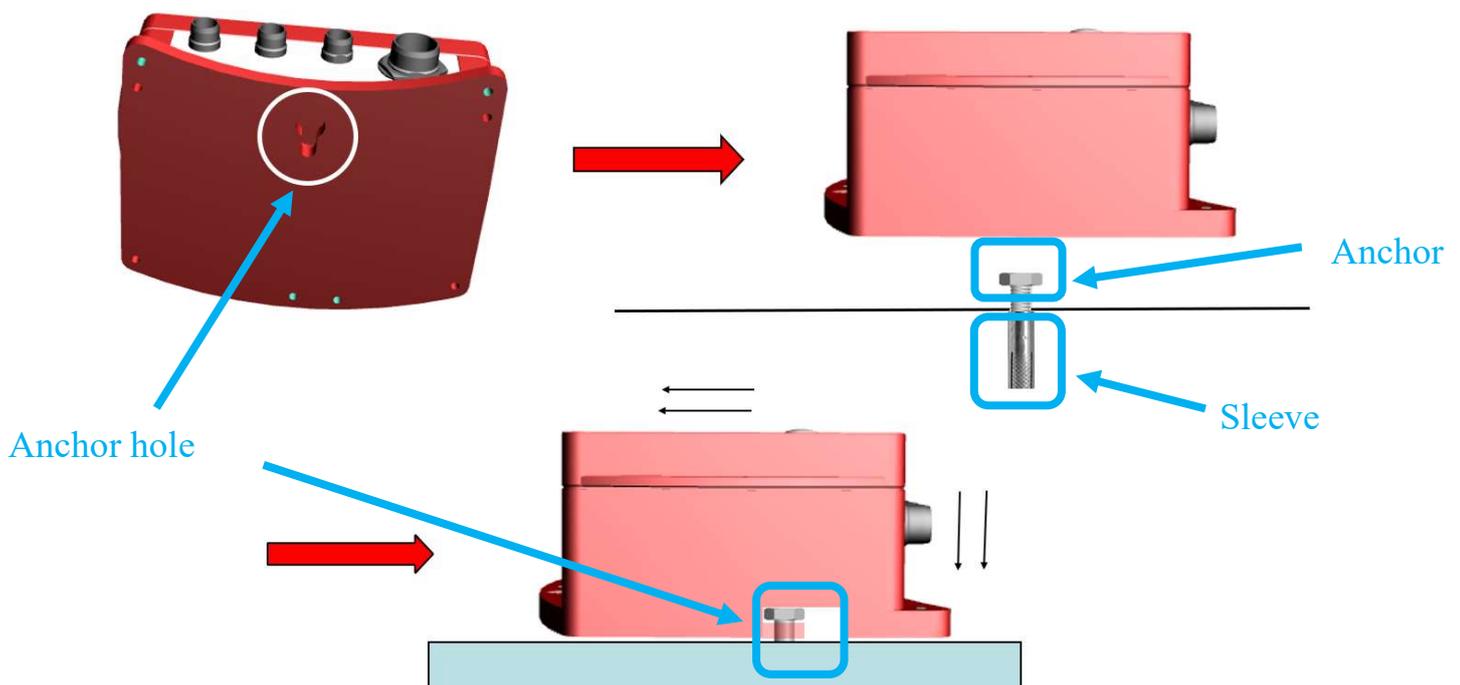


Step 1 : Drilling a hole with sleeve anchor diameter and depth on the wall or platform(ground), diameter and depth around 0.5 and 1.58 inches.

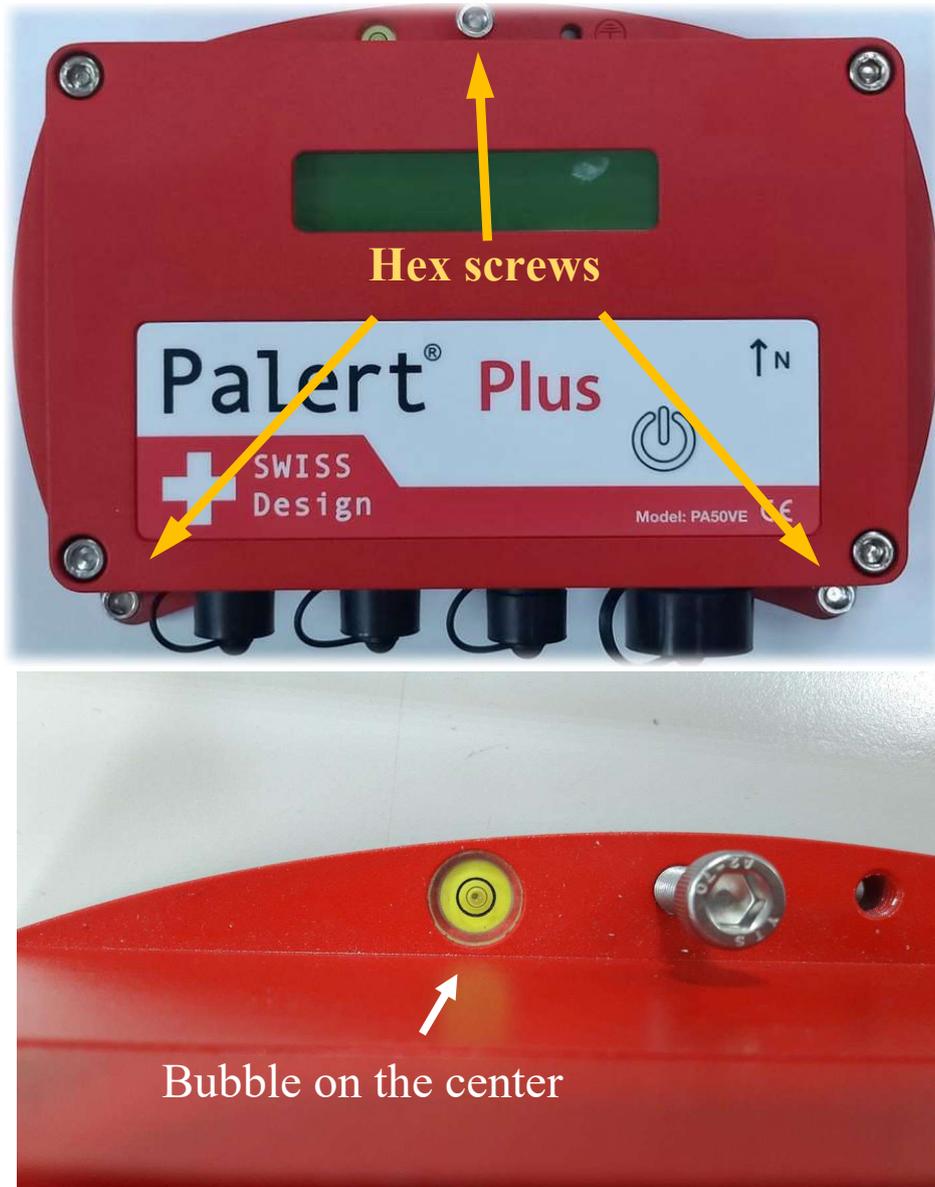
Step 2 : Taps the sleeve in hole with hammer.

Step 3 : Drive the anchor into sleeve part and keep a sufficient distance (around 0.31 inch).

Step 4 : Hook sensor on anchor.



Step 5 : Tight these 3 hex screws on the wall or platform(ground). Level the bubble on the center (horizontal requirement).



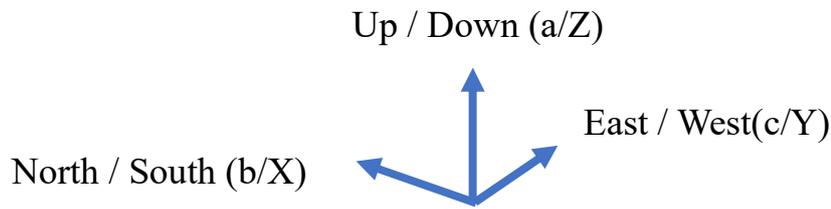
Step 6 : GPS Antenna should be encapsulated with glue as below.

- #. Put the GPS connector cover.
- #. Inject the glue.
- #. Cover the cap after injected.



## 2.2 Mount Direction Description

### 2.2.1 Components Definition

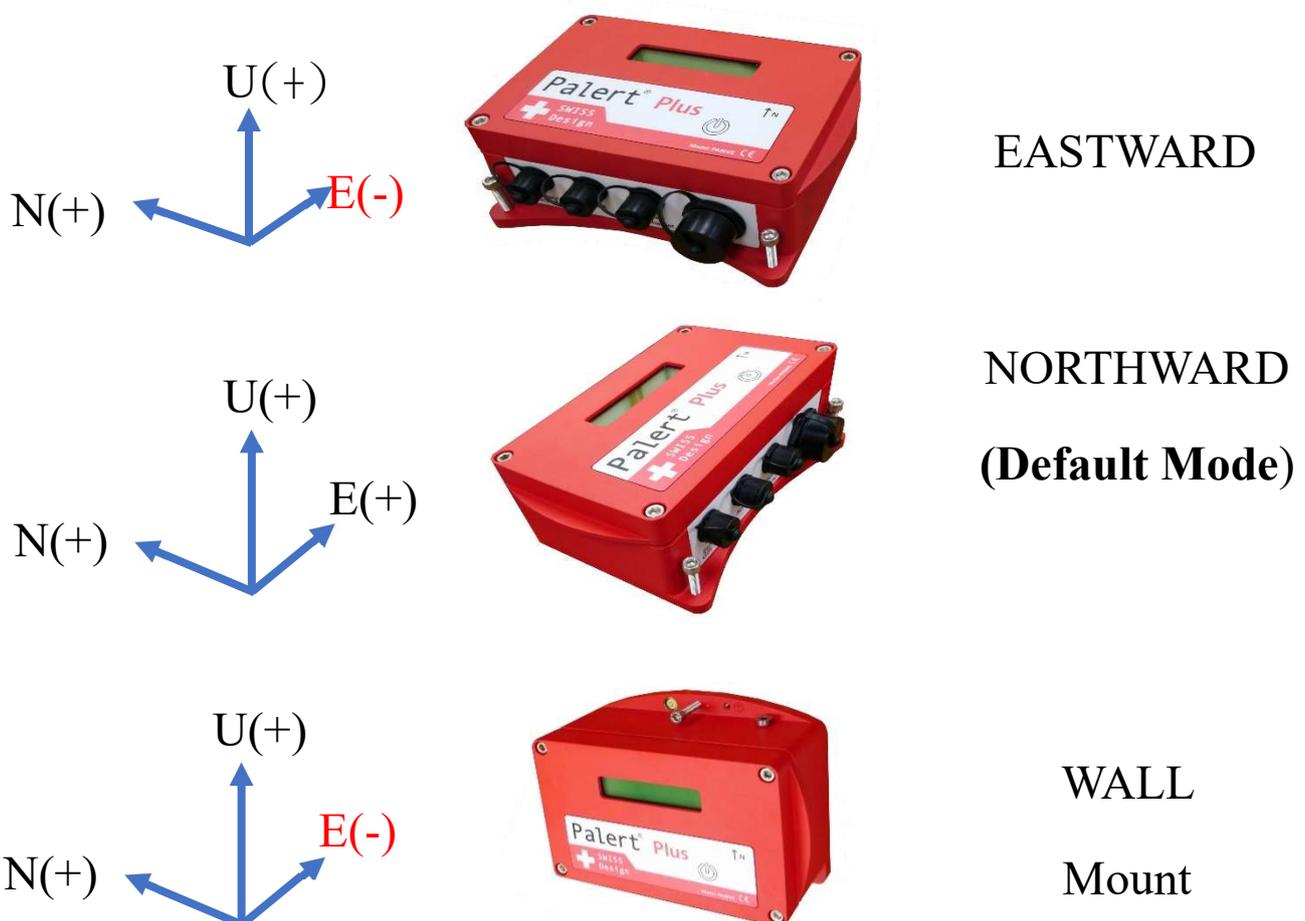


### 2.2.2 Mount Mode

“WALL” and “EASTWARD” mount: Output positive value is in upward, northward and westward direction (negative is on the contrary).

“NORTHWARD” mount: Output positive is in upward, northward and eastward direction (negative is on the contrary). The 3 modes can be set in software.

**NOTICE: The definition of wave polarization is reverse between WALL & NORTHWORD mounting mode from EAST/WEST directions, please contact manufactory when having the wall mounting requirement.**



# 3 Software Description

## 3.1 Computer IP setting

To connected with sensor, computer(laptop) should be the same IP domain with it, here under is the description.

Step 1:

Right click WIFI (Fan symbol) and select “Network and Internet”.



