OPTIONS FOR
GLOBAL AIR SAMPLER SYSTEMS

Rev: 02 Sep 2021

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F&J SPECIALTY PRODUCTS, INC.
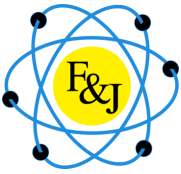## *The Nucleus of Quality Air Monitoring Programs*

METEOROLOGICAL STATION
GLOBAL AIR SAMPLER SYSTEMS
WS-110

Measured Parameters	Accuracy
Wind Speed	± 2 knots
Wind Direction	< 4° per second average error
Temperature	± 1.1°C
Humidity	± 5% R.H.
Barometric Pressure	± 2 mbar

LOW VOLUME System

HIGH VOLUME System

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ELECTRICAL SURGE PROTECTION
FOR
REMP AIR SAMPLING SYSTEMS
P/N: FJ-SSI-AS-02

Surges or power line transients are brief overvoltage spikes or disturbances on a power wave form which can damage, degrade or destroy electronic equipment and motors. Externally generated transients include utility grid switching, magnetic coupling and nearby or direct lightning strikes.

F&J SPECIALTY PRODUCTS, INC. (F&J) recommends the use of a "Surge Protective Device" (SPD) for both analog and digital air samplers utilized in REMP air sampling applications. F&J has commissioned a leading manufacturer of SPDs in the USA to design and develop a product that would protect air sampling instruments utilized in NPP REMP programs from the negative effects of power line surges.

Dimensions:	7.3"L × 4.8"W × 2.5"H
Weight:	1.97 lbs. (.90 kg)
Receptacles;	Two (2) 125VAC, 15A standard USA female grounding receptacles powered by one standard USA male plug
Test Standard;	IEEE Std C62.41.2^{TM}– 2002 and IEEE Std C62.62^{TM}—2010

References:

• IEEE Std C62.41.1^{TM} –2002—IEEE Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits

• IEEE Std C62.41.2^{TM} –2002—IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits

• IEEE Std C62.62 –2010—IEEE Standard Test Specifications for Surge-Protective Devices (SPDs) for use on the Load Side of the Service Equipment in Low-Voltage (1000 V and less) AC Power Circuits

These are the standards that describe the surge environment and govern performance specifications of SPDs.

ELECTRICAL SURGE PROTECTION
FOR
HIGH VOLUME AIR SAMPLING SYSTEMS

P/N: FJ-SSI-AS-03

NORTH AMERICAN

P/N: FJ-SSI-02E-UK

UK RECEPTACLE

P/N: FJ-SSI-HLASE

SCHUKO RECPTACLE

Surges or power line transients are brief overvoltage spikes or disturbances on a power wave form which can damage, degrade or destroy electronic equipment and motors. Externally generated transients include utility grid switching, magnetic coupling and nearby or direct lightning strikes.

F&J SPECIALTY PRODUCTS, INC. (F&J) recommends the use of a "Surge Protective Device" (SPD) for digital air samplers utilized in high volume (HV)/low volume (LV) air sampling applications. F&J has commissioned a leading manufacturer of SPDs in the USA to design and develop a product that would protect air sampling instruments utilized in NPP HV/ LV air sampling programs from the negative effects of power line surges.

Dimensions:	8"L × 8"W × 4.4"H (20.3 x 20.3 x 11.2 cm)
Weight:	5.8 lbs. (2.6 kg)
Receptacles;	Two (2) 250VAC, 13A United Kingdom (UK) style grounding receptacles. This unit can be factory installed in the HV/LV air sampler at the time of fabrication or retro fitted to older air samplers with only minor changes.
Test Standard;	IEEE Std C62.41.2^{TM}– 2002 and IEEE Std C62.62^{TM}—2010

References:

• IEEE Std C62.41.1^{TM} –2002—IEEE Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits

• IEEE Std C62.41.2^{TM} –2002—IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000   V and less) AC Power Circuits

• IEEE Std C62.62 –2010—IEEE Standard Test Specifications for Surge-Protective Devices (SPDs) for use on the Load Side of the Service Equipment in Low-Voltage (1000 V and less) AC Power Circuits

These are the standards that describe the surge environment and govern performance specifications of SPDs.

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Global Air Sampler
Data Acquisition Software Program Description
"GASdaq"

General Description

The Global Air Sampler data acquisition program GASdaq, is a sophisticated software program that compliments the F&J air sampling systems which contain Global Air Sampler (GAS) advanced-technology electronic hardware systems.

