

# Model **DSM3400 Series**



Digital Service Module  
Data Sheet No. G 545

## Digital Pressure Measurement

### Features

- Sample rates up to 625 samples/channel/second
- Accepts up to 8 ZOC electronic pressure scanners (512 channels max.)
- Upgrade ZOC pressure scanners to digital Ethernet systems
- Multiple communication I/O choices
- Digital I/O available

### General Description

The Digital Service Module, Model DSM3400, is an intelligent module designed to interface ZOC electronic pressure scanners to an Ethernet network. The Model DSM supports up to 8 cable serviced ZOC electronic pressure scanners or ZOCEIM electrical input modules.

The DSM3400 service module incorporates an embedded PC, eight 16 bit A/D converters, RAM, and flash memory.

The DSM microprocessor performs engineering unit conversion and compensates for temperature changes, thereby reducing thermal errors from the ZOC pressure sensors. The microprocessor can also control external solenoid valves (Model DSMCPM) or user's valves to perform automatic on-line zero and span calibration. This on-line calibration capability virtually eliminates sensor thermal errors. System accuracy of  $\pm 0.08\%$  FS (5 psi and up) is achievable.

Pressure data are output in engineering units via Ethernet or other optional communication interfaces.



*DSM3400 shown*

### Applications

#### **DSM3400/Ethernet** (*General*)

The DSM3400 is designed to connect cable serviced ZOC pressure scanners (ZOC17, ZOC22B, and ZOC33) to the intelligent world of an Ethernet network. The module is powered by 12 or 24Vdc. One DSM3400 accepts 8 ZOC pressure scanners.

Communication is Ethernet 100baseT. Multiple DSMs can be placed on one network.

#### **DSM3400/ARINC429** (*Flight Test*)

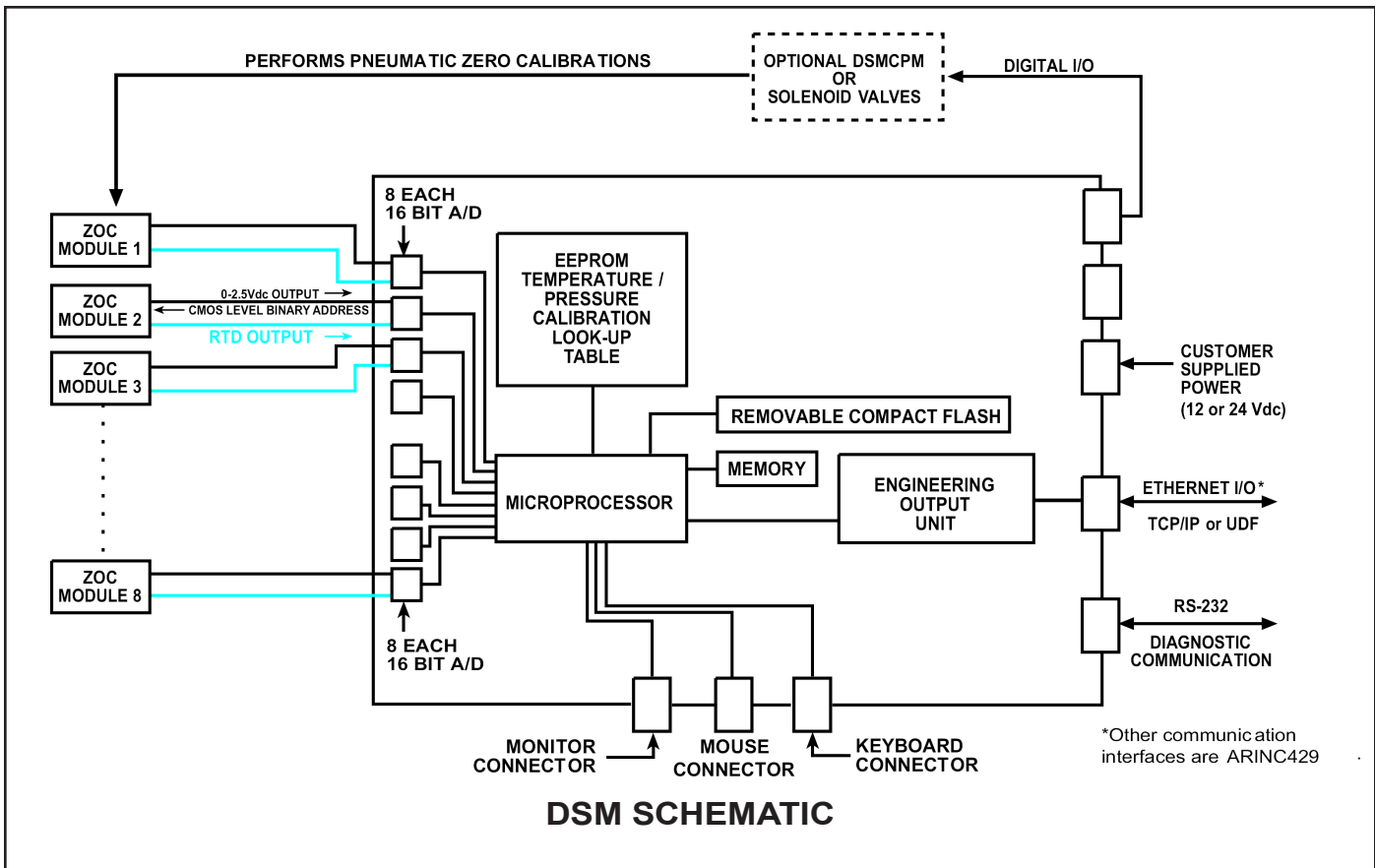
The flight test version of the DSM3400 is the same as above except it has an additional ARINC429 card as well as the 100baseT Ethernet port for communication, setup, and diagnostics.