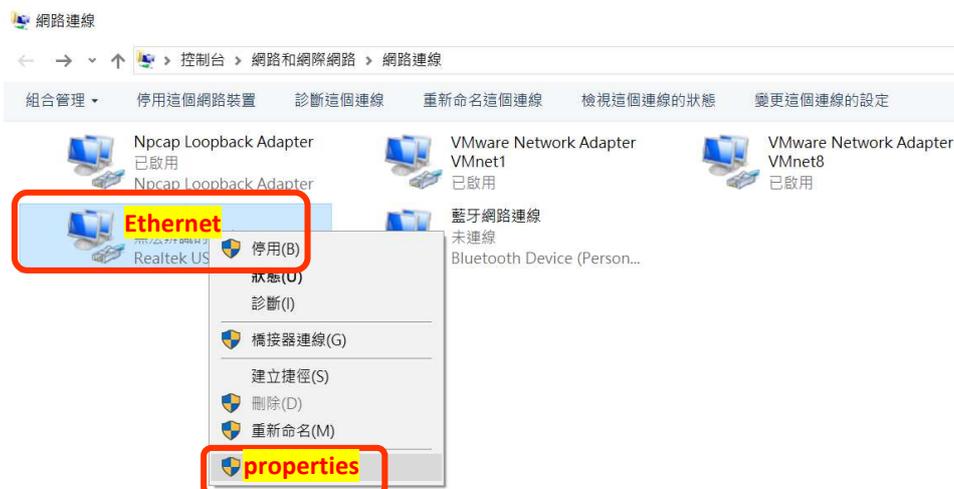
Step 2:

Select change adaptor settings



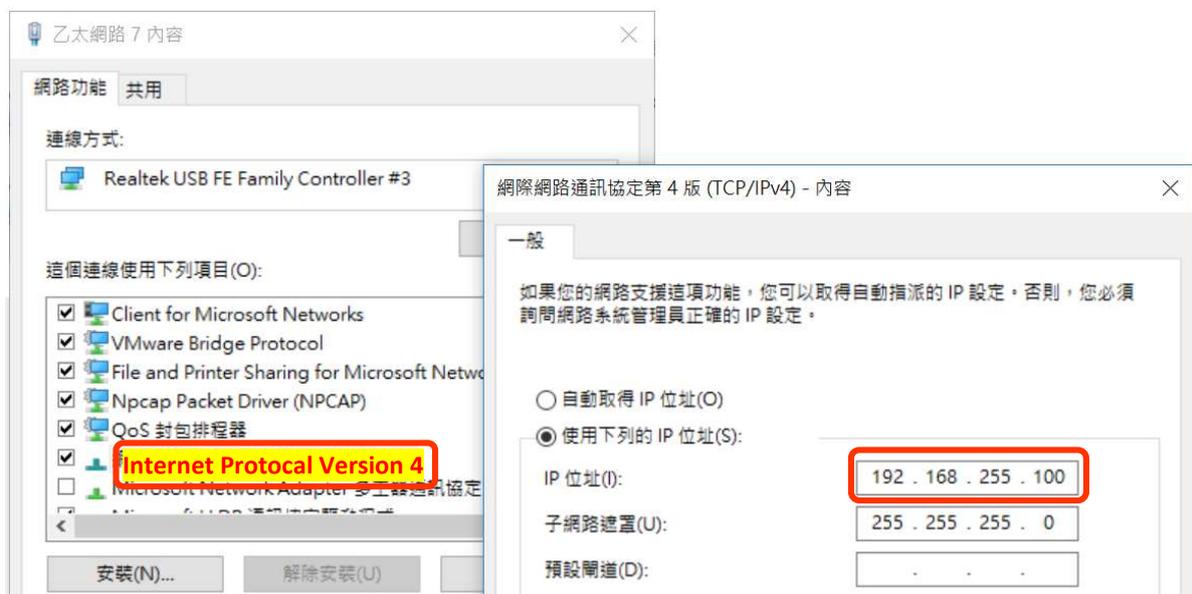
Step 3:

Right click and select properties.



Step 4:

Click IP-V4 and set the same IP with sensor IP domain, for example, default sensor IP is 192.168.255.1, you can only change the 4<sup>th</sup> number with 192.168.255.xxx (the number below 254) in it.



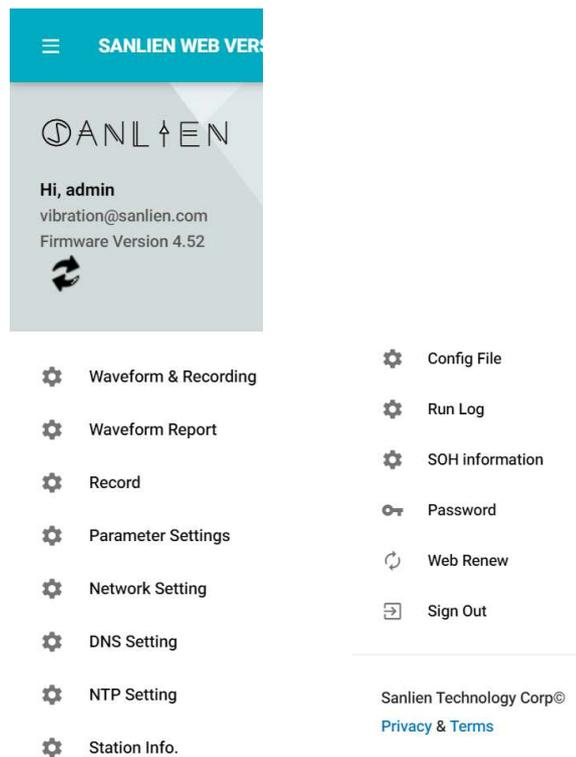
## 3.2 Web Service

### 3.2.1 Web Login

After changing computer IP, open web browser(**DO NOT** use IE) with sensor IP at address bar(If there's no connection with any ethernet cable, the default IP will be "192.168.255.1"). Before clicking "**SEND**", insert "**admin**" as username, "**p@ssw0rd**" as password, clicking "**SEND**" to enter the main page.

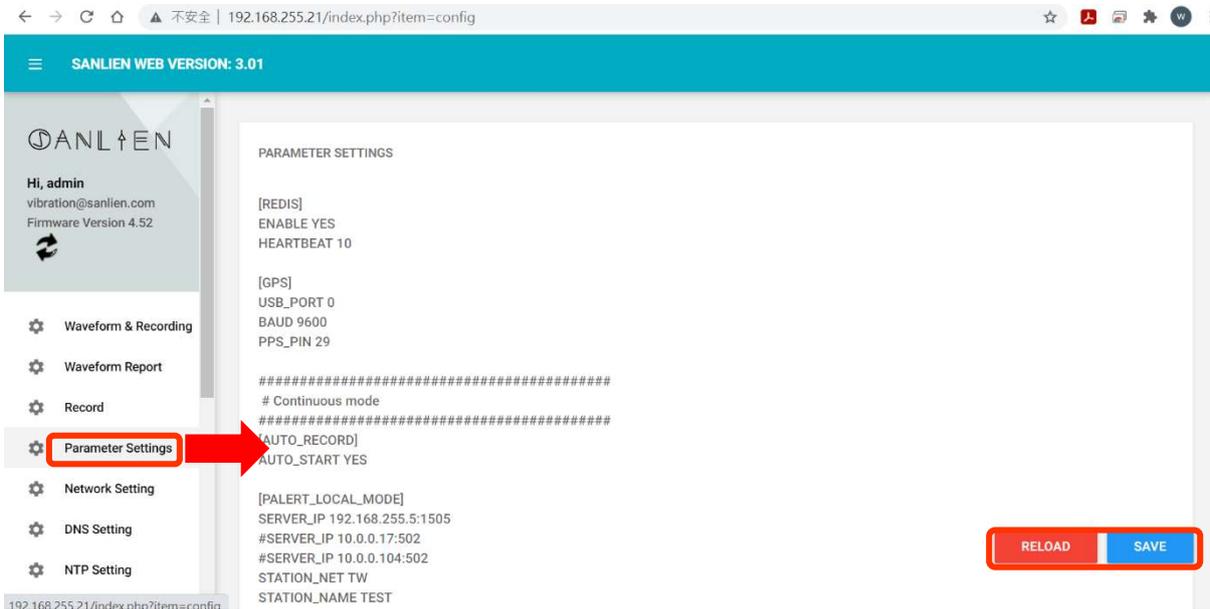


Main properties list on the left side window of main page.



### 3.2.2 Parameter settings

Click “Parameter Settings”, and it appears configuration parameters on the right-side window, click “SAVE” and” Reload” after setting changed.



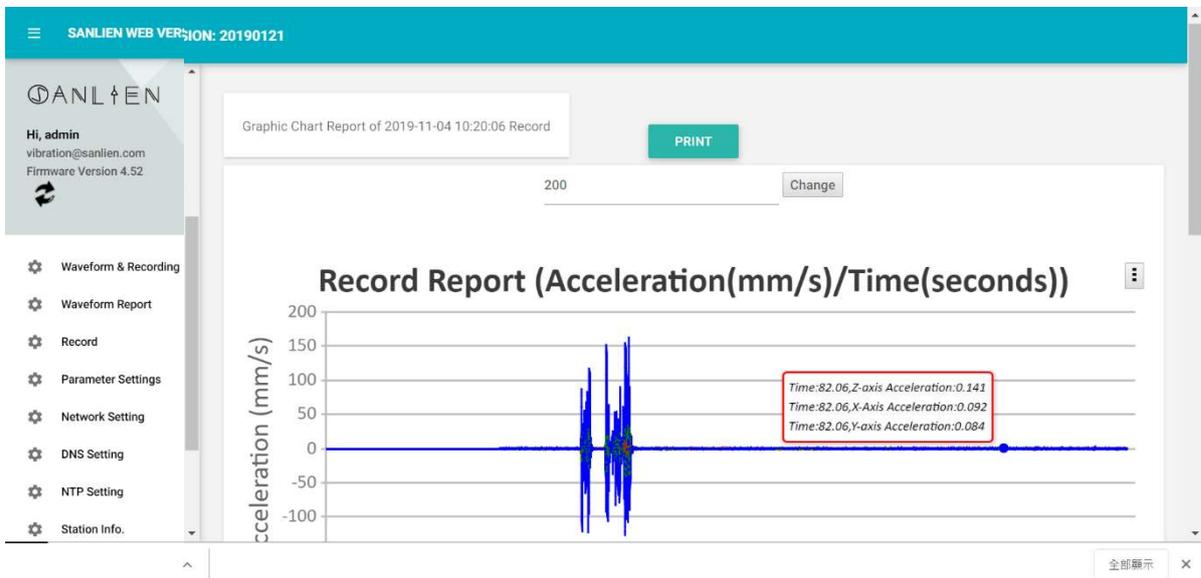
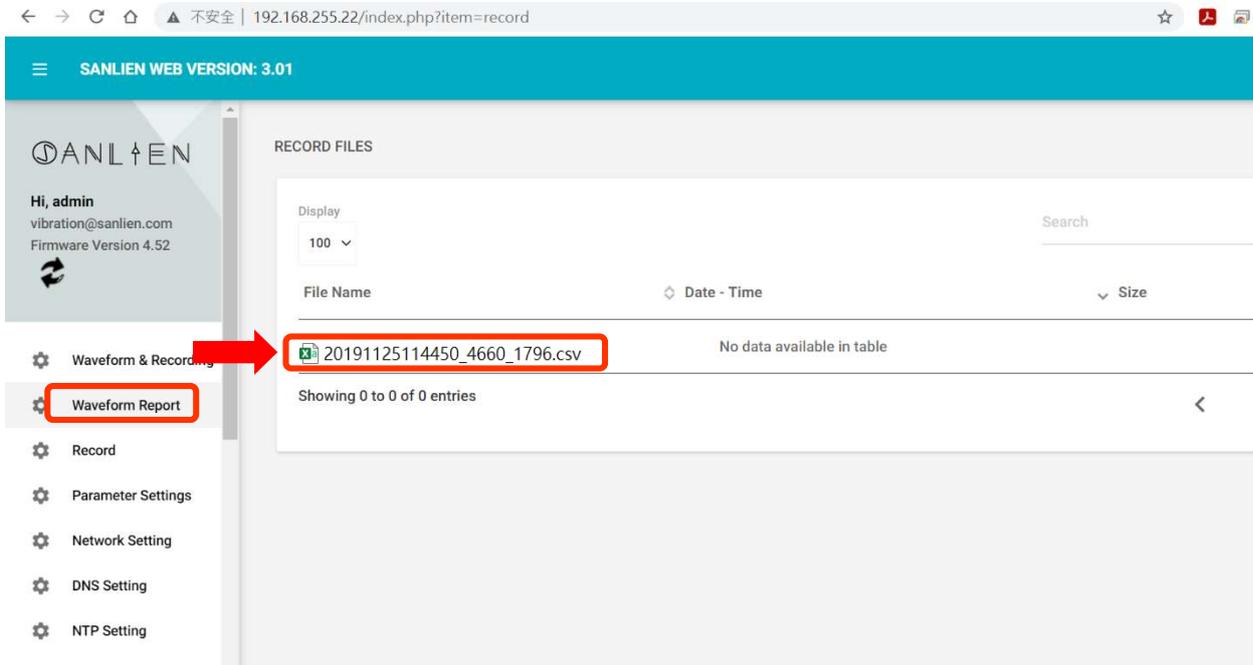
### 3.2.3 Waveform & Recording

Web service provides real time waveform, when click “Waveform & Recording” on the main property, a new streaming webpage will pop up, clicking “Start streaming” can see real time waveform, It also provides a simulation, an square plus with 100 gal generates during 0.8 second after clicking “Calibration”. The “Offset” button serves the manually offsetting in anytime.