The GAS systems are designed for air sampling applications which have one or more of the following criteria requirements:

1) Remote and unattended sampling systems requiring sample data download after the sample event

2) Air sampling systems which require that alarm notifications be transmitted immediately to specified individuals or locations by email, telephone or to a central server with optional communications hardware

3) Air sampling systems requiring that data be transmitted from the field station to a central location on a near real-time basis including alarm notifications

The GAS electronics module can be setup and operated utilizing its on-board four button keypad and the 4 line by 24 character vacuum fluorescent display, or the GASdaq data acquisition software.

GAS systems can be integrated with a second air sampler (DFM Mode) or a Weather Station (WS Mode)

The following pages illustrate the various operator selectable features of the GAS systems via the GASdaq User Settings Screen and an example of the various GASdaq program screens viewable on a PC which is connected to the GAS system.

A. Standard Air Sampling Mode

GASdaq: Data Acquisition Software

The GASdaq software enables the user to connect a PC to any F&J Global Air Sampler and easily setup, monitor, transmit, and download the sample data from the instrument after the sample event, or at operator selectable transmission frequencies during the sample event. Operator selectable features include the following:

1) Setup the air sampling instrument utilizing operator selectable radio button system

        a) Engineering units for measured and calculated parameters
        b) Reference temperature and pressure values for volumetric flow
        c) Alarm settings for six different parameters
        d) Operating modes
        e) Data storage averaging frequencies
        g) Data transmission frequencies

User Settings Screen

The following two screen displays represent the Main Data Screen viewable on the PC during the sample event (measurement in process) and the Main Data Screen after sample event has been terminated.

Main Screen during Operation

Main Screen after Termination of the Sample Event

The GASdaq software enables a user to view on the PC screen and print the following reports on a Windows printer:

    1) Management Report and data charts for the sample event
    2) Data records report
    3) Alarm settings report

Management Report for GASdaq in Standard Air Sampling Mode

Management Report

IDENTIFICATION OF AIR SAMPLER

Serial Number:	5041	Company Name:	COMPNAME
Station Number:	STATION#	Plant Site:	PLNTSITE
Filter1 ID:	FILTER_1	Recalibration Due:	15 FEB 2022
Filter2 ID:	FILTER_2	Software Version:	V03.03c

SETUP PARAMETERS IN AIR SAMPLER

Flow Type:	Volumetric	Operation Mode:	Continuous
Flow Unit:	SCFM		
Volume Unit:	SCF		
Temperature Unit:	°C		
Pressure Unit:	InHg		
Reference Temp.:	20.0 °C		
Reference Press.:	29.92 InHg		
End After:	100000.0 SCF	RS-232 Freq.:	1 sec
Setup Flow:	5.00 SCFM	Storage Freq.:	1 min
Flow Diff. Alarm:	±15%	Inlet P. Drop:	3.6 InHg
Inlet P. Range:	26.6 - 30.2 InHg	Temp. Range:	12.8 - 37.2 °C

MEASUREMENT SUMMARY

|				
Start at:	20 FEB 2021 00:17	Stored Data Record(s):		24786
		Power Outage(s):		2
Elapsed Time:	0,18:15 d,h:m	Power Outage(s) Time:		0,11:22 d,h:m
Sample Volume:	12385.0 SCF	Percent Availability:		29.5%
Ambient Volume:	12242.0 CF	Number of Alarms:		30
Initial Flow:	34.81 SCFM	Inlet P. Drop Reference:		30.0 InHg
	Minimum:	Maximum:	Average:	
Standard Flow:	0.00	82.65	29.97	SCFM
Ambient Flow:	0.00	81.77	29.63	CFM
Temperature:	13.9	21.3	18.6	°C
Ambient Press.:	29.87	30.09	30.01	InHg
Differential Press.:	-0.135	0.738		InHg

F&J GASdaq V01.02.14

Comments:

Operator: Approved by:
Date: Date:

