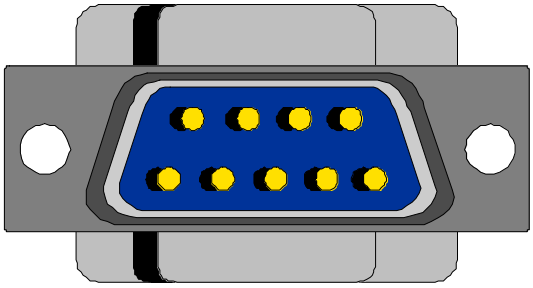

RS-232 Interface Documentation

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Introduction

This document supplements the analyzer and calibrator user manuals and describes recent changes made to the RS-232 interface. Although this document primarily refers to the Model 100A-AMX in its examples, the features described here apply to all the instruments. Wherever appropriate, differences between the *pre-AMX* (older instruments) and *AMX* (newer instruments) interface are pointed out.

You can determine if your instrument is a pre-AMX or AMX instrument by examining the software configuration (typically accessed by pressing **SETUP-CFG**). If the last entry in the list is "SBC40 CPU" then you have a pre-AMX instrument; if the last entry in the list is "SBC40-AMX CPU" then you have an AMX instrument.

This document is written for both casual users who simply want to issue a few commands to the instrument, and for sophisticated users, such as programmers writing software to interface with the instrument.

The information in this document applies to the software versions listed in the table below. For earlier software versions, refer to the appropriate user manual. **In order to reduce the size of this manual, the information for the Model 100 and Model 200 has been deleted.**

Software Versions This Manual Applies To	
Instrument Model	**Software Version (and later)**
Pre-AMX Instruments	
M100A	K.2
M101A/M102A	A.8
M200A	K.5
M300	C.3
M400	D.5
M401[1]	A.7
AMX Instruments	
M100A-AMX[2]	B.4
M101A/M102A-AMX	A.4
M200A-AMX[3]	C.8
M300-AMX	B.0
M400-AMX	C.6
M400A-AMX	B.0
M450-AMX	A.8
M700-AMX[1]	C.7

[1] Calibrator.
[2] Entire family of instruments, including the M100A and M100AH.
[3] Entire family of instruments, including the M200A, M200AH, M200AM, and M200AU.

The RS-232 interface provides two primary features: status reporting for the purpose of maintaining an audit trail, and a command line interface for controlling the instrument via commands. Status reporting is described in the section called *Asynchronous Status Reporting* and the status messages are listed in *Appendix E*. The command line interface is described in the section titled *Command Line Interface*, and *Appendix A* lists the syntax of all of the commands.

Typographic Conventions Used in this Manual

In this manual, front panel push-buttons are indicated using bold capital characters, for example, **SETUP**. Push-button sequences are denoted by a series of button names, separated by dashes, such as **SETUP-MORE-COMM-BAUD**.

Setup variable names are italicized, as in *BAUD_RATE*.

RS-232 printout is enclosed in a shaded box, with user input in lower case, and instrument output in upper case, like so:

```
v baud_rate=”19.2”<CR>
V   63:11:47  0100  BAUD_RATE=19.2 (300,1200,2400,4800,9600,19.2)
```

In RS-232 printouts, non-printable characters are denoted by special symbols consisting of several characters enclosed in angle brackets, as shown in the table below. All commands must be terminated by a carriage return, so if a <CR> symbol is not shown in an RS-232 command, it is implied. Similarly, all messages transmitted by the instrument are terminated by a carriage return-line feed pair; so if a <CRLF> symbol is not shown in an RS-232 output, it is implied.

Special RS-232 Symbols

Symbol	Character Represented
<ESC>	Escape
<SP>	Space
<BS>	Backspace
<CR>	Carriage return
<LF>	Line feed
<CRLF>	Carriage return, line feed pair

Configuration

This section explains how to configure the RS-232 interface only; refer to the instrument user manual for information on configuring the rest of the instrument. The instrument setup variables are listed in *Appendix F* since they are accessible via the command line interface. Refer to the *Command Line Interface* section for information on viewing and modifying these variables.

Setup Variables for Configuring RS-232 Interface

The table below lists all of the setup variables related to the RS-232 interface.

Setup Variables for Configuring RS-232 Interface	
Variable Name	**Description**
RS232_MODE	Sets basic operating mode.
BAUD_RATE	Sets communication baud rate.
RS232_PASS	Sets log on password.
MACHINE_ID	Sets instrument ID number.

RS-232 Line Parameters

The RS-232 interface is configured as a DCE (data communications equipment) device, meaning it can be connected directly to a DTE (data terminal equipment) device, such as a PC. It is also configured for 8 data bits, 1 stop bit, and no parity. These settings cannot be changed.

There are two ways to set the baud rate in an instrument: using the setup menus, and using the RS-232 command line itself. Of course, if you change the baud rate using the command line, you will see garbage characters whenever the instrument prints to the RS-232, until you change the baud rate of your terminal to match that of the instrument.

Setting the Baud Rate Using the Menus

The setup menu button sequence to set the baud rate differs slightly from instrument to instrument. The table below lists the button sequence for each instrument.

Setup Menu Button Sequences for Setting the Baud Rate	
Instrument Model	**Button Sequence**
Pre-AMX Instruments	
M100A	SETUP-MORE-COMM-BAUD
M101A/M102A	SETUP-MORE-COMM-BAUD
M200A	SETUP-MORE-COMM-BAUD
M300	SETUP-COMM-BAUD
M400	SETUP-COMM-BAUD
M401	SETUP-COMM-BAUD

AMX Instruments	
M100A-AMX	SETUP-MORE-COMM-BAUD
M101A/M102A-AMX	SETUP-MORE-COMM-BAUD
M200A-AMX	SETUP-MORE-COMM-BAUD
M300-AMX	SETUP-MORE-COMM-BAUD
M400-AMX	SETUP-MORE-COMM-BAUD
M400A-AMX	SETUP-MORE-COMM-BAUD
M450-AMX	SETUP-COMM-BAUD
M700-AMX	SETUP-MORE-COMM-BAUD

To change the baud rate from the RS-232 command line, you simply set the setup variable called *BAUD_RATE* to the desired value. However the command syntax and the allowed values are different for pre-AMX and AMX instruments.

Setting the Baud Rate Using the Command Line (Pre-AMX Instruments)

The pre-AMX instruments can only support baud rates of 300, 1200, and 2400. To set the baud rate from the command line, use the following command:

```
v baud_rate=2400<CR>
```

Be careful not to specify anything other than 300, 1200, or 2400 for the baud rate. Although the instrument will accept *any* numeric value, the RS-232 interface will not work reliably at other baud rates, especially baud rates higher than 2400.

Setting the Baud Rate Using the Command Line (AMX Instruments)

The AMX instruments can support baud rates of 300, 1200, 2400, 4800, 9600, and 19200. To set the baud rate from the command line, use the following command:

```
v baud_rate=”2400”<CR>
```

Note that in the AMX instruments, you must put the baud rate in double quotes. The table below lists the valid baud rate settings in the AMX instruments.

Valid Baud Rate Settings for AMX Instruments
“300”
“1200”
“2400”
“4800”
“9600”
“19.2”

Modes of Operation

The RS-232 interface supports several different modes of operation, some of which may be used concurrently. The table below lists the operating modes which may be selected by setting the *RS232_MODE* setup variable.

RS232_MODE Settings	
Decimal Value	**Feature Description**
1	Turns on quiet mode (messages suppressed).
2	Places instrument in computer mode (no echo).
4	Enables security feature (log on required).
8	Enables native protocol and setup menus.
16	Enables alternate protocol and setup menus.
32	Enables multidrop support.

By adding up the decimal values for each feature you want to enable, you can determine the proper setting for *RS232_MODE*. For example, if you want to enable quiet mode and the security feature, then set *RS232_MODE* to 1+4, or 5. Each mode is described in detail below.

Note that decimal value 2 of the *RS232_MODE* variable selects terminal or computer mode only when the instrument is powered up. You can change the mode during operation by sending a Control-T (ASCII code 14 hex) to select terminal mode or Control-C (ASCII code 3 hex). Changing the mode at run-time like this does not affect the *RS232_MODE* variable.

In the M400 and M401 you can set the *RS232_MODE* variable using the setup menus by pressing **SETUP-COMM-MODE**. In the "A-series" and AMX instruments, you can set the *RS232_MODE* variable using the setup menus by pressing **SETUP-MORE-VARS**, scrolling to the *RS232_MODE* variable, pressing **EDIT**, and entering the desired value. In the M300 alone, there is no way to set the *RS232_MODE* variable using the setup menus; you must use the RS-232 interface command line.

Quiet Mode

Usually, the RS-232 interface reports mode changes, warning conditions, and DAS reports as they occur. This is called *normal* mode. In some cases, however, it is desirable to have the instrument report information only when requested in order to reduce the amount of RS-232 communication. This is called *quiet* mode.

You would most likely enable quiet mode when you have a host computer hooked up to the instrument, polling it for its status at periodic intervals; or when you are using the multidrop mode.

Terminal Mode

The RS-232 interface is designed to be used by human operators via a terminal, and to be connected to other equipment such as printers, computers, and data loggers. Consequently, it provides two primary modes of operation: terminal mode and computer mode.

When a human operator is communicating with the instrument via a terminal, the instrument should be placed into *terminal* mode, which echoes keystrokes and allows editing of the command line using the backspace and escape keys.

Computer Mode

When a host computer or data logger is connected to the instrument, it should be placed into *computer* mode, which does not echo characters received or allow the special editing keys.

Security Mode

Since the RS-232 interface permits almost total control over the instrument, a security feature is available which requires logging on with a password before commands will be processed. To enable the security feature, set decimal flag 4 of the *RS232_MODE* setup variable.

When the security feature is enabled you must log on using the following command before you can issue commands:

```
logon 940331<CR>
```

Note that “940331” is the password in this example. By default it is simply the year, month, and date that this feature was first implemented. You can change the password to any 6-digit number you want by setting the variable *RS232_PASS* to a number from 0-999999. You can certainly change the password and enable or disable the security feature from the command line.

If you entered the correct password when logging on, the instrument will respond with the message:

```
L  DDD:HH:MM  IIII  LOG ON SUCCESSFUL<CRLF>
```

If you did not enter the correct password, the instrument will respond with the message:

```
L  DDD:HH:MM  IIII  LOG ON FAILED<CRLF>
```

If you attempt to issue commands other than “logon” or “?” while not logged on, the instrument will respond with the message:

```
L  DDD:HH:MM  IIII  MUST LOG ON<CRLF>
```

When you are finished with your logon session, you must log off using the following command:

```
logoff<CR>
```

If you don't log off, you will leave the instrument in the logged on state, circumventing the security feature.

Protocol Selection

In the future, the RS-232 interface will support more than one command protocol. Decimal flags 8 and 16 select which protocol is active. Currently these have no effect except in the M200A. In the M200A, decimal flag 8 must be set in order for the RS-232 configuration menu to appear.

Multidrop Mode

The RS-232 interface supports a multidrop configuration (by means of additional external hardware to handle the line arbitration) which allows multiple instruments to be connected to the same RS-232 "bus." The principal difference between multidrop and non-multidrop mode is that the RS-232 RTS signal is used to turn the drivers in the external hardware on prior to transmitting messages, and turn the drivers off again shortly after transmitting. This multidrop protocol assumes that only one instrument will be transmitting at a time. It is up to the controlling host computer to ensure that this protocol is adhered to.

In addition to hardware-level support, all of the RS-232 interface commands allow an instrument ID number as part of the command. Regardless of whether multidrop mode is enabled, if you include an ID number in a command, the instrument will only process the command if the ID number matches the instrument's ID number.

In general, the ID number should appear in a command after the first token in the command and preceded by a space. The printout below shows several commands, each with and without ID numbers.

```
?
? 100
logon 940331
logon 100 940331
c zero
c 100 zero
v baud_rate=”2400”
v 100 baud_rate=”2400”
```

Notice in all of the commands, the ID number of "100" appears after the first token in the command. The commands including ID numbers would be executed only if the instrument's ID number was set to "100."

Typical RS-232 Configurations

Since there a lot of possible combinations of RS-232 mode settings it can be confusing to set the RS-232 configuration properly, so the table below lists some typical configurations.

Typical RS-232 Configurations	
Configuration	**RS232_MODE Setting**
Normal • Status, warning, DAS messages reported. • Characters echoed. Line editing allowed. • No security or multidrop.	8
Computer • Status, warning, DAS messages suppressed. • Characters not echoed. Line editing disabled. • No security or multidrop.	11
Security • Status, warning, DAS messages reported. • Characters echoed. Line editing allowed. • No multidrop.	12
Hessen protocol (optional) • Status, warning, DAS messages suppressed. • Characters not echoed. Line editing disabled. • Alternate protocol enabled; native protocol disabled. • No security or multidrop.	19
Multidrop • Status, warning, DAS messages suppressed. • Characters not echoed. Line editing disabled. • Commands must include ID number. • No security. • Multidrop.	43

Asynchronous Status Reporting

Asynchronous reporting of status messages as an audit trail is one of the two principal uses for the RS-232 interface (the other is the command line interface for controlling the instrument). You can effectively disable the asynchronous reporting feature by setting the interface to quiet mode *(see the Configuration section)*.

Asynchronous reports include DAS reports, warning messages, calibration and diagnostic status messages. Refer to *Appendix E* for a list of the messages, and the *Command Line Interface* section for information on controlling the instrument via the RS-232 interface.

General Message Format

All messages output from the instrument (including those output in response to a command line request) have the format:

```
X  DDD:HH:MM  IIII  MESSAGE<CRLF>
```

"X" is a single character indicating the message type, as shown in the table below.

Message Types	
First Character	**Message Type**
C	Calibration
D	Diagnostic
L	Logon
R[1]	DAS report
S[2]	Stream
T	Test measurement
V	Variable
W	Warning

[1] Pre-AMX instruments only. In AMX instruments, "D" is used instead, reflecting the predictive *diagnostic* nature of these reports.
[2] M450 only.

"DDD:HH:MM" is a time-stamp indicating the day-of-year (*DDD*) as a number from 1 to 366, the hour of the day (*HH*) as a number from 00 to 23, and the minute (*MM*) as a number from 00 to 59.

"IIII" is the 4-digit instrument ID number.

"*MESSAGE"* contains warning messages, test measurements, DAS reports, variable values, etc.

"<CRLF>" is a carriage return-line feed pair that terminates the message and also makes the messages appear neatly on a printer.

The uniform nature of the output messages makes it easy for a host computer to parse them.

DAS Reports in Pre-AMX Instruments

A built-in DAS capability exists in all analyzers and in the M401 calibrator. However, it differs between AMX and pre-AMX instruments.

Every few minutes (the reporting frequency is specified by the *REPORT_FREQ* variable) the data acquisition system in a pre-AMX instrument issues a report to the RS-232 interface. This report shows the average concentration reading during the reporting interval, the range, and the number of one-minute samples taken during that interval. The message format is:

```
R  DDD:HH:MM  IIII  RANGE=xxxx PPB  SO2=xxxx PPB
SAMPLES=xxxx<CRLF>
```

Whenever the instrument is in calibration, or in diagnostic mode, or when invalid concentrations are calculated, no concentration readings are included in the average. Thus, it is possible for an average to contain 0 samples. If the number of samples in an average is 0, then *XXXX* is shown as the concentration reading.

If the RS-232 interface is in the quiet mode, then these reports are not printed, although they can be requested by a user or host computer at a later time using the "R count" command (*see Appendix A*). When DAS reports are requested via the command line interface, the range field is omitted, since the range is not stored in the DAS database, and the message format is:

```
R  DDD:HH:MM  IIII  SO2=xxxx PPB  SAMPLES=xxxx<CRLF>
```

The most recent 100 DAS readings are stored in a database in battery-backed RAM, so they are retained even when the instrument is powered off.

DAS Reports in AMX Instruments

A much more sophisticated DAS (sometimes referred to as predictive diagnostics) capability is built into the AMX instruments. This new DAS capability allows you to select which data parameters to monitor, how frequently to monitor them, how many reports to store in memory, and whether or not to print the reports to the RS-232 interface.

Because they are highly configurable, the DAS reports in the AMX instruments do not have a uniform format. Therefore, some sample DAS reports from AMX instruments are shown and briefly described below.

Average Concentration Report

The following DAS report shows the average concentration, like the DAS report in the pre-AMX instruments, but with a different format. "CONC" is a user-defined name used to identify the data channel. Following the colon, the report indicates that the average concentration of range 1 ("CONC1") is 482.7 PPB.

```
D   63:11:40  0100  CONC  : AVG  CONC1 = 482.7 PPB<CRLF>
```

Calibration Parameter Report

The following DAS report shows the calibration parameters measured during the last span calibration. Notice that there are three lines of output in the report; this is because three data parameters are monitored by this data channel. The name used to identify the channel is "CALDAT," which stands for *calibration data*.

In the first line, after the colon, the report indicates that the new slope ("SLOPE1") calculated is 0.976. In the second line the report indicates that the new offset ("OFSET1") calculated is 0.0 mV. And in the third line the report indicates that the instantaneous concentration ("ZSCNC1") prior to calculating a new slope and offset was 409.9 PPB.

```
D   63:11:45  0100  CALDAT: INST SLOPE1= 0.976<CRLF>
D   63:11:45  0100  CALDAT: INST OFSET1=   0.0 mV<CRLF>
D   63:11:45  0100  CALDAT: INST ZSCNC1= 409.9 PPB<CRLF>
```

The same calibration parameter report may also appear in *compact* format, with all the parameters on one line, as shown below. This format reduces the amount of output, and is well suited for parsing by a host computer.

```
D   63:11:45  0100  CALDAT:   1   0.976     0.0   409.9<CRLF>
```

Warning Messages

Whenever a warning message is reported on the instrument's display, if the RS-232 interface is in the normal mode (as opposed to quiet mode), the warning message is also printed to the RS-232 interface. These messages are helpful when trying to track down a problem with the instrument and for determining whether or not the DAS reports are actually valid. The warning message format is:

```
W  DDD:HH:MM  IIII  WARNING MESSAGE<CRLF>
```

An example of an actual warning message is:

```
W  194:11:03  0100  SAMPLE FLOW WARN<CRLF>
```

Warnings may be cleared via the front panel or the command line interface.

Calibration Status Messages

Whenever the instrument starts or finishes a zero or span calibration, it issues a status report to the RS-232 interface. If the RS-232 interface is in the normal mode, these reports will be printed. Otherwise, they will be discarded. The format of these messages is:

```
C  DDD:HH:MM  IIII  CALIBRATION STATUS MESSAGE<CRLF>
```

An example of an actual sequence of calibration status messages is:

```
C   63:23:30  0100  START ZERO CALIBRATION<CRLF>
C   63:23:45  0100  FINISH ZERO CALIBRATION<CRLF>
C   63:23:45  0100  START SPAN CALIBRATION<CRLF>
C   64:00:00  0100  FINISH SPAN CALIBRATION<CRLF>
```

Zero or span calibration may be initiated from the instrument front panel, from the contact closure inputs, automatically at a specified time of day, or from the command line interface.

Diagnostic Status Messages

Although diagnostic status messages are never reported asynchronously (they are printed only in response to user actions), they are described here anyway.

Whenever the instrument enters or exits diagnostic mode, or a diagnostic command is executed from the command line, the instrument issues a report to the RS-232 interface. These reports have the following format:

```
D  DDD:HH:MM  IIII  DIAGNOSTIC STATUS MESSAGE<CRLF>
```

An example of an actual sequence of diagnostic status messages is shown below. The commands typed by the user are in lower case; the diagnostic reports are in upper case.

```
d enter sig<CR>
D  194:11:30  0100  ENTER DIAGNOSTIC MODE<CRLF>
d span_valve<CR>
D  194:11:31  0100  SPAN_VALVE=OFF<CRLF>
d span_valve=on<CR>
D  194:11:32  0100  SPAN_VALVE=ON<CRLF>
d exit<CR>
D  194:11:33  0100  EXIT DIAGNOSTIC MODE<CRLF>
```

In the preceding example, the user entered the “Signal I/O” diagnostic test using the command “d enter sig.” This test permits users to examine and change the state of individual hardware I/O signals for the purpose of diagnosing problems with the instrument. After entering this diagnostic test, the user examined the state of the span calibration valve with the command “d span_valve.” The user then opened the span calibration valve using the command “d span_valve=on.” Finally, the user exited the “Signal I/O” diagnostic test using the command “d exit.” Exiting the diagnostic test restored all of the I/O signals to their proper states.

Command Line Interface

The command line interface for controlling the instrument is the second of the two principal uses for the RS-232 interface. The command line interface provides almost complete control over the instrument, including configuration, calibration, diagnostics, and data acquisition. Refer to *Appendix A* for a detailed list of all the commands and examples of each.

Obtaining Help

If you cannot remember anything else about the command line interface, remember the question mark key *(?)*. If you type this character, followed by the Enter or Return key, the following help screen (from the M100A) will be displayed:

```
------------------------------------------------------------------------
| Model 100A, Software Rev. K.1, Help Screen                           |
|----------------------------------------------------------------------|
| TERMINAL MODE KEYS                                                   |
|     BS     Backspace                                                 |
|     ESC    Erase line                                                |
|     ^R     Recall last command                                       |
|     ^E     Execute last command                                      |
|     CR     Execute command                                           |
|     ^C     Switch to computer mode                                   |
| COMPUTER MODE KEYS                                                   |
|     LF     Execute command                                           |
|     ^T     Switch to terminal mode                                   |
| COMMMANDS                                                            |
|     ? [id]                                (Display this help screen) |
|     LOGON [id] password         (Establish connection to analyzer) |
|     LOGOFF [id]                 (Terminate connection to analyzer) |
|     T [id] SET ALL|name|hexmask                    (Display test(s)) |
|     T [id] LIST [ALL|name|hexmask] [NAMES|HEX]     (Print test(s)) |
|     T [id] name                                (Print single test) |
|     T [id] CLEAR ALL|name|hexmask                  (Disable test(s)) |
|     W [id] SET ALL|name|hexmask                (Display warning(s)) |
|     W [id] LIST [ALL|name|hexmask] [NAMES|HEX]  (Print warning(s)) |
|     W [id] name                              (Clear single warning) |
|     W [id] CLEAR ALL|name|hexmask                 (Clear warning(s)) |
|     C [id] LIST                        (Print calibration commands) |
|     C [id] command                    (Execute calibration command) |
|     D [id] LIST                         (Print diagnostic commands) |
|     D [id] name[=value]                 (Examine or set I/O signal) |
|     D [id] LIST NAMES        (Print names of all diagnostic tests) |
|     D [id] ENTER name                    (Execute diagnostic test) |
|     D [id] EXIT                             (Exit diagnostic test) |
|     D [id] SYS_RESET|RAM_RESET|EE_RESET(Reset analyzer/RAM/EEPROM) |
|     V [id] LIST                           (Print setup variables) |
|     V [id] name[=value [warn_low [warn_high]]]   (Modify variable) |
|     V [id] CONFIG                    (Print analyzer configuration) |
```

```
|     V [id] MODE                          (Print current analyzer mode) |
|     R [id] count                                    (Print DAS reports) |
-------------------------------------------------------------------------
```

The following help screen is from the M100A-AMX and is fairly typical of all the AMX instruments, except the M700:

```
-------------------------------------------------------------------------
| Model 100A , Software Rev. A.8, Help Screen                           |
|-----------------------------------------------------------------------|
| TERMINAL MODE KEYS                                                    |
|     BS     Backspace                                                  |
|     ESC    Abort line                                                 |
|     CR     Execute command                                            |
|     ^C     Switch to computer mode                                    |
| COMPUTER MODE KEYS                                                    |
|     LF     Execute command                                            |
|     ^T     Switch to terminal mode                                    |
| COMMMANDS                                                             |
|     ? [id]                                  (Display this help screen) |
|     LOGON [id] password       (Establish connection to instrument)    |
|     LOGOFF [id]               (Terminate connection to instrument)    |
|     T [id] SET ALL|name|hexmask                    (Display test(s))   |
|     T [id] LIST [ALL|name|hexmask] [NAMES|HEX]     (Print test(s))    |
|     T [id] name                                 (Print single test)   |
|     T [id] CLEAR ALL|name|hexmask                  (Disable test(s))   |
|     W [id] SET ALL|name|hexmask                (Display warning(s))    |
|     W [id] LIST [ALL|name|hexmask] [NAMES|HEX]  (Print warning(s))    |
|     W [id] name                                (Clear single warning) |
|     W [id] CLEAR ALL|name|hexmask                 (Clear warning(s))  |
|     C [id] ZERO|SPAN [1|2]                  (Enter calibration mode)   |
|     C [id] ASEQ number                  (Execute automatic sequence)  |
|     C [id] COMPUTE ZERO|SPAN              (Compute new slope/offset)    |
|     C [id] EXIT                            (Exit calibration mode)    |
|     C [id] ABORT                         (Abort calibration sequence) |
|     D [id] LIST                               (Print all I/O signals)  |
|     D [id] name[=value]                    (Examine or set I/O signal) |
|     D [id] LIST NAMES        (Print names of all diagnostic tests)    |
|     D [id] ENTER name                       (Execute diagnostic test) |
|     D [id] EXIT                               (Exit diagnostic test)  |
|     D [id] RESET [RAM|EEPROM]          (Reset instrument/RAM/EEPROM)  |
|     D [id] PRINT ["name"]                     (Print data channel(s))  |
|     D [id] REPORT "name" [RECORDS=number] [COMPACT|VERBOSE]           |
|     V [id] LIST                               (Print setup variables)  |
|     V [id] name[=value [warn_low [warn_high]]]   (Modify variable)     |
|     V [id] name="value"                    (Modify enumerated variable)|
|     V [id] CONFIG                  (Print instrument configuration)   |
|     V [id] MODE                     (Print current instrument mode)   |
-------------------------------------------------------------------------
```

The two help screens shown above are very similar except for some differences in the command line editing keys, and some of the diagnostic commands, notably those commands related to the DAS. The "^" character in the above help screens refers to the *Control* key on the keyboard. For instance, "^C" means Control-C.

