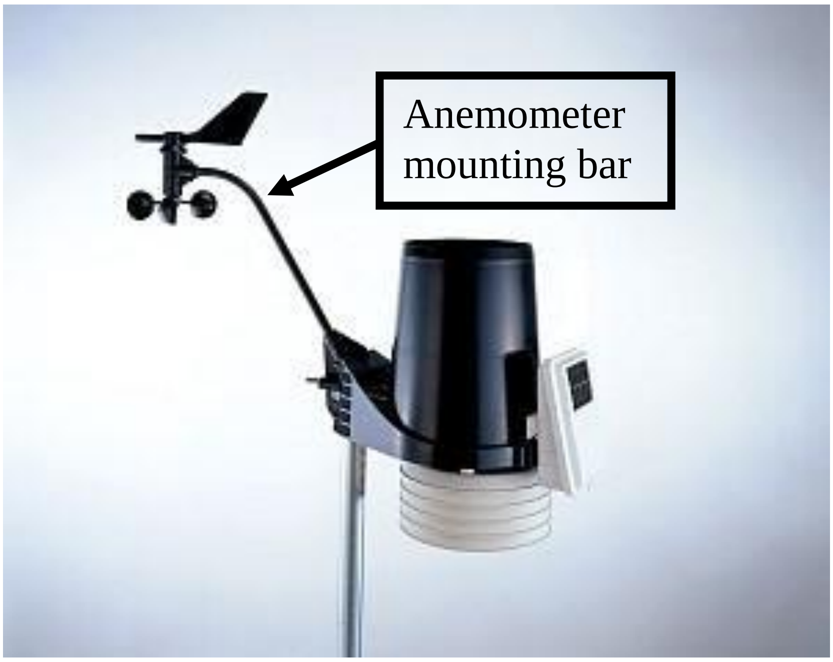
Checklist for Operating the Automatic Weather Station (AWS)

Preface: The purpose of writing this checklist for Co-WIN members and staffs is to ensure that the configurations of all the AWSs, both in hardware and software aspects, meet the standard for acquiring accurate weather information. Skipping any part would lead to incorrect data shown to the public. Please try your best to go through the whole checklist and submit the completed checklist form for future reference. This will save a lot of checking time in the future with known data quality for each member station. Thank you for your co-operation!

Matthew

Tools used in this checklist:
Screw driver, wrench, Allen wrench, multimeter, compass, alcohol cotton

I. Integrated Sensor Suite (ISS)



1. Wind measurement

- Confirm wind cup and wind vane turning smoothly.

- Confirm correct wind direction shown on console (pressing “WIND” twice) by comparing wind vane pointing direction with a compass.

- Confirm if the **anemometer mounting bar is pointing north**. It is the **factory default reference of north** when the wind vane is pointing in the same direction as the mounting bar. It is to ensure the weather station gives a correct wind direction. If it is not feasible, enter the offset in **menu 14** in WeatherLink.

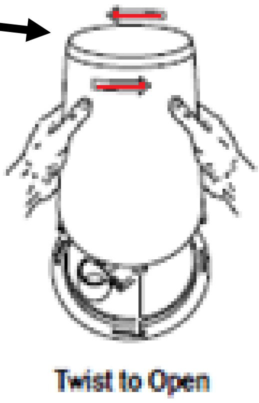
2. Rainfall, temperature and relative humidity measurement

- Clear and confirm no dirt and debris blocking the hole at the bottom of the rain collector.

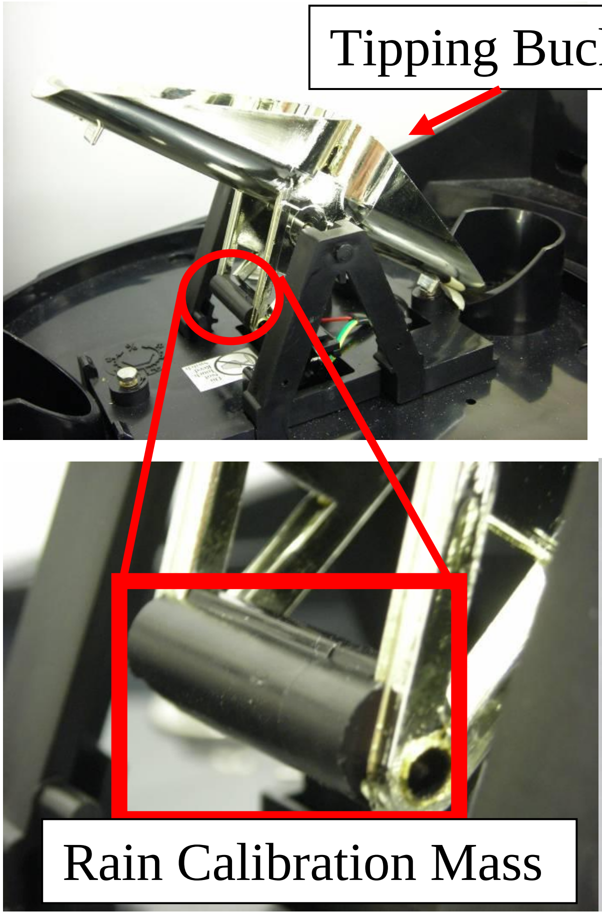
- Take out the debris screen in the rain collector and remove the rain collector as shown (remember to place the debris screen back after checking). Check if the tipping bucket is clean and functioning.

Debris Screen

In anti-clockwise direction

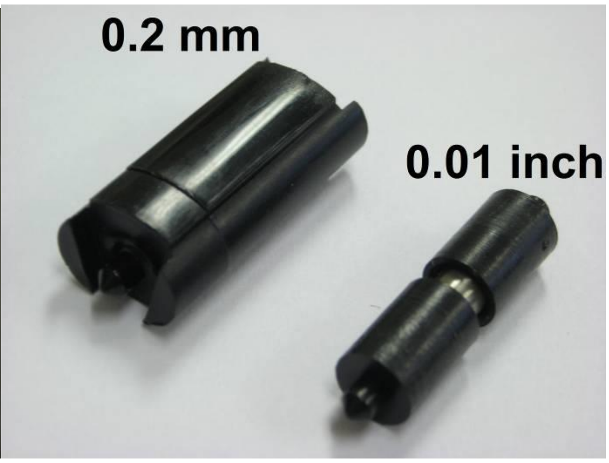


- Check and mark down the rain calibration mass installed under the tipping bucket.



Tipping Bucket

Rain Calibration Mass



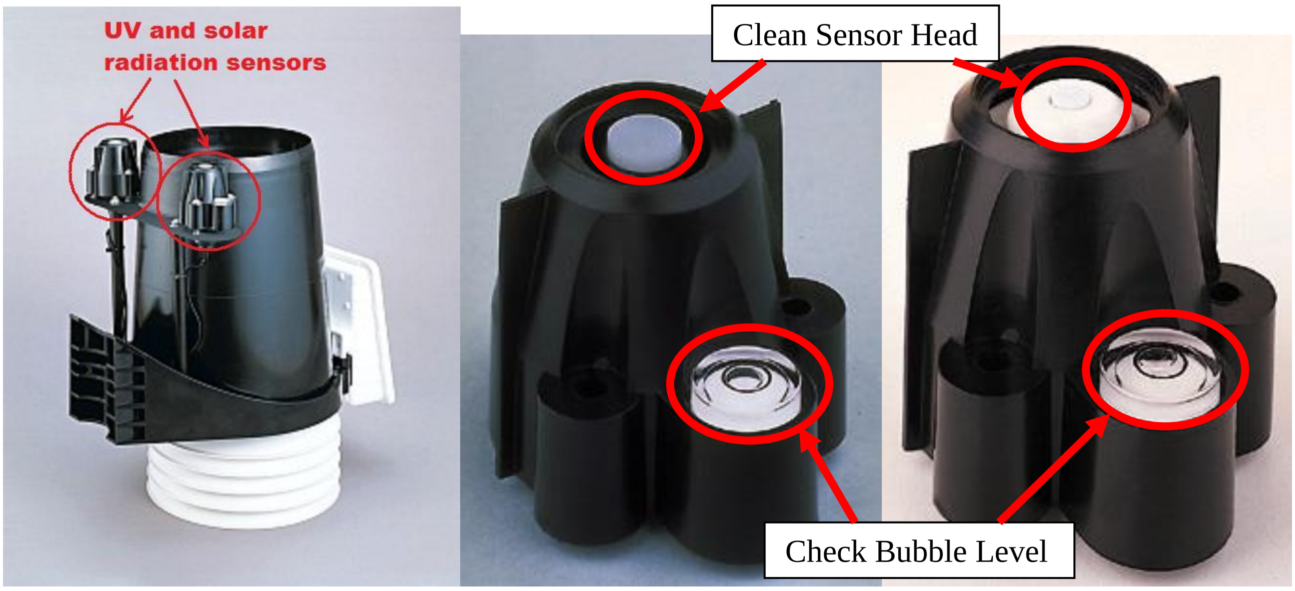
The larger and smaller weight is for measurement in 0.2 mm and 0.01 inch for each flip of the tipping buckets. Settings in WeatherLink and console mismatch with the actual installed mass would give underestimated/overestimated amount of precipitation.