Management Report Chart

Charts are printed according to graph selection and current zoom / chart positioning. The engineering units can be changed in User Settings.
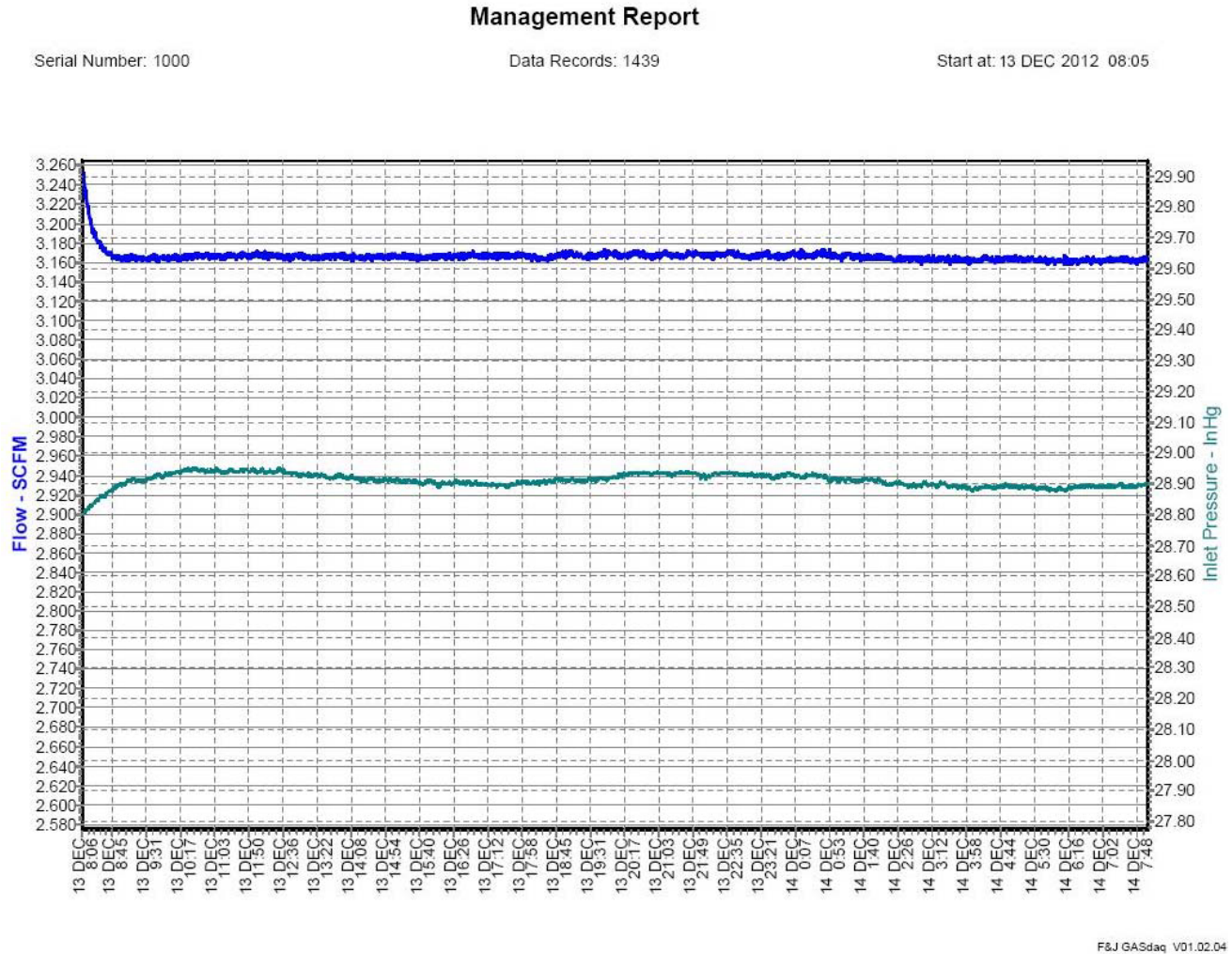
Depending on the alarms, errors, and instrument options the chart header may contain error-related information.

Data Records Table in Standard Air Sampling Mode

Data Records

Data Records: 25
Records with Alarms/Errors: 24
Number of Alarms/Errors: 1
(Flow: 1, Press: 0, Temp: 0)
(pDrop: 0, Record error: 0)

[Chart & Report]   [Done]

Record Number	Date & Time From Stored Record	Flow SCFM	Diff.P. InHg	Temp. °F	Inlet P. InHg	Alarms F,P,T,D,R
1	01 FEB 2013 11:37	0.00	0.001	66.3	30.22	
2	01 FEB 2013 11:38	0.00	0.000	66.3	30.22	F
3	01 FEB 2013 11:39	0.00	0.000	66.3	30.23	f
4	01 FEB 2013 11:40	0.00	0.000	66.3	30.23	f
5	01 FEB 2013 11:41	0.00	0.000	66.3	30.23	f
6	01 FEB 2013 11:42	0.00	-0.000	66.3	30.22	f
7	01 FEB 2013 11:43	0.00	0.000	66.3	30.23	f
8	01 FEB 2013 11:44	0.00	0.000	66.3	30.23	f
9	01 FEB 2013 11:45	0.00	-0.000	66.3	30.22	f
10	01 FEB 2013 11:46	0.00	0.000	66.3	30.22	f
11	01 FEB 2013 11:47	0.00	-0.000	66.3	30.22	f
12	01 FEB 2013 11:48	0.00	0.000	66.3	30.22	f

Alarms Settings in Standard Air Sampling Mode

More User Settings

Alarm Settings

Report alarm when:

