Skyradiometer

POM-01

Operation Manual

(For Windows OS)

March 2017

[Index]

Specification

POM-01 Skyradiometer measures circum solar radiation and spectrum intensity of the direct solar radiation for the research of the size distribution and concentration of the aerosols.

＜POM-01＞

Half view angle	0.5 deg										
Min. Scattering angle	0, 2, 3, 4, 5, 7, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90・・・180(deg.)　Max. 180 deg.										
Band width 50%	10nm										
Wavelengths	Monitor Channel	1	2	3	4	5	6	7			
	Wavelength (nm)	315	400	500	675	870	940	1020			
	*Channel 0=Dark reference, 940nm=Channel for water vapor absorption band										
Channel setting	Filter wheel type										
Detector	Short wave length (315nm to 1020nm)	Si Photodiode : Hamamatsu Photonics									
Range	2.5mA , 250uA , 25uA , 2.5uA , 250nA , 25nA , 2.5nA　*Auto control										
Temperature Control Measurement	40℃ (Heater control only) Measurement range: Short λ : 0 to 50 deg.C Option: Cooling Unit　　　　　　　　　　　　　(*λ =Wavelength)										
Tracking Control	Stepping motor: 2 axis of Azimuth and Zenith, Stepping angle 0.0036 deg / pulse										
Tracker Movable range	Azimuth	+/- 300 deg (South 0 deg)									
	Zenith	-60 to 160 deg (Horizontal level 0 deg)									
Sun Sensor	4 element Si Sensor : Hamamatsu Photonics										
Rain Sensor	AKI-1801										
Communication	RS-232										
Power Consumption	200W　(100V/2A)										
Power Supply	100 to 240VAC /2A (50/60Hz)										
Weight	Skyradiometer : Approx. 16kg										
	Cable : Approx.4kg / 20m (Standard)										
Accessories	- Power cable (20m:Standard) - Communication Cable (20m:Standard) Up to 100m is available(Option) - Rain Sensor - Tool box (Screws, Hex driver, Self-fusing tape, Silica-gel) - CD-ROM (Software for observation) - Case for sensor										

Installation

Condition of the installation

- Skyradiometer shall be installed under the clear sky (Sun sensor need to react during the installation)
- Mount the tracker on the sold and flat place, with free field of view, especially in the direction of East-South-West.

Installation procedure

1. Load the sensor tube on the tracker arm and fix it with nuts. Set the position with reference of the arrow label.

2. Connect the cable 4, 5, 6, Connect the sun sensor cable 6.

NOTE: All connectors are the single lock type.

Align the guide of the plug and receptacle, and push the plug straight until it makes the "click" sound.

(5key type of guide can be easily aligned by slightly rotating the plug)

NOTE: Do not twist the lock nut, when inserting the plug.

Guide of all connectors are locating on the top.

When removing the connector, rotate the lock nut counter clockwise to 45 degrees and pull out them.

NOTE: Do not twist the end-bell, during the removal of connectors.

3. Locate the label of "South" , on the tracker to the direction of South.

4. Adjust the horizontality of the skyradiometer by using a water bubble on the leg of sun tracker. It is necessary to maintain the sun tracking accuracy.

5. Fix the skyradiometer on the mounting base, by using 3 pieces of screws, included in the package.
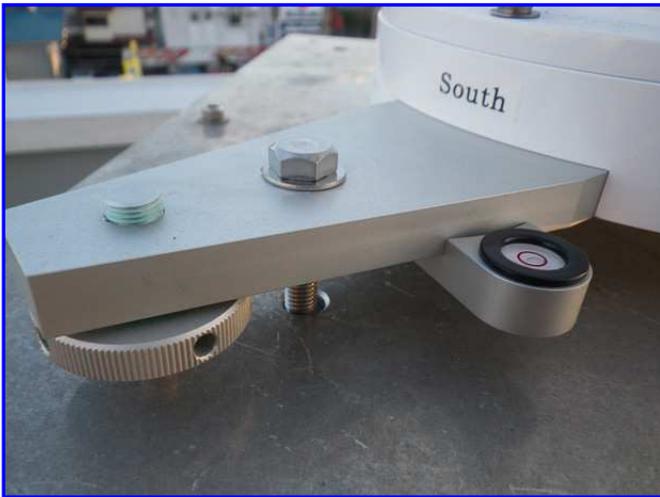
NOTE: It is necessary to fix skyradiometer to the flat and robust mounting base, for the fall-prevention against the strong wind.

6. Connect the rain sensor

7. Connect the Communication cable(RS232) and Power cable (AS3P).

NOTE: Prior to the connection of the power cable, make sure that there would be no obstacles around the skyradiometer, since it automatically start the origin search movement, immediately after connecting the power cable.

8. Boot the "POM01_Setting2015.exe" software and display the setting screen. Edit the measurement schedule, with reference of the page 8. "Setting". Click "Close" on the right bottom corner after the completion of the schedule edit.

9. Execute the "POM-01_JMA.exe" and boot the observation program.

10. Skyradiometer starts the measurement, based on the settings.

Skyradiometer has 2 measurement modes of sun sensor mode and calculation mode. Sun tracking is based on the information of the installation site (latitude, longitude, time), during the calculation mode. In addition, sun sensor corrects the small tracking errors during the sun sensor mode.

NOTE: It is important to locate the "South" label on the foot part of skyradiometer, in order to let the sun sensor react to the sun within +/- 5 degrees to the sun.

In order to minimize the difference between the calculation mode and sun sensor mode, please adjust the position of skyradiometer. This difference can be recognized by hiding the sun sensor under the clear sky (Adjust the position to minimize the movement of the sensor, before and after hiding the sun sensor).
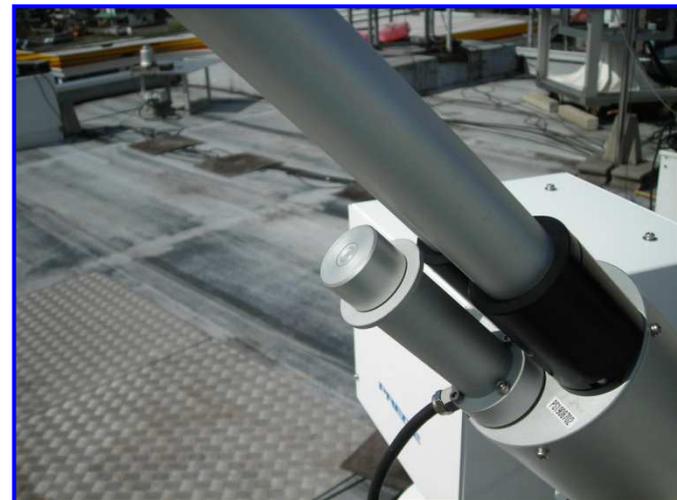
Settings

Required specifications

PC: Pentium 2<   Memory 256MB<   Free HDD area 1GB<   Serial port (RS-232C)

OS: Windows XP / Vista / 7 (32bit/64bit)

First of all, execute the POM01_SET ********.exe, and configure the observation program.

NOTE: ******** is the version of release (Updated date)

Folder will be automatically generated at the directly of C:¥POM-01¥data   C:¥POM-01¥obs

Setting Screen

NOTE: Configure the following items at the setting screen.

Setting File Name	: Display the Setting file (.obs) on the operation program screen.
Skyradiometer S/N	: Enter the serial number, labeled on the Sensor tube.
Sun Tracker	: Enter the serial number, labeled on the tracker.
Place	: Location of observation site

Longitude [deg]	: Longitude of the observation site
	(East longitude=+, West longitude=-) up to 3rd decimal place.
Latitude [deg]	: Latitude of the observation site
	(North latitude=+, South latitude=-) up to 3rd decimal place.

SunTracker Origin Position : Mechanical offset value of the sun tracker. (Stated on the label of tracker)

    Azimuth (AORG) : Offset value of azimuth direction (Approx. -300 deg +/- 10 deg)

    Altitude　(ZORG) : Offset value of altitude direction (Approx. 0 deg +/- 10 deg)

Observation Starting/Ending Airmass : Value of airmass to start and terminate the observation.

Observation Switching Airmass : Value of airmass to switch the observation mode (*1)

Direct Sun Measurement : Activate or inactivate the direct sun observation

    Interval Time[min] : Executing interval [min]

Scattering Measurement for Aerosol Observation : Activate or inactivate the aerosol observation.

    Interval Time[min] : Executing interval [min]

（a）Airmass ＜ Switching Airmass : (*1) Scatting Angle = 180 deg when airmass is smaller than configured value

   ・Both Side Measurement : Sensor moves to the direction of scattering angle both to clockwise and counter clockwise (See Page 13)

（b）Airmass ＞ Switching Airmass : (*1) Scatting Angle = 30 deg when airmass is bigger than configured value. (See Page 13)

   ・Alternation Measurement : Sensor moves to the direction of scattering angle to clockwise and counter clockwise alternatively (See Page 13)

（c）Zenith scanning for Aerosol : Execute the vertical observation voluntarily , during the aerosol observation. (See page 13)

                    NOTE: Zenith scanning for Aerosol would be skipped if vertical observation has already executed.