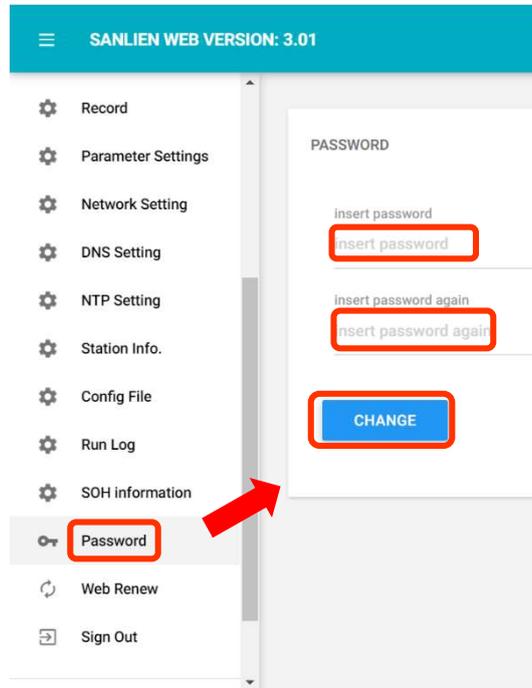
### 3.2.4 Waveform Report

Click "Waveform Report" to check the recorded event file, then click the file name to see the event waveform report as below.



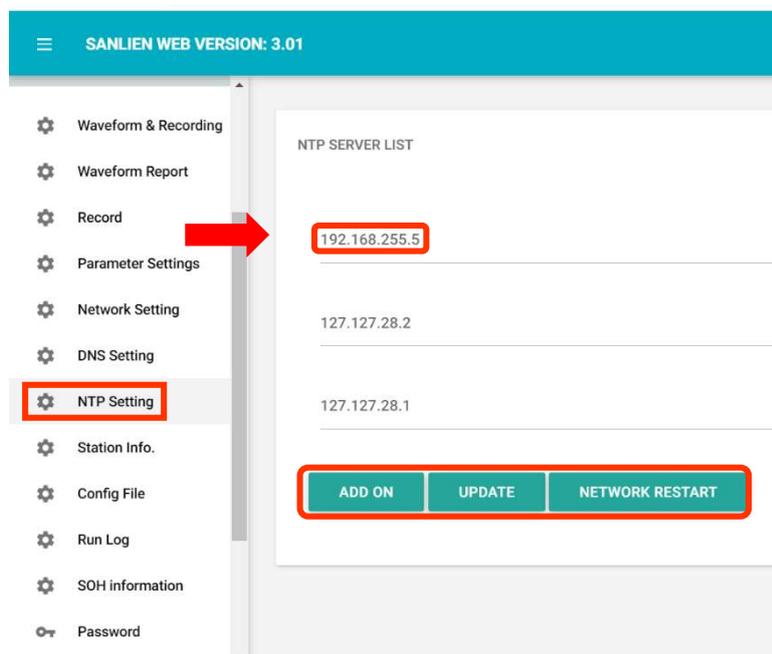
### 3.2.5 Password

Password can be changed by “admin” user, clicking “Password” . Click “CHANGE” after double confirmed the password.



### 3.2.6 NTP (Network Time Protocol) Setting

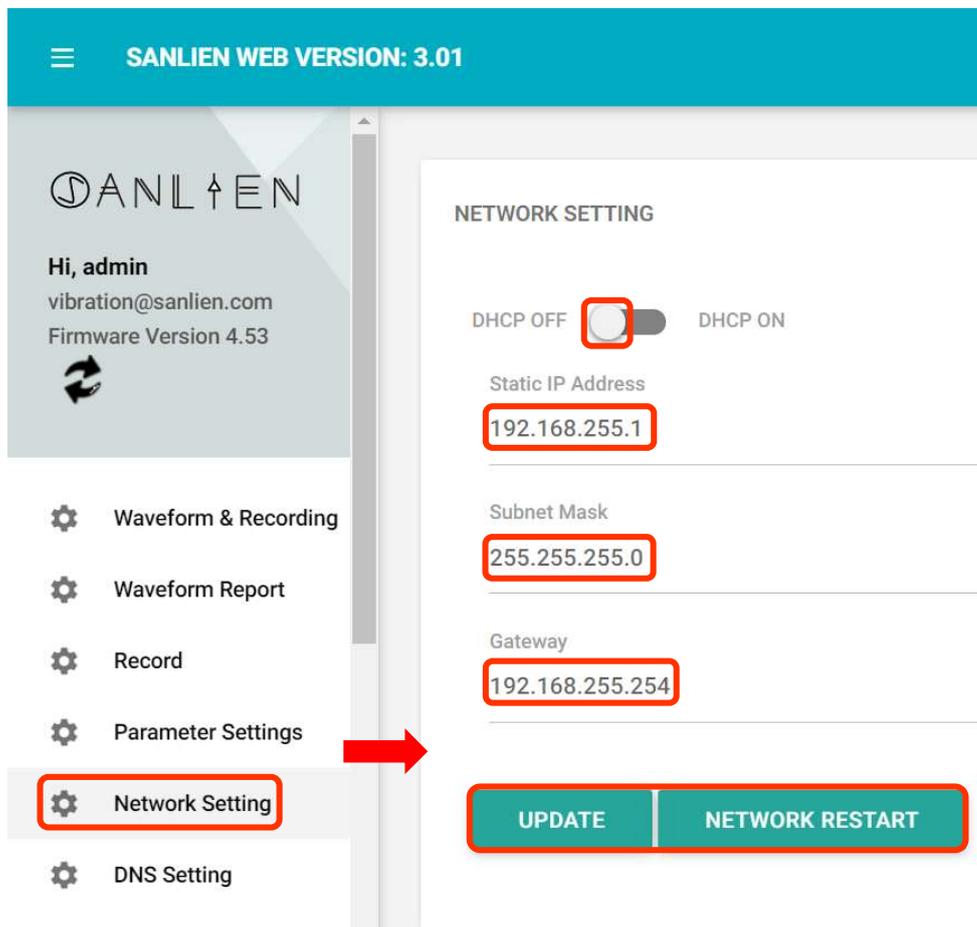
Sensor provides the NTP time synchronization service, please enable **port 123** to open this function. NTP can be inserted domain name or IP address. Click “NTP Setting” at left main property page and then clicking “NETWORK RESTART” after modifying “UPDATE” and “ADD ON”.



### 3.2.7 Self-IP Setting

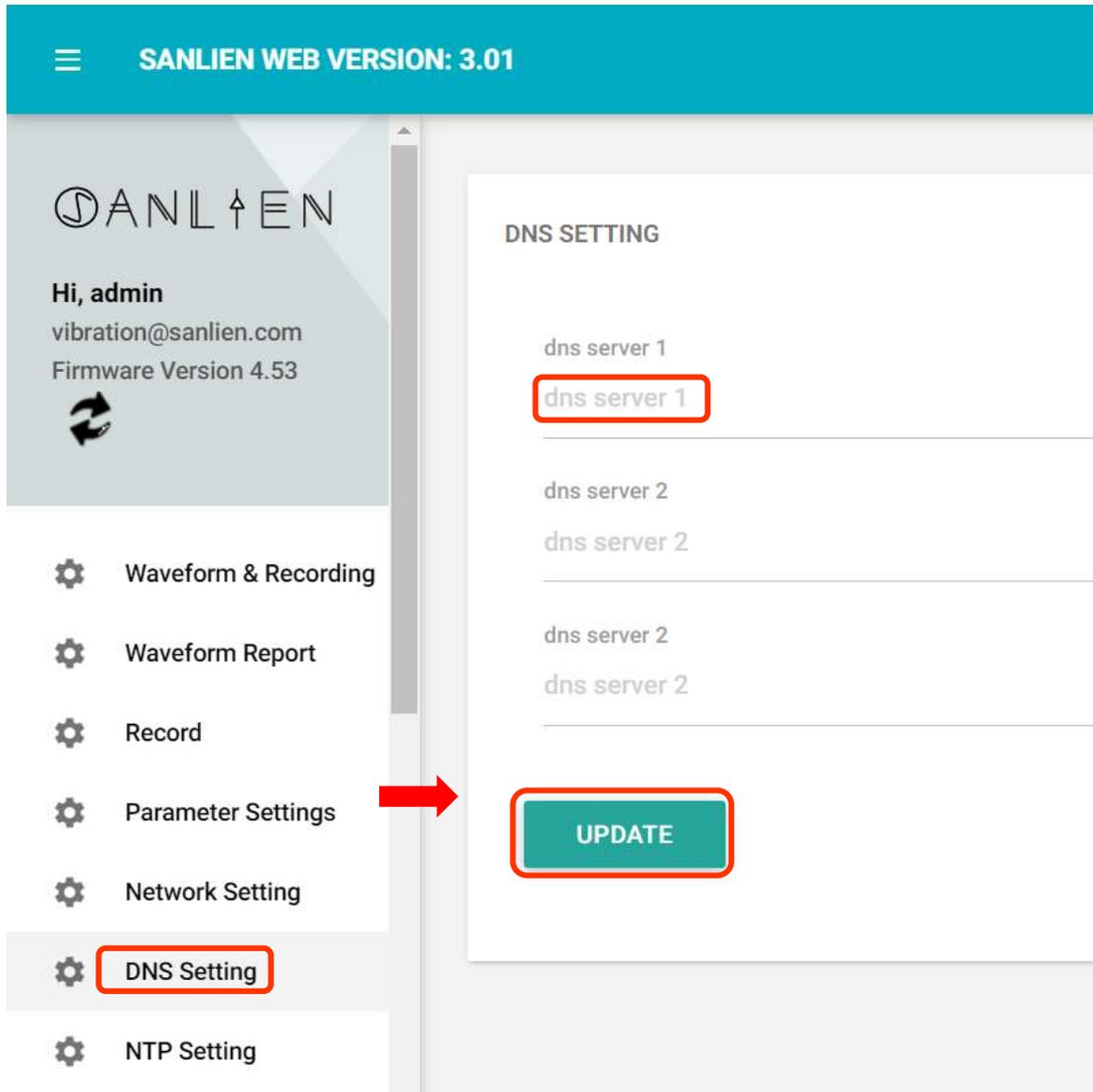
If there is no any internet(intranet) connected with sensor its default IP will be as “192.168.255.1” even in DHCP (Dynamic Host Configuration Protocol) mode. DHCP mode means that if sensor connected with hub or switch, it automatically gets an IP address. sensor can be in the static IP mode as well. The setting sequence description as below.

0. Click “**Networking Setting**”
1. Click to “**DHCP OFF**”
2. Insert IP-V4
3. Insert subnet mask
4. Insert gateway
5. Click “**UPDATE**” and “**NETWORK RESTART**”
6. Power cycle sensor physically



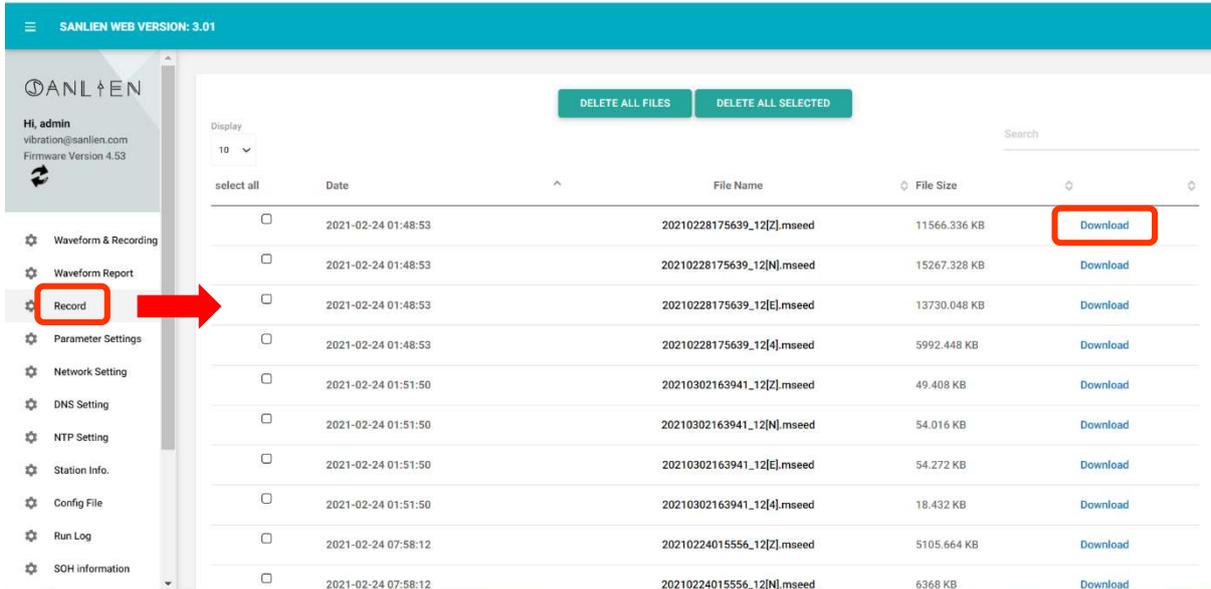
### 3.2.8 DNS Setting

If sensor connects via internet, the DNS (Domain Name System) needs to be enabled. The DNS can be enabled as google public IP by 8.8.8.8(or 8.8.4.4). Besides that, it can be defined as privacy DNS in individual area as well. Click **“DNS Setting”** then Click **“UPDATE”** after setting up at right side window.