☑ Flow differs from Setup flow by   ○ ±10%   ○ ±15%   ● ±20%
☑ Inlet Pressure higher than   [34.0] InHg
☑ Inlet Pressure lower than   [20.0] InHg
☑ Temperature higher than   [110] °F
☑ Temperature lower than   [40] °F
☑ Inlet Pressure drop (dust loading)   [5.0] InHg

[Done]

Air Sampler Clock Setting

☑ Synchronize Air Sampler's clock with PC clock when sending Setup to Instrument

Directory for Automatically Saved Data and Setup Files

Current Directory:
[C:\ACCMAN2\]   [Browse]

Operator selectable alarms are available for:
    Flow deviation
    High inlet pressure
    Low inlet pressure
    High temperature
    Low temperature
    Inlet pressure drop due to dust loading

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The GASdaq software enables a user to view and print data charts vs. time of two operator selectable measured parameters in still mode, moving chart mode, or in zoom mode. The data charts illustrate alarm events, if any.

Data Chart Selection Option
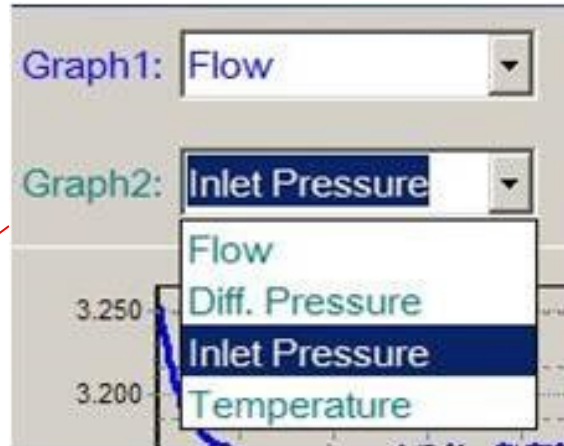
Data Chart

Data Chart with Alarm Event

Alarm event indication

