TELEDYNE ANALYTICAL INSTRUMENTS

# ENGINEERING CHANGE ORDER (ECO)

ECO No. 07-0162
ECR No. 07-0169
SH. 1 OF 5

U; 1/16/08

| FAMILY: | MODEL: | PREPARED BY: | RESP. ENGINEER: | CHANGE CATEGORY |
|---|---|---|---|---|
| AX300, MX300 | AX300, 300-I<br>MX300, 300-I | Vincent Figueroa<br>10/2/07 | A.A. 10-04-07<br>Angel Alegria | M1 M2 (M3) REC |

**REASON FOR CHANGE:** Revised software so that when the only the HI alarm is disabled by pushing the HI alarm setting over 100. The low alarm is still functional at LO set point. Second change was to add a time out to "unlocked" keys mode. Keys are returned to "locked" mode after 6 seconds if no buttons are pressed. The software was re-evaluated with new revised software evaluation test procedure TP-MX300/AX300 (SOFTWARE VALIDATION) REV 1 Revised manuals to correspond with software change and per customer request. ~~SEE REWORK AND REORDER NOTES ON SHEETS~~

CAUSE CODE: 1 2 3 4 5 6 7 (8) 9 10

SUB-CONTRACT: YES OR (NO)

RE-TRAINING REQ.: YES OR NO

NOTIFIED BODY NOTIFICATION [ ]

| AFFECTED DOCUMENTS | INCORP | REVISION WAS | REVISION IS | MATERIAL DISPOSITION N=N/A U=USE R=REWORK S=SCRAP: ON ORDER | STOCK | ASSY | TEST | FIN. GOODS | FIELD | MANUFACTURING EFFECTIVITY |
|---|---|---|---|---|---|---|---|---|---|---|
| A75012 | X | 4.3 | 5A | R | S | S | S | U | U | 3/28/08 |
| TPMX300/AX300 (SOFTWARE VALADATION) | X | 0 | 1 | N | N | N | N | N | N | 3/25/08 |
| M75708 | X | 0 | 10/2/07 | N | N | N | N | N | N | 4/21/09 |
| M75389 | X | 0 | 9/27/07 | N | N | N | N | N | N | 4/21/09 |
| AX/MX300QS | X | 0 | 9/27/07 | N | N | N | N | N | N | 4/21/08 |
| M75387 | X | 0 | 9/27/07 | N | N | N | N | N | N | 4/21/08 |
| M75707 | X | 0 | 10/1/07 | N | N | N | N | N | N | 4/21/09 |
| FORM A81351 | X | — | 0 | N | N | N | N | N | N | 4/11/08 |
| FORM A81355 | X | — | 0 | N | N | N | N | N | N | 4/11/08 |

**DESCRIPTION OF CHANGE:**

SEE REWORK NOTES AND REORDER INFORMATION ON SHEET 5 OF 5.

**A75012 PROGRAMMING INSTRUCTIONS**

-Change pictorial of label revision
is: 1.4 was: 1.3
-Change software version in note 2
is: ..A75012_4.HEX was: .. A75012_3 HEX
-Add note 5
PROGRAMMER "CONFIGURATION BITS"
OSCILLATOR: ~~OFF~~ XT U; 1/22/08
WATCH TIMER: ON
POWER UP TIMER: OFF
BROWN OUT DETECT: DISABLED
BROWN OUT VOLTAGE: 2 5V
CODE PROTECT: OFF

Teledyne Analytical Instruments

ECO RELEASE

DOCUMENT CONTROL COPY

Updated Technical file Name: _____ Date 3/17/08

## CHANGE CONTROL BOARD (CCB) (SIGNATURE & DATE)

| ENGINEERING: | QUALITY: | SALES: | GENERAL MANAGER: |
|---|---|---|---|
| 10/4/07 | 3-13-08 | 10/8/07 | |
| **TEST:** 10-10-07 | **PROD. CONTROL:** 2/11/08 | **CONFIGURATION:** 3/17/08 | **E. H. S.:** |

FORM 003 REV. 5

FILE: FM003-5.DOC

| TELEDYNE ANALYTICAL INSTRUMENTS | ENGINEERING CHANGE ORDER (ECO) | ECO No. 07-0162<br>ECR No 07-0169<br>SH. 2 OF 5 |
|---|---|---|

DESCRIPTION OF CHANGE:

AX/MX300QS MANUAL QUICK START AX300/MX300

-Revised note under "HI ALARM" section page 2 of 2

is: The HI alarm may be defeated by setting the HI alarm limit one step above 100%. The HI alarm setting will display - - to show that it is disabled. The LO alarm is still functional.

was: The HI and LO alarms may be defeated by setting the HI alarm limit one step above 100%. The display will blink ALARM OFF continually in this mode.

M75708 MANUAL AX300-I

M75389 MANUAL AX300

-Add to end of sect 2.1 before note.

is: . If the keys are unlocked but no button pressing action is taken for six seconds, the unit will revert to locked keys mode.

-Revised sect 3.7

is: D) Try calibrating with a known good sensor, if this fails, contact Customer Support.

was: E) Try calibrating with a known good sensor; if this fails, see symptom "Reading drifts over 2–3%..."

-Revised sentence in 2.4 sect ("DO")

is: Always use the plastic flow diverter only when using the tee adapter.

was: Removed the plastic flow diverter only when using the tee adapter.

-Add note to section 2.1.1 pg 16 for AX300 manual and pg 15 for AX300-1 manual under step 2

is: NOTE: THE SENSOR CABLE COMES IN MULTIPLE CONFIGURATIONS. AS SUCH, ANY REFERENCES TO CABLE CONTAINING COILS OR A LOCKING NUT ON THE PLUG MAY NOT REFLECT THE CABLE SUPPLIED WITH A SPECIFIC ANALYZER.

-Add note to section 2.1.5 pg 24 for AX300 manual and pg 22 for AX300-1 manual under figure 2-8

is:

RS232 has been tested with window Hyperterminal. The setup changes with different windows version. If other software than window hyperterminal is used, consult with factory.