Zenith Measurement for Clouds : Activate or inactivate the Zenith scanning（See page 12 for example）
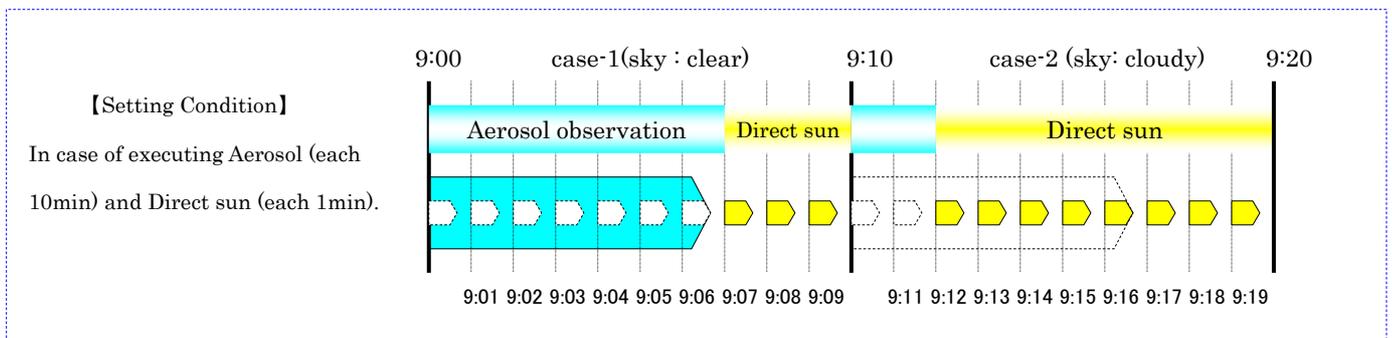
Com Port	: Serial port of PC for observation (Port number)
Folder（Path）	: Set the directory to store the measurement data
	(Files to be generated：.sun, .data, .cld)

Example: In case the storing directory was set as C:¥POM-01¥Data, folder will be generated automatically with each date, and the data will be stored with the file name of observation date, such as C:¥POM-01¥Data¥20160315.

Filter Wavelengths [nm]	: Settings of filter wavelength (number and wavelength is fixed for each sensor)
	0 = Dark (Fixed)　+ 7 wavelengths
Auto Sun-Disk Scan	: Execute automatic disc scan measurement (Check of light axis)
All Channel	: All 7ch disc scan
・500nm、1627nm	: Disc scan of one of each from short and long wave length
Interval Day	: Setting of executing cycle (day) of the disc scan
Time	: Setting of executing time (LT) of the disc scan
Name of the setting file	: Displays the setting file for observation program (Obs)
Rain sensor function	: Enabling/disabling of rain sensor function
	(fixed as enabled on the setting screen)
Automatic termination of the program	: Observation program will be terminated automatically at the end of the observation.
Filter Wavelengths [nm]	: Settings of filter wavelengths (numbers and wavelengths are fixed

for each individual sensor) 0=Dark(fixed) + 11 wavelengths.

Obs Load   : Setting file, stored by Obs Save will be retrieved.

Obs Save   : Store the setting file

NOTE: Make sure to store the settings by "Obs save" whenever any settings were modified.
Please confirm that correct name of ".Obs" file is displayed in the field of setting file name, after the "Obs Save" and "Obs Load".

Close   : Close the setting screen.

Specification of the operation

Standard Operation

Followings are the specification of the skyradiometer's movement (Numeric values can be modified in the Setting Screen)

1. Start (end) of the observation : Start at Airmass <=10

(Start) Airmass＜=10 (End) Airmass＞=10

Ex.Observation Starting/Ending Airmas ＝10
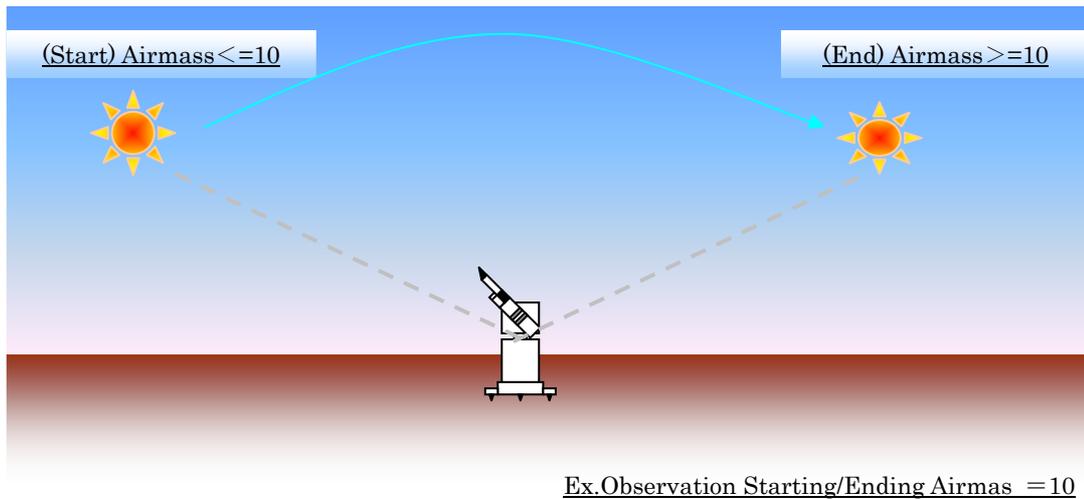
2. Aerosol observation interval : Time (Every 10 minutes) or Airmass (Every 0.25 steps or 20 minutes)

3rd observation --- 9:20 Ex. Time / Every 10minute

2nd observation --- 9:10

1st observation --- 9:00

3rd observation --- 4.00 Ex. Airmass / Every

2nd observation --- 4.25

1st observation --- 4.50
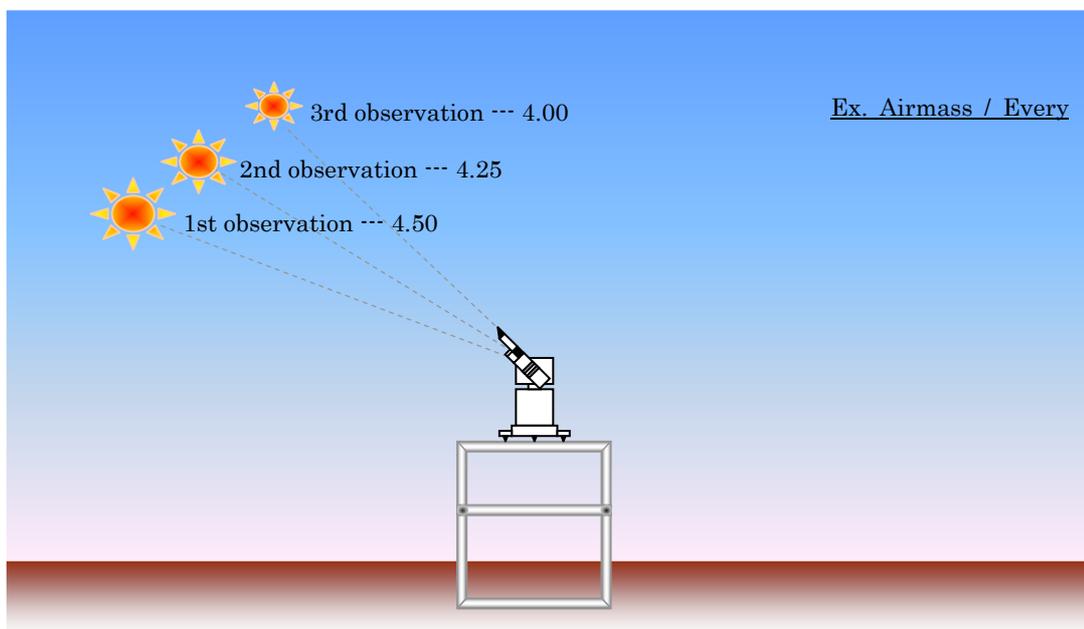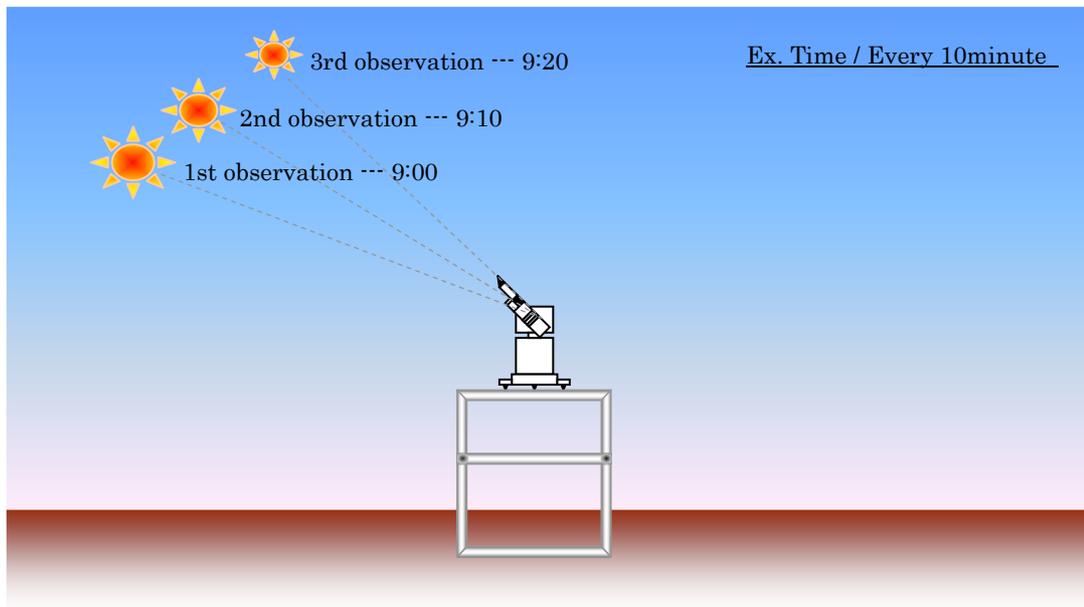
3. Direct sun observation interval : Time (60 sec)