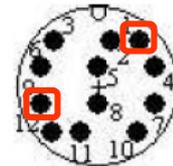
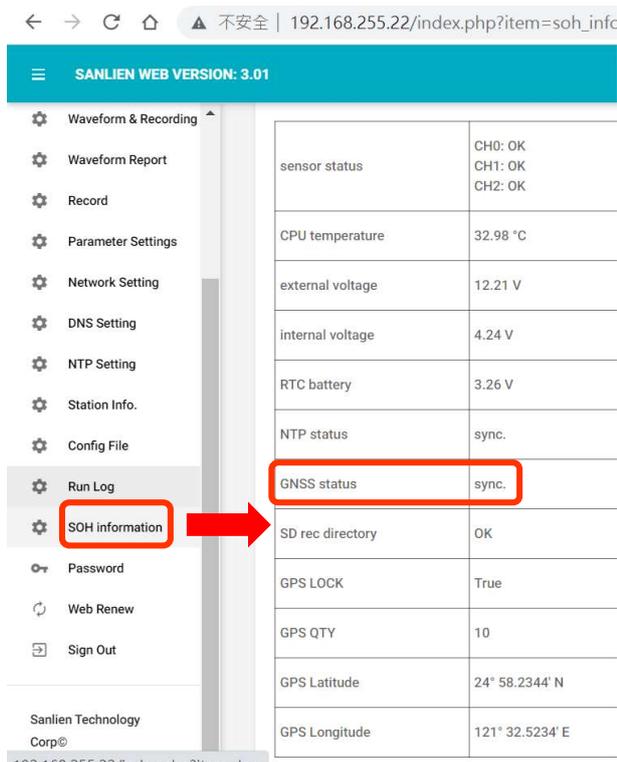
### 3.2.9 Record Download & SOH

Click “Record” then all the files can be downloaded from “Download” word.



Click “SOH Information”, status of health shows the basic health condition, the items see below. If GNSS connected stable, the GNSS shows “sync.”, LCD always appears a heart-beat cycling dot on the right top of location between the number of firmware version.

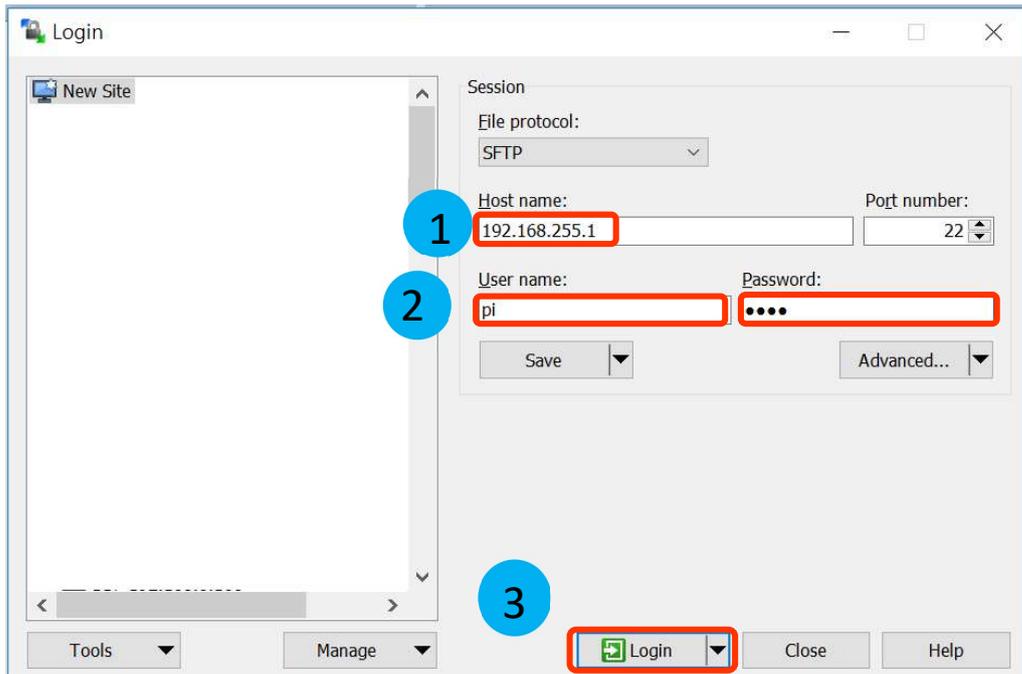
**Notice:** If sensor repeat showing “no heartbeat” on LCD, short pin1 & pin9 with a dupont line from sensor port after power off it, and then power on again, the status becomes normal.



## 3.3 WinSCP Operation

### 3.3.1 WinSCP Login

- (1) Insert sensor IP (Default: 192.168.255.1)
- (2) User name: **pi**  
Password: **1111**
- (3) Click Login

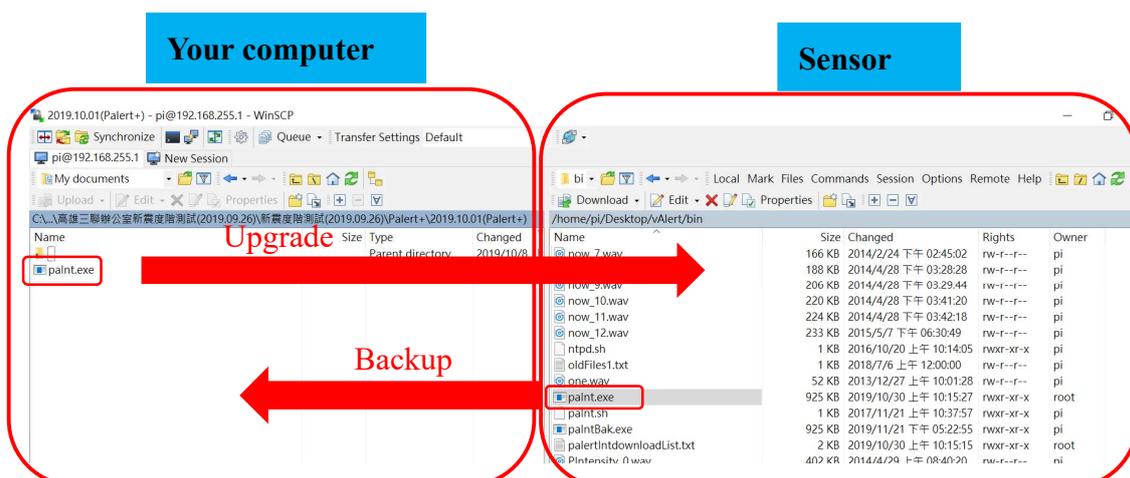


### 3.3.2 WinSCP Interface

Drag new firmware to upgrade

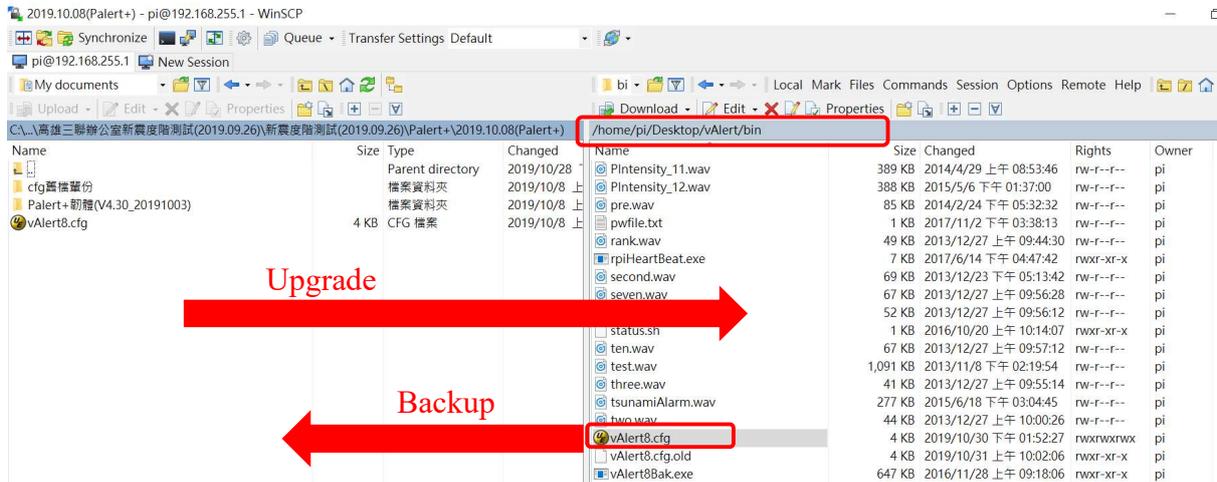
Left Side: Local side (your computer)

Right Side: Sensor



### 3.3.3 WinSCP Retrieves Parameter File

Click into /home/pi/Desktop/vAlert/bin and retrieving “vAlert8.cfg” and dragging to your computer, open this configuration file to edit, and then upgrade back to sensor after it is modified.



Below shows the basic “Event mode” parameters setting and “Continuous mode” for example. Event mode has the trigger thresholds, which are “PD”, “PGA” and “STA\_LTA”. For this case, modify the “PD” and “STAL\_LTA” from “ON” to “YES”, and then saving and dragging back to sensor side by WinSCP. Sensor will be enabled all of these trigger function after reloading parameters. Mounting mode default is “NORTHWARD”, which means north side forward north direction in ground mounting. Currently, LPF provides 10 secs.

```

#####
# Continuous mode
#####
[AUTO_RECORD]
AUTO_START YES

[PALERT_LOCAL_MODE]
SERVER_IP 192.168.255.5:1505
#SERVER_IP 10.0.0.17:502
#SERVER_IP 10.0.0.104:502
STATION_NET TW
STATION_NAME TEST
STATION_CH_NAME HL
STATION_LOCATION 00
SAMPLING_RATE 100
LPF 10
HPF 0
AUTO_OFFSET YES
PD_TRIG_ENABLE NO
PGA_TRIG_ENABLE NO
STA_LTA_TRIG_ENABLE NO
INSTALLATION_ANGLE 0
MOUNT_MODE NORTHWARD

[EVENT_FILE_FORMAT]
mseed
#####
# Event mode
#####
#[PALERT_LOCAL_MODE]
#SERVER_IP 10.0.0.102:502
#SERVER_IP 10.0.0.103:502
#SERVER_IP 10.0.0.104:502
#STATION_NET TW
#STATION_NAME PP01
#STATION_CH_NAME HL
#STATION_LOCATION 00
#SAMPLING_RATE 1000
#LPF 10
#HPF 0
#AUTO_OFFSET YES
#PD_TRIG_ENABLE YES
#PD_WATCH_THRESHOLD 0.2
#PD_WARNING_THRESHOLD 0.35
#PGA_TRIG_ENABLE YES
#PGA_WATCH_THRESHOLD 8
#PGA_WARNING_THRESHOLD 25
#PGA_ACTION_THRESHOLD 80
#STA_LTA_TRIG_ENABLE YES
#STA_WIDTH 2
#LTA_WIDTH 40
#STA_LTA_THRESHOLD 3.5
#STA_LTA_EVENT_TIME 15
#STA_LTA_RELAY1 2.4
#STA_LTA_RELAY2 8.1
#STA_LTA_RELAY3 24.9
#INSTALLATION_ANGLE 0
#MOUNT_MODE EASTWARD

```



Default “[SAMPLING\_RATE]” is “100” in sampling per second, it optional provides “200”, ”500” and “1000”. Default output format is miniseed, it can be changed to CSV format by adding the hashtag symbol (“#”) in front of 2 command lines from “[EVENT\_FILE\_FORMAT]” command. “[RECORD\_INTENSITY]” criteria can be changed at second line by the number of MMI scale. Following this principle, command can be enabled by removing the hashtag in front any of these commands. The “hardware.cfg” at the same folder has the priority than vAlert8.cfg to execute. **DO NOT** change “hardware.cfg” before contacting manufactory.

<pre>#PD_TRIG_ENABLE YES #PD_WATCH_THRESHOLD 0.2 #PD_WARNING_THRESHOLD 0.35 #PGA_TRIG_ENABLE YES #PGA_WATCH_THRESHOLD 8 #PGA_WARNING_THRESHOLD 25 #PGA_ACTION_THRESHOLD 80 #STA_LTA_TRIG_ENABLE YES #STA_WIDTH 2 #LTA_WIDTH 40 #STA_LTA_THRESHOLD 3.5 #STA_LTA_EVENT_TIME 15 #STA_LTA_RELAY1 2.4 #STA_LTA_RELAY2 8.1 #STA_LTA_RELAY3 24.9 #INSTALLATION_ANGLE 0 #MOUNT_MODE EASTWARD #[RECORD_INTENSITY] 2 #[PECORD_PGA] 8 [PRE_EVENT_SECOND] 5</pre>	<pre>##### # Palert local mode ##### [PALERT_LOCAL_MODE] SPS1000 YES LCD_BACK_LIGHT_SECOND 15 MODE TAIWAN SERVER_STREAM_MODE_TAIWAN 4 STREAM_TRIG_PACKET NO CEB_MODE NO MSEEDFILE_VALID_DAY 90 CEB_SEND_TIMEOUT_USEC 5000 STREAMING_IN_MSEC 1000 VECTOR_INTENSITY YES FILTER_CEB_MODE NO FIR_MODE NO WATCH_TIME 5 WARNING_TIME 10 POWEROFF_SECONDS_TO_CPU 10 EXT_POWER_LOW_TH 10 INT_BATTERY_LOW_TH 3.5 RTC_BATTERY_LOW_TH 2.5 CPU_STATUS_DISPLAY_INTERVAL 60 EVENT_MAX_SECONDS 600 EVENT_MIN_SECONDS 10 RING_SECONDS 30 RING_CHANNELS 3 RING_FILTERED NO S3_MODE NO MINIMUM_OFFSET_GAL 1960 SENSOR_TYPE PALERT220 RTC_SOURCE RPI CPU_RTC_PPS_ENABLE YES</pre>
---	--

After modifying the requirement setting. physical reload parameters after press the button for 4 seconds.