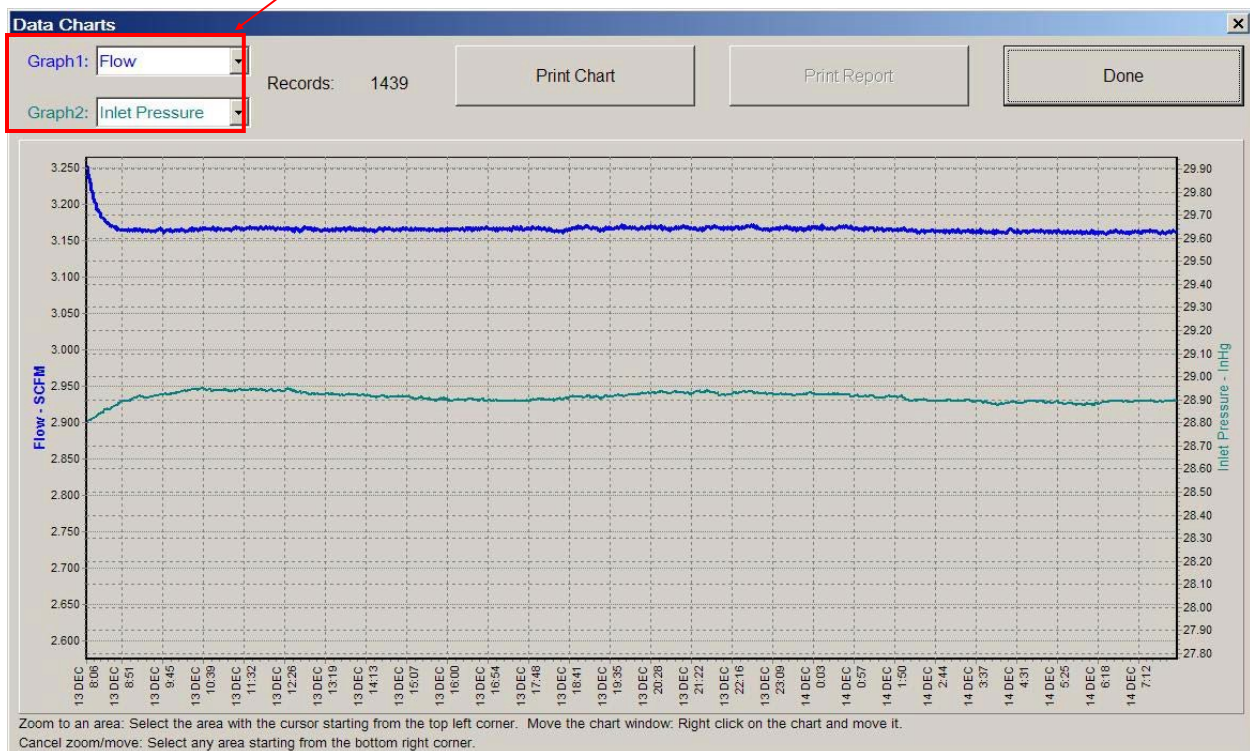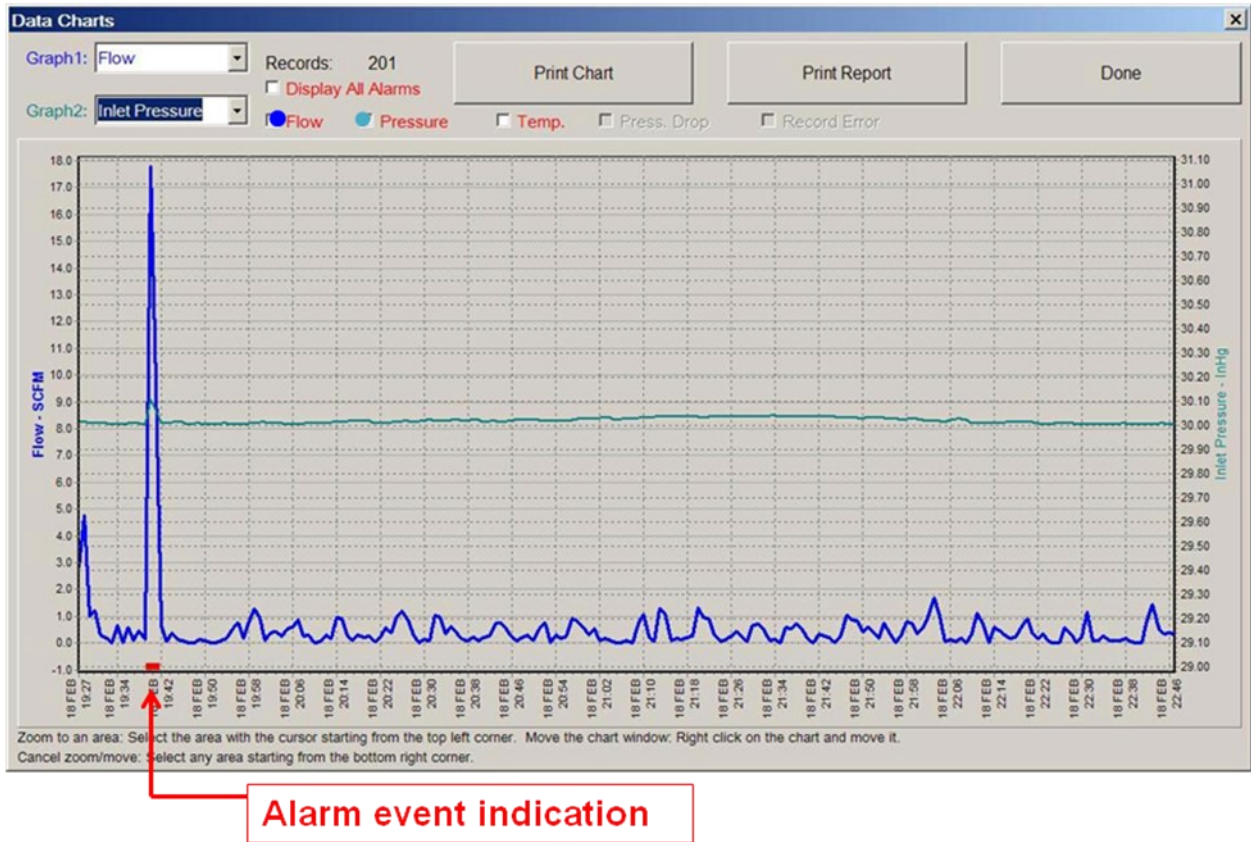F&J provides purchasers of GAS systems with the computer commands necessary to control the air sampler in the field via direct connection or remotely. The command set includes the following functions:

1) Start/stop
2) Send stored data since last transmission
3) Send data continuously at operator selectable frequency

The command set enables purchasers to create their own software programs to interact with GAS field air sampling instruments in lieu of the GASdaq software.

B. Second Air Sampler Integration
(DFM Mode)

Main Screen in DFM Mode (Measurement in process)

Any Global Air Sampler can accept the RS232 data input from either an independent F&J Digital Flow Meter (DFM) or another Global Air Sampler (GAS) air sampling system.

Typically this second air sampler will be utilized to collect another radioactive pollutant species on a different collection medium.

For example the UHV-600 Series air sampler utilizes the DFM system option with a TE3.2 TE-DA impregnated charcoal cartridge and a FP102M2 pre-filter (part number DF-UHV-3.2) for purposes of radioiodine collection.

