



MS4515

SPECIFICATIONS

- **PCB Mounted Pressure Transducers**
- **Pressure Ranges from 2 to 30 inches H₂O**
- **Amplified Ratiometric Analog Output**
- **Differential & Gage**
- **Temperature Compensated**
- **3.3V or 5.0 V_{DC} Supply Voltage**

FEATURES

- Inches H₂O Pressure Ranges
- PCB Mountable
- High Level Analog Output
- Barbed Pressure Ports

APPLICATIONS

- Blocked Filter Detection
- Altitude and Airspeed Measurements
- Medical Instruments
- Fire Suppression System
- Panel Meter
- Air Movement/Environmental Controls
- Pneumatic Controls

The MS4515 is a small, ceramic based, PCB mounted pressure transducer from TE Connectivity. The transducer is built using the latest CMOS sensor conditioning circuitry to create a low cost, high performance transducer designed to meet the strictest requirements from OEM customers.

The MS4515 is fully calibrated and temperature compensated with a total error band (TEB) of less than 1.0% over the compensated range. The sensor operates from single supply of either 3.3 or 5.0V_{DC} and requires a single external component for proper operation.

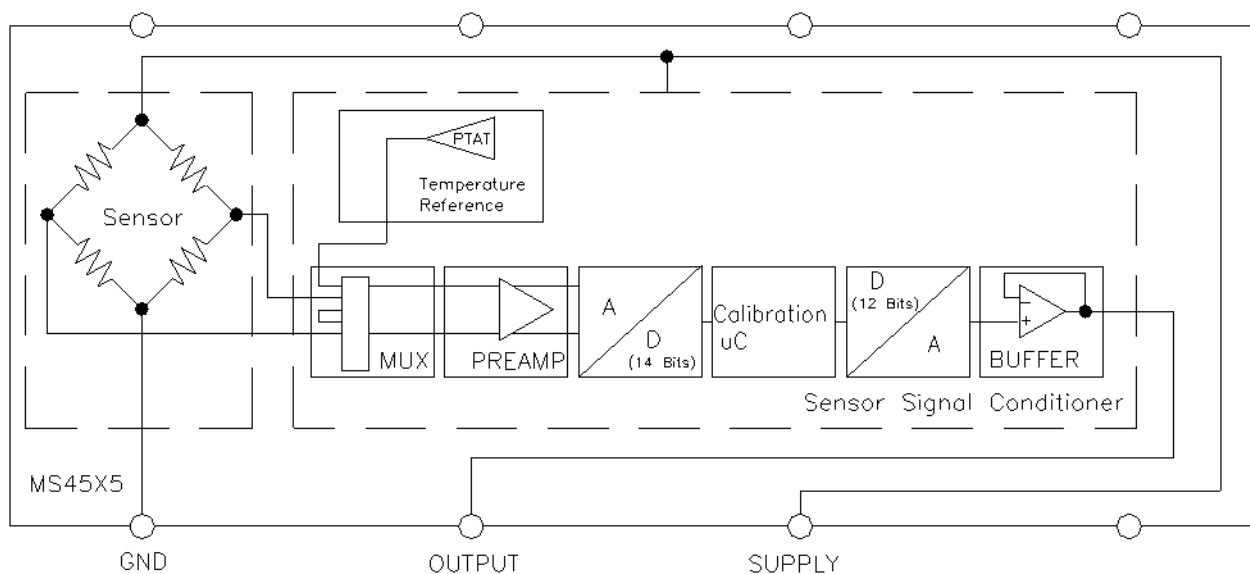
The rugged ceramic transducer is available in side port, top port, and manifold mount versions and can measure gage or differential pressure from 2 to 30 inches H₂O. The 1/8" barbed pressure ports mate securely with 3/32" ID tubing.

STANDARD RANGES (INCHES H₂O)

| Range | Gage | Differential | Option Availability |
|-------|----------------|----------------|---------------------|
| 2 | | DS, SS, TP, MM | |
| 4 | DS, SS, TP, MM | DS, SS, TP, MM | |
| 5 | DS, SS, TP, MM | DS, SS, TP, MM | |
| 10 | DS, SS, TP, MM | DS, SS, TP, MM | -F |
| 20 | DS, SS, TP, MM | DS, SS, TP, MM | -F |
| 30 | DS, SS, TP, MM | DS, SS, TP, MM | -F |

See Package Configurations: DS= Dual Side Port, SS= Single Side Port, TP= Top Port, MM= Manifold Mount
Pin Style "L" is only available SS and MM port types.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Parameter | Conditions | Min | Max | Unit | Notes |
|-----------------------------------|------------------------------------|------------------------------|------|------|----------------|
| Supply Voltage | T _A = 25 °C | 2.7 | 5.5 | V | |
| Output Current | T _A = 25°C | | 3 | mA | |
| Load Resistance (R _L) | T _A = 25°C | 10 | | kΩ | |
| Storage Temperature | | -40 | +125 | °C | |
| Humidity | T _A = 25°C | | 95 | %RH | Non Condensing |
| Overpressure | T _A = 25 °C, both Ports | Not to Exceed 300 | | psi | |
| Burst Pressure | T _A = 25 °C, Port 1 | | | psi | See Table 1 |
| ESD | Contact Discharge | -2 | +2 | kV | |
| MSL | | Moisture Sensitivity Level 1 | | | |
| Solder Temperature | | 250°C, 5 sec max. | | | |

TABLE 1- BURST PRESSURE BY RANGE AND PACKAGE STYLE

| Style | Port | 002 | 004 | 005 | 010 | 020 | 030 | Unit |
|--------|--------|-----|-----|-----|-----|-----|-----|------|
| DS, MM | Port 1 | 10 | 10 | 10 | 10 | 10 | 20 | PSI |
| | Port 2 | 10 | 10 | 10 | 10 | 10 | 20 | PSI |
| SS, TP | Port 1 | | 10 | 10 | 10 | 10 | 20 | PSI |