- Clean the white radiation shield when necessary. It should be checked regularly to avoid insects building nests inside.

Radiation shield with temperature and humidity sensor inside

3. Solar and UV radiation measurement

- Use **ethanol cotton** to clean the UV & solar radiation sensor head surface gently.

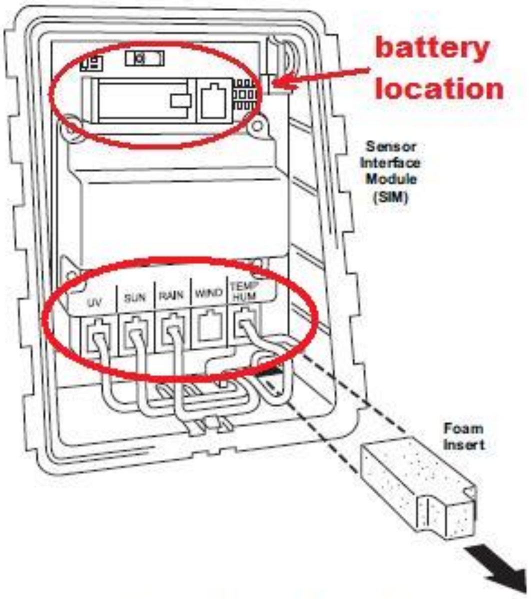

UV and solar radiation sensors
Clean Sensor Head
Check Bubble Level

Solar radiation sensor UV index sensor

- Adjust the bubble of the bubble levels to the center for both sensors.

4. Signal cable connection and batteries

- Confirm all cables plugged in the right receptacles inside the white box (see figure below).


battery
location
Sensor
Interface
Module
(SIM)
UV
SUN
RAIN
WIND
TEMP
HUM
Foam
Insert

Note: Only Plus models have UV and solar cables already attached.

- (For wireless version) Check battery level (normal: 3V) of the battery inside the white box

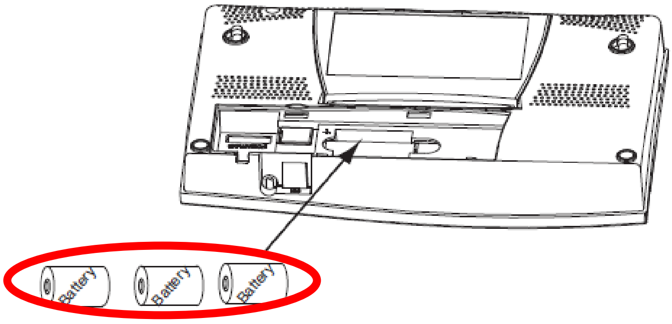
- (for wireless version) Replace the battery if its voltage output is lower than 3V. It should be replaced about half yearly to ensure the proper operation of the automatic weather station.

II. Data Acquisition and Display Console

- Confirm A/C adapter plugged with main socket switched on.

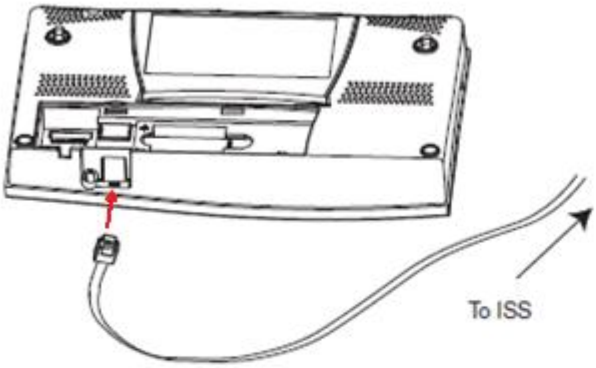
- Confirm all diagnostic beep sound when powering up. The first beep notes that the processor is running. The second beep emits when the data logger is detected (if installed) and the third beeps for the display.

- Install 3 C-size batteries into the battery slot. (for ensuring the console working normally during A/C power failure).

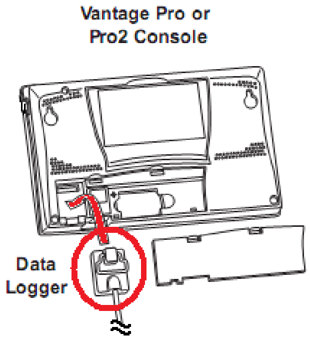


- Replace new battery if “LOW CONSOLE BATTERIES” is shown on console.

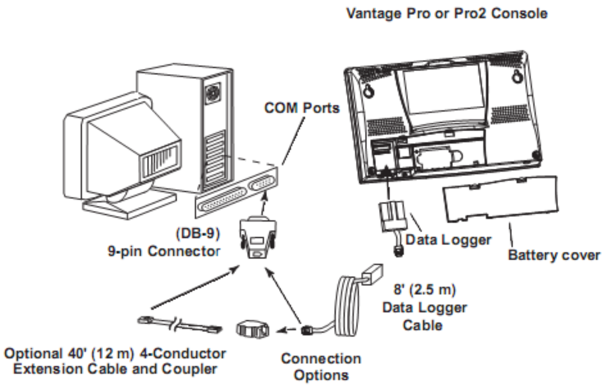
- (For cabled version) Confirm console to ISS cable connected.



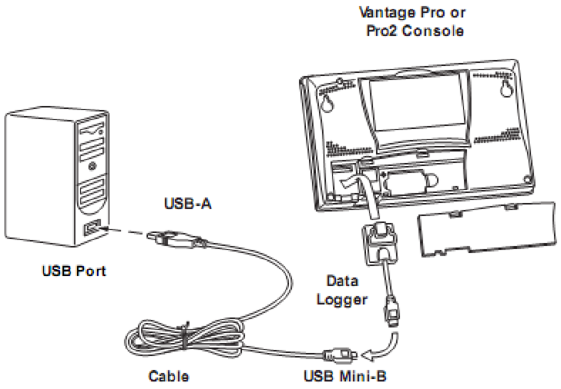
- (If WeatherLink is used) Confirm data logger plugged firmly into the slot at the back of the console. Before plugging / unplugging the data logger, power off the console by disconnecting A/C adapter and removing back-up batteries to prevent damage to and ensure normal operation of the data logger.


Vantage Pro or
Pro2 Console
Data
Logger

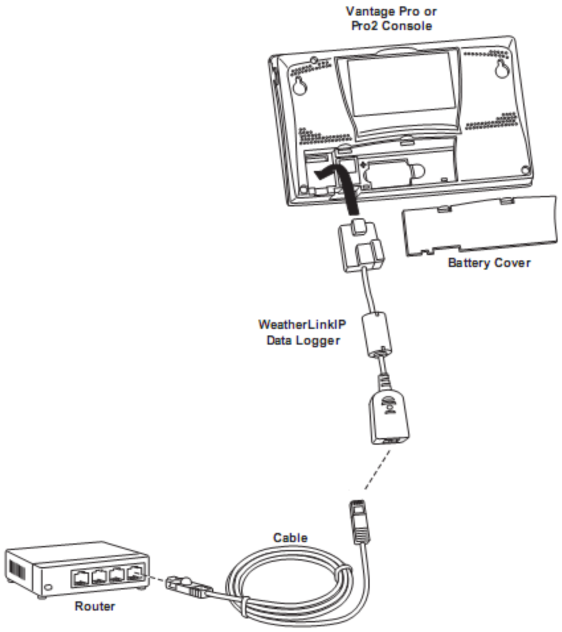
- (If WeatherLink is used) Confirm the cables are plugged firmly into computer / network receptacles and to the data logger.


