

7.0 TEST REPORT

NO. 10486

from

Acton Environmental Testing Corp,

Acton, Ma.

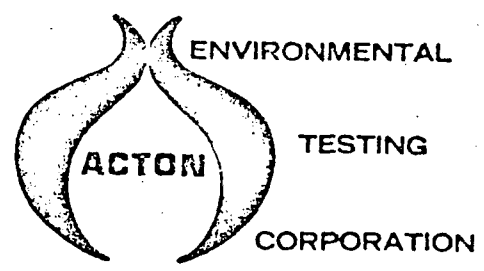
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Test Report No. 10486

No. of Pages 9

Report of Test on

GAGE & DIFFERENTIAL
PRESSURE TRANSMITTERS
TYPE E10 SERIES
for
THE FOXBORO COMPANY
under
PURCHASE ORDER NO. E17489



Date October 31, 1973

	Prepared	Checked	Approved
By	W. Schreiner	M. Casaubon	M. L. Tolf
Signed	<i>W. Schreiner</i>	<i>M. Casaubon</i>	<i>M. L. Tolf</i>
Date	<i>10/31/73</i>	<i>10/31/73</i>	<i>10/31/73</i>

MLT:WJS/hmf

Administrative Data

1.0 Purpose of Test: To subject the items listed herein to the seismic test as specified in The Foxboro Company Test Procedure for Seismic Vibration Qualification Test of E10 Series MCA/RRW Transmitters, dated Sept. 1973.

2.0 Manufacturer: The Foxboro Company

3.0 Manufacturer's Type or Model No: Refer to FOREWORD herein.

4.0 Drawing, Specification or Exhibit: The Foxboro Company Qualification Test Procedure of E10 Series MCA/RRW Transmitters, dated September 1973.

5.0 Quantity of Items Tested: Refer to FOREWORD herein.

6.0 Security Classification of Items: None

7.0 Date Test Completed: October 19, 1973

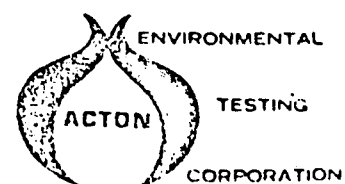
8.0 Test Conducted By: M. Casaubon
C. Pilotte
D. McLaughlin

9.0 Disposition of Specimens: Returned to The Foxboro Company.

10.0 Abstract: Refer to RESULT section herein.

Report No. 10486

Page 1

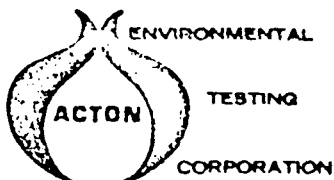


FOREWORD

The following electronic transmitters were subjected to the seismic test as specified herein.

<u>MODEL NO.</u>	<u>SERIAL NO.</u>	<u>RANGE</u>
E11GH	2713115	0-1000 psig
E11GH	2713116	0-1000 psig
E13DM	2713118	0-100 inches (H ₂ O)
E13DH	2713119	0-100 inches (H ₂ O)

Report No. 10486



1.0 REQUIREMENTS

The test samples, as specified herein, shall be subjected to the seismic test as specified in the Foxboro Company Qualification Test Procedure of E10 Series MCA/RRW Transmitters, dated September 1973.

2.0 PROCEDURES

2.1 MEASUREMENTS

The Foxboro Company personnel set up, operated, calibrated and monitored the test items before, during and after the vibration testing and retained data.

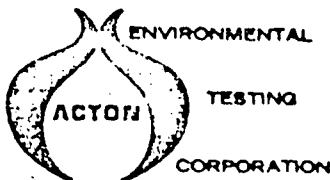
2.2 MOUNTING

The test samples were mounted by their normal mounting means in individual fixtures which in turn were rigidly mounted to the moveable platform of an AETC Vibration system. Throughout the complete test, the transmitters were mounted in their normal attitude.

2.3 ACCELEROMETER PLACEMENT

A control accelerometer was mounted in close proximity to the mounting point on one of the transmitters. One accelerometer was mounted on the top of each unit cover (4). Two additional accelerometers were mounted on the junction box covers of units 1 and 2. All accelerometers were monitoring in axis vibration.

