SandFlow SF4

Sand Aeolian Transport & Wind-Speed Monitoring

GENERAL DESCRIPTION

The SandFlow SF4 sensor is an ultra-robust instrument measuring solid particle flux intensities and indicative wind speeds.

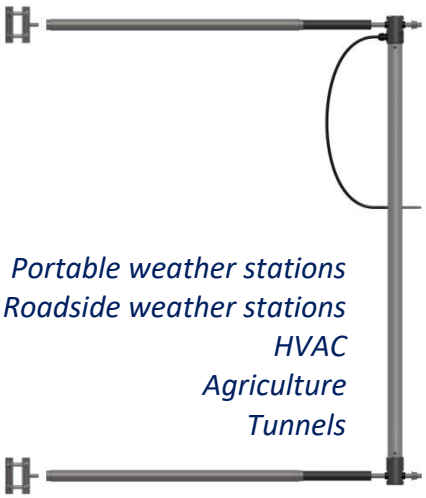
- It is a very low-power, maintenance-free and totally sealed acoustic instrument with no mobile parts.
- The sensing part of the instrument is a cylindrical, anti-abrasion, anti-adhesion and anti-rime coated tube supported by two strong stainless steel arms.
- Sand flux impact and wind laminar air friction induce change in internal acoustic pressure. The two excitations are discriminated as independent signals as a result of a specific acoustic, mechanical and electronic design.
- The instrument includes a dedicated analog conditioning module, a digital I/O module and an analog restitution module that can be **connected conveniently to almost any external central unit** (data logger, industrial module interface, instrumentation DAQ, USB port). It features continuous or pulse analog voltage outputs, SDI-12 communication (meteorological standard communication protocol); serial RS-232, RS-485 (with adaptor).
- You can customize the full configuration of the sensor, in a non-volatile memory, with a Plug-and-Play computer connection thanks to a universal USB LINK accessory (provided with the sensor).

KEY FEATURES

- Maintenance-free & special design and construction to resist the highest winds, extreme temperatures, rime, sunlight and abrasion.
- Lightweight, corrosion free, UV/Ozone stable, non-obstructable. Resistant to shock, vibration, lightning, ashes, 100% RH and even to temporary submersion. Operating temperature from −40 °C to 80 °C (−50 °C to 100 °C extended).
- Plug-and-Play or totally configurable to fit any application.
- Very low power consumption: 2.1 mA continuous for a nominal operation (10% duty-cycle).
- Adaptable to any structure thanks to a range of very high standard stainless steel clamping accessories.
- Directly connect the sensor to your central unit or configure any analog or digital communication through the USB LINK accessory.
- Possibility to connect the sensor with a very long cable (typ. up to 150 m) with very high information robustness and under very low current drain, thanks to the SDI-12 multi-drop interface, or using an RS485 adapter.

TYPICAL APPLICATIONS

- Sand storm detection
- Sand/dust aeolian transport monitoring
- Mass flux and indicative wind speed measurement
- Meteorological and scientific applications
- Industrial surveillance applications



Portable weather stations
Roadside weather stations
HVAC
Agriculture
Tunnels

SPECIFICATIONS

SETTINGS POSSIBILITIES

Wire	Signal	User selectable	Plug and Play default factory settings
White	Power +	No	Positive power supply (6 to 30) VDC
Brown	Signals GND	No	OUT1 GND, OUT2 GND and SDI-12 GND
Green	OUT1	1. Disabled 2. Wind speed (Persistent, +0V to full-scale +2.5V or +5V) 3. Particle flux (Persistent, +0V to full-scale +2.5V or +5V) 4. Particle flux (Pulse, +0V to full-scale +2.5V or +5V)	3. Particle flux, persistent, +0V to +5V
Yellow	OUT2	1. Disabled 2. Wind speed (Persistent, +0V to full-scale +2.5V or +5V) 3. Particle flux (Persistent, +0V to full-scale +2.5V or +5V) 4. Particle flux (Pulse, +0V to full-scale +2.5V or +5V) 5. Raw signal (±2.5V) (Note: direct, unfiltered AC output of the sensor)	3. Wind speed, persistent, +0V to +5V
Blue	SDI-12	1. Disabled 2. Wind speed only 3. Particle flux only 4. Wind speed and particle flux	4. SDI 12 bus active, address: 0, Wind speed and particle flux
Grey	RX	1. Disabled 2. Wind speed only 3. Particle flux only 4. Wind speed and particle flux	4. RS-232 active, Wind speed and particle flux
Pink	TX		
Black	Power GND (0V)	No	Power GND (0V)

MAXIMUM RATINGS

Voltage ranges and measuring scales	
Voltage outputs	Continuous analog voltage or pulse analog voltage, user selectable +0 to +2.5V or +0 to +5V are available. Pulse threshold, integrator timeout and duration are also user selectable. The continuous analog voltage persists on the outputs so that output voltages can be read at any time.
Wind speed scaling	Sensitivity @voltage range +2.5V: [10 mV/(km/h)] i.e. +2.5V corresponds to 250 km/h
	Sensitivity @voltage range +5V: [20 mV/(km/h)] i.e. +5V corresponds to 250 km/h
Particles flux scaling	Sensitivity @voltage range +2.5V: [10 mV/(g/m^2/s)] i.e. +2.5V corresponds to 250 g/m^2/s
	Sensitivity @voltage range +5V: [20 mV/(g/m^2/s)] i.e. +5V corresponds to 250 g/m^2/s

POWER SUPPLY

Supply	Ratings
Voltage	6 V to 30 V DC (9.6 V and 16 V DC in case of powering through the SDI-12 terminals)
Current	< 1 mA in stand-by mode and 20 mA max. in acquisition mode. For a typical nominal duty-cycle of 10%: 2.1 mA (20 mA for duty-cycle of 100%).