Vantage Pro or Pro2 Console
COM Ports
(DB-9)
9-pin Connector
Data Logger
Battery cover
8' (2.5 m)
Data Logger
Cable
Optional 40' (12 m) 4-Conductor
Extension Cable and Coupler
Connection
Options

WeatherLink serial port version


Vantage Pro or
Pro2 Console
USB-A
USB Port
Data
Logger
Cable
USB Mini-B

WeatherLink USB version


Vantage Pro or
Pro2 Console
Battery Cover
WeatherLinkIP
Data Logger
Cable
Router

WeatherLink IP version

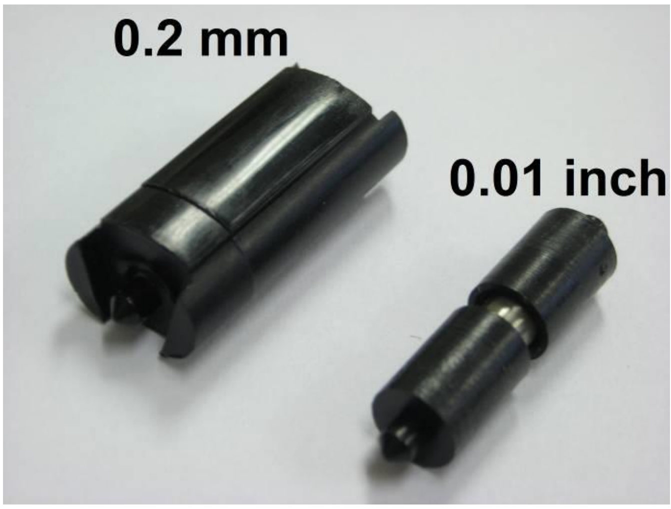
Setup mode

1. Enter Setup Mode by pressing DONE and the down arrow (-) at the same time, or it should be in the setup mode after power failure.
2. Use button "**BAR**" and "**DONE**" to switch **back** and **next** setting.
3. Use **left/right** buttons to switch between items and **+/-** buttons to change value.
4. Press "**2nd**" and then press "**GRAPH**" to change **unit**.

Confirm following settings (**bolded**):are being chosen:

(All the items below could be set by using WeatherLink, except serial baud rate)

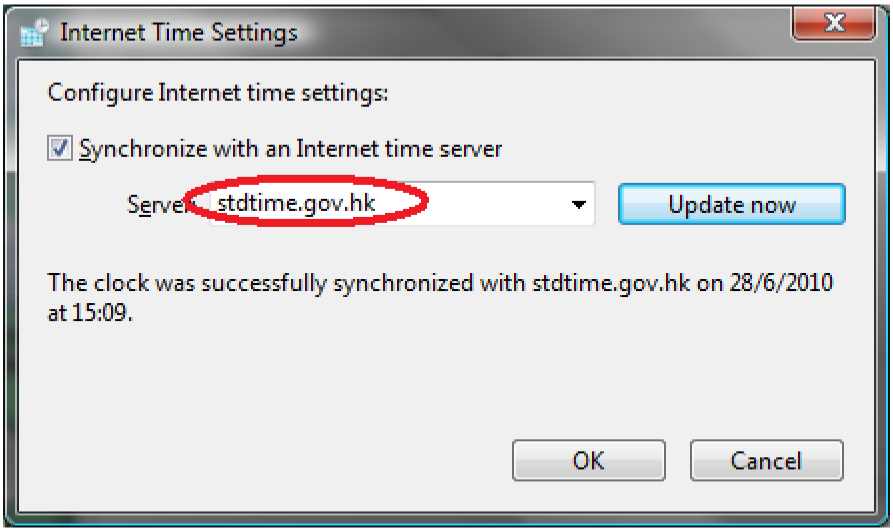
- Receiving from Station No.1 (**"X" on lower right corner flashing slowly means data is sending back from ISS to console.**)
- **On** (ISS) 1.
- Retransmit **Off**.
- Date/Time correct?
- Set Latitude (**North!**) and Longitude (**East!**) (Press "2nd" and then press "GRAPH" to change direction)
- **+8GMT Hong Kong**.
- Daylight Saving **Manual**.
- Daylight Saving **OFF**.
- Altitude (**in meter**)? (estimate the elevation of the console location from mean sea level, eg. By google map)
- Wind Cup Size **Large**.
- Rain collector unit **0.2mm / 0.01inch**.



- Rain season begins **Jan 1**.
- (if exist) Serial baud rate **19200**.

III Operating System

- Synchronize the computer clock with HKO’s standard time server (stdtime.gov.hk). **If this step is not done, the data return to Co-WIN will be rejected with incorrect timestamp!**



Internet Time Settings

Configure Internet time settings:

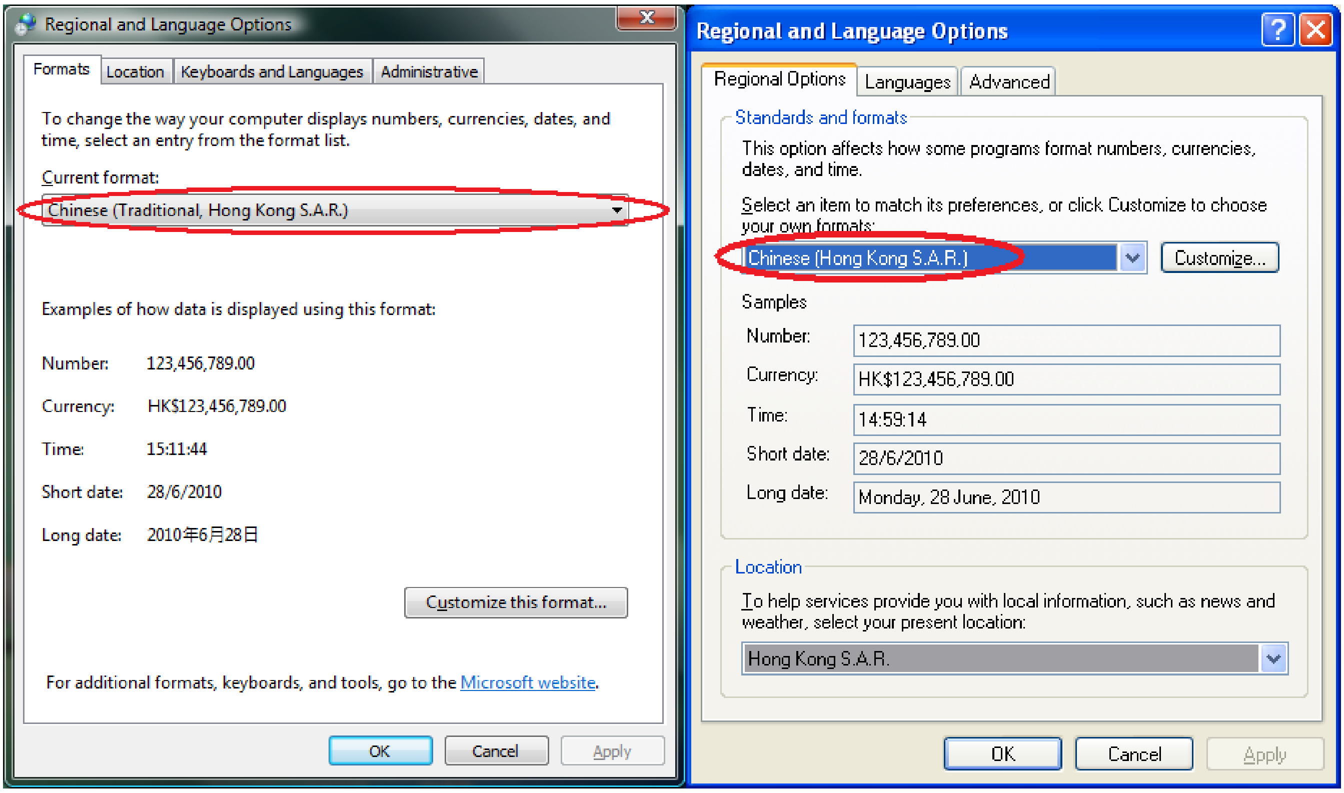
☑ Synchronize with an Internet time server

Server: stdtime.gov.hk

Update now
OK
Cancel

The clock was successfully synchronized with stdtime.gov.hk on 28/6/2010 at 15:09.