Windows 95 version

| | |
|---|---|
| Baud: | 2400 |
| Data: | 7 |
| Parity: | ODD |
| Stop bit: | 1 |
| Flow control: | NONE |

Windows 98, Windows 2000 and Window XP version:

| | |
|---|---|
| Baud: | 2400 |
| Data: | 8 |
| Parity: | ODD |
| Stop bit: | 1 |
| Flow control: | NONE |

-Revised spare part list on page 48 for AX300 manual and page 44 for AX300-I

is: C74721 Cable Assembly was: B69934 Cable Assembly

| TELEDYNE ANALYTICAL INSTRUMENTS | ENGINEERING CHANGE ORDER (ECO) | ECO No 07-0162<br>ECR No 07-0169<br>SH. 3 OF 5 |
|---|---|---|

DESCRIPTION OF CHANGE:

**M75387 MANUAL MX300**
**M75707 MANUAL MX300-I**
-Revised note under "HI ALARM" sect 2.1.4
is: The HI alarm may be defeated by setting the HI alarm limit one step above 100% The HI alarm setting will display - - to show that it is disabled The LO alarm is still functional

was: The HI and LO alarms may be defeated by setting the HI alarm limit one step above 100%. The display will blink ALARM OFF continually in this mode.

-Revised 4TH note under "HI ALARM" sect 2 1 4
is: When HI alarm is disabled (set point above 100%) the set point is shown as two dashes "- -". The LO alarm setting is not affected

was: When the alarm is in the OFF condition (set point above 100%) the ALARM OFF status message blinks slowly on the LCD below the oxygen readout

-Revised 2 4 sect "DO"
is: Always use the plastic flow diverter when using the tee adapter.
Was: Remove the plastic flow diverter when using the tee adapter.

-Revise sect 3 8
is:D) Try calibrating with a known good sensor, if this fails, contact Customer Support.
was: E) Try calibrating with a known good sensor; if this fails, see symptom "Reading drifts over 2–3% . "

-Add note to section 2.1.1 pg 16
is: NOTE: THE SENSOR CABLE COMES IN MULTIPLE CONFIGURATIONS. AS SUCH, ANY REFERENCES TO THE CABLE CONTAINING COILS OR A LOCKING NUT ON THE PLUG MAY NOT REFLECT THE CABLE SUPPLIED WITH A SPE ANALYZER

-Add note to section 2 1 5 pg 24 for AX300 manual and pg 22 for AX300-1 manual under figure 2-8
is:
RS232 has been tested with window Hyperterminal. The setup changes with different windows version. If other software than window hyperterminal is used, consult with factory

Windows 95 version

| | |
|---|---|
| Baud: | 2400 |
| Data: | 7 |
| Parity: | ODD |
| Stop bit: | 1 |
| Flow control: | NONE |

Windows 98, Windows 2000 and Window XP version:

| | |
|---|---|
| Baud: | 2400 |
| Data: | 8 |
| Parity: | ODD |
| Stop bit: | 1 |
| Flow control: | NONE |

-Revised spare part list on page 46 for MX300 manual and page 44 for MX300-I
is: B74721 Cable Assembly was: B69934 Cable Assembly

C
V: 1/22/08

| TELEDYNE ANALYTICAL INSTRUMENTS | ENGINEERING CHANGE ORDER (ECO) | ECO No 07-0162<br>ECR No. 07-0169<br>SH. 39 OF 45 |
|---|---|---|

V-
1/11/08

## DESCRIPTION OF CHANGE:

**TPMX300/AX300 SOFTWARE VALIDATION**
-Add steps 57, 58 and 59 wuth 4 new steps. Renumber steps that follow as required.

IS:

| | | | |
|---|---|---|---|
| 57 | Adjust the High O2 Alarm to above 100%<br><br>Verify that the High O2 Alarm set point displayes 2 dashes, and the Low O2 Alarm set point is displayed normally | High Alarm displays dashes, Low Alarm displays normally | ☐ Pass<br>☐ Fail |
| 58 | Adjust the High O2 Alarm to above 100%<br><br>Set a voltage to obtain a reading of 100%, verify that no alarm is actuated | No alarm sounds | ☐ Pass<br>☐ Fail |
| 59 | Adjust the High O2 Alarm to above 100%<br><br>Set the low O2 Alarm to 25%, then set a voltage to obtain a reading of 21%, verify that alarm sounds | Alarm sounds | ☐ Pass<br>☐ Fail |
| 60 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% Adjust the High O2 Alarm to above 100%<br><br>Slowly adjust the Sensor voltage for readings from 21 0% down to 0% Verify that the alarm activates below 20% and the "Check Sensor" icon is on when the reading is below 18% | Alarm activates below 20% and Check Sensor on below 18% | ☐ Pass<br>☐ Fail |

WAS:

| | | | |
|---|---|---|---|
| 57 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20%<br><br>Adjust the High O2 Alarm to above 100% Verify that the Low O2 Alarm set point and the High O2 Alarm set point are turned off and the Alarm Off display flashes slowly | Alarm set points off and Alarm Off flashes slowly | ☐ Pass<br>☐ Fail |
| 58 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% Adjust the High O2 Alarm to above 100% to turn off the alarms<br><br>Adjust the Sensor voltage for readings up to 100% Verify that no alarms are activated | No alarms activate | ☐ Pass<br>☐ Fail |
| 59 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% Adjust the High O2 Alarm to above 100% to turn off the alarms<br><br>Slowly adjust the Sensor voltage for readings from 21 0% down to 0% Verify that the alarm activates and the "Check Sensor" icon is on when the reading is below 18% | Alarm activates and Check Sensor on | ☐ Pass<br>☐ Fail |

| TELEDYNE ANALYTICAL INSTRUMENTS | ENGINEERING CHANGE ORDER (ECO) | ECO No. 07-0162<br>ECR No. 07-0169<br>SH. 4 5 OF 4 5 |
|---|---|---|

DESCRIPTION OF CHANGE:

TP-MX300/AX300 (SOFTWARE VALIDATION) REV 0 (cont.)

5 Add last step to procedure

| | | | |
|---|---|---|---|
| 76 | Press the LOCK/UNLOCK button to unlock the keys<br><br>Display should flash slowly Do not press buttons Display should stop flashing between 3 and 9 seconds after Unit reverts to locked mode<br><br>Verify locked mode by pressing the CAL button, calibration should NOT start | Flashing stops around 3 to 9 seconds, when not flashing, CAL button has no effect | ☐ Pass<br>☐ Fail |

6 Add to introduction section 1 0 of this procedure, page 2:
was: "This document defines the conditions and provides for the recording of the results of the Software Validation Test of the TAI Medical Percent Oxygen Analyzer, Model MX300 and AX300"

is: 'This document defines the conditions and provides for the recording of the results of the Software Validation Test of the TAI Medical Percent Oxygen Analyzer, Model MX300 and AX300 (including models MX300-I and AX300-I).

