



Campbell
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QUICK DEPLOY GUIDE

FluoreSENS 10

Sun-Induced Chlorophyll Fluorescence (SIF) System



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IMPORTANT NOTE: This Quick Deploy Guide is meant to be a general reference to give the installer an overview of the steps required to make this system operational. The product manuals are the definitive source for detailed installation instructions and information.

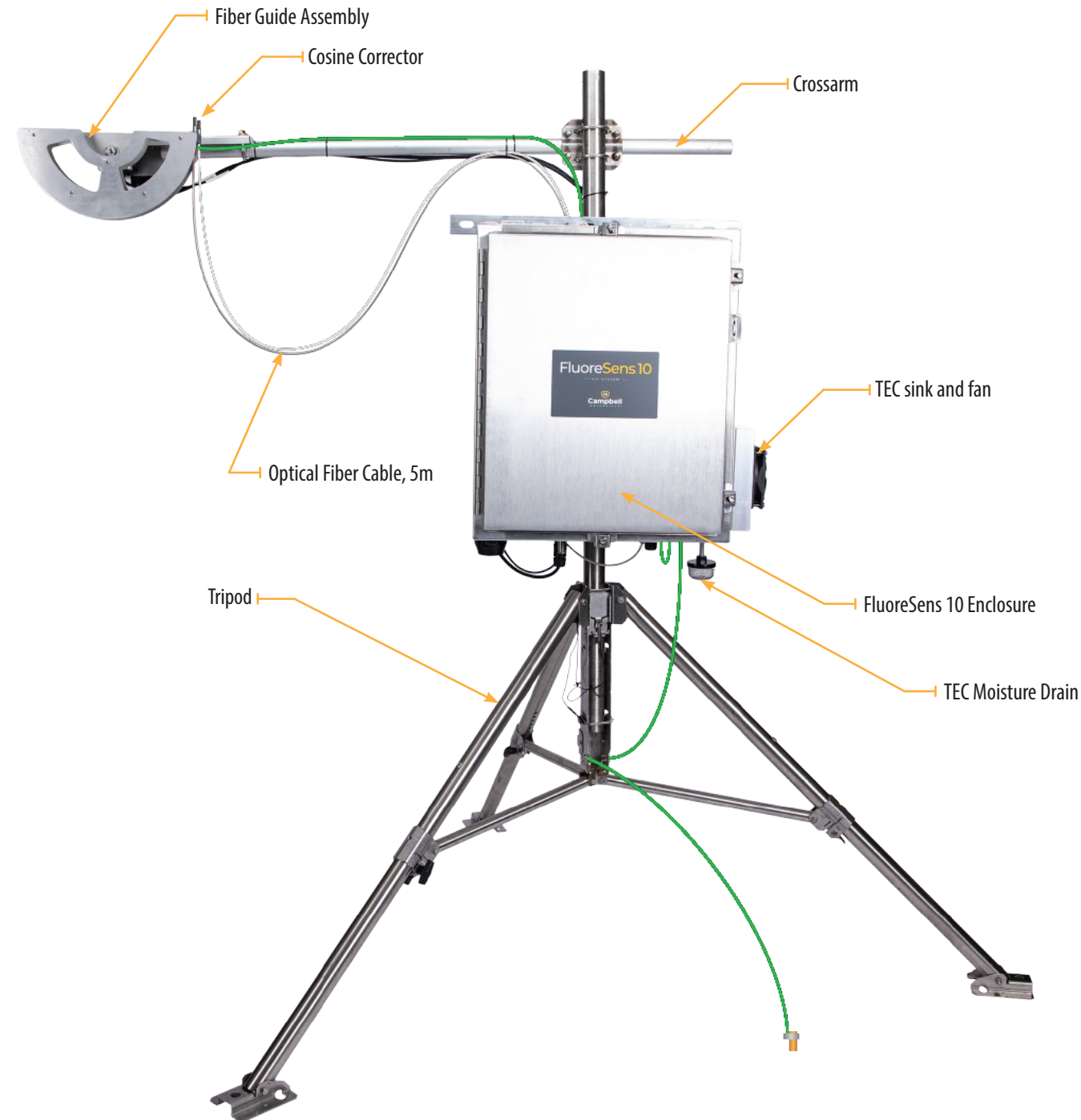
1



Caution!

- Read the precaution section of the manual to prevent any electrical and mechanical hazards.
- Do not connect or disconnect the spectrometer(s) or other sensors while the system is powered. Doing so can result in damage to the instrument.
- Grounding electrical components in the measurement system is critical. Proper earth (chassis) grounding will ensure maximum electrostatic discharge (ESD) protection and higher measurement accuracy.
- Do not bend the optical fibers below a radius of 8 cm. A lower radius will alter the calibration, and a narrow bending can break the fiber.