The output of the DF-UHV-3.2 DFM RS232 is routed to the inlet RS232 of the UHV-600 GAS electronic module. The DFM air sampling data is stored on the GAS electronics module for future transmission and reports using the GASdaq software.

Another application is for a REMP particulate iodine system to accept data from a tritium collection system located in the same ambient shelter.

F&J GASdaq

Global Air Sampler Data Acquisition by F&J V01.02.14

Status: Communication with Global Air Sampler is OK - Measurement is running, pump is on

COM Port Setting

Measurement Settings					
Flow Type:	Volumetric	Serial #:	5041	Recal. Due:	15 FEB 2022
Ref. Temp.:	32.0 °F	Op. Mode:	Continuous	End After:	14,23:59 d,h:m
Ref. Press.:	29.92 InHg	Storage Freq.:	1 min
RS232 Freq.:	1 sec	Flow Diff. Alarm:	±15%	Inlet P. Drop:	2.5 InHg
Inlet P. Range:	22.0 - 32.0 InHg	Temp. Range:	45.0 - 100.0 °F	Setup Flow:	12.00 SCFM

User Settings

Measurement Summary at 01 MAY 2021 12:32 (refreshed every 10 min.)

				Minimum	Maximum	Average	
Start at:	01 MAY 2021 0:00	Standard Flow:		10.97	12.13	11.93	SCFM
End at:		Ambient Flow:		10.51	11.45	11.13	CFM
Stored Data Record(s):	151	Temperature:		20.0	20.8	20.8	°C
Power Outage(s):	0	Ambient Press.:		29.97	30.03	29.99	InHg
Power Outage(s) Time:	0,00:00 d,h:m	Differential Press.:		0.081	0.097		InHg
Initial Flow:	12.03 SCFM						
Percent Availability:	99.9 %	Inlet P. Drop Reference:		28.0 InHg			

Refresh Data

Air Sampler Data		DFM Data	
Standard Flow:	11.98 SCFM	Standard Flow:	11.93 SCFM
Ambient Flow:	11.92 SCFM	Ambient Flow:	11.94 CFM
Temperature:	20.8 °C	Temperature:	20.1 °C
Inlet Pressure:	30.18 InHg	Inlet Pressure:	30.13 InHg
Sample Volume:	1803.8 SCF	Sample Volume:	1800.1 SCF
Ambient Volume:	1681.1 CF	Ambient Volume:	1806.8 CF
Elapsed Time:	0,02:31 d,h:m	Elapsed Time:	0,02:31 d,h:m
Instrument Alarm(s):		No AC	

Stop Measurement

Advanced Features (Autostart, Records)

Termination Screen

After the termination of the measurement the final elapsed time and volume values are shown for both the Global Air Sampler and the DFM.

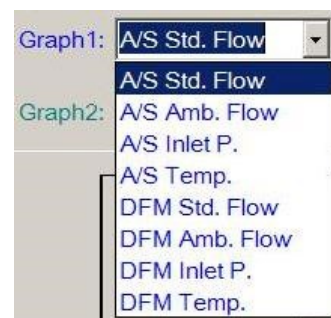| Sample Volume:	7532.6 SCF	Sample Volume:	7591.6 SCF
Ambient Volume:	5533.4 CF	Ambient Volume:	5580.8 CF
Elapsed Time:	0,17:03 d,h:m	Elapsed Time:	0,17:03 d,h:m

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Data Record Table DFM Mode

In DFM data mode measured values from the Global Air Sampler and the DFM are displayed side by side in the data table. The communication error signals DFM connection or data transfer problems.

Data Records:	44
Records with Alarms/Errors:	3
Number of Alarms/Errors:	2
(Flow: 0, Press.: 1, Temp.: 1, pDrop: 0)	
(AC loss: 0, Low batt.: 0, Comm.err: 0, Rec.err: 0)	

Chart & Report　　**Done**

Record	Date & Time From Stored Record	A/S Std. Flow SCFM	A/S Amb. Flow CFM	A/S Temp. °F	A/S Inlet P. InHg	DFM Std. Flow SCFM	DFM Amb. Flow CFM	DFM Temp. °F	DFM Inlet P. InHg	Alarms F,P,T,D, A,L,C,R
1	18 JAN 2014 12:13	18.73	18.93	68.8	29.82	18.38	18.44	68.2	29.47	
2	18 JAN 2014 12:14	18.74	18.95	68.8	29.81	18.80	18.92	68.2	29.49	P,T

Data Charts in DFM Mode

In DFM data mode graph selection includes Global Air Sampler and DFM parameters.

Graph1: A/S Std. Flow

Graph2:

- A/S Std. Flow
- A/S Amb. Flow
- A/S Inlet P.
- A/S Temp.
- DFM Std. Flow
- DFM Amb. Flow
- DFM Inlet P.
- DFM Temp.