V. 4/8/08

**FORM A81355 REVISION UPDATE INSERT SHEET**, AX300/AX300-I
**FORM A81351 REVISION UPDATE INSERT SHEET**, MX300/MX300-I
-Initial release

**Manual rework instructions for AX300, AX300-I, MX300 and MX300-I**
Production to add insert Form A81355 for old stock manual for MX300 and MX300-I
-Make copies of sheets and cut on dotted line into halves. Each half sheet is inserted inside front cover of manual.

Production to add insert Form A81351 for old stock manual for AX300 and AX300-I
-Make copies of sheets and cut on dotted line into halves. Each half sheet is inserted inside front cover of manual.

Form are located in j:\forms directory
**Purchasing to re-order manual with new revision level once existing stock inventory is used completely.**

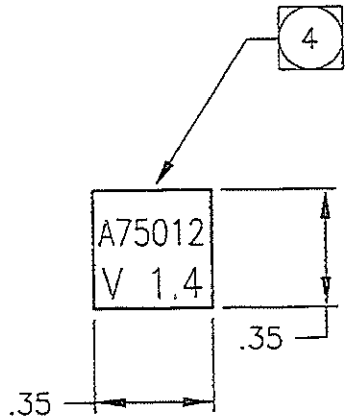
NOTES: UNLESS OTHERWISE SPECIFIED

1. OBSERVE ALL PROPER ANTI-STATIC PRACTICES OPERATOR MUST BE PROPERLY GROUNDED.
2. PROGRAM P/N 1 582 USING THE FOLLOWING SOFTWARE FILE: A75012_4.HEX
3. INSTALL LABEL ON MICROPROCESSOR

(4) PRINT LABEL AS SHOWN USING .075 HIGH LETTERS AND CUT TO SIZE
MATERIAL: WEBER ULTRA PLATE #L-58242
LABEL COLOR: SILVER, LETTERING COLOR: BLACK

5. PROGRAMMER "CONFIGURATION BITS"
OSCILLATOR: XT
WATCHDOG TIMER: ON
POWER UP TIMER: OFF
BROWN OUT DETECT: DISABLED
BROWN OUT VOLTAGE: 2.5V
CODE PROTECT: OFF

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DESCRIPTION | DATE | APP. | REV. BY |
| 2 | INC ECO 03-0233 | 10/1/03 | AA | VF |
| 3 | INC ECO 04-0042 | 6/14/04 | AA | VF |
| 4 | INC. ECO 06-0193 | 12/28/06 | AA | MN |
| 5 | INC ECO 07-0162 | 10/2/07 | AA | VF |




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | 1 582 | MICORPROCESSOR, PIC16LC774-I/PT, (MICROCHIP) |

BILL OF MATERIAL

DO NOT SCALE DWG



TOLERANCE UNLESS OTHERWISE SPECIFIED: ANGULAR ±1/2°
LINEAR X = ±.1, XX = ±.02, XXX = ±.010

TELEDYNE INSTRUMENTS
*Analytical Instruments*
A Teledyne Technologies Company
City of Industry, California, 91748, USA

| | SIGNATURES | DATE |
|---|---|---|
| S/ | | |
| N/ | DRFT: A RASMUSSEN | 08/14/02 |
| P/ | CHK: | |
| I/ | APPR: | |
| F/ | ENGR: A RASMUSSEN | |
| O/ | C.O.: | |
| REFERENCE | CAD I.D. A75012-5 | |

TITLE: PROGRAMMING INSTRUCTIONS MODEL MX300/AX300

SCALE: NONE
SIM:
SHEET: 1 OF 1

MATL: AS LISTED
DWG NO.: A-75012
REV: 5

| TELEDYNE ANALYTICAL INSTRUMENTS<br>A business unit of Teledyne Instruments | **TEST PROCEDURE** | TEST AND CALIBRATION DEPARTMENT |
|---|---|---|
| MODEL NUMBER:<br><br>MX300/AX300 | PROCEDURE NUMBER:<br><br>TP-MX300/AX300<br>(SOFTWARE VALIDATION) | PAGE: 1 OF 14<br>REV.: 1 REV. DATE: 9/27/07<br>ECO #: 07-0162 |

PRELIMINARY PRINT

DATE 9/27/07 INIT.

## WARNING

TESTING OF THIS INSTRUMENT MAY INVOLVE ELECTROSTATIC SENSITIVE DEVICES (ESD), HIGH VOLTAGE. 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 | |

## 1.0 INTRODUCTION

This document defines the conditions and provides for the recording of the results of the Software Validation Test of the TAI Medical Percent Oxygen Analyzer, Model MX300 and AX300 (including models MX300-I and AX300-I).

## 2.0 APPLICABLE DOCUMENTS

FDA Guidance Document on Software Validation
Statement of Work MX300/AX300

## 3.0 TEST OBJECTIVE

The objective of this test is to validate the software of the MX300 / AX300 oxygen monitor / analyzer.

## 4.0 TEST DESCRIPTION

The testing is performed at room temperature and includes testing of all functions of the MX/AX 300 Oxygen Analyzer to insure the software is functioning properly and is in compliance with design specification.

## 5.0 TEST EQUIPMENT

5.1 Power Requirement- The device is powered by 4.5V DC which should be provided by an adjustable DC power supply

5.2 Equipment Requirements- As follows

(a) Keithley Voltage Source, Model 220 or equivalent
(b) DMM Fluke Model 8020A or equivalent
(c) RS232 cable
(d) PC computer with Window's Terminal or equivalent software installed
(e) DC Power Supply, HP 6237B or equivalent
(f) Stopwatch

## 6.0 TEST SETUP

Set up the unit to be tested per Figure 1

## 7.0 SETUP

Set the mode switches for 3 ½ digit display, analog output and alarms enabled (i.e , JP3 only)

Calibration: Unless otherwise specified, calibrate the instrument as follows:
Use a Sensor Simulator with a series resistance of 100 Ohms
Set the sensor voltage to 50 mV. +/- 0.02 mV.
Calibrate the instrument for 100.0% +/- 0.2% O2.

