

# TEST PROCEDURE

**TEST AND CALIBRATION  
DEPARTMENT**
**MODEL NUMBER:**
**MIXCHEK**
**PROCEDURE NUMBER:**
**TP-HE/O2**
**PAGE: 1 OF 6**
**REV.: 1 REV. DATE: 8-5-03**
**ECO #:**

## FUNCTIONAL TEST PROCEDURE

**PRELIMINARY PRINT**  
**DATE** 8-6-03 **INIT.** [Signature]

### WARNING

**TESTING OF THIS INSTRUMENT MAY INVOLVE ELECTROSTATIC SENSITIVE DEVICES (ESD), HIGH VOLTAGE, HAZARDOUS GASES, AND/OR CHEMICALS. PERSONNEL WHO ARE NOT FAMILIAR WITH PROCEDURES FOR THE ABOVE MUST CHECK WITH THEIR SUPERVISOR PRIOR TO BEGINNING THE TEST.**

CONCURRENCE	DATE	CONCURRENCE	DATE
ORIGINATOR		SENSOR DEPARTMENT	
PRODUCTION ENGINEER		QUALITY ASSURANCE	
TEST DEPARTMENT		OTHER	

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**1.0 INTRODUCTION**

This functional test is performed as the final check of the model HE/O2 percent oxygen & percent helium analyzer prior to shipment.

**2.0 APPLICABLE DOCUMENTS**

(a) Schematic B75027 , Main PC Board  
(b) Instruction Manual, MIXCHEK, M75030 Percent Oxygen & Helium Analyzer

**3.0 TEST OBJECTIVE**

The objective of this test is to exercise all the functions of the analyzer to ensure it performs to the specifications as outlined in the above reference documents.

**4.0 TEST DESCRIPTION**

The Q drawing will list any options that this unit has installed. Preliminary Alignment and sub-assembly procedures for all these options must have been performed prior to the start of this test. The test will consist of a comprehensive check of the electrical Characteristics to specified tolerances. Following successful completion of the electrical functionality, the unit under test will be subjected to gas sample only if required by customer/Sales Order. The test steps indicated with asterisk (\*) are data collection points(see attachment 1 and 2).

**5.0 TEST EQUIPMENT**

5.1 Power Requirement- Power to be supplied by the 115VAC power adapter (US version).

5.2 Equipment Requirements.

(A) AC power adapter (A558)  
(B) RD33-D1 sensor  
(C) DMM Fluke Model 8020A or equivalent  
(D) Oscilloscope  
(E) 100% Helium Gas  
(F) Variac  
(G) AIR (20.9% O2/ N2)  
(H)

**6.0 TEST SETUP**

Set up the unit to be tested per Figure 1. Verify that all options and jumpers have been installed and all special instructions accomplished per the running sheet and applicable drawings.

