

SOUTHWEST RESEARCH INSTITUTE  
Department of Quality Assurance  
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 33604 ASSET # 001195 DATE 08 March 99

ITEM DATA:

Manufacturer Minn Smith Model SDFS0 30 PSI  
Description diff. metal sensor Serial # 9142  
Accessories spec sheet

ACTION REQUESTED Cal

CUSTODIAN Div 20 Ron Green

Turned in by: Melissa Hill Phone 2636

CHARGE # 20-1102-861 Date Required \_\_\_\_\_

INSTRUMENT USED ON:  (DOD/NASA)  (NUCLEAR)  (GLP)  (SPPE)  (ISO)  
 OTHER \_\_\_\_\_

COPY OF CALIBRATION CERTIFICATE  (Yes)  (No)

NEW WORK  Yes  No If yes, an evaluation shall be made to verify capabilities.

By MHI Date 03-08-99

Work involves proprietary/confidential information or equipment  (Yes)  (No)

CONDITION RECEIVED: \_\_\_\_\_ (F) Out of tolerance, repaired to specifications  
\_\_\_\_\_ (G) In tolerance, minor adjustments/repairs made  
\_\_\_\_\_ (J) In tolerance, no adjustments/repairs  
\_\_\_\_\_ (K) Out of tolerance, adjusted to specifications  
\_\_\_\_\_ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) 5 Point Cal

Tol not verified

Data and Unc only.

CAL ENVIRONMENT:  
Temperature 68 °F Humidity 46 %RH

CALIBRATED/REPAIRED: By OMWood Cal Procedure CCCP-P1-001

Date 3-11-99 Accuracy Unknown

Cal Interval 12mo Reliability Code: \_\_\_\_\_

Next Cal due 3-11-00 Cal Time 2 hr Repair Time \_\_\_\_\_

Standards used (Asset#) 5429, 4259

DATE COMPLETED 3-11-99

DATE PICKED UP 3/11/99 PICKED UP BY [Signature]

33604

# WORK ORDER HISTORY

DATE	START STOP	CAL	REP	REMARKS:
				10.000V
				0                    -0.517                    -0.492                    -0.493
				7.5                    -25.387                    -25.286
				15                    -50.262                    50.195                    -50.181                    -50.184
				22.5                    -75.201                    -75.185
				30                    -100.139                    ↗                    -100.060 ↘
TOTAL CAL/REPAIR				TOTAL HOURS _____





Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory

Accredited



Certificate #  
0972-01

## Certificate of Calibration

11 March 1999

**Issued to:** RON GREEN DIV20 B57  
**Manufacturer/Model:** MICRO SWITCH SDF5D  
**Description:** DIFFERENTIAL SENSOR  
**Serial Number:** 9742  
**Asset Number:** 007175

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 68.0 Degrees Fahrenheit Humidity: 46 % RH

**Calibration Date:** 11 Mar 99

**Calibration Procedure:** CLCP-PI-001 1997

**Condition as Received:** SEE REMARKS

**Condition as Released:** SEE CAL DATA

**Remarks:** TOLERANCE NOT VERIFIED. SEE ATTACHED CALIBRATION DATA AND UNCERTAINTY

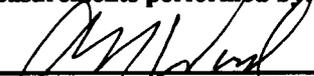
**Approved by:**

  
\_\_\_\_\_  
Jim Patterson, Supervisor of Walt Hill, Metrologist

Certificate # 33604

m:\a2la.rpt Rev date 10 Mar 99

**Measurements performed by:**

  
\_\_\_\_\_  
Mack Wood, Technician

Page 1 of 12

# WORK ORDER 38212

Date Received 3/15/00

Asset No. 007175 Manufacturer MICRO SWITCH Model 5DF5D  
Description DIFFERENTIAL SENSOR Serial Number 9742  
Accessory Received/Required NONE  
Div/CC ID NONE Accessory to Asset No. N/A Accuracy \_\_\_\_\_ Mfg. Tol. \_\_\_\_\_  
Div/CC DIV20 Location B57 Custodian RON GREEN Tel. 3505  
Charge/Project No. 20.00751.006 Proprietary/Confidential N Date Required ROUTINE  
Work Requested CALIBRATION.  
Receiving Inspection O.K.  
Delivered By DWAYNE H. Tel. 2012