- Under “Regional and Language Options”, **Chinese (HKSAR)** must be chosen. It will affect the identification of time stamp format.



Regional and Language Options

Formats
Location
Keyboards and Languages
Administrative

To change the way your computer displays numbers, currencies, dates, and time, select an entry from the format list.

Current format: Chinese (Traditional, Hong Kong S.A.R.)

Examples of how data is displayed using this format:

Number: 123,456,789.00
Currency: HK$123,456,789.00
Time: 15:11:44
Short date: 28/6/2010
Long date: 2010年6月28日

Customize this format...

For additional formats, keyboards, and tools, go to the Microsoft website.

OK
Cancel
Apply

Regional and Language Options

Regional Options
Languages
Advanced

Standards and formats

This option affects how some programs format numbers, currencies, dates, and time.

Select an item to match its preferences, or click Customize to choose your own formats:

Chinese (Hong Kong S.A.R.)

Samples

Number: 123,456,789.00
Currency: HK$123,456,789.00
Time: 14:59:14
Short date: 28/6/2010
Long date: Monday, 28 June, 2010

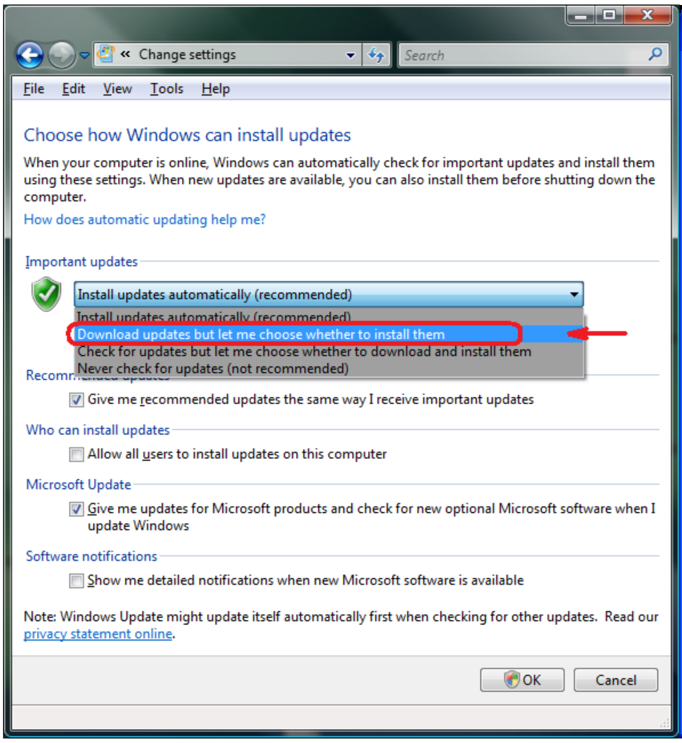
Location

To help services provide you with local information, such as news and weather, select your present location:

Hong Kong S.A.R.

OK
Cancel
Apply

- Windows update must be set to be installed manually to prevent computer restarted and not logged in.



Choose how Windows can install updates

When your computer is online, Windows can automatically check for important updates and install them using these settings. When new updates are available, you can also install them before shutting down the computer.

How does automatic updating help me?

Important updates

Install updates automatically (recommended)

Install updates automatically (recommended)
Download updates but let me choose whether to install them
Check for updates but let me choose whether to download and install them
Never check for updates (not recommended)

Recommended updates

☑ Give me recommended updates the same way I receive important updates

Who can install updates

☐ Allow all users to install updates on this computer

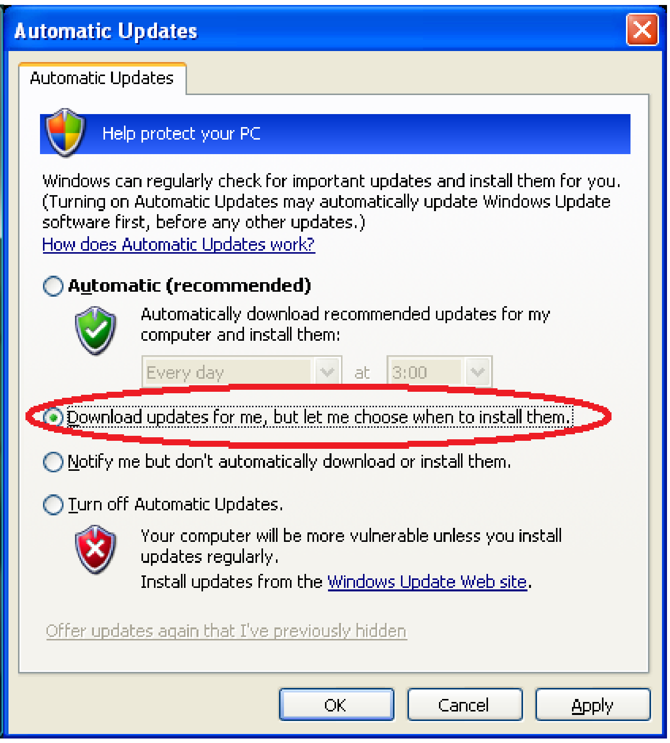
Microsoft Update

☑ Give me updates for Microsoft products and check for new optional Microsoft software when I update Windows

Software notifications

☐ Show me detailed notifications when new Microsoft software is available

Note: Windows Update might update itself automatically first when checking for other updates. Read our privacy statement online.



Help protect your PC

Windows can regularly check for important updates and install them for you. (Turning on Automatic Updates may automatically update Windows Update software first, before any other updates.)

How does Automatic Updates work?

○ **Automatic (recommended)**

Automatically download recommended updates for my computer and install them:

Every day at 3:00

● Download updates for me, but let me choose when to install them.

○ Notify me but don't automatically download or install them.

○ Turn off Automatic Updates.

Your computer will be more vulnerable unless you install updates regularly.

Install updates from the Windows Update Web site.

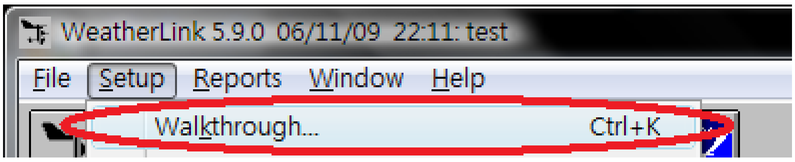
Offer updates again that I've previously hidden

IV WeatherLink

- WeatherLink version at least 5.9.0? (if not please download the update patch from the following webpage: http://www.davisnet.com/support/weather/software_sftwr.asp)

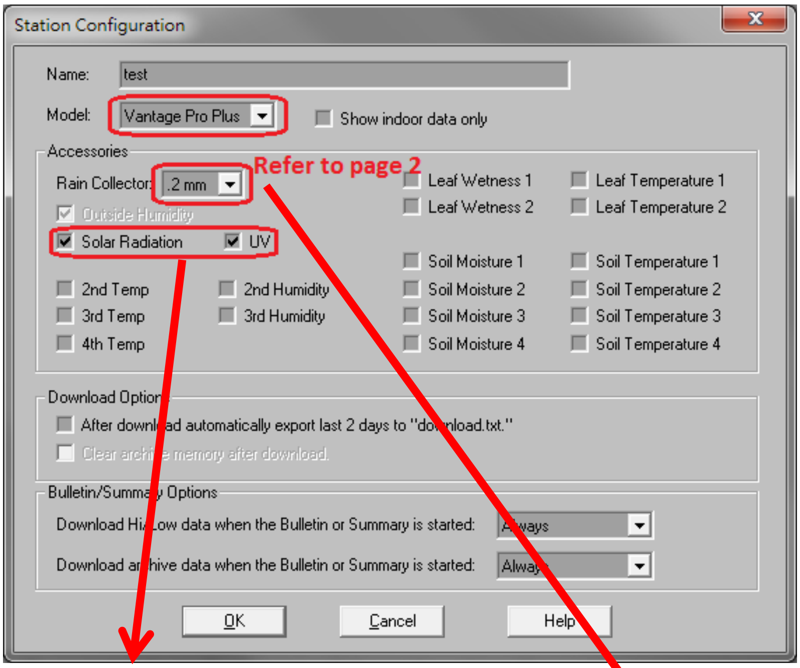
The manufacturer has addressed the driver drop out issue in version 5.9.0, which can solve most of the “connection lost” problem.