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## SYSTEM TEST SETUP

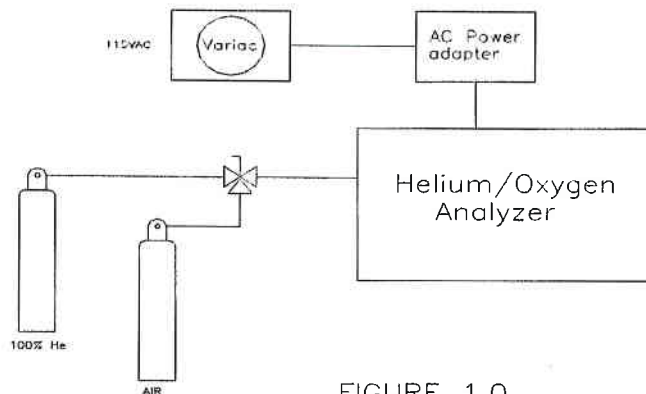


FIGURE 1.0

STEP #	OPERATOR ACTION	EXP RESULT	TOLERANCE
	<b><u>SYSTEM SETUP:</u></b>		
1.	Remove the cover of the analyzer to access the circuit board.	N/A	
2.	Verify that JP1, & JP2 are installed.	N/A	
3.	Install a O2 sensor plug into J1 on PCB. Verify that the T/C sensor is installed and plugged into J4.	N/A	
4.	Connect the AC power adapter, and turn on the power switch.	N/A	
5.	Verify that the power switch works properly in all positions.	N/A	
6.	Verify that the switch has the correct number of positions.	N/A	
7. *	Verify that the power supply rails are +/- 5 VDC +/- 0.2 (JP1 - JP2), & (TP1 - JP2)	5.0vdc	0.2+/-vdc
8. *	Use an oscilloscope to verify the power supply rails are noise free. Use JP2 for ground, check TP1, & JP1	<40mv	< 70mv noise
9.	Verify that all the DPM digits are displayed.	N/A	
10.	Adjust the O2 SPAN dial on the front cover fully CCW	18.1% O2	20.7% -15.7%
11.	Adjust the O2 span dial fully CW	25.0%	27% - 23%
12.	Adjust the O2 Span to 20.9% O2	N/A	
13.	Connect the DVM to TP3 (U3 pin7) and ground.	N/A	
14. *	Adjust R21 to set the DVM to 1.55VDC	1.55VDC	+/-0.002VDC

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15.	Attach the DVM to TP2 and ground		NA		
16. *	Adjust R18 (ZERO) to set the voltage to zero		0.00mv		+/-2mv
17. *	Verify that the Helium Display reads 00.0		00.0%		+/-0.1%
18.	(portable only) Attach the AC power adapter to the Variac.		N/A		
19.	(portable only) Attach the DVM to TP4, & JP2.		N/A		
20.	(portable only) Turn on the Variac and the analyzer. Increase the Variac voltage (FROM ZERO) until the low battery indicator goes out, and the unit is operating.		N/A		
21. *	Turn down the voltage until the low voltage indicator lights. Note the voltage on the DVM		5.1		+/- 0.15
22.	Set the Variac to 115Vac		N/A		
23.	Attach 100% Helium gas to the analyzer, & adjust the gas flow to 1 SCFH		N/A		
24. *	Verify that the O2 reading is 00.0		00.0% O2		+/- 0.2% O2
25. *	Adjust R16 SPAN to set the Helium DPM to 100		100.0% He		+/- 0.1% He
26.	Attach air to the analyzer, and adjust the flow rate to 1.0 SCFH		N/A		
27. *	Verify that the Helium display indicates 00.0% helium		00.0% He		+/-0.1% He
28. *	Set the O2 SPAN to 20.9% O2		20.9 O2		+/- 0.1% O2
29. *	Use DVM to verify the Zero set point @ TP2 (ref. step16)		0.00mv		+/-2mv
	Portable units only: electrical test		N/A		
30.	Attach the DVM to TP4, & JP2, and select BATT. TEST with the power switch.		N/A		
31.	Adjust The VARIAC until the DVM = 5.5Vdc		5.5 Vdc		+/- .05
32. *	Verify that the Oxygen display indicates 104.8		104.8		+/- 3
33.	Select the ON position with the Power Switch		N/A		
34. *	Verify that the Helium display indicates 00.0% helium		00.0% He		+/-0.2% He
35.	Remove AC power adapter		N/A		
36.	Measure the resistance between JP2 & the negative (BLACK) lead end of the battery pack		0.0 ohms		0.25 ohms max.
37.	Measure the resistance between TP4 & the positive (red) lead end of the battery pack		0.0 ohms		0.25 ohms max

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<b>38.</b>	<b>Gas test:</b> Calibrate the O2 sensor with air to 20.9% +/-0.0 Verify the accuracy of the analyzer using the a mixture of Helium and Air at three points (near 70%, 50%, & 30% Helium). Calculate the correct Helium values based on the O2 reading (ref. Air_test.xls spread sheet or the Air/He chart in the manual). The actual reading and the calculated reading must match within +/- 2% Helium. Allow a minimum of 30 sec. for the reading to stabilize. If the error exceeds 2%, verify the calibration of the O2 sensor, & Helium analyzer and re-test. If the error exceeds 2% a software update may be required. Note if the T/C sensor fails to repeate it's Zero or Span settting it may be defective.				
<b>39.*</b>	Record % Helium, and % O2 reading	70% He / 6.27% O2		+/-2% He	
<b>40.*</b>	Record % Helium, and % O2 reading	50% He / 10.45% O2		+/-2% He	
<b>41.*</b>	Record % Helium, and % O2 reading	30% He / 14.63% O2		+/-2% He	
<b>38.</b>	Remove the O2 sensor	N/A			
<b>39.</b>	End of Test	N/A			
<b>40.</b>	Install cover and retaining hardware.	N/A			