Terminal vs. Computer Mode

The command line interface is designed to be used in several different ways: by human operators, by host computers, and by other equipment such as data loggers. Human operators would like to have keystrokes echoed and to be able to edit the command being entered. Host computers, on the other hand, don't want commands to be echoed, since they would clutter up the analyzer's response messages. Thus, the command line interface provides two modes of operation: terminal mode for human operators, and computer mode for host computers or data loggers.

You can configure the *power-up* mode of the command line interface by setting the appropriate bits of the *RS232_MODE* variable. (See the *Configuration* section for information on this variable.) You can change the mode of the command line interface during operation by sending one of the ASCII codes listed in the table below.

Terminal / Computer Mode Keys	
Key	**Function**
Control-T (ASCII 20 decimal)	Switch to terminal mode (echo, edit).
Control-C (ASCII 3 decimal)	Switch to computer mode (no echo, no edit).

If the command line doesn't seem to respond to keystrokes or commands, one of the first things you should do is send a Control-T to switch the command line interface into terminal mode.

Entering Commands

In pre-AMX instruments, all commands must be terminated by a carriage return or line feed; commands are not processed until a carriage return or line feed is entered. In AMX instruments, all commands must be terminated by a carriage return.

Commands are not case-sensitive and you should separate all command tokens (i.e. keywords, data values, etc.) with spaces.

Terminal Mode

While entering a command in terminal mode you may use the following editing keys:

Command Line Editing Keys	
Key	**Function**
CR (carriage return)	Execute command.
BS (backspace)	Backspace one character to the left.
ESC (escape)	Abort entire command. In AMX instruments, a backslash ("\") is printed and a new line started. In pre-AMX instruments the command line is erased.

Control-R (ASCII 18 decimal)[1]	Recall previous command.
Control-E (ASCII 5 decimal) [1]	Recall and execute previous command.
[1] Pre-AMX instruments only. AMX instruments don't support this feature.	

Computer Mode

In computer mode, there is no echoing of characters typed and the editing keys above are ignored. You can enter commands manually in computer mode, but you won't be able to see what you've typed.

Keywords

Words such as *T*, *LIST*, *EXIT*, etc. are called *keywords* and are shown on the help screen in uppercase, but they are not case-sensitive.

In pre-AMX instruments, you must type the entire keyword; abbreviations are not accepted. In the AMX instruments, you can abbreviate the keyword to the fewest number of characters that uniquely identify the keyword. For example, instead of typing "d report …" to request DAS records, you can type "d rep …," abbreviating "report" to simply "rep."

Operators

Certain individual characters have special functions. These characters are called *operators* and are summarized in the table below.

Command Line Operators

Character	Function
?	Print help screen
=	Assignment

Data Types

Data types consist of integers, hexadecimal integers, floating-point numbers, booleans, and text strings.

Integers

Integers are used to indicate integral quantities such as a number of records, a filter length, etc. They consist of an optional plus or minus sign, followed by one or more digits. For example, *+1*, *-12*, *123* are all valid integers.

Hexadecimal Integers

Hexadecimal integers are used for the same purposes as integers. They consist of the two characters "0x," followed by one or more hexadecimal digits (0-9, A-F, a-f), which is the C-language convention. No plus or minus sign is permitted. For example, *0x1*, *0x12*, *0x1234abcd* are all valid hexadecimal integers.

In pre-AMX instruments you may use hexadecimal integers only to specify test measurement and warning message bit masks (*see the T SET, T CLEAR, and T LIST commands*). In AMX instruments you can use integers and hexadecimal integers interchangeably, whichever is more convenient.

Floating Point Numbers

Floating-point numbers are used to specify continuously variable values such as temperature set points, time intervals, warning limits, millivolts, etc. They consist of an optional plus or minus sign, followed by zero or more digits, an optional decimal point, and zero or more digits. (At least one digit must appear before or after the decimal point.) Scientific notation is not permitted. For example, *+1.0, 1234.5678, -.1, 1* are all valid floating-point numbers.

Booleans

Booleans are used to specify the value of variables or I/O signals that may assume only two values. They are denoted by the keywords *ON* and *OFF*.

Strings

Text strings are used to represent data that cannot be easily represented by the other data types, such as data channel names, which may contain letters and numbers. They consist of a double quote, followed by one or more printable characters, including spaces, letters, numbers, and symbols, and a final double quote. For example, *"a"*, *"1"*, *"123abc"*, and *"()[]<>"* are all valid text strings. There is no way to include the double quote character in a text string.

Text strings are not used in pre-AMX instruments. In AMX instruments, however, strings are used to identify DAS data channels and enumerated variable values. Since the user can set the name of a DAS data channel to any string, it needs to be enclosed in double quotes whenever it's referred to from the RS-232 interface command line. For example, to request DAS concentration records you need to use a command like the following:

```
d report "conc"<CR>
```

Notice that in the above command the name of the data channel is enclosed in double quotes, making it a string. The other place you need to use text strings is when specifying the value for an *enumerated* setup variable. An enumerated setup variable is one that can assume a finite number of values, such as the *USER_UNITS* variable that's in most AMX instruments. This variable can typically assume one of the following values: "PPB," "PPM," "UGM," or "MGM." To set this variable from the RS-232 interface, you need to use a command like the following:

```
v user_units="ppb"<CR>
```

The double quotes are required with enumerated variables because the values sometimes include numbers or spaces, which make them easy for the user to understand, but difficult for the instrument to recognize unless they're enclosed in quotes. Enumerated values are not case-sensitive.

Variable, Message, and Other Names

Some commands allow you to access variables, messages, and other items, such as DAS data channels, by name. When using these commands you must type the entire name of the item; you cannot abbreviate the names.

Appendix A — General Commands

The commands that may be used in the command line interface are listed in alphabetical order below. In each command keywords are shown in uppercase and parameters are shown in lowercase. Optional keywords or parameters are shown in brackets ("[" and "]"}. "|" indicates *or*; for example, NAMES | HEX means use either NAMES *or* HEX.

In all of the commands, an instrument ID number may optionally be provided. If so, then the command will be executed only if the ID number specified in the command matches the instrument's ID number.

NAME

? - print help screen

SYNTAX

? [id]

DESCRIPTION

Prints out a single page of help information, including special keys, operators, and commands.

EXAMPLES

?	Prints help screen for instrument.
? 100	Prints help screen for instrument with ID number "100."

INSTRUMENTS

All.

NAME

C LIST - print calibration commands

SYNTAX

C [id] LIST

DESCRIPTION

C LIST prints the calibration commands available.

EXAMPLES

C LIST	Prints calibration commands.
C 100 LIST	Prints calibration commands for instrument with ID number "100."

INSTRUMENTS

M100A, M200A, M300, M400, M401. This command is not supported in AMX instruments.

NAME

C command - execute calibration command

SYNTAX

C [id] command

DESCRIPTION

C command executes a calibration command. The calibration commands differ from instrument to instrument, so they are listed separately in *Appendix B*.

EXAMPLES

C ZERO	Starts remote zero calibration.
C 100 EXITZ	Terminates remote zero calibration (does not terminate span).
C EXIT	Terminates remote zero or span calibration or hold off.
C 100 COMPUTE ZERO	Computes new slope and offset during zero calibration.
C GENERATE 100 PPB SO2	Generates 100 PPB of SO_2 gas (M700).

INSTRUMENTS

All except M450.

NAME

D LIST - print diagnostic commands

SYNTAX

D [id] LIST

DESCRIPTION

D LIST prints the diagnostic commands available.

EXAMPLES

D LIST	Prints diagnostic commands.
D 100 LIST	Prints diagnostic commands for instrument with ID number “100.”

INSTRUMENTS

M300, M400, M401.

NAME

D LIST - print I/O signal values or diagnostic test names

SYNTAX

D [id] LIST [NAMES]

DESCRIPTION

D LIST prints the current values of all of the hardware I/O signals in the instrument. The sample printout below shows how each type of I/O signal is formatted.

```
D   63:11:47  0100  EXT_ZERO_CAL=OFF
D   63:11:47  0100  SPAN_VALVE=OFF
D   63:11:47  0100  PMT_SIGNAL=832.5 MV
D   63:11:47  0100  CONC_OUT_1=4012.9 MV
```

In the above printout, *EXT_ZERO_CAL* is a digital input, and its state is *OFF* (logic low); *SPAN_VALVE* is a digital output whose state is also *OFF*; *PMT_SIGNAL* is an analog input whose current value is 832.5 mV; and *CONC_OUT_1* is an analog output whose current value is 4012.9 mV.

D LIST NAMES prints the names of all the diagnostic tests which may be initiated from the RS-232 interface using the *D ENTER name* command. (Some diagnostic tests are not suitable for initiating from the RS-232 interface since they require user interaction.)

EXAMPLES

D 100 LIST	Prints all I/O signal values for instrument with ID number “100.”
D LIST NAMES	Prints names of all diagnostic tests which may be initiated.

INSTRUMENTS

M100A, M200A, and all AMX instruments.

NAME

D command - execute diagnostic command

SYNTAX

D [id] command

DESCRIPTION

D command executes a diagnostic command. The diagnostic commands differ from instrument to instrument, so they are listed separately in *Appendix C*.

EXAMPLES

D ENTER	Enter diagnostic mode (M300).
D 100 ENTER SIG	Enter signal I/O diagnostic mode (M100A).
D EXIT	Exit diagnostic mode.

D SYS_RESET	Performs power-on reset of instrument (M100A).
D 100 RESET RAM	Performs power-on reset of instrument (M100A-AMX).
D 100 PRINT “CONC”	Prints DAS data channel configuration (M100A-AMX).
D REPORT “CONC” RECORDS=10	Prints DAS concentration data (M100A-AMX).

INSTRUMENTS

All.

NAME

LOGON - establish connection to instrument

SYNTAX

LOGON [id] password

DESCRIPTION

Logs user onto instrument in order to execute other commands or obtain the instrument’s status. When security mode is enabled (*see Configuration section*) you must use this command to gain access to the instrument. If security mode is not enabled then this command has no effect.

An example of a series of commands to obtain DAS concentration data from an instrument that has the security mode enabled would be:

```
logon 940331
d report “conc”
logoff
```

EXAMPLES

LOGON 940331	Attempts to logon using password “940331.”
LOGON 100 940331	Attempts to logon to instrument with ID number “100.”

INSTRUMENTS

All.

NAME

LOGOFF - terminate connection to instrument

SYNTAX

LOGOFF [id]

DESCRIPTION

Logs user off instrument, preventing processing of additional commands until the next *LOGON* command. You should always use this command when you are finished with your communication session in order to ensure the security of the instrument.

EXAMPLES

LOGOFF	Logs user off.
LOGOFF 100	Logs user off instrument with ID number “100.”

INSTRUMENTS

All.

NAME

STREAM – stream control

SYNTAX

STREAM [id] AUTO
STREAM [id] MANUAL [number]
STREAM [id] PRINT [number]

DESCRIPTION

The first command selects stream *number* for manual monitoring. The second command places instrument into automatic monitoring mode. The third command prints the configuration for one stream or all the streams.

EXAMPLES

STREAM AUTO	Switches to automatic monitoring.
STREAM MANUAL	Selects current stream for manual monitoring.
STREAM MANUAL 1	Selects stream 1 for manual monitoring.
STREAM 450 MANUAL 6	Selects stream 1 of instrument “450” for manual monitoring.
STREAM PRINT	Prints configuration of all streams.
STREAM PRINT 3	Prints configuration of stream 3.

INSTRUMENTS

M450.

NAME

T | W CLEAR - clear test measurements or warning messages
W name - clear warning message

SYNTAX

T | W [id] CLEAR ALL | name | hexmask
W [id] name

DESCRIPTION

Clears test measurements or warning messages from the front panel by name or by hexadecimal mask. You must specify ALL to clear all the test measurements or warning messages, a name to clear just one message, or a hexadecimal mask to clear selected messages. *W name* is the same as *W CLEAR name* and is provided for compatibility with the older syntax.

EXAMPLES

T CLEAR ALL	Clears all test measurements (only warnings will be displayed).
T 100 CLEAR SO2	Clears SO_2 concentration test measurement for instrument “100.”
T CLEAR 0x000F	Clear first 4 (4-bits) test measurements.
W CLEAR WSYSRES	Clears system reset warning message.
W 100 WSYSRES	Clears system reset warning message for instrument “100.”

INSTRUMENTS

All.

NAME

T | W LIST - print test measurements or warning messages
T name - print test measurement

SYNTAX

T | W [id] LIST [ALL | name | hexmask] [NAMES | HEX]
T [id] name

DESCRIPTION

Prints currently displayed messages, or prints specific messages by name or hexadecimal mask *(see T | W SET command for description of this mask)*. Without any options, this command prints only the displayed test measurements or waning messages. With the NAMES option, it prints the names of the displayed messages. With the HEX option, it prints a hexadecimal mask in which each bit that is set corresponds to a displayed message. The NAMES and HEX options don’t apply when printing messages by name or hexadecimal mask. *T name* is the same as *T LIST name* and is provided for compatibility with the older syntax.

EXAMPLES

T 100 LIST	Prints currently displayed test measurements for instrument “100.”
T LIST ALL	Prints all test measurements.
T 100 LIST ALL NAMES	Prints names of all test measurements for instrument “100.”
T LIST SO2	Prints SO_2 concentration test measurement.

T SO2	Prints SO_2 concentration test measurement.
T 100 LIST 0x0000000F	Prints first 4 (4-bits) test measurements for instrument “100.”
W LIST HEX	Prints hexadecimal mask indicating currently displayed warnings.

INSTRUMENTS

All.

NAME

T | W SET - display test measurements or warning messages

SYNTAX

T | W [id] SET ALL | name | hexmask

DESCRIPTION

Displays a test measurement or warning message on the front panel. Displaying a warning message causes the fault LED to turn on, and the warning message to be printed to the RS-232 audit trail, just as if the instrument had displayed it.

By selectively displaying or clearing test measurements you can customize the instrument by showing just the test measurements you want.

You can display messages by name or by a 32-bit hexadecimal mask in which each bit, starting from the least significant bit, corresponds to one message. There is a separate hexadecimal mask for test measurements and warning messages. To obtain a list of the test measurements or warning messages, use the *T|W LIST* command.

EXAMPLES

T SET ALL	Displays all test measurements.
T 100 SET SO2	Displays SO_2 concentration test measurement for instrument “100.”
T SET 0xF	Displays the first 4 (4-bits) test measurements.
W SET WSYSRES	Displays system reset warning message.

INSTRUMENTS

All.

NAME

V CONFIG - print instrument software configuration

SYNTAX

V [id] CONFIG

DESCRIPTION

Prints the software version number and the list of features installed in the software. The format of this listing is shown in the example below.

```
v config
V   63:11:46  0100  CONFIG[ 0]=M100A  SO2 Analyzer
V   63:11:46  0100  CONFIG[ 1]=Revision A.7
V   63:11:46  0100  CONFIG[ 2]=SBC40-AMX CPU
```

EXAMPLES

V CONFIG	Prints instrument software configuration.
V 100 CONFIG	Prints software configuration for instrument with ID number “100.”

INSTRUMENTS

All.

NAME

V LIST - print all setup variables

SYNTAX

V [id] LIST

DESCRIPTION

Prints the current value, warning limits (if applicable), and data entry limits of all setup variables.

EXAMPLES

V LIST	Prints values of all setup variables.
V 100 LIST	Prints values of all setup variables for instrument “100.”

INSTRUMENTS

All.

NAME

V MODE - print current instrument mode

SYNTAX

V [id] MODE

DESCRIPTION

Prints the current instrument mode which is displayed in the upper left-hand corner of the front panel display (*also see Appendix D*). This command is particularly useful when the RS-232 interface is operating in the quiet mode, which suppresses status messages

indicating mode changes. With this command, you can reliably obtain the current instrument mode at any time.

EXAMPLES

V MODE	Prints current instrument mode.
V 100 MODE	Prints current mode for instrument “100.”

INSTRUMENTS

All.

NAME

V name - examine or modify individual setup variable

SYNTAX

V [id] name [= value [warn_low [warn_high]]]
V [id] name [= “value”]

DESCRIPTION

If just *name* is specified, the current value, warning limits (if applicable), and data entry limits of the variable are printed. If the name is followed by = and a value, the variable is changed to the new value if the value is within the data entry limits of the variable. The value may optionally be followed by one or two warning limits, representing the low and high warning limits, respectively.

If the variable is an enumerated variable, for instance *USER_UNITS*, then you must use the second syntax shown above, enclosing the value in double quotes.

EXAMPLES

V AUTO_CAL_EN	Prints value of the *AUTO_CAL_EN* variable.
V AUTO_CAL_EN=ON	Sets the *AUTO_CAL_EN* variable to *ON*.
V RCELL_SET=50 45 55	Sets *RCELL_SET* to *50* and warning limits to *45-55*.
V 100 USER_UNITS =”PPB”	Sets *USER_UNITS* to *PPB* for instrument “100.”

INSTRUMENTS

First syntax: All instruments.
Second syntax: AMX instruments only.

NAME

R count - print DAS reports

SYNTAX

R [id] count

DESCRIPTION

Prints the most recent *count* DAS reports using the format described in the section titled *DAS Reports in Pre-AMX Instruments*.

EXAMPLES

R 10	Prints 10 most recent DAS reports.
R 100 10	Prints 10 most recent DAS reports for instrument “100.”

INSTRUMENTS

All pre-AMX instruments.

Appendix B — Calibration Commands

The calibration commands differ from instrument to instrument, so they are listed separately in the tables below.

Pre-AMX Instrument Calibration Commands

M100A Calibration Commands	
Command	**Description**
C [id] ZERO	Start zero calibration.
C [id] LOWSPAN[1]	Start low span calibration.
C [id] SPAN	Start span calibration.
C [id] ASEQ number[1]	Start calibration sequence *number* (1-3).
C [id] EXITZ	Exit zero calibration.
C [id] EXITL[1]	Exit low span calibration.
C [id] EXITS	Exit span calibration.
C [id] EXIT	Exit current step of calibration sequence and continue with next step.
C [id] ABORT[1]	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.
[1] Only available in versions with multi-sequence IZS option.	

M101A/M102A Calibration Commands	
Command	**Description**
C [id] ZERO [gas][2] [1|2][3]	Start remote zero calibration.
C [id] LOWSPAN [gas][2] [1|2][1,3]	Start remote low span calibration.
C [id] SPAN [gas][2] [1|2][3]	Start remote span calibration.
C [id] ASEQ number[1]	Start remote calibration sequence *number* (1-3).
C [id] EXITZ	Terminate remote zero calibration.
C [id] EXITL[1]	Terminate remote low span calibration.
C [id] EXITS	Terminate remote span calibration.
C [id] EXIT	Terminate remote zero or span calibration or hold off.
C [id] ABORT[1]	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.

C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

[1] Only available in versions with multi-sequence IZS option.
[2] In H_2S instruments, gas may be either H2SGAS or SO2GAS. In TRS instruments, gas may be either TRSGAS or SO2GAS.
[3] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.

M200A Calibration Commands	
Command	**Description**
C [id] ZERO	Start remote zero calibration.
C [id] SPAN	Start remote span calibration.
C [id] EXITZ	Terminate remote zero calibration.
C [id] EXITS	Terminate remote span calibration.
C [id] EXIT	Terminate remote zero or span calibration or hold off.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

M300 Calibration Commands	
Command	**Description**
C [id] ZERO	Start remote zero calibration.
C [id] SPAN	Start remote span calibration.
C [id] EXITZ	Terminate remote zero calibration.
C [id] EXITS	Terminate remote span calibration.
C [id] EXIT	Terminate remote zero or span calibration or hold off.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

M400 Calibration Commands	
Command	**Description**
C [id] ZERO	Start remote zero calibration.
C [id] LOWSPAN	Start remote low span calibration.
C [id] SPAN	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).

C [id] EXITZ	Terminate remote zero calibration.
C [id] EXITL	Terminate remote low span calibration.
C [id] EXITS	Terminate remote span calibration.
C [id] EXIT	Terminate remote zero or span calibration or hold off.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

M401 Calibration Commands	
Command	**Description**
C [id] STBY	Go to standby mode.
C [id] ZERO	Generate zero gas.
C [id] O3GEN	Generate span gas.
C [id] ASEQ	Execute automatic sequence.

AMX Instrument Calibration Commands

M100A-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [1|2][1]	Start remote zero calibration.
C [id] LOWSPAN [1|2][1,2]	Start remote low span calibration.
C [id] SPAN [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).
C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.
[2] M100AH-AMX only.

M101A/M102A-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [gas][2] [1|2][1]	Start remote zero calibration.
C [id] SPAN [gas][2] [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).

C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.
[2] In H_2S instruments, gas may be either H2SGAS or SO2GAS. In TRS instruments, gas may be either TRSGAS or SO2GAS.

M200A-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [1|2][1]	Start remote zero calibration.
C [id] LOWSPAN [1|2][1,2]	Start remote low span calibration.
C [id] SPAN [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).
C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.
[2] M200AH-AMX and M200AU-AMX only.

M300-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [1|2][1]	Start remote zero calibration.
C [id] SPAN [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).
C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.

[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.

M400-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [1|2][1]	Start remote zero calibration.
C [id] LOWSPAN [1|2][1]	Start remote low span calibration.
C [id] SPAN [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).
C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.
[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.	