4. Direction of Aerosol observation : Observes horizontal direction of east and west alternately.

However, skyradiometer observes vertical direction (Zenith to North) when the sun altitude exceeds 75 degrees.

Observation of horizontal direction

Observation of vertical direction
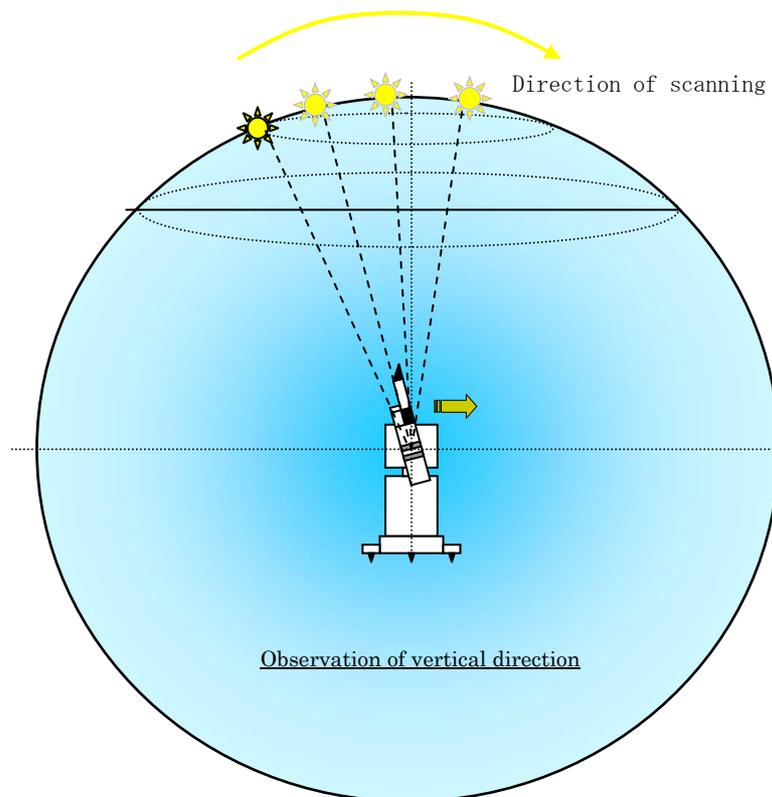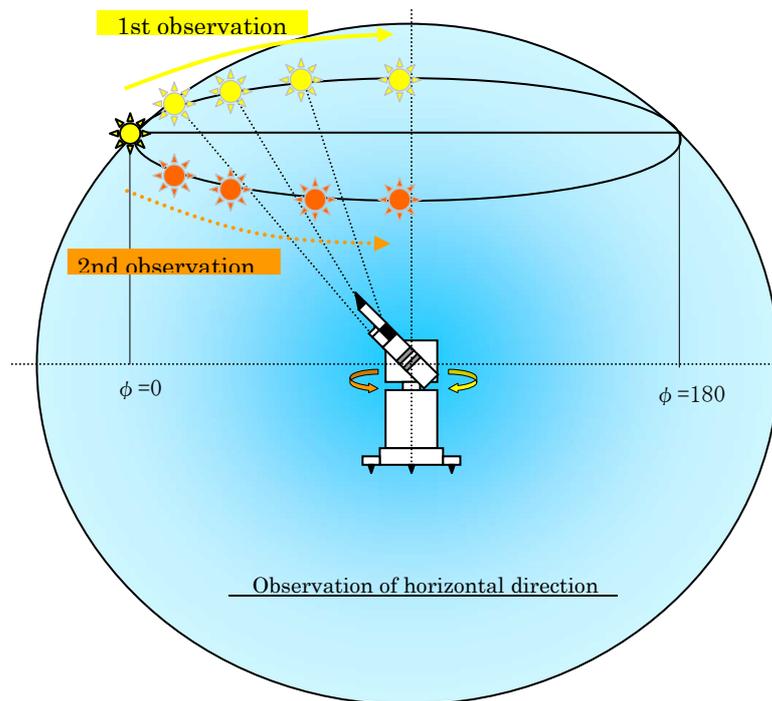
Scattering angle   : Max. 24 points (Depending on the calculation of the scattering angle)
                     0,2,3,4,5,7,10,15,20,25,30,40,50,60,70,80,90,100,110,120,130,140,150,160

Disk scan schedule : Disk scan schedule (interval, day and time) can be modified in the

setting screen. (Default: every 7 days, 10:00a.m.)

Each wavelength with the check in the "Disk" of Wavelengths Setup will be

scanned once, when the sky is clear and time reached to the set time

Time Correction of the tracker ：23:00 (Every day)

: synchronize the clock of the tracker and PC.

Rain Sensor : Skyradiometer stops at the waiting position (sensor faces downword) when it

detected water on its surface.

Waiting position = South of azimuth direction, and Altitude of -30 degrees.

Formula to derive Airmass

Airmass ＝ 1／COS θ

［ θ ＝ Solar altitude ＊ （π／180）］

θ
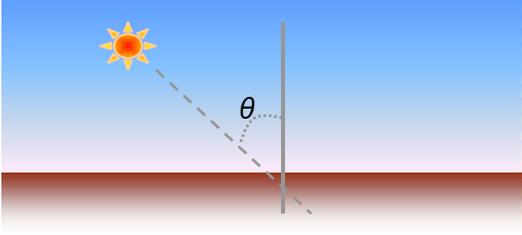
Special Measurement

■ Zenith Measurement for Clouds
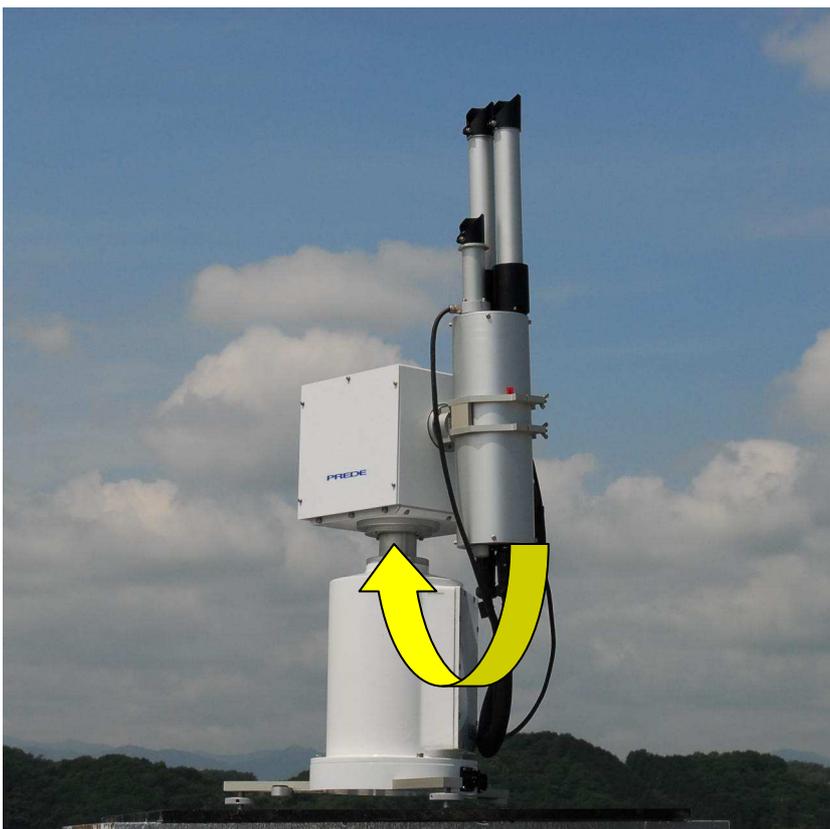
Observation of Zenith angle（90°）