Individual checkboxes are available for all alarms and errors.

Graph1: A/S Std. Flow　Records: 70　☑ Display All Alarms　**Print Chart**　**Print Report**　**Done**

Graph2: DFM Std. Flow　☑ Flow ☑ Pressure ☑ Temp. ☑ Press. Drop ☑ AC Loss ☑ Low Batt. ☑ Comm. Error ☑ Record Error

Additional Field for DFM Mode Option

In DFM mode the elapsed time, ambient and standard volumes, and averaged flows are printed in the Measurement Summary data section as follows:

DFM Data			
Elapsed Time:	0,00:03 d,h:m		
Sample Volume:	75.9 SCF	Average Sample Flow:	23.60 SCFM
Ambient Volume:	55.8 CF	Average Ambient Flow:	17.35 CFM

C. Weather Station Mode

The Global Air Sampler (GAS) electronics can be integrated with the WS100X Weather Station. The WS100X measures wind speed, wind direction, air temperature, barometric pressure and humidity. The weather station data is transmitted to the GAS electronics via the RS232 port via cable

The GASdaq program allows user to select air sampler operation based on the conditional operator selectable criteria of wind speed and direction. This is referred to as a "conditional sampling" mode.

Alternatively, the operator can measure and report the weather station data continuously to the GAS electronic module for future transmission and reports using the GASdaq software.

Main Screen in Weather Station Mode (Measurement in process)

Alarm Settings Screen

Data Records in Weather Station Mode

In weather station mode measured values from the Global Air Sampler and the weather station are displayed side by side in the data table.

Record	Date & Time From Stored Record	A/S Std. Flow SLPM	A/S Temp. °C	A/S Inlet P. hPa	WS Wind Dir. degree	WS Wind Speed mph	WS Temp. °C	WS Barom P. hPa	WS Humidity %	Alarms Errors
1	22 MAY 2014 13:45	200.2	25.3	1005	271	8.6	20.6	1012	49	
2	22 MAY 2014 13:46	205.6	25.3	1005	296	7.5	20.9	1012	48	

Data Charts in Weather Station Mode

In weather station mode graph selection includes Global Air Sampler and weather station parameters.

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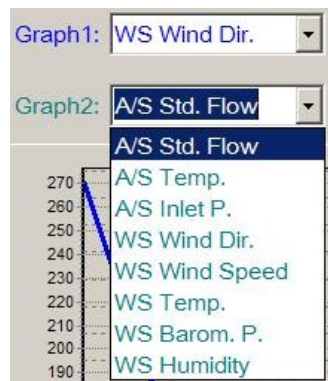
TWO PORT SERIAL TO ETHERNET SERVER
F&J MODEL 2PSETH

NOTABLE FEATURES:

- State-of-the-Art Electronics
- Input Voltage: 7 – 24V DC; 12V @ 120mA
- AC Adapter included
- Serial Ports: 2 each RS-232; 9 pin DB9 connectors
- Ethernet Interface: 10/100 BaseT with RJ45 connector
- LEDs for Ethernet Link, Activity, and Power
- LEDs for status of serial ports
- Web-based configuration
- Environmental Operating Temperature: -40° to 85° C
- UL, C/UL, CE, and FCC approvals
- Dimensions: 4.20" x 3.25" x 1.00"
 (not including mounting brackets)

GENERAL DESCRIPTION:

The 2PSETH is a complete serial to Ethernet converter. Using two devices, a serial-to-Ethernet tunnel can be established over an Ethernet network or the Internet to enable serial connectivity with an F&J air sampler and a computer.

Creation of the serial tunnel requires one converter to act as a server and another as a client. Configuration of a device as a server or a client is accomplished through the web-based configuration interface that is accessed through the Ethernet connection on each device. The client device (most likely connected to the computer) initiates communication with the server device (connected to the air sampler). This requires the client device to know the IP address of the server device which means a static IP address is required for the server device. This can be obtained from your network or Internet service provider.

Communications over long-distances may involve communicating through routers or firewalls. Therefore, some configuration of the Internet service gateway may be required.