M400A-AMX Calibration Commands	
Command	**Description**
C [id] ZERO [1|2][1]	Start remote zero calibration.
C [id] LOWSPAN [1|2][1]	Start remote low span calibration.
C [id] SPAN [1|2][1]	Start remote span calibration.
C [id] ASEQ number	Start remote calibration sequence *number* (1-3).
C [id] EXIT	Terminate remote zero or span calibration.
C [id] ABORT	Abort rest of calibration sequence and immediately resume sampling.
C [id] COMPUTE ZERO	Calculates a new slope and offset during zero calibration. Must be in zero calibration first.
C [id] COMPUTE SPAN	Calculates a new slope and offset during span calibration. Must be in span calibration first.
[1] This parameter selects the range to calibrate. Nothing or a value of 1 selects the low range; a value of 2 selects the high range.	

M700-AMX Calibration Commands	
Command	**Description**
C [id] GENERATE conc[1] units[2] gas[3]	Generate concentration.

C [id] GPT | GPTPS noConc[1] noUnits[2] o3Conc[1] o3Units[2]	Generate GPT or GPT-preset.
C [id] PURGE	Go into purge mode.
C [id] STANDBY	Go into standby mode.
C [id] EXECSEQ number	Execute predefined sequence *number*.
C [id] MANUAL calGas[3] calFlow[4] dilFlow[5] OFF | CONST | REF | BENCH [O3 mV | PPB]	Generate manual concentration.
C [id] PRINT	Print all predefined sequences.

[1] Numerical concentration to generate (e.g. 400).
[2] Concentration units (e.g. PPB). See M700 manual for list of allowable units.
[3] Calibration gas (e.g. SO2). See M700 manual for list of allowable gases.
[4] Calibration gas flow rate (lpm).
[5] Diluent flow rate (lpm).

Appendix C — Diagnostic Commands

The diagnostic commands differ from instrument to instrument, so they are listed separately in the tables below.

M300, M400, M401 Diagnostic Commands	
Command	**Description**
D [id] ENTER	Enter diagnostic mode.
D [id] EXIT[1]	Exit diagnostic mode.
D [id] PREV[1]	Selects previous diagnostic test.
D [id] NEXT[1]	Selects next diagnostic test.
D [id] ON[1]	Turns digital diagnostic test ON.
D [id] OFF[1]	Turns digital diagnostic test OFF.
D [id] PAUSE[1]	Pauses D/A diagnostic test at current voltage.
D [id] RESUME[1]	Resumes D/A diagnostic test voltage stepping.
D [id] SYS_RESET[2]	Resets instrument software (same as power on).
D [id] RAM_RESET[2]	Resets instrument software and erases RAM (same as installing new software version).
D [id] EE_RESET[2]	Resets instrument software and erases RAM and EEPROM.
[1] You must issue the *D ENTER* command before using this command. [2] You do not need to issue the *D ENTER* command before using this command.	

M100A, M101A, M102A, M200A Diagnostic Commands	
Command	**Description**
D [id] ENTER name	Execute diagnostic test *name*. (See tables below.)
D [id] EXIT[1]	Exit diagnostic test. Restore I/O signals to previous values if signal I/O diagnostic test was executed.
D [id] name[2]	Prints current value of I/O signal *name*.
D [id] name=value[1]	Sets current value of I/O signal *name* to *value*. Signal must be a digital or analog output. For digital outputs, *value* may be *ON* or *OFF*. For analog outputs, *value* may be from -5000 to +5000 mV.
D [id] SYS_RESET[2]	Resets instrument software (same as power on).
D [id] RAM_RESET[2]	Resets instrument software and erases RAM (same as installing new software version).
D [id] EE_RESET[2]	Resets instrument software and erases RAM and EEPROM.
[1] You must issue the *D ENTER* command before using this command. [2] You do not need to issue the *D ENTER* command before using this command.	

AMX Instrument Diagnostic Commands	
Command	**Description**
D [id] ENTER name	Execute diagnostic test *name*. (See tables below.)
D [id] EXIT[1]	Exit diagnostic test. Restore I/O signals to previous values if signal I/O diagnostic test was executed.
D [id] name[2]	Prints current value of I/O signal *name*.
D [id] name=value[1]	Sets current value of I/O signal *name* to *value*. Signal must be a digital or analog output. For digital outputs, *value* may be *ON* or *OFF*. For analog outputs, *value* may be from -5000 to +5000 mV.
D [id] PRINT "name" [2]	Prints the current configuration of the DAS data channel *name*.
D [id] REPORT "name" [RECORDS = number] [COMPACT | VERBOSE] [2]	Prints data records for the DAS data channel *name*. If the RECORDS option is specified, *number* is the number of records to print, from the most recent backwards in time. If the COMPACT option is specified, the records are formatted with up to 5 data parameters per line. If the VERBOSE option is specified, the records are formatted with one data parameter per line.
D [id] RESET[2]	Resets instrument software (same as power on).
D [id] RESET RAM[2]	Resets instrument software and erases RAM (same as installing new software version).
D [id] RESET EEPROM[2]	Resets instrument software and erases RAM and EEPROM.
[1] You must issue the *D ENTER* command before using this command. [2] You do not need to issue the *D ENTER* command before using this command.	

Diagnostic Test Names

The tables below list the names of the diagnostic tests for each instrument which may be initiated from the RS-232 interface using the *D ENTER* command.

M100A, M101A, M102A, M200A, M200A-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.
OT	Invokes optic test.
ET	Invokes electrical test.

M100A-AMX, M101A-AMX, M102A-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.
OTEST	Invokes optic test.
ETEST	Invokes electrical test.

M300 Diagnostic Test Names	
Name	**Description**
SPAN VALVE	Allows control of span calibration valve.
CAL VALVE	Allows control of sample/calibration valve.
ELEC. TEST	Invokes electrical test.
D/A OUTPUT	Cycles D/A outputs through full range.

M300-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.
ETEST	Invokes electrical test.

M400 Diagnostic Test Names	
Name	**Description**
SPAN VALVE	Allows control of span calibration valve.
CAL VALVE	Allows control of sample/calibration valve.
D/A OUTPUT	Cycles D/A outputs through full range.

M400-AMX, M400A-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.
O3GEN	Calibrates ozone generator.

M401 Diagnostic Test Names	
Name	**Description**
D/A OUTPUT	Cycles D/A outputs through full range.

M450-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.

M700-AMX Diagnostic Test Names	
Name	**Description**
SIG	Signal I/O. Allows modification of output signals.
O3GEN	Calibrates ozone generator.
LEAK	Performs automatic leak check.

Appendix D — Instrument Modes

The tables below list all of the modes available in all of the instruments. They are provided here since the current mode may be requested via the command line interface using the "V MODE" command.

Pre-AMX Instrument Modes

M100A Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG DAC	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG LAMP	UV lamp calibration diagnostic.
DIAG MEM	Memory reset diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SAMPLE S	Sampling; automatic dynamic span calibration enabled.
SAMPLE Z	Sampling; automatic dynamic zero calibration enabled.
SAMPLE ZS	Sampling; automatic dynamic zero and span calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL D	Automatic dynamic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL D	Automatic dynamic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M101A/M102A Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG DAC	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.

DIAG I/O	Signal I/O diagnostic.
DIAG LAMP	UV lamp calibration diagnostic.
DIAG MEM	Memory reset diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SAMPLE S	Sampling; automatic dynamic span calibration enabled.
SAMPLE Z	Sampling; automatic dynamic zero calibration enabled.
SAMPLE ZS	Sampling; automatic dynamic zero and span calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL D	Automatic dynamic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL D	Automatic dynamic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M200A Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG DAC	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG MEM	Memory reset diagnostic.
DIAG O3GEN	Ozone generator diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SAMPLE S	Sampling; automatic dynamic span calibration enabled.
SAMPLE Z	Sampling; automatic dynamic zero calibration enabled.
SAMPLE ZS	Sampling; automatic dynamic zero and span calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL D	Automatic dynamic span calibration.

SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL D	Automatic dynamic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M300 Instrument Modes	
Mode	**Description**
CAL VALVE	Calibration valve diagnostic.
D/A OUTPUT	D/A output cycling diagnostic.
ELEC. TEST	Electrical test diagnostic.
HOLD OFF	Calibration or diagnostic hold off.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SAMPLE S	Sampling; automatic dynamic span calibration enabled.
SAMPLE Z	Sampling; automatic dynamic zero calibration enabled.
SAMPLE ZS	Sampling; automatic dynamic zero and span calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL D	Automatic dynamic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
SPAN VALVE	Span valve diagnostic.
ZERO CAL A	Automatic zero calibration.
ZERO CAL D	Automatic dynamic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M400 Instrument Modes	
Mode	**Description**
CAL VALVE	Calibration valve diagnostic.
D/A OUTPUT	D/A output cycling diagnostic.
HOLD OFF	Calibration or diagnostic hold off.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SAMPLE S	Sampling; automatic dynamic span calibration enabled.
SAMPLE Z	Sampling; automatic dynamic zero calibration enabled.
SAMPLE ZS	Sampling; automatic dynamic zero and span calibration enabled.

SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL D	Automatic dynamic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
SPAN VALVE	Span valve diagnostic.
ZERO CAL A	Automatic zero calibration.
ZERO CAL D	Automatic dynamic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M401 Instrument Modes	
Mode	**Description**
ASEQ xxxx%A	Automatic sequence generation in progress.
ASEQ xxxx%M	Manual sequence generation in progress.
ASEQ xxxx%R	Remote sequence generation in progress.
BCAL SPAN	Bench span calibration.
BCAL ZERO	Bench zero calibration.
D/A OUTPUT	D/A output cycling diagnostic.
O3GN CAL M	Manual O3 generation.
O3GN CAL R	Remote O3 generation.
SETUP X.X	Setup mode (X.X is software version).
STBY	Standby mode, automatic timer disabled.
STBY AZ2S	Standby mode, automatic timer enabled, zero-2 span points.
STBY AZ5S	Standby mode, automatic timer enabled, zero-5 span points.
STBY AZS	Standby mode, automatic timer enabled, zero-span.
ZERO CAL M	Manual zero generation.
ZERO CAL R	Remote zero generation.

AMX Instrument Modes

M100A-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG FCAL[1]	Flow calibration diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG LAMP	UV lamp calibration diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG PCAL[1]	Pressure sensor calibration diagnostic.

DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
LOW CAL A[1]	Automatic low span calibration.
LOW CAL M[1]	Manual low span calibration.
LOW CAL R[1]	Remote low span calibration.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.
[1] M100AH-AMX only.	

M101A/M102A-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG LAMP	UV lamp calibration diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M200A-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG OPTIC	Optical test diagnostic.
DIAG OZONE	Ozone generator control diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
LOW CAL A[1]	Automatic low span calibration.
LOW CAL M[1]	Manual low span calibration.
LOW CAL R[1]	Remote low span calibration.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.
[1] M200AH-AMX and M200AU-AMX only.	

M300-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG DARK	Dark calibration diagnostic.
DIAG ELEC	Electrical test diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).

SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M400-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG O3GEN	Ozone generator calibration diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
LOW CAL A	Automatic low span calibration.
LOW CAL M	Manual low span calibration.
LOW CAL R	Remote low span calibration.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M400A-AMX Instrument Modes	
Mode	**Description**
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG D/A	D/A calibration diagnostic.
DIAG FCAL	Flow calibration diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG LEAK	Automatic leak check diagnostic.
DIAG O3GEN	Ozone generator calibration diagnostic.
DIAG PCAL	Pressure sensor calibration diagnostic.

DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
LOW CAL A	Automatic low span calibration.
LOW CAL M	Manual low span calibration.
LOW CAL R	Remote low span calibration.
M-P CAL	Manual multi-point calibration.
SAMPLE	Sampling; automatic calibration disabled.
SAMPLE A	Sampling; automatic calibration enabled.
SETUP X.X	Setup mode (X.X is software version).
SPAN CAL A	Automatic span calibration.
SPAN CAL M	Manual span calibration.
SPAN CAL R	Remote span calibration.
ZERO CAL A	Automatic zero calibration.
ZERO CAL M	Manual zero calibration.
ZERO CAL R	Remote zero calibration.

M450-AMX Instrument Modes	
Mode	**Description**
AUTO #N	Automatically monitoring stream *N*.
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.
DIAG CAL	Photometer bench zero/span calibration.
DIAG CFG	Viewing software configuration.
DIAG D/A	D/A calibration diagnostic.
DIAG DARK	Dark calibration diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG PCAL	Pressure sensor calibration diagnostic.
DIAG PHOTO	Photometer lamp drive calibration diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
MANUAL #N	Manually monitoring stream *N*.
SETUP X.X	Setup mode (X.X is software version).

M700-AMX Instrument Modes	
Mode	**Description**
BCAL SPAN	Photometer bench span calibration.
BCAL ZERO	Photometer bench zero calibration.
DIAG	In diagnostic menu.
DIAG AOUT	D/A output cycling diagnostic.

DIAG D/A	D/A calibration diagnostic.
DIAG I/O	Signal I/O diagnostic.
DIAG LEAK	Automatic leak check diagnostic.
DIAG MFC	Mass flow controller configuration and calibration diagnostic.
DIAG O3GEN	Ozone generator calibration diagnostic.
DIAG RESET	Memory reset diagnostic.
DIAG RS232	RS-232 transmit diagnostic.
DIAG TCHN	Test channel diagnostic.
GENERATE	Generating a concentration.
GPT	Generating a GPT.
GPTPS	Generating a GPT-preset.
MANUAL	Generating a manual concentration.
PURGE	Purging.
SEQ X-Y	Executing step *Y* of sequence *X*.
SETUP X.X	Setup mode (X.X is software version).
STANDBY	In standby mode. Not generating any gas.

Appendix E — Messages

The tables below list all of the messages used in all of the instruments. All messages have the format described in the section titled *General Message Format*, including the leading character indicating the message type, the time stamp, and the instrument ID. For brevity, the message type, the time stamp, and the instrument ID are omitted from the messages shown in the tables below. You can refer to test measurements and warning messages by name using the command line interface.

Pre-AMX Instrument Messages

Model 100A Messages

M100A Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION, SO2=xxxx PPB[1]	Finished zero calibration.
START xxxx% SPAN CALIBRATION[2]	Beginning low span calibration.
FINISH xxxx% SPAN CALIBRATION[2], SO2=xxxx PPB[1]	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION, SO2=xxxx PPB[1]	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.
[1] Depends on which units are currently selected. [2] Available only if multi-sequence IZS option is installed.	

M100A Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M100A DAS Messages	
Message	**Description**
RANGE=xxxx SO2=xxxx PPB[1] SAMPLES=xxxx	Automatic DAS report.
SO2=xxxx PPB[1] SAMPLES=xxxx	DAS report in response to command line request. (Range omitted.)
[1] Depends on which units are currently selected.	

M100A Test Measurements		
Name	**Message**	**Description**
SO2	SO2=xxxx PPB[1]	SO_2 concentration.
RANGE1[2]	RANGE1=xxxx PPB[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPB[1]	Instrument range 2.
RANGE	RANGE=xxxx PPB[1]	Instrument range.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
SPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
PMT	PMT=xxxx MV	PMT output.
UV	UV LAMP=xxxx MV	UV lamp output.
LAMPR	LAMP RATIO=xxxx%	Current UV ÷ calibrated UV.
STRAY	STR. LGT=xxxx PPB[1]	Stray light.
DARKPMT	DRK PMT=xxxx MV	PMT dark offset.
DARKLAMP	DRK LMP=xxxx MV	UV lamp dark offset.
SLOPE	SLOPE=xxxx	Calibration slope term.
OFFSET	OFFSET=xxxx MV	Calibration offset term.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
IZSTEMP	IZS TEMP=xxxx C	IZS temperature.
TESTCHAN	TEST=xxxx MV	Diagnostic test channel output.
CLKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if a multiple-range mode is in use.

M100A Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WUVLAMP	UV LAMP WARNING	UV lamp out of spec.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSMPPRES	SAMP PRESSURE WARN	Sample pressure out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WRCELLT	RCELL TEMP WARNING	Reaction cell temp. out of spec.
WIZSTMP	IZS TEMP WARNING	IZS temp. out of spec.
WPMTTMP	PMT TEMP WARNING	PMT temp. out of spec.
WSHUTTER	SHUTTER WARNING	Dark calibration shutter not functioning.

WHVPS	HVPS WARNING	High voltage power supply out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WADINS	A/D NOT INSTALLED	A/D card not installed or broken.

Model 101A/102A Messages

M101A/M102A Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION, SO2[1]=xxxx PPB[2]	Finished zero calibration.
START xxxx% SPAN CALIBRATION[3]	Beginning low span calibration.
FINISH xxxx% SPAN CALIBRATION[3], SO2[1]=xxxx PPB[2]	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION, SO2[1]=xxxx PPB[2]	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.
[1] Depends on which gas is being calibrated. May be SO2, H2S, or TRS. [2] Depends on which units are currently selected. [3] Available only if multi-sequence IZS option is installed.	

M101A/M102A Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M101A/M102A DAS Messages	
Message	**Description**
RANGE=xxxx SO2=xxxx H2S[1]=xxxx PPB[2] SAMPLES=xxxx	Standard DAS report.
SO2=xxxx H2S[1]=xxxx PPB[2] SAMPLES=xxxx	DAS report in response to command line request.
[1] "H2S" in M101A; "TRS" in M102A. [2] Depends on which units are currently selected.	

M101A/M102A Test Measurements		
Name	**Message**	**Description**
SO2	SO2=xxxx PPB[1]	SO_2 concentration.
H2S or TRS[2]	H2S=xxxx PPB[1] or TRS=xxxx PPB[1,2]	H_2S or TRS concentration.
RANGE1[3]	SO2 RNG=xxxx PPB[1]	SO_2 range.
RANGE2[3]	H2S RNG=xxxx PPB[1] or TRS RNG=xxxx PPB[1,2]	H_2S or TRS range.
RANGE	RANGE=xxxx PPB[1]	Instrument range.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
SPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
PMT	PMT=xxxx MV	PMT output.
UV	UV LAMP=xxxx MV	UV lamp output.
LAMPR	LAMP RATIO=xxxx%	Current UV ÷ calibrated UV.
STRAY	STR. LGT=xxxx PPB[1]	Stray light.
DARKPMT	DRK PMT=xxxx MV	PMT dark offset.
DARKLAMP	DRK LMP=xxxx MV	UV lamp dark offset.
SO2SLOPE	SO2 SLOPE=xxxx	SO_2 calibration slope term.
SO2OFFSET	SO2 OFFS=xxxx MV	SO_2 calibration offset term.
H2SSLOPE or TRSSLOPE[2]	H2S SLOPE=xxxx or TRS SLOPE=xxxx[2]	H_2S or TRS calibration slope term.
H2SOFFSET or TRSOFFSET[2]	H2S OFFS=xxxx MV or TRS OFFS=xxxx MV[2]	H_2S or TRS calibration offset term.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
IZSTEMP	IZS TEMP=xxxx C	IZS temperature.
CONVTEMP[4]	CONV TEMP=xxxx C	Converter temperature.
TESTCHAN	TEST=xxxx MV	Diagnostic test channel output.
CLKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] "H2S" in M101A; "TRS" in M102A.
[3] Visible only if independent range mode is in use.
[4] M101A only.

M101A/M102A Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.

WUVLAMP	UV LAMP WARNING	UV lamp out of spec.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSMPPRES	SAMP PRESSURE WARN	Sample pressure out of spec.
WCONVTEMP	CONV TEMP WARNING	Converter temp. out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WRCELLT	RCELL TEMP WARNING	Reaction cell temp. out of spec.
WIZSTMP	IZS TEMP WARNING	IZS temp. out of spec.
WPMTTMP	PMT TEMP WARNING	PMT temp. out of spec.
WSHUTTER	SHUTTER WARNING	Dark calibration shutter not functioning.
WHVPS	HVPS WARNING	High voltage power supply out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 200A Messages

M200A Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION, NO2[1]=xxxx PPB[2]	Finished zero calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION, NO2[1]=xxxx PPB[2]	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point cal.
FINISH MULTI-POINT CALIBRATION, NO2[1]=xxxx PPB[2]	Finished multi-point cal.
[1] NO2 or NH3 depending on software options installed. [2] Depends on which units are currently selected.	

M200A Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M200A DAS Messages	
Message	**Description**
RANGE=xxxx NO2[1]=xxxx NOX[1]=xxxx NO[1]=xxxx PPB[2] SAMPLES=xxxx	Standard DAS report.

NO2[1]=xxxx NOX[1]=xxxx NO[1]=xxxx PPB[2] SAMPLES=xxxx	DAS report in response to command line request.
[1] NO2/NOX/NO or NH3/TNX/TN depending on software options installed. [2] Depends on which units are currently selected.	

M200A Test Messages		
Name	**Message**	**Description**
NONOX[5]	NO=xxxx NOX=xxxx PPB[3]	NO-NOX concentration.
NOXRANGE or TNXRANGE[1,4]	NOX RNG=xxxx PPB[3] or TNX RNG=xxxx PPB[3]	D/A range for NO_X or TNX channel.
NORANGE or TNRANGE[1,4]	NO RNG=xxxx PPB[3] or TN RNG=xxxx PPB[3]	D/A range for NO or TN channel.
NO2RANGE or NH3RANGE[1,4]	NO2 RNG=xxxx PPB[3] or NH3 RNG=xxxx PPB[3]	D/A range for NO_2 or NH_3 channel.
RANGE[2]	RANGE=xxxx PPB[3]	Instrument range.
STABILITY	NOX[4] STB=xxxx PPB[1]	Concentration stability.
SFLOW	SAMP FLW=xxxx CC/M	Sample flow rate.
OFLOW	OZONE FL=xxxx CC/M	Ozone flow rate.
PMT	PMT=xxxx MV	PMT output.
AZERO	AZERO=xxxx MV	Auto zero offset.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
IZSTEMP	IZS TEMP=xxxx C	IZS temperature.
MOLYTEMP or CONVTEMP[6]	MOLY TEMP=xxxx C or CONV TEMP=xxxx C[6]	Converter temperature.
RCPRESS	RCEL=xxxx IN-HG-A	Reaction cell pressure.
SMPPRESS	SAMP=xxxx IN-HG-A	Sample pressure.
NOXSLOPE or TNXSLOPE	NOX SLOPE=xxxx or TNX SLOPE=xxxx	NO_X or TNX calibration slope term.
NOXOFFSET or TNXOFFSET	NOX OFFS=xxxx MV or TNX OFFS=xxxx MV	NO_X or TNX calibration offset term.
NOSLOPE or TNSLOPE	NO SLOPE=xxxx or TN SLOPE=xxxx	NO or TN calibration slope term.
NOOFFSET or TNOFFSET	NO OFFS=xxxx MV or TN OFFS=xxxx MV	NO or TN calibration offset term.
NO2 or NH3	NO2[4]=xxxx PPB[3] or NH3[4]=xxxx PPB[3]	NO_2 or NH_3 concentration.
NOX or TNX	NOX[4]=xxxx PPB[3] or TNX[4]=xxxx PPB[3]	NO_X or TNX concentration.

NO or TN	NO[4]=xxxx PPB[3] or TN[4]=xxxx PPB[3]	NO or TN concentration.
CLKTIME	TIME=hh:mm:ss	Time of day.

[1] Available only when independent D/A range mode is being used.
[2] Available only when independent D/A range mode is *not* being used.
[3] Depends on which units are currently selected.
[4] NO2/NOX/NO or NH3/TNX/TN depending on software options installed.
[5] Available only when "triple-gas" software option is installed.
[6] "CONV" when high temperature converter option is installed.