■ Both Side

Both side will be scaned in each observation
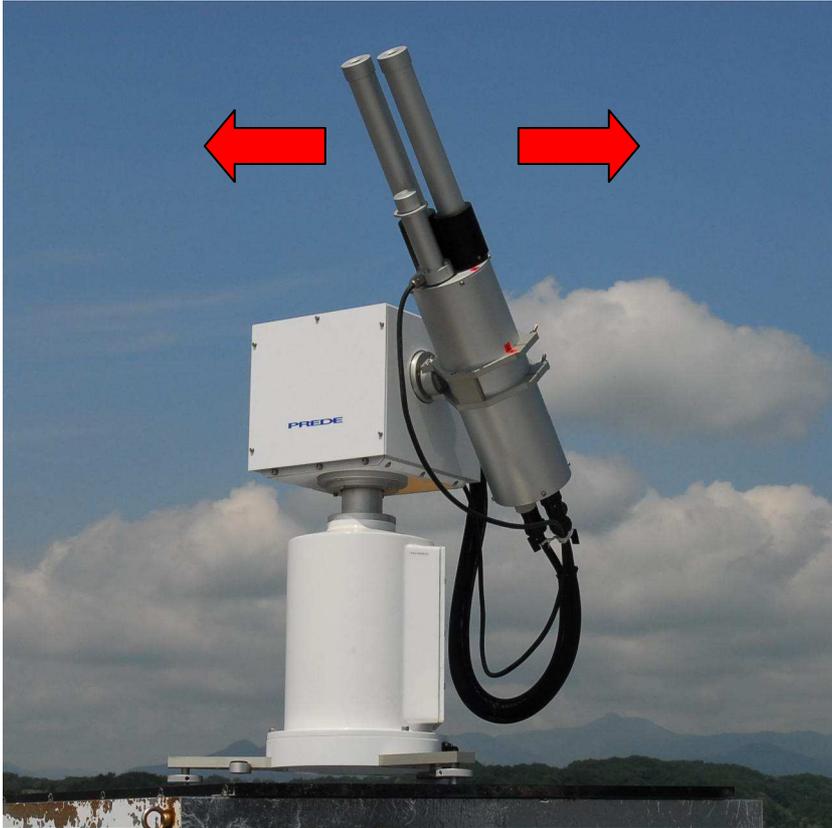
When the airmass went below the threshold (4.5), scattering angle will be 180 deg., and direction of the scattering scan will be normal movement of;

Before noon: Clockwise

After noon: Counter Clockwise

However, if "Both Side" on the observation setting in the setting screen was activated (checked), Skyradiometer will scan both direction of clockwise and counter clockwise in every observation.

■ Alternation

Scan one direction in each observation
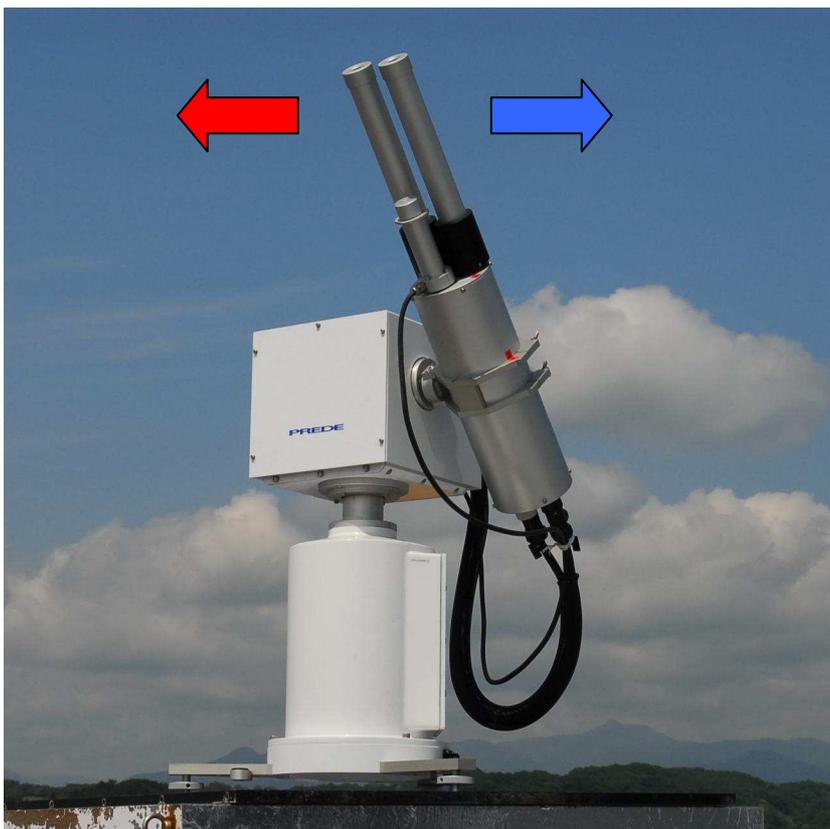
When the airmass exceeded the threshold (4.5), scattering angle will be 30 deg., and direction of the scattering scan will be normal movement of;

Before noon: Clockwise

After noon: Counter Clockwise

However, if "Alternation" on the observation setting in the setting screen was activated (checked), Skyradiometer will scan each direction one by one. (If the first scan was clockwise, next scan will be counter clockwise, followed by clockwise, counter clockwise, alternately).

Observation

After the completion of the settings, start the observation problem by executingPOM-01_CNT ********.exe in the control program folder.

NOTE: ******** is the version of release (Updated date)

Observation screen
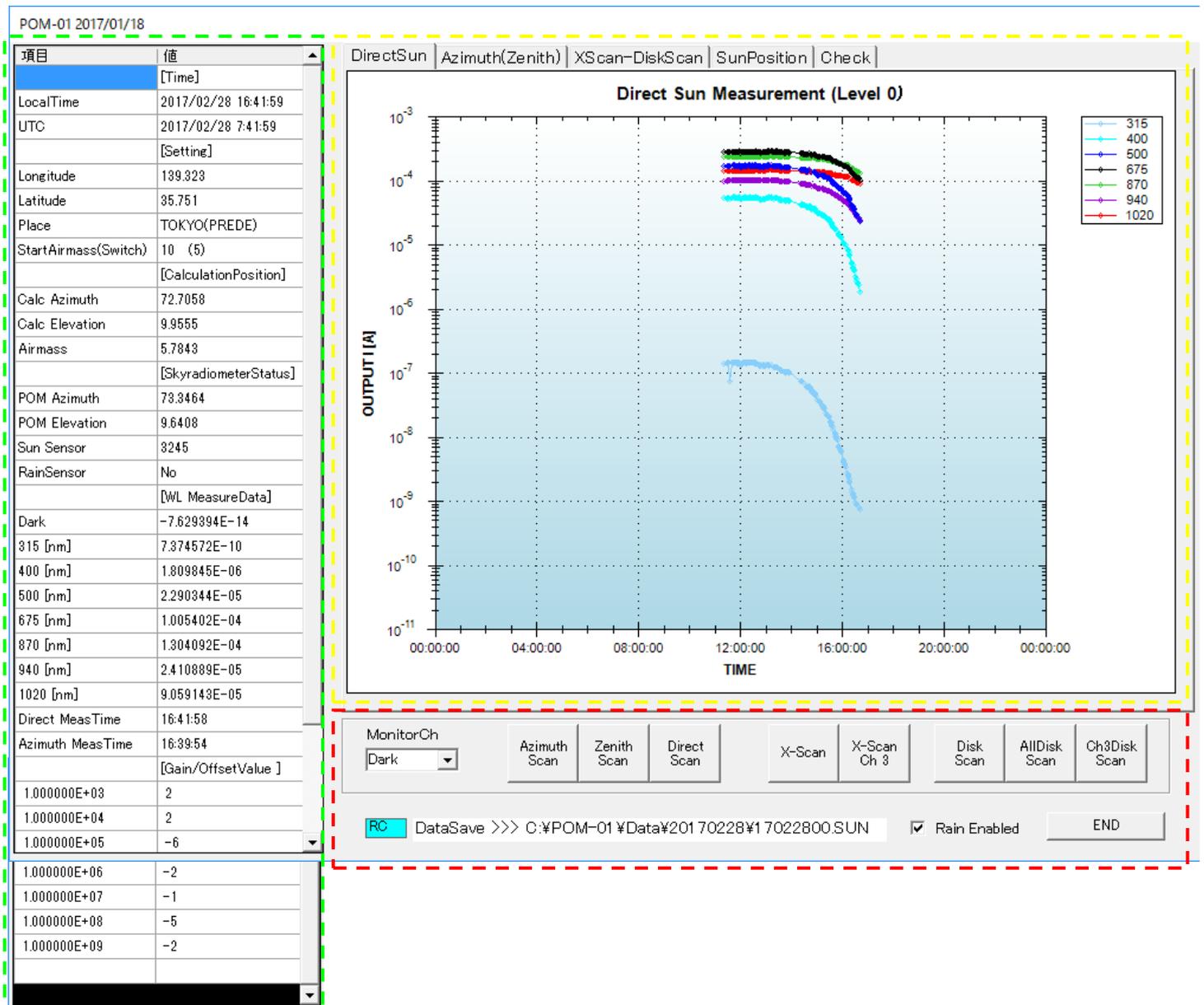
Yellow frame : Graphic display. Tabs on the top will be changed automatically with respect to the type of observation.
- DirectSun – Observation results of direct sun.
- Azimuth (Zenith) – Value of aerosol observation.
- XScan-DiskScan – Result of the X-Diskscan
- Sun Position －Position of the sun (Calculated value, actual value)
- Check －Manual control of direction of the sensor.

