

Airflow Sciences Equipment, LLC
3DDAS™ Data Acquisition System & Accessories

Options – 2018

3DDAS™ Instrumentation & Specifications

Software: Windows® Operating System
(minimum) MS Excel®
Airflow Sciences Program 3DPROBE™

Housing: Heavy duty polypropylene copolymer with
O-ring sealed latched cover

Dimensions: 11.0" H x 17.5" W x 16.5" D

Weight: 17 lb [8 kg]

Power: 120 VAC / 2A



Environmental: 40° F – 130° F Operating, 50° F – 170° F Storage

Instrumentation:

Velocity DP 0.25% Full Scale Accuracy, User Selected Range
Yaw Angle DP 1.0% Full Scale Accuracy, User Selected Range
Pitch Angle DP 0.25% Full Scale Accuracy, User Selected Range
Static Pressure 0.14% Full Scale Accuracy, User Selected Range
NIST Traceable Calibration on All Pressure Transducers

K-Type Electrically Isolated Thermocouple Module

16 Bit USB Based Data Acquisition System – 500V Electrical Isolation

Three Button Wireless Radio Frequency Remotes (2)

Training: 3DDAS™ and 3DPROBE™ Users Manual

Warranty / One (1) Year Parts & Labor on ASE hardware
Technical Manufacturer's warranty non-ASE hardware
Support: 10 hours telephone technical support

Delivery: 1-6 weeks Depending On Options

Shipping: EXW (Incoterms 2010) Livonia, MI, USA

Base version: without computer & mount



Options / Accessories

Rugged, Fully Integrated Data Acquisition Computer Part No. 3D-PC

A rugged computer can be added to the 3DDAS™ system (Panasonic Toughbook or equivalent) . The Toughbook is ideal for demanding industrial and field testing environments. The Toughbook is fully integrated into the 3DDAS™ with a quick-release mount, integrated power supply, and protection cage. The 3DProbe™ program is tightly integrated with the Toughbook touch screen interface. The computer is covered by a three year parts and labor Panasonic Protection Plus warranty.

Computer Specifications (minimum):

- Full magnesium alloy case
- Moisture- and dust-resistant LCD, keyboard and touchpad
- Sealed port and connector covers
- Shock-mounted removable hard drive in stainless steel case
- Rugged, dust-resistant hinges
- Vibration-, shock- and drop-resistant
- Windows® Operating System
- Intel® Core 2 Duo Processor U7500
- 1024MB SDRAM
- 80GB hard drive (shock-mounted and user-removable)
- 10.4" 1024 x 768 (XGA) transmissive, 550 nit daylight-readable TFT active matrix color LCD with Digitizer
- Intel® Wireless WiFi Link 4965AG 802.11a/b/g
- Sealed Backlit Rubber Membrane Keyboard



Atmospheric Pressure Transducer Part No. 3D-PX-ATM

The atmospheric pressure transducer provides continuously updated atmospheric pressure and eliminates the need for user-input atmospheric pressure. The transducer is completely integrated into the 3DProbe™ software.

Range: 600-1100 mbar
Accuracy: 0.1% Accuracy
NIST Traceable Calibration Certificate w/Data Points

Low Range Pressure Transducer Set Part No. 3D-PX-LOW

Additional pressure instrumentation for the velocity DP and pitch DP measurement can be added to the 3DDAS™. They will provide improved flow measurement accuracy at low velocities. When the low range transducers are installed the 3DProbe™ program automatically selects the correct range on a point-by-point basis. User specifies the range. A typical configuration would have P1-P2 transducers with 1 IWC and 5 IWC ranges paired together, allowing for a large range of flexibility while maintaining accuracy.

Range: User Specified
Accuracy: 0.25% Accuracy
NIST Traceable Calibration w/Data Points

3DDAS™ Inclinometer
Part No. 3D-INCLIN

The 3DDAS™ inclinometer is an analog output inclinometer that can be attached to the end of a probe for traverses in which the probe is horizontal. The inclinometer outputs the current probe yaw angle directly to the 3DPROBE™ program. With the inclinometer, manual reading and recording of the yaw angle is not required. The inclinometer is completely integrated into the 3DProbe program. The inclinometer comes in a weatherproof polycarbonate enclosure, the U bolt mounting system will accommodate probes from one to two inches in diameter.