### 3.3.4 Earthquake Event Checking

Sensor can download recording event file from the path

“/home/pi/Desktop/vAlert/rec” by WinSCP.

C:\Program Files (x86)\Palert\RecCSV				/home/pi/Desktop/vAlert/rec				
Name	Size	Type	Changed	Name	Size	Changed	Rights	Owner
..		Parent directory	2019/11/26 上午 06:49:...	.		2017/11/2 上午 10:39:57	rw-r-xr-x	pi
190611001059_4309...	786 KB	Microsoft Excel 運...	2019/6/11 下午 02:49:23	20191029145431_466...	231 KB	2019/10/29 下午 02:54:55	rw-r--r--	root
190725083248_-1.CSV	915 KB	Microsoft Excel 運...	2019/7/25 上午 08:35:21	20191029145459_466...	211 KB	2019/10/29 下午 02:55:20	rw-r--r--	root
190725083641_-1.CSV	915 KB	Microsoft Excel 運...	2019/7/25 上午 08:38:01	20191029145546_466...	211 KB	2019/10/29 下午 02:56:07	rw-r--r--	root
190725084020_-1.CSV	915 KB	Microsoft Excel 運...	2019/7/25 上午 08:41:31	20191030094143_466...	211 KB	2019/10/30 上午 09:42:03	rw-r--r--	root
190725084457_-1.CSV	915 KB	Microsoft Excel 運...	2019/7/25 上午 08:46:13	20191030095447_466...	211 KB	2019/10/30 上午 09:55:08	rw-r--r--	root
190805181316_3252....	915 KB	Microsoft Excel 運...	2019/8/5 下午 06:15:02	20191030134129_466...	487 KB	2019/10/30 下午 01:42:31	rw-r--r--	root
191031094109_2072....	915 KB	Microsoft Excel 運...	2019/10/31 上午 09:42:...	20191030134429_466...	217 KB	2019/10/30 下午 01:44:51	rw-r--r--	root
20191029180232_364...	1,403 KB	Microsoft Excel 運...	2019/10/29 下午 06:04:...	20191030135218_466...	217 KB	2019/10/30 下午 01:52:40	rw-r--r--	root
M0518085510.csv	1 KB	Microsoft Excel 運...	2019/5/18 上午 08:55:13	20191030135510_466...	217 KB	2019/10/30 下午 01:55:31	rw-r--r--	root
M0606171110.csv	1 KB	Microsoft Excel 運...	2019/6/6 下午 05:11:12	20191031082158_466...	318 KB	2019/10/31 上午 08:22:36	rw-r--r--	root
				20191031100235_466...	204 KB	2019/10/31 上午 10:02:18	rw-r--r--	root
				20191031100532_466...	258 KB	2019/10/31 上午 10:06:00	rw-r--r--	root
				20191031100932_466...	217 KB	2019/10/31 上午 10:09:54	rw-r--r--	root
				20191031101104_466...	211 KB	2019/10/31 上午 10:11:25	rw-r--r--	root
				20191031101334_466...	211 KB	2019/10/31 上午 10:13:55	rw-r--r--	root
				20191031101549_466...	211 KB	2019/10/31 上午 10:16:10	rw-r--r--	root
				20191031101744_466...	217 KB	2019/10/31 上午 10:18:06	rw-r--r--	root
				20191031102157_466...	217 KB	2019/10/31 上午 10:22:19	rw-r--r--	root
				20191031103804_466...	217 KB	2019/10/31 上午 10:38:26	rw-r--r--	root
				20191031103906_466...	817 KB	2019/10/31 上午 10:40:57	rw-r--r--	root
				20191031104208_466...	251 KB	2019/10/31 上午 10:42:35	rw-r--r--	root
				20191031105239_466...	217 KB	2019/10/31 上午 10:53:01	rw-r--r--	root

#### File name description:

 20191125114450\_4660\_1796.csv

Date: YYYYMMDDhhmmss

Serial NO.

Acceleration multiples 10

\*\*\*\*\*

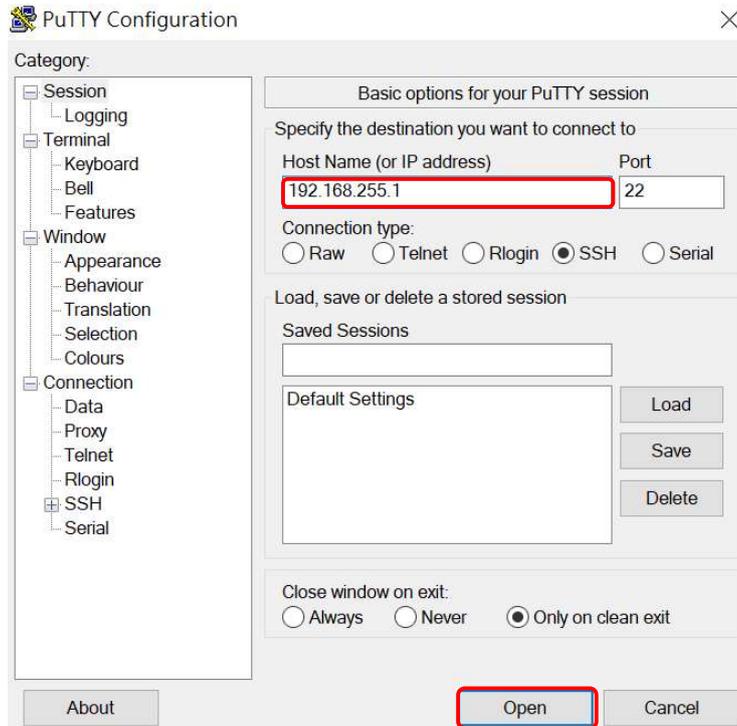
WinSCP Official Webpage to download:

<https://winscp.net/eng/download.php>

## 3.4 PuTTY Operation

### 3.4.1 PuTTY Login

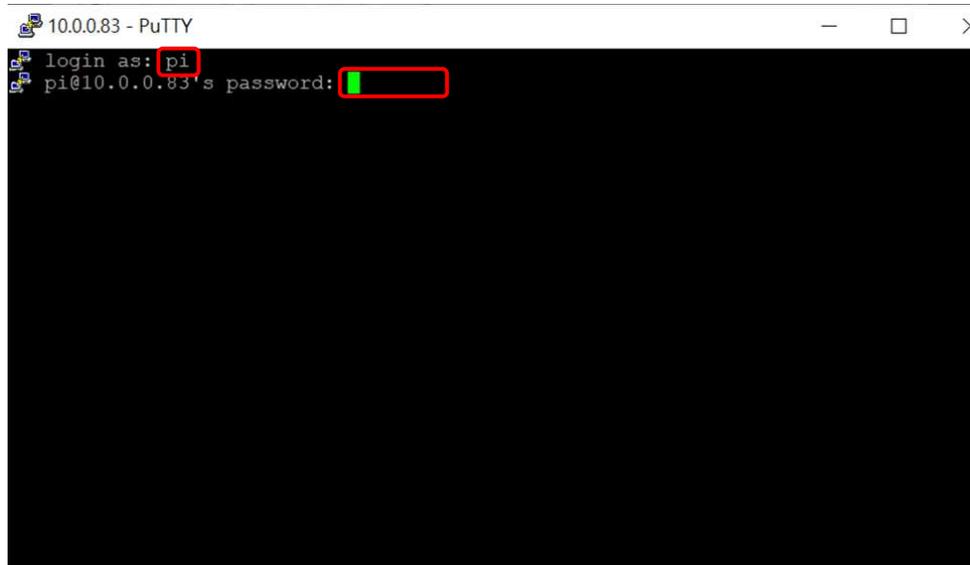
- (1) Insert sensor IP (Default: 192.168.255.1)
- (2) Click “Open”



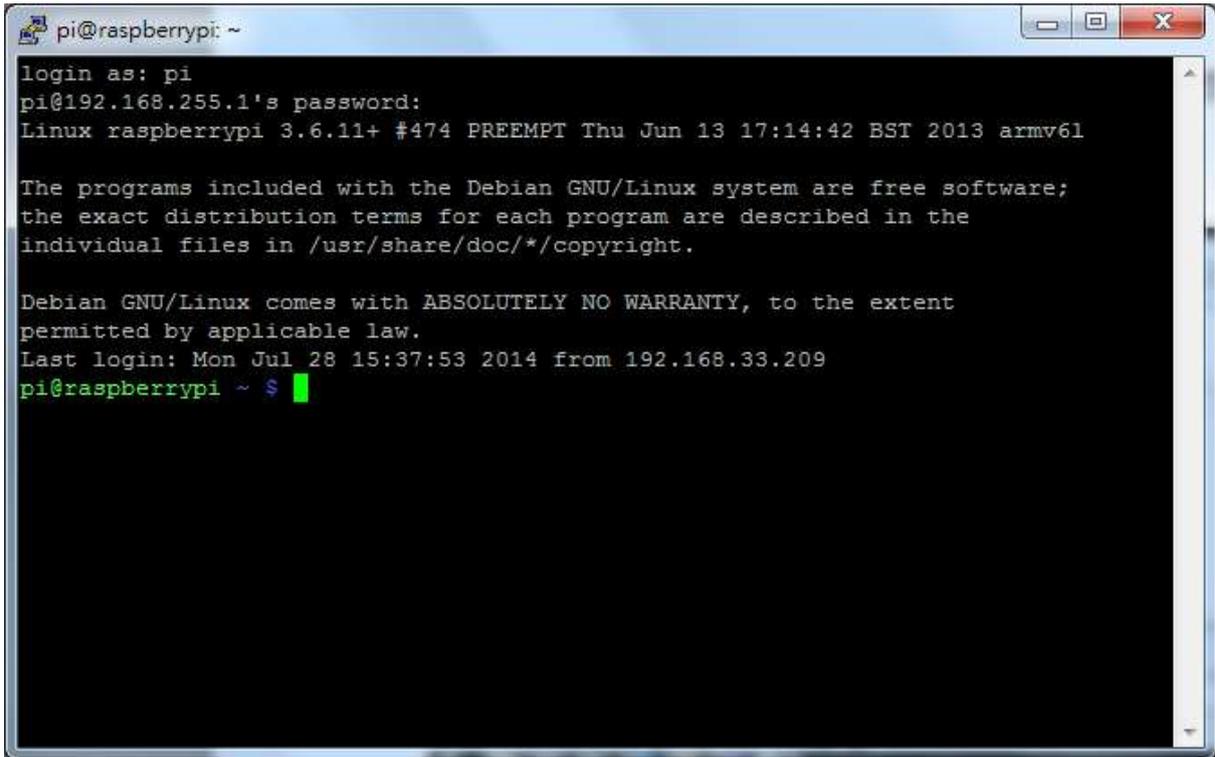
### 3.4.2 PuTTY Login Window

Login in: pi

Password: 1111. Putty is invisible to enter.



The initial command window shows below.



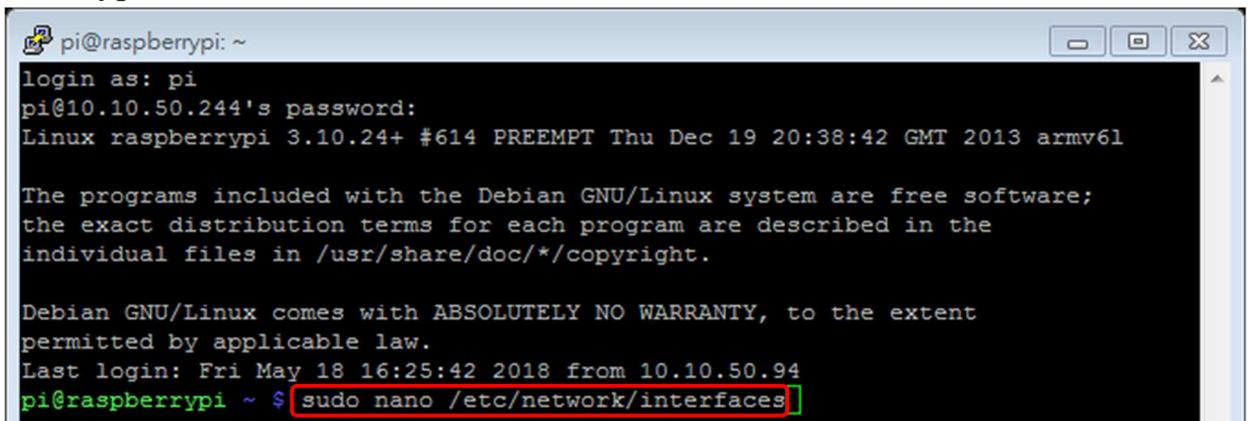
```
pi@raspberrypi: ~
login as: pi
pi@192.168.255.1's password:
Linux raspberrypi 3.6.11+ #474 PREEMPT Thu Jun 13 17:14:42 BST 2013 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Jul 28 15:37:53 2014 from 192.168.33.209
pi@raspberrypi ~ $
```

### 3.4.3 Modify Sensor IP

Type “`sudo nano /etc/network/interfaces`” to enter.