- Run Walkthrough: (click setup -> walkthrough)



Menu 1:

Select the correct model (Vantage Pro – without UV and solar sensors, Vantage Pro Plus – with UV and solar sensors), rain collector unit setting **0.2mm / 0.01inch**. **If this step is not done, the data return to Co-WIN will be incorrect!**


Station Configuration

Name: test

Model: Vantage Pro Plus

☐ Show indoor data only

Accessories

Rain Collector: .2 mm

☑ Outside Humidity

☑ Solar Radiation ☑ UV

☐ 2nd Temp ☐ 2nd Humidity

☐ 3rd Temp ☐ 3rd Humidity

☐ 4th Temp

☐ Leaf Wetness 1 ☐ Leaf Temperature 1

☐ Leaf Wetness 2 ☐ Leaf Temperature 2

☐ Soil Moisture 1 ☐ Soil Temperature 1

☐ Soil Moisture 2 ☐ Soil Temperature 2

☐ Soil Moisture 3 ☐ Soil Temperature 3

☐ Soil Moisture 4 ☐ Soil Temperature 4

Download Options

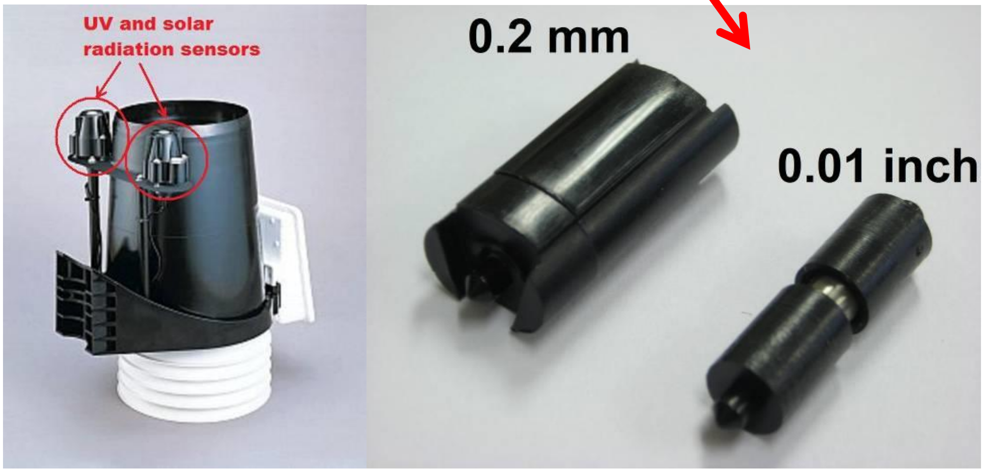
☐ After download automatically export last 2 days to "download.txt."

☐ Clear archive memory after download.

Bulletin/Summary Options

Download Hi/Low data when the Bulletin or Summary is started: Always

Download archive data when the Bulletin or Summary is started: Always



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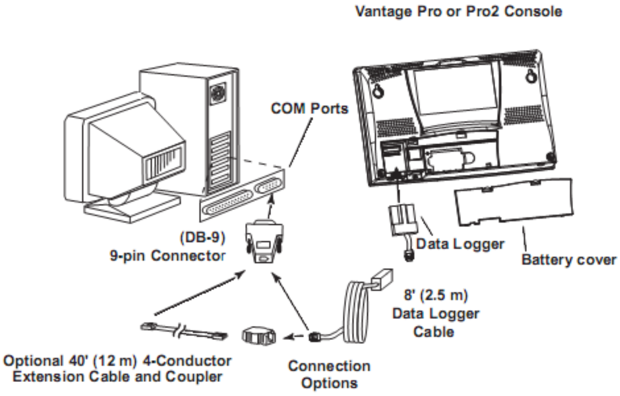
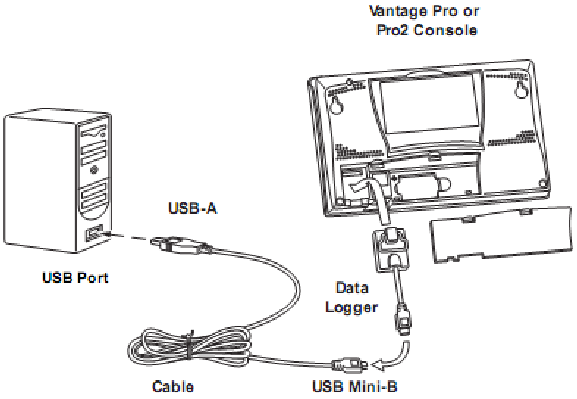
Menu 2:

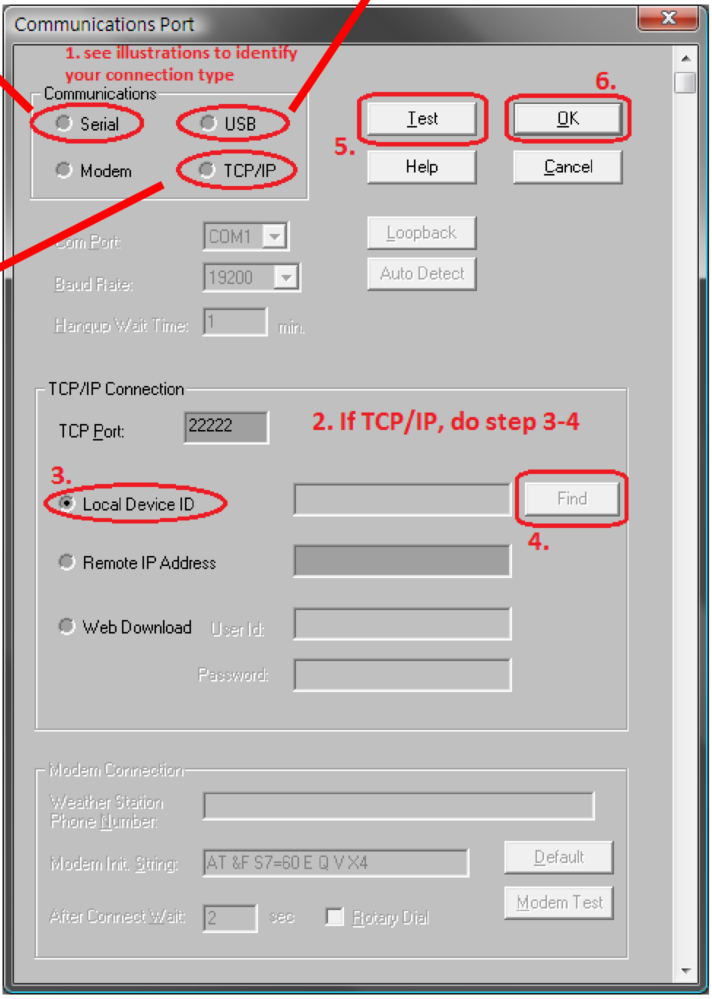
Check which connection method you are using.


Vantage Pro or Pro2 Console
COM Ports
(DB-9)
9-pin Connector
Data Logger
Battery cover
8' (2.5 m)
Data Logger
Cable
Optional 40' (12 m) 4-Conductor
Extension Cable and Coupler
Connection
Options

WeatherLink serial port version


Vantage Pro or
Pro2 Console
USB-A
USB Port
Data
Logger
Cable
USB Mini-B

WeatherLink USB version


Communications Port
Test
OK
Help
Cancel
Loopback
Auto Detect
Find
Default
Modem Test

1. see illustrations to identify your connection type

Communications

○ Serial ○ USB

○ Modem ○ TCP/IP

5. Test 6. OK

Com Port: COM1

Baud Rate: 19200

Hangup Wait Time: 1 min.