Range: +/- 80° From Vertical
Accuracy: 1.0% Full Scale



Yaw Angle Laser Pointer, Mount, and Protractor
Part No. 3D-RBL

This system allows precise yaw angle measurements to be made when testing at vertical test ports. The system includes a probe support, protractor plate, laser pointer, and laser target. The system comes in a rugged plastic carrying case.

The probe support has 2" NPT male pipe thread for mounting to a test port. Removable bushings in the probe support accommodate probes from one to 1.75 inches in diameter.

The protractor plate is used for reading the probe yaw angle and is mounted to and re-positionable on the probe support. The protractor meets the specifications of EPA Method 2F and is marked to indicate axial flow direction and the sign of the yaw angle. The protractor is made from 1/8" aluminum plate with indelible photo etched markings.



The laser pointer mounts to the end of a probe and shines a dot on the protractor to indicate the yaw angle. The laser target is a separate piece used to align the laser beam with the probe body.

3D Test Port Support
Part No. 3D-TPS

Threaded coupling to support and align the probe in a test port. Removable brass bushings are machined to a close tolerance to the probe O.D. Stainless steel construction, 2" NPT pipe thread.
Note: included with laser pointer kit.



3D Probe Umbilical

Part No. 3D-UMBILICAL-(length in feet)

ASE's 3D probe umbilical is a heavy duty, light weight umbilical for use with the prism head and spherical head 3D probes. The umbilical consists of five pressure lines, one type K thermocouple line, and an electrical line for the 3DDAS™ Inclinometer. The umbilical is covered by heavy duty polyester mesh sleeving. The pressure lines are color coded to match the 3DDAS™ and prism head probe connections. The standard length is 25 feet [7.6m].



Pressure Lines (5):	0.170" ID x 1/4" OD Nylon Tubing
Pressure Line Connections:	Stainless Steel Swagelok Type QC4 Quick Disconnect
Thermocouple Line:	20 Gage Solid Twisted Pair Type K
Thermocouple Connections:	Standard Size Type K Male and Female
Inclinometer Line:	4 Conductor 20 gage Stranded Wire
Inclinometer Connections:	Mil-Spec 1/4 turn

3D Probe Leak Check Kit

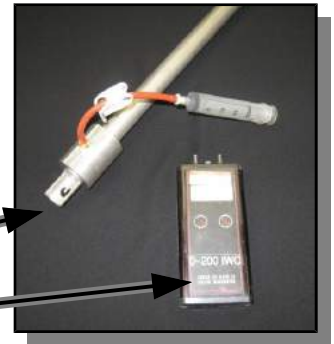
Part No. 3D-LEAKKIT-BASE/FULL/DELUXE

Leak check is required for all EPA and AMCA official tests, and is recommended for all tests. Custom designed leak check fitting allows all 5 lines to be pressurized simultaneously (separate fittings available for either the prism or spherical probe types). When used in conjunction with the 3DDAS leak check software, all data is stored within the test file for proper EPA documentation. Base price includes pressurizing syringe, tubing, and one custom fitting (specify whether prism or spherical probe fitting is required). Hand-held manometer is optional.

Base kit (Note: included with 3D probe purchase)

Full kit, including manometer (0-200 "H2O [50kPa] range)

Deluxe kit, including manometer and second custom fitting (both prism and spherical)



3D Probe Accessories Kit

Part No. 3D-KIT

Complete accessories kit includes; inclinometer, yaw angle laser and leak check components, all packaged in a rugged pelican case, with custom foam cutouts for the components.

Periodic Maintenance and Calibration

It is recommended that the 3DDAS™ be calibrated at least annually. The maintenance and calibration services include:

- Calibration of inclinometer, pressure transducers and thermocouple module using NIST traceable instrumentation.
- Electronic system check out (computer, data acquisition system, power supply, remote)
- Repair / replacement of non-warranted parts not included. These will be quoted on separately.

3D Velocity Probe

Part No. 3D-P-(length in inches) / 3D-S-(length in inches)

Prism-type and spherical 3D probes, conforming to the requirements of EPA Method 2F are available.