Report No. 10486



2.4 VIBRATION TEST

RESONANT SURVEY(PERPENDICULAR TO ZERO SET)

The frequency range from 1-35 Hz was scanned at the rate of 1 octave/minute at an input level of 0.5g's. Resonant frequencies were detected as follows:

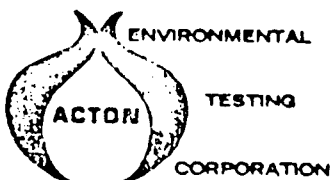
<u>ACCELEROMETER NUMBER</u>	<u>UNIT NO.</u>	<u>SERIAL NO.</u>	<u>FREQUENCIES (Hz)</u>
1	1	2713115	5.5, 9, 13, 29
2	2	2713116	3, 6, 9, 13, 21, 29
3	3	2713118	9, 13, 29
4	4	2713119	9, 13, 29
5	1	2713115	13, 29
6	2	2713116	13, 29

RESONANT SURVEY(HORIZONTAL TO ZERO SET)

The frequency range from 1-35 Hz was scanned at a rate of 1 octave/minute and resonant frequencies were detected as follows:

<u>ACCELEROMETER NUMBER</u>	<u>UNIT NO.</u>	<u>SERIAL NO.</u>	<u>FREQUENCIES (Hz)</u>
1	1	2713115	1.75, 3.5, 9, 14, 28
2	2	2713116	1.75, 3.5, 6, 14
3	3	2713118	1.75, 3.5, 14

Report No. 10486



ACCELEROMETER NUMBER	UNIT NO.	SERIAL NO.	FREQUENCIES (Hz)
4	4	2713119	1.75, 3.5, 14
5	1	2713115	1.75, 3.5, 5, 6, 7, 8, 9, 12, 17, 28
6	2	2713116	1.75, 3.5, 14, 21

RESONANT SURVEY (VERTICAL AXIS)

The frequency range from 1-35 Hz was scanned at a rate of 1 octave/minute. There was no evidence of any resonant frequencies detected.

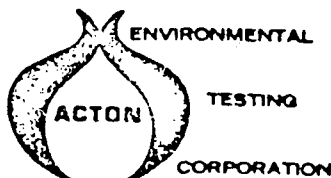
BEAT FREQUENCY TEST (VERTICAL AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz and 3.5g's at 2 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

BEAT FREQUENCY TEST (PERPENDICULAR TO ZERO SET AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz and 3.5g's at 2 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

Report No. 10486



BEAT FREQUENCY TEST (HORIZONTAL TO ZERO SET AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz and 3.5g's at 2 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

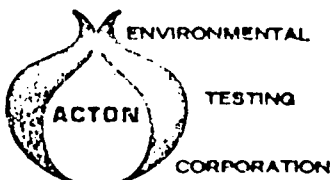
BEAT FREQUENCY TEST (PERPENDICULAR TO ZERO SET AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz, 2.8g's at 2 Hz and 5g's at 3 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

SINE BEAT TEST (VERTICAL AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz, 2.8g's at 2 Hz and 5g's at 3 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

Report No. 10486



SINE BEAT TEST(VERTICAL AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz, 2.8g's at 2 Hz, 4.6g's at 3 Hz, 6.4g's at 4 Hz, 8.2g's at 5 Hz and 10g's at 6 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

SINE BEAT TEST(PERPENDICULAR TO ZERO SET AXIS)

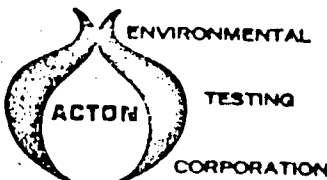
A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz, 2.8g's at 2 Hz, 4.6g's at 3 Hz, 6.4g's at 4 Hz, 8.2g's at 5 Hz and 10g's at 6 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

SINE BEAT TEST(HORIZONTAL TO ZERO SET AXIS)

A sine beat test was performed at each frequency from 1-35 Hz. The amplitude was 1.0g's at 1 Hz, 2.8g's at 2 Hz, 4.6g's at 3 Hz, 6.4g's at 4 Hz, 8.2g's at 5 Hz and 10g's at 6 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant super-position of motion.

