



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

**WORK ORDER**

CERTIFICATE # 25827 ASSET # 025510 DATE 18 June 97

ITEM DATA:

Manufacturer Omega Model DX302-015GV  
Description pressure transducer Serial # 961218  
Accessories \_\_\_\_\_

ACTION REQUESTED cal

CUSTODIAN Bill W. Don Green

Turned in by: Sunny Cappola Phone 927

CHARGE # 20.5-708-061 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 \_\_\_\_\_ Date \_\_\_\_\_

CONDITION RECEIVED: \_\_\_\_\_ (F) Out of tolerance, repaired to specifications  
\_\_\_\_\_ (G) In tolerance, minor adjustments/repairs made  
AK (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) Sprint Cal

CAL ENVIRONMENT:  
Temperature 68 °F Humidity 66 %RH

CALIBRATED/REPAIRED: CMW  
By \_\_\_\_\_ Cal Procedure CCCP-7F-001  
Date 6-19-97 Accuracy ± 2mv  
Cal Interval 12mo Reliability Code: \_\_\_\_\_  
Next Cal due 6-19-98 Cal Time 2.5h Repair Time \_\_\_\_\_  
Standards used (Asset#) 5259 4259 5242

DATE COMPLETED 6-20-97  
DATE PICKED UP \_\_\_\_\_ PICKED UP BY Sunny Cappola

25827

# PRESSURE CALIBRATION CHECK FORM

Date 6-19-97 Work Order 25827 Technician [Signature]  
 Inst Cust. Ron Green Ext 5077 Charge # 20-5708-661 time 2.5hr

A) Unit Under Test Omega Press Trans  
 Model PX302-0156V Serial No. 961218 Asset No. 5570  
 Range 0-15 psig Uncertainty ± 1mv Std Unc ± 0.3 PSI (± 2%)  
 ± 0.25% FS + 2mv ? could be twice til. below

B) Calibration Standard (1) Mensor Dig Ind  
 Model 5014 Serial No. 340119 B Asset No. 5259  
 Uncertainty ± 0.003 psi [± 0.02% (15)] Std Unc \_\_\_\_\_

C) Calibration Standard (2) Phillips DVM  
 Model PM2535 Serial No. DM638003 Asset No. 4259  
 Uncertainty ± 0.02% Std Unc \_\_\_\_\_  
 Comb Unc (rss B&C) 0.02832 TUR (A Unc/Comb Unc) 70/1

If less than 4:1, Total combined calibration Unc (kXrss) \_\_\_\_\_  
 k= \_\_\_\_\_ Explanation \_\_\_\_\_  
 Env: Room Temp. 68°F Humidity 66% Baro Press. 29.12" Hg  
 Conversion Factor(s) \_\_\_\_\_

STANDARD	INCREASING UNITS: <u>PSIG</u>	DECREASING UNITS: <u>mV</u>	TOLERANCE: <u>± 1mv</u>	
			MIN	MAX
AS FOUND				
0	-00.735	-0.744	-1.0	1.0
3.75	24.414	24.390	24	26
7.50	49.517	49.541	49	51
12.25	81.118	81.142	74	76
15.00	99.302	↗	99	101
11.25	74.498	74.490		
AS DELIVERED	re run			
0	<del>-0.749</del>	-0.748		
3.75	24.411	24.417		
7.50	49.512	49.510		
11.25	74.504	74.479		
15.0	99.288	↗		

99.276

2mv?

NOTES: Exc 10.004 v Page 1 of 1

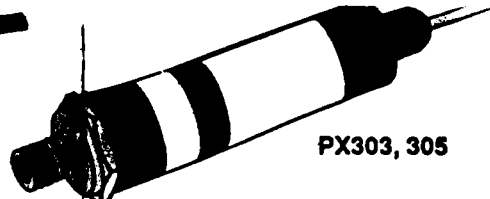
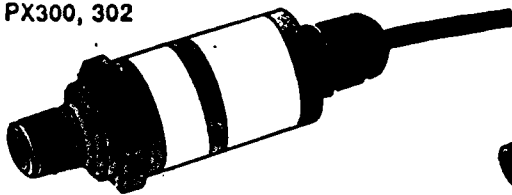
LSQ Tol +0.10% FS \*  
 -0.19% FS

$$V_{out} = P(6.6758) - 0.6579$$



PX300, 302

PX300, 302, 303 and 305 Series Pressure Transducer M1306/0492



PX303, 305

COMMON SPECIFICATIONS FOR ALL UNITS

Table with 2 columns: Specification Name and Value. Includes Accuracy, Zero Balance, Operating Temp, Compensated Temp, Thermal Effects, Thermal Hysteresis, Vibration, Shock, Proof Pressure, Stability, Gage Type, Electrical Connection, Wetted Parts, Pressure Cavity, and Pressure Connection.