When the test calls for setting the sensor voltage, adjust the Sensor Simulator to the specified voltage +/- 0 05 mV

For battery supply, connect a variable supply capable of 2.0 to 6.0 volts at 10 mA minimum. Unless otherwise specified, set the battery voltage to 4.5 +/- 0.02 Volts.
When the test calls for setting the Battery Voltage, adjust the supply to the specified voltage +/- 0.02 Volts

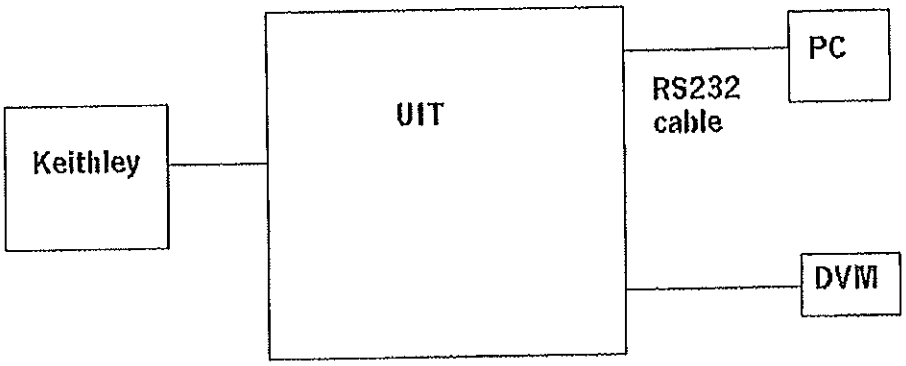



FIGURE 1

| MODEL NUMBER: MX300 / AX300 | PROCEDURE NUMBER: TP-MX300/AX300 (SOFTWARE VALIDATION) | PAGE: 4 OF 14<br>REV.: 1 REV. DATE: 9/27/07<br>ECO #: 07-0162 |
|---|---|---|

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 1 | During Power On & Self Test (POST) Verify the Alarm LED and audio alarm operate. | LED illuminates temporarily & audio tone temporarily | ☑ Pass<br>☐ Fail |
| 2 | Verify that all LCD segments are turned on temporarily during POST | All segments on | ☑ Pass<br>☐ Fail |
| 3 | Self-test. With an instrument set up normally, apply power and verify that the instrument passes the Power-On Self Test and enters the Pre-Calibration mode flashing 0 00 | Unit powers on without errors | ☑ Pass<br>☐ Fail |
| 4 | Turn off the unit and remove the batteries. Hold the calibration key pressed and install the batteries. Verify that the instrument beeps, displays an error condition and does not start. | POST fails | ☑ Pass<br>☐ Fail |
| 5 | Turn off power. Hold down the key shownapply power and verify that the error is shown on the display. Repeat for each key | ☐ Low Key Err = 60<br>☐ Batt Key Err = 61<br>☐ Cal Key Err = 62<br>☐ Up Key Err = 63<br>☐ Dn Key Err = 64<br>☐ Sil Key Err = 65<br>☐ Hi Key Err = 66<br>☐ Alm Key Err = 67<br>☐ Lock Key Err = 68 | ☑ Pass<br>☐ Fail |
| 6 | Verify that the ADC is checked during POST by using an oscilloscope to verify that the Analog output pulses up to 1.0 v +/- 0.2 volts for 40 to 200 milliseconds and then drops to 0 +/- 0.1 volt and no errors are shown on the display | Pulse out 1.03 volts<br>(0.8 to 1.2 volts)<br>For 154 millisecs<br>(40 to 200 millisecs) | ☑ Pass<br>☐ Fail |
| 7 | Turn power off. Connect a 50 Ohm resistor across the analog output. Install batteries. Verify that an error occurs | 50 Ohm resistor causes Err 7.1 | ☑ Pass<br>☐ Fail |
| 8 | Turn off power then turn it back on. The unit should automatically enter the Pre- Calibration Mode with the display flashing 0 00. Set the Sensor voltage to 10 mV and press the Cal key. The unit should count down from 10 to 0 and then display 20.9%. Press the Lock key and the unit should enter the normal mode displaying 20.9%. | Unit enters the Calibration mode automatically | ☑ Pass<br>☐ Fail |

| MODEL NUMBER: MX300 / AX300 | PROCEDURE NUMBER: TP-MX300/AX300 (SOFTWARE VALIDATION) | PAGE: 5 OF 14<br>REV.: 1 REV. DATE: 9/27/07<br>ECO #: 07-0162 |
|---|---|---|

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 9 | With the unit calibrated and in the normal mode, press the Lock key and verify the O2 display flashes Press the Hi Alarm key and verify that the Hi Alarm display flashes Using the Up/Down keys, verify that each time the key pressed, the display changes in the proper direction Hold a key down and verify that the display increments automatically in the direction of the key that was pressed | Keys operate as expected with no bounce or extra activations Autokey is operational. | ☑ Pass<br>☐ Fail |
| 10 | Adjust the Sensor voltage to display 21% Disconnect the sensor and verify that the Check Sensor icon is displayed | Sensor error | ☑ Pass<br>☐ Fail |
| 11 | Set the voltage to 3.4 Volts and verify that the battery alarm does not activate | No Alarms | ☑ Pass<br>☐ Fail |
| 12 | Set the voltage to 3.2 Volts and verify that the Battery Icon outline appears with no segments activated | Low Battery Icon Active | ☑ Pass<br>☐ Fail |
| 13 | Set the voltage to 3 2 Volts and verify that the Battery Icon outline appears with no segments activated. Then raise the voltage up to 3 4 Volts and verify that the battery icon turns off. | Low Battery Icon turns off. | ☑ Pass<br>☐ Fail |
| 14 | Set the voltage to 5.0 Volts and hold down the Battery Test key. Lower the voltage slowly and observe the battery status on the display. Verify that the number of battery icons decreases to zero as the voltage is lowered to 3.4 Volts. Release the key and verify that the battery status icon turns off. | Battery status icons decrease as battery voltage is lowered | ☑ Pass<br>☐ Fail |
| 15 | Set the voltage to 3 6 Volts. Set the instrument so all alarms are inactive and the backlight is off Measure the current drain with a milliamp meter. Verify that it is below 1.4 mA | .45 mA<br>(Less than 1 4 mA) | ☑ Pass<br>☐ Fail |
| 16 | Set the voltage to 4 0 Volts. Gradually lower the voltage to 3 0 volts and verify that the instrument shuts down. | Shuts down | ☑ Pass<br>☐ Fail |
| 17 | Circuit accuracy test Set the Battery Voltage to 3.3 Volts. Set the sensor voltage to 5 0 mV. Record the reading Verify the O2 reading is 10 0 +/- 0.5% | 10.0 % O2<br>(9.5 to 10.5 %) | ☑ Pass<br>☐ Fail |
| 18 | Circuit accuracy test. Set the Battery Voltage to 5.0 Volts. Set the sensor voltage to 5 0 mV Record the reading. Verify the O2 reading is 10 0 +/- 0 5% | 10.0 % O2<br>(9.5 to 10 5 %) | ☑ Pass<br>☐ Fail |
| 19 | Circuit accuracy test. Set the Battery Voltage to 3 3 Volts. Set the sensor voltage to 10 0 mV Record the reading. Verify the O2 reading is 20 0 +/- 0 5% | 20.1 % O2<br>(19.5 to 20.5 %) | ☑ Pass<br>☐ Fail |

| MODEL NUMBER: MX300 / AX300 | PROCEDURE NUMBER: TP-MX300/AX300 (SOFTWARE VALIDATION) | PAGE: 6 OF 14<br>REV.: 1 REV. DATE: 9/27/07<br>ECO #: 07-0162 |
|---|---|---|