Upon completion of the above testing, Foxboro personnel examined the test samples and found that one sub-assembly of one unit was cracked. The crack was noted on the force motor assembly, P/N N0148NH on Unit #4, Electronic Transmitter, Model E13DH, S/N 2713119. The assembly was

Report No. 10486



replaced and a beat frequency test in all three axes was again performed at the following levels: 1.0g's at 1 Hz, 2.8g's at 2 Hz, 4.6g's at 3 Hz, 6.4g's at 4 Hz, 8.2g's at 5 Hz and 10g's at 6 thru 35 Hz. The number of beats at each test frequency was 10 and the number of test frequencies cycled per beat was 10. The time between beats was of sufficient duration to preclude significant superposition of motion.

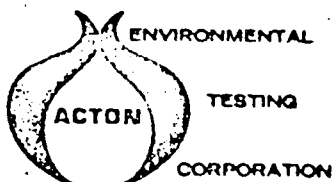
3.0 RESULTS

During the resonant survey in the HORIZONTAL AXIS TO ZERO SET AXIS, there was evidence of output shifts and Foxboro personnel took measurements and retained same.

S/Ns 2713115, 2713116 and 2713118 had no evidence of any damage as a result of this test.

S/N 2713119 on the re-test had no evidence of any damage as a result of this test. During the re-test at 3-4 Hz in the VERTICAL AXIS, the sample had evidence of offset outputs and these were recorded by Foxboro personnel and retained.

Report No. 10486



TEST EQUIPMENT LIST

NAME	MFGR.	MODEL	SER.NO.	RANGE	ACCURACY	INV.#	CAL.FREQ.
Accelerometer	PCB	302A	671	1 Hz - 5 KHz	+5%	AC380	3 months
"	"	"	673	"	"	AC382	" "
"	"	"	667	"	"	AC376	" "
"	"	"	697	"	"	AC387	" "
"	"	"	565	"	"	AC383	" "
Sweep Osc.	Spec.Dynamics	SD104-5	21	.005 Hz - 50 KHz	2%	SG315	" "
Visicorder 12-channel	Minn-Honey	906C34	99334	DC - 2 KHz	+1 DB	RE311	" "
Oscilloscope	Tektronix	564	9027	DC - 10MC Hz	+2%	OS311	" "
Amplifier	Scott	250AR	1010	5 - 50 KHz	+1/4%	AM311	6 months
Power Supply	PCB	483A	273	Output=22 VDC 12MA	N/A	PE374	" "
Voltmeter	HP	403A		10 Hz - 1 MHz, 0-300V	+3%	MV322	3 months
One Burst Gen.	GRC	1396	1052	DC - 2 MHz	N/A	SG326	6 months
Low Freq.Gen.	HP	202B	397	0.01 Hz - 1 KHz	+5%	SG319	" "
Hydraulic Actuator	MTS	204.63		DC - 300 Hz 25,000 force lbs.25"DA max.	2% Freq. 5% Ampl.		
Hydraulic Actuator	"	443.115		DC - 2000 Hz	1%		

031.47 (RSP) It is the staff's position that the responses to Questions 031.47.040.1, and 040.57 are, as a group, unacceptable, because FSAR Table 3.10-1 does not provide the information which is requested in Question 040.57 and because the response to Question 040.57 does not provide the information which was requested by Question 031.47. Therefore, please provide the following information:

- (1) Identify each instrument that is to be mounted on the subject rack.
- (2) Provide the information that is required by Section 3.10-2 of Regulatory Guide 1.70 for each instrument identified under Part 1 above. (Please note that, for such complex equipment that cannot be modeled accurately enough to predict its response correctly for functional verification, qualification by testing is required.)

Response:

Wyle Report No. 42807-1 "Seismic Simulation on an Instrument Rack" was submitted in response to question 031.23. This report contained the results of the seismic tests performed on the local instruments panels.

The only Class 1E equipment mounted on these local panels are transmitters and these are identified in FSAR Appendix 3.11A, Tables 3.11A-1 and 3.11A-2A. The following seismic qualification reports are provided for these transmitters:

<u>Test Report No.</u>	<u>Test Facility</u>	<u>Contract</u>
10348-5	ACTON	92784
507	Utility and Process Automation	92784
T1-1058 *	Foxboro	92784
43522-1	Wyle	87352

*Will be submitted by August 1, 1979

219