M200A Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WOZFLOW	OZONE FLOW WARNING	Ozone flow out of spec.
WRCELLP	RCELL PRESS WARN	Reaction cell pressure out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WRCELLT	RCELL TEMP WARNING	Reaction cell temp. out of spec.
WIZSTMP	IZS TEMP WARNING	IZS temp. out of spec.
WMOLYTMP or WCONVTMP[1]	MOLY TEMP WARNING or CONV TEMP WARNING[1]	Converter temp. out of spec.
WPMTTEMP	PMT TEMP WARNING	PMT temp. out of spec.
WAZERO	AUTO ZERO WARNING	Auto-zero offset too large.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WADINS	V/F NOT DETECTED	V/F card not installed or broken.

[1] "CONV" when high temperature converter option is installed.

Model 300 Messages

M300 Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION, CO=xxxx PPB[1]	Finished zero calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION, CO=xxxx PPB[1]	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point cal.
FINISH MULTI-POINT CALIBRATION, CO=xxxx PPB[1]	Finished multi-point cal.

START CALIBRATION HOLD	Beginning calibration hold off.
FINISH CALIBRATION HOLD	Finished calibration hold off.
[1] Depends on which units are currently selected.	

M300 Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.
SPAN VALVE=ON(OFF) [1]	Status of span valve test.
CAL VALVE=ON(OFF) [1]	Status of cal. valve test.
ELEC. TEST=ON(OFF) [1]	Status of electrical test.
D/A OUTPUT=xxxx% [1]	Status of D/A cycling test.
BEGIN DIAGNOSTIC HOLD	Beginning diagnostic hold off.
FINISH DIAGNOSTIC HOLD	Finished diagnostic hold off.
[1] Printed only if diagnostic mode invoked from command line interface.	

M300 DAS Messages	
Message	**Description**
RANGE=xxxx CO=xxxx PPB[1] SAMPLES=xxxx	Standard DAS report.
CO=xxxx PPB[1] SAMPLES=xxxx	DAS report in response to command line request.
[1] Depends on which units are currently selected.	

M300 Test Messages		
Name	**Message**	**Description**
CO	CO=xxxx PPB[1]	CO concentration.
RANGE	RANGE=xxxx PPB[1]	Instrument range.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
COMEAS	CO MEAS=xxxx CNT	CO measure reading.
COREF	CO REF=xxxx CNT	CO reference reading.
MRRATIO	MR RATIO=xxxx	CO measure / CO reference.
SPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SFLOW	SMP FLOW=xxxx CC/M	Sample flow rate.
STEMP	SAMPLE TEMP=xxxx C	Sample temperature.
BENCHTEMP	BENCH TEMP=xxxx C	Optical bench temperature.
WHEELTEMP	WHEEL TEMP=xxxx C	Wheel temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
TESTCHAN	TEST=xxxx MV	Diagnostic test channel output.
CLKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.

M300 Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WSOURCE	SOURCE WARNING	IR source intensity out of spec.
WBENCHHLT	BENCH TEMP FAILURE	Bench heater shutdown.
WWHEELHLT	WHEEL TEMP FAILURE	Wheel heater shutdown.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSMPPRES	SAMP PRESSURE WARN	Sample pressure out of spec.
WSMPTEMP	SAMPLE TEMP WARN	Sample temp. out of spec.
WBENCHTMP	BENCH TEMP WARNING	Bench temp. out of spec.
WWHEELTMP	WHEEL TEMP WARNING	Wheel temp. out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WSYNC	SYNC ERROR	Sync. error.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WDCPS	DCPS WARNING	DC power supply out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 400 Messages

M400 Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION, O3=xxxx PPB[1]	Finished zero calibration.
START xxxx% SPAN CALIBRATION	Beginning low span calibration.
FINISH xxxx% SPAN CALIBRATION, O3=xxxx PPB[1]	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION, O3=xxxx PPB[1]	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point cal.
FINISH MULTI-POINT CALIBRATION, O3=xxxx PPB[1]	Finished multi-point cal.
START CALIBRATION HOLD	Beginning calibration hold off.
FINISH CALIBRATION HOLD	Finished calibration hold off.
[1] Depends on which units are currently selected.	

M400 Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.
SPAN VALVE=ON(OFF) [1]	Status of span valve test.
CAL VALVE=ON(OFF) [1]	Status of cal. valve test.
D/A OUTPUT=xxxx%[1]	Status of D/A cycling test.
BEGIN DIAGNOSTIC HOLD	Beginning diagnostic hold off.
FINISH DIAGNOSTIC HOLD	Finished diagnostic hold off.
[1] Printed only if diagnostic mode invoked from command line interface.	

M400 DAS Messages	
Message	**Description**
RANGE=xxxx O3=xxxx PPB[1] SAMPLES=xxxx	Standard DAS report.
O3=xxxx PPB[1] SAMPLES=xxxx	DAS report in response to command line request.
[1] Depends on which units are currently selected.	

M400 Test Messages		
Name	**Message**	**Description**
O3	O3=xxxx PPB[1]	O3 concentration.
RANGE	RANGE=xxxx PPB[1]	Instrument range.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
O3MEAS	O3 MEAS=xxxx MV	O3 measure reading.
O3REF	O3 REF=xxxx MV	O3 reference reading.
IZSREF	IZS REF=xxxx MV	O3 generator reference detector.
O3GENDRIVE	O3 DRIVE=xxxx MV	O3 generator lamp drive voltage.
SPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SFLOW	SAMPLE FL=xxxx CC/M	Sample flow rate.
STEMP	SAMPLE TEMP=xxxx C	Sample temperature.
ALTEMP	ANA LAMP TMP=xxxx C	Analyzer lamp temperature.
ILTEMP	IZS LAMP TMP=xxxx C	IZS lamp temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
TESTCHAN	TEST=xxxx MV	Diagnostic test channel output.
CLKTIME	TIME=hh:mm:ss	Time of day.
[1] Depends on which units are currently selected.		

M400 Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WALMPINT	ANA LAMP WARNING	Analyzer lamp intensity out of spec.
WILMPINT	IZS LAMP WARNING	IZS lamp intensity out of spec.
WILMPHLT	IZS LAMP SHUTDOWN	IZS lamp temp. out of spec.
WREFDET	IZS REF DET WARN	O3 generator reference out of spec.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSMPPRES	SAMP PRESSURE WARN	Sample pressure out of spec.
WSMPTEMP	SAMPLE TEMP WARN	Sample temp. out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WILMPTMP	IZS LAMP TEMP WARN	IZS lamp temp. out of spec.
WALMPTMP	ANA LAMP TEMP WARN	Analyzer lamp temp. out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WDCPS	DCPS WARNING	DC power supply out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 401 Messages

M401 Calibration Messages	
Message	**Description**
STANDBY	Entering standby mode. Not generating O3 or zero.
GENERATE ZERO	Generating zero gas.
GENERATE xxxx PPB[1] O3	Generating O3 concentration.
BEGIN AUTO SEQUENCE xxxx% OF 400 PPB[1]	Generating O3 sequence.
FINISH AUTO SEQUENCE	Stop generating O3 sequence.
START BENCH ZERO CALIBRATION	Beginning bench zero calibration.
FINISH BENCH ZERO CALIBRATION, O3=xxxx PPB[1]	Finished bench zero calibration.
START BENCH SPAN CALIBRATION	Beginning bench span calibration.
FINISH BENCH SPAN CALIBRATION, O3=xxxx PPB[1]	Finished bench span calibration.
[1] Depends on which units are currently selected.	

M401 Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.
D/A OUTPUT=xxxx%[1]	Status of D/A cycling test.
[1] Printed only if diagnostic mode invoked from command line interface.	

M401 DAS Messages	
Message	**Description**
RANGE=xxxx O3=xxxx PPB[1] SAMPLES=xxxx	Standard DAS report.
O3=xxxx PPB[1] SAMPLES=xxxx	DAS report in response to command line request.
[1] Depends on which units are currently selected.	

M401 Test Messages		
Name	**Message**	**Description**
O3	O3=xxxx PPB[1]	O3 concentration.
O3SET	O3 SET=xxxx PPB[1]	O3 generator set point.
RANGE	RANGE=xxxx PPB[1]	Instrument range.
O3MEAS	O3 MEAS=xxxx MV	O3 measure reading.
O3REF	O3 REF=xxxx MV	O3 reference reading.
O3GENREF	O3 GEN=xxxx MV	O3 generator reference detector.
O3GENDRIVE	O3 DRIVE=xxxx MV	O3 generator lamp drive voltage.
SPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
STEMP	SAMPLE TEMP=xxxx C	Sample temperature.
ALTEMP	ALAMP TEMP=xxxx C	Analyzer lamp temperature.
O3GENFL	O3 FLOW=xxxx L/M	O3 generator flow rate.
O3LMPTEMP	OLAMP TEMP=xxxx C	O3 generator lamp temperature.
O3REGPRESS	REG=xxxx IN-HG-A	Regulator pressure.
O3SLOPE	O3 SLOPE=xxxx	O3 bench calibration slope term.
O3OFFSET	O3 OFFS=xxxx PPB[1]	O3 bench calibration offset term.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
TESTCHAN	TEST=xxxx MV	Diagnostic test channel output.
CLKTIME	TIME=hh:mm:ss	Time of day.
[1] Depends on which units are currently selected.		

M401 Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WALMPINT	ANA LAMP WARNING	Analyzer lamp intensity out of spec.
WO3FLOW	O3 FLOW WARNING	O3 generator flow out of spec.
WO3REFDET	O3 REF DET WARN	O3 generator reference out of spec.
WSMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSMPPRES	SAMP PRESSURE WARN	Sample pressure out of spec.
WSMPTEMP	SAMPLE TEMP WARN	Sample temp. out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temp. out of spec.
WO3LMPTMP	O3 LAMP TEMP WARN	O3 generator lamp temp. out of spec.
WALMPTMP	ANA LAMP TEMP WARN	Analyzer lamp temp. out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

AMX Instrument Messages

Model 100A-AMX Messages

The tables below list the messages for the entire M100A-AMX family, including the M100AH-AMX.

M100A-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.
START LOW SPAN CALIBRATION[1]	Beginning low span calibration.
FINISH LOW SPAN CALIBRATION[1]	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.
[1] M100AH-AMX only.	

M100A-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M100A-AMX Test Measurements		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPB[1]	Instrument range.
RANGE1[2]	RANGE1=xxxx PPB[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPB[1]	Instrument range 2.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
VACUUM[3]	VAC=xxxx IN-HG-A	Vacuum pressure.
SAMPPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SAMPFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
PMTDET	PMT=xxxx MV	PMT output.
UVDET	UV LAMP=xxxx MV	UV lamp output.
LAMPRATIO	LAMP RATIO=xxxx%	Current UV ÷ calibrated UV.
STRAYLIGHT	STR. LGT=xxxx PPB[1]	Stray light.
DARKPMT	DRK PMT=xxxx MV	PMT dark offset.
DARKLAMP	DRK LMP=xxxx MV	UV lamp dark offset.
SLOPE	SLOPE=xxxx	Calibration slope term.
OFFSET	OFFSET=xxxx MV	Calibration offset term.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCELLTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
IZSTEMP[3]	IZS TEMP=xxxx C	IZS temperature.
SO2	SO2=xxxx PPB[1]	SO_2 concentration.
TESTCHAN	TEST=xxxx MV[4]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if a multiple-range mode is in use.
[3] M100AH-AMX only.
[4] Units may be “MV” or “MA” depending on D/A configuration.

M100A-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WPMT	PMT DET WARNING	PMT detector out of spec.
WUVLAMP	UV LAMP WARNING	UV lamp out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WVACPRESS[1]	VACUUM PRESS WARN	Vacuum pressure out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.

WRCELLTEMP	RCELL TEMP WARNING	Reaction cell temperature out of spec.
WIZSTEMP[1]	IZS TEMP WARNING	IZS temperature out of spec.
WPMTTEMP	PMT TEMP WARNING	PMT temperature out of spec.
WDARKCAL[1]	DARK CAL WARNING	Dark calibration offset too large.
WSHUTTER[2]	SHUTTER WARNING	Dark calibration shutter not functioning.
WHVPS	HVPS WARNING	High voltage power supply out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

[1] M100AH-AMX only.
[2] M100A-AMX only.

Model 101A/102A-AMX Messages

M101A/M102A-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.

M101A/M102A-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M101A/M102A-AMX Test Measurements		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPB[1]	Instrument range.
RANGE1[2]	RANGE1=xxxx PPB[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPB[1]	Instrument range 2.
STABILITY	SO2[3,4] STB=xxxx PPB[1]	Concentration stability.
SAMPPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SAMPFLOW	SAMP FL=xxxx CC/M	Sample flow rate.

PMTDET	PMT=xxxx MV	PMT output.
UVDET	UV LAMP=xxxx MV	UV lamp output.
LAMPRATIO	LAMP RATIO=xxxx%	Current UV ÷ calibrated UV.
STRAYLIGHT	STR. LGT=xxxx PPB[1]	Stray light.
DARKPMT	DRK PMT=xxxx MV	PMT dark offset.
DARKLAMP	DRK LMP=xxxx MV	UV lamp dark offset.
SO2SLOPE	SO2 SLOPE=xxxx	SO_2 calibration slope term.
SO2OFFSET	SO2 OFFS=xxxx MV	SO_2 calibration offset term.
H2SSLOPE or TRSSLOPE[4]	H2S SLOPE=xxxx or TRS SLOPE=xxxx[4]	H_2S or TRS calibration slope term.
H2SOFFSET or TRSOFFSET[4]	H2S OFFS=xxxx MV or TRS OFFS=xxxx MV[4]	H_2S or TRS calibration offset term.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCELLTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
IZSTEMP	IZS TEMP=xxxx C	IZS temperature.
CONVTEMP[5]	CONV TEMP=xxxx C	Converter temperature.
SO2	SO2=xxxx PPB[1]	SO_2 concentration.
H2S or TRS[4]	H2S=xxxx PPB[1] or TRS=xxxx PPB[1,4]	H_2S or TRS concentration.
TESTCHAN	TEST=xxxx MV[6]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Depends on which gas is selected for the stability measurement.
[4] "H2S" in M101A-AMX; "TRS" in M102A-AMX.
[5] M101A-AMX only.
[6] Units may be "MV" or "MA" depending on D/A configuration.

M101A/M102A-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WUVLAMP	UV LAMP WARNING	UV lamp out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WCONVTEMP	CONV TEMP WARNING	Converter temperature out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.
WRCELLTEMP	RCELL TEMP WARNING	Reaction cell temperature out of spec.

WIZSTEMP	IZS TEMP WARNING	IZS temperature out of spec.
WPMTTEMP	PMT TEMP WARNING	PMT temperature out of spec.
WSHUTTER	SHUTTER WARNING	Dark calibration shutter not functioning.
WHVPS	HVPS WARNING	High voltage power supply out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 200A-AMX Messages

The tables below list the messages for the entire M200A-AMX family, including the M200AH-AMX and M200AU-AMX.

M200A-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.
START LOW SPAN CALIBRATION[1]	Beginning low span calibration.
FINISH LOW SPAN CALIBRATION[1]	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.
[1] M200AH-AMX and M200AU-AMX only.	

M200A-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M200A-AMX Test Messages		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPB[1]	Instrument range.
NOXRANGE[2]	NOX RNG=xxxx PPB[1]	Range for NO_X.
NORANGE[2]	NO RNG=xxxx PPB[1]	Range for NO.
NO2RANGE[2]	NO2 RNG=xxxx PPB[1]	Range for NO_2.
STABILITY	NOX[3] STB=xxxx PPB[1]	Concentration stability.

SAMPFLOW	SAMP FLW=xxxx CC/M	Sample flow rate.
OZONEFLOW	OZONE FL=xxxx CC/M	Ozone flow rate.
PMT	PMT=xxxx MV	Raw PMT output.
NORMPMT	NORM PMT=xxxx MV	Normalized PMT output.
AUTOZERO	AZERO=xxxx MV	Auto-zero offset.
HVPS	HVPS=xxxx V	High voltage power supply.
DCPS	DCPS=xxxx MV	DC power supply.
RCELLTEMP	RCELL TEMP=xxxx C	Reaction cell temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PMTTEMP	PMT TEMP=xxxx C	PMT temperature.
BLOCKTEMP[4]	BLOCK TEMP=xxxx C	Orifice block temperature.
IZSTEMP[5]	IZS TEMP=xxxx C	IZS temperature.
CONVTEMP	CONV[6] TEMP=xxxx C	Converter temperature.
RCELLPRESS	RCEL=xxxx IN-HG-A	Reaction cell pressure.
SAMPPRESS	SAMP=xxxx IN-HG-A	Sample pressure.
NOXSLOPE	NOX SLOPE=xxxx	NO_X calibration slope term.
NOXOFFSET	NOX OFFS=xxxx MV	NO_X calibration offset term.
NOSLOPE	NO SLOPE=xxxx	NO calibration slope term.
NOOFFSET	NO OFFS=xxxx MV	NO calibration offset term.
NO2	NO2=xxxx PPB[1]	NO_2 concentration.
NOX	NOX=xxxx PPB[1]	NO_X concentration.
NO	NO=xxxx PPB[1]	NO concentration.
TESTCHAN	TEST=xxxx MV[7]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Depends on which gas is selected for the stability measurement.
[4] M200AH-AMX only.
[5] M200A-AMX only.
[6] Converter name may be “CONV,” “MOLY,” or “O3KL.”
[7] Units may be “MV” or “MA” depending on D/A configuration.

M200A-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WOZONEFLOW	OZONE FLOW WARNING	Ozone flow out of spec.
WRCELLPRESS	RCELL PRESS WARN	Reaction cell pressure out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.
WRCELLTEMP	RCELL TEMP WARNING	Reaction cell temperature out of spec.

WBLOCKTEMP[1]	BLOCK TEMP WARNING	Orifice block temperature out of spec.
WIZSTMP[2]	IZS TEMP WARNING	IZS temperature out of spec.
WCONVTEMP	CONV[3] TEMP WARNING	Converter temperature out of spec.
WPMTTEMP	PMT TEMP WARNING	PMT temperature out of spec.
WAUTOZERO	AUTO ZERO WARNING	Auto-zero offset too large.
WHVPS	HVPS WARNING	High voltage power supply out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

[1] M200AH-AMX only.
[2] M200A-AMX only.
[3] Converter name may be "CONV," "MOLY," or "O3KL."

Model 300-AMX Messages

M300-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.

M300-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M300-AMX Test Messages		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPM[1]	Instrument range.
RANGE1[2]	RANGE1=xxxx PPM[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPM[1]	Instrument range 2.
STABILITY	STABIL=xxxx PPM[1]	Concentration stability.
COMEAS	CO MEAS=xxxx MV	CO measure reading.
COREF	CO REF=xxxx MV	CO reference reading.

MRRATIO	MR RATIO=xxxx	CO measure / CO reference.
SAMPPRESS	PRES=xxxx IN-HG-A	Sample pressure.
SAMPFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
SAMPTEMP	SAMPLE TEMP=xxxx C	Sample temperature.
BENCHTEMP	BENCH TEMP=xxxx C	Optical bench temperature.
WHEELTEMP	WHEEL TEMP=xxxx C	Wheel temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
COSLOPE	SLOPE=xxxx	CO calibration slope term.
COOFFSET	OFFSET=xxxx	CO calibration offset term.
CO	CO=xxxx PPM[1]	CO concentration.
TESTCHAN	TEST=xxxx MV[3]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Units may be "MV" or "MA" depending on D/A configuration.

M300-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WSOURCE	SOURCE WARNING	IR source intensity out of spec.
WBENCHTEMP	BENCH TEMP WARNING	Optical bench temperature out of spec.
WWHEELTEMP	WHEEL TEMP WARNING	Wheel temperature out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WSAMPTEMP	SAMPLE TEMP WARN	Sample temperature out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.
WSYNC	SYNC WARNING	Sync. OK indicator not active.
WDCPS	DCPS WARNING	DC power supply out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 400-AMX Messages

M400-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.

START LOW SPAN CALIBRATION	Beginning low span calibration.
FINISH LOW SPAN CALIBRATION	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.

M400-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M400-AMX Test Messages		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPB[1]	Instrument range.
RANGE1[2]	RANGE1=xxxx PPB[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPB[1]	Instrument range 2.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
PHOTOMEAS	O3 MEAS=xxxx MV	Photometer measure reading.
PHOTOREF	O3 REF=xxxx MV	Photometer reference reading.
O3GENREF	O3 GEN=xxxx MV	O_3 generator reference detector.
O3GENDRIVE	O3 DRIVE=xxxx MV	O_3 generator lamp drive voltage.
PHOTOSPRESS	PRES=xxxx IN-HG-A	Sample pressure.
PHOTOSFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
PHOTOSTEMP	SAMPLE TEMP=xxxx C	Sample temperature.
PHOTOLTEMP	PHOTO LAMP=xxxx C	Photometer lamp temperature.
O3GENTEMP	O3 GEN TMP=xxxx C	O_3 generator lamp temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
PHOTOSLOPE	SLOPE=xxxx	O_3 calibration slope term.
PHOTOOFFSET	OFFSET=xxxx PPB	O_3 calibration offset term.
O3	O3=xxxx PPB[1]	O_3 concentration.
TESTCHAN	TEST=xxxx MV[3]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Units may be “MV” or “MA” depending on D/A configuration.

M400-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WPHOTOREF	PHOTO REF WARNING	Photometer detector reference reading out of spec.
WO3GENREF	O3 GEN REF WARNING	O_3 generator reference detector reading out of spec.
WO3GENINT	O3 GEN LAMP WARN	O_3 generator lamp intensity out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPTEMP	SAMPLE TEMP WARN	Sample temperature out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.
WO3GENTEMP	O3 GEN TEMP WARN	O_3 generator lamp temperature out of spec.
WPHOTOLTEMP	PHOTO TEMP WARNING	Photometer lamp temperature out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WDCPS	DCPS WARNING	DC power supply out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 400A-AMX Messages

M400A-AMX Calibration Messages	
Message	**Description**
START ZERO CALIBRATION	Beginning zero calibration.
FINISH ZERO CALIBRATION	Finished zero calibration.
START LOW SPAN CALIBRATION	Beginning low span calibration.
FINISH LOW SPAN CALIBRATION	Finished low span calibration.
START SPAN CALIBRATION	Beginning span calibration.
FINISH SPAN CALIBRATION	Finished span calibration.
START MULTI-POINT CALIBRATION	Beginning multi-point calibration.
FINISH MULTI-POINT CALIBRATION	Finished multi-point calibration.

M400A-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M400A-AMX Test Messages		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPB[1]	Instrument range.
RANGE1[2]	RANGE1=xxxx PPB[1]	Instrument range 1.
RANGE2[2]	RANGE2=xxxx PPB[1]	Instrument range 2.
STABILITY	STABIL=xxxx PPB[1]	Concentration stability.
PHOTOMEAS	O3 MEAS=xxxx MV	Photometer measure reading.
PHOTOREF	O3 REF=xxxx MV	Photometer reference reading.
O3GENREF	O3 GEN=xxxx MV	O_3 generator reference detector.
O3GENDRIVE	O3 DRIVE=xxxx MV	O_3 generator lamp drive voltage.
VACUUM	VAC=xxxx IN-HG-A	Vacuum pressure.
PHOTOSPRESS	PRES=xxxx IN-HG-A	Sample pressure.
PHOTOSFLOW	SAMP FL=xxxx CC/M	Sample flow rate.
PHOTOSTEMP	SAMPLE TEMP=xxxx C	Sample temperature.
PHOTOLTEMP	PHOTO LAMP=xxxx C	Photometer lamp temperature.
O3GENTEMP	O3 GEN TMP=xxxx C	O_3 generator lamp temperature.
BLOCKTEMP	BLOCK TEMP=xxxx C	Orifice block temperature.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
DCPS	DCPS=xxxx MV	DC power supply.
PHOTOSLOPE	SLOPE=xxxx	O_3 calibration slope term.
PHOTOOFFSET	OFFSET=xxxx PPB	O_3 calibration offset term.
O3	O3=xxxx PPB[1]	O_3 concentration.
TESTCHAN	TEST=xxxx MV[3]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Units may be “MV” or “MA” depending on D/A configuration.