TCP/IP Connection

TCP Port: 22222

2. If TCP/IP, do step 3-4

3. ● Local Device ID

4. Find

○ Remote IP Address

○ Web Download User Id:

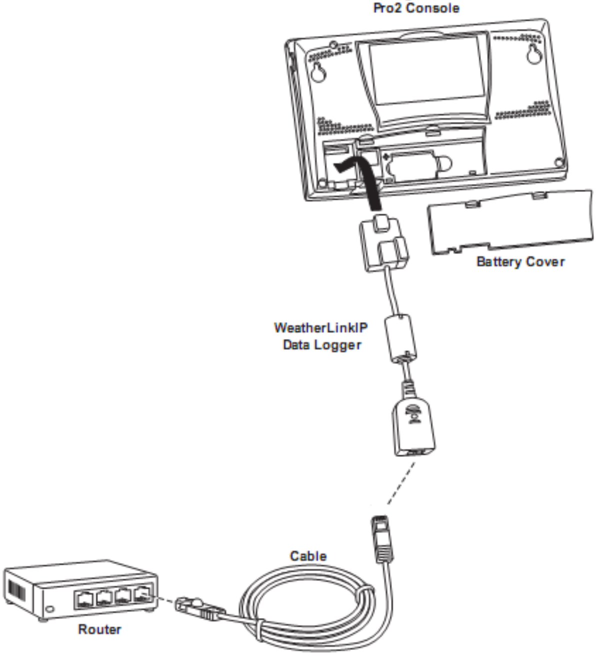
Password:

Modem Connection

Weather Station Phone Number:

Modem Init. String: AT &F S7=60 E Q V X4

After Connect Wait: 2 sec ☐ Rotary Dial


Vantage Pro or
Pro2 Console
Battery Cover
WeatherLinkIP
Data Logger
Cable
Router

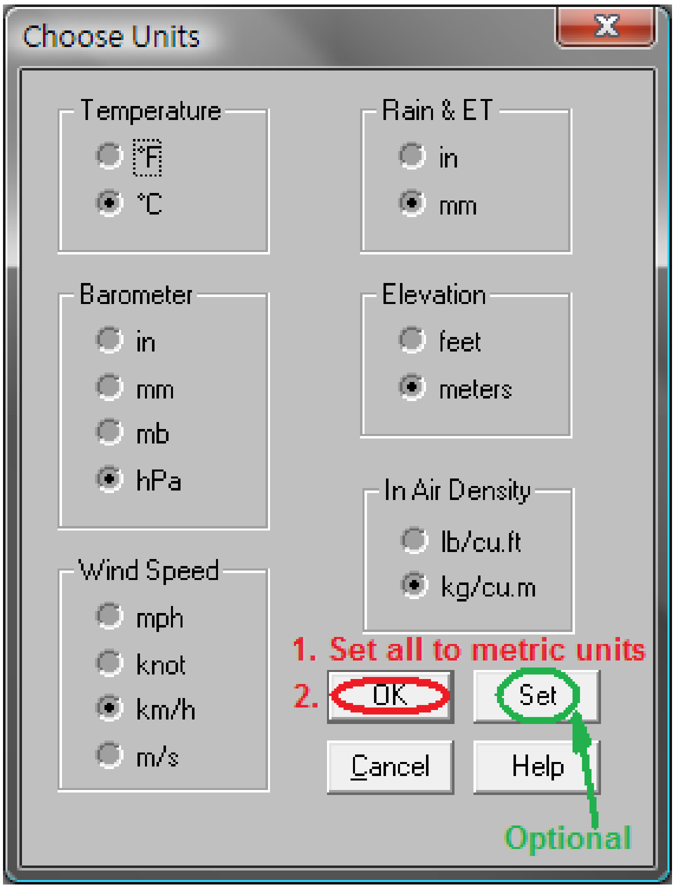
WeatherLink IP version

Choose the correct port and enter the appropriate serial port number / IP address if necessary.

Press **"Test"** to check the connection.

Menu 3:

Set all to Metric Unit. **If this step is not done, the data return to Co-WIN will be incorrect!**



Temperature: ○ °F ● °C

Rain & ET: ○ in ● mm

Barometer: ○ in ○ mm ○ mb ● hPa

Elevation: ○ feet ● meters

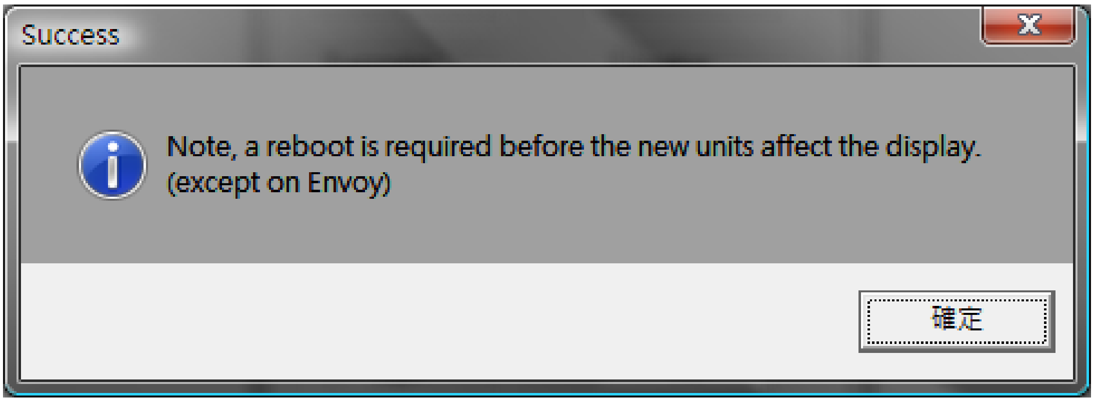
In Air Density: ○ lb/cu.ft ● kg/cu.m

Wind Speed: ○ mph ○ knot ● km/h ○ m/s

1. Set all to metric units
2.

Optional

If you also want to set units display on console by WeatherLink, press “Set” (may require to reboot the console by disconnecting all power sources (A/C adapter and batteries)).



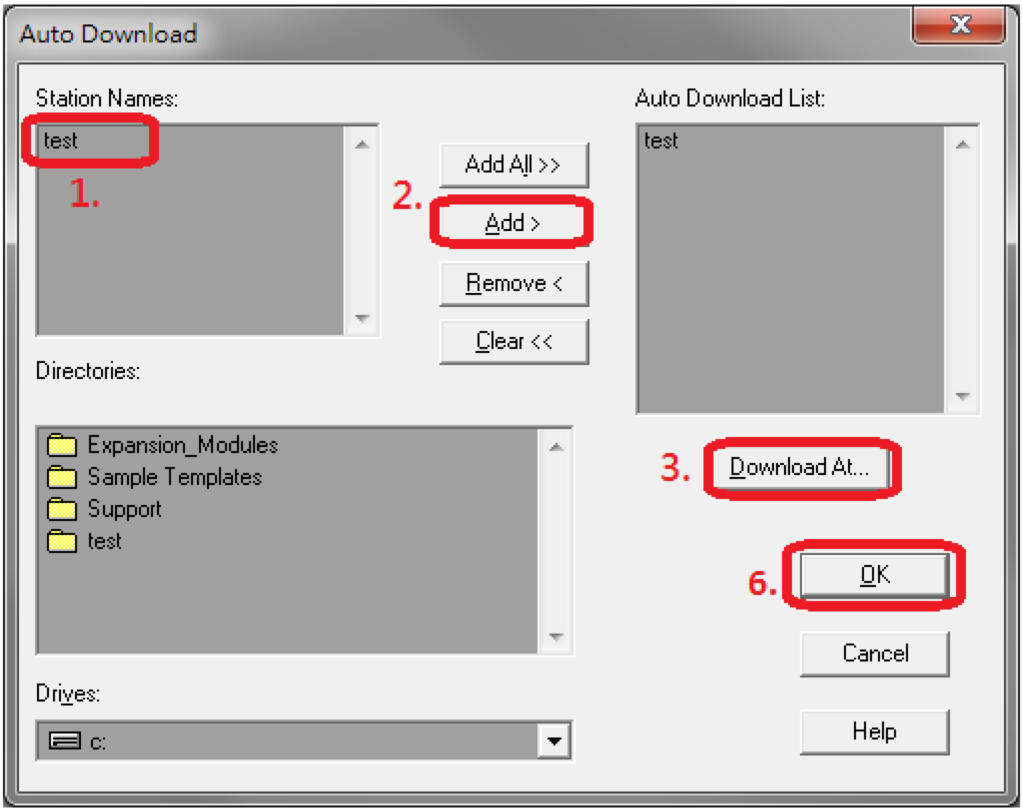
Note, a reboot is required before the new units affect the display.
(except on Envoy)