Five hole probe consists of the following:

	Industrial Applications	Laboratory/HVAC Applications
• Probe type	Prism or Spherical	Prism
• Probe head diameter, standard: (smaller diameters available)	1.0" [25.4 mm]	0.5" [12.7 mm]
• Probe body diameter: (depends on probe length)	1.0" to 2.0" [25.4 to 50.8 mm]	0.5" [12.7 mm]
• Probe length (one piece): (longer or multi-piece probes available at additional cost)	Up to 14' [4.25m]	Up to 8' [2.4m]
• Probe material, head:	304 SS	304 SS
• Probe material, body:	304 SS seamless	304 SS
• Pressure line breakout:	1/8" [3.2mm] OD tubes	1/8" [3.2mm] OD tubes
• Construction:	Silver solder	Solder and/or weld
• Temperature rating:	900 F	Varies
• Leak check kit:	Included	Included



3D Probe Options

- Integrated Thermocouple (1" [25.4 mm] dia probe only)

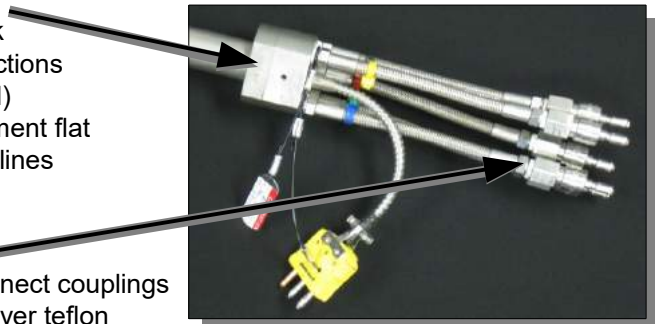
- Type K thermocouple ungrounded junction
- 1/8" stainless steel sheath, grounded

- Hard Pressure Line Break-out

- 2.0" diameter stainless steel block
- Tapped 1/8" pressure line connections
- Thermocouple mount (if equipped)
- Probe scribe line location & alignment flat
- Provides strain relief on pressure lines

- Pressure line quick disconnect pigtails

- Swagelok QC4 male quick disconnect couplings
- 6" flexible pigtail, stainless braid over teflon
- Color coded to match 3DDAS and umbilical



- 3D Probe Calibration

- US EPA compliant 17" x 35" wind tunnel
- Spherical or prism-type 3D probes
- Leak check, probe inspection
- Glass bead blast of probe head
- Two air velocities, typically 60 & 90 ft/sec [18 & 27 m/s]
- Two runs at each velocity to ensure repeatability
- 17 pitch angles, -40 to +40 degrees in 5 degree increments
- Determination of R_{slo} at each velocity
- Data reduction, including
 - Comparison of replicate runs per EPA method
 - Calculation of F1 and F2 calibration curves
 - Calculation of probe Reynolds Number
 - Calibration coefficients for 3DDAS software
- Complete calibration report, meets all the requirements of EPA Method 2F



S-Type Pitot Probe

Part No. 1D-S-(length in inches)

The S-Type Pitot Probe can be used with the 3DDAS™ to perform EPA Method 2 testing.

- Probe body diameter: 1.0"
- Probe length: Up to 10' [3m] (one piece)
(longer or multi-piece probes available at add'l cost)
- Probe material: 304 Stainless Steel seamless tubing
- Pressure line breakout: Loose 1/8" tube ends
- Temperature rating: 1100 F
- Leak check kit included



S-Type Pitot Probe Options

- Integrated Thermocouple (1" [25.4 mm] dia probe only)
 - Type K thermocouple ungrounded junction
 - 1/8" stainless steel sheath, grounded
- Hard Pressure Line Break-out
 - Stainless steel block
 - Tapped 1/8" pressure line connections
 - Thermocouple mount
 - Probe scribe line location & alignment flat
- Pressure line quick disconnect pigtails
 - Swagelok QC4 male quick disconnect couplings
 - 6" flexible pigtail, stainless braid over teflon
 - Color coded to match 3DDAS and umbilical

- Calibration

- US EPA compliant 17" x 35" wind tunnel
- Leak check, probe inspection
- Glass bead blast of probe head
- Two air velocities, typically 60 & 90 ft/sec
- Two runs at each velocity to ensure repeatability
- Data reduction, including
 - Comparison of replicate runs per EPA method
 - Calculation of Cp calibration curves
 - Calculation of probe Reynolds Number
 - Calibration coefficients for 3DDAS software
- Complete calibration report, meets all the requirements of EPA Method 2

S-Probe Head

Part No. 1D-S-HEAD

Head only, no probe body. Total length is ~8" long.