M400A-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WPHOTOREF	PHOTO REF WARNING	Photometer detector reference reading out of spec.
WO3GENREF	O3 GEN REF WARNING	O_3 generator reference detector reading out of spec.
WO3GENINT	O3 GEN LAMP WARN	O_3 generator lamp intensity out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPTEMP	SAMPLE TEMP WARN	Sample temperature out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.

WO3GENTEMP	O3 GEN TEMP WARN	O_3 generator lamp temperature out of spec.
WPHOTOLTEMP	PHOTO TEMP WARNING	Photometer lamp temperature out of spec.
WBLOCKTEMP	BLOCK TEMP WARNING	Orifice block temperature out of spec.
WORIFICE	ORIFICE FLOW WARN	Orifice flow out of spec.
WDYNZERO	CANNOT DYN ZERO	Unable to dynamically zero calibrate instrument.
WDYNSPAN	CANNOT DYN SPAN	Unable to dynamically span calibrate instrument.
WDCPS	DCPS WARNING	DC power supply out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 450-AMX Messages

M450-AMX Audit Trail Messages	
Message	**Description**
HI ALARM ON STREAM n, LIMIT=xxxx, CONC=xxxx PPB[1]	High alarm limit was exceeded on stream *n*.
HI-HI ALARM ON STREAM n, LIMIT=xxxx, CONC=xxxx PPB[1]	High-high alarm limit was exceeded on stream *n*.
ALARM CLEARED ON STREAM n, CONC=xxxx PPB[1]	Alarm on stream *n* cleared itself. This message appears only if alarm latching is off.
ALARM ACKNOWLEDGED FOR STREAM n	User acknowledged alarm for stream *n* in **ALRM** menu. This message appears only if alarm latching is on.
DONE MONITORING STREAM n, CONC=xxxx PPB[1]	This message is printed just before the instrument switches to another stream.
[1] Depends on which units are currently selected.	

M450-AMX Calibration Messages	
Message	**Description**
START PHOTOMETER ZERO/SPAN CALIBRATION	Beginning photometer bench zero/span calibration.
FINISH PHOTOMETER ZERO/SPAN CALIBRATION	Finished photometer bench zero/span calibration.

M450-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.

M450-AMX Test Messages		
Name	**Message**	**Description**
RANGE	RANGE=xxxx PPM[1]	Instrument range.
PHOTOSPRESS	PRES=xxxx IN-HG-A	Sample pressure.
PHOTOSTEMP	SAMPLE TEMP=xxxx C	Sample temperature.
O3	O3=xxxx PPM[1]	O_3 concentration.
CLOCKTIME	TIME=hh:mm:ss	Time of day.
[1] Depends on which units are currently selected.		

M450-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WPHOTOREF	PHOTO REF WARNING	Photometer detector reference reading out of spec.
WSAMPPRESS	SAMPLE PRESS WARN	Sample pressure out of spec.
WSAMPFLOW	SAMPLE FLOW WARN	Sample flow out of spec.
WSAMPTEMP	SAMPLE TEMP WARN	Sample temperature out of spec.
WBOXTEMP	BOX TEMP WARNING	Box temperature out of spec.
WPHOTOLTEMP	PHOTO TEMP WARNING	Photometer lamp temperature out of spec.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Model 700-AMX Messages

M700-AMX Calibration Messages	
Message	**Description**
START BENCH ZERO CALIBRATION	Beginning photometer bench zero calibration.
FINISH BENCH ZERO CALIBRATION, CONC=xxxx PPB O3	Finished photometer bench zero calibration.
START BENCH SPAN CALIBRATION	Beginning photometer bench span calibration.
FINISH BENCH SPAN CALIBRATION, CONC=xxxx PPB O3	Finished photometer bench span calibration.
GENERATE conc[1] units[2] gas[3] Example: GENERATE 400 PPB SO2	Generating a concentration.

GPT noConc[1] noUnits[2] NO,o3Conc[1] o3Units[2] O3 Example: GPT 100 PPB NO,100 PPB O3	Generating a GPT.
GPTPS noConc[1] noUnits[2] NO,o3Conc[1] o3Units[2] O3 Example: GPTPS 100 PPB NO,100 PPB O3	Generating a GPT-preset.
MANUAL conc[1] units[2] gas[3] Example: MANUAL 400 PPB SO2	Generating a manual concentration of a single gas.
MANUAL conc[1] units[2] gas[3],o3Conc[1] o3Units[2] O3 Example: MANUAL 400 PPB NO,400 PPB O3	Generating a manual concentration consisting of a gas plus O_3.
MANUAL conc[1] units[2] gas[3],xxxx MV O3 Example: MANUAL 400 PPB NO,1000 MV O3	Generating a manual concentration consisting of a gas plus O_3 at a constant mV level.
PURGE	Purging.
STANDBY	Going into standby mode.
SEQUENCE nnnn, CYCLE xxxx Example: SEQUENCE 123, CYCLE 1	Executing cycle *xxxx* of sequence *nnnn*. Sequence will repeat forever.
SEQUENCE nnnn, CYCLE xxxx OF cccc Example: SEQUENCE 123, CYCLE 1 OF 10	Executing cycle *xxxx* of sequence *nnnn*. Sequence will execute *cccc* times.

[1] Numerical concentration to generate (e.g. 400).
[2] Concentration units (e.g. PPB). See M700 manual for list of allowable units.
[3] Calibration gas (e.g. SO2). See M700 manual for list of allowable gases.

M700-AMX Diagnostic Messages	
Message	**Description**
ENTER DIAGNOSTIC MODE	Entering diagnostic mode.
EXIT DIAGNOSTIC MODE	Exiting diagnostic mode.
LEAK CHECK ABORTED xxxx PSIG	User aborted automatic leak check. *xxxx* was the pressure at the end of the test.
LEAK CHECK PASSED xxxx PSIG	Automatic leak check passed.
LEAK CHECK FAILED xxxx PSIG	Automatic leak check failed.

M700-AMX Test Messages		
Name	**Message**	**Description**
ACTCALFLOW	ACT CAL=xxxx LPM	Actual calibration gas flow rate.
TARGCALFLOW	TARG CAL=xxxx LPM	Target calibration gas flow rate.
ACTDILFLOW	ACT DIL=xxxx LPM	Actual diluent flow rate.
TARGDILFLOW	TARG DIL=xxxx LPM	Target diluent flow rate.
O3GENREF	O3 GEN REF=xxxx MV	O_3 generator reference detector.
O3GENFLOW	O3 FLOW=xxxx LPM	O_3 generator flow rate.
O3GENDRIVE	O3 GEN DRIVE=xxxx MV	O_3 generator lamp drive voltage.

O3GENTEMP	O3 LAMP TEMP=xxxx C	O_3 generator lamp temperature.
CALPRESS	CAL PRESSURE=xxxx PSIG	Calibration gas pressure.
DILPRESS	DIL PRESSURE=xxxx PSIG	Diluent pressure.
REGPRESS	REG PRESSURE=xxxx PSIG	Regulator pressure.
ACTCONC	ACT=STANDBY	Actual gas generation mode.
TARGCONC	TARG=STANDBY	Target gas generation mode.
BOXTEMP	BOX TEMP=xxxx C	Internal box temperature.
PERMTEMP	PERM TEMP=xxxx C	Permeation tube temperature.
PERMFLOW	PERM FLOW=xxxx LPM	Permeation tube flow rate.
PHOTOMEAS	PHOTO MEASURE=xxxx MV	Photometer measure reading.
PHOTOREF	PHOTO REFERENCE=xxxx MV	Photometer reference reading.
PHOTOFLOW	PHOTO FLOW=xxxx LPM	Photometer sample flow rate.
PHOTOLTEMP	PHOTO LAMP TEMP=xxxx C	Photometer lamp temperature.
PHOTOSPRESS	PHOTO SPRESS=xxxx IN-HG-A	Photometer sample pressure.
PHOTOSTEMP	PHOTO STEMP=xxxx C	Photometer sample temperature.
PHOTOSLOPE	PHOTO SLOPE=xxxx	Photometer calibration slope term.
PHOTOOFFSET	PHOTO OFFSET=xxxx PPB	Photometer calibration offset term.
DCPS	DCPS=xxxx MV	DC power supply.
TESTCHAN	TEST=xxxx MV[3]	Diagnostic test channel output.
CLOCKTIME	TIME=hh:mm:ss	Time of day.

[1] Depends on which units are currently selected.
[2] Visible only if independent range mode is in use.
[3] Units may be “MV” or “MA” depending on D/A configuration.

M700-AMX Warning Messages		
Name	**Message**	**Description**
WSYSRES	SYSTEM RESET	Instrument was reset/powered on.
WRAMINIT	RAM INITIALIZED	RAM was erased.
WPHOTOLTEMP	PHOTO LAMP TEMP WARNING	Photometer lamp temperature out of spec.
WO3GENTEMP	O3 GEN LAMP TEMP WARNING	O_3 generator lamp temperature out of spec.
WPERMTEMP	PERM TUBE TEMP WARNING	Permeation tube temperature out of spec.
WPHOTOREF	PHOTO REFERENCE WARNING	Photometer detector reference reading out of spec.
WO3GENREF	O3 GEN REFERENCE WARNING	O_3 generator reference detector reading out of spec.
WCALPRESS	CAL GAS PRESSURE WARNING	Calibration gas pressure out of spec.
WDILPRESS	DILUENT PRESSURE WARNING	Diluent pressure out of spec.

WREGPRESS	REGULATOR PRESSURE WARNING	Regulator pressure out of spec.
WMFCFLOW	CAL GAS/DILUENT FLOW WARNING	MFC flow out of spec.
WDCPS	DCPS WARNING	DC power supply out of spec.
WI2CDET	I2C INTERFACE NOT DETECTED	Valve/status board not installed or broken.
WVFDET	V/F NOT DETECTED	V/F card not installed or broken.

Appendix F — Setup Variables

The tables below list all of the variables used in all of the instruments. You can change the variables manually using the command line interface, or via the setup menus.

Pre-AMX Setup Variables

Model 100A Setup Variables

M100A Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
RCELL_SET	°C	50 (warning limits: 45–55)	30–70	Reaction cell temperature set point and warning limits.
IZS_SET	°C	50 (warning limits: 45–55)	30–70	IZS temperature set point and warning limits.
FAULT_TIME	Seconds	0	0–300 (0 = don't timeout)	Fault LED timeout.
RS232_MODE	—	8	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
TIME_ZERO	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of automatic zero calibration.

TIME_SPAN	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of automatic span calibration.
TIME_HOLD	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of calibration hold-off.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
AUTO_CAL_EN[1]	—	OFF	ON, OFF	ON enables automatic calibration; OFF disables it.
AUTO_TIME[1]	HHMM	2330	0000–2359	Time of day for automatic calibration.
AUTO_SHIFT[1]	Minutes	0	-60–60	Added to AUTO_TIME each day.
ASEQ_MODE1[2]	—	0	0–7	Calibration mode for sequence 1. 0 = disabled 1 = zero 2 = zero–low span 3 = zero–high span 4 = zero–low span–high span 5 = low span 6 = high span 7 = low span–high span
ASEQ_TIMER1[2]	—	OFF	ON, OFF	ON enables automatic timer for sequence 1; OFF disables it.
ASEQ_DATE1[2]	MMDDYY	010100	010100–123199	Starting date for sequence 1 timer.
ASEQ_TIME1[2]	HHMM	2330	0000–2359	Starting time for sequence 1 timer.
ASEQ_DAYS1[2]	Days	1	0–366	Delta days for sequence 1 timer.
ASEQ_DTIME1[2]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 1 timer.

ASEQ_MODE2[2]	—	0	0–7	Calibration mode for sequence 2. (Same as ASEQ_MODE1.)
ASEQ_TIMER2[2]	—	OFF	ON, OFF	ON enables automatic timer for sequence 2; OFF disables it.
ASEQ_DATE2[2]	MMDDYY	010100	010100–123199	Starting date for sequence 2 timer.
ASEQ_TIME2[2]	HHMM	2330	0000–2359	Starting time for sequence 2 timer.
ASEQ_DAYS2[2]	Days	1	0–366	Delta days for sequence 2 timer.
ASEQ_DTIME2[2]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 2 timer.
ASEQ_MODE3[2]	—	0	0–7	Calibration mode for sequence 3. (Same as ASEQ_MODE1.)
ASEQ_TIMER3[2]	—	OFF	ON, OFF	ON enables automatic timer for sequence 3; OFF disables it.
ASEQ_DATE3[2]	MMDDYY	010100	010100–123199	Starting date for sequence 3 timer.
ASEQ_TIME3[2]	HHMM	2330	0000–2359	Starting time for sequence 3 timer.
ASEQ_DAYS3[2]	Days	1	0–366	Delta days for sequence 3 timer.
ASEQ_DTIME3[2]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 3 timer.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.
FILT_SIZE	Samples	240	1–480	Moving average filter size.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_DELTA	PPB	20	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	%	5	1–100	Percent change to trigger adaptive filter.
FILT_ASIZE	Samples	20	1–100	Moving average filter size in adaptive mode.
FILT_DELAY	Seconds	180	0–300	Delay before leaving adaptive filter mode.

ZS_MODE	—	0	0–2	Zero/span options. 0 = no valves or IZS 1 = zero/span valves only 2 = zero/span valves and IZS
RANGE_MODE	—	0	0–2	Range control mode. 0 = single 1 = auto 2 = independent
PHYS_RANGE0	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE1	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	1–50000	D/A concentration range 1.
CONC_RANGE2[3]	Conc.	500	1–50000	D/A concentration range 2.
DAC0_GAIN	—	1	0.8–1.2	D/A 0 calibrated gain.
DAC1_GAIN	—	1	0.8–1.2	D/A 1 calibrated gain.
DAC2_GAIN	—	1	0.8–1.2	D/A 2 calibrated gain.
DAC3_GAIN	—	1	0.8–1.2	D/A 3 calibrated gain.
DAC0_OFFSET	mV	0	-500–500	D/A 0 calibrated offset.
DAC1_OFFSET	mV	0	-500–500	D/A 1 calibrated offset.
DAC2_OFFSET	mV	0	-500–500	D/A 2 calibrated offset.
DAC3_OFFSET	mV	0	-500–500	D/A 3 calibrated offset.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
LAMP_CAL	mV	3500	1000–5000	UV lamp output at last lamp calibration.
LAMP_GAIN	—	1	0.5–1.5	UV lamp compensation attenuation factor.
DARK_FREQ	Minutes	30	0–1440 (0 disables dark calibration)	Dark calibration frequency.
DARK_DWELL	Seconds	10	1–60	Dwell time after closing or opening dark shutter.
DARK_SAMP	Samples	5	1–10	Number of dark samples to average.
DARK_FSIZE	Samples	2	1–100	Dark offset moving average filter size.
DARK_LIMIT	mV	200	0–1000	Maximum dark offset allowed.
SPAN_VALUE	Conc.	400	1-50000	Target SO_2 concentration during span calibration of range 1.

SPAN_VALUE2[3]	Conc.	400	1-50000	Target SO_2 concentration during span calibration of range 2.
IZS_LOW_PCT[2]	%	25	1-100	Percent of SPAN_VALUE during low span calibration.
USER_UNITS	—	0	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m^3 3 = mg/m^3
DIL_ENABLE	—	OFF	ON, OFF	ON enables dilution factor; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor applied to concentration.
SO2_SLOPE	PPB/mV	1	0.25–4	Slope for range 1.
SO2_SLOPE2[3]	PPB/mV	1	0.25–4	Slope for range 2.
SO2_OFFSET	mV	0	-1500–1500	Offset for range 1.
SO2_OFFSET2[3]	mV	0	-1500–1500	Offset for range 2.
SFLOW_SET	cc/m	700 (warning limits: 350–1200)	0–1200	Nominal sample flow set point and warning limits.
BOX_SET	°C	30 (warning limits: 8–50)	5–60	Nominal box temperature and warning limits.
PMT_SET	°C	7 (warning limits: 2–12)	0–40	PMT temperature set point and warning limits.
TEMPCO_GAIN	—	0.15	0–10	Temperature coefficient attenuation factor.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
TEST_CHN_ID	—	0	0–11	Diagnostic analog output ID. 0 = disabled 1 = PMT reading 2 = UV lamp reading 3 = sample pressure 4 = sample flow 5 = reaction cell temperature 6 = box temperature 7 = IZS temperature

				8 = PMT temperature 9 = DCPS 10 = HVPS 11 = DAS concentration
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	0	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
LANGUAGE_ID[4]	ID	100	100, 110	Language for user interface. 100 = English 110 = German
BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.

[1] Present only if multi-sequence IZS option is *not* installed.
[2] Present/used only if multi-sequence IZS option is installed.
[3] Used only in multi-range modes.
[4] Present only if multiple language option is installed.

Model 101A/102A Setup Variables

101A/102A Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
RCELL_SET	°C	50 (warning limits: 45–55)	30–70	Reaction cell temperature set point and warning limits.
IZS_SET	°C	50 (warning limits: 45–55)	30–70	IZS temperature set point and warning limits.
FAULT_TIME	Seconds	0	0–300 (0 = don't timeout)	Fault LED timeout.
RS232_MODE	—	8	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode

				2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
MEAS_MODE	—	401	400, 401, 402, 403	Gas measure mode. 400 = measure SO_2 only 401 = measure both gases, calibrate on SO_2 402 = measure H_2S/TRS only 403 = measure both gases, calibrate on H_2S/TRS
"Hard" Setup Variables				
MEAS_PERIOD	Minutes	10	1–60	Length of time to sample each gas (dual gas modes only).
MEAS_DELAY	Minutes	3	0–20	How long to defer sampling after switching valve (dual gas modes only).
TIME_ZERO	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of automatic zero calibration.
TIME_SPAN	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of automatic span calibration.
TIME_HOLD	Minutes	15	1–20 (1–60 in multi-sequence option)	Duration of calibration hold-off.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.

AUTO_CAL_EN[3]	—	OFF	ON, OFF	ON enables automatic calibration; OFF disables it.
AUTO_TIME[3]	HHMM	2330	0000–2359	Time of day for automatic calibration.
AUTO_SHIFT[3]	Minutes	0	-60–60	Added to AUTO_TIME each day.
ASEQ_MODE1[4]	—	0	0–7	Calibration mode for sequence 1. 0 = disabled 1 = zero 2 = zero–low span 3 = zero–high span 4 = zero–low span–high span 5 = low span 6 = high span 7 = low span–high span
ASEQ_TIMER1[4]	—	OFF	ON, OFF	ON enables automatic timer for sequence 1; OFF disables it.
ASEQ_DATE1[4]	MMDDYY	010100	010100–123199	Starting date for sequence 1 timer.
ASEQ_TIME1[4]	HHMM	2330	0000–2359	Starting time for sequence 1 timer.
ASEQ_DAYS1[4]	Days	1	0–366	Delta days for sequence 1 timer.
ASEQ_DTIME1[4]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 1 timer.
ASEQ_MODE2[4]	—	0	0–7	Calibration mode for sequence 2. (Same as ASEQ_MODE1.)
ASEQ_TIMER2[4]	—	OFF	ON, OFF	ON enables automatic timer for sequence 2; OFF disables it.
ASEQ_DATE2[4]	MMDDYY	010100	010100–123199	Starting date for sequence 2 timer.
ASEQ_TIME2[4]	HHMM	2330	0000–2359	Starting time for sequence 2 timer.
ASEQ_DAYS2[4]	Days	1	0–366	Delta days for sequence 2 timer.
ASEQ_DTIME2[4]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 2 timer.

ASEQ_MODE3[4]	—	0	0–7	Calibration mode for sequence 3. (Same as ASEQ_MODE1.)
ASEQ_TIMER3[4]	—	OFF	ON, OFF	ON enables automatic timer for sequence 3; OFF disables it.
ASEQ_DATE3[4]	MMDDYY	010100	010100–123199	Starting date for sequence 3 timer.
ASEQ_TIME3[4]	HHMM	2330	0000–2359	Starting time for sequence 3 timer.
ASEQ_DAYS3[4]	Days	1	0–366	Delta days for sequence 3 timer.
ASEQ_DTIME3[4]	HHMM	0000	0000–2359	Delta hours and minutes for sequence 3 timer.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.
ZS_MODE	—	0	0–2	Zero/span options. 0 = no valves or IZS 1 = zero/span valves only 2 = zero/span valves and IZS
RANGE_MODE	—	0	0–2	Range control mode. 0 = single 1 = independent 2 = auto
PHYS_RANGE0	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE1	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	1–50000	D/A concentration range 1 or range for SO_2.
CONC_RANGE2[5]	Conc.	500	1–50000	D/A concentration range 2 or range for H_2S/TRS.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
USER_UNITS	—	0	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m^3 3 = mg/m^3
DIL_ENABLE	—	OFF	ON, OFF	ON enables dilution factor; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor applied to concentration.
IZS_LOW_PCT[4]	%	25	1-100	Percent of SO2_SPAN1 during low span calibration.

SO2_SPAN1	Conc.	400	1-50000	Target SO_2 concentration during span calibration of range 1.
SO2_SPAN2	Conc.	400	1-50000	Target SO_2 concentration during span calibration of range 2.
SO2_SLOPE1	PPB/mV	1	0.25–4	SO_2 slope for range 1.
SO2_SLOPE2	PPB/mV	1	0.25–4	SO_2 slope for range 2.
SO2_OFFSET1	mV	0	-1500–1500	SO_2 offset for range 1.
SO2_OFFSET2	mV	0	-1500–1500	SO_2 offset for range 2.
H2S_SPAN1[1] or TRS_SPAN1[2]	Conc.	400	1-50000	Target H_2S/TRS concentration during span calibration of range 1.
H2S_SPAN2[1] or TRS_SPAN2[2]	Conc.	400	1-50000	Target H_2S/TRS concentration during span calibration of range 2.
H2S_SLOPE1[1] or TRS_SLOPE1[2]	PPB/mV	1	0.25–4	H_2S/TRS slope for range 1.
H2S_SLOPE2[1] or TRS_SLOPE2[2]	PPB/mV	1	0.25–4	H_2S/TRS slope for range 2.
H2S_OFFSET1[1] or TRS_OFFSET1[2]	mV	0	-1500–1500	H_2S/TRS offset for range 1.
H2S_OFFSET2[1] or TRS_OFFSET2[2]	mV	0	-1500–1500	H_2S/TRS offset for range 2.
FILT_SIZE	Samples	240	1–480	Moving average filter size.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_DELTA	PPB	20	0–1000	Absolute change to trigger adaptive filter.
FILT_PCT	%	5	0–100	Percent change to trigger adaptive filter.
FILT_ASIZE	Samples	20	1–100	Moving average filter size in adaptive mode.
FILT_DELAY	Seconds	180	0–300	Delay before leaving adaptive filter mode.
LAMP_CAL	mV	3500	1000–5000	UV lamp output at last lamp calibration.
LAMP_GAIN	—	1	0.5–1.5	UV lamp compensation attenuation factor.
DARK_FREQ	Minutes	30	0–1440 (0 disables dark calibration)	Dark calibration frequency.
DARK_DWELL	Seconds	10	1–60	Dwell time after closing or

				opening dark shutter.
DARK_SAMP	Samples	5	1–10	Number of dark samples to average.
DARK_FSIZE	Samples	2	1–100	Dark offset moving average filter size.
DARK_LIMIT	mV	200	0–1000	Maximum dark offset allowed.
SFLOW_SET	cc/m	700 (warning limits: 350–1200)	0–1200	Nominal sample flow set point and warning limits.
CONV_SET[1]	°C	315 (warning limits: 310–320)	0–350	Converter temperature set point and warning limits.
BOX_SET	°C	30 (warning limits: 8–50)	5–60	Nominal box temperature and warning limits.
PMT_SET	°C	7 (warning limits: 2–12)	0–40	PMT temperature set point and warning limits.
TEMPCO_GAIN	—	0.15	0–10	Temperature coefficient attenuation factor.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
TEST_CHN_ID[1]	—	0	0–12	Diagnostic analog output ID. 0 = disabled 1 = PMT reading 2 = UV lamp reading 3 = sample pressure 4 = sample flow 5 = reaction cell temperature 6 = box temperature 7 = IZS temperature 8 = PMT temperature 9 = converter temperature 10 = DCPS 11 = HVPS 12 = DAS concentration
TEST_CHN_ID[2]	—	0	0–11	Diagnostic analog output ID. 0 = disabled 1 = PMT reading

				2 = UV lamp reading 3 = sample pressure 4 = sample flow 5 = reaction cell temperature 6 = box temperature 7 = IZS temperature 8 = PMT temperature 9 = DCPS 10 = HVPS 11 = DAS concentration
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	0	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
SO2_GAS_ID[6]	ID	100	0–999	Unique ID number for SO_2 gas.
H2S_GAS_ID[1,6] or TRS_GAS_ID[2,6]	ID	101	0–999	Unique ID number for H_2S/TRS gas.
BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.