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 20 | Circuit accuracy test Set the Battery Voltage to 5.0 Volts Set the sensor voltage to 10 0 mV Record the reading. Verify the O2 reading is 20 0 +/- 0 5% | 20.1 % O2 (19.5 to 20.5 %) | ☑ Pass ☐ Fail |
| 21 | Circuit accuracy test Set the Battery Voltage to 3 3 Volts. Set the sensor voltage to 49 0 mV Record the reading Verify the O2 reading is 98.0 +/- 0 5% | 98.1 % O2 (97.5 to 98 5 %) | ☑ Pass ☐ Fail |
| 22 | Circuit accuracy test Set the Battery Voltage to 5 0 Volts Set the sensor voltage to 49 0 mV Record the reading. Verify the O2 reading is 98 0 +/- 0 5% | 98.1 % O2 (97.5 to 98.5 %) | ☑ Pass ☐ Fail |
| 23 | Circuit Response time Set the Battery Voltage to 5.0 Volts Adjust the sensor voltage for an O2 reading of 99 +/- 1%. Unplug the sensor and wait 15 seconds. Verify that the O2 reading is less than 0.4% At the same time, start a stopwatch and plug in the sensor. When the O2 reading exceeds 88.2 %, stop the stopwatch Verify that the time is less than 8 seconds | <1.0 Seconds (Less than 8 Sec) | ☑ Pass ☐ Fail |
| 24 | Circuit Response time. Set the Battery Voltage to 3 3 Volts Adjust the sensor voltage for an O2 reading of 99 +/- 1%. Unplug the sensor and wait 15 seconds. Verify that the O2 reading is less than 0 4% At the same time, start a stopwatch and plug in the sensor When the O2 reading exceeds 88 2 %, stop the stopwatch Verify that the time is less than 8 seconds | 1.3 Seconds (Less than 8 Sec) | ☑ Pass ☐ Fail |
| 25 | Circuit Response time. Set the Battery Voltage to 5 0 Volts Adjust the sensor voltage for an O2 reading of 99 +/- 1% and wait 15 seconds At the same time, start a stopwatch and unplug in the sensor When the O2 reading drops below 9 9%, stop the stopwatch Verify that the time is less than 8 seconds | 2.1 Seconds (Less than 8 Sec) | ☑ Pass ☐ Fail |
| 26 | Circuit Response time. Set the Battery Voltage to 3 3 Volts Adjust the sensor voltage for an O2 reading of 99 +/- 1% and wait 15 seconds At the same time, start a stopwatch and unplug in the sensor When the O2 reading drops below 9 9%, stop the stopwatch Verify that the time is less than 8 seconds. | 1.62 Seconds (Less than 8 Sec) | ☑ Pass ☐ Fail |
| 27 | DAC accuracy test. Connect a 10k resistive load to the Analog output. Set the Battery Voltage to 5.0 Volts. Adjust the sensor voltage for an O2 reading of 0 5% +/- 0 5% Record the reading and verify that the Analog output measures 0 05 +/- 0 01 Volts. | 51.3 mV Volts (0.04 to 0 06 Volts) | ☑ Pass ☐ Fail |
| 28 | Without changing the setup for the previous test, adjust the battery voltage to 3 3 Volts and wait 5 seconds. Record the voltage and verify that it did not change by more than 0 5% from the previous test. | 51.2mV Volts .0001 Difference (Diff= -0 5 to 0 5 %) | ☑ Pass ☐ Fail |
| 29 | DAC accuracy test Connect a 10k resistive load to the Analog output Set the Battery Voltage to 5 0 Volts. Adjust the sensor voltage for an O2 reading of 20% +/- 0 5%. Record the reading and verify that the Analog output measures 0 2 +/- 0 01 Volts | 200.8 Volts (0 195 to 0 205 Volts) | ☑ Pass ☐ Fail |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 30 | Without changing the setup for the previous test, adjust the battery voltage to 3 3 Volts and wait 5 seconds Record the voltage and verify that it did not change by more than 0 5% from the previous test. | 200.7 Volts<br>.000.81 Difference<br>(Diff = -0 5 to 0 5 %) | ☑ Pass<br>☐ Fail |
| 31 | DAC accuracy test. Connect a 10k resistive load to the Analog output Set the Battery Voltage to 5 0 Volts Adjust the sensor voltage for an O2 reading of 99% +/- 0 5%. Record the reading and verify that the Analog output measures 0 99 +/- 0 005 Volts | 990.2 Volts<br>(0 985 to 0 995 Volts) | ☑ Pass<br>☐ Fail |
| 32 | Without changing the setup for the previous test, adjust the battery voltage to 3 3 Volts and wait 5 seconds. Record the voltage and verify that it did not change by more than 0 5% from the previous test | 990.1 Volts<br>.0001 Difference<br>(Diff = -0 5 to 0 5 %) | ☑ Pass<br>☐ Fail |
| 33 | With no alarms no active, set the keyboard to the Locked mode. Press each key listed on the right and verify that the backlight turns on immediately and automatically turns off 2 +/- 1 seconds later. Also verify that no other activity occurs and the display does not change (other than the reading). | ☐ Low Alarm OK<br>☐ Up OK<br>☐ High Alarm OK<br>☐ Battery Check OK<br>☐ Down OK<br>☐ Alarm Test OK<br>☐ Cal OK<br>☐ Silence OK | ☑ Pass<br>☐ Fail |
| 34 | Set the High alarm to 40% Adjust the sensor simulator so that the reading is 45% and the alarm is active. Set the keyboard to the Locked mode. Press each key listed on the right and verify that the keys have not effect, except that the Silence key turns off the audio alarm and the BatteryChk key shows the battery status | ☐ LowAlarm – no effect<br>☐ Up – no effect<br>☐ HiAlarm – no effect<br>☐ BatteryChk -active<br>☐ Down – no effect<br>☐ AlarmTest – no effect<br>☐ Cal – no effect<br>☐ Silence – quiets alarm | ☑ Pass<br>☐ Fail |