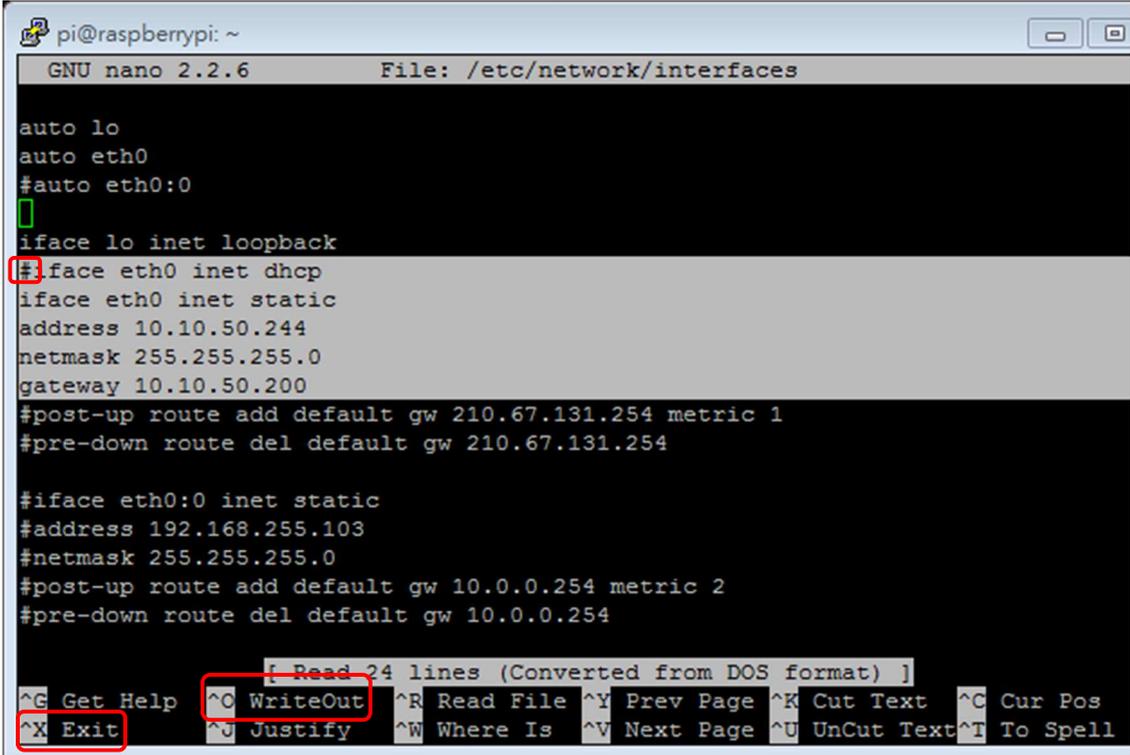
```
pi@raspberrypi: ~
login as: pi
pi@10.10.50.244's password:
Linux raspberrypi 3.10.24+ #614 PREEMPT Thu Dec 19 20:38:42 GMT 2013 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri May 18 16:25:42 2018 from 10.10.50.94
pi@raspberrypi ~ $ sudo nano /etc/network/interfaces
```

After entering, Command will open an edit window.

- (1) The Cursor should be moved by direction button on your keyboard, for this case, adds a hashtag in front of DHCP to stop the automatically IP given, and setting the new IP on it, finally pressing “**Ctrl + O**” at the same time on keyboard to write down, “**Ctrl + X**” to exit this mode.



```
pi@raspberrypi: ~
GNU nano 2.2.6 File: /etc/network/interfaces

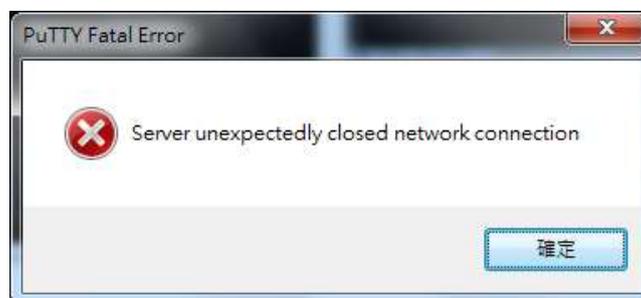
auto lo
auto eth0
#auto eth0:0
[red box]
iface lo inet loopback
[red box] #iface eth0 inet dhcp
iface eth0 inet static
address 10.10.50.244
netmask 255.255.255.0
gateway 10.10.50.200
#post-up route add default gw 210.67.131.254 metric 1
#pre-down route del default gw 210.67.131.254

#iface eth0:0 inet static
#address 192.168.255.103
#netmask 255.255.255.0
#post-up route add default gw 10.0.0.254 metric 2
#pre-down route del default gw 10.0.0.254

[ Read 24 lines (Converted from DOS format) ]
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

- (2) Press 4 seconds from sensor button or typing “**sudo /etc/init.d/networking restart**” on command line to reload the IP.

(PuTTY shows error when reloading, this is normal) ◦



### 3.4.4 Modify NTP

(1) Type “**sudo nano /etc/ntp.conf**” to add or setting the NTP address.

```
pi@raspberrypi: ~
login as: pi
pi@192.168.255.3's password:

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Feb 13 17:36:25 2020 from 192.168.255.100
pi@raspberrypi:~ $ sudo nano /etc/ntp.conf
```

(2) The adding command is “**server IP iburst**”, shows below.

```
GNU nano 2.2.6 File: /etc/ntp.conf Modified
restrict ::1

# Clients from this (example!) subnet have unlimited access, but only if
# cryptographically authenticated.
#restrict 192.168.123.0 mask 255.255.255.0 notrust

# If you want to provide time to your local subnet, change the next line.
# (Again, the address is an example only.)
#broadcast 192.168.123.255

# If you want to listen to time broadcasts on your local subnet, de-comment the
# next lines. Please do this only if you trust everybody on the network!
#disable auth
#broadcastclient

server 192.168.255.100 iburst
```

(3) Repeat the “**Ctrl + O**” and “**Ctrl + X**” and 4 seconds by key.

(4) Command “**ntpq -pn**” can check the current NTP status.

```
pi@raspberrypi:~ $ ntpq -pn
```

NTP table is showing a start (\*) when NTP enabling, if start has not appearing, there is no any NTP connected.

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Feb 13 17:36:45 2020 from 192.168.255.100
pi@raspberrypi:~ $ ntpq -pn
remote          refid           st t when poll reach  delay  offset  jitter
=====
*192.168.255.100 76.79.67.76    14 u  49   64   17   5.096  49.983  46.799
pi@raspberrypi:~ $
```