[1] M101A
[2] M102A
[3] Present only if multi-sequence IZS option is *not* installed.
[4] Present/used only if multi-sequence IZS option is installed.
[5] Used only in multi-range modes.
[6] Present only if Hessen network option is installed.

Model 200A Setup Variables

M200A Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
SFLOW_SET	cc/m	500 (warning limits: 350–900)	0–1000	Nominal sample flow set point and warning limits.
OFLOW_SET	cc/m	80	0–500	Nominal ozone flow set

		(warning limits: 50–150)		point and warning limits.
IZS_SET	°C	50 (warning limits: 45–55)	30–70	IZS temperature set point and warning limits.
RS232_MODE	—	8	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
CAL_ON_NO2	—	OFF	OFF, ON	ON enables span calibration on pure NO_2; OFF disables it.
"Hard" Setup Variables				
ZS_MODE	—	0	0–2	Zero/span options. 0 = no valves or IZS 1 = zero/span valves only 2 = zero/span valves and IZS
TIME_ZERO	Minutes	15	1–20	Duration of automatic zero calibration.
TIME_SPAN	Minutes	15	1–20	Duration of automatic span calibration.
TIME_HOLD	Minutes	15	1–20	Duration of calibration hold off.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
AUTO_CAL_EN	—	OFF	ON, OFF	ON enables automatic calibration; OFF disables it.
AUTO_TIME	HHMM	2330	0000–2359	Time of day for automatic calibration.

AUTO_SHIFT	Minutes	0	-60–60	Added to AUTO_TIME each day.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.
TIME_BASE	—	5	0–7	Conversion time base for PMT detector. 0 = 33 ms. 1 = 66 ms. 2 = 133 ms. 3 = 266 ms. 4 = 533 ms. 5 = 1 second 6 = 2 seconds 7 = 4 seconds
FILT_SIZE	Samples	42	1–80	Moving average filter size.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_DELTA1	PPB	50	5–100	Absolute change to omit readings.
FILT_PCT1	%	10	5–50	Percent change to omit readings.
FILT_DELTA2	PPB	30	5–100	Absolute change to shorten filter.
FILT_PCT2	%	6	5–50	Percent change to shorten filter.
FILT_ASIZE	Samples	6	1–30	Moving average filter size in adaptive mode.
FILT_DELAY	Seconds	120	0–200	Delay before leaving adaptive filter mode.
PC_GAIN	—	1	0–10	Pressure compensation attenuation factor.
CE_FACTOR	—	1	0.96–1.02 (0.8–1.1 in NH_3 option)	Moly converter efficiency factor.
NO2_PERMTB	—	OFF	OFF, ON	ON enables span calibration using NO_2 permeation tube; OFF disables it.
RANGE_MODE	—	0	0–2	Range control mode. 0 = single 1 = auto 2 = independent
PHYS_RANGE0	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE1	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	1–50000	D/A concentration range 1 or range for NO_X.

CONC_RANGE2[3]	Conc.	500	1–50000	D/A concentration range 2 or range for NO.
CONC_RANGE3[3]	Conc.	500	1–50000	D/A concentration range for NO_2.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
DAC0_GAIN	—	1	0.8–1.2	D/A 0 calibrated gain.
DAC1_GAIN	—	1	0.8–1.2	D/A 1 calibrated gain.
DAC2_GAIN	—	1	0.8–1.2	D/A 2 calibrated gain.
DAC3_GAIN	—	1	0.8–1.2	D/A 3 calibrated gain.
DAC0_OFFSET	mV	0	-500–500	D/A 0 calibrated offset.
DAC1_OFFSET	mV	0	-500–500	D/A 1 calibrated offset.
DAC2_OFFSET	mV	0	-500–500	D/A 2 calibrated offset.
DAC3_OFFSET	mV	0	-500–500	D/A 3 calibrated offset.
NOX_DWELL	Tenths of a second	25 (65 in NH_3 option)	0–300	Dwell time after switching valve to NO_X position.
NOX_SAMPLE	Samples	2	1–30	Number of samples to take in NO_X mode.
NO_DWELL	Tenths of a second	15 (30 in NH_3 option)	0–300	Dwell time after switching valve to NO position.
NO_SAMPLE	Samples	2	1–30	Number of samples to take in NO mode.
AZERO_FREQ	Valve cycles	6	0–30 (0 disables auto-zero)	Auto-zero frequency.
AZERO_DWELL	Seconds	4	0–10	Dwell time after initiating auto-zero.
AZERO_SAMP	Samples	2	1–10	Number of auto-zero samples to average.
AZERO_FSIZE	Samples	15	1–100	Auto-zero offset moving average filter size.
AZERO_LIMIT	mV	200	0–1000	Maximum auto-zero offset allowed.
NOX_SPAN	Conc.	400	1-50000	Target NO_X concentration during span calibration of range 1.
NO_SPAN	Conc.	400	1-50000	Target NO concentration during span calibration of range 1.
NO2_SPAN	Conc.	400	1-50000	Target NO_2 concentration during converter efficiency calibration.

USER_UNITS	—	0	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m ^{3} 3 = mg/m^3
DIL_ENABLE	—	OFF	ON, OFF	ON enables dilution factor; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor applied to concentration.
NOX_SLOPE	PPB/mV	1	0.25–4	NO_X slope for range 1.
NOX_OFFSET	mV	0	-1500–1500	NO_X offset for range 1.
NO_SLOPE	PPB/mV	1	0.25–4	NO slope for range 1.
NO_OFFSET	mV	0	-1500–1500	NO offset for range 1.
RCELL_SET	°C	50 (warning limits: 45–55)	30–70	Reaction cell temperature set point and warning limits.
BOX_SET	°C	30 (warning limits: 5–48)	0–70	Nominal box temperature and warning limits.
PMT_SET	°C	7 (warning limits: 5–12)	0–40	PMT temperature set point and warning limits.
MOLY_SET[1]	°C	315 (warning limits: 305–325)	0–350	Moly converter temperature set point and warning limits.
CONV_SET[2]	°C	1000 (warning limits: 950–1050)	0–1100	High temperature converter set point and warning limits.
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	200	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
NOX_GAS_ID[5]	ID	200	0–999	Unique ID number for NO_X gas.
NO_GAS_ID[5]	ID	201	0–999	Unique ID number for NO gas.
NO2_GAS_ID[5]	ID	202	0–999	Unique ID number for NO_2 gas.

BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
STABIL_GAS	—	500	500, 501, 502	Selects gas for stability measurement. 500 = NOX 501 = NO 502 = NO2
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.

[1] Present only if high-temperature converter option is *not* installed.
[2] Present/used only if high-temperature converter option is installed.
[3] Used only in multi-range modes.
[4] Present/used only if high-temperature converter option is installed.
[5] Present only if Hessen network option is installed.

Model 300 Setup Variables

M300 Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
TIME_ZERO	Minutes	15	1–20	Duration of automatic zero calibration.
TIME_SPAN	Minutes	15	1–20	Duration of automatic span calibration.
TIME_HOLD	Minutes	15	1–20	Duration of calibration hold off.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
AUTO_CAL_EN	—	OFF	ON, OFF	ON enables automatic calibration; OFF disables it.
AUTO_TIME	HHMM	2330	0000–2359	Time of day for automatic calibration.
AUTO_SHIFT	Minutes	0	-60–60	Added to AUTO_TIME each day.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.
TIME_BASE	—	0	0–7	Conversion time base for PMT detector. 0 = 33 ms. 1 = 66 ms. 2 = 133 ms.

				3 = 266 ms. 4 = 533 ms. 5 = 1 second 6 = 2 seconds 7 = 4 seconds
FILT_SIZE	Samples	750	1–750	Moving average filter size.
FILT_DELTA	PPM	4	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	%	10	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	60	0–60	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
IZS_AVAIL	—	OFF	ON, OFF	ON enables IZS; OFF disables it.
USER_UNITS	—	1	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m^3 3 = mg/m^3
CO_DWELL	Tenths of a second	1	0–300	Dwell time between each sample.
CO_SAMPLE	Samples	1	1–30	Number of samples to average each cycle.
CO_SPAN	Conc.	40	1–10000	Target CO concentration during span calibration.
CO_SLOPE	—	1	-1–2	CO slope.
CO_OFFSET	—	0	-0.2–0.2	CO offset.
CO_CONST1	—	700 (55000 in high conc. option)	100–2000 (100–100000 in high conc. option)	Constant used in CO calculations.
CO_CONST2	—	0.13 (0.2050 in high conc. option)	0–0.2 (0–1 in high conc. option)	Constant used in CO calculations.
DARK_REF_MV	mV	0	-1000–1000	Dark offset for reference readings.
DARK_MES_MV	mV	0	-1000–1000	Dark offset for measure readings.
DAC0_GAIN	—	1	0.8–1.2	D/A 0 calibrated gain.

DAC1_GAIN	—	1	0.8–1.2	D/A 1 calibrated gain.
DAC2_GAIN	—	1	0.8–1.2	D/A 2 calibrated gain.
DAC3_GAIN	—	1	0.8–1.2	D/A 3 calibrated gain.
DAC0_OFFSET	mV	0	-500–500	D/A 0 calibrated offset.
DAC1_OFFSET	mV	0	-500–500	D/A 1 calibrated offset.
DAC2_OFFSET	mV	0	-500–500	D/A 2 calibrated offset.
DAC3_OFFSET	mV	0	-500–500	D/A 3 calibrated offset.
DA_RANGE	Conc.	50	1–10000	D/A concentration range.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
BENCH_SET	°C	48 (warning limits: 43–53)	0–100	Optical bench temperature set point and warning limits.
WHEEL_SET	°C	68 (warning limits: 63–73)	0–100	Wheel temperature set point and warning limits.
TEST_CHN_ID	—	0	0–10	Diagnostic analog output ID. 0 = disabled 1 = CO measure reading 2 = CO reference reading 3 = sample pressure 4 = sample flow 5 = sample temperature 6 = bench temperature 7 = wheel temperature 8 = box temperature 9 = DCPS 10 = DAS concentration
FAULT_TIME	Seconds	0	0–300 (0 = don’t timeout)	Fault LED timeout.
PASS_ENABLE	—	ON	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	0	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.

RS232_MODE	—	0	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.

Model 400 Setup Variables

M400 Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
TIME_ZERO	Minutes	15	1–20	Duration of automatic zero calibration.
TIME_SPAN	Minutes	15	1–20	Duration of automatic span calibration.
TIME_HOLD	Minutes	15	1–20	Duration of calibration hold off.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
ASEQ_MODE1	—	0	0–7	Calibration mode for sequence 1. 0 = disabled 1 = zero 2 = zero–low span 3 = zero–high span 4 = zero–low span–high span 5 = low span 6 = high span 7 = low span–high span

ASEQ_TIMER1	—	OFF	ON, OFF	ON enables automatic timer for sequence 1; OFF disables it.
ASEQ_DATE1	MMDDYY	010100	010100–123199	Starting date for sequence 1 timer.
ASEQ_TIME1	HHMM	2330	0000–2359	Starting time for sequence 1 timer.
ASEQ_DAYS1	Days	1	0–366	Delta days for sequence 1 timer.
ASEQ_DTIME1	HHMM	0000	0000–2359	Delta hours and minutes for sequence 1 timer.
ASEQ_MODE2	—	0	0–7	Calibration mode for sequence 2. (Same as ASEQ_MODE1.)
ASEQ_TIMER2	—	OFF	ON, OFF	ON enables automatic timer for sequence 2; OFF disables it.
ASEQ_DATE2	MMDDYY	010100	010100–123199	Starting date for sequence 2 timer.
ASEQ_TIME2	HHMM	2330	0000–2359	Starting time for sequence 2 timer.
ASEQ_DAYS2	Days	1	0–366	Delta days for sequence 2 timer.
ASEQ_DTIME2	HHMM	0000	0000–2359	Delta hours and minutes for sequence 2 timer.
ASEQ_MODE3	—	0	0–7	Calibration mode for sequence 3. (Same as ASEQ_MODE1.)
ASEQ_TIMER3	—	OFF	ON, OFF	ON enables automatic timer for sequence 3; OFF disables it.
ASEQ_DATE3	MMDDYY	010100	010100–123199	Starting date for sequence 3 timer.
ASEQ_TIME3	HHMM	2330	0000–2359	Starting time for sequence 3 timer.
ASEQ_DAYS3	Days	1	0–366	Delta days for sequence 3 timer.
ASEQ_DTIME3	HHMM	0000	0000–2359	Delta hours and minutes for sequence 3 timer.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.

TIME_BASE	—	5	0–7	Conversion time base for PMT detector. 0 = 33 ms. 1 = 66 ms. 2 = 133 ms. 3 = 266 ms. 4 = 533 ms. 5 = 1 second 6 = 2 seconds 7 = 4 seconds
FILT_SIZE	Samples	32	1–100	Moving average filter size.
FILT_DELTA	PPB	20	0.01–1000	Absolute change to trigger adaptive filter.
FILT_PCT	%	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	60	0–60	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
ZS_MODE	—	0	0–3	Zero/span options. 0 = no valves or IZS 1 = zero/span valves only 2 = zero/span valves and IZS 3 = zero/span valves and IZS and reference detector
IZS_FEEDBK	—	OFF	ON, OFF	ON enables IZS feedback control; OFF disables it.
IZS_SETPT	PPB	400	0–1500	Target O_3 concentration for IZS.
IZS_LOW_PCT	%	25	1–100	Percent of IZS_SETPT during low span calibration.
IZS_DEF_PCT	%	100	1–100	Percent of IZS_SETPT when sampling normally.
USER_UNITS	—	0	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m^3 3 = mg/m^3
UGM_PER_PPB	g/PPB	2.142	0.1–10	Unit conversion factor.
O3_DWELL	Seconds	2	0–30	Dwell time after switching measure/reference valve.

O3_SAMPLE	Samples	1	1–30	Number of samples to take in each valve mode.
O3_SPAN	Conc.	400	50–10000	Target O_3 concentration during span calibration.
O3_SLOPE	—	1	0.85–1.15 (0.5–1.5 in Hessen option)	O_3 slope.
O3_OFFSET	PPB	0	-1000–1000	O_3 offset.
DARK_OFFSET	mV	0	-1000–1000	Dark offset for measure/reference readings.
LO_CONC_LIM	Conc.	0.1	0.01–1000	O_3 concentration low alarm limit.
HI_CONC_LIM	Conc.	0.3	0.01–1000	O_3 concentration high alarm limit.
DA_RANGE	Conc.	500	100–20000	D/A concentration range.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
ALAMP_SET	°C	52 (warning limits: 51–61)	1–100	Photometer lamp temperature set point and warning limits.
IZSLAMP_SET	°C	48 (warning limits: 43–53)	1–100	IZS lamp temperature set point and warning limits.
TEST_CHN_ID	—	0	0–11	Diagnostic analog output ID. 0 = disabled 1 = measure reading 2 = reference reading 3 = O_3 generator reference detector reading 4 = sample pressure 5 = sample flow 6 = sample temperature 7 = photometer lamp temperature 8 = O_3 generator lamp temperature 9 = box temperature 10 = DCPS 11 = DAS concentration

FAULT_TIME	Seconds	0	0–300 (0 = don't timeout)	Fault LED timeout.
PASS_ENABLE	—	ON	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	0	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.
RS232_MODE	—	0	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.

Model 401 Setup Variables

M401 Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
TIME_ZERO	Minutes	15	1–20	Duration of automatic zero calibration.
TIME_SPAN	Minutes	15	1–20	Duration of automatic span calibration.
AUTO_CAL_MD	—	0	0–3	Automatic calibration mode. 0 = disabled 1 = zero–100% span 2 = zero–25%–100% span 3 = zero–20%–40%–60%–80%–100% span
AUTO_TIME	HHMM	2330	0000–2359	Time of day for automatic calibration.

AUTO_SHIFT	Minutes	0	-60–60	Added to AUTO_TIME each day.
REPORT_FREQ	Minutes	60	1–1440	DAS reporting period.
FILT_SIZE	Samples	32	1–100	Moving average filter size.
O3_GEN_MODE	—	0	0–2	O_3 generator mode. 0 = constant output 1 = reference feedback control 2 = bench feedback control
O3_GEN_SET	PPB	400	0–1500	Target O_3 generator concentration.
USER_UNITS	—	0	0–3	Concentration units for user interface. 0 = PPB 1 = PPM 2 = g/m^3 3 = mg/m^3
O3_DWELL	Seconds	2	0–30	Dwell time after switching measure/reference valve.
O3_SAMPLE	Samples	1	1–30	Number of samples to take in each valve mode.
O3_SLOPE	—	1	0.85–1.15	O_3 slope.
O3_OFFSET	PPB	0	-1000–1000	O_3 offset.
DARK_OFFSET	mV	0	-1000–1000	Dark offset for measure/reference readings.
DA_RANGE	Conc.	500	100–20000	D/A concentration range.
DA_OFFSET	mV	0	-500–500	Offset added to D/A outputs.
ALAMP_SET	˚C	52 (warning limits: 51–61)	1–100	Photometer lamp temperature set point and warning limits.
O3LAMP_SET	˚C	48 (warning limits: 43–53)	1–100	IZS lamp temperature set point and warning limits.

TEST_CHN_ID	—	0	0–13	Diagnostic analog output ID. 0 = disabled 1 = measure reading 2 = reference reading 3 = O_3 generator reference detector reading 4 = sample pressure 5 = sample flow 6 = sample temperature 7 = photometer lamp temperature 8 = O_3 regulator pressure 9 = O_3 flow 10 = O_3 generator lamp temperature 11 = box temperature 12 = DCPS 13 = DAS concentration
FAULT_TIME	Seconds	0	0–300 (0 = don't timeout)	Fault LED timeout.
PASS_ENABLE	—	ON	ON, OFF	ON enables passwords; OFF disables them.
MACHINE_ID	ID	0	0–9999	Unique ID number for instrument.
BAUD_RATE	Baud	2400	300, 1200, 2400	RS-232 interface baud rate.
RS232_MODE	—	0	0–32767	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
AUTO_CAL_EN	—	OFF	ON, OFF	ON enables automatic calibration; OFF disables it.

AMX Setup Variables

Model 100A-AMX Setup Variables

M100A-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
RCELL_SET	°C	50 (warning 45–55)	30–70	Reaction cell temperature set point and warning limits.
IZS_SET[1]	°C	50 (warning 45–55)	30–70	IZS temperature set point and warning limits.
DYN_ZERO	—	OFF	OFF, ON	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	OFF, ON	ON enables remote dynamic span calibration; OFF disables it.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
TIME_BASE	—	33 MS	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for PMT and UV detector channels. Put value in double quotes (") when setting from the RS-232 interface.

DWELL_TIME	Seconds	1	0.1–10	Dwell time before taking each sample.
FILT_SIZE	Samples	240 (M100AH: 30)	1–480	Moving average filter size.
FILT_ASIZE	Samples	20 (M100AH: 6)	1–100	PMT moving average filter size in adaptive mode.
FILT_DELTA	PPM	0.02 (M100AH: 10)	0.001–0.1 (M100AH: 1–100)	Absolute change to trigger adaptive filter.
FILT_PCT	%	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	180	0–300	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive filter; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor.
USER_UNITS	—	PPB (M100AH: PPM)	PPB, PPM, UGM, MGM (M100AH: PPM, MGM)	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
LAMP_CAL	mV	3500	1000–5000	Last calibrated UV lamp reading.
LAMP_GAIN	—	1	0.5–1.5	UV lamp compensation attenuation factor.
TEMPCO_GAIN	—	0	0–2	Temperature coefficient attenuation factor for pressure readings.
DARK_ENABLE	—	ON	OFF, ON	ON enables PMT/UV dark calibration; OFF disables it.
DARK_FREQ	Minutes	30	0.1–1440	Dark calibration frequency.
DARK_DWELL	Seconds	10	1–60	Dwell time after closing or opening dark shutter.
DARK_SAMPLES	Samples	5	1–10	Number of dark samples to average.
DARK_FSIZE	Samples	2	1–100	Dark offset moving average filter size.
DARK_LIMIT	mV	200 (M100AH: 400)	0–1000	Maximum dark offset allowed.

SO2_SPAN1	Conc.	400 (M100AH: 4000)	0.1–50000	Target SO_2 concentration during span calibration of range 1.
SO2_SLOPE1	PPB/mV (M100AH: PPM/mV)	1	0.25–4	SO_2 slope for range 1.
SO2_OFFSET1	mV	0	-1500–1500	SO_2 offset for range 1.
SO2_SPAN2	Conc.	400 (M100AH: 4000)	0.1–50000	Target SO_2 concentration during span calibration of range 2.
SO2_SLOPE2	PPB/mV (M100AH: PPM/mV)	1	0.25–4	SO_2 slope for range 2.
SO2_OFFSET2	mV	0	-1500–1500	SO_2 offset for range 2.
RANGE_MODE	—	SNGL	SNGL, DUAL, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
PHYS_RANGE1	PPM	2 (M100AH: 500)	0.1–2500 (M100AH: 5–5000)	Low pre-amp range.
PHYS_RANGE2	PPM	20 (M100AH: 5000)	0.1–2500 (M100AH: 5–5000)	High pre-amp range.
CONC_RANGE1	Conc.	500 (M100AH: 5000)	0.1–50000	D/A concentration range 1.
CONC_RANGE2	Conc.	500 (M100AH: 5000)	0.1–50000	D/A concentration range 2.
SFLOW_SET	cc/m	700 (warning: 350–1200)	0–1200	Nominal sample flow set point and warning limits.
SAMP_FLOW_SLOPE	—	1	0.5–1.5	Sample flow slope correction factor (adjusted flow = measured flow x slope).
BOX_SET	˚C	30 (warning: 8–50)	5–60	Box temperature set point and warning limits.
PMT_SET	˚C	7 (warning: 2–12)	0–40	PMT temperature set point and warning limits.
BAUD_RATE	—	19.2 (1200 in Hessen	300, 1200, 2400,	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-

		option)	4800, 9600, 19.2	232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	100	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
TEST_CHAN_ID	—	NONE	NONE, PMT READING, UV READING, SAMPLE PRESSURE, SAMPLE FLOW, RCELL TEMP, CHASSIS TEMP, IZS TEMP[1], PMT TEMP, DCPS VOLTAGE, HVPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
PASS_ENABLE	—	OFF	OFF, ON	ON enables passwords; OFF disables them.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
RCELL_CYCLE	Seconds	10	0.5–30	Reaction cell temperature control cycle period.
RCELL_PROP	—	0.5	0–10	Reaction cell temperature PID proportional coefficient.
RCELL_INTEG	—	0.02	0–10	Reaction cell temperature PID integral coefficient.
RCELL_DERIV	—	0.1	0–10	Reaction cell temperature PID derivative coefficient.