ENVIRONMENTAL SPECIFICATIONS

| Parameter | Conditions |
|----------------------|---------------------------------------------------------------|
| Mechanical Shock | Mil Spec 202F, Method 213B, Condition C, 3 Drops |
| Mechanical Vibration | Mil Spec 202F, Method 214A, Condition 1E, 1Hr Each Axis |
| Thermal Shock | 100 Cycles over Storage Temperature, 30 minute dwell |
| Life | 1 Million FS Cycles |
| MTTF | >10Yrs, 70 °C, 1.188 Million Pressure Cycles, 120%FS Pressure |

PERFORMANCE SPECIFICATIONS

Supply Voltage¹: 5.0V or 3.3 V_{DC}

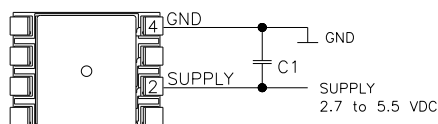
Ambient Temperature: 25°C (unless otherwise specified)

| PARAMETERS | MIN | TYP | MAX | UNITS | NOTES |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------|-------|-------|
| Output | 0.500 | | 4.500 | V | 1,2,3 |
| | 0.250 | | 4.75 | V | |
| Accuracy | -0.25 | | 0.25 | %Span | 2 |
| Total Error Band (TEB) | -1.0 | | 1.0 | %Span | 3,5 |
| TEB (4inH ₂ O and Below) | -2.0 | | 2.0 | %Span | 3,5 |
| Supply Current | | 3 | | mA | 5 |
| Compensated Temperature | 0 | | +60 | °C | 4 |
| Operating Temperature | -10 | | +85 | °C | |
| Response Time | | 1 | | ms | 5 |
| Start time to data ready | | | 6 | ms | |
| Weight | 1.43 | | 2.02 | grams | |
| Media | Non-Corrosive Dry Gases Compatible with Ceramic, Silicon, Borosilicate Glass, RTV, Gold, Aluminum and Epoxy. See "Wetted Material by Port Designation" chart below. | | | | |

Notes

1. Proper operation requires an external capacitor placed as shown in Connection Diagram. Output is ratiometric to supply voltage variations of less than 10%.
2. Accuracy: The maximum deviation from a best fit straight line (BFSL) fitted to the output measured over the pressure range at 25°C. Includes all errors due to pressure non linearity, hysteresis, and non-repeatability.
3. Total error band includes all accuracy errors, thermal errors over the compensated temperature range, and span and offset calibration tolerances. For ideal sensor output with respect to input pressure, reference Pressure Transfer Function charts below. TEB values are valid only at the calibrated supply voltage.
4. For errors beyond the compensated temperature range, see Extended Temperature Multiplier chart below.
5. This product can be configured for custom OEM requirements, contact factory for lower power consumption or higher accuracy.

CONNECTION DIAGRAM

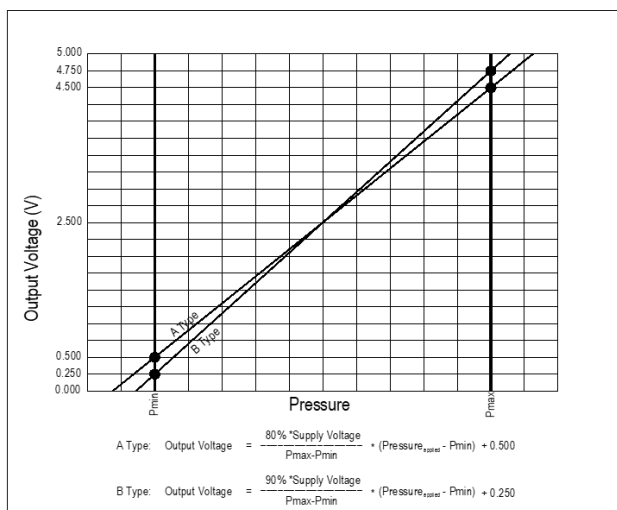


Notes

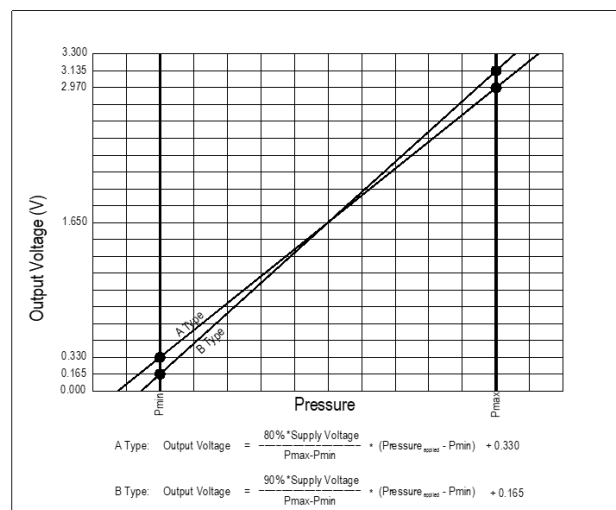
1. Place 100nF capacitor between Supply and GND to within 2 cm of sensor.