If system has no NTP can be provided, sensor can be set as self-IP time synchronization. Shows below.

```
pi@raspberrypi: ~
GNU nano 2.2.6 File: /etc/ntp.conf Modified
# If you want to listen to time broadcasts on your local subnet, de-comment the
# next lines. Please do this only if you trust everybody on the network!
#disable auth
#broadcastclient

server 127.0.0.1
fudge 127.127.1.0 stratum 10

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Hashtag server x.x.x.x iburst

Add 2 lines of commands:

**“server 127.127.1.0”**

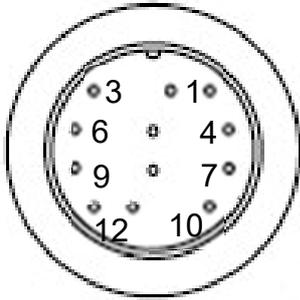
**“fudge 127.127.1.0 stratum 10”**

\*\*\*\*\*

PuTTY Official Webpage to download:

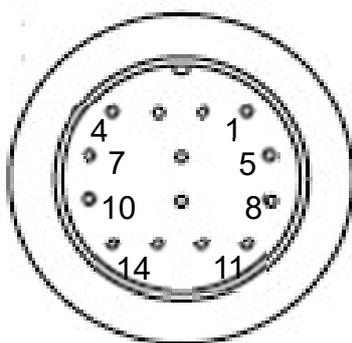
<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

## Appendix: Sensor Port Pin Definition Front side view



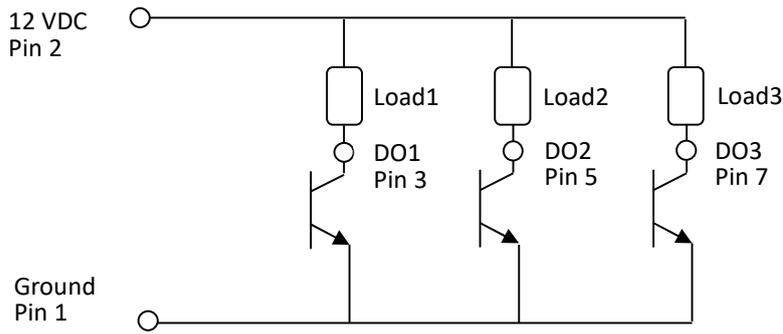
Pin	Description	Pin	Description
1	Ground	7	NC
2	12 VDC output, 0.1 A maximum	8	NC
3	Sensor + input	9	Switch-off internal battery if grounded
4	Sensor – input	10	NC
5	NC	11	NC
6	NC	12	Protective earthing conductor

## AUX Port Pin Definition Front side view

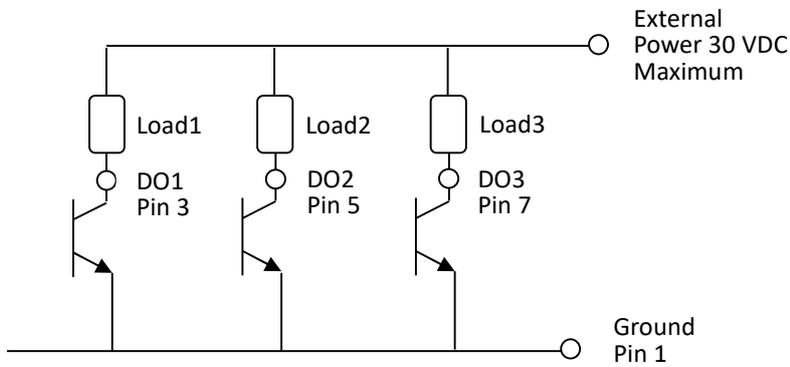


Pin	Description	Pin	Description
1	Ground	8	NC
2	12 VDC output, 0.1 A maximum	9	NC
3	DO1 output, 0.1 A maximum	10	NC
4	NC	11	NC
5	DO2 output, 0.1 A maximum	12	NC
6	NC	13	NC
7	DO3 output, 0.1 A maximum	14	Protective earthing conductor

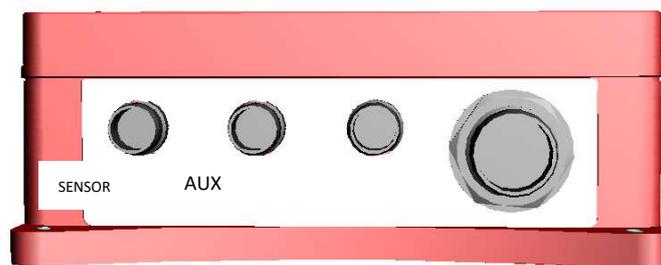
## AUX DO Pin Wiring



- Internal Power Source: 12 VDC be Provided in Pin 2 (Total 0.1A Max).



- External Power Source: 30 VDC(Max) should be Supported.



## Modbus Registration Mapping-pALERT S303

### AO (4xxxx)

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0063	R	SYNC_FLAG	Bit 0: NTP SYNC. Bit 1: server0 connection Bit 2: server1 connection Bit 3: server2 connection Bit 8: admin. server0 connection Bit 9: admin. server1 connection Bit 10: admin. server2 connection Bit 14: GPS sync. Bit 15: time sync. with CWB EEW server
0x0064	R	A_AXIS	A axis Acceleration in count, 1 gal = 16.718 counts
0x0065	R	B_AXIS	B axis Acceleration in count, 1 gal = 16.718 counts
0x0066	R	C_AXIS	C axis Acceleration in count, 1 gal = 16.718 counts
0x0067	R	VECTOR	Real time vecor acceleration in count , 1 gal = 16.718 counts. Vector = $\sqrt{a^2 + b^2 + c^2}$
0x0068	R	A_OFFSET	A axis zero offset in count
0x0069	R	B_OFFSET	B axis zero offset in count
0x006A	R	C_OFFSET	C axis zero offset in count
0x006B	R	VECTOR_GAL_MAX	The maximum vector acceleration during earthquake occurred. The unit is 0.1 gal. The value will keep in the register until next event occurred in this registration.
0x006C	R	INTENSITY_NOW	Real time intensity
0x006D	R	INTENSITY_MAX	The maximum intensity during earthquake event.
0x006E	R	EVENT_FLAG	Bit 1: Pd event Bit 2: PGA event Bit 3: STA/LTA ebent
0x006F	R	LTA_FLAG	0: STA/LTA : System is initializing and unabling to detect earthquake. 1: STA/LTA : Earthquake is detecting normally.
0x0070	R/W	WRITE_CONFIG	0x0080: Enforce stop program execution 0x0180: Reload program 0x0181: Enable FTP update program 0x0380: Setting is written down into initSetup.cfg 0x0480: Read initSetup.cfg 0x0580: Execute rset to zero calcutaion 0x10C1: Reload geophone data

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0071			Keep in blank now
0x0072	R	STA	STA timing. Unit is 0.1 sec
0x0073	R	LTA	LTA timing. Unit is 0.1 sec
0x0074	R	STALTA_THRESHOLD	STA/LTA threshold
0x0075			Blank
0x0076	R	DIO_STATUS	DO status. The responding bit will be 1 or 2 when enabling DO. Bit 0: DO1 Bit 1: DO2 Bit 2: DO3
0x0077	R	EVENT_TIME	The duration time after detecting STA/LTA event.
0x0078	R	PGA_WATCH_THRESHOLD	PGA value WATCH value (The first threshold). The unit is count (1 gal = 16.718 counts).
0x0079			Keep blank now
0x007A	R	STALTA_RELAY0_THRESHOLD	DO1 value after triggering STA/LTA threshold. The unit is 0.1 gal.
0x007B	R	STALTA_RELAY1_THRESHOLD	DO2 value after triggering STA/LTA threshold. The unit is 0.1 gal.
0x007C	R	PGV_1S	The Maximum real time PGA value per second, the unit is 0.1 mm/sec.
0x007D			Blank
0x007E			Blank
0x007F	R	STALTA_VALUE	STA/LTA value. The unit is 0.01 second.
0x0080	R	EVENT_A_MAX	Palert S303 will calculating the maximum acceleration value in every axis, this is the resgisteration to register A axis in count during earthquake occured. 1 gal = 16.718 counts.
0x0081	R	EVENT_B_MAX	Palert S303 will calculating the maximum acceleration value in every axis, this is the registeration to register B axis in count during earthquake occured. 1 gal = 16.718 counts.
0x0082	R	EVENT_C_MAX	Palert S303 will calculating the maximum acceleration value in every axis, this is the registeration to register C axis in count during earthquake occured. 1 gal = 16.718 counts.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0083	R	VENT_VECTOR_A_MAX	Palert S303 will calculating the maximum vector acceleration value in every axis, this is the registration to register A axis in count during earthquake occured. 1 gal = 16.718 counts.
0x0084	R	VENT_VECTOR_B_MAX	Palert S303 will calculating the maximum vector acceleration value in every axis, this is the registration to register B axis in count during earthquake occured. 1 gal = 16.718 counts.
0x0085	R	VENT_VECTOR_C_MAX	Palert S303 will calculating the maximum vector acceleration value in every axis, this is the registration to register C axis in count during earthquake occured. 1 gal = 16.718 counts.
0x0086			Blank
0x0087			Blank
0x0088	R	PD	Palert S303 starts to calculate Pd value after detecting P wave. The unit is 0.001 cm.
0x0089	R	TOUC	Palert S303 starts to calculate tau-c value after detecting P wave. The unit is 0.001 cm.
0x008A	R	PD_FLAG	Pd Status Bit 5 : The determination of Deteting P-Wave or not. Bit 6 : The first threshold of Pd value (The WATCH value). Bit 7 : The second threshold of Pd value (The WARN value). Bit 8 : The upper motion of P-Arriving wave. Bit 9 : The down motion of P-Arriving wave.
0x008B	R	PGA_10S	PGA vector calculates with every 10 seconds. The unit is count. 1 gal = 16.718 counts. Formula $=\sqrt{a^2 + b^2 + c^2}$
0x008C	R	EVENT_YEAR	The status of earthquake in year.
0x008D	R	EVENT_MONTH	The status of earthquake in month.
0x008E	R	EVENT_DAY	The status of earthquake in day.
0x008F	R	EVENT_HOUR	The status of earthquake in hour.
0x0090	R	EVENT_MINUTE	The status of earthquake in mimutes.
0x0091	R	EVENT_SECOND	The status of earthquake in second.
0x0092	R	SYSTEM_YEAR	The status of system in year.
0x0093	R	SYSTEM_MONTH	The status of system in month.
0x0094	R	SYSTEM_DAY	The status of system in day.
0x0095	R	SYSTEM_HOUR	The status of system in hour.
0x0096	R	SYSTEM_MINUTE	The status of system in minutes.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0097	R	SYSTEM_SECOND	The status of system in second.
0x0098 ~ 0x009D			Blank
0x009E	R	A_DISPLACEMENT	A axis real time displacement in cm. The unit is 0.001cm (Functioning in Pd triggering was enabled ).
0x009F			Blank
0x00A0	R		PGA WARNING value (The second threshold). The unit is count. 1 gal = 16.718 counts.
0x00A1	R		Pd WARNING value(threshold). The unit is 0.001 cm.
0x00A2	R	TRIG_MODE	Low pass filter and trigger mode status. Bit 1: Enable Pd trigger Bit 2: Enable PGA trigger Bit 3: Enable STA/LTAtrigger Bit 6: Enable LPF in 10 Hz Bit 7: Enable LPF in 20 Hz Bit 8: Enable LPF in 40 Hz Bit 9: Enable LPF in 80 Hz Bit 6 and Bit 8 trigger at the same time: Enable LPF in 50Hz when Bit 7 and Bit 9 trigger at the same time: Enable LPF in 100Hz when Bit 10: Enable HPF in 0.1 Hz. Bit 11: Enable HPF in 0.3 Hz. Bit 12: Enable HPF in 0.5 Hz. Bit 13: Enable HPF in 1 Hz. Bit 14: Enable HPF in 2 Hz. Bit 15: Enable HPF in 3 Hz.
0x00A3	R	PD_WATCH_THRESHOLD	Pd WATCH value, the unit is 0.001 cm.
0x00A4	R	MEMS_CAL0_A_AXIS	A axis calibrate factor in 0 G (Unit: 0.1 gal). This value has filled before sold out in factory.
0x00A5	R	MEMS_CAL0_B_AXIS	B axis calibrate factor in 0 G (Unit: 0.1 gal). This value has filled before sold out in factory.
0x00A6	R	MEMS_CAL0_C_AXIS	C axis calibrate factor in 0 G (Unit: 0.1 gal). This value has filled before sold out in factory.
0x00A7	R	MEMS_CAL_A_AXIS	A axis calibrate factor in 1 G (Unit: 1 G). This value has filled before sold out in factory.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x00A8	R	MEMS_CAL_B_AXIS	B axis calibrate factor in 1 G (Unit: 1 G). This value has filled before sold out in factory.
0x00A9	R	MEMS_CAL_C_AXIS	C axis calibrate factor in 1 G (Unit: 1 G). This value has filled before sold out in factory.
0x00AA	R	NTP_IP1	The first value of NTP IP address.
0x00AB	R	NTP_IP2	The second value of NTP IP address.
0x00AC	R	NTP_IP3	The third value of NTP IP address.
0x00AD	R	NTP_IP4	The fourth value of NTP IP address.
0x00AE	R	SYSTEM_WEEKDAY	The system time, the value is week day.
0x00AF	R	SERVER0_IP12	The first and the second IP values of TCP server0.
0x00B0	R	SERVER0_IP34	The third and the fourth IP values of TCP server0.
0x00B1	R	SERVER1_IP12	The first and the second IP values of TCP server1.
0x00B2	R	SERVER1_IP34	The third and the fourth IP values of TCP server1.
0x00B3	R	IP1	The first value of IP address.
0x00B4	R	IP2	The second value IP address.
0x00B5	R	IP3	The third IP value of IP address.
0x00B6	R	IP4	The fourth IP value of IP address.
0x00B7	R	NETMASK1	The first value of submask IP address.
0x00B8	R	NETMASK2	The second value of submask IP address.
0x00B9	R	NETMASK3	The third value of submask IP address.
0x00BA	R	NETMASK4	The fourth value of submask IP address.
0x00BB	R	GATEWAY1	The first value of gateway IP address.
0x00BC	R	GATEWAY2	The second value of gateway IP address.
0x00BD	R	GATEWAY3	The third value of gateway IP address.
0x00BE	R	GATEWAY4	The fourth value of gateway IP address.
0x00BF			Blank
0x00C0	R/W	STREAM_CONTROL	Streaming packet output control. 0: No streaming out. 1: Mode 1 output (16 bit). 2: Header of mode 1 output only. 4: Mode 4 streaming out (miniSEED). 8: Mode 8 streaming out (TAF Lab Calibtarion use). 16: Mode 16 streaming out (24 bit).
0x00C1			Blank
0x00C2	R	WATCH_WARNING_TIME	Duration time of WATCH and WARNING. The unit is second. High byte: WATCH time, Low byte: WARNING time

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x00C3	R	VECTOR_GAL_NOW	Real time vector acceleration. The unit is 0.1 gal.
0x00C4			Blank
0x00C5			Blank
0x00C6	R	VERSION	The software version.
0x00C7	R	SERIAL_NO	Serial number
0x00C8 ~ 0x00CA			Blank
0x00CB	R	SERVER2_IP12	The first and the second IP values of TCP server2.
0x00CC	R	SERVER2_IP34	The third and the fourth IP values of TCP server2.
0x00CD			Blank
0x00CE			Blank
0x00CF	R	OP_MODEX	Bit 3: The mode of CWB2020 intensity scale calculation. Taiwan uses only.
0x00D0	R	SD03_A_MAX	The maximum of A axis SD value (0.3 Hz), CEB mode only.
0x00D1	R	SD03_B_MAX	The maximum of B axis SD value (0.3 Hz), CEB mode only.
0x00D2	R	SD03_C_MAX	The maximum of C axis SD value (0.3 Hz), CEB mode only.
0x00D3	R	SV03_A_MAX	The maximum of A axis SV value (0.3 Hz), CEB mode only.
0x00D4	R	SV03_B_MAX	The maximum of B axis SV value (0.3 Hz), CEB mode only.
0x00D5	R	SV03_C_MAX	The maximum of C axis SV value (0.3 Hz), CEB mode only.
0x00D6	R	SA03_A_MAX	The maximum of A axis SA value (0.3 Hz), CEB mode only.
0x00D7	R	SA03_B_MAX	The maximum of B axis SA value (0.3 Hz), CEB mode only.
0x00D8	R	SA03_C_MAX	The maximum of C axis SA value (0.3 Hz), CEB mode only.
0x00D9	R	SD10_A_MAX	The maximum of A axis SD value (1 Hz), CEB mode only.
0x00DA	R	SD10_B_MAX	The maximum of B axis SD value (1 Hz), CEB mode only.
0x00DB	R	SD10_C_MAX	The maximum of C axis SD value (1 Hz), CEB mode only.
0x00DC	R	SV10_A_MAX	The maximum of A axis SV value (1 Hz), CEB mode only.
0x00DD	R	SV10_B_MAX	The maximum of B axis SV value (1 Hz), CEB mode only.
0x00DE	R	SV10_C_MAX	The maximum of C axis SV value (1 Hz), CEB mode only.
0x00DF	R	SA10_A_MAX	The maximum of A axis SA value (1 Hz), CEB mode only.
0x00E0	R	SA10_B_MAX	The maximum of B axis SA value (1 Hz), CEB mode only.
0x00E1	R	SA10_C_MAX	The maximum of C axis SA value (1 Hz), CEB mode only.
0x00E2	R	SD03_A_MAX	The maximum of A axis SD value (3 Hz), CEB mode only.