FluoreSENS 10 System Diagram



Software

The heart of the FluoreSENS 10 system lies in its customizable data logging software known as IMACSS, short for Integrated Measurement And Control System for SIF. IMACSS serves as a software component responsible for controlling and executing all the functions of the spectrometer(s).

IMACSS is equipped to handle errors, including power outages or communication disruptions with the spectrometer.

IMACSS is responsible for controlling the operating temperature, managing the buffer size for spectral data transfer and storage, setting spectral integration times, opening and closing the internal shutter, starting or stopping spectral sampling, and checking the spectrometer status.

Due to licensing constraints, IMACSS will be encrypted, rendering it unmodifiable by end-users.

2

Required Tools

The following tools are required to install the SIF system in the field. Additional tools may be required for a user-supplied tripod, tower or crossarm.

- | | |
|----------------------------|--------------------------------|
| 1. 9/16-in open end wrench | grounding rod into the ground) |
| 2. 1/2-in open end wrench | |
| 3. 9/64-in hex key | 6. Small, flat-tip screwdriver |
| 4. Adjustable wrench | 7. Large, flat-tip screwdriver |
| 5. Sledgehammer (to drive | |

3

Physical Deployment

1. Set up the tripod and mount enclosure.



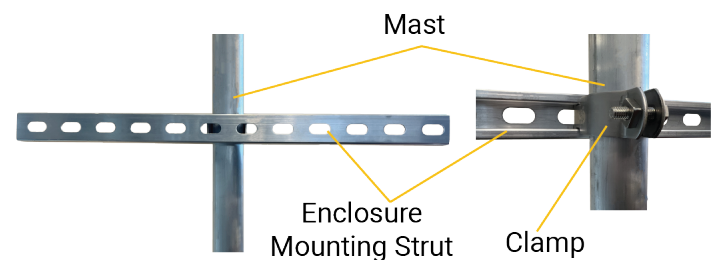
2. Attach the CM20X crossarm to the tripod mast.



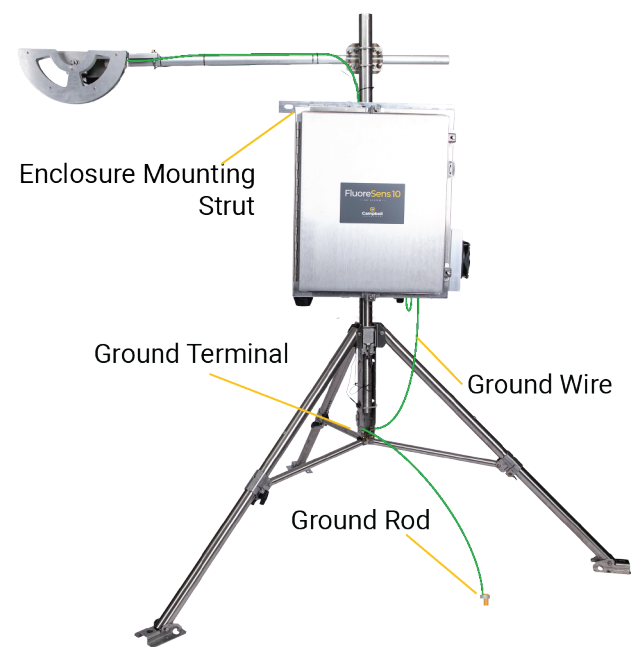
3. Mount the fiber guide assembly to the cross arm using two U-bolts, nuts, and washers. The fiber guide assembly must be mounted parallel to the ground, not the crossarm. See the manual for more information.



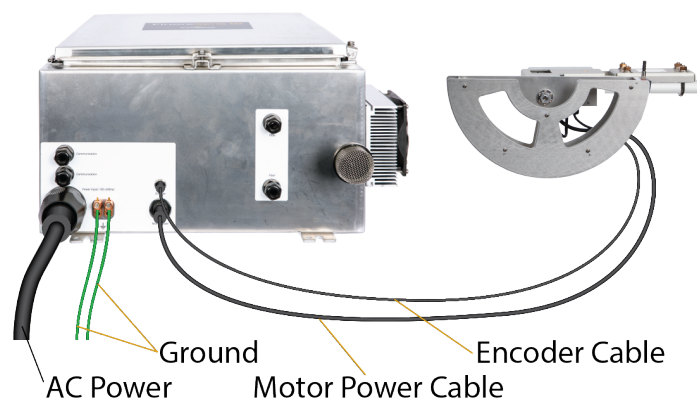
4. Mount the FluoreSENS 10 enclosure. Attach the first strap/clamp to the pole. Slide the curved side of the slotted strut to the edge of the strap and secure it by tightening the strap's screws for a stable and secure hold. Fasten the upper end of enclosure to the strut using two screws and nuts. Attach the second strut, adjust its position as needed and then tighten the screw. Finally, attach the lower end of the enclosure to the second strut.