PRESSURE AND TEMPERATURE TRANSFER FUNCTION

Pressure Transfer Functions, Supply=5V



Pressure Transfer Functions, Supply=3.3V



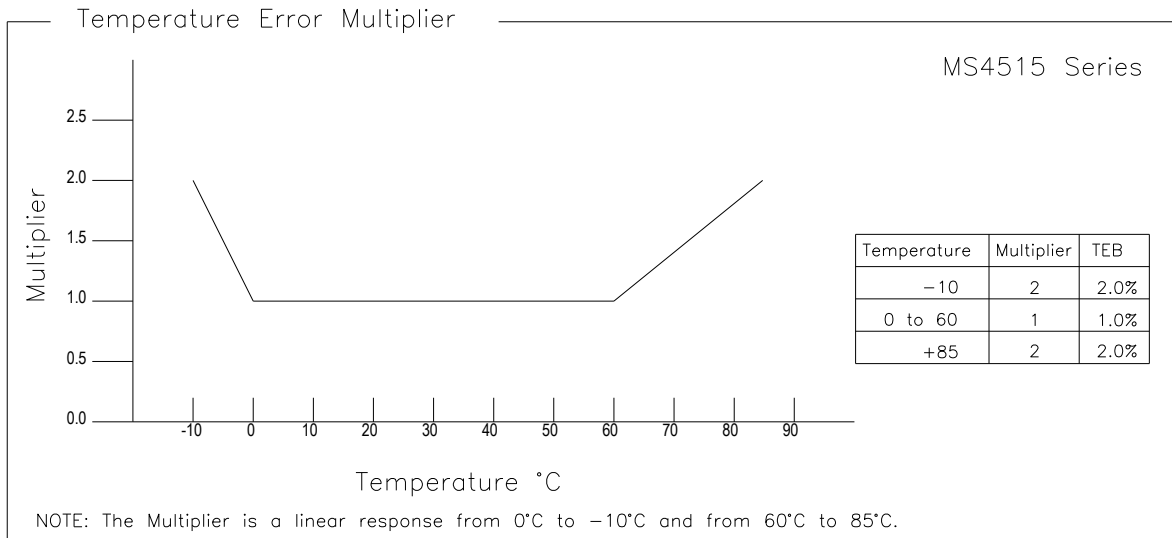
Sensor Output at Significant Percentages, (Vs=5.00)

| OUTPUT (%Vs) | Output Type A (inH2O) | Output Type B (inH2O) | Voltage (V) |
|--------------|--------------------------------------------------------------|-------------------------------------------------------------|-------------|
| 0 | $P_{\text{MIN}} - (P_{\text{MAX}} - P_{\text{MIN}}) * 10/80$ | $P_{\text{MIN}} - (P_{\text{MAX}} - P_{\text{MIN}}) * 5/90$ | 0.000 |
| 5 | | P_{MIN} | 0.250 |
| 10 | P_{MIN} | | 0.500 |
| 50 | | | 2.500 |
| 90 | P_{MAX} | | 4.500 |
| 95 | | P_{MAX} | 4.750 |
| 100 | $P_{\text{MAX}} + (P_{\text{MAX}} - P_{\text{MIN}}) * 10/80$ | $P_{\text{MAX}} + (P_{\text{MAX}} - P_{\text{MIN}}) * 5/90$ | 5.000 |

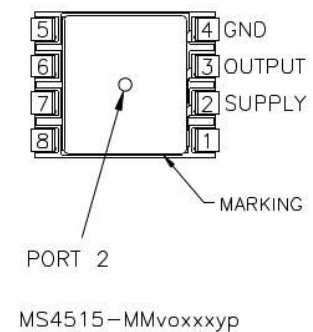
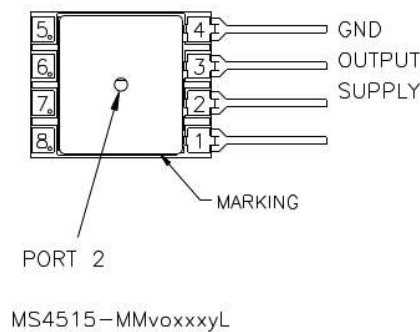
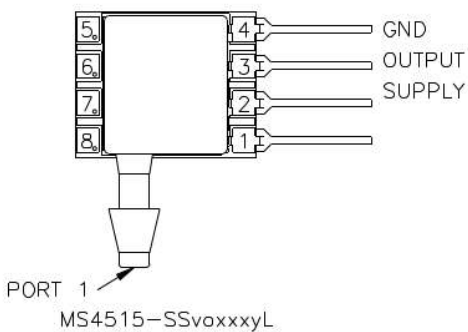
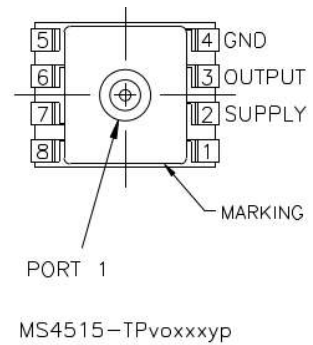
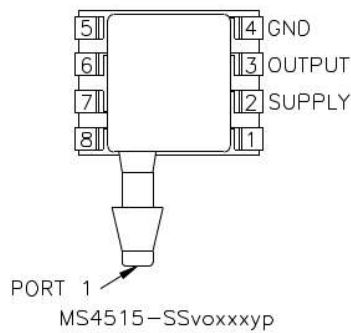
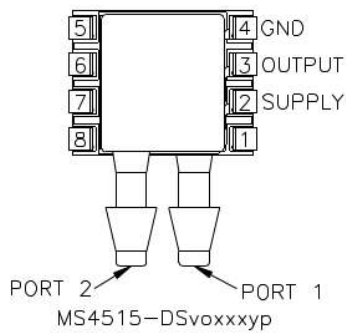
Sensor Output at Significant Percentages, (Vs=3.30)

| Output (%Vs) | Output A (inH2O) | Output B (inH2O) | Voltage (V) |
|--------------|--------------------------------------------------------------|-------------------------------------------------------------|-------------|
| 0 | $P_{\text{MIN}} - (P_{\text{MAX}} - P_{\text{MIN}}) * 10/80$ | $P_{\text{MIN}} - (P_{\text{MAX}} - P_{\text{MIN}}) * 5/90$ | 0.000 |
| 5 | | P_{MIN} | 0.165 |
| 10 | P_{MIN} | | 0.330 |
| 50 | | | 1.650 |
| 90 | P_{MAX} | | 2.970 |
| 95 | | P_{MAX} | 3.315 |
| 100 | $P_{\text{MAX}} + (P_{\text{MAX}} - P_{\text{MIN}}) * 10/80$ | $P_{\text{MAX}} + (P_{\text{MAX}} - P_{\text{MIN}}) * 5/90$ | 3.300 |