0x00E3	R	SD03_B_MAX	The maximum of B axis SD value (3 Hz), CEB mode only.
0x00E4	R	SD03_C_MAX	The maximum of C axis SD value (3 Hz), CEB mode only.
0x00E5	R	SV03_A_MAX	The maximum of A axis SV value (3 Hz), CEB mode only.
0x00E6	R	SV03_B_MAX	The maximum of B axis SV value (3 Hz), CEB mode only.
0x00E7	R	SV03_C_MAX	The maximum of C axis SV value (3 Hz), CEB mode only.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x00E8	R	SA03_A_MAX	The maximum of A axis SA value (3 Hz), CEB mode only.
0x00E9	R	SA03_B_MAX	The maximum of B axis SA value (3 Hz), CEB mode only.
0x00EA	R	SA03_C_MAX	The maximum of C axis SA value (3 Hz), CEB mode only.
0x00EB	R	RTD_LOOP_CNT	Intern ADC conunter, system using.
0x00EC	R/W	GLOBALEVENT	Contineous recording control, the system reads continuous waveform data when this bit filled as 1.
0x00ED			Blank
0x00EE	R	ADMIN_SERVER0_IP12	Admin. The first and second value of server0 IP.
0x00EF	R	ADMIN_SERVER0_IP34	Admin. The third and fourth value of server0 IP
0x00F0	R	ADMIN_SERVER1_IP12	Admin. The first and second value of server1 IP.
0x00F1	R	ADMIN_SERVER1_IP34	Admin. The third and fourth value of server1 IP
0x00F2 ~ 0x00F8			Blank
0x00F9	R	D_AXIS	The fourth(D) axis (Geophone) real time velocity. The unit is 0.01 mm/sec.
0x00FA	R	D_OFFSET	The fourth(D) axis (Geophone) zero offset.
0x00FB	R	EVENT_D_MAX	The maximum value of D axis (Geophone) during earthquake event. The unit is count.
0x00FC	R	MEMS_CAL0_D_AXIS	D axis calibrate factor in 0 G (Unit: 0.1 gal). This value has filled before sold out in factory.
0x00FD	R	MEMS_CAL_D_AXI	D axis calibrate factor in 1 G (Unit: 1 G). This value has filled before sold out in factory.
0x00FE	R	STALTA_THRESHOLD_ST OP	The STA/LTA event stop threshold, CEB use only. The unit is 0.01.
0x00FF	R	STALTA_RELAY2_THRES HOLD	THE DO3 action value when STA/LTA triggering. The unit is 0.1 gal.
0x0100	R	PGA_RELAY2_THRESHO LD	DO3 action threshold when PGA triggering. The unit is count. 1 gal = 16.718 counts
0x0101			Blank
0x0102	R/W	POWER_OFF_BUTTON	Remote control in button time(sec.).
0x0103	R/W	POWER_OFF_CNT	Remote control in accumulation time(sec.).
0x0104	R/W	LOCAL_PORT_STREAMI NG	TCP port real time packet transmission, 1 is transmit, 0 is stop. Please refer to [LOCAL_STREAM_DEBUG] command in config file.
0x0105	R/W	RECORDING_START_TI ME	Recording start time in unix timestamp.
0x0107	R/W	RECORDING_STOP_TIM E	Recording end time in unix timestamp.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0109			Blank
0x010A	R	ERR_CNT	The number of error counting
0x010B	R	VECTOR_GAL_EVENT_SECOND	The vector acceleration calculated in every second during earthquake event. The unit is 0.1 gal.
0x010C	R	A_COUNT_EVENT_SECOND	The maximum vector acceleration of A axis calculated in every second during earthquake event. The unit is count.
0x010D	R	B_COUNT_EVENT_SECOND	The maximum vector acceleration of B axis calculated in every second during earthquake event. The unit is count.
0x010E	R	C_COUNT_EVENT_SECOND	The maximum vector acceleration of C axis calculated in every second during earthquake event. The unit is count.
0x010F	R	INTENSITY_NOW_EVENT_SECOND	The maximum intensity calculated in every second during earthquake event.
0x0110	R	VECTOR_VELOCITY_MAX	The maximum vector velocity. The unit is 0.1 mm/sec.
0x0111	R	SAMPLING_RATE	Sample per second. The unit is number of samples in every second.
0x0112	R	VELOCITY_A	Real time velocity of A axis. The unit is 0.1 mm/sec.
0x0113	R	VELOCITY_B	Real time velocity of B axis. The unit is 0.1 mm/sec.
0x0114	R	VELOCITY_C	Real time velocity of C axis. The unit is 0.1 mm/sec. °
0x0115	R	VELOCITY_A_MAX	The maximum vector velocity of A axis. The unit is 0.1 mm/sec.
0x0116	R	VELOCITY_B_MAX	The maximum vector velocity of B axis. The unit is 0.1 mm/sec.
0x0117	R	VELOCITY_C_MAX	The maximum vector velocity of C axis. The unit is 0.1 mm/sec.
0x0118	R	VECTOR_VELOCITY_EVENT_SECOND	The vector velocity calculated in every second during earthquake event. The unit is 0.1 mm/sec.
0x0119	R	VELOCITY_A_EVENT_SECOND	The maximum vector velocity of A axis calculated in every second during earthquake event. The unit is 0.1 mm/sec.
0x011A	R	VELOCITY_B_EVENT_SECOND	The maximum vector velocity of B axis calculated in every second during earthquake event. The unit is 0.1 mm/sec.
0x011B	R	VELOCITY_C_EVENT_SECOND	The maximum vector velocity of C axis calculated in every second during earthquake event. The unit is 0.1 mm/sec.
0x011C 0x011D	R	VELOCITY_A_FLOAT_SECOND	The maximum vector velocity of A axis calculated in every second during earthquake event. The data is floating point format. The unit is mm/sec.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x011E 0x011F	R	VELOCITY_B_FLOAT_SE COND	The maximum vector velocity of B axis calculated in every second during earthquake event. The data is floating point format. The unit is mm/sec.
0x0120 0x0121	R	VELOCITY_C_FLOAT_SE COND	The maximum vector velocity of C axis calculated in every second during earthquake event. The data is floating point format. The unit is mm/sec.
0x0122 - 0x018E			Blank
0x018F	R	PCB_TEMP	PCB mainboard temperature. The unit is 0.01°C.
0x0190	R	EXT_VOLT	External power source. The unit is 0.01 voltage.
0x0191	R	INT_BAT_VOLT	Internal power source. The unit is 0.01 V.
0x0192	R	RTC_BAT_VOLT	RTC battery power source. The unit is 0.01 V.
0x0193	R/W	LCD_CONTRAST	LCD contrast value. The value adjusts from 0-100.
0x0194	R/W	SENSOR_STATUS	Sensor OK: bit0-bit3 (ch 0-3) Sensor Noise: bit4-bit7 (ch 0-3) 0: OK, 1: Noise p.s. The result will be updated based on: Program initial: the very first exact 0 second. Interval: every 1440 minutes after initial.
0x0195	R/W	SD_NG	Booting check result. 1 is error, 0 is normal.
0x031E	R/W	REMOTE_RELAY	DO remote control. Bit0-3: DO1-DO4
0x0383 0x0384	R	DISP_A_FLOAT_EVENT_ MAX	The maximum displacement of A axis during earthquake event. The unit is um.
0x0385 0x0386	R	DISP_B_FLOAT_EVENT_ MAX	The maximum displacement of B axis during earthquake event. The unit is um.
0x0387 0x0388	R	DISP_C_FLOAT_EVENT_ MAX	The maximum displacement of C axis during earthquake event. The unit is um.
0x0389 0x038A	R	VECTOR_DISP_FLOAT_E VENT_SECOND	The vector displacement calculated in every second during earthquake event. The unit is um.
0x038B 0x038C	R	DISP_A_FLOAT_EVENT_ SECOND	The A axis displacement calculated in every second during earthquake event. The unit is um.
0x038D 0x038E	R	DISP_B_FLOAT_EVENT_ SECOND	The B axis displacement calculated in every second during earthquake event. The unit is um.
0x038F 0x0390	R	DISP_C_FLOAT_EVENT_ SECOND	The C axis displacement calculated in every second during earthquake event. The unit is um.
0x0391 0x0392	R	DISP_A_FLOAT_SECOND	The A axis displacement calculated in every second. The unit is um.

Modbus AO Address (4XXXX)			
Register	R/W	Label	Description
0x0393 0x0394	R	DISP_B_FLOAT_SECOND	The B axis displacement calculated in every second. The unit is um.
0x0395 0x0396	R	DISP_C_FLOAT_SECOND	The C axis displacement calculated in every second. The unit is um.

## AI (3xxxx)

Modbus AI Address (3XXXX) Read only			
Register		Label	Description
0x00A8		DORTS_RELAY_REG	DORTS DO output status.
0x00A9		ISO2631_RELAY_REG	ISO2631 DO output status.
0x00B3		INSTRUMENT_CODE	11: pALERT S303 Taiwan mode 12: pALERT S303 China mode 14: Palert220
0x00C7 ~ 0x00DB		MBUS_LCD_MAP_ADDR	LCD marquee words output.
0x018F		GPS_LOCK	GPS locked information.
0x0190		GPS_QTY	Satellite locked number.
0x0191		GPS_ANTENNA	GPS antenna status. 0: NG 1: OK
0x0192		GPS_LAT_DEG	Latitude in degree (+ is North, - is South)
0x0193		GPS_LAT_MIN	Latitude in minute.
0x0194		GPS_LAT_SEC	Latitude in 0.01 second.
0x0195		GPS_LON_DEG	Longitude in degree (+ is East, - is West)
0x0196		GPS_LON_MIN	Longitude in minute.
0x0197		GPS_LON_SEC	Longitude in 0.01 second.
0x0199		NTP_ST	NTP stratum level, 16 is unuseable.
0x019A		NTP_T	NTP server type: u: Unicast or Manycas b: Broadcast or Multicast l: Local clock s: Symmetry joint (Back up use) A: Manycast service. B: Broadcast service. M: Multicast service.
0x019B		NTP_WHEN	A time of time synchronization from last time to now. The unit is second.

<b>Modbus AI Address (3XXXX) Read only</b>		
<b>Register</b>	<b>Label</b>	<b>Description</b>
0x019C	NTP_POLL	Time synchronization frequency. The unit is second.
0x019D	NTP_REACH	NTP testing value, 337 means time synchronization stabilized.
0x019E	NTP_DELAY	NTP time delay value. The value to count the back-and-forth time. The unit is ms. Float format.
0x01A0	NTP_DELAY_INT	NTP time delay value. The value to count the back-and-forth time. The unit is ms. Integer format.
0x01A1	NTP_OFFSET	NTP time drift offset value. The more the value closes to 0, the more the time closes between local machine and NTP server. The unit is ms. Float format.
0x01A3	NTP_OFFSET_INT	NTP time drift offset value. The more the value closes to 0, the more the time closes between local machine and NTP server. The unit is ms. Integer format.
0x01A4	NTP_JITTER	The mean drift value with NTP server. The more the value smaller, the more the time accurately. Float format.
0x01A6	NTP_JITTER_INT	The mean drift value with NTP server. The more the value smaller, the more the time accurately. Integer format.
0x01F3	SI_YEAR	Enable SI calculation in time of YEAR.
0x01F4	SI_MONTH	Enable SI calculation in time of MNTH.
0x01F5	SI_DAY	Enable SI calculation in time of day.
0x01F6	SI_HOUS	Enable SI calculation in time of hour.
0x01F7	SI_MINUTE	Enable SI calculation in time of minute.
0x01F8	SI_SECOND	Enable SI calculation in time of second.
0x01F9	SI_PEAK	The maximum value of SI. The unit is 0.01.
0x01FA	SI_REALTIME	The real time value of SI. The unit is 0.01.
0x0333	ISO_DATA_COUNTER	ISO2631 data update counter.
0x0334	ISO_XY_GAL	ISO2631 horizontals vector value. The unit is 0.1 gal.
0x0335	ISO_Z_GAL	ISO2631 vertical value. The unit is 0.1 gal.
0x0336	ISO_XY_DB	ISO2631 horizontals vector value. The unit is 0.01 dB.
0x0337	ISO_Z_DB	ISO2631 vertical value. The unit is 0.01 dB.
0x0338	ISO_MAX_DB	ISO2631 vertical value. The unit is 0.01 dB.
0x0339	ISO_DB_LATCH	The maximum of ISO2631 keeping dB value. The unit is 0.01 dB.
0x033A		Blank
0x033B		Blank
0x033C	ISO_RELAY	ISO2631 DO status.
0x0347	DORTS_DATA_CONUTER	DORTS data update counter.

Modbus AI Address (3XXXX) Read only		
Register	Label	Description
0x0348	DORTS_2HZ_DB	DORTS dB value in 2 Hz. The unit is 0.01 dB.
0x0349	DORTS_4HZ_DB	DORTS dB value in 4 Hz. The unit is 0.01 dB.
0x034A	DORTS_8HZ_DB	DORTS dB value in 8 Hz. The unit is 0.01 dB.
0x034B	DORTS_16HZ_DB	DORTS dB value in 16 Hz. The unit is 0.01 dB.
0x034C	DORTS_31P5HZ_DB	DORTS dB value in 31.5 Hz. The unit is 0.01 dB.
0x034D	DORTS_63HZ_DB	DORTS dB value in 63 Hz. The unit is 0.01 dB.
0x034E	DORTS_MAX_DB	The maximum of DORTS dB value. The unit is 0.01 dB.
0x034F	DORTS_DB_LATCH	The maximum of DORTS keeping dB value. The unit is 0.01 dB.
0x0350	DORTS_RELAY	DORTS DO status.
0x0351		Blank
0x0352		Blank
0x2773	RELAY1_PGA	DO1 PGA starting value. The unit is 0.1 gal.
0x2774	RELAY2_PGA	DO2 PGA starting value. The unit is 0.1 gal.
0x2775	RELAY3_PGA	DO3 PGA starting value. The unit is 0.1 gal.
0x2776		Blank
0x2777	RELAY1_PGV	DO1 PGV starting value. The unit is 0.1 mm/sec.
0x2778	RELAY2_PGV	DO2 PGV starting value. The unit is 0.1 mm/sec.
0x2779	RELAY3_PGV	DO3 PGV starting value. The unit is 0.1 mm/sec.
0x277A		Keep in blank now
0x277B	RELAY1_INTENSITY	DO1 intensity threshold.
0x277C	RELAY2_INTENSITY	DO2 intensity threshold.
0x277D	RELAY3_INTENSITY	DO3 intensity threshold.
0x277E ~ 0x2782		Blank
0x2783	SINGLE_RELAY_MODE	0: DO controls by every single relay. 1: DO controls by sequence of 3 relaias. Relay1 and relay2 off when relay3 on, relay1 off when relay2 on.
0x2784	RELAY_BLINK_MODE	0: DO output is not interactivey on and off. 1: DO output is interactivey on/off every 0.5 second.
0x2785	RELAY_CONTROL_BY_ERR	0: DO still keep functioning even error has been detected. 1: DO can be enabled when system has issued.
0x2786	RELAY_RESET_BY_MANUAL	0: DO reset automatically. 1: DO have to reset by 3 seconds pressing on button.