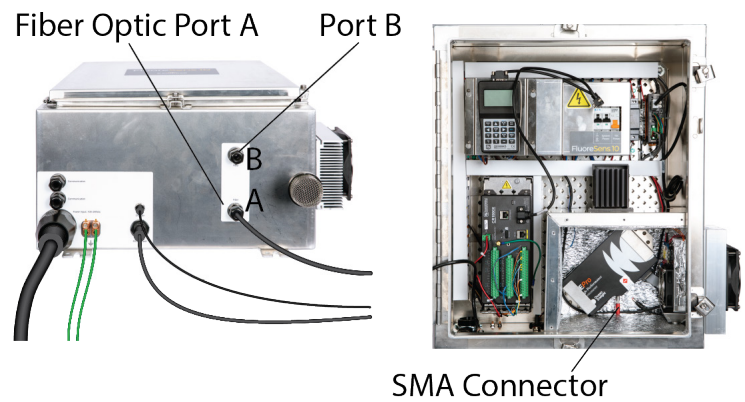
5. Ground the fiber guide assembly and enclosure. Connect grounding wire between the grounding lug located underneath of fiber guide and bottom of the enclosure and both to earth ground. **Do not attach the fiber optic cables until step 10.**



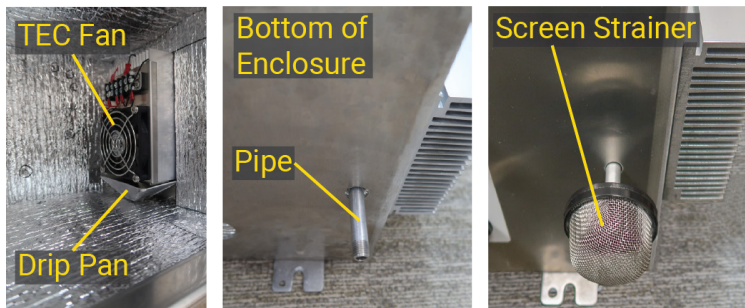
6. Connect the motor power cable (thick cable) connector and encoder cable connector to the mating connectors on the bottom of the enclosure. Power the system so that the fiber guide can find home position without damaging fiber optic guide.



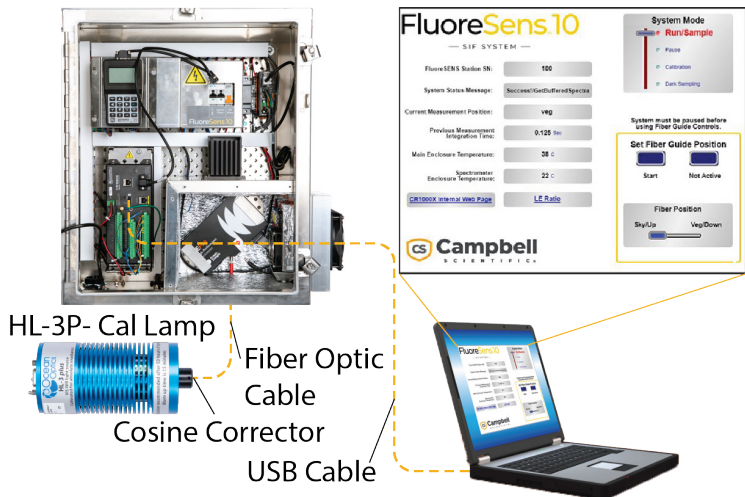
7. Insert the QE Pro fiber optic cable through port A (and the Flame fiber optic cable through port B) on the bottom of the enclosure and connect to the SMA connector(s) of the spectrometer (s). Then, connect the other end to cosine corrector and insert it into the light source of the lamp.