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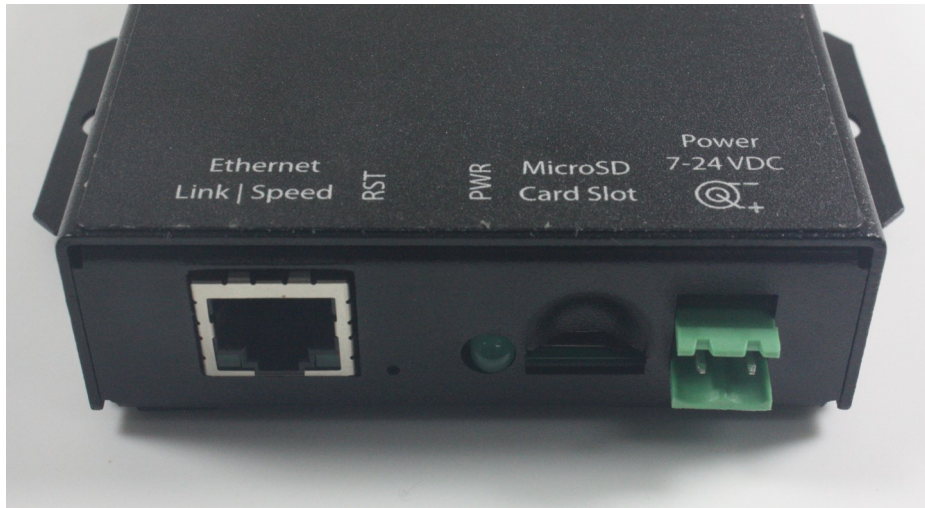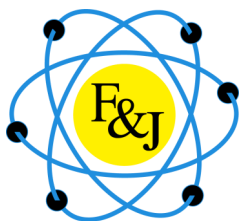
RADIOIODINE COLLECTION FILTER CARTRIDGES

MODEL "C" SERIES

MODEL "3.1" SERIES

MODEL "3.2" SERIES

MODEL "M" SERIES
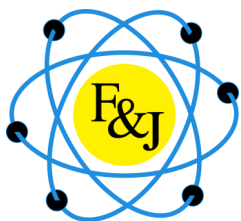

MODEL "M5" SERIES

LAPEL SERIES

MODEL "B" SERIES

MODEL "CSM" SERIES

LABEL COLOR CODING
MESH SIZES (U.S. SIEVE)
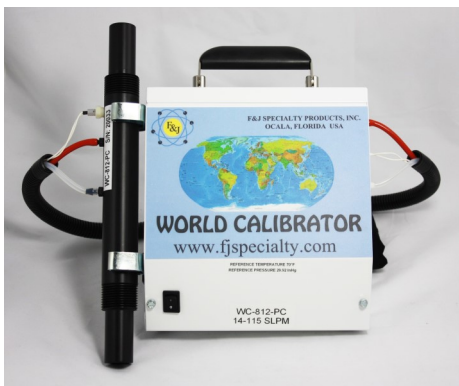
- **Red:** 8 x 16
- **Green:** 30 x 50
- **Yellow:** 20 x 40
- **Brown:** 12 x 20
- **Blue: Silver Zeolite**
    - 16 x 40
    - 30 x 50
    - 50 x 80

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AIR FLOW CALIBRATORS

**WORLD CALIBRATOR
PC VERSION**

**WORLD CALIBRATOR
VFD VERSION**

**PC INTERFACEABLE
MULTI-SENSOR SERIES VFD VERSION**

**COMPACT DIGITAL
CALIBRATOR V.2 SERIES**

**ECONOCAL AIR FLOW
CALIBRATOR SERIES**

**COMPACT DIGITAL
CALIBRATOR V.2 SERIES**

MINI CALIBRATOR

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PRODUCT PROFILE

Air Sampling Systems
- High Volume Air Samplers
  — Portable Grab Samplers
  — Environmental Systems
  — Enzyme Dust Samplers
  — PM10 Systems
- Continuous Air Samplers
  — Environmental Systems
  — Portable
  — Fixed Station
- Personal Air Samplers
- Emergency Response DC
  Powered Air Sampling Systems

Filter Paper
- Glass Fiber
- Cellulose
- Membrane
- Quartz

Filter Holders
- Open face
- In-Line
- PAS Filter Holders
- Materials
  — Plastic
  — Aluminum
  — Stainless Steel

Radon Detection Devices
- 2-Day Passive Charcoal Canisters
- 7-Day Passive Charcoal Canisters
- Continuous Radon Monitors

Tritium Detection Systems
- Portable and Fixed Station
- Collection Systems utilizing Silica
- Gel or Molecular Sieve Absorbents
- Continuous Tritium Monitors

New Products
- Global Air Sampling Systems
- Digital Flowmeter Air Samplers
- C-14 Collection Systems
- ELITE DIGITAL LIGHT (EDL) Air Samplers
- Isokinetic Air Sampling Systems
- MEGA High Volume Air Samplers
- ULTRA High Volume (CTBTO) Air Samplers

Radioiodine Collection Cartridges
- TEDA Impregnated Charcoal
- Silver Zeolite
- Custom Cartridges
- Bulk Silver Zeolite

Air Flow Calibrators
- World Calibrator Series
- Compact Digital V.2 Series
- Mini-Calibrator