[1] M100A only.

Model 101A/102A-AMX Setup Variables

M101A/M1012A-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
MEASURE_MODE	—	SO2-H2S[1] or SO2-TRS[2]	SO2, SO2-H2S, H2S[1] or SO2, SO2-TRS, TRS[2]	Gas measure mode. Put value in double quotes (") when setting from the RS-232 interface.
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
RCELL_SET	°C	50 (warning 45–55)	30–70	Reaction cell temperature set point and warning limits.
IZS_SET	°C	50 (warning 45–55)	30–70	IZS temperature set point and warning limits.
DYN_ZERO	—	OFF	OFF, ON	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	OFF, ON	ON enables remote dynamic span calibration; OFF disables it.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
MEASURE_PERIOD	Minutes	10	1–60	Length of time to sample each gas (dual gas modes only).

MEASURE_DELAY	Minutes	3	0.1–20	How long to defer sampling after switching valve (dual gas modes only).
TIME_BASE	—	33 MS	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for PMT and UV detector channels. Put value in double quotes (") when setting from the RS-232 interface.
DWELL_TIME	Seconds	1	0.1–10	Dwell time before taking each sample.
FILT_SIZE	Samples	240	1–480	Moving average filter size.
FILT_ASIZE	Samples	20	1–100	PMT moving average filter size in adaptive mode.
FILT_DELTA	PPB	20	1–100	Absolute change to trigger adaptive filter.
FILT_PCT	%	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	180	0–300	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive filter; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor.
USER_UNITS	—	PPB	PPB, PPM, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
LAMP_CAL	mV	3500	1000–5000	Last calibrated UV lamp reading.
LAMP_GAIN	—	1	0.5–1.5	UV lamp compensation attenuation factor.
TEMPCO_GAIN	—	0.15	0.01–10	Temperature coefficient attenuation factor for pressure readings.
DARK_ENABLE	—	ON	OFF, ON	ON enables PMT/UV dark calibration; OFF disables it.
DARK_FREQ	Minutes	30	0.1–1440	Dark calibration frequency.
DARK_DWELL	Seconds	10	1–60	Dwell time after closing or opening dark shutter.
DARK_SAMPLES	Samples	5	1–10	Number of dark samples to average.

DARK_FSIZE	Samples	2	1–100	Dark offset moving average filter size.
DARK_LIMIT	mV	200	0–1000	Maximum dark offset allowed.
SO2_SPAN1	Conc.	400	0.1–50000	Target SO_2 concentration during span calibration of range 1.
SO2_SPAN2	Conc.	400	0.1–50000	Target SO_2 concentration during span calibration of range 2.
SO2_SLOPE1	PPB/mV	1	0.25–4	SO_2 slope for range 1.
SO2_SLOPE2	PPB/mV	1	0.25–4	SO_2 slope for range 2.
SO2_OFFSET1	mV	0	-1500–1500	SO_2 offset for range 1.
SO2_OFFSET2	mV	0	-1500–1500	SO_2 offset for range 2.
H2S_SPAN1[1] or TRS_SPAN1[2]	Conc.	400	0.1–50000	Target H_2S/TRS concentration during span calibration of range 1.
H2S_SPAN2[1] or TRS_SPAN2[2]	Conc.	400	0.1–50000	Target H_2S/TRS concentration during span calibration of range 2.
H2S_SLOPE1[1] or TRS_SLOPE1[2]	PPB/mV	1	0.25–4	H_2S/TRS slope for range 1.
H2S_SLOPE2[1] or TRS_SLOPE2[2]	PPB/mV	1	0.25–4	H_2S/TRS slope for range 2.
H2S_OFFSET1[1] or TRS_OFFSET1[2]	mV	0	-1500–1500	H_2S/TRS offset for range 1.
H2S_OFFSET2[1] or TRS_OFFSET2[2]	mV	0	-1500–1500	H_2S/TRS offset for range 2.
RANGE_MODE	—	SNGL	SNGL, IND, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
PHYS_RANGE1	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE2	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	0.1–50000	D/A concentration range 1.
CONC_RANGE2	Conc.	500	0.1–50000	D/A concentration range 2.
SFLOW_SET	cc/m	700 (warning: 350–1200)	0–1200	Nominal sample flow set point and warning limits.
CONV_SET[1]	°C	315 (warning limits: 310–320)	0–350	Converter temperature set point and warning limits.
BOX_SET	°C	30 (warning:	5–60	Box temperature set point

		8–50)		and warning limits.
PMT_SET	°C	7 (warning: 2–12)	0–40	PMT temperature set point and warning limits.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	101[1] or 102[2]	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
SO2_GAS_ID[3]	ID	111	0–999	Unique ID number for SO_2 gas.
H2S_GAS_ID[1,3] or TRS_GAS_ID[2,3]	ID	112	0–999	Unique ID number for H_2S/TRS gas.
TEST_CHAN_ID	—	NONE	NONE, PMT READING, UV READING, SAMPLE PRESSURE, SAMPLE FLOW, RCELL TEMP, CHASSIS TEMP, IZS TEMP, PMT TEMP, IZS TEMP[1], DCPS VOLTAGE, HVPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
REMOTE_CAL_MODE	—	SO2-LOW	SO2-LOW, SO2-HIGH, H2S-LOW, H2S-HIGH [1] or	Gas measure mode. Put value in double quotes (") when setting from the RS-232 interface.

			SO2-LOW, SO2-HIGH, SO2-TRS, TRS[2]	
PASS_ENABLE	—	OFF	OFF, ON	ON enables passwords; OFF disables them.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
RCELL_CYCLE	Seconds	10	0.5–30	Reaction cell temperature control cycle period.
RCELL_PROP	—	0.5	0–10	Reaction cell temperature PID proportional coefficient.
RCELL_INTEG	—	0.02	0–10	Reaction cell temperature PID integral coefficient.
RCELL_DERIV	—	0.1	0–10	Reaction cell temperature PID derivative coefficient.

[1] M101A.
[2] M102A.
[3] Present only if Hessen network option is installed.

Model 200A-AMX Setup Variables

The M200A-AMX family encompasses three different software variations. Because the list of setup variables is significantly different for each variation, the setup variables for each variation are listed in separate tables below.

M200A-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
SFLOW_SET	cc/m	500 (warning limits: 350–	0–1000	Nominal sample flow set point and warning limits.

		600)		
OFLOW_SET	cc/m	80 (warning limits: 50–150)	0–500	Nominal ozone flow set point and warning limits.
IZS_SET	°C	50 (warning limits: 45–55)	30–70	IZS temperature set point and warning limits.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
CAL_ON_NO2	—	OFF	OFF, ON	ON enables span calibration on pure NO_2; OFF disables it.
"Hard" Setup Variables				
TPC_GAIN	—	1	0–10	Temperature/pressure compensation attenuation factor.
CE_FACTOR1	—	1	0.8–1.2	Moly converter efficiency factor for range 1.
CE_FACTOR2	—	1	0.8–1.2	Moly converter efficiency factor for range 2.
TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for PMT detector channel. Put value in double quotes (") when setting from the RS-232 interface.
FILT_TYPE	—	MA	FIR, MA	Signal processing filter type. Put value in double quotes (") when setting from the RS-232 interface.
FILT_SIZE	Samples	42	1–80	Moving average filter size.

FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_OMIT_DELTA	PPM	0.05	0.005–0.1	Absolute change to omit readings.
FILT_OMIT_PCT	%	10	5–50	Percent change to omit readings.
FILT_SHORT_DELT	PPM	0.03	0.005–0.1	Absolute change to shorten filter.
FILT_SHORT_PCT	%	6	5–50	Percent change to shorten filter.
FILT_ASIZE	Samples	6	1–30	Moving average filter size in adaptive mode.
FILT_DELAY	Seconds	120	0–200	Delay before leaving adaptive filter mode.
NOX_DWELL	Seconds	2.5	0–30	Dwell time after switching valve to NO_X position.
NOX_SAMPLE	Samples	2	1–30	Number of samples to take in NO_X mode.
NO_DWELL	Seconds	1.5	0–30	Dwell time after switching valve to NO position.
NO_SAMPLE	Samples	2	1–30	Number of samples to take in NO mode.
DIL_FACTOR	—	1	1–1000	Dilution factor applied to concentration.
USER_UNITS	—	PPB	PPB, PPM, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
AZERO_ENABLE	—	ON	ON, OFF	ON enables auto-zero; OFF disables it.
AZERO_FREQ	Minutes	1	0–60	Auto-zero frequency.
AZERO_DWELL	Seconds	4	0–60	Dwell time after opening or closing auto-zero valve.
AZERO_SAMPLE	Samples	2	1–10	Number of auto-zero samples to average.
AZERO_FSIZE	Samples	15	1–50	Auto-zero offset moving average filter size.
AZERO_LIMIT	mV	200	0–1000	Maximum auto-zero offset allowed.
NOX_SPAN1	Conc.	400	4–20000	Target NO_X concentration during span calibration of range 1.

NO_SPAN1	Conc.	400	4–20000	Target NO concentration during span calibration of range 1.
NO2_SPAN1	Conc.	400	4–20000	Target NO_2 concentration during converter efficiency calibration of range 1.
NOX_SLOPE1	PPB/mV	1	0.25–4	NO_X slope for range 1.
NOX_OFFSET1	mV	0	-10000–10000	NO_X offset for range 1.
NO_SLOPE1	PPB/mV	1	0.25–4	NO slope for range 1.
NO_OFFSET1	mV	0	-10000–10000	NO offset for range 1.
NOX_SPAN2	Conc.	400	4–20000	Target NO_X concentration during span calibration of range 2.
NO_SPAN2	Conc.	400	4–20000	Target NO concentration during span calibration of range 2.
NO2_SPAN2	Conc.	400	4–20000	Target NO_2 concentration during converter efficiency calibration of range 2.
NOX_SLOPE2	PPB/mV	1	0.25–4	NO_X slope for range 2.
NOX_OFFSET2	mV	0	-10000–10000	NO_X offset for range 2.
NO_SLOPE2	PPB/mV	1	0.25–4	NO slope for range 2.
NO_OFFSET2	mV	0	-10000–10000	NO offset for range 2.
RANGE_MODE	—	SNGL	SNGL, IND, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
PHYS_RANGE1	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE2	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	10–20000	D/A concentration range 1 or range for NO_X.
CONC_RANGE2[1]	Conc.	500	10–20000	D/A concentration range 2 or range for NO.
CONC_RANGE3[1]	Conc.	500	10–20000	D/A concentration range for NO_2.
RCELL_SET	°C	50 (warning limits: 45–55)	30–70	Reaction cell temperature set point and warning limits.

CONV_SET	°C	315 (warning limits: 305–325)	0–800	Converter temperature set point and warning limits.
BOX_SET	°C	30 (warning limits: 5–48)	0–70	Nominal box temperature and warning limits.
PMT_SET	°C	7 (warning limits: 5–12)	0–40	PMT temperature set point and warning limits.
STD_RCELL_TEMP	°K	323 (valid limits: 278–338)	0–500	Standard reaction cell temperature and valid limits for temperature compensation.
STD_RCELL_PRESS	"Hg	5 (valid limits: 0.5–32)	0.1–50	Standard reaction cell pressure and valid limits for pressure compensation.
STD_SAMP_PRESS	"Hg	29.92 (valid limits: 0.5–32)	0.1–50	Standard sample pressure and valid limits for pressure compensation.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
MACHINE_ID	ID	200	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
NOX_GAS_ID[2]	ID	211	0–999	Unique ID number for NO_X gas.
NO_GAS_ID[2]	ID	212	0–999	Unique ID number for NO gas.
NO2_GAS_ID[2]	ID	213	0–999	Unique ID number for NO_2 gas.
TEST_CHAN_ID	—	NONE	NONE, PMT DE-TECTOR, OZONE FLOW, SAMPLE FLOW, SAMPLE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.

			PRESS-URE, RCELL PRESS-URE, RCELL TEMP, IZS TEMP, CONV TEMP, PMT TEMP, CHASSIS TEMP, DCPS VOLTAGE, HVPS VOLTAGE	
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
STABIL_GAS	—	NOX	NO, NOX, NO2	Selects gas for stability measurement. Put value in double quotes (") when setting from the RS-232 interface.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.

[1] Used only in multi-range modes.
[2] Present only if Hessen network option is installed.

Model 200AH-AMX Setup Variables

M200AH-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
MEASURE_MODE	—	NONOX	NO, NOX, NONOX	Gas measure mode. Put value in double quotes (") when setting from the RS-232 interface.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.

DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
CONC_LIM_ENAB	—	OFF	ON, OFF	ON enables concentration alarms; OFF disables them.
NOX_CONC_LIM	Conc.	0 (alarm limits: -5000–5000)	-5000–5000	NO_X concentration alarm limits.
NO_CONC_LIM	Conc.	0 (alarm limits: -5000–5000)	-5000–5000	NO concentration alarm limits.
NO2_CONC_LIM	Conc.	0 (alarm limits: -5000–5000)	-5000–5000	NO_2 concentration alarm limits.
SFLOW_SET	cc/m	290 (warning limits: 200–900)	100–1000	Nominal sample flow set point and warning limits.
OFLOW_SET	cc/m	250 (warning limits: 150–900)	10–1000	Nominal ozone flow set point and warning limits.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
“Hard” Setup Variables				

TPC_GAIN	—	1	0–10	Temperature/pressure compensation attenuation factor.
CE_FACTOR1	—	1	0.8–1.2	Moly converter efficiency factor for range 1.
CE_FACTOR2	—	1	0.8–1.2	Moly converter efficiency factor for range 2.
TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for PMT detector channel. Put value in double quotes (") when setting from the RS-232 interface.
SG_TIME_BASE	—	33 MS	Same as above.	Conversion time base for PMT detector channel in single-gas measure modes. Put value in double quotes (") when setting from the RS-232 interface.
FILT_TYPE	—	MA	FIR, MA	Signal processing filter type. Put value in double quotes (") when setting from the RS-232 interface.
FILT_SIZE	Samples	5	1–80	Moving average filter size.
SG_FILT_SIZE	Samples	60	1–80	Moving average filter size channel in single-gas measure modes.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_OMIT_DELTA	PPM	10	5–100	Absolute change to omit readings.
FILT_OMIT_PCT	%	10	5–50	Percent change to omit readings.
FILT_SHORT_DELT	PPM	5	5–100	Absolute change to shorten filter.
FILT_SHORT_PCT	%	5	5–50	Percent change to shorten filter.
FILT_ASIZE	Samples	2	1–30	Moving average filter size in adaptive mode.
SG_FILT_ASIZE	Samples	10	1–30	Moving average filter size in adaptive mode, in single-gas measure modes.

FILT_DELAY	Seconds	60	0–200	Delay before leaving adaptive filter mode.
SG_FILT_DELAY	Seconds	60	0–200	Delay before leaving adaptive filter mode in single-gas measure modes.
NOX_DWELL	Seconds	4.2	0–30	Dwell time after switching valve to NO_X position.
SG_NOX_DWELL	Seconds	1	0–30	Dwell time after switching valve to NO_X position in single-gas measure modes.
NOX_SAMPLE	Samples	2	1–30	Number of samples to take in NO_X mode.
SG_NOX_SAMPLE	Samples	1	1–30	Number of samples to take in NO_X mode in single-gas measure modes.
NO_DWELL	Seconds	4.2	0–30	Dwell time after switching valve to NO position.
SG_NO_DWELL	Seconds	1	0–30	Dwell time after switching valve to NO position in single-gas measure modes.
NO_SAMPLE	Samples	2	1–30	Number of samples to take in NO mode.
SG_NO_SAMPLE	Samples	1	1–30	Number of samples to take in NO mode in single-gas measure modes.
DIL_FACTOR	—	1	1–1000	Dilution factor applied to concentration.
USER_UNITS	—	PPM	PPM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
AZERO_ENABLE	—	ON	ON, OFF	ON enables auto-zero; OFF disables it.
AZERO_FREQ	Minutes	2	0–60	Auto-zero frequency.
AZERO_DWELL	Seconds	4	0–60	Dwell time after opening or closing auto-zero valve.
AZERO_SAMPLE	Samples	2	1–10	Number of auto-zero samples to average.
SG_AZERO_SAMP	Samples	2	1–10	Number of auto-zero samples to average in single-gas measure modes.
AZERO_FSIZE	Samples	8	1–50	Auto-zero offset moving average filter size.

AZERO_LIMIT	mV	200	0–1000	Maximum auto-zero offset allowed.
NOX_SPAN1	Conc.	80	1–5000	Target NO_X concentration during span calibration of range 1.
NO_SPAN1	Conc.	80	1–5000	Target NO concentration during span calibration of range 1.
NO2_SPAN1	Conc.	80	1–5000	Target NO_2 concentration during converter efficiency calibration of range 1.
NOX_SLOPE1	PPM/mV	1	0.25–4	NO_X slope for range 1.
NOX_OFFSET1	mV	0	-10000–10000	NO_X offset for range 1.
NO_SLOPE1	PPM/mV	1	0.25–4	NO slope for range 1.
NO_OFFSET1	mV	0	-10000–10000	NO offset for range 1.
NOX_SPAN2	Conc.	80	1–5000	Target NO_X concentration during span calibration of range 2.
NO_SPAN2	Conc.	80	1–5000	Target NO concentration during span calibration of range 2.
NO2_SPAN2	Conc.	80	1–5000	Target NO_2 concentration during converter efficiency calibration of range 2.
NOX_SLOPE2	PPM/mV	1	0.25–4	NO_X slope for range 2.
NOX_OFFSET2	mV	0	-10000–10000	NO_X offset for range 2.
NO_SLOPE2	PPM/mV	1	0.25–4	NO slope for range 2.
NO_OFFSET2	mV	0	-10000–10000	NO offset for range 2.
RANGE_MODE	—	SNGL	SNGL, IND, AUTO, REM	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
PHYS_RANGE1	PPM	500	5–5000	Low pre-amp range.
PHYS_RANGE2	PPM	5000	5–5000	High pre-amp range.
CONC_RANGE1	Conc.	100	5–5000	D/A concentration range 1 or range for NO_X.
CONC_RANGE2[1]	Conc.	100	5–5000	D/A concentration range 2 or range for NO.
CONC_RANGE3[1]	Conc.	100	5–5000	D/A concentration range for NO_2.

RCELL_SET	°C	50 (warning limits: 45–55)	30–70	Reaction cell temperature set point and warning limits.
BLOCK_SET	°C	50 (warning limits: 45–55)	30–70	Orifice block temperature set point and warning limits.
CONV_TYPE	—	CONV	NONE, MOLY, CONV, O3KL	Converter type. Put value in double quotes (") when setting from the RS-232 interface.
CONV_SET	°C	315 (warning limits: 305–325)	0–800	Converter temperature set point and warning limits.
BOX_SET	°C	30 (warning limits: 5–48)	0–70	Nominal box temperature and warning limits.
PMT_SET	°C	7 (warning limits: 5–12)	0–40	PMT temperature set point and warning limits.
STD_RCELL_TEMP	°K	323 (valid limits: 278–338)	0–500	Standard reaction cell temperature and valid limits for temperature compensation.
STD_RCELL_PRESS	"Hg	5 (valid limits: 0.5–32)	0.1–50	Standard reaction cell pressure and valid limits for pressure compensation.
STD_SAMP_PRESS	"Hg	29.92 (valid limits: 0.5–32)	0.1–50	Standard sample pressure and valid limits for pressure compensation.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
MACHINE_ID	ID	200	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
NOX_GAS_ID[2]	ID	211	0–999	Unique ID number for NO_X gas.

NO_GAS_ID[2]	ID	212	0–999	Unique ID number for NO gas.
NO2_GAS_ID[2]	ID	213	0–999	Unique ID number for NO_2 gas.
TEST_CHAN_ID	—	NONE	NONE, PMT DE-TECTOR, OZONE FLOW, SAMPLE FLOW, SAMPLE PRESS-URE, RCELL PRESS-URE, RCELL TEMP, BLOCK TEMP, CONV TEMP, PMT TEMP, CHASSIS TEMP, DCPS VOLTAGE, HVPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
STABIL_GAS	—	NOX	NO, NOX, NO2	Selects gas for stability measurement. Put value in double quotes (") when setting from the RS-232 interface.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.

[1] Used only in multi-range modes.
[2] Present only if Hessen network option is installed.

Model 200AU-AMX Setup Variables

M200AU-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
MEASURE_MODE	—	NONOX	NO, NOX, NONOX	Gas measure mode. Put value in double quotes (") when setting from the RS-232 interface.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
SFLOW_SET	cc/m	1000 (warning limits: 800–1200)	100–1500	Nominal sample flow set point and warning limits.
OFLOW_SET	cc/m	80 (warning limits: 50–150)	0–500	Nominal ozone flow set point and warning limits.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
TPC_GAIN	—	1	0–10	Temperature/pressure compensation attenuation factor.

CE_FACTOR1	—	1	0.8–1.2	Moly converter efficiency factor for range 1.
CE_FACTOR2	—	1	0.8–1.2	Moly converter efficiency factor for range 2.
TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for PMT detector channel. Put value in double quotes (") when setting from the RS-232 interface.
SG_TIME_BASE	—	33 MS	Same as above.	Conversion time base for PMT detector channel in single-gas measure modes. Put value in double quotes (") when setting from the RS-232 interface.
FILT_TYPE	—	MA	FIR, MA	Signal processing filter type. Put value in double quotes (") when setting from the RS-232 interface.
FILT_SIZE	Samples	42	1–80	Moving average filter size.
SG_FILT_SIZE	Samples	60	1–80	Moving average filter size channel in single-gas measure modes.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
FILT_OMIT_DELTA	PPM	0.05	0.005–0.1	Absolute change to omit readings.
FILT_OMIT_PCT	%	10	5–50	Percent change to omit readings.
FILT_SHORT_DELT	PPM	0.03	0.005–0.1	Absolute change to shorten filter.
FILT_SHORT_PCT	%	6	5–50	Percent change to shorten filter.
FILT_ASIZE	Samples	6	1–30	Moving average filter size in adaptive mode.
SG_FILT_ASIZE	Samples	10	1–30	Moving average filter size in adaptive mode, in single-gas measure modes.
FILT_DELAY	Seconds	120	0–200	Delay before leaving adaptive filter mode.
SG_FILT_DELAY	Seconds	60	0–200	Delay before leaving

				adaptive filter mode in single-gas measure modes.
NOX_DWELL	Seconds	2.5	0–30	Dwell time after switching valve to NO_X position.
SG_NOX_DWELL	Seconds	1	0–30	Dwell time after switching valve to NO_X position in single-gas measure modes.
NOX_SAMPLE	Samples	2	1–30	Number of samples to take in NO_X mode.
SG_NOX_SAMPLE	Samples	1	1–30	Number of samples to take in NO_X mode in single-gas measure modes.
NO_DWELL	Seconds	1.5	0–30	Dwell time after switching valve to NO position.
SG_NO_DWELL	Seconds	1	0–30	Dwell time after switching valve to NO position in single-gas measure modes.
NO_SAMPLE	Samples	2	1–30	Number of samples to take in NO mode.
SG_NO_SAMPLE	Samples	1	1–30	Number of samples to take in NO mode in single-gas measure modes.
DIL_FACTOR	—	1	1–1000	Dilution factor applied to concentration.
USER_UNITS	—	PPB	PPB, UGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
AZERO_ENABLE	—	ON	ON, OFF	ON enables auto-zero; OFF disables it.
AZERO_FREQ	Minutes	1	0–60	Auto-zero frequency.
AZERO_DWELL	Seconds	4	0–60	Dwell time after opening or closing auto-zero valve.
AZERO_SAMPLE	Samples	2	1–10	Number of auto-zero samples to average.
SG_AZERO_SAMP	Samples	2	1–10	Number of auto-zero samples to average in single-gas measure modes.
AZERO_FSIZE	Samples	15	1–100	Auto-zero offset moving average filter size.
AZERO_LIMIT	mV	200	0–1000	Maximum auto-zero offset allowed.