## WORK HISTORY

Date	Start Time	Stop Time	Notes

## PARTS

Part Name	Part Number	Cost	Failure Description

SwRI Cal-Lab BY: MW  
CAL: 03/11/99 DUE: 03/11/00  
SPECIAL: SEE CERTIFICATE  
AN: 007175 SN: 9742  
I HONOR MY OATH TO REPORT ALL VIOLATIONS OF THE RULES

38212

## WORK SUMMARY

Failure Description \_\_\_\_\_  
Repair Action \_\_\_\_\_  
Cal Procedure CCCP-P1-001 Jun 99 Temp 68 F Hum 40 %  
Tech [Signature] Cal Hrs. 25 Repair Hrs. \_\_\_\_\_ Part Cost \_\_\_\_\_  
Action Taken Cal  
Standards Used 5429, 4259  
Date Cal 3-20-00 Int. 12 Mo. Date Due 3-20-01 Reliability Code \_\_\_\_\_  
Date Picked Up 03/21/00 Picked Up By Dwayne Helbert  
workreq.rpt Rev 30 Jan 00

# PRESSURE CALIBRATION DATA SHEET

Date 3-20-00 Work Order 38212 Technician [Signature]  
 Inst Cust. R Green Ext 3505 Charge # 20-00751-006 time 2.5

**A) Unit Under Test** Micro Switch Press Trans.  
 Model SDFSD Serial No. 9742 Asset No. 7175  
 Range 30 PSI Uncertainty Unknown Std Unc \_\_\_\_\_

**B) Calibration Standard (1)** Memo  
 Model 5014 Serial No. 340148A Asset No. 5429  
 Uncertainty ±0.4% FS Std Unc \_\_\_\_\_

**C) Calibration Standard (2)** Phillips DMM  
 Model PM2535 Serial No. DM638003 Asset No. 4259  
 Uncertainty ±0.012 of FS Std Unc \_\_\_\_\_  
 Comb Unc (rss B&C) ±0.4% TUR (A Unc/Comb Unc) N/A

If less than 4:1, Total combined calibration Unc (kXrss) \_\_\_\_\_  
 k= \_\_\_\_\_ Explanation \_\_\_\_\_  
 Env: Room Temp. 68°F Humidity 40% Baro Press. 29.11" Hg  
 Conversion Factor(s) N/A

STANDARD	INCREASING	DECREASING	TOLERANCE: <i>See Note</i>	
UNITS: PSI	UNITS: mV	UNITS: mV	UNITS:	
AS FOUND			MIN	MAX
0	0.462	0.429	±0.4% FS (Unc)	
-7.5	25.315	25.241	↓	
15.0	50.217	50.152		
22.5	75.147	75.135		
30.0	100.096	?		
AS DELIVERED			(4) +10V EXC = 10V (±0.01V)	





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6220 Culebra Road  
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(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0972-01

## Certificate of Calibration

20 March 2000

**Issued to:** RON GREEN DIV20 B57  
**Manufacturer/Model:** MICRO SWITCH 5DF5D  
**Description:** DIFFERENTIAL SENSOR  
**Serial Number:** 9742  
**Asset Number:** 007175

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 68.0 Degrees Fahrenheit Humidity: 40 % RH

**Calibration Date:** 20 Mar 00 **Calibration Procedure:** CLCP-PI-001 JUN99

**Condition as Received:** SEE REMARKS

**Condition as Released:** SEE CAL DATA

**Remarks:** MEASUREMENT DATA AND UNCERTAINTY ATTACHED

Approved by:

\_\_\_\_\_  
Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 38212

m:\a2la.rpt Rev date 14 Dec 99

Measurements performed by:

\_\_\_\_\_  
Mack Wood, Technician

Page 1 of 1

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Received by RCRUZ, 4/30/02 1:58:37PM

||||| ||||| ||||| ||||| ||||| ||||| |||||

Arrived 4/30/02

Work Order **444048351**

Asset No. 007175 Manufacturer MICRO SWITCH

Model SDF5D

Equipment Type DIFFERENTIAL PRESSURE SENSOR Serial No. 9742

Accessory No.