ADDITIONAL INFORMATION

All ISAW sensors are ultra-robust, high performance sensors for environmental monitoring. Their construction with no mobile parts makes them ideal for a wide range of meteorological, industrial and scientific applications even in the harshest environments. The ISAW Catalogue lists all available ISAW equipment and the ISAW User Guide provides all the required information and instructions to operate the sensors.

The sensors can simply be used by reading DC outputs (+0 to +2.5V or +0 to +5V continuous or pulse analog voltages available). Note that the continuous DC analog voltages are persistent on the outputs so that output voltages can be read at any time (the reading interval from your peripheral is independent from the duration of the time integration of the sensor).

The USB LINK accessory and the ISAW-toolbox software suite allow you to get introduced to the sensor by immediately establishing a connection with a computer or laptop, realizing a quick and simple communication start test, accessing all settings menus and seeing live data with a simple scope utility. You also have permanent access to the configuration and communication setups of the sensor directly in a terminal console mode. Remote access is also possible using other standard serial communication modes (RS232, RS 485 or extended SDI-12 commands).

Configuration includes measuring settings (e.g. averaging durations), power settings, communication and mapping settings (e.g. analog and/or digital outputs, voltage scales, duty-cycle, bus address, etc.). Following the instructions in the ISAW User Guide you can adapt the default configuration at any time to almost any mode of use. The sensors are compatible with both analog and/or digital peripherals. The default configuration, as well as any other customized configuration, is non-volatile, ensuring that your sensor remains in the desired operating configuration whatever the powering scenarios. Thus, even in case of repeated power failures, the sensor will always restart automatically in the desired configuration mode.

When adding or replacing an ISAW sensor, it is possible to pre-configure it in order to achieve Plug and Play functionality without any on-site configurations. The sensor is totally stand-alone, so that the full lifetime operation of the sensor on your installation doesn't require any software installation or maintenance.

When choosing an SDI-12 interface for your sensor, you can configure the data frame content you need, set the sensor address of your choice, connect more than one ISAW sensor (as well as other SDI sensors) to a single data recorder and use extension cables up to typically 150 m with a very low current drain.

SOFTWARE

For advanced use requiring a customized setting of the sensor, or simply to adjust some factory default settings (e.g. changing voltage range, pulse duration, SDI address, etc.), the non-intrusive and standalone freeware ISAW-Toolbox allows you to immediately configure the sensor exactly to your needs and load this configuration permanently in the non-volatile memory of the sensor.

Free download the ISAW-Toolbox software suite at www.isaw-products.com. Connect the sensor to your computer using the USB Link accessory. The USB Link accessory has an 8-PIN quick connector for the sensor's wires, a built-in power converter, and a USB plug for direct connection to a Windows, Linux, or Mac OS machine.

USB LINK
accessory

GENERAL CONDITIONS

ORDERING & SHIPPING

The SandFlow SF4 sensor is available with or without mounting kit. Three different mounting kits, as well as a range of complementary spare parts and accessories, allow you to select the equipment that perfectly matches your operating situation. A complete list of references and descriptions is available in the *ISAW Catalogue*.

ORDER REF.	Description
SF4	SandFlow sensor without mounting kit, USB link accessory included
SF4-TARB	SandFlow sensor with tubular arms fastened with V brackets (size* S, M or L), USB link accessory included
SF4-TARP	SandFlow sensor with tubular arms fastened on plate, USB link accessory included
SF4-TARC	SandFlow sensor with tubular arms fastened with high force collars (size** S, M or L), USB link accessory included

* Mast's outer diameter: S = 28-52 mm, M = 38-80 mm, L = 68-116 mm
** Mast's outer diameter: S = 27-51 mm, M = 44-76 mm, L = 74-102 mm

Worldwide wood-free cardboard box shipping,
HLP 1.05 × 0.2 m × 0.15 m, max. 4.24 kg net.

CONDITIONS OF USE

Always remember that ISAW sensors are acoustic instruments and could thus potentially be affected by structure-borne vibrations issuing from the supporting structure (for example, a steel cable impacting repetitively on a metal mast when subjected to wind); or to a lesser extent by parasitic low-frequency noise from the immediate environment (for example, excessive proximity to heavy traffic or machinery could lead to parasitic signals). It is recommended that you pay attention to avoiding possible parasitic noise when mounting the project.

DISCLAIMER

When using ISAW sensors, IAV Technologies SARL is not responsible for the choice, selection, relevance and usage appropriateness of the sensor's installation site; nor for the usage, interpretation, and extrapolation of the information made available to the users. Any known system issues that may induce dysfunction or skew the measurements are reported to the users through documentation updates. To continually improve the system, the ISAW Products division of IAV Technologies SARL reserves the option to continuously evolve the sensor's hardware, software, and user recommendations.

WARRANTY

Two-year warranty. The sensor, the USB link accessory and the mounting accessories are designed and produced with the highest standards. The equipment has a total of more than 100 mechanical and electrical spare parts and 250 electronic components. In case of failure, DO NOT TRY to open the sensor. Opening is destructive unless it is done at the factory for repair. None of the moving or user-serviceable parts require routine maintenance. Opening the unit will void the warranty. In the event of failure, before returning the unit, we recommend that you:

1. Check all cables and connectors for continuity, bad contacts, corrosion, etc.
2. Conduct a bench test e.g. using the Scope utility.
3. Contact us directly for advice.

Factory return address: IAV TECHNOLOGIES SARL
ISAW Products Division
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