BAM 1020 STANDARD 7500 COMMAND SPECIFICATION

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1. Overview

This document describes the implementation of the latest and most advanced STANDARD 7500 protocol used in the BAM 1020 firmware revision 9.0.0 and greater.

2. Instrument Communication Modes

2.1. Overview

There are three modes of communication:

1. *User communication* – This is a user interactive mode using simple letter commands for ease of use.
2. *Computer communication* – This mode is used for computer-to-device communication. It requires a level of data integrity.
3. *Network communication* – This mode is used for computer-to-device communication with more than one device on a network.

2.2. User Communication

In the user communication mode (terminal mode), the user simply presses the Enter key, <cr>, three times to enter the mode. In this mode simple character commands can be issued with no <Esc> character required.

An asterisk character appears during wake-up, and also after a command has completed. The asterisk indicates that the instrument is ready for a new command. Commands are echoed back from the instrument in this mode. The characters must be echoed as received in the instrument.

A help menu can be viewed by sending H, h, or ?; giving all the commands available to the user. Factory commands are not shown.

Pressing <Esc> or Q<cr> will exit terminal mode.

2.3. Computer Communication

In the computer communication mode the command format requires a level of data integrity – checksum.

This mode is entered whenever an <Esc> character is sent to the instrument.

Character echo is suppressed in this mode.

2.3.1. **Computer Command Format**

The computer command has the following format:

```
<Esc>Cmd p1 p2*cs<cr>
```

Computer commands are prefaced with an `<Esc>` (0x1B) character followed directly by a command, `Cmd`, which is variable in length depending on the command. After the command characters there can be zero or more parameter fields, `p1 p2`. Each parameter field is delimited by one or more Space characters (0x20). The end of the message is signaled by the Checksum Delimiter character `*` (0x2A) followed by the checksum, `cs`, and finally terminated with a carriage return `<cr>` (0x0D) character.

A computer command example follows:

```
<Esc>RV*1234<cr>
```

All command responses are terminated with a checksum

```
BAM 1020, 83347, R9.0.0*01179<cr><lf>
```

2.3.2. **Checksum Computation**

Checksum is calculated as the 16 bit unsigned integer sum of all of the characters after the `<Esc>` character up to but not Including the Checksum Delimiter Character `*` (0x2A). It is printed out as an ASCII decimal number.

The result is always 5 characters in length with leading zeros.

The checksum may be bypassed in the following manner: `*//<cr>`.

3. Command Summary

3.1. Command List

Command	Description
#	Get 7500 Protocol Revision
?	Print help menu
1	Print Settings report
2	Print All User data report
3	Print New User data report
4	Print Last User data report
5	Print All Flow Stats report
6	Print New Flow Stats report
7	Print Alarm event report
8	Print All 5-Min Flow report
9	Print New 5-Min Flow report
A	<Esc>A Network address command
C	Clear User, Flow Stats and 5-Min Flow data log files
D	Get/Set Date
H	Print help menu
K	Get/Set factory calibration K-factor
Q	Exit User mode
T	Get/Set time part of the real time clock
AR	Get/Set Analog output voltage Range
CA	Clear Alarm log file
CM	Get/Set Cycle Mode
CO	Get/Set analog output Concentration Offset
CR	Get/Set analog output Concentration Range
CU	Get/Set Concentration Units
DS	Report User data log channel descriptors
DT	Get/Set date and time
GW	Get/Set Gateway address
HS	Get/Set RS-232 Flow Control
ID	Get/Set location ID or address