Green frame	:	Display of time, setting, status, and measurement date.
[Time]	:	Time of PC
Local Time	:	Local time
UTC	:	Universal time coordinated
[Setting]	:	Setting
Longitude	:	Longitude of the installation site
Latitude	:	Latitude of the installation site
Place	:	Location of the installation site
Start Airmass（Switch）	:	Airmass value to start and terminate the observation.
		(airmass value to switch the observation mode)
[Calculation Position]	:	Position, calculated from the time and location
Calc Azimuth	:	Solar Azimuth (W:$-90°$ S: $0°$ W: $+90°$ N: $180°$)
Calc Elevation	:	Solar Altitude (nadir: $-90°$ Horizontal: $0°$ Zenith: $90°$)
Airmass	:	Airmass value, calculated from the time and location.
[Skyradiometer Status]	:	Status of Skyradiometer (Actual value)
POM Azimuth	:	Solar Azimuth (W:$-90°$ S: $0°$ W: $+90°$ N: $180°$)
POM Elevation	:	Solar Altitude (nadir: $-90°$ Horizontal: $0°$ Zenith: $90°$)
Sun Sensor	:	Sun sensor output value
Rain Sensor	:	Presence of detection from the rain sensor
		NOTE: Sensor will face to the south, diagonally downward when it detects rain. (Rain stand by position)
[WL Measure Data]	:	Measurement value of each wavelength
Direct MeasTime	:	Time to measure the direct sun
Azimuth MeasTime	:	Time to measure the aerosol (horizontal scan)
[Gain/OfsetValue]	:	Offset values of each range （Short wave sensor / Long wave sensor）

Red frame	:	Manual control keys and Message column
MoniterCh	:	Monitoring channels can be selected during the stand by phase, and measurement value will be displayed in the green frame.
Azimuth Scan	:	Execution of manual aerosol measurement (Horizontal scan)
Zenith Scan	:	Execution of manual aerosol measurement (Vertical scan)
Direct Scan	:	Execution of manual measurement of direct sun
X-Scan	:	Execute the X-Scan of the channel, selected by MoniterCh.
X-Scan（3ch）	:	Set the filter to 3ch and execute the scan for the optical axis alignment.
Disk Scan	:	Execute the disc scan of the channel, selected by MoniterCh.
All Disk Scan	:	Execute the disc scan of the all channels.
		Disc scan data file of each wavelength channel is generated.
Ch3 Disk Scan	:	Execute the disc scan of only 5ch (Shortwave) and 10ch(longwave).
		Disc scan data file of 5ch and 10ch is generated.
Message column	:	Disk scan of only 3ch (500nm) and disc scan data file of 3ch will be generated.

NOTE: Color of command box varies based on the process, but red color indicates the error (such as communication error (time out)). In case red color remains for a while, Observation program, PC, and skyradiometer may have to be rebooted.

Rain Enable	:	Enable the rain detection
END	:	Terminate the observation program

Direct Sun Observation Screen

Graphic display will be automatically switched and measurement result will be displayed when direct sun observation has started.
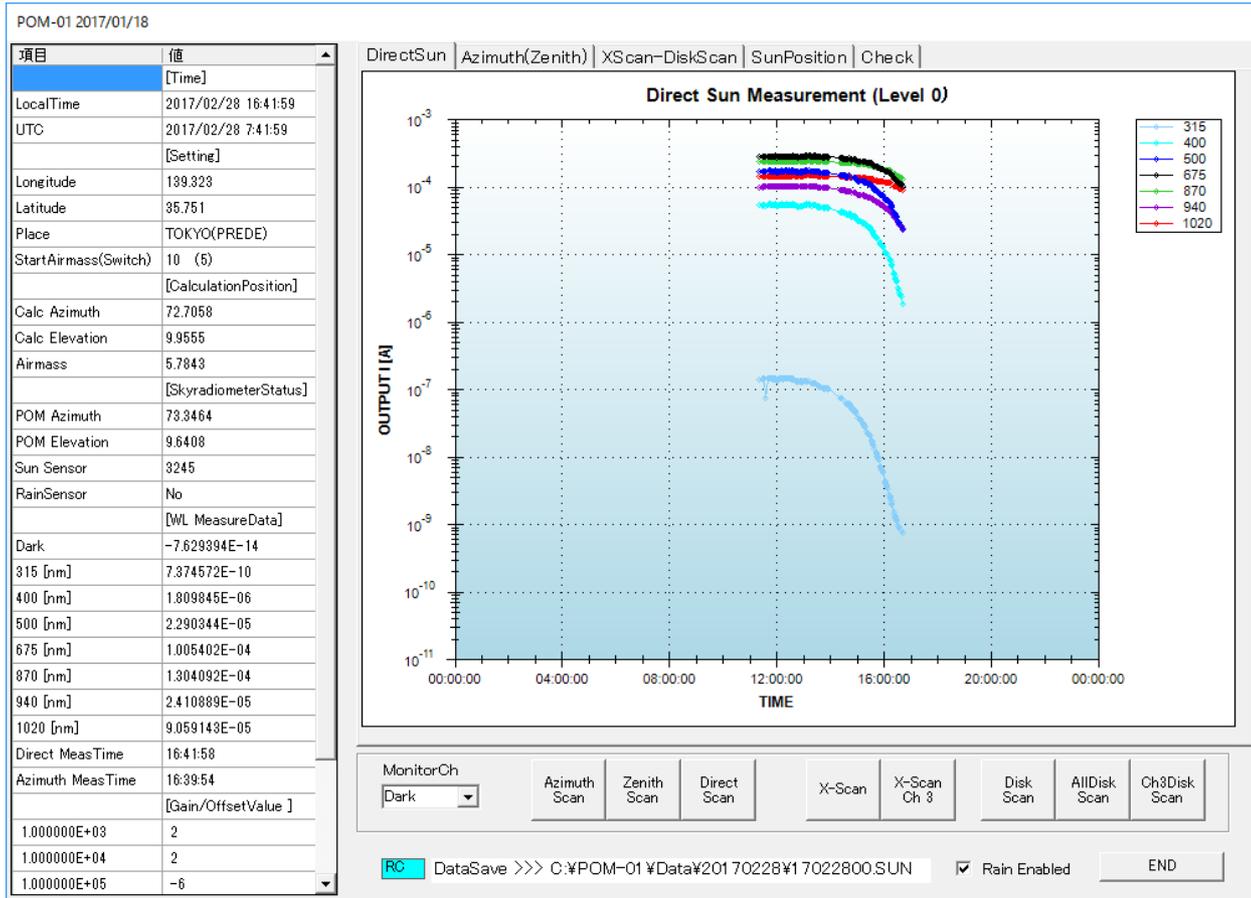
Aerosol Observation Screen