MILLIVOLT OUTPUT FOR PX300 & 302

Table with 2 columns: Specification Name and Value. Includes Excitation, Output, Input & Output Res., Response Time, Weight, and Wiring.

VOLTAGE OUTPUT FOR PX303-xxx5V, PX303-xxx10V

Table with 2 columns: Specification Name and Value. Includes Excitation, Output, Span, Min. Load Resistance, Quiescent Draw, Response Time, Weight, and Wiring.

CURRENT OUTPUT FOR PX305

Table with 2 columns: Specification Name and Value. Includes Excitation, Output, Span, Max Loop Resistance, Response Time, Weight, and Wiring.

CALIBRATION

All models are tested to meet or exceed the published specifications. The calibration and testing were done using instrumentation and standards traceable to the National Institute of Standards and Technology (NIST) (also tested per MIL standard 45662A).

WARNING !

READ BEFORE INSTALLATION

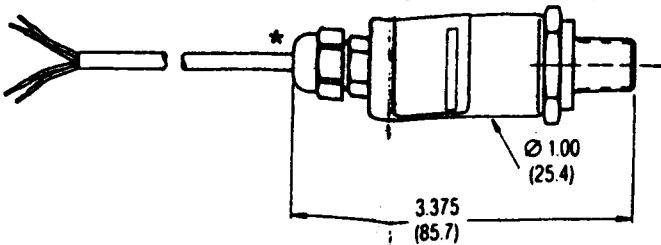
Fluid hammer and surges can destroy any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects. Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is suddenly begun, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed, and a pressure snubber should be installed on every transducer.

Symptoms of fluid hammer and surge's damaging effects:

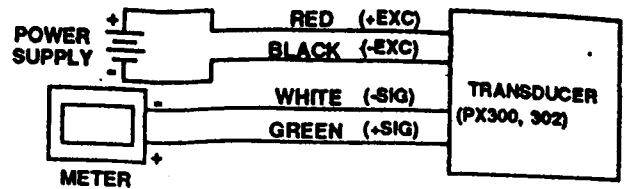
- 1. Pressure transducer exhibits an output at zero pressure (large zero offset). If zero offset is less than 10% FS, user can usually re-zero meter, install proper snubber and continue monitoring pressures.
2. Pressure transducer output remains constant regardless of pressure.
3. In severe cases, there will be no output.

## MILLIVOLT TRANSDUCERS - PX300, 302

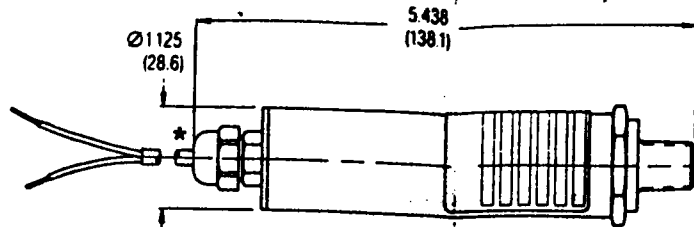


**\* THE WIRES CAN NOT BE UNPLUGGED FROM THE SENSOR !**

## WIRING

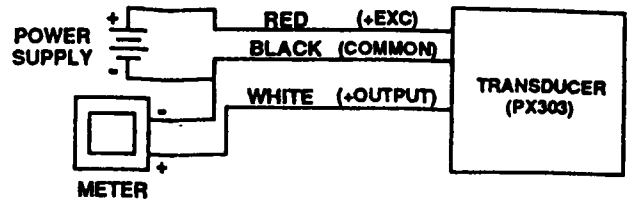


## VOLTAGE OUTPUT TRANSDUCER - PX303

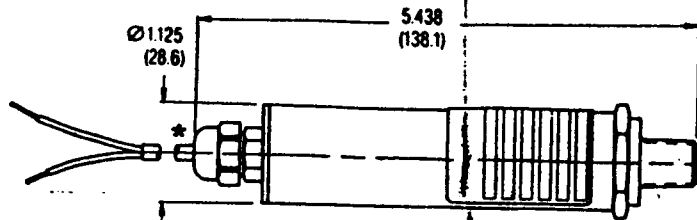


**\* THE WIRES CAN NOT BE UNPLUGGED FROM THE SENSOR !**

## WIRING

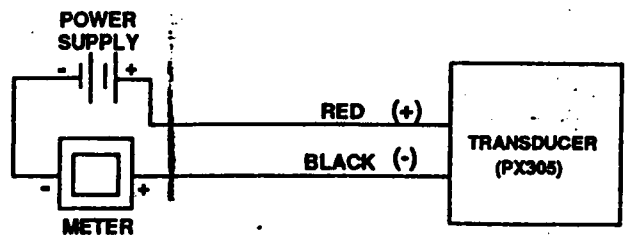


## CURRENT OUTPUT TRANSDUCER - PX305



**\* THE WIRES CAN NOT BE UNPLUGGED FROM THE SENSOR !**

## WIRING



Dimensions in Inches (mm)