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|---|---|---|

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 35 | Set the Sensor voltage to 13.0 mV Verify that the unit calibrates at 20 9% For each test shown below, set the sensor voltage and record the corresponding O2 reading. Verify that the O2 reading is within 1 0%<br>A 62 2 mV 99 0 to 101 0%<br>B 31 1 mV 49 0 to 51 0%<br>C 13 0 mV 19 9 to 21 9%<br>D 6 22 mV 9 0 to 11 0% | A 100 %<br>B 49.9 %<br>C 20 8 %<br>D 9.9 % | ☑ Pass<br>☐ Fail |
| 36 | Set the Sensor voltage to 10 0 mV. Verify that the unit calibrates at 20 9% For each test shown below, set the sensor voltage and record the corresponding O2 reading. Verify that the O2 reading is within 1 0%<br>A 47 85 mV 99 0 to 101.0%<br>B 23 92 mV 49 0 to 51 0%<br>C 10 0 mV 19.9 to 21.9%<br>D. 4 78 mV 9.0 to 11.0%<br>E. 0.0 mV 0 0 to 1 0% | A 99.9 %<br>B 50.0 %<br>C 20.9 %<br>D 10.1 %<br>E 00.0 % | ☑ Pass<br>☐ Fail |
| 37 | Set the Sensor voltage to 5 2 mV. Verify that the unit calibrates at 20 9% For each test shown below, set the sensor voltage and record the corresponding O2 reading. Verify that the O2 reading is within 1 0%.<br>A. 24.88 mV 99 0 to 101.0%<br>B. 12.44 mV 49 0 to 51 0%<br>C. 5.2 mV 19.9 to 21.9%<br>D. 2 49 mV 9 0 to 11 0% | A 99.8 %<br>B 49.8 %<br>C 20.9 %<br>D 10.1 % | ☑ Pass<br>☐ Fail |
| 38 | Set the Sensor voltage to 62 20 mV. Verify that the unit calibrates at 100.0% For each test shown below, set the sensor voltage and record the corresponding O2 reading Verify that the O2 reading is within 1 0%<br>A 62 20 mV 99 0 to 101 0%<br>B. 31 10 mV 49.0 to 51 0%<br>C 13 00 mV 20.0 to 22.0%<br>D. 6 22 mV 9 0 to 11 0% | A 100.0 %<br>B 49.9 %<br>C 20.8 %<br>D 9.9 % | ☑ Pass<br>☐ Fail |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 39 | Set the Sensor voltage to 47.85 mV. Verify that the unit calibrates at 100.0%. For each test shown below, set the sensor voltage and record the corresponding O2 reading. Verify that the reading is within 1.0% of the specified voltage.<br>A 47.85 mV 99.0 to 101.0%<br>B 23.92 mV 49.0 to 51.0%<br>C 10.00 mV 19.9 to 21.9%<br>D 4.78 mV 9.0 to 11.0% | A 100.0%<br>B 50.0%<br>C 20.7%<br>D 10.0 % | ☑ Pass<br>☐ Fail |
| 40 | Set the Sensor voltage to 28.35 mV. Verify that the unit calibrates at 100.0%. For each test shown below, set the sensor voltage and record the corresponding O2 reading. Verify that the reading is within 1.0% of the specified voltage<br>A. 28.35 mV 99.0 to 101.0%<br>B. 14.00 mV 49.0 to 51.0%<br>C. 5.85 mV 19.9 to 21.9%<br>D 2.8 mV 9.0 to 11.0% | A 100.0%<br>B 49.7%<br>C 20.5%<br>D 9.9 % | ☑ Pass<br>☐ Fail |
| 41 | Set the Sensor voltage to the value in the table. Press the Cal key and verify that the Check Sensor indicator is activated and the calibration cannot be completed | Check Sensor indicator and Cal fails at:<br>No Sensor Fails ____<br>4.23 mV Fails ____<br>13.77 mV Fails ____<br>20.00 mV Fails ____<br>27.09 mV Fails ____<br>65.87 mV Fails ____<br>75.00 mV Fails ____ | ☑ Pass<br>☐ Fail |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 42 | Set the Sensor voltage to the value in the table. Press the Cal key and verify that Calibration occurs at the value indicated and the Check Sensor indicator is not activated Press the Lock key and repeat for each value in the table | Check Sensor indicator does not activate and Calibration is successful<br><br>4.44mV 20.9%<br>OK ___<br>10.00mV 20.9%<br>OK ___<br>13.15mV 20.9%<br>OK ___<br>28.35mV 100.0%<br>OK ___<br>50.00mV 100.0%<br>OK ___<br>62.98mV 100.0%<br>OK ___ | ☑ Pass<br>☐ Fail |
| 43 | Set the Sensor voltage to 10 mV. Calibrate at 20.9% Set the Sensor voltage to obtain a reading of 50.0%. Turn off the instrument Wait 10 seconds or more and then turn the instrument back on. Verify that the reading still shows 50.0% +/- 1% | Retained calibration reading 50.0 (49.0% to 51.0%) | ☑ Pass<br>☐ Fail |
| 44 | Adjust the Sensor voltage to obtain an O2 reading of 100%. Set the Low O2 alarm to 19%.<br><br>Set the mode to High Alarm Verify that the set point can be adjusted to 20% and lock the keyboard<br><br>Repeat the paragraph above for High Alarm setpoints of 50% and 99% | ☐ Sets ok to 20%<br>☐ Sets ok to 50%<br>☐ Sets ok to 99% | ☑ Pass<br>☐ Fail |
| 45 | Adjust the Sensor voltage to obtain an O2 reading of 19%. Set the High O2 Alarm to 100%<br><br>Set the mode to Low Alarm Verify that the set point can be adjusted to 20% and lock the keyboard.<br><br>Repeat the paragraph above for Low Alarm setpoints of 50% and 99%. | ☐ Sets ok to 20%<br>☐ Sets ok to 50%<br>☐ Sets ok to 99% | ☑ Pass<br>☐ Fail |
| 46 | Adjust the Sensor voltage to obtain an O2 reading of 49% Set Low O2 Alarm to 20%<br><br>Set the mode to High O2 Alarm. Adjust the set point to 50% and lock the keyboard<br><br>Set the mode to Low Alarm Verify that the set point can be adjusted up to 49.9%. Continue to adjust the Low Alarm up to 98.0% and verify that the High Alarm is automatically "pushed" above the Low Alarm. | Sets up to 49.9% without affecting the High Alarm ____<br><br>Sets up to 98% pushing the High Alarm above it.<br>____ | ☑ Pass<br>☐ Fail |
| 47 | Adjust the Sensor voltage to obtain an O2 reading of 21.0% Set the High O2 Alarm to 90% and the Low O2 Alarm to 20.0% Verify that alarm does not activate. | No Alarms | ☑ Pass<br>☐ Fail |