Graphic display will be automatically switched and measurement result will be displayed when aerosol observation has started.
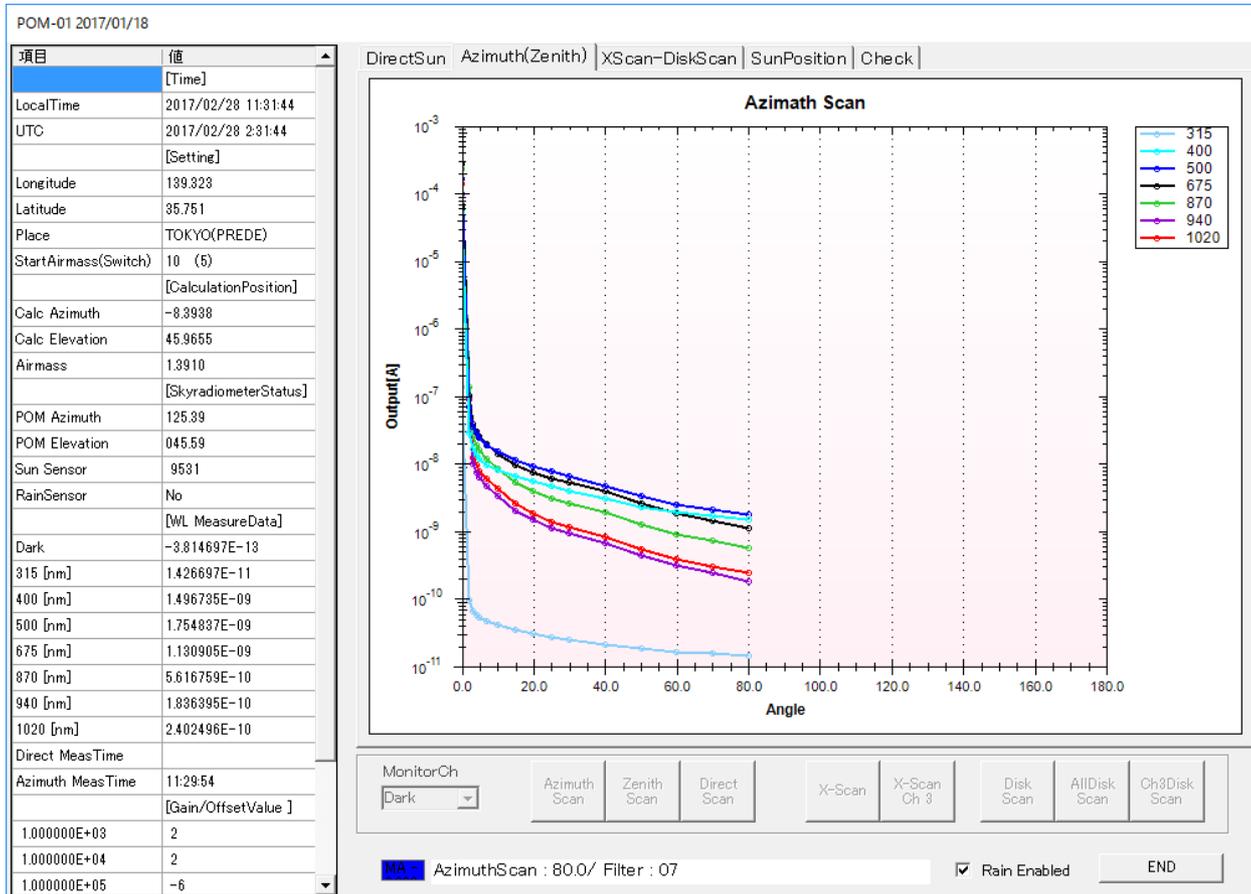
X-Scan Screen

Graphic display will be automatically switched and the X-scan result will be displayed,

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項目	値
	[Time]
LocalTime	2017/02/28 11:45:58
UTC	2017/02/28 2:45:58
	[Setting]
Longitude	139.323
Latitude	35.751
Place	TOKYO(PREDE)
StartAirmass(Switch)	10 (5)
	[CalculationPosition]
Calc Azimuth	-3.3385
Calc Elevation	46.2639
Airmass	1.3840
	[SkyradiometerStatus]
POM Azimuth	-2.7540
POM Elevation	45.8964
Sun Sensor	9734
RainSensor	No
	[WL MeasureData]
Dark	0
315 [nm]	1.456985E-07
400 [nm]	5.477905E-05
500 [nm]	1.710358E-04
675 [nm]	2.822876E-04
870 [nm]	2.381134E-04
940 [nm]	1.012955E-04
1020 [nm]	1.429596E-04
Direct MeasTime	11:45:57
Azimuth MeasTime	
	[Gain/OffsetValue]
1.000000E+03	2
1.000000E+04	2
1.000000E+05	-6

DirectSun | Azimuth(Zenith) | XScan-DiskScan | SunPosition | Check

Disk(X)-Scan

Azimuth center -0.015
Altitude center 0.001

Z:10 4.3686E-07
Z:9 5.6953E-07
Z:8 1.3012E-06
Z:7 1.0202E-05
Z:6 3.6247E-05
Z:5 7.5256E-05
Z:4 1.1802E-04
Z:3 1.5349E-04
Z:2 1.6825E-04
Z:1 1.7074E-04
Z:0 1.7084E-04
Z:-1 1.7047E-04
Z:-2 1.6817E-04
Z:-3 1.5068E-04
Z:-4 1.1526E-04
Z:-5 7.4173E-05
Z:-6 3.7231E-05
Z:-7 1.0883E-05
Z:-8 1.4634E-06
Z:-9 5.6953E-07
Z:-10 4.1183E-07
A:10 1.0426E-05
A:9 2.7390E-05
A:8 4.9492E-05
A:7 7.8346E-05
A:6 1.0630E-04
A:5 1.3451E-04
A:4 1.5633E-04
A:3 1.6812E-04
A:2 1.7089E-04
A:1 1.7068E-04
A:0 1.7055E-04
A:-1 1.7058E-04
A:-2 1.6975E-04
A:-3 1.6834E-04
A:-4 1.5927E-04

MonitorCh: Dark

Azimuth Scan | Zenith Scan | Direct Scan | X-Scan | X-Scan Ch 3 | Disk Scan | AllDisk Scan | Ch3Disk Scan

X Mode(SC) : O   ☑ Rain Enabled   END

X-Scan is the process to align the optical axis. This process is recommended when the skyradiometer was relocated and re-installed. Adjust the values of Azimuth center and Altitude center within +/- 0.050, by the screws. Please adjust both at Ch5 and Ch10.

i.e. when the Altitude center was -0.075, tighten the screw 4.

NOTE: X-Scan needs to be carried out under the clear sky. This cannot be accurate if there are any clouds in the sky.

④ Altitude center (－)

Azimuth center (－) ①   ② Azimuth center (＋)

③ Altitude center (＋)

Front view of the sun sensor

Disc Scan Screen

Graphic display will be automatically switched and the Disk Scan results will be displayed.

Please carry out the Disc Scan on the regular basis (Periodically)

Automatic disc san is available by the setting on the observation program.

NOTE: X-Scan needs to be carried out under the clear sky. This cannot be accurate if there are any clouds in the sky.

Sun Position Screen

Transitive graph of the sun position will be displayed when clicking on the "SunPosition" tab.
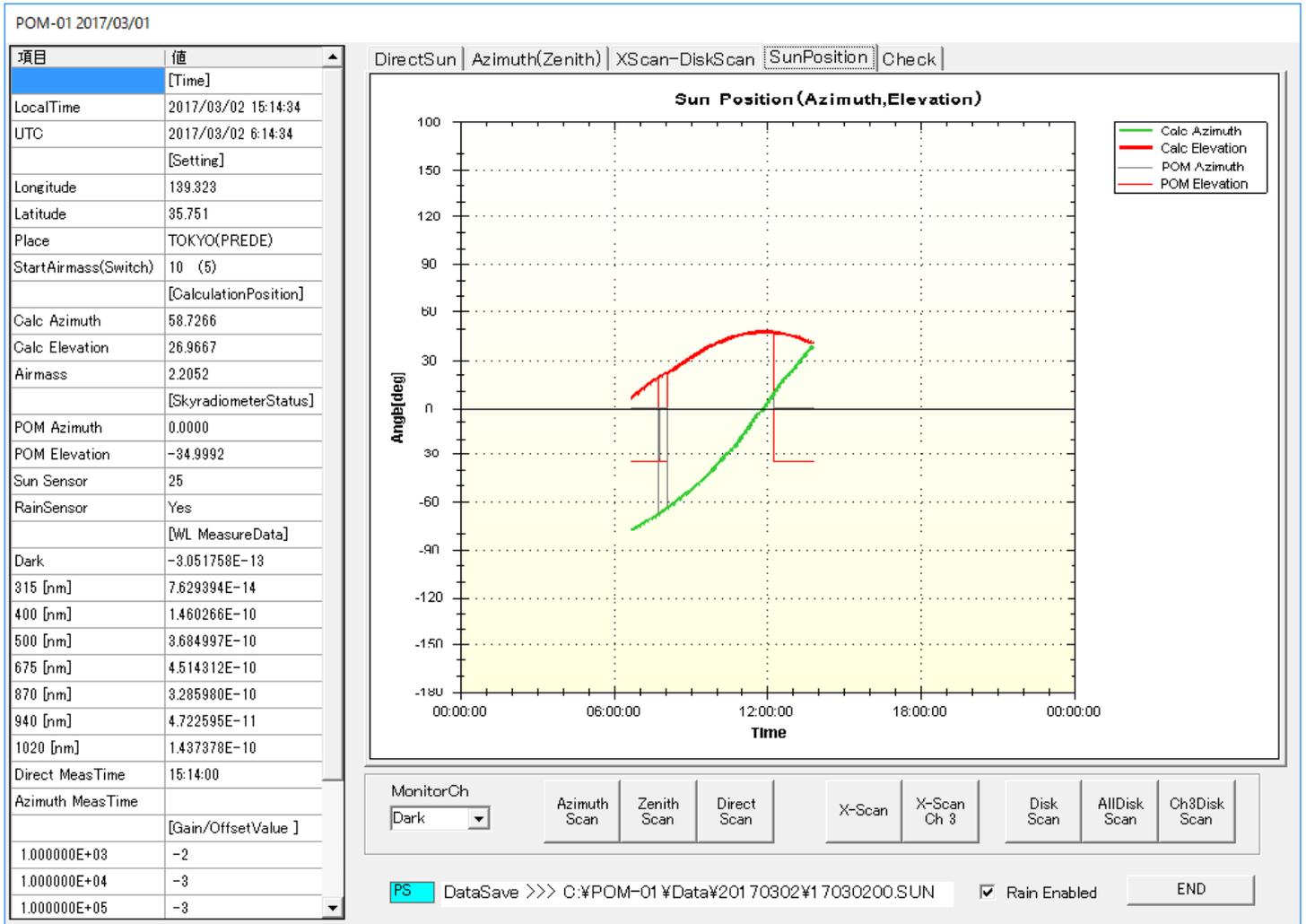
Tracks of the Calc Azimuth, POM Azimuth, Calc Elevation, and POM Elevation will be almost the same in case POM-01 was correctly installed.