EXTENDED TEMPERATURE MULTIPLIER CHART



PACKAGE, PINOUT & PRESSURE TYPE CONFIGURATION



| Pin Name | Pin | Function |
|----------|--------|-------------------------|
| SUPPLY | 2 | Positive Supply Voltage |
| OUTPUT | 3 | Analog Output |
| GND | 4 | Ground |
| | 1, 5-8 | No Connection |

| Pressure Type | P _{min} | P _{max} | Description |
|--------------------------------|---------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Differential/ Bidirectional | -P _{range} | +P _{range} | Output is proportional to the difference between Port 1 and Port 2. Output swings positive when Port 1 > Port 2. Output is 50% of supply voltage when Port 1 = Port 2 |
| Gage | 0psiG | +P _{range} | Output is proportional to the difference between 0psiG (P _{min}) and Port 1. Output swings positive when Port 1 > Port 2. |

P_{range} is equal to the maximum full scale pressure specified in the ordering information.

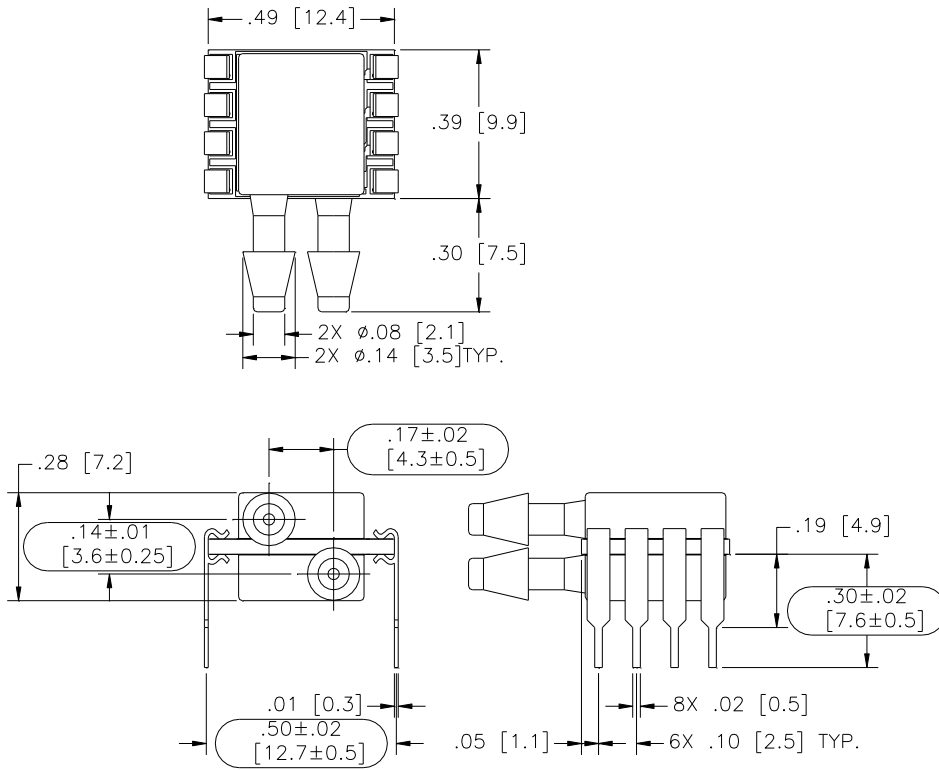
WETTED MATERIAL BY PORT DESIGNATION

| Style | Port | Material | | | | | | |
|------------|--------|----------|---------|--------------------|-----|------|----------|-------|
| | | Ceramic | Silicon | Borosilicate Glass | RTV | Gold | Aluminum | Epoxy |
| DS, MM | Port 1 | X | X | X | X | | | X |
| | Port 2 | X | X | X | X | X | X | X |
| SS, TP, SM | Port 1 | X | X | X | X | X | X | X |