#### **RAD4000 or DSM3400** (*Wind Tunnel*)

When ZOC pressure scanners are intended to be mounted inside a wind tunnel model, the Remote A/D (RAD) module is ideally suited. It operates similarly to the DSM3400 except the A/Ds are remotely located in the wind tunnel model. These A/Ds are packaged in a compact modular design with a good model aspect ratio that is designed to fit inside the model in close proximity to the ZOC pressure scanners. Size is dependent on the number of A/Ds required.

Reference data sheet G562 for more details on this state-of-the-art model Remote A/D (RAD).

# DSM Operations



## On-Line Sensor Compensation and Calibration

A customer or Scanivalve supplied (DSMCPM) remote solenoid valve is utilized for performing quick zero calibrations without the use of a pressure calibrator. When actuated, the positive side of the pressure sensor is pneumatically shorted to the reference manifold, creating a zero differential.

The sensor zero offsets from each ZOC pressure scanner are then updated and saved to disk in the DSM module.

The ZOC transducers used with the DSM3400 series are factory calibrated over their full pressure and temperature ranges. The resultant calibration data are stored in a 280 plane pressure temperature look-up table in the DSM module.

Each ZOC pressure scanner has a factory installed RTD temperature sensor. As the temperature changes, the microprocessor selects

the appropriate temperature plane, or interpolates between planes, to correct the pressure reading. This on-line temperature correction and quick zero calibration correct for inherent zero drift and temperature sensitivity, thus developing a long-term 6 month accuracy of  $\pm 0.1\%FS$ .

## DSM3400 Hardware

The DSM contains a Pentium processor embedded PC for fast EU conversion and throughput. The DSM module also contains memory for program storage with limited data storage. Ethernet 100BaseT or ARINC429 interfaces are available. Also incorporated into the DSM module are two serial ports (COM1 and COM2) and 5 digital I/O circuits. When a monitor, keyboard, and mouse are connected, the DSM3400 becomes a powerful stand-alone PC running Windows Embedded XP<sup>®</sup>.

# DSM Networking Address

The IP address is user assignable.

All scan and calibration variables are software configurable by the user. This includes number of frames/scan, number of averages per frame, sampling speed, etc.

## Scan Groups

The DSM series products can be configured into multiple scan groups. A scan group is a list of channels to be measured, along with the order and rate of sampling. These scan groups allow scanning of pre-selected channels from each of eight different ZOC pressure scanners. Any number of randomly selected channels can be sampled from a total of 512 channels. In addition, each of the eight ZOC pressure scanners in a scan group can have different throughput rates.