IT	Get/Set Inlet Type
LG	Get/Set Display Language
MA	Get/Set Modbus Address
MN	Get/Set Maintenance 'M' flag/bit
MP	Get/Set Modbus Port
NW	Get/Set <Esc>A Network mode
OI	Get/Set Output Interval
OP	Get/Set Operation state
PR	Print Report
PT	Get/Set Protocol Type
PU	Get/Set Pressure Units
PW	Unlock user or factory protected commands
QH	Print User data record header
RQ	Print User data current readings
RT	Get/Set CSV Report Type
RV	Print Model/Part/Revision
SB	Get/Set baud rate
SS	Get Met One serial number
ST	Get/Set Sample Time (data log period)
TS	Get/Set Time Stamp mode
UN	Get/Set data log channel units
BCT	Get/Set Beta Count Time
BST	Get/Set Bam Sample Time
CEV	Get/Set Concentration error value
DNS	Get/Set DNS server address
GTC	Start touch screen calibration
ROP	Get/Set Operation state report
RPW	Report encrypted user password
SPW	Get/Set user password
USW	Get/Set USW Absorption Coefficient
XRD	Get Record Descriptors
XRF	XMODEM read file
BKGD	Get/Set Background offset

FLOW	Get/Set Flow report enable
G2CO	Get/Set Generation 2 Concentration Offset
G2CR	Get/Set Generation 2 Concentration Range
G2CT	Get/Set Generation 2 Concentration Type
G2BP	Get/Set Generation 2 log BP channel
G2FT	Get/Set Generation 2 log FT channel
G2RH	Get/Set Generation 2 log RH channel
G2RT	Get/Set Generation 2 Report Type
LPWR	Get/Set Inlet heater low power
SPAN	Get/Set span membrane mass
SPCK	Get/Set Span membrane check mode
STDT	Get/Set Standard temperature
DSCRC	Get the data log channel descriptors CRC
G2FRH	Get/Set Generation 2 log FRH channel
FRHSP	Get/Set FRH Set Point
RHEAT	Get/Set Heater report enable
TPRES	Get/Set tape advance pressure
G2DYNM	Get/Set Conc dynamic range
G2MEMB	Get/Set Generation 2 log Memb channel
IPADDR	Get/Set IP Address
XRDCRC	Get File descriptors CRC
NETMASK	Get/Set Subnet Mask address
IPCONFIG	Report IP Configuration

4. BAM 1020 Commands

The command and responses shown below are for computer mode unless otherwise noted. User mode responses are more verbose and similar in nature.

4.1. # – Get 7500 Protocol Revision

Command	Description
#	Get the 7500 Protocol Revision.

Response	Description
# 7500 r	7500 – This protocol number r – The revision of this document implemented in firmware

Example
#<cr> # 7500 C<cr><lf>

4.2. 1 – Print Settings Report

Command	Description
1	Print the Settings report

Response

```
BAM 1020 Settings Report
2020-06-11 16:05:27

     Station ID, 1
  Serial Number, A14540

       Firmware, 83347, R9.0.0
        Display, 82451, R1.1
      Digital 1, 597, 10503-01, R01.0.0

              K, 1.000
     Background, 0.0000
            Usw, 0.302
  Span Membrane, 0.851
     Conc Units, ug/m3
     Beta Count, 4-MINUTE
     Conc Error, FULL SCALE VALUE
     Inlet Type, PM10
     Span Check, 24 HR
   Factory Mode, OFF

  Standard Temp, 25 C
  Tape Pressure, 150
     Pres Units, mmHg

  FRH Set Point, 35
      Low Power, 20

     BAM Sample, 50
    MET Average, 1 HR
     Cycle Mode, STANDARD
    Maintenance, OFF

     Time Stamp, ENDING
Interval Output, 0

     Conc Range, 1000 ug/m3
    Conc Offset, -15 ug/m3
 Analog Range 1, 0-1.0 V
 Analog Range 2, 0-1.0 V
      DAC Cal 1, 0.0,0,1.0,29789
      DAC Cal 2, 0.0,0,1.0,29789

         RS-232, 115200
Flow Control-232, NONE
```

```
        RS-485, 115200

   Modbus Port, RS-232
Modbus Address, 1
    Byte Order, 512

     IP Config, Static, DHCP
    IP Address, 0.0.0.0, 0.0.0.0:7500
   Subnet Mask, 0.0.0.0, 0.0.0.0
       Gateway, 0.0.0.0, 0.0.0.0

   Report Type, GENERATION 2
     Conc Type, ACTUAL
    Conc Range, 1000 ug/m3
   Conc Offset, -15 ug/m3
 Dynamic Range, STANDARD
       BP Log, NONE
      Memb Log, NONE
        RH Log, NONE
       FRH Log, NONE
        FT Log, NONE

     Flow Zero, 0.03

 Name,  Offset,  Slope
 Flow,   0.000,  1.000
   AT,   0.000
   BP,   0.000
   FT,   0.000
  FRH,   0.000
   FP,   0.000

  Sound Volume, 10
     Language, English
```

4.3. 2 – Print All User Data Report

Command	Description
2	Print all the user data as a CSV report.