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| MX300 / AX300 | TP-MX300/AX300 (SOFTWARE VALIDATION) | REV.: 1 REV. DATE: 9/27/07 |
| | | ECO #: 07-0162 |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 48 | Adjust the Sensor voltage to obtain an O2 reading of 21.0%. Set the High O2 Alarm to 22.0% and the Low O2 Alarm to 19%. Verify that the alarm does not activate | No Alarms | ☑ Pass ☐ Fail |
| 49 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the High O2 Alarm to 90% and the Low O2 Alarm to 22%. Verify that the alarm activates. | Low O2 visual Alarm and audio alarm both activated. | ☑ Pass ☐ Fail |
| 50 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 18% and the High O2 Alarm to 22% Verify that the alarm does not activate | No Alarms | ☑ Pass ☐ Fail |
| 51 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 18% and the High O2 Alarm to 20%. Verify that the alarm activates | High O2 visual Alarm and audio alarm both activated | ☑ Pass ☐ Fail |
| 52 | Adjust the Sensor voltage to obtain an O2 reading of 21%. Set the Low O2 Alarm to 18% and the High O2 Alarm to 25% Adjust the Sensor voltage for an O2 reading of 28% and verify that both the visual High O2 and audio alarms are activated. Press the Silence key and start a timer. Verify that the audible alarm is silent for 115 to 120 seconds, after which the audible alarm sounds again. Record the silent time. | Audio alarm silences for 115 to 120 secs. 117 Secs silent | ☑ Pass ☐ Fail |
| 53 | Adjust the Sensor voltage to obtain an O2 reading of 21%. Set the Low O2 Alarm to 20% and the High O2 Alarm to 25%. Adjust the Sensor voltage for an O2 reading of 18% and verify that both the visual Low O2 and audio alarms are activated. Press the Silence key and start a timer. Verify that the audible alarm is silent for 115 to 120 seconds, after which the audible alarm sounds again. Record the silent time | Audio alarm silences for 115 to 120 secs. 116 Secs silent | ☑ Pass ☐ Fail |
| 54 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% and the High O2 Alarm to 25% Adjust the Sensor voltage for an O2 reading of 18% and listen to the audio alarm Adjust the Sensor voltage for an O2 reading of 28% and listen to the audio alarm Verify that the alarm is not a continuous tone, but has bursts that identify it as a high priority alarm (3 beeps,short pause, 2 beeps, long pause) | Audio alarm has bursts | ☑ Pass ☐ Fail |
| 55 | User interface test. Unlock the keyboard and verify that pressing the Alarm Test key starts the alarm test which activates the high and low alarms as well as the audio alarms and that the test turns off automatically. | Visual and audio alarms activated. | ☑ Pass ☐ Fail |
| 56 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20%<br><br>Adjust the High O2 Alarm to above 100% | High Alarm adjusts above 100% | ☑ Pass ☐ Fail |