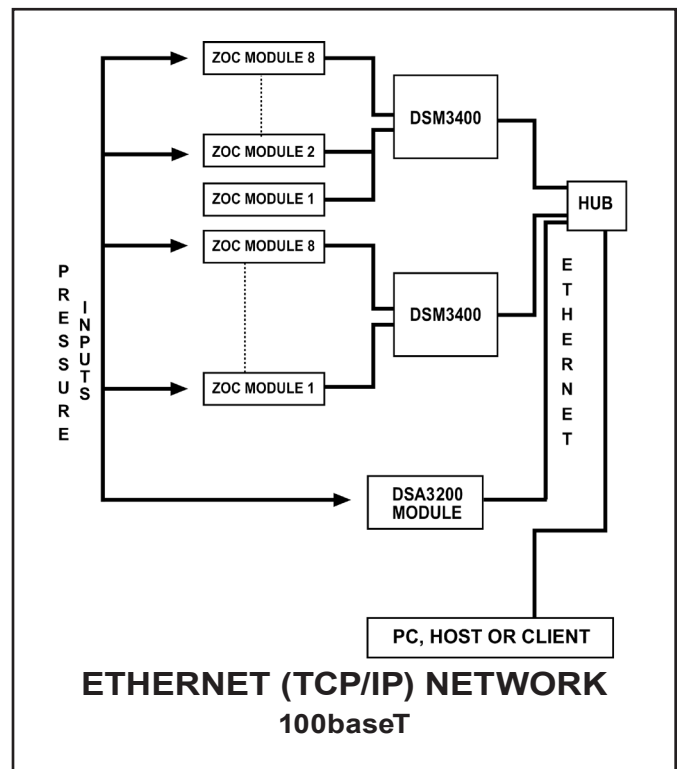
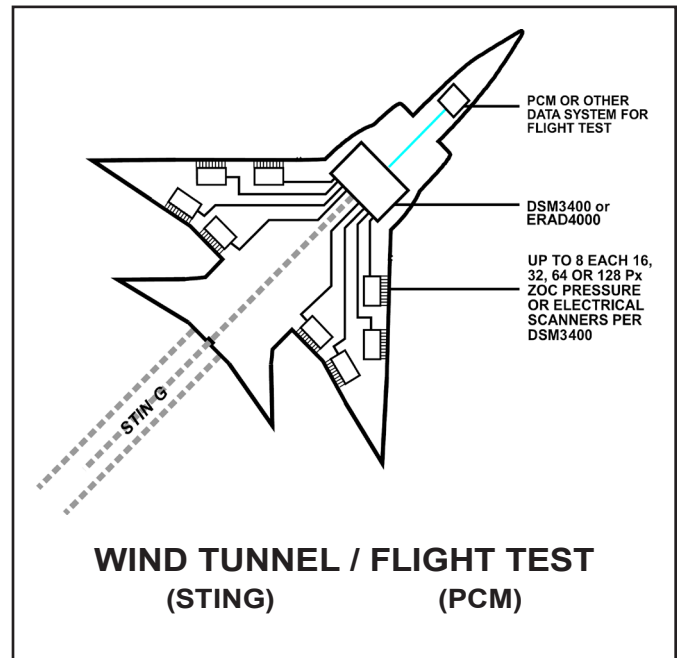
## DSM Communication

Communication to the DSM is either Ethernet TCP/IP or UDP, or ARINC429. The network can be set up and variables configured via Windows HyperTerminal, a Telnet session, or through either Scanivalve's Configuration Utility or ScanTel communications utility. A Scanivalve LabVIEW Development Kit is also optionally available for LabVIEW 2009 (ver 8.2 and up) that includes the Configuration Utility.

For field calibrations of ZOC modules connected to the DSM, Scanivalve has an accurate pressure calibrator, model SPC4000. Included with the calibrator is Scanivalve's calibration utility software, PressCAL. This allows for automated calibrations with the SPC4000 calibrator, or manual calibrations with the users own pressure calibrator or dead weight tester. PressCAL updates the module calibration coefficient files and generates "as received" and "calibration validation" reports.

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Windows Embedded XP® is a registered trademark of Microsoft Corp.



# Specifications

**No. of ZOC Pressure Scanners:** 1 to 8

**Operating Temperature Range:** 0–60° C

**Accuracy:** 10 inch H<sub>2</sub>O ±0.15%F.S.  
20 inch H<sub>2</sub>O ±0.15%F.S.  
1 psid ±0.12%F.S.  
2.5 psid ±0.10%F.S.  
5 to 50 psid ±0.08%F.S.