Interval 12 M

Calibration Procedure CLCP-PI-001 JUN99

Location B57

Div/Client DIV20

Custodian RON GREEN

Mail Stop T1

Tel 5305

**IN LINE**

Special Instructions \_\_\_\_\_

Notify before adjustments or repairs. ( ) Provide data with certificate ( ) Certificate Typ. \_\_\_\_\_

Charge/Project No. 00751.006 1.20

Requester / Telephone TROY MAXWELL X2012

5051

This information is correct for the work requested.

### WORK NOTES

Date	Hours	Remarks/Notes
<u>5/7/02</u>	<u>1.5</u>	<u>cal</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>n/a</u>	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech R. D. K. S. T. Cal Hrs. 1.5 Repair Hrs \_\_\_\_\_ Parts Cost \_\_\_\_\_ Temp 62 F Hum. 36 %

Standards Used 4163, 4259

Date Picked Up 5-8-02

Picked Up By Troy Maxwell

48351





# LOW COST WET/WET DIFFERENTIAL PRESSURE SENSOR

## PX26 Series 0-1 to 0-100 psi Gage and Differential

PX26 Series  
**\$35**

- ✓ Water and Many Other Liquids May be Applied to Both Sides
- ✓ Gage and Differential Models Available
- ✓ Miniature PC Board Mount Design

OMEGA's PX26 Series pressure sensors feature state-of-the-art silicon technology which permits both sides of the diaphragm to handle liquids. A unique conductive seal between the silicon diaphragm and the plastic housing allows for wet/wet applications and lower production costs than typical gold wire silicon sensors. This new construction has a larger diaphragm than traditional silicon sensors, resulting in increased long-term stability.

### SPECIFICATIONS

**Excitation:** 10 Vdc, 16 Vdc max @ 2 mA

**Output (@ 10 Vdc):** 1 psi = 16.7 mV

5 psi = 50 mV; >5 psi = 100 mV

**Linearity:** ±0.25% FS BFSL Typical (±1% maximum), P2>P1

**Hysteresis and Repeatability:** 0.2% FS

**Zero Balance:** ±1.5 mV

**Span Tolerance:** ±3.0 mV

**1 Year Stability:** 0.5% FS

**Operating Temperature:** -40 to 85°C (-40 to 185°F)

**Compensated Temperature:** 0 to 50°C (32 to 122°F)

#### Thermal Effects:

Zero: 1 mV Span: 1% Rgd

**Proof Pressure:** 20 psi for ≤5 psi;

45 psi for 15 psi; 60 psi for 30 psi

200 psi for 100 psi range

**Input Resistance:** 7.5 kΩ

**Output Resistance:** 2.5 kΩ

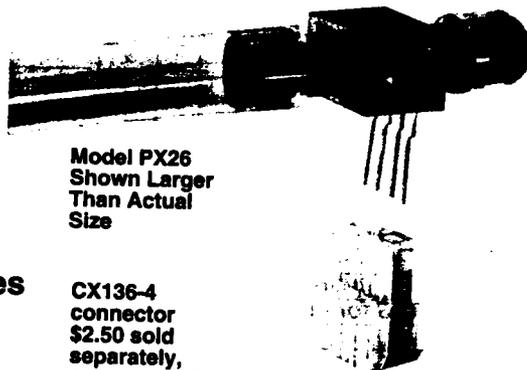
**Response Time:** 1 ms

**Gage Type:** Silicon sensor

**Wetted Parts:** Polyethimide, silicon, fluorosilicone

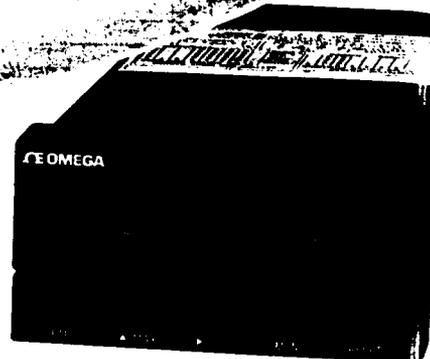
**Mating Connector:** CX136-4, (\$2.50), not included, see page C-3