There would be either problems in installation method, or defect of the unit, if there were significant difference in between above tracks.

In addition, those tracks would not match while POM-01 detects rain, as the sensor is facing to the rain stand by position (south, diagonally downward).

Check Screen

Check screen will be displayed when clicking on the "Check" tab.

Please stop the auto tracking mode, by clicking on the "SC Command" button.

It will then, turned to the manual mode.

Sensor will face to the required direction, when entering the desirable Azimuth and Altitude angle on the Check screen.

It is a shift to an absolute position, based on the reference position of Azimuth : South = 0, and Horizontality = 0.

POM-01 will be switched to auto tracking mode when clicking on the SA Command button.

Observation data

Observation data / Data format

File name format

Following 4 types of observation data will be generated in the observation program.

Each Observation data has different extension.

 1. Normal Observation data file   : <u>FileName : yymmddnn.dat</u>

 2. Direct Sun observation data file   : <u>FileName : yymmddnn.sun</u>

 3. Disk scan data file   : <u>FileName : yymmddnn.V**</u>

 4. Cloud scan data file   : <u>FileName : yymmddnn.cld</u>

"yymmdd" in the above example indicates the year(yy), month(mm), and date(dd) of the observation data.
"nn" is the file number.
In the field of file number "nn", value of 00 to 99 could be generated. This value is fixed as "00" for the latest model.

In case of generating files in each 1 hour, files of 0 to 59 minutes will be generated.

 1.Normal Observation data file   : FileName : yymmdd_HH.dat
 2.Direct Sun Observation data file : FileName : yymmdd_HH.sun
 3.Cloud scan data file   : FileName : yymmdd_HH.cld

"yymmdd" in the above example indicates the year(yy), month(mm), and data(dd) of the observation data, and "HH" is the hour from 0 to 23.
Header and data record of this file are the same.

Common header
First 2 digit of the data file will be common in each data file.

Contents of the common header
 Each parameter is aligned with the following order with comma-delimited fixed length format.
 1st line: Type of POM(6), Tracker S/N(7), Sensor S/N(7), Latitude(8), Longitude(8),
     Date/GMT(8), Time/GMT(8), Date/LT(8), Time/LT(8)
 2nd line: Number of channels, 1ch, 2ch, 3ch, …… 11ch (Information of the wavelength)

[Example]   POM-01,1822105,1957002, 139.315, 035.738,09/05/19,20:10:05,09/05/20,05:10:05
        11,0315,0340,0380,0400,0500,0675,0870,0940,1020,1627,2200

1. Normal observation data

File name : 09052000.dat…Date of observation = 20th May 2009, File number = 00

[Example]
 09/05/19,20:30:05,09/05/20,05:30:05,H,Fussa,
 20:30:05,05:30:05,-106.89,009.62,3.6880E-09,1.9538E-09,1.3190E-08,1.7071E-07,3.8078E-06,
    ∼ 2.6970E-05,4.6799E-05,4.9362E-06,4.6783E-05,6.5872E-05,3.4393E-05,-21.3,18.1,0000

1st line: Observation date(GMT), Observation start time(GMT), Observation Date(LT), Observation start time (LT),
   type of Observation, name of installation site.

   type of observation H: Horizontal scan / V: Vertical scan
   Header will be added after each observation.

2nd line:Observation time(GMT), Observation time(LT), azimuth angle, altitude angle, measurement value (Ch1),
   Measurement value (Ch2) …… Measurement value (Ch11), Temperature of NIR sensor, Internal
   temperature of sensor, Air pressure.

   - Azimuth and altitude angle are direction of the sensor during the observation.
   - Observation values are the sensor's current value in the unit of (A).
   - They will be logged downwards, based on the scattering angle, selected in the setting screen.
   - If "Barometer Com Port" was activated (checked), without connecting the pressure sensor, value
    of the data will be ", 0000".
   - If "Barometer Com Port" was not activated (not checked), value of the data will be displayed as

", -999".

2. Data of Direct sun observation

File name: 09052000.aun : Observation date = 20th May 2009, file number = 00

[Example]
09/05/19,20:11:36,09/05/20,05:11:36,S,Fussa,
20:40:04,05:40:04,-105.54,011.51,4.1847E-09,3.0655E-09,2.5963E-08,3.0296E-07,5.1796E-06,
～ 3.2005E-05,5.2956E-05,6.9740E-06,5.2269E-05,7.2594E-05,3.8612E-05,-21.1,18.5,0000,01209

1st line: Observation date(GMT), Observation start time(GMT), Observation date(LT), Observation start time (LT)
Type of observation, Name of installation site.

Type of observation S: Direct Sun.

2nd line(Data): Observation time(GMT), Observation time(LT), Azimuth angle, Altitude angle,

Measurement value (Ch1), Measurement value (Ch2)……Measurement value (Ch 11),
Temperature of NIR sensor, Internal temperature of sensor, Air pressure, Sun sensor level.

- Azimuth and altitude angle are direction of the sensor during the observation.
- Observation values are the sensor's current value in the unit of (A).
- If "Barometer Com Port" was activated (checked), without connecting the pressure sensor, value
  of the data will be ", 0000".
- If "Barometer Com Port" was not activated (not checked), value of the data will be displayed as
  ", -999".

3.Disc scan observation data

File name: 09052600.V01 : Observation date = 26th May 2009, Filter channel = 1, File number = 00.

[Example]
09/05/26,05:13:41,09/05/26,14:13:41,D,315,Fussa,
-1.0,9.0790E-12,1.0757E-11,1.2512E-11,1.4191E-11,1.6556E-11,1.9302E-11,2.1973E-11,……
-0.9,1.0529E-11,1.2283E-11,1.4496E-11,1.6785E-11,2.0370E-11,2.3880E-11,2.8534E-11,……
⋮
1.0,8.4686E-12,9.9182E-12,1.1215E-11,1.2817E-11,1.4648E-11,1.6403E-11,1.8234E-11,……

1st line: Observation date(GMT), Observation start time(GMT), Observation date(LT), Observation start time (LT)
Type of observation, Name of installation site, Type of observation D: Disk scan

Header will be added in every observation.

2nd line(Data):

Value 1: Altitude angle -1.0 degree / Azimuth angle from the Center (Sun), Value 1, Value 2, Value 3……

Value 2: Altitude angle -0.9 degree / Azimuth angle from the Center (Sun), value 1, Value 2, Value 3……

+0.1 degree

Value 21: Altitude angle +1.0 degree / Azimuth angle from the Center (Sun), value1, value 2, value 3……

Measurement values are Current output value from the sensor in the unit of (A)

500nm

Output(A)