**Power Requirements:** 12Vdc or 24 Vdc  
115/230Vac with PDM1000 power supply

**Power Mating Connector:** Bendix PTO6A-8-3S-SR

**Digital In Mating Connector:** Bendix PTO6A-12-10S-SR

**Digital Out Mating Connector:** Bendix PTO6A-12-10P-SR

**ZOC Mating Connector:** MDM-15SH003P

**COM1 & 2 Serial Mating Connector:** Cannon DE9S

**Ethernet Connector:** RJ-45

**Communication Protocol:** Ethernet 10/100BaseT  
IEEE-802.3, TCP/IP or UDP  
ARINC429 (optional if card ordered)

**Sample/Throughput Rate:** 200Hz/channel/sec: TCP/IP  
ASCII  
625Hz/channel/sec: UDP Binary

**Dimensions:** 8.0 inch X 9.0 inch X 6.0 inch  
(203.20 mm) X (228.6 mm) X (152.40 mm)

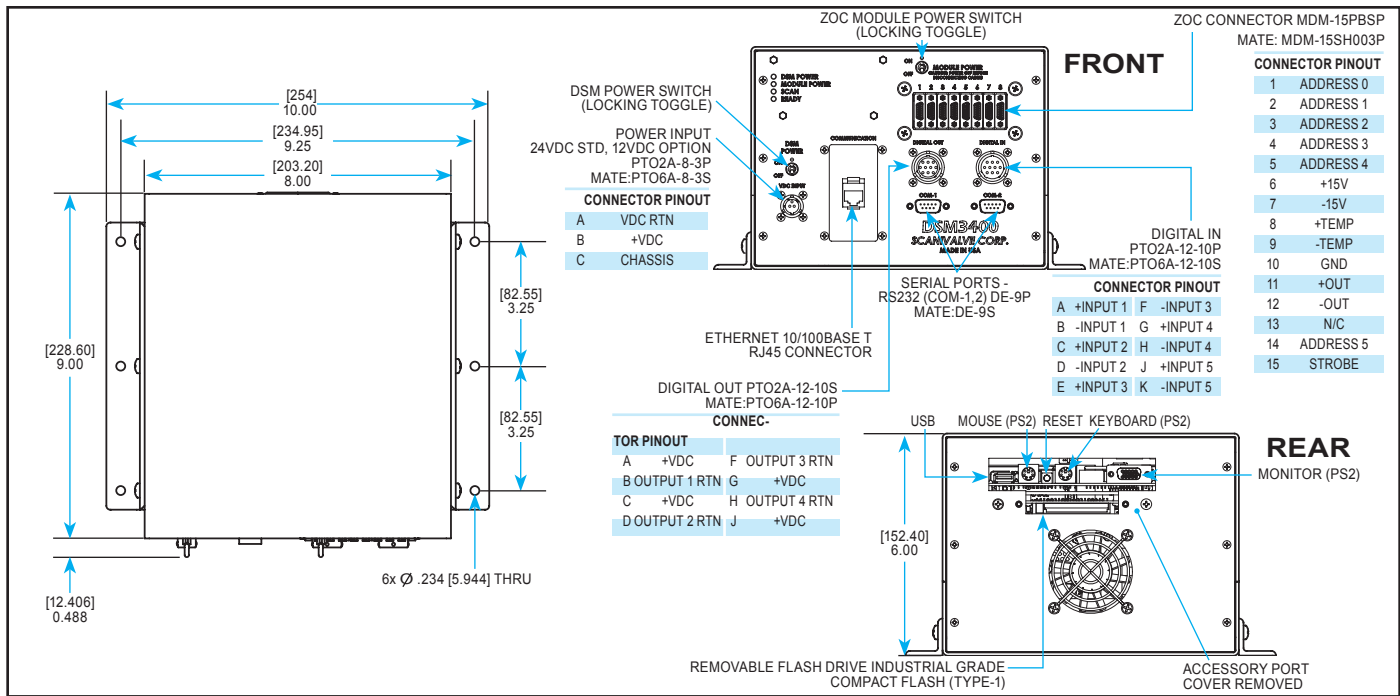
**Weight:**  
DSM3400: 9.0 lbs. (4.09 Kg)  
PDM1000: 1.5 lbs. (.68 Kg)

## Ordering Information

DSM3400 Model	Ethernet Interface	24Vdc I/O solenoid voltage
	-Ethernet	-12Vdc
	-ARINC429	-24Vdc

Note: When ARINC429 card is ordered, Ethernet port is also included.

## Dimensions Inches (mm)



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