

APES – EM 27/SUN

Automatic Protective Enclosure System (APES)



Features

- IP65 protection rating
- Wind resistance: withstand Grade 13 typhoon (certified)
- Cabinet-type heating & cooling air conditioner (800 W)
- Detachable optical glass dome (transmittance > 85%)
- Automatically opening/closing protective cover
- Remote emergency operation supported
- Built-in camera to remote adjust solar tracker

General Introduction

The Automatic Protective Enclosure System (APES) provides reliable protection for the Bruker EM 27/SUN spectrometer and improves its environmental adaptability. The cabinet enables 24-hour unattended outdoor operation of the spectrometer, lowering operational complexity and running costs. The protective cover opens automatically during rainless daytime and closes automatically at night after sunset or when rain is detected. The system also supports remote monitoring and control via a client terminal.

Appearance View

- Optical Dome (Top) ①
- Aluminum alloy Protective Cover (Side) ②
- Cabinet Air Conditioner (Side) ③
- Adjustable Support Feet (Bottom) ④
- Detachable moving casters (Bottom) ⑤
- Carrying handles (Side) ⑥



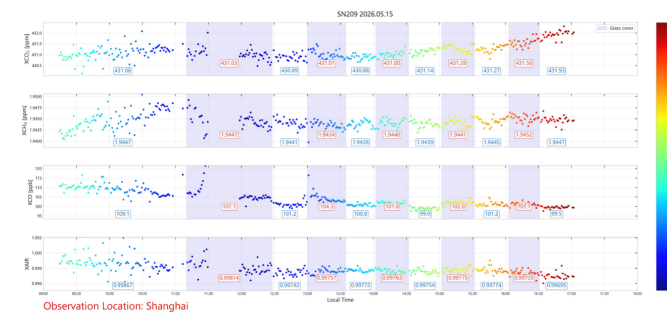
Optical Dome with its Accessory for Open Path Measurement



EM 27/SUN Total Column Gas Observation Samples (with and without Optical Dome)

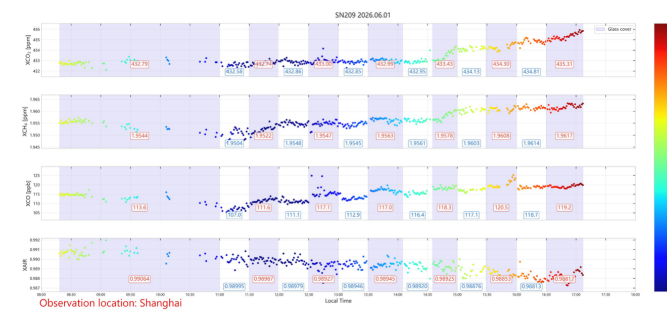
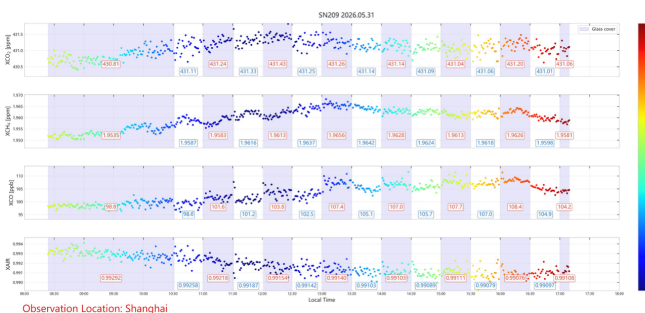
■ 2025.11.26