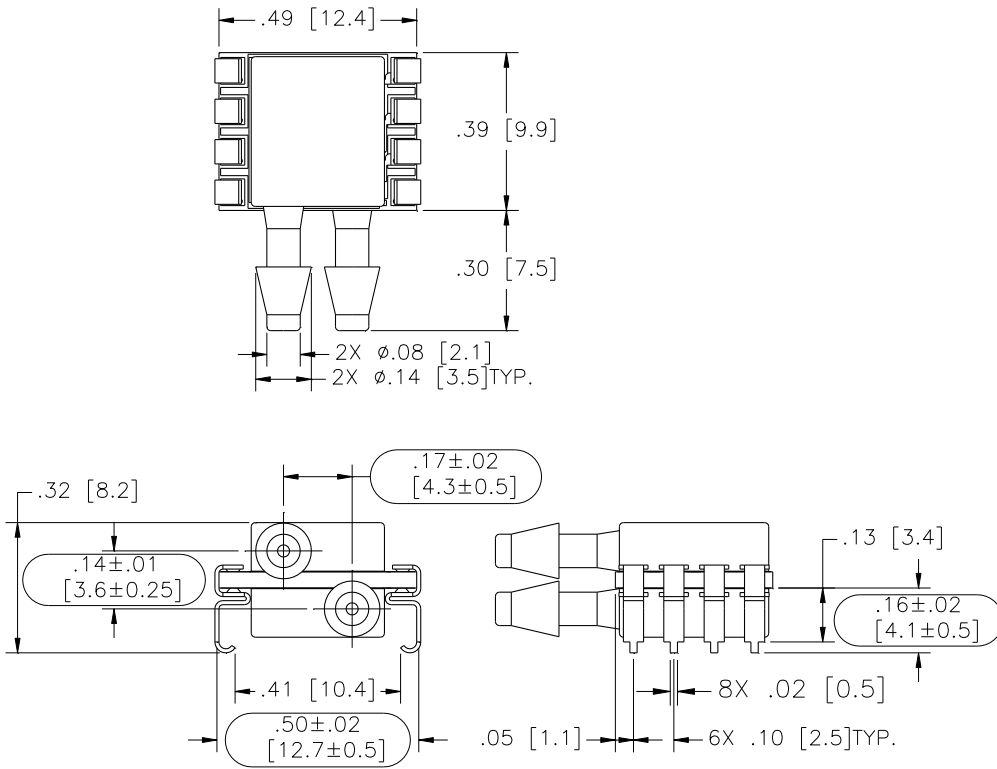
"X" Indicates Wetted Material

DIMENSIONS (are in INCHES [mm])

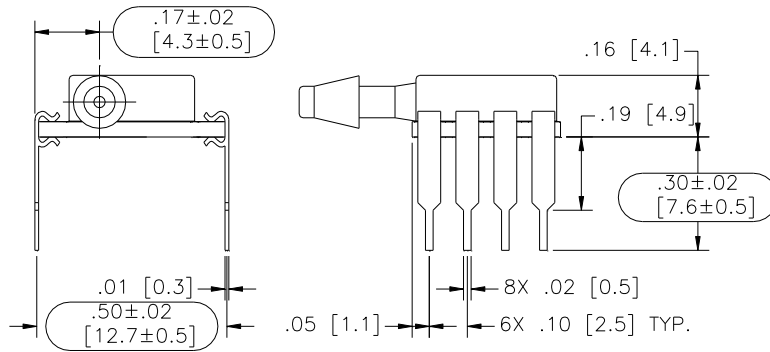
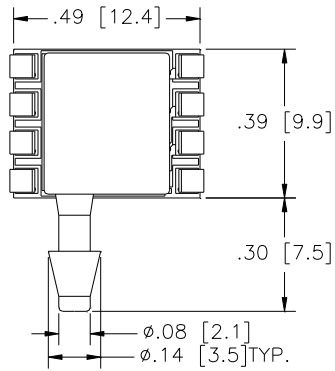
Model: MS4515-DSvoxxxP



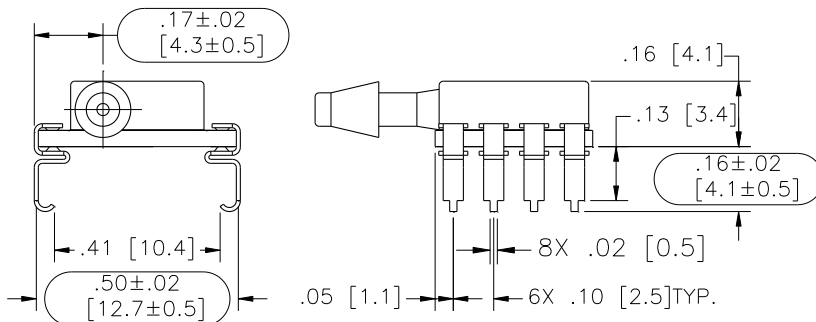
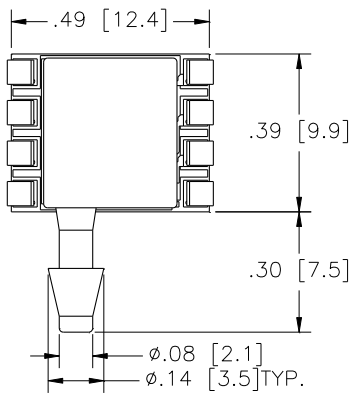
Model: MS4515-DSvoxxxS