Service USA and Canada: Call OMEGA Toll Free  
**OMEGA Engineering, Inc.**

One Omega Drive, Box 4047  
 Stamford, CT 06907-0047 USA  
 Headquarters: (203) 359-1660

Sales: 1-800-826-6342/1-800-TC-OMEGA

Customer Service: 1-800-622-2378/1-800-622-BEST

Engineering: 1-800-872-9436/1-800-USA-WHEN

FAX: (203) 359-7700 TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

Service Europe: United Kingdom Sales and Distribution Center

**OMEGA Technologies Ltd.**

P.O. Box 1, Broughton Astley, Leicestershire  
 LE9 6XR, England

Telephone: (0455) 285520 FAX: (0455) 283912

## WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of 37 months from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal three (3) year product warranty to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

There are no warranties except as stated herein. There are no other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and of fitness for a particular purpose. OMEGA ENGINEERING, INC. is not responsible for any damages or losses caused to other equipment, whether direct, indirect, incidental, special or consequential, which the purchaser may experience as a result of the installation or use of the product. The buyer's sole remedy for any breach of this agreement by OMEGA ENGINEERING, INC. or any breach of any Warranty by OMEGA ENGINEERING, INC. shall not exceed the purchase price paid by the purchaser to OMEGA ENGINEERING, INC. for the unit or units or equipment directly affected by such breach.

Every precaution for accuracy has been taken in the preparation of this manual, however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

**BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS).** The assigned AR number should then be marked on the outside of the return package and on any correspondence.

**FOR WARRANTY RETURNS**, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems you are having with the product.

**FOR NON-WARRANTY REPAIRS OR CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. Your P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems you are having with the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. That way our customers get the latest in technology and engineering. OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

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

**WORK ORDER**

CERTIFICATE # 29821 ASSET # 005370 DATE 21 May 98

ITEM DATA:

Manufacturer Omega Model PR32-0159V  
 Description Pressure Transducer Serial # 961218  
 Accessories \_\_\_\_\_

ACTION REQUESTED Cal

CUSTODIAN D. W. Forster

Turned in by: \_\_\_\_\_ Phone 2012

CHARGE # 70.011 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.

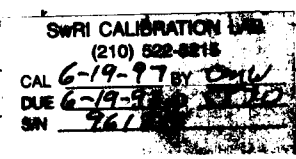
By W. Date 5-21-98

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) Unable to Calibrate: fitting is galled & leaking

0.25% FS Thermal effect 1%  
0-15 Psi  
0-100mV output ±1mV



CAL ENVIRONMENT: Temperature \_\_\_\_\_ °F Humidity \_\_\_\_\_ %RH

CALIBRATED/REPAIRED: By DMW Cal Procedure \_\_\_\_\_  
 Date 5-21-98 Accuracy \_\_\_\_\_  
 Cal Interval 12mo Reliability Code: \_\_\_\_\_  
 Next Cal due \_\_\_\_\_ Cal Time 0.5 Repair Time \_\_\_\_\_  
 Standards used (Asset#) \_\_\_\_\_

DATE COMPLETED 5-22-98  
 DATE PICKED UP 5/26/98 PICKED UP BY Jan. D. Forster

29821



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
Department of Quality Assurance  
Calibration Laboratory

## Out of Tolerance Notice

22 May 1998

The following asset was found to be out of tolerance when submitted for calibration. Please be aware measurements made with this instrument may be inaccurate.

### Instrument Information

Issued to: RON GREEN DIV20 B57

Manufacturer/Model: OMEGA PX302-015GV

Description: PRESSURE TRANSDUCER

Serial Number: 961218

Asset Number: 005570

SwRI Cap No.: NONE

Accuracy: +/-2MV

Calibration Interval: 12 months

Calibration Procedure:

Remarks:

(1) UNABLE TO CALIBRATE DUE TO LEAK AT SNUB

### Calibration Results

Out of Tolerance Date: 21 May 98

Last Valid Calibration Date: 19 Jun 97

Certificate # 29821

Signed: 

Checked by: 

## Out of Tolerance Notice