■ 2026.05.15



■ 2026.05.31

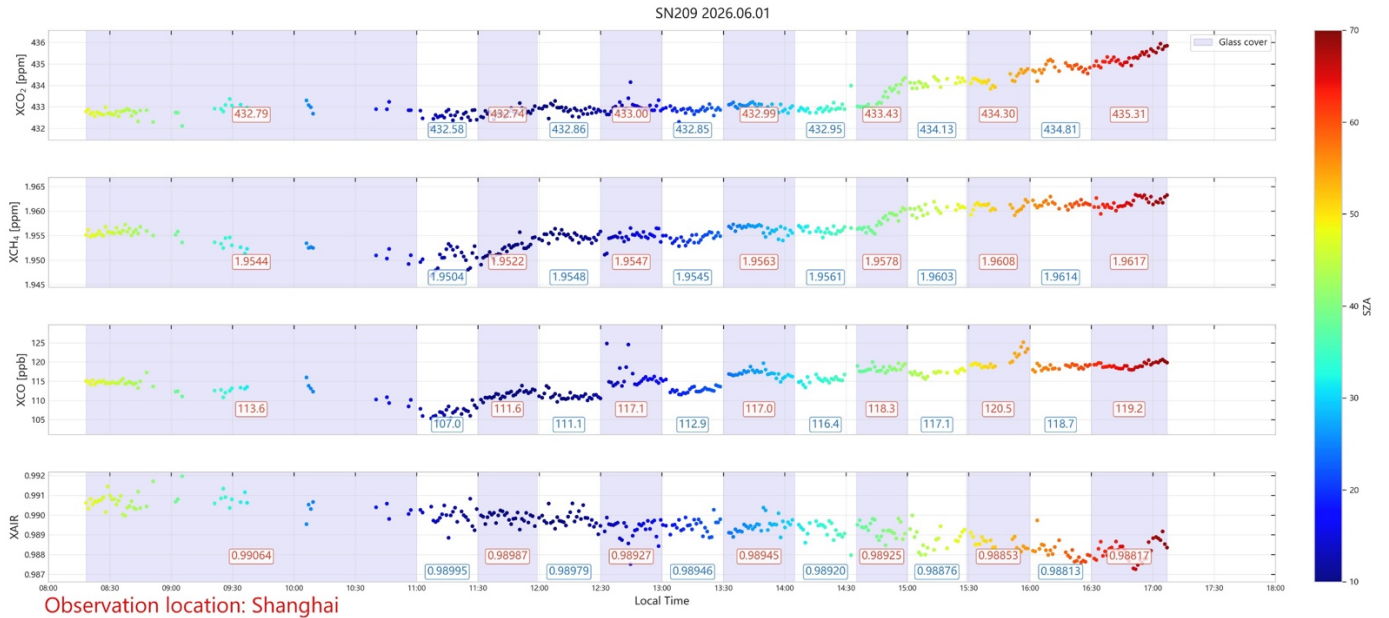
■ 2026.06.01



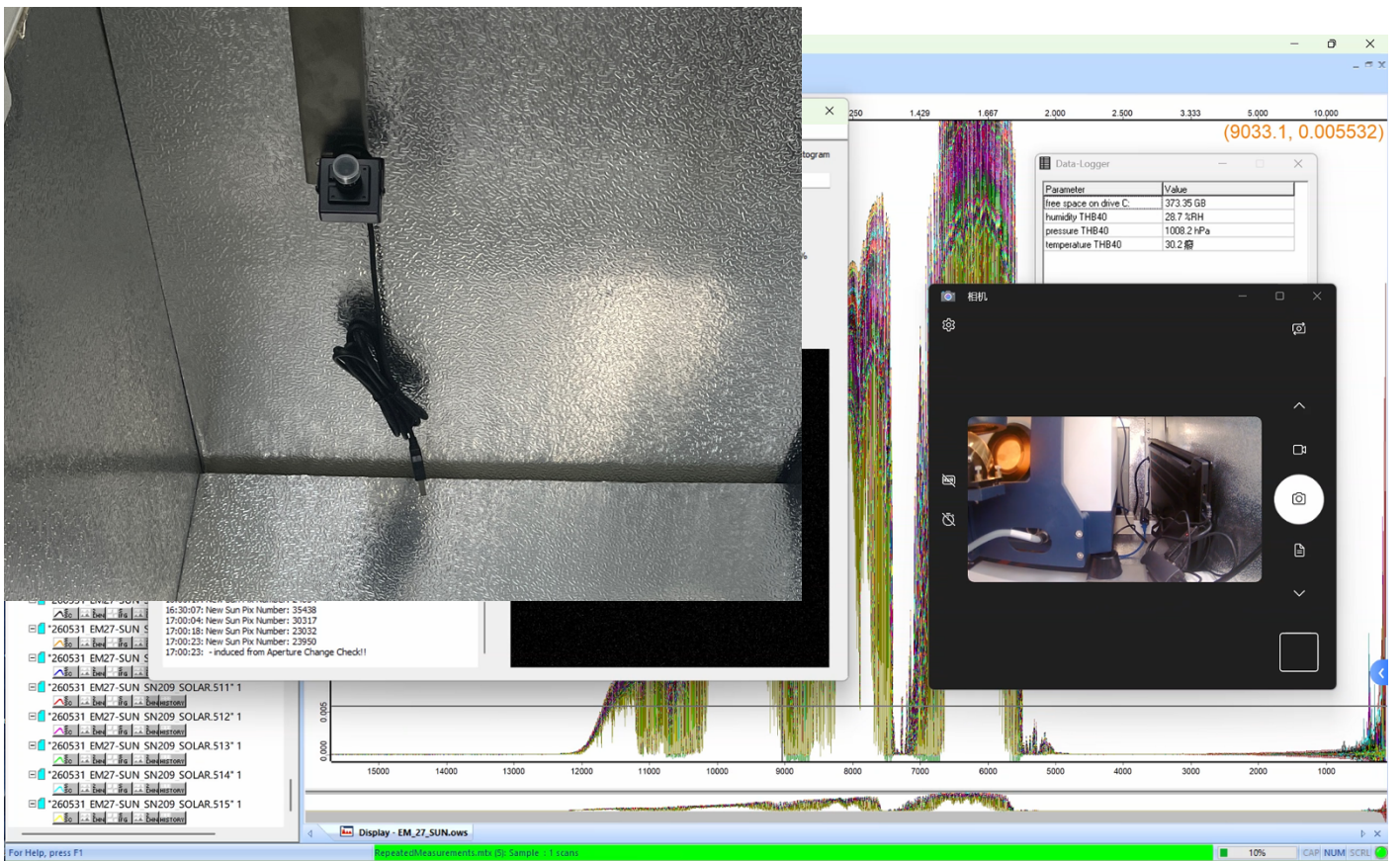
- Notes:
1. Shaded: data with Optical Dome closed; White: data with Optical Dome open. The time gap between dome opening / closing is approximately 10 – 20 minutes depending on solar tracker focus adjustment.
 2. The impact of the Optical Dome from the above observation results is seen almost no impact for XCO₂ and XCH₄, and minimal and quantifiable, approx. 2 ppb or 2%, for XCO. More field tests shall follow to verify.
 3. Only the SZA criterion (SZA < 70°) was applied to the data shown.