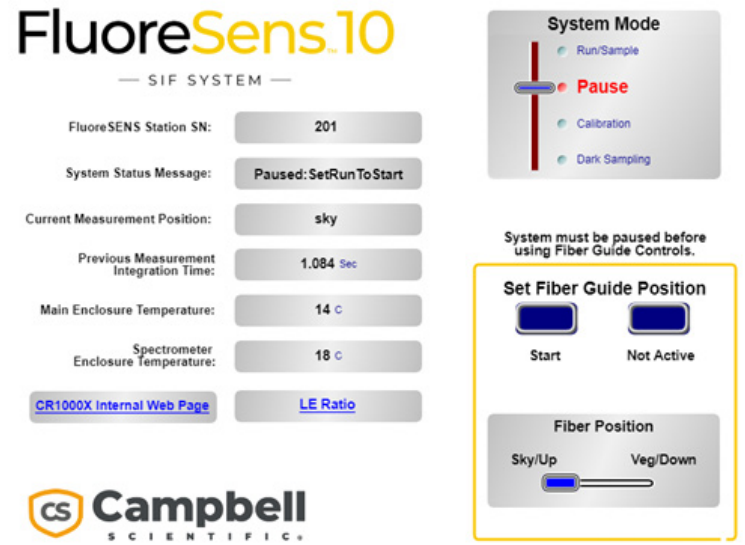
8. Place the drip pan below the Thermo electric cooler (TEC) fan inside of the enclosure, insert the pipe from the bottom of enclosure and screw on to the drip pan. Screw the screen strainer onto the end of the pipe.



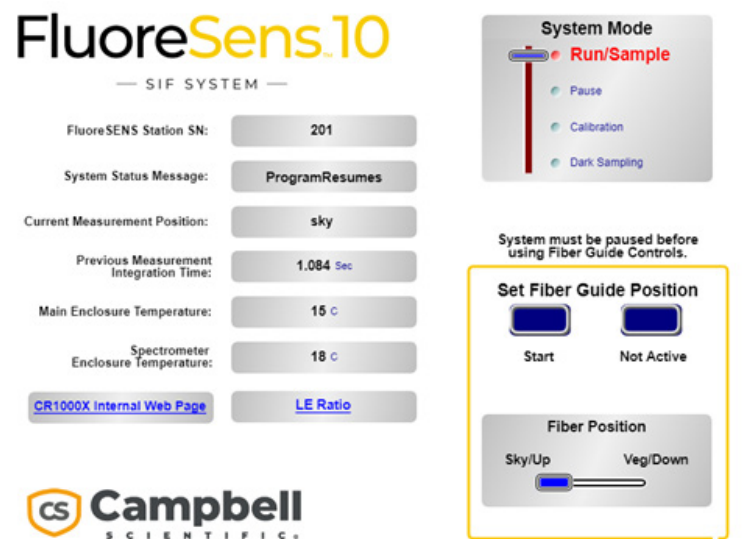
9. Perform Absolute irradiance calibration with known light source. Refer to absolute irradiance calibration section in the FluoreSENS 10 manual. (Skip this step if calibration is performed during bench test in laboratory before deployment.)



10. After absolute irradiance calibration, Pause the system (**RTMC**) and connect fiber optic cable(s) with cosine corrector to the fiber guide.



11. Switch to **Run/Sample** to start making measurements.



4 Troubleshooting

Repositioning fiber guide

The fiber optic guide may sometimes not accurately align with the sky or vegetation position due to various factors, including handling during shipping, interactions with birds, and tower installation on uneven ground. In such scenarios, the fiber guide should be accurately positioned using RTMC/CR1000KD and the **Home Preset** button in the AZD-KD (see FluoreSENS 10 enclosure (p. 5) for more details).

1. Bring the System Mode to **Pause**. Wait for the current sampling to complete and System Status Message to change to **Paused: SetRun To Start**.
2. Press **Start** on the Set Fiber Guide Position panel located in the lower right on the RTMC panel. At this point, the motor is disengaged.
3. Level the fiber guide to the appropriate position. Hold the position and press **Engage Motor**.
4. On the AZD-KD, press and hold **Home Preset** for about one second until the red light starts blinking. Release the button and press it once more immediately to set the location of the fiber guide into the motor encoder memory. The LED will return to a steady green color.
5. Press **Position Set** again, then press **Exit/Cancel** to exit from fiber guide position mode.
6. Switch back to **Run/Sample** System Mode on the upper part of the RTMC panel to begin sampling/measuring again.

AZD-KD Motor Controller



Flame and SN500 tables with no output

If Flame and SN500 table outputs are not updating, or meaningful values are not reported even if both sensors are connected, make sure **FLAME_OPTION** and **SN500_ENABLE** in the CompileOptions table are set to **true** (insert '1') and restart the program by setting **ApplyAndRestart** to **true** ('1'). The program will restart and both Flame and SN500 output will display under the **FlameSky**, **FlameVeg**, and **SN500** tables.

For more information, including data processing steps, please see the FluoreSENS 10 manual.

Table Monitor: Passive Monitoring	
CompileOptions	
Field	Value
RecNum	0
TimeStamp	10/11/2023 12:31:44 PM
SN500_ENABLE	true
FLAME_OPTION	false
ApplyAndRestart	false