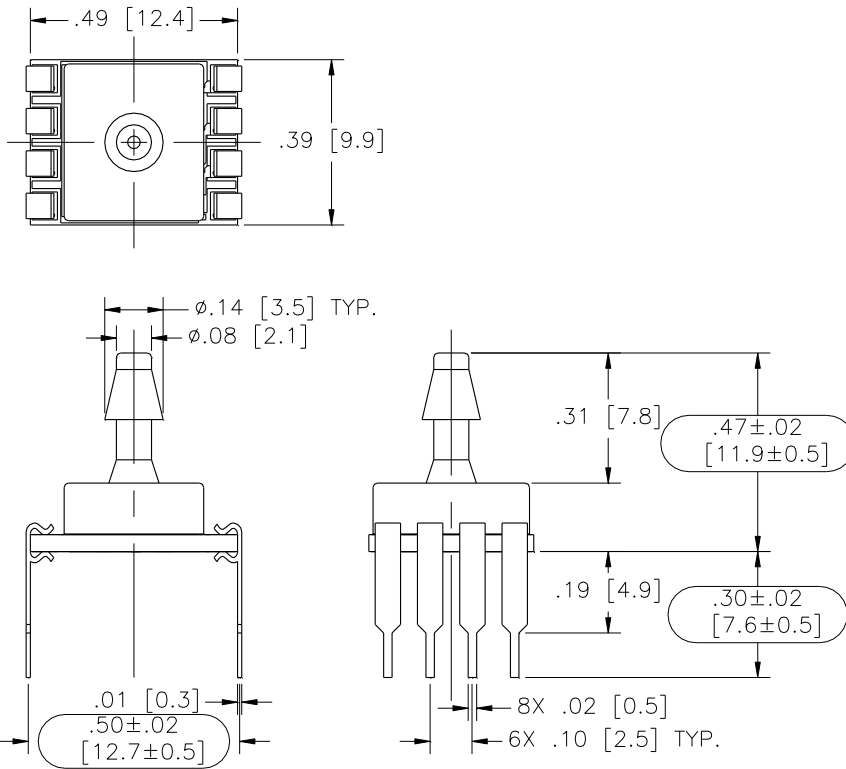
Model: MS4515-SSvoxxxxyP



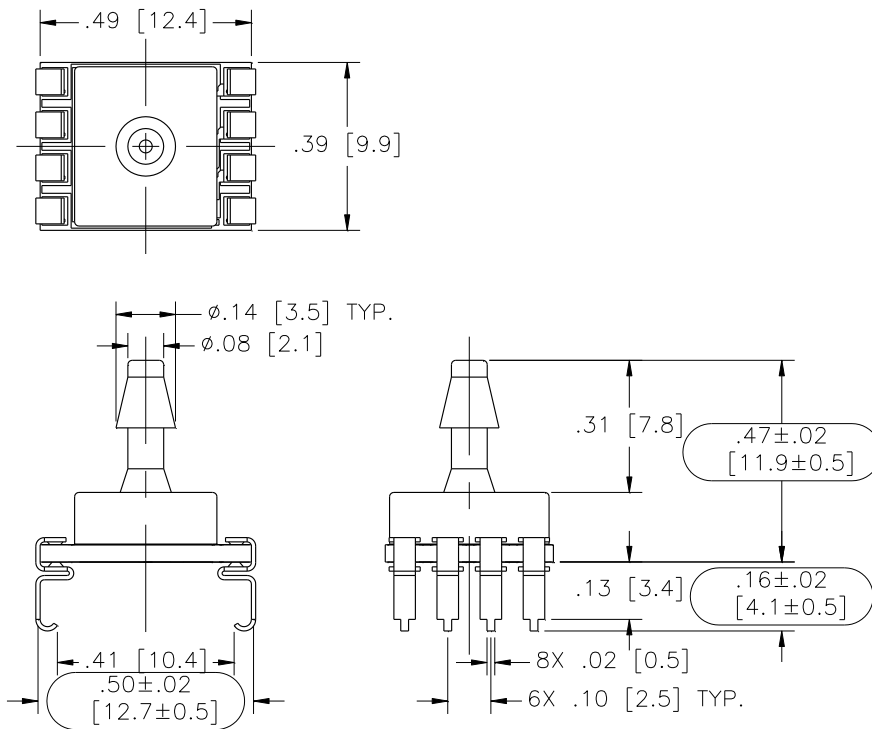
Model: MS4515-SSvoxxxxyS



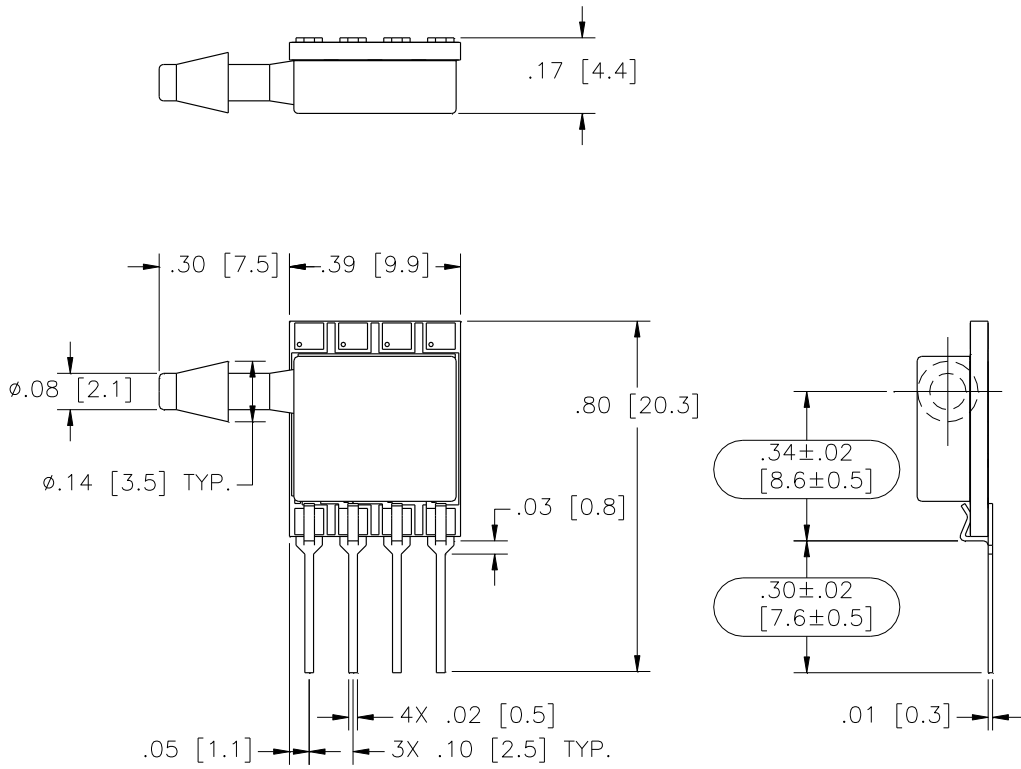
Model: MS4515-TPvxxxxxyP



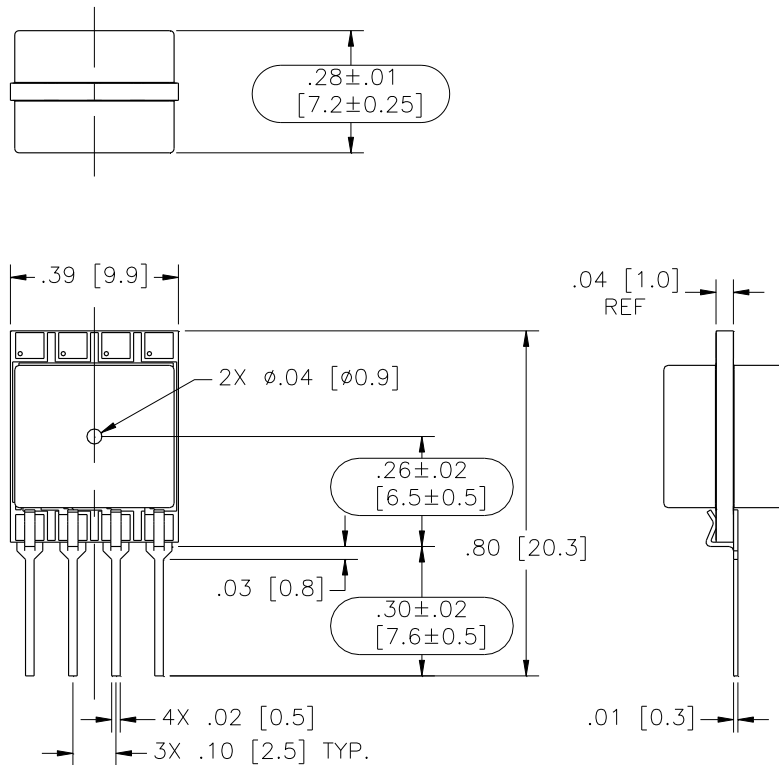
Model: MS4515-TPvxxxxxyS



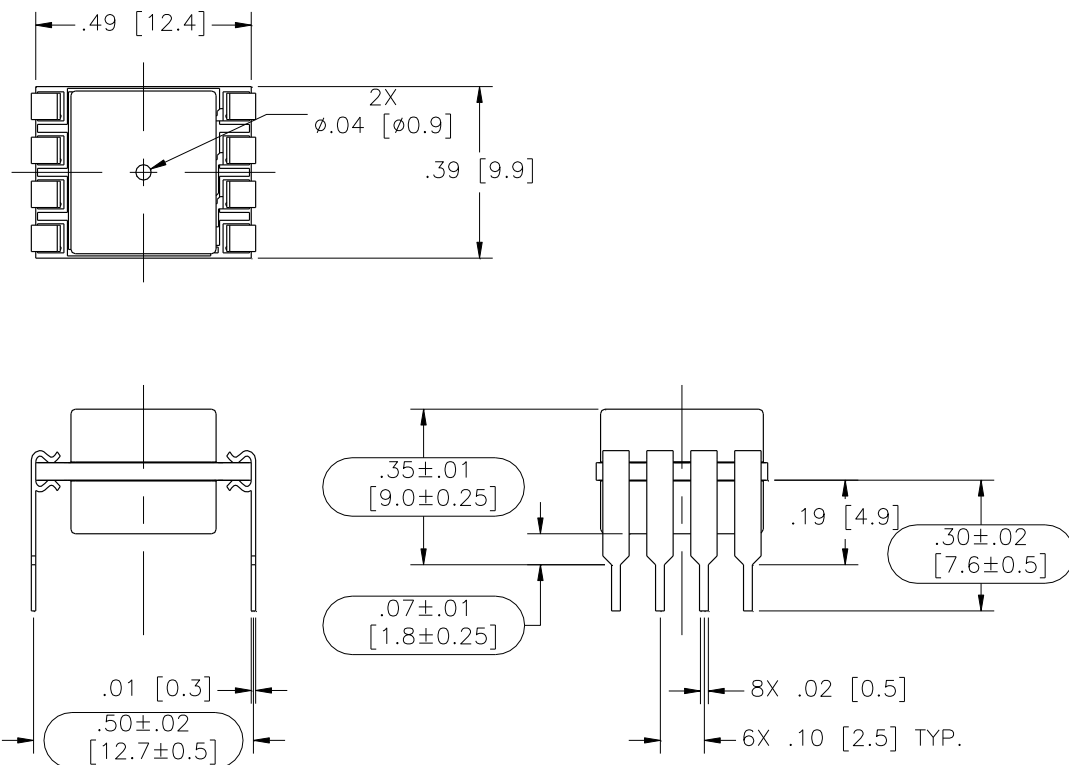
Model: MS4515-SSvoxxxyl



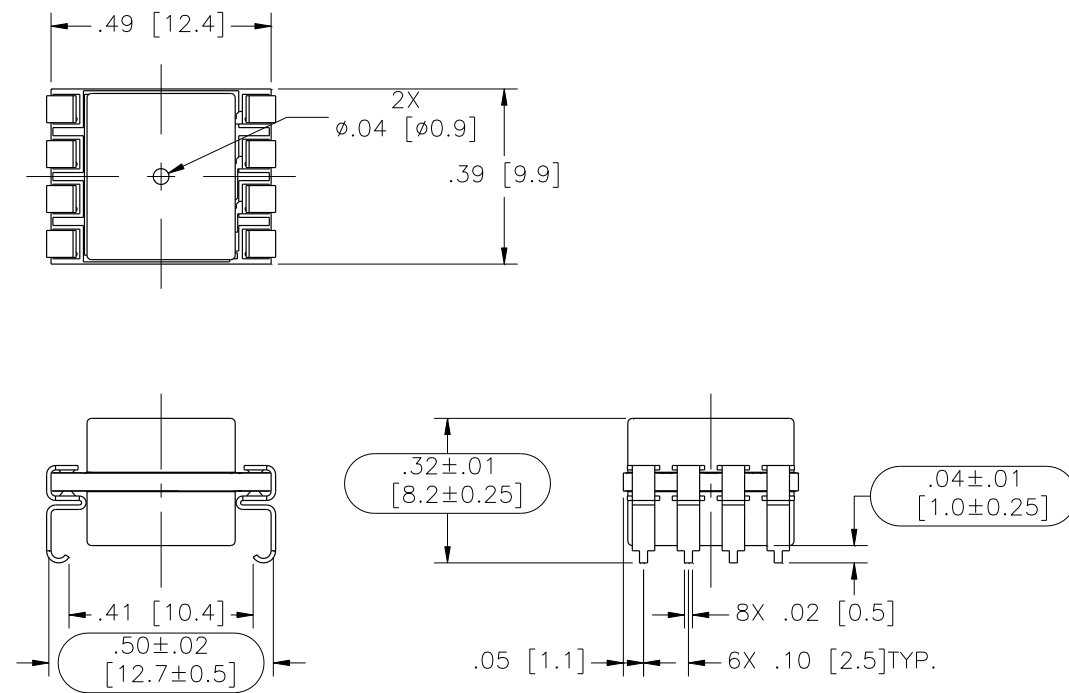
Model: MS4515-MMvoxxxyl



Model: MS4515-MMv0xxxP



Model: MS4515-MMv0xxxS

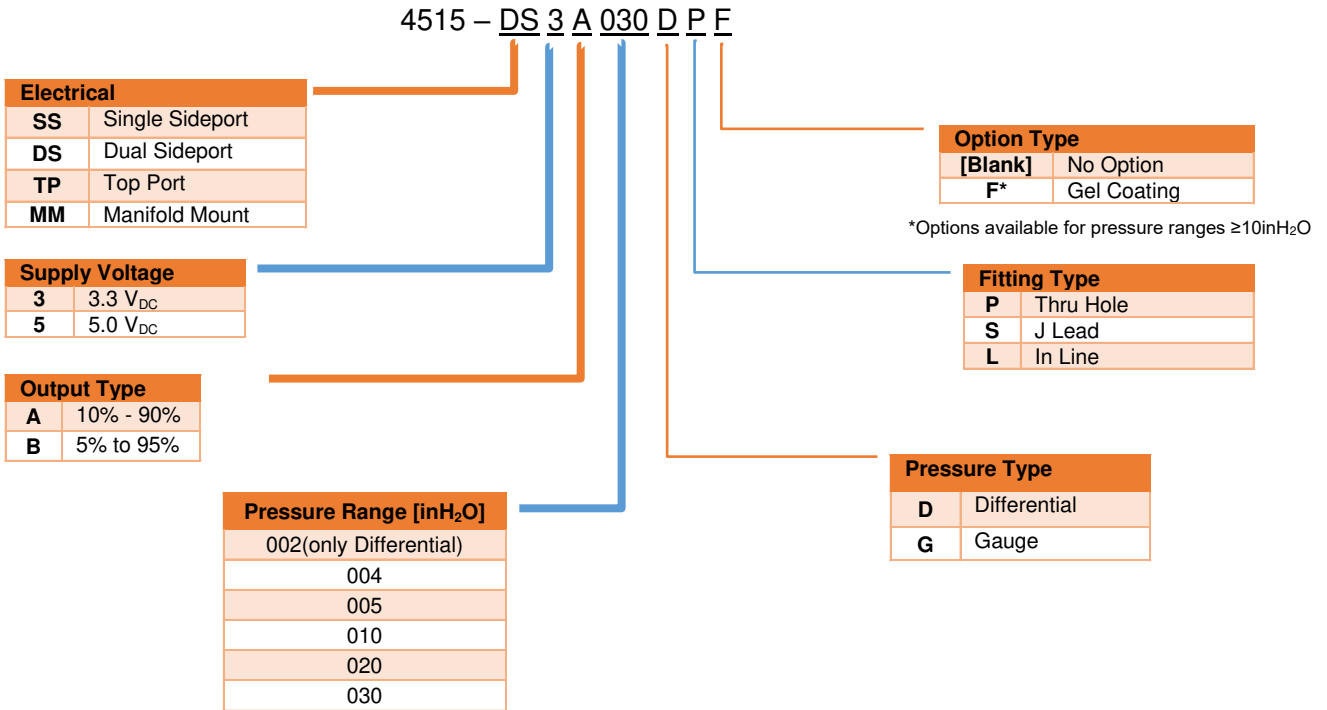


AVAILABLE OPTIONS

Gel Coat (-F Option)

The MS4515 is designed for non-ionic and clean dry air applications. Select this option for added protection in high humidity or slightly corrosive environments with the application of a silicone gel elastomer to sensor and ASIC. For questions concerning media compatibility, contact the factory.

ORDERING INFORMATION



NORTH AMERICA

Measurement Specialties, Inc.,
a TE Connectivity company
Tel: 800-522-6752
Email: customercare.frmt@te.com

EUROPE

Measurement Specialties (Europe), Ltd.,
a TE Connectivity Company
Tel: 800-440-5100
Email: customercare.bevx@te.com

ASIA

Measurement Specialties (China) Ltd.,
a TE Connectivity company
Tel: 0400-820-6015
Email: customercare.shzn@te.com

TE.com/sensorsolutions

Measurement Specialties, Inc., a TE Connectivity company.

Measurement Specialties, TE Connectivity, TE Connectivity (logo) and EVERY CONNECTION COUNTS are trademarks. All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

© 2015 TE Connectivity Ltd. family of companies All Rights Reserved.