The data plots used in this document are provided by Assi. Prof. Qiansi TU, Tongji University Shanghai.

■ 2026.06.01 (measurements enlarged)



■ Built-in Camera to check and adjust the solar tracker



Automatic Protective Enclosure System APES-EM 27/SUN Specifications

1) Environmental Adaptability

Cabinet IP Rating	IP65 (dome closed) - Certified by a third-party laboratory
Power Supply	AC220V / 800W
Operating Ambient Temperature	-10° - 60° (designed, with more field tests to verify)
Operating Ambient Relative Humidity	0 - 100%
Wind Resistance Rating	The cabinet withstands Category 13 typhoons (Certified by a third-party laboratory)

2) Optical Dome

Spectral Characteristics	Transmittance > 85% in the 380 nm - 2300 nm range
Mechanical Dimensions	Diameter 316 mm, thickness 5 mm (±1 mm)
Optical Materials	Borosilicate optical glass (H-K9L) (by default) or fused silica optical glass (JGS3) (optional, with price adjustment)
Mounting Type	Removable with mounting accessory
Observation Angle Range	Solar zenith angle 0 - 85°

3) Internal Cabinet Temperature Approx. 20° - 30°

4) Internal Cabinet Relative Humidity ≤ approx. 40% (design value approx. 20%)

5) Main Functions

Protection Function	Automatic dome protection activation within 10 seconds of rainfall detection
Automatic Control Function	Programmable scheduling for automatic observation Start and Stop
Temperature, Humidity, and Pressure Detection Function	Built-in temperature, humidity, and pressure sensors (with calibration certificates if required)
Water Ingress Alarm Function	Automatic spectrometer power shutdown upon water ingress detection
Remote Control Function	Remote monitoring and control via client software over a local area network (LAN)
Data Storage Function	Real-time monitoring of key component operating status with data logging at 10-second intervals
Built-in Camera	Remote check and adjustment of the spectrometer solar tracker

6) Mechanical Structure & Sizes Structure: Double-layer inner structure, double-door design, protective cover stored on the side
990 × 600 × 800 mm (L × W × H)
(Dimensions include Cabinet Air Conditioner, excluding Protective Cover and Bottom Feet)

Weight 64 kg (Enclosure System, excluding Cabinet Air Conditioner)
18 kg (Cabinet Air Conditioner)