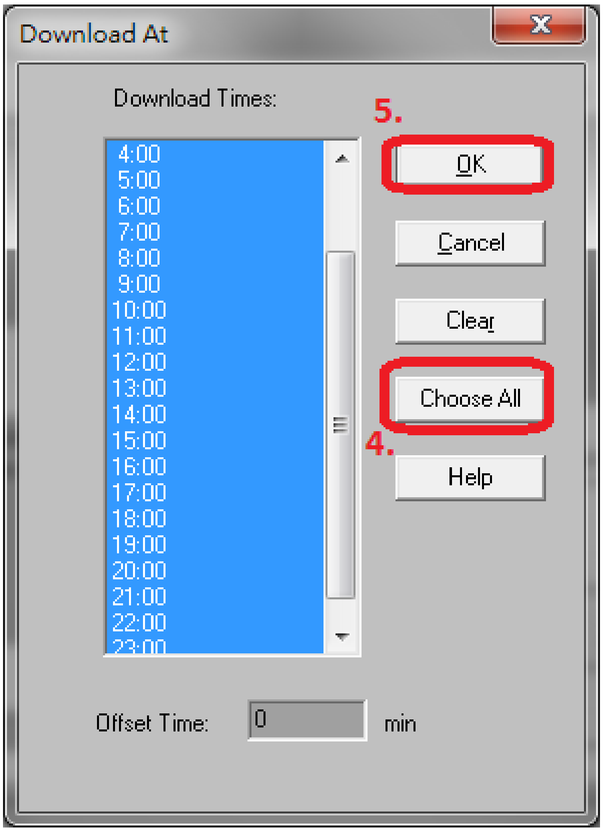
Menu 4:

Skin factor type scale: SKIP

Menu 5:

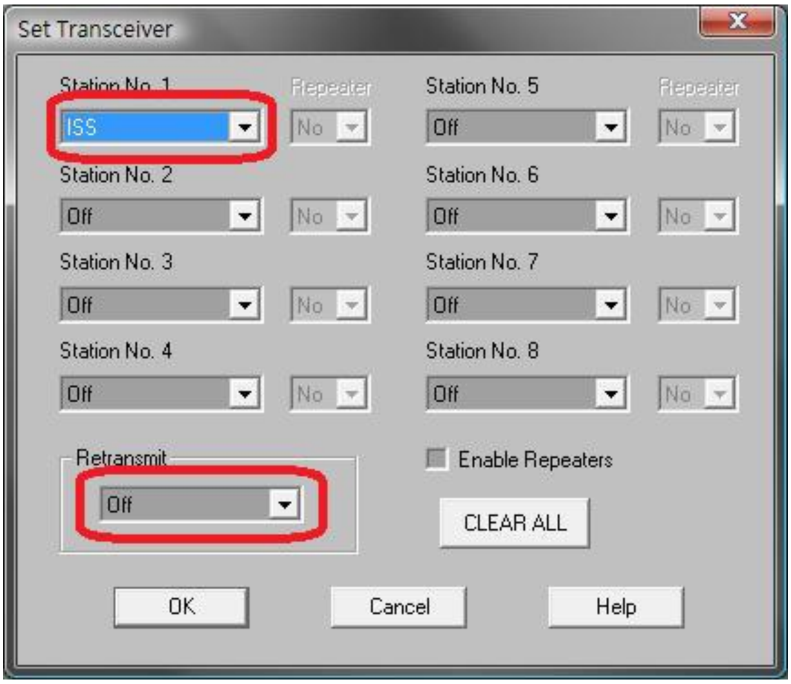
Set auto download: (the name is "test" in our example)


Auto Download
Station Names:
test
1.
2.
Add All >>
Add >
Remove <
Clear <<
Auto Download List:
test
Directories:
Expansion_Modules
Sample Templates
Support
test
3.
Download At...
6.
OK
Cancel
Drives:
c:
Help


Download At
Download Times:
5.
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
OK
Cancel
Clear
Choose All
4.
Help
Offset Time:
0
min

Menu 6:

Set console transceiver (should be the same setting as below, unless you have other instruments connected)



Set Transceiver

Station No. 1: ISS — Repeater: No
Station No. 2: Off — Repeater: No
Station No. 3: Off — Repeater: No
Station No. 4: Off — Repeater: No
Station No. 5: Off — Repeater: No
Station No. 6: Off — Repeater: No
Station No. 7: Off — Repeater: No
Station No. 8: Off — Repeater: No
Retransmit: Off
☐ Enable Repeaters

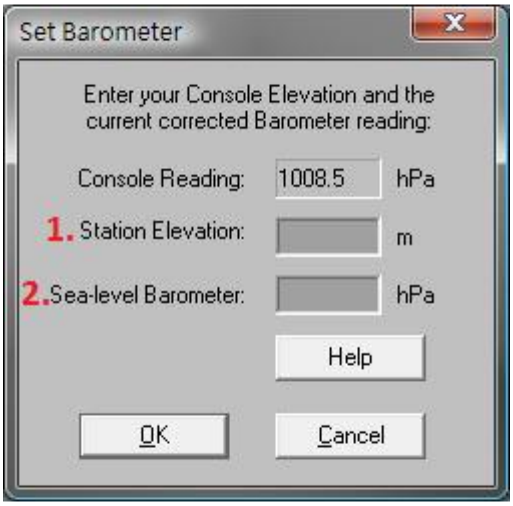
Menu 7:

Barometer and elevation

1. Input elevation of the Console (not the ISS) with reference to the mean sea level (consider the geographical and building height by using Google contour map or other means).

2. Input the pressure found from the nearest HKO weather station from HKO website: (http://www.weather.gov.hk/wxinfo/ts/display_element_pp_c.htm).

If this step is not done, the air pressure measured will be incorrect!



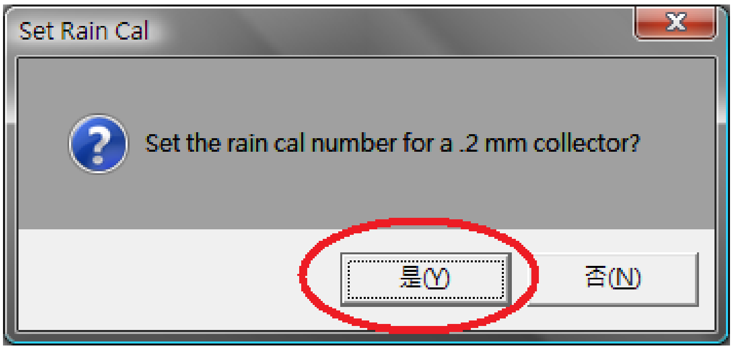
Set Barometer

Enter your Console Elevation and the current corrected Barometer reading:

Console Reading: 1008.5 hPa
1. Station Elevation: m
2. Sea-level Barometer: hPa

Menu 8:

Confirm rain calibration number. The rain collector unit setting in menu 1 will send to the console after confirmation. **If this step is not done, the rainfall measurement will be incorrect!**