1627nm

Output(A)
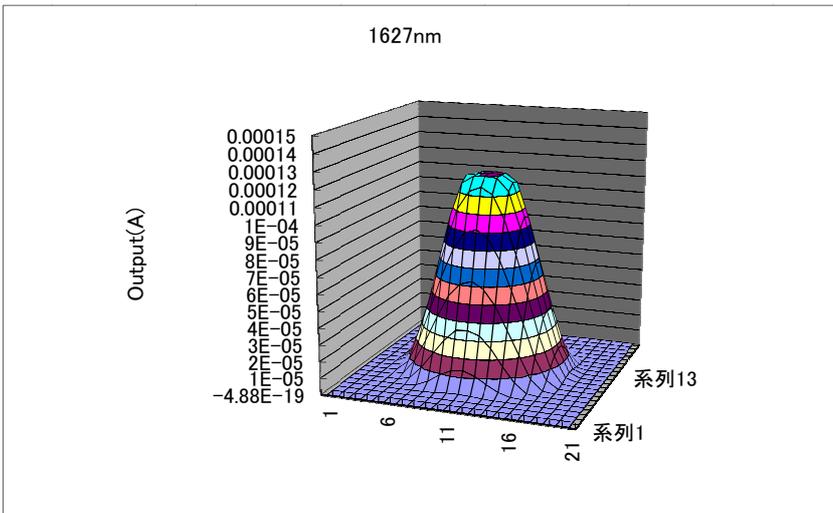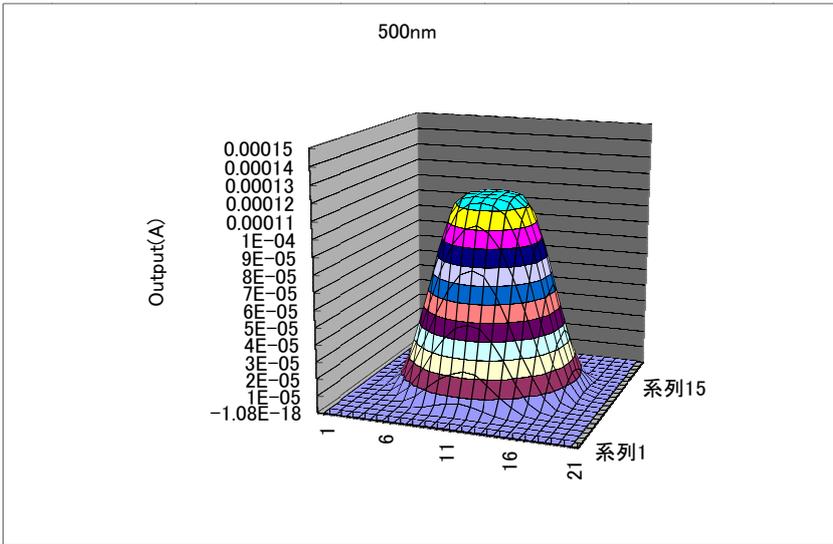
Scan result by using Microsoft Excel

4. Cloud observation data

File name: 09052000.cld : Observation date = 20th May 2009, File number = 00.

[Example]
09/05/19,20:53:41,09/05/20,05:53:41,C,Fussa,
00:22:40,09:22:40,-071.44,056.18,8.4686E-12,1.8448E-10,5.3902E-10,3.0594E-09,5.1849E-09,
　　　　～　　3.2906E-09,1.4713E-09,5.3253E-10,8.9104E-10,5.6458E-10,4.1199E-10,-17.4,30.0,0000

1st line: Observation date(GMT), Observation start time(GMT), Observation date(LT), Observation start time (LT)
Type of observation, Name of installation site.

Type of observation C: Cloud observation

2nd line(Data): Observation time(GMT), Observation time(LT), Azimuth angle, Altitude angle,
Measurement value (Ch1), Measurement value (Ch2)……Measurement value (Ch 11),
Temperature of NIR sensor, Internal temperature of sensor, Air pressure.

- Azimuth and altitude angle are direction of the sensor during the observation.
- Observation values are the sensor's current value in the unit of (A).
- If "Barometer Com Port" was activated (checked), without connecting the pressure sensor, value
  of the data will be ", 0000".
- If "Barometer Com Port" was not activated (not checked), value of the data will be displayed as
  ", -999".

5. Observation setting file

User can set the file name by themselves. (File extension is .obs)
Contents of the file is as follows. This can be edited by the setting program.

#POM-01 SettingFile	: 1. Header
PS000000	: 2. Sensor serial number
PS111111	: 3. Tracker serial number
TOKYO(PREDE)	: 4. Installation site (Name)
139.315	: 5. Longitude of the installation site
35.738	: 6. Latitude of the installation site
-300.0, 0.0	: 7. Offset of the instrument Aorg, Zorg
COM1	: 8. Communication port
10, 5	: 9. Airmass at the start of observation, switch airmass
1, 1	: 10. Presence or absence of direct sun observation, observation frequency (minute)
1, 10, 0, 0	: 11. Presence or absence of diffuced sun observation, observation frequency (minute), Presence or absence of alternative observation, Presence or absence of both direction observation.
1	: 12. Presence or absence of cloud (zenith) observation.
0, 0	: 13. Presence or absence of the data in each time, and output of HK information file.
C:¥POM-01¥Data	: 14. Directly to store the data
1, 2, 7, 11 : 00	: 15. Presence or absence of automatic disc scan observation, Observation mode, Observation frequency (day), Time of observation.
1, 1	: 16. ON/OFF of Rain sensor function, Automatic termination of the program.
340, 380, 400, 500, 675, 870, 940, 1020, 1225, 1627, 2200,	: 17. Filters
9600	: 18. Communication speed

Information of SKYNET, registered sites
> http://www.ccsr.u-tokyo.ac.jp/~clastr/
> http://skyrad.sci.u-toyama.ac.jp/
> http://atmos.cr.chiba-u.ac.jp/

User Maintenance

Skyradiometer cleaning procedure

Before the maintenance, please terminate the observation program and disconnect the power cable.

- Replacement of Silica gel

Silica gel case is locating under the cable connector of the sensor. Remove the case and check the color of silica gel. If it was turned to pink, please replace the new silica gel.

When fitting the silica gel case again, please make sure it is tight enough.

Silica gel case can be removed by hand
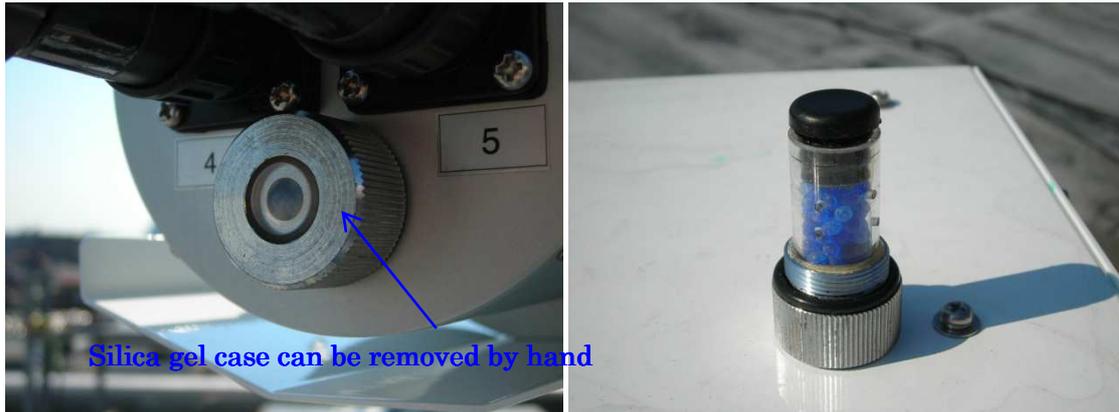
- Cleaning of Lens

Remove the black cover for both short wave and long wave tube by loosening the wing nut.

Remove the dusts by air blower and clean the lens surface by the liquid cleaner (Ethanol/Alcohol with cotton SWAB).

Set the black cover back into the original position, and tighten it by the wing nut.

Wing nut

- Cleaning of Sun sensor

Wipe the glass window part of the sun sensor by the liquid cleaner (Ethanol/Alcohol with cotton SWAB).

- Cleaning of Rain sensor

Wipe the detector part of the rain sensor by the liquid cleaner (Ethanol/Alcohol with cotton SWAB), in case there were any dirt on its surface.
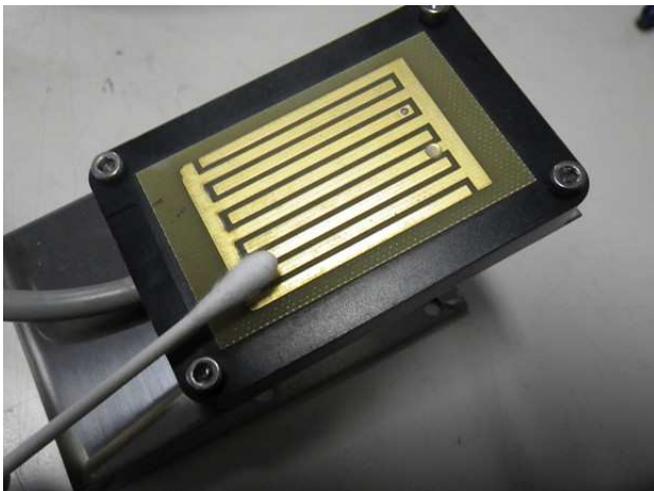
Connect the power cable again and reboot the observation program again after the cleaning.

Sensor carrying case

・Exterior appearance

EC DECLARATION OF CONFORMITY

We, PREDE CO.,LTD.

Sasamoto Building, 1-26-8 Kamidaira, Fussa-shi, Tokyo 197-0012, JAPAN

declare under our sole responsibility that the product

Product name	: Sky Radiometer
Model No.	: POM-01/POM-02

to which this declaration relates is in conformity with the following standards or other normative documents

EN 61010-1 : 2001 [Safety]

EN 61326-1 : 2006 [EMC]

following the provisions of EC Council Directives

Low Voltage Directive 2006/95/EC

EMC Directive 2004/108/EC

Signature

Kazutoshi Sasamoto

PREDE PREDE CO.,LTD.

President

sasamoto@prede.com

042-539-3755

31 August , 2012