Header Response – A report header is present when execute from terminal mode. It is suppressed in computer mode.

```
Data Report
2020-06-11 16:11:49
Station, 1, A14540

Time,Conc(ug/m3),ConcS(ug/m3),Qtot(m3),QtotS(m3),Flow(lpm),WS(m/s),WD(Deg),AT(C),RH(%),BP(mmHg),FT(C)
,FRH(%),Memb(mg/cm2),Status
```

Data Response – The data is reported in a comma separated variable (CSV) format.

An <Esc> or <cr> character will cancel the report output.

```
2020-06-05 18:00:00,+00003.0,+00003.0,0.698,0.698,+16.65,00.0,000,+024.4,032,792.7,+026.2,024,
0.856,00000
```

4.4. 3 – Print New User Data Report

Command	Description
`3`	Print the new user data as a CSV report since the last report.

Response – The response is the same as the 2-command

4.5. 4 – Print Last User Data Report

Command	Description
`4`	Print the last data record.
`4 0`	Print all the data.
`4 -1`	Print the new data since the last request.
`4 n`	Print the last `n`-records where `n` is less than 2000.

Response – The response is the same as the 2-command

4.6. 5 – Print All Flow Stats Report

Command	Description
2	Print all the Flow Stats data log.

Response:

```
Flow Statistics Report
2020-06-09 08:01:28
Station, 9, A14540

Time,Elapsed(HH:mm:ss),Flow(lpm),CV(%),Vol(m3),Flag,AT(C),AT Min,AT Max,BP(mmHg),BP Min,BP Max
2020-06-05 17:08:36,00:41:58,16.66,0.2,0.698,0,24.4,24.3,24.7,792.7,792.6,792.8
2020-06-05 18:08:27,00:41:58,16.66,0.1,0.698,0,24.4,24.3,24.6,792.8,792.7,792.9
```

4.7. 6 – Print New Flow Stats Report

Command	Description
5	Print the new Flow Stats data log since the last report.