Set Rain Cal

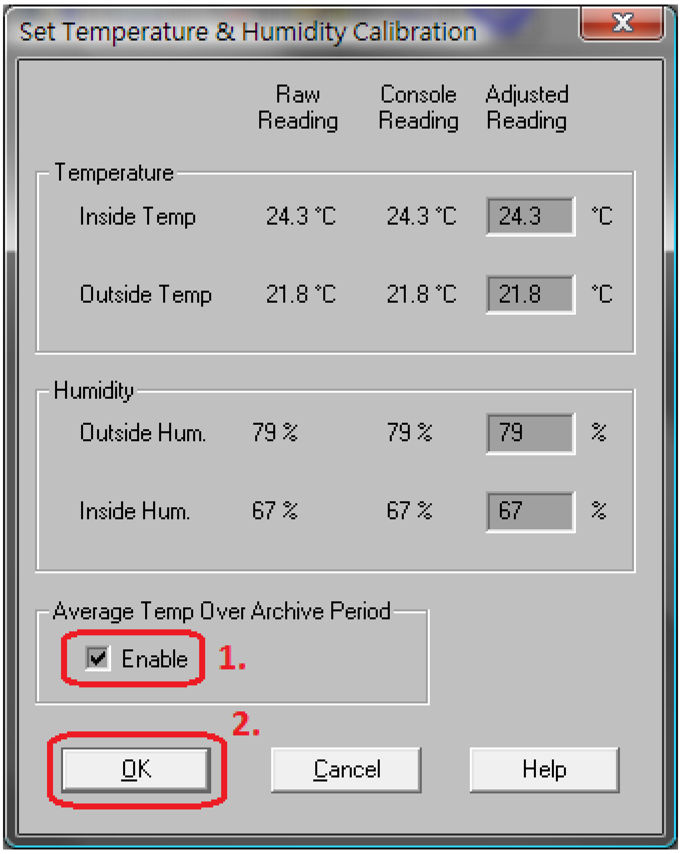
Set the rain cal number for a .2 mm collector?

If the cal number prompted is not correct, please set the correct value in **Menu 1**.

Menu 9:

Set temperature and humidity

Sometimes console reading value deviates from the raw reading. Confirm "Enable" is checked and press “OK” to refresh settings.



Set Temperature & Humidity Calibration

	Raw Reading	Console Reading	Adjusted Reading	
Temperature				
Inside Temp	24.3 °C	24.3 °C	24.3	°C
Outside Temp	21.8 °C	21.8 °C	21.8	°C
Humidity				
Outside Hum.	79 %	79 %	79	%
Inside Hum.	67 %	67 %	67	%

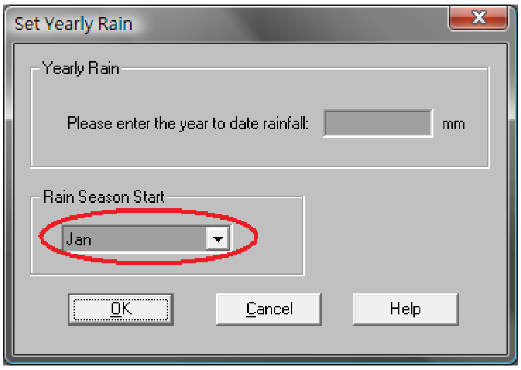
Average Temp Over Archive Period

☑ Enable

Menu 10:

Enter rain season: **Jan**

"Rain Season Start" here means the first month starting to count the annual rainfall, not the starting month of rain season.



Set Yearly Rain

Yearly Rain

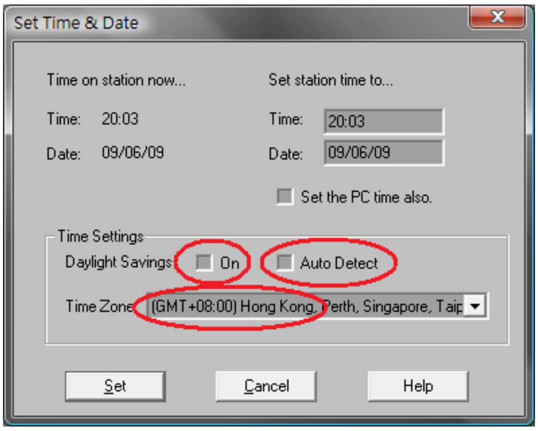
Please enter the year to date rainfall: mm

Rain Season Start

Jan

Menu 11:

Daylight savings: **no tick** for the 2 check boxes, Time Zone: **GMT +8:00 Hong Kong**, and press **"set"** to confirm.



Set Time & Date

Time on station now...

Time: 20:03

Date: 09/06/09

Set station time to...

Time: 20:03

Date: 09/06/09

☐ Set the PC time also.

Time Settings

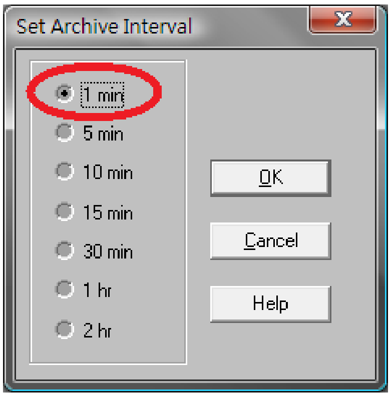
Daylight Savings ☐ On ☐ Auto Detect

Time Zone (GMT+08:00) Hong Kong, Perth, Singapore, Taip

Menu 12:

Set the archive interval: 1 min

If this step is not done, the data return to Co-WIN will be incorrect!



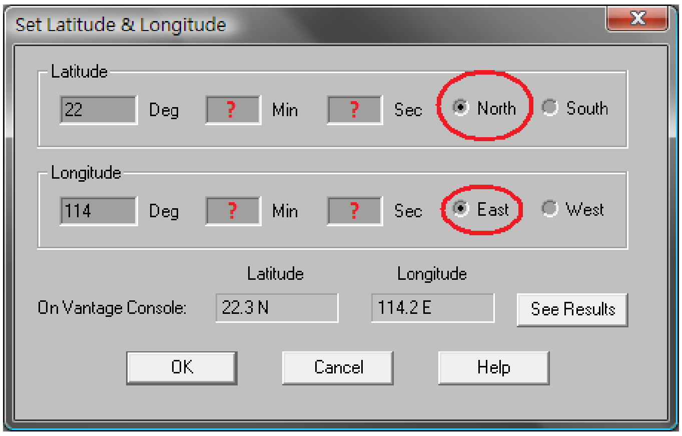
Set Archive Interval

● 1 min
○ 5 min
○ 10 min
○ 15 min
○ 30 min
○ 1 hr
○ 2 hr

Menu 13:

Input latitude and longitude of the AWS.

Set the latitude (**North!**) and longitude (**East!**)



Set Latitude & Longitude

Latitude: 22 Deg ? Min ? Sec ● North ○ South

Longitude: 114 Deg ? Min ? Sec ● East ○ West

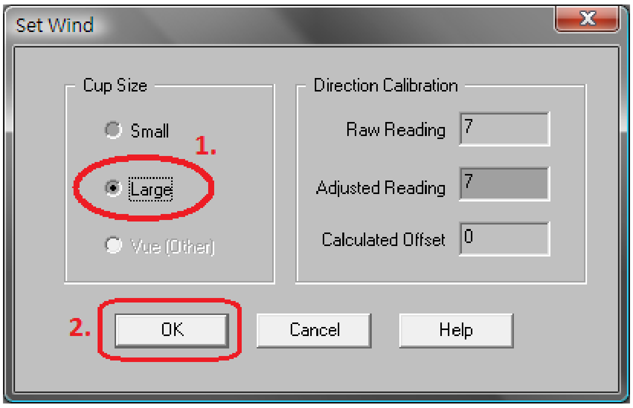
On Vantage Console: Latitude 22.3 N, Longitude 114.2 E

1. Use a GPS to check the Latitude and Longitude of your weather station.
2. Use Google map to right click the location of your weather station on the map and choose “set this point as center of map”, then type the following command line into browser address bar: **javascript:void(prompt('',gApplication.getMap().getCenter()));**

Menu 14:

Confirm wind cup size: **Large**

If this step is not done, the data return to Co-WIN will be incorrect!



Set Wind

Cup Size: ○ Small ● Large ○ Vue (Other)

Direction Calibration: Raw Reading 7, Adjusted Reading 7, Calculated Offset 0

If the anemometer mounting bar cannot be set to pointing north, please input the current direction in degree in “Adjusted Reading” to amend the wind direction.

Mark down the value of “Calculated Offset”.

Menu 15:

Set alarm – cancel all alarm

---END---