- Probe material: 304 Stainless Steel seamless tubing, 3/8"

S-Probe Umbilical

Part No. S-UMBILICAL-(*length in feet*)

ASC's S-probe umbilical is a heavy duty, light weight umbilical that consists of two pressure lines and one type K thermocouple line. The umbilical is covered by heavy duty polyester mesh sleeving. The standard length is 25 feet.

Pressure Lines (2):	0.170" ID x 1/4" OD Nylon Tubing
Pressure Line Connections:	Stainless Steel Swagelok Type QC4 Quick Disconnect
Thermocouple Line:	20 Gage Solid Twisted Pair Type K
Thermocouple Connections:	Standard Size Type K Male and Female



2D Velocity Probe (Fecheimer)

Part No. 2D-P-(*length in inches*)

A 2D velocity probe, also called the Fecheimer probe, is a 3-hole pitot probe used to measure velocity magnitude and yaw angle. It is similar in design to the 3D probe, and can be faceted (prism face) or cylindrical (smooth). It operates similarly to a 3D probe using EPA Method 2F procedures, but does not measure the pitch angle. The 2D Velocity Probe can be used with handheld meters or the 3DDAS™ to perform EPA Method 2 testing.

- Probe body diameter: 1.0"
- Probe material: 304 Stainless Steel seamless tubing
- Probe length: Up to 10' [3m] (one piece) (longer or multi-piece probes available at add'l cost)
- Pressure line breakout: Loose 1/8" tube ends
- Temperature rating: 1100 F
- Leak check kit included



2D Velocity Probe Options

- Integrated Thermocouple (1" [25.4 mm] dia probe only)
 - Type K thermocouple ungrounded junction
 - 1/8" stainless steel sheath, grounded

- Hard Pressure Line Break-out
 - Stainless steel block
 - Tapped 1/8" pressure line connections
 - Thermocouple mount
 - Probe scribe line location & alignment flat

- Pressure line quick disconnect pigtails
 - Swagelok QC4 male quick disconnect couplings
 - 6" flexible pigtail, stainless braid over teflon
 - Color coded to match 3DDAS and umbilical

- Handheld pressure and temperature meter
 - Combined digital meter to read P1-P2 and temperature
 - Analog (Magnahelic) to read P2-P3 for yaw nulling

- Calibration
 - US EPA compliant 17" x 35" wind tunnel
 - Leak check, probe inspection
 - Glass bead blast of probe head
 - Two air velocities, typically 60 & 90 ft/sec
 - Two runs at each velocity to ensure repeatability
 - Determination of Rslo at each velocity
 - Data reduction, including
 - Comparison of replicate runs per EPA method
 - Calculation of F1 calibration curve
 - Calculation of probe Reynolds Number
 - Calibration coefficients for 3DDAS software
 - Complete calibration report, meets all the requirements of EPA Method 2F (except P4/P5)

2D Velocity Probe Umbilical

Part No. 2D-UMBILICAL-(*length in feet*)

ASC's 2D Velocity Probe umbilical is a heavy duty, light weight umbilical that consists of three pressure lines and one type K thermocouple line. The umbilical is covered by heavy duty polyester mesh sleeving. The standard length is 25 feet.

Pressure Lines (3):	0.170" ID x 1/4" OD Nylon Tubing
Pressure Line Connections:	Stainless Steel Swagelok Type QC4 Quick Disconnect
Thermocouple Line:	20 Gage Solid Twisted Pair Type K
Thermocouple Connections:	Standard Size Type K Male and Female



3DDAS™ Equipment Rental

Full system rental

ASE has a limited number of 3DDAS™ devices available for rental. A standard rental includes:

- 3DDAS™ system with computer
- Calibrated 3D Probe with thermocouple
- Inclinometer or Laser pointer
- Leak check kit
- Users manual

3D Probe only rental

For customers needing only a probe, the following rental is available:

- Calibrated 3D Probe with thermocouple
- Leak check kit