**Weight:** 2 g (0.07 oz)



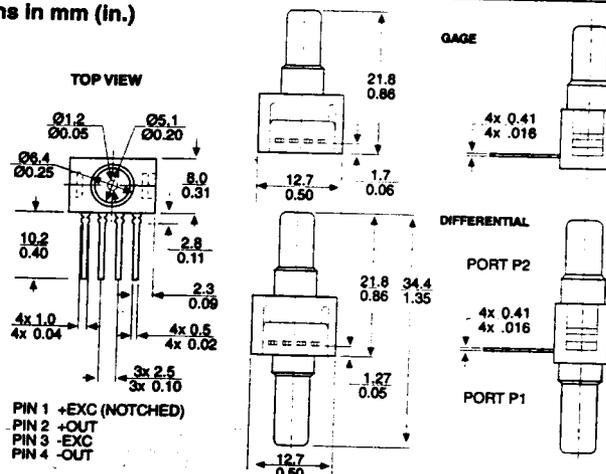
Model PX26  
Shown Larger  
Than Actual  
Size

CX136-4  
connector  
\$2.50 sold  
separately,  
see page C-3



DP25-S Meter, \$245, sold  
separately, see Section D  
Shown Smaller Than Actual Size

Dimensions in mm (in.)



### MOST POPULAR MODELS HIGHLIGHTED

To Order (Specify Model Number)

MADE IN  
USA

RANGE	MODEL NUMBER	PRICE	COMPATIBLE METERS*
0 to 1 psig	PX26-001GV	\$35	DP25-S, DP460-S, DP41-S
0 to 5 psig	PX26-005GV	35	DP25-S, DP460-S, DP41-S
0 to 15 psig	PX26-015GV	35	DP25-S, DP460-S, DP41-S
0 to 30 psig	PX26-030GV	35	DP25-S, DP460-S, DP41-S
±1 psid	PX26-001DV	35	DP25-S, DP460-S, DP41-S
±5 psid	PX26-005DV	35	DP25-S, DP460-S, DP41-S
±15 psid	PX26-015DV	35	DP25-S, DP460-S, DP41-S
±30 psid	PX26-030DV	35	DP25-S, DP460-S, DP41-S
±100 psid	PX26-100DV	35	DP25-S, DP460-S, DP41-S

### ACCESSORIES

MODEL NUMBER	PRICE	DESCRIPTION
CX136-4	\$ 2.50	4 pin connector (see page C-3)
TX4-100	28.50	4 conductor copper wire, 100 ft
TY316-100	20.00	Flexible plastic tubing, 100 ft

Comes with complete operator's manual.

\*See Section D for compatible meters

Ordering Example: PX26-030DV has a bidirectional range of ±30 psid, \$35.



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## Certificate of Calibration

7 May 2002

**Issued to:** RON GREEN DIV20 T1  
**Manufacturer/Model:** MICRO SWITCH 5DF5D  
**Description:** DIFFERENTIAL PRESSURE SENSOR  
**Serial Number:** 9742  
**Asset Number:** 007175  
**Work Order Number:** 444048351

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 68.0 Degrees Fahrenheit Humidity: 36 % RH

**Calibration Date:** 7 May 02 **Calibration Procedure:** CLCP-PI-001 JUN99

**Condition as Received:** IN TOLERANCE

**Condition as Returned:** IN TOLERANCE

**Remarks:**

**Approved by:**

  
Walt Hill, Metrology Group Leader  
Institute Calibration Laboratory

**Measurements performed by:**

  
Roger Dykstra, Technician