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|---|---|---|
| MX300 / AX300 | TP-MX300/AX300 (SOFTWARE VALIDATION) | REV.: 1 REV. DATE: 9/27/07 |
| | | ECO #: 07-0162 |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 57 | Adjust the High O2 Alarm to above 100%<br><br>Verify that the High O2 Alarm set point displayes 2 dashes, and the Low O2 Alarm set point is displayed normally. | High Alarm displays dashes, Low Alarm displays normally | ☑ Pass<br>☐ Fail |
| 58 | Adjust the High O2 Alarm to above 100%<br><br>Set a voltage to obtain a reading of 100%, verify that no alarm is actuated | No alarm sounds. | ☑ Pass<br>☐ Fail |
| 59 | Adjust the High O2 Alarm to above 100%.<br><br>Set the low O2 Alarm to 25%, then set a voltage to obtain a reading of 21%, verify that alarm sounds | Alarm sounds | ☑ Pass<br>☐ Fail |
| 60 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% Adjust the High O2 Alarm to above 100%<br><br>Slowly adjust the Sensor voltage for readings from 21.0% down to 0% Verify that the alarm activates below 20% and the "Check Sensor" icon is on when the reading is below 18%. | Alarm activates below 20% and Check Sensor on below 18% | ☑ Pass<br>☐ Fail |
| 61 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the Low O2 Alarm to 20% Adjust the High O2 Alarm to 25%. Turn the instrument off for 10 seconds and then turn it back on. Verify that the High and Low O2 alarm set points are still 20% and 25% | Alarm set points retained at 20% and 25% after power off | ☑ Pass<br>☐ Fail |
| 62 | Setup the unit to run in the normal mode continuously displaying O2 Verify that the unit is operating normally and then connect a 50 Ohm resistor across the analog output Verify that Error 3 occurs | Unit powers on with E3 0 | ☑ Pass<br>☐ Fail |
| 63 | Setup the unit to run in the normal mode continuously displaying O2. Use a precision voltage source for the sensor. Monitor the reading over 1 hour and record the high and low readings The difference should be less than +/- 2 0 % | Difference < 2 %<br>Max 20.7<br>Min 20.4<br>Diff 0.3 | ☑ Pass<br>☐ Fail |
| 64 | Remove batteries Attempt to install one or more of the batteries backwards. Verify that the unit does not turn on Install the batteries properly and verify that the unit turns on normally | Reversed batteries – unit not on. Unit not damaged and functions normally | ☑ Pass<br>☐ Fail |
| 65 | Remove batteries and re-install When the audio alarm stops sounding, quickly press and hold down the + key Verify that the unit beeps 2 times with pauses between and the display is blank | Beeps error code 2 | ☑ Pass<br>☐ Fail |
| 66 | Calibrate the unit to 20 9% with a sensor connected Observe that the reading does not change more than 2% O2 when brought within 3 feet of an operating computer for 10 seconds | Reading stable within +/-2% O2 when near a computer<br>Min 20.9<br>Max 20.9 | ☑ Pass<br>☐ Fail |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 67 | Remove batteries Install jumpers JP3 and JP7, an invalid combination Install batteries Calibrate the unit to 20.9% Monitor the analog output on a DVM and verify that the reading jumps around and is not stable within 2% Remove the batteries and remove JP7. Install batteries and verify the unit is still operational and the analog output is now stable | With both jumpers, analog output readings is not stable over 10 secs<br>Max 20.45 Min 20.25 ✓ (diff > 2%.)<br>With only JP3 installed, the unit starts without errors and the analog output is stable over 10 secs<br>Max 20.6 Min 20.4 (Diff < 2%) | ☑ Pass<br>☐ Fail |
| 68 | Remove batteries Remove jumpers JP3 and JP7, an invalid combination. Install batteries. Calibrate the unit to 20.9% Verify that the unit operates normally Connect a meter to the analog output Verify the reading is less than 0.05 volts. Remove the batteries and install JP3. Install batteries and verify the unit operates normally and the analog output is 0 21 +/- 0 02 volts | With both jumpers off, the unit produces 0 volts at the analog output. Unit is not damaged | ☑ Pass<br>☐ Fail |
| 69 | Configure the unit for digital output (RS232) (JP7 On, JP3 off). Connect a computer or data terminal to the digital output jack. Set the baud rate to 2400, 7 data bits and odd parity Verify that the data displayed matches the O2 reading. Change the terminal setting to even parity and verify that the data on the terminal shows errors | Verify that the digital mode is operational and uses odd parity | ☑ Pass<br>☐ Fail |
| 70 | With unit configured for Digital output (RS232). Calibrate the instrument at 100% O2 Attach a compatible, digital device to the digital serial connector that displays the digital output. Change the Sensor voltage to produce O2 readings from 0 to 100% in 10% steps. Verify that the digital output corresponds exactly to the reading on the display. | Digital output matches O2 reading | ☑ Pass<br>☐ Fail |
| 71 | Configure the unit for low-resolution mode (JP6) and analog output Verify that the low-resolution mode is operational and the tenths digit does not appear. | O2 resolution is units % and tenths does not appear. | ☑ Pass<br>☐ Fail |
| 72 | Configure the unit for No-Alarms mode (JP5) and analog output. Verify that the alarms do not show on the display and that the alarms cannot be set. | No alarms on display and alarms cannot be set | ☑ Pass<br>☐ Fail |
| 73 | Adjust the Sensor voltage to obtain an O2 reading of 21% Set the High O2 Alarm to 90% and the Low O2 Alarm to 22% Verify that the audio alarm sound pressure level is between 45 dBA and 75 dBA at one meter | High O2 Audio Alarm intensity 65 dBA (45-75) | ☑ Pass<br>☐ Fail |
| 74 | Adjust the Sensor voltage to obtain an O2 reading of 24% Set the Low O2 Alarm to 18% and the High O2 Alarm to 22%. Verify that the audio alarm sound pressure level is between 45 dBA and 75 dBA at one meter | Low O2 Audio Alarm intensity 65 dBA (45-75) | ☑ Pass<br>☐ Fail |

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|---|---|---|
| MX300 / AX300 | TP-MX300/AX300 (SOFTWARE VALIDATION) | REV.: 1 REV. DATE: 9/27/07 |
| | | ECO #: 07-0162 |

| STEP # | OPERATOR ACTION | RESULT | PASS / FAIL |
|---|---|---|---|
| 75 | Connect a compatible sensor Calibrate the sensor for 20.9%. Verify that the sensor calibrates and then displays 20.9% +/- 1% | O2 = 20.9 % (19.9% to 21.9%) | ☑ Pass ☐ Fail |
| 76 | Press the LOCK/UNLOCK button to unlock the keys<br><br>Display should flash slowly. Do not press buttons Display should stop flashing between 3 and 9 seconds Unit reverts to locked mode.<br><br>Verify locked mode by pressing the CAL button, calibration should NOT start. | Flashing stops around 3 to 9 seconds, when not flashing, CAL button has no effect | ☑ Pass ☐ Fail |
| 77 | Remove then replace battery.<br><br>Turn on power<br>Step 1)<br>Wait for initialization<br>In uncalibrated mode perform the following test:<br>Hold down one of the keys shown below for 15 seconds MAXIMUM. If an error (E60 to E68) does not occur before 15 seconds, this is a FAIL.<br>If the error does occur then it is a PASS<br><br>After an error occurs, remove, then replace the battery<br>Turn on power and repeat Step 1) for each key<br><br>Expected error result per each key:<br><br>- LO Key Err = 60<br>- BAT TEST Key Err = 61<br>- CAL Key Err = 62<br>- Up Key Err = 63<br>- Down Key Err = 64<br>- Silence Key Err = 65<br>- HI Key Err = 66<br>- ALARM TEST Key Err = 67<br>- LOCK/UNLOCK Key Err = 68 | Error Code listed to the left is shown when is a key is simulated to be stuck | ☑ Pass ☐ Fail |

Software Version 1.4 Hardware Version N/A

Operator Name Andrew Rasmussen Date 3-12-08

Did the test pass? Yes Signature

Date(s) of Test 1-21-08

## TEST PROCEDURE DATA SHEET

Model Number MX300I  Serial Number 254469

Test Personnel Andrew Rasmussen  QC Witness (If applicable) _____

Test Proc. Number TP-MX300/AX300 Software Validation  Revision 1  Rev. Date 9-27-07

### TEST EQUIPMENT

| INSTRUMENT | MFG/MODEL | SERIAL NO. | CAL.DUE DATE |
|---|---|---|---|
| Source Measure Unit | Keithley 236 | CC05705 | 6-1-08 |
| Stop Watch | Programmable | CC 05697 | 2-12-08 |
| Powel Supply | HP 62373 | E1000097 | Not Required |
| Multimeter | Fluke 45 | CC09259 | 9-21-08 |
| Digital Oscop | Tektronix 2432A | T100517 | Not Required |
| Sound Level meter | Radio Shack | NA | Not Required |

### TEST PROCEDURE DATA POINTS

| Step # | Data | Step # | Data | Step # | Data | Step # | Data |
|---|---|---|---|---|---|---|---|
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