NOX_SPAN1	Conc.	400	1–2000	Target NO_X concentration during span calibration of range 1.
NO_SPAN1	Conc.	400	1–2000	Target NO concentration during span calibration of range 1.
NO2_SPAN1	Conc.	400	1–2000	Target NO_2 concentration during converter efficiency calibration of range 1.
NOX_SLOPE1	PPB/mV	1	0.25–4	NO_X slope for range 1.
NOX_OFFSET1	mV	0	-10000–10000	NO_X offset for range 1.
NO_SLOPE1	PPB/mV	1	0.25–4	NO slope for range 1.
NO_OFFSET1	mV	0	-10000–10000	NO offset for range 1.
NOX_SPAN2	Conc.	400	1–2000	Target NO_X concentration during span calibration of range 2.
NO_SPAN2	Conc.	400	1–2000	Target NO concentration during span calibration of range 2.
NO2_SPAN2	Conc.	400	1–2000	Target NO_2 concentration during converter efficiency calibration of range 2.
NOX_SLOPE2	PPB/mV	1	0.25–4	NO_X slope for range 2.
NOX_OFFSET2	mV	0	-10000–10000	NO_X offset for range 2.
NO_SLOPE2	PPB/mV	1	0.25–4	NO slope for range 2.
NO_OFFSET2	mV	0	-10000–10000	NO offset for range 2.
RANGE_MODE	—	SNGL	SNGL, IND, AUTO, REM	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
PHYS_RANGE1	PPM	2	0.1–2500	Low pre-amp range.
PHYS_RANGE2	PPM	20	0.1–2500	High pre-amp range.
CONC_RANGE1	Conc.	500	0.1–2000	D/A concentration range 1 or range for NO_X.
CONC_RANGE2[1]	Conc.	500	0.1–2000	D/A concentration range 2 or range for NO.
CONC_RANGE3[1]	Conc.	500	0.1–2000	D/A concentration range for NO_2.
RCELL_SET	°C	40 (warning	30–70	Reaction cell temperature set point and warning

		limits: 35–45)		limits.
CONV_TYPE	—	MOLY	NONE, MOLY, CONV, O3KL	Converter type. Put value in double quotes (") when setting from the RS-232 interface.
CONV_SET	˚C	315 (warning limits: 305–325)	0–800	Converter temperature set point and warning limits.
BOX_SET	˚C	30 (warning limits: 5–48)	0–70	Nominal box temperature and warning limits.
PMT_SET	˚C	-5 (warning limits: -9–1)	-10–10	PMT temperature set point and warning limits.
STD_RCELL_TEMP	˚K	323 (valid limits: 278–338)	0–500	Standard reaction cell temperature and valid limits for temperature compensation.
STD_RCELL_PRESS	"Hg	3.2 (valid limits: 0.1–10)	0.1–50	Standard reaction cell pressure and valid limits for pressure compensation.
STD_SAMP_PRESS	"Hg	28 (valid limits: 0.5–32)	0.1–50	Standard sample pressure and valid limits for pressure compensation.
PRESS_FILT_SIZE	Samples	60	1–120	Sample and reaction cell pressure moving average filter size.
PRESS_SAMP_FREQ	Minutes	2	0.1–60	Sample and reaction cell pressure sampling frequency.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
MACHINE_ID	ID	200	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
NOX_GAS_ID[2]	ID	211	0–999	Unique ID number for NO_X gas.

NO_GAS_ID[2]	ID	212	0–999	Unique ID number for NO gas.
NO2_GAS_ID[2]	ID	213	0–999	Unique ID number for NO_2 gas.
TEST_CHAN_ID	—	NONE	NONE, PMT DE-TECTOR, OZONE FLOW, SAMPLE FLOW, SAMPLE PRESS-URE, RCELL PRESS-URE, RCELL TEMP, CONV TEMP, PMT TEMP, CHASSIS TEMP, DCPS VOLTAGE, HVPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.
STABIL_GAS	—	NOX	NO, NOX, NO2	Selects gas for stability measurement. Put value in double quotes (") when setting from the RS-232 interface.
STABIL_FREQ	Seconds	120	1–300	Stability measurement sampling frequency.
RCELL_CYCLE	Seconds	10	0.5–30	Reaction cell temperature control cycle period.
RCELL_PROP	—	1	0–10	Reaction cell PID temperature control proportional coefficient.
RCELL_INTEG	—	0.1	0–10	Reaction cell PID temperature control

				integral coefficient.
RCELL_DERIV	—	0 (disabled)	0–10	Reaction cell PID temperature control derivative coefficient.

[1] Used only in multi-range modes.
[2] Present only if Hessen network option is installed.

Model 300-AMX Setup Variables

M300-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold off period.
DYN_ZERO	—	OFF	ON, OFF	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	ON, OFF	ON enables remote dynamic span calibration; OFF disables it.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
TIME_BASE	—	33 MS	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for measure/reference detector channel. Put value in double quotes (") when setting from the RS-232 interface.
CO_DWELL	Seconds	0.2	0–30	Dwell time before taking measure or reference sample.
CO_SAMPLE	Samples	1	1–30	Number of samples to take

				in measure or reference mode.
FILT_SIZE	Samples	750	1–1000	Moving average filter size.
FILT_DELTA	PPM	4	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	%	10	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	90	0–180	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	ON, OFF	ON enables adaptive filter; OFF disables it.
USER_UNITS	—	PPB	PPB, PPM, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
DIL_FACTOR	—	1	0.1–1000	Dilution factor applied to concentration.
DARK_MEAS_MV	mV	0	-1000–1000	Dark offset for measure reading.
DARK_REF_MV	mV	0	-1000–1000	Dark offset for reference reading.
CO_CONST1	—	700	100–2000	CO calculation constant.
CO_CONST2	—	0.13	0–0.2	CO calculation constant.
ET_MEAS_GAIN	—	1	0.0001–9.9999	Electrical test gain factor for measure reading.
ET_REF_GAIN	—	1	0.0001–9.9999	Electrical test gain factor for reference reading.
STD_TEMP	˚K	321	1–500	Standard temperature for temperature compensation.
STD_PRESS	"Hg	28.5	1–50	Standard pressure for pressure compensation.
BENCH_SET	˚C	48 (warning limits: 43–53)	0–100	Optical bench temperature set point and warning limits.
WHEEL_SET	˚C	68 (warning limits: 63–73)	0–100	Wheel temperature set point and warning limits.
CO_SPAN1	Conc.	40	1–10000	Target CO concentration during span calibration of range 1.
CO_SLOPE1	—	1	0.25–2	CO slope for range 1.

CO_OFFSET1	—	0	-0.2–0.2	CO offset for range 1.
CO_SPAN2	Conc.	40	1–10000	Target CO concentration during span calibration of range 2.
CO_SLOPE2	—	1	0.25–2	CO slope for range 2.
CO_OFFSET2	—	0	-0.2–0.2	CO offset for range 2.
RANGE_MODE	—	SNGL	SNGL, DUAL, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
CONC_RANGE1	Conc.	50	0.1–50000	D/A concentration range 1.
CONC_RANGE2[1]	Conc.	50	0.1–50000	D/A concentration range 2.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	300	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
TEST_CHAN_ID	—	NONE	NONE, CO MEASURE, CO REF-ERENCE, SAMPLE PRESS-URE, SAMPLE FLOW, SAMPLE TEMP, BENCH TEMP, WHEEL TEMP, CHASSIS TEMP, DCPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
PASS_ENABLE	—	OFF	ON, OFF	ON enables passwords; OFF disables them.

STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
[1] Used only in multi-range modes.				

Model 400-AMX Setup Variables

M400-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold-off period.
PHOTO_LAMP	°C	52 (warning limits: 51–61)	0–100	Photometer lamp temperature set point and warning limits.
O3_GEN_LAMP	°C	48 (warning limits: 43–53)	0–100	O_3 generator lamp temperature set point and warning limits.
O3_GEN_LOW1	PPB	100	0–1500	O_3 generator low set point for range 1.
O3_GEN_LOW2	PPB	100	0–1500	O_3 generator low set point for range 2.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
O3_TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for photometer detector channel. Put value in double quotes (") when setting from the RS-232 interface.
O3_DWELL	Seconds	2	0.1–30	Dwell time after switching

				measure/reference valve.
O3_SAMPLE	Samples	1	1–30	Number of detector readings to sample.
DARK_OFFSET	mV	0	-1000–1000	Photometer dark offset.
FILT_SIZE	Samples	32	1–100	Moving average filter size.
FILT_DELTA	PPB	20	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	Percent	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	60	0–60	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive filter; OFF disables it.
DIL_FACTOR	—	1	0.1–1000	Dilution factor.
USER_UNITS	—	PPB	PPB, PPM, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
O3_GEN_MODE	—	CNST	CNST, REF	O_3 generator mode. Put value in double quotes (") when setting from the RS-232 interface.
O3_GEN_SET1	PPB	400	0–1500	O_3 generator high set point for range 1.
O3_GEN_SET2	PPB	400	0–1500	O_3 generator high set point for range 2.
O3_GEN_DEF	PPB	400	0–1500	O_3 generator default set point.
REF_FREQ	Seconds	12	1–60	Reference feedback adjustment frequency.
REF_FSIZE	Samples	4	1–10	Reference feedback filter size.
REF_PROP	—	0.1	0–10	Reference PID proportional coefficient.
REF_INTEG	—	0.2	0–10	Reference PID integral coefficient.
REF_DERIV	—	0.1	0–10	Reference PID derivative coefficient.
O3_SPAN1	Conc.	400	50–10000	Target O_3 concentration during span calibration of range 1.
O3_SLOPE1	—	1	0.85–1.15	O_3 slope for range 1.
O3_OFFSET1	PPB	0	-100–100	O_3 offset for range 1.

O3_SPAN2	Conc.	400	50–10000	Target O_3 concentration during span calibration of range 2.
O3_SLOPE2	—	1	0.85–1.15	O_3 slope for range 2.
O3_OFFSET2	PPB	0	-100–100	O_3 offset for range 2.
DYN_ZERO	—	OFF	OFF, ON	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	OFF, ON	ON enables remote dynamic span calibration; OFF disables it.
RANGE_MODE	—	SNGL	SNGL, DUAL, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
CONC_RANGE1	Conc.	500	0.1–20000	D/A concentration range 1.
CONC_RANGE2[1]	Conc.	500	0.1–20000	D/A concentration range 2.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	400	0–9999 (0–999 in Hessen option)	Unique ID number for instrument.
TEST_CHAN_ID	—	NONE	NONE, O3 PHOTO MEAS, O3 PHOTO REF, O3 GEN REF, SAMPLE PRESSURE, SAMPLE FLOW, SAMPLE TEMP, PHOTO LAMP TEMP,	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.

			O3 LAMP TEMP, CHASSIS TEMP, DCPS VOLTAGE	
PASS_ENABLE	—	OFF	OFF, ON	ON enables passwords; OFF disables them.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
[1] Used only in multi-range modes.				

Model 400A-AMX Setup Variables

M400A-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
DAS_HOLD_OFF	Minutes	15	0.5–20	Duration of DAS hold-off period.
PHOTO_LAMP	°C	52 (warning limits: 51–61)	0–100	Photometer lamp temperature set point and warning limits.
O3_GEN_LAMP	°C	48 (warning limits: 43–53)	0–100	O_3 generator lamp temperature set point and warning limits.
O3_GEN_LOW1	PPB	100	0–1500	O_3 generator low set point for range 1.
O3_GEN_LOW2	PPB	100	0–1500	O_3 generator low set point for range 2.
BLOCK_SET	°C	48 (warning limits: 43–53)	0–100	Orifice block temperature set point and warning limits.
SAMP_FLOW_SET	cc/m	800 (warning limits: 200–1000)	100–1000	Nominal sample flow set point and warning limits.
RS232_MODE	—	8 (19 in Hessen option)	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security

				8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
O3_TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for photometer detector channel. Put value in double quotes (") when setting from the RS-232 interface.
O3_DWELL	Seconds	2	0.1–30	Dwell time after switching measure/reference valve.
O3_SAMPLE	Samples	1	1–30	Number of detector readings to sample.
DARK_OFFSET	mV	0	-1000–1000	Photometer dark offset.
FILT_SIZE	Samples	32	1–100	Moving average filter size.
FILT_DELTA	PPB	20	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	Percent	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	60	0–60	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive filter; OFF disables it.
SAMP_FLOW_SLOPE	—	1	0.5–1.5	Sample flow slope correction factor.
DIL_FACTOR	—	1	1–1000	Dilution factor.
USER_UNITS	—	PPB	PPB, PPM, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
O3_GEN_MODE	—	CNST	CNST, REF	O_3 generator mode. Put value in double quotes (") when setting from the RS-232 interface.
O3_GEN_SET1	PPB	400	0–1500	O_3 generator high set point for range 1.
O3_GEN_SET2	PPB	400	0–1500	O_3 generator high set point

				for range 2.
O3_GEN_DEF	PPB	400	0–1500	O_3 generator default set point.
REF_FREQ	Seconds	12	1–60	Reference feedback adjustment frequency.
REF_FSIZE	Samples	4	1–10	Reference feedback filter size.
REF_PROP	—	0.1	0–10	Reference feedback PID proportional coefficient.
REF_INTEG	—	0.2	0–10	Reference feedback PID integral coefficient.
REF_DERIV	—	0.1	0–10	Reference feedback PID derivative coefficient.
O3_SPAN1	Conc.	400	50–10000	Target O_3 concentration during span calibration of range 1.
O3_SLOPE1	—	1	0.85–1.15	O_3 slope for range 1.
O3_OFFSET1	PPB	0	-100–100	O_3 offset for range 1.
O3_SPAN2	Conc.	400	50–10000	Target O_3 concentration during span calibration of range 2.
O3_SLOPE2	—	1	0.85–1.15	O_3 slope for range 2.
O3_OFFSET2	PPB	0	-100–100	O_3 offset for range 2.
DYN_ZERO	—	OFF	OFF, ON	ON enables remote dynamic zero calibration; OFF disables it.
DYN_SPAN	—	OFF	OFF, ON	ON enables remote dynamic span calibration; OFF disables it.
RANGE_MODE	—	SNGL	SNGL, DUAL, AUTO	Range control mode. Put value in double quotes (") when setting from the RS-232 interface.
CONC_RANGE1	Conc	500	0.1–20000	D/A concentration range 1.
CONC_RANGE2[1]	Conc	500	0.1–20000	D/A concentration range 2.
BAUD_RATE	—	19.2 (1200 in Hessen option)	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	400	0–9999 (0–999 in	Unique ID number for instrument.

			Hessen option)	
TEST_CHAN_ID	—	NONE	NONE, O3 PHOTO MEAS, O3 PHOTO REF, O3 GEN REF, SAMPLE PRESSURE, SAMPLE FLOW, SAMPLE TEMP, PHOTO LAMP TEMP, O3 LAMP TEMP, CHASSIS TEMP, DCPS VOLTAGE	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.
PASS_ENABLE	—	OFF	OFF, ON	ON enables passwords; OFF disables them.
STABIL_FREQ	Seconds	10	1–300	Stability measurement sampling frequency.
PHOTO_CYCLE	Seconds	10	0.5–30	Photometer lamp temperature control cycle period.
PHOTO_PROP	—	1	0–10	Photometer lamp PID temperature control proportional coefficient.
PHOTO_INTEG	—	0.1	0–10	Photometer lamp PID temperature control integral coefficient.
PHOTO_DERIV	—	0 (disabled)	0–10	Photometer lamp PID temperature control derivative coefficient.
PATH_LENGTH	cm	41.96	0.01–100	Photometer detector path length.

[1] Used only in multi-range modes.

Model 450-AMX Setup Variables

M450-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
"Easy" Setup Variables				
LATCH_ALARMS	—	OFF	OFF, ON	ON latches alarms until cleared; OFF clears alarms automatically.
ALARM_BEEPER	—	ON	OFF, ON	ON enables alarm beeper; OFF disables it.
TPC_ENABLE	—	ON	OFF, ON	ON enables temperature/ pressure compensation; OFF disables it.
STD_TEMP	°K	273	200–500	Standard temperature used for compensation.
STD_PRESS	"Hg	29.92	15–50	Standard pressure used for compensation.
PHOTO_LAMP	°C	52 (warning limits: 51–61)	0–100	Photometer lamp temperature set point and warning limits.
RS232_MODE	—	0	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
"Hard" Setup Variables				
STREAM_DWELL	Minutes	3	0.1–120	Dwell time after switching streams.
O3_TIME_BASE	—	1 SEC	33 MS, 66 MS, 133 MS, 266 MS, 533 MS, 1 SEC, 2 SEC, 4 SEC	Conversion time base for photometer detector channel. Put value in double quotes (") when setting from the RS-232 interface.
O3_DWELL	Seconds	2	0.1–30	Dwell time after switching

				measure/reference valve.
O3_SAMPLE	Samples	1	1–30	Number of detector readings to sample.
DARK_OFFSET	mV	0	-1000–1000	Photometer dark offset.
FILT_SIZE	Samples	32	1–100	Moving average filter size.
FILT_DELTA	PPB	20	1–1000	Absolute change to trigger adaptive filter.
FILT_PCT	Percent	5	1–100	Percent change to trigger adaptive filter.
FILT_DELAY	Seconds	60	0–60	Delay before leaving adaptive filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive filter; OFF disables it.
USER_UNITS	—	PPM	PPB, PPHM, PPM, PPMW, UGM, MGM	Concentration units for user interface. Put value in double quotes (") when setting from the RS-232 interface.
O3_SPAN	Conc.	400	0.1–10000	Target O_3 concentration during span calibration.
O3_SLOPE	—	1	0.85–1.15	O_3 slope.
O3_OFFSET	PPB	0	-100–100	O_3 offset.
BAUD_RATE	—	19.2	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
MACHINE_ID	ID	450	0–9999	Unique ID number for instrument.
PHOTO_CYCLE	Seconds	10	0.5–30	Photometer lamp temperature control cycle period.
PHOTO_PROP	—	1	0–10	Photometer lamp temperature PID proportional coefficient.
PHOTO_INTEG	—	0.1	0–10	Photometer lamp temperature PID integral coefficient.
PHOTO_DERIV	—	0	0–10	Photometer lamp temperature PID derivative coefficient.

PHOTO_LMP_DRIVE	mV	4500	0–5000	Photometer lamp drive setting.
PHOTO_REF_SET	mV	4500	0–5000	Target reference detector reading during photometer lamp calibration.
PHOTO_LMP_FREQ	Seconds	5	1–60	Feedback control frequency during lamp calibration.
PHOTO_LMP_PROP	—	0.1	0–10	Proportional coefficient for lamp calibration.
PHOTO_LMP_INTEG	—	0.1	0–10	Integral coefficient for lamp calibration.
PHOTO_LMP_DERIV	—	0.1	0–10	Derivative coefficient for lamp calibration.
PATH_LENGTH	cm	41.96	0.01–100	Photometer detector path length.

Model 700-AMX Setup Variables

M700-AMX Setup Variables				
Setup Variable	**Numeric Units**	**Default Value**	**Value Range**	**Description**
“Easy” Setup Variables				
PHOTO_LAMP	˚C	52 (warning limits: 51–61)	0–100	Photometer lamp temperature set point and warning limits.
O3_GEN_LAMP	˚C	48 (warning limits: 43–53)	0–100	O_3 generator lamp temperature set point and warning limits.
RS232_MODE	—	8	0–65535	RS-232 mode flags. Add values to combine flags. 1 = quiet mode 2 = computer mode 4 = enable security 8 = enable native protocol 16 = enable alternate protocol 32 = enable multidrop
CLOCK_ADJ	Sec./Day	0	-60–60	Time-of-day clock speed adjustment.
“Hard” Setup Variables				
O3_DWELL	Seconds	2	0.1–30	Dwell time after switching photometer measure/reference valve.

O3_SAMPLE	Samples	1	1–30	Number of photometer detector readings to sample.
DARK_OFFSET	mV	0	-1000–1000	Photometer dark offset.
PHYS_RANGE1	PPM	0.5	0.1–2000	Low pre-amp range.
FILT_SIZE	Samples	32	1–100	Moving average photometer filter size.
FILT_DELTA	PPB	20	1–1000	Absolute change to trigger adaptive photometer filter.
FILT_PCT	Percent	5	1–100	Percent change to trigger adaptive photometer filter.
FILT_DELAY	Seconds	60	0–120	Delay before leaving adaptive photometer filter mode.
FILT_ADAPT	—	ON	OFF, ON	ON enables adaptive photometer filter; OFF disables it.
O3_SLOPE	—	1	0.85–1.15	O_3 photometer slope.
O3_OFFSET	PPB	0	-100–100	O_3 photometer offset.
O3_BCAL_SET	PPB	400	0.1–10000	Target O_3 photometer span concentration during bench calibration.
O3_DEF_DRIVE	mV	1000	0–5000	O_3 generator lamp default drive setting.
O3_GEN_FLOW	lpm	0.105	0.001–1	O_3 generator nominal flow rate.
O3_GEN_MODE	—	CNST	CNST, REF, BNCH	O_3 generator mode. Put value in double quotes (") when setting from the RS-232 interface.
REF_FREQ	Seconds	12	1–60	Reference feedback adjustment frequency.
REF_FSIZE	Samples	4	1–10	Reference feedback filter size.
REF_PROP	—	0.1	0–10	Reference feedback PID proportional coefficient.
REF_INTEG	—	0.2	0–10	Reference feedback PID integral coefficient.
REF_DERIV	—	0.1	0–10	Reference feedback PID derivative coefficient.
BENCH_FREQ	Seconds	10	1–60	Bench feedback adjustment frequency.
BENCH_FSIZE	Samples	2	1–10	Bench feedback filter size.
BENCH_PROP	—	0.25	0–10	Bench feedback PID

				proportional coefficient.
BENCH_INTEG	—	0.25	0–10	Bench feedback PID integral coefficient.
BENCH_DERIV	—	0.25	0–10	Bench feedback PID derivative coefficient.
PRESS_LIMIT	PSIG	25 (warning limits: 15–33)	0–50	Nominal gas/diluent pressure and warning limits.
REG_PRESS_LIM	PSIG	20 (warning limits: 15–25)	0–50	Nominal regulator pressure and warning limits.
PERM_SET	˚C	50 (warning limits: 49–51)	0–100	Permeation tube temperature set point and warning limits.
PERM_FLOW	lpm	0.105	0.001–1	Permeation tube nominal flow rate.
TARGET_FLOW	lpm	2	0.01–20	Target output flow rate.
RS232_PASS	Password	940331	0–999999	RS-232 log on password.
BAUD_RATE	—	19.2	300, 1200, 2400, 4800, 9600, 19.2	RS-232 port baud rate. Put value in double quotes (") when setting from the RS-232 interface.
MACHINE_ID	ID	700	0–9999	Unique ID number for instrument.
TEST_CHAN_ID	—	NONE	NONE, O3 PHOTO MEAS, O3 PHOTO REF, O3 GEN REF, SAMPLE PRESSURE, SAMPLE FLOW, SAMPLE TEMP, PHOTO LAMP	Diagnostic analog output ID. Put value in double quotes (") when setting from the RS-232 interface.

			TEMP, O3 LAMP TEMP, CHASSIS TEMP, DCPS VOLTAGE	
PASS_ENABLE	—	ON	OFF, ON	ON enables passwords; OFF disables them.