Response – The response is the same as the 5-command

4.8. 7 – Print Alarm Event Report

Command	Description
7	Print all the alarm events

Response:

```
Alarm Report
2020-06-11 16:43:22
Station, 1, A14540

Time,Alarm
2020-06-11 16:43:12, Tape
2020-06-11 16:43:12, Tape,Latch
2020-06-11 16:43:12, Tape,Shuttle Reset
2020-06-11 16:43:12, Tape,Shuttle Fine
2020-06-11 16:43:12, Tape,Forward Move
2020-06-11 16:43:12, Tape,Forward Timeout
2020-06-11 16:43:12, Tape,Backward Move
2020-06-11 16:43:12, Tape,Backward Timeout
2020-06-11 16:43:12, Tape,Tension
2020-06-11 16:43:12, Tape,Un-Tension
2020-06-11 16:43:12, Tape,Capstan Forward Move
2020-06-11 16:43:12, Tape,Capstan Forward Timeout
2020-06-11 16:43:12, Tape,Capstan Backward Move
2020-06-11 16:43:12, Tape,Capstan Backward Timeout
2020-06-11 16:43:12, Tape,Capstan Fine Backward Move
2020-06-11 16:43:12, Tape,Capstan Fine Forward Timeout
2020-06-11 16:43:12, Tape,Tape Break
2020-06-11 16:43:12, Tape,Fail Safe
2020-06-11 16:43:12, Tape,Unknown Subcategory
2020-06-11 16:43:12, Count
2020-06-11 16:43:12, Count,Mass
2020-06-11 16:43:12, Count,Membrane
2020-06-11 16:43:12, Count,Stability
2020-06-11 16:43:12, Count,Unknown Subcategory
2020-06-11 16:43:12, Membrane Deviation
2020-06-11 16:43:12, Membrane Deviation,5%
2020-06-11 16:43:12, Membrane Deviation,Unknown Subcategory
2020-06-11 16:43:12, Pressure
2020-06-11 16:43:12, Pressure,Filter Pressure
2020-06-11 16:43:12, Pressure,Unknown Subcategory
2020-06-11 16:43:12, Flow
2020-06-11 16:43:12, Flow,QTotal
```

```
2020-06-11 16:43:12, Flow,5% Out-of-regulation
2020-06-11 16:43:12, Flow,Flow Failure
2020-06-11 16:43:12, Flow,AT Failure
2020-06-11 16:43:12, Flow,AT Disconnected
2020-06-11 16:43:12, Flow,Internal FP Failure
2020-06-11 16:43:12, Flow,Internal RH Failure
2020-06-11 16:43:12, Flow,External BP Failure
2020-06-11 16:43:12, Flow,Pump Off Failure
2020-06-11 16:43:12, Flow,Unknown Subcategory
2020-06-11 16:43:12, Nozzle
2020-06-11 16:43:12, Nozzle,Up
2020-06-11 16:43:12, Nozzle,Down
2020-06-11 16:43:12, Nozzle,Unknown Subcategory
2020-06-11 16:43:12, Membrane Timeout
2020-06-11 16:43:12, Membrane Timeout,Withdraw
2020-06-11 16:43:12, Membrane Timeout,Extend
2020-06-11 16:43:12, Membrane Timeout,Unknown Subcategory
2020-06-11 16:43:12, Power Fail
2020-06-11 16:43:12, Internal
2020-06-11 16:43:12, Internal,Mass
2020-06-11 16:43:12, Internal,Membrane
2020-06-11 16:43:12, Internal,Stability
2020-06-11 16:43:12, Internal,Coarse
2020-06-11 16:43:12, Internal,Unknown Subcategory
2020-06-11 16:43:12, Maintenance
```

4.9. 8 – Print All 5-Min Flow Report

Command	Description
8	Print all the 5-Min Flow data log.

Response:

```
5-Minute Flow Report
2017-12-29 14:27:40
Station, 446, U16446

Time,Flow(lpm),AT(C),BP(mmHg)
2017-12-29 07:43:24,16.64,24.4,734.1
2017-12-29 07:48:24,16.64,24.5,734.2
2017-12-29 08:13:24,16.63,24.3,734.0
2017-12-29 08:18:24,16.64,24.3,733.9
2017-12-29 08:23:24,16.64,24.2,733.9
2017-12-29 08:28:24,16.65,24.3,733.9
2017-12-29 08:33:24,16.64,24.4,733.9
2017-12-29 08:38:24,16.64,24.3,733.9
2017-12-29 08:43:24,16.64,24.4,733.9
2017-12-29 08:48:24,16.64,24.5,733.8
```

4.10. 9 – Print New 5-Min Flow Report

Command	Description
9	Print the new 5-Min Flow data log since the last report.

Response – The response is the same as the 8-command

4.11. A – <Esc A> Network Address Command

4.12. C – Clear Data Log

Command	Description
C Y	Clear the User, Flow Stats, and 5-Min Flow data logs.

Response
C Y

Example
C Y<cr> C Y<cr><lf>

4.13. D – Get or Set Date Only

Command	Description
D	Get the date part of the real time clock.
D yyyy-MM-dd	Set the date part of the real time clock.

Response
D yyyy-MM-dd

Parameter	Description
yyyy	Years 2000 – 2037
MM	Months 1 – 12
dd	Days 1 – 31

Example
D<cr> D 2013-01-08<cr><lf> D 2013-01-08<cr> D 2013-01-08<cr><lf>

4.14. H – Help Menu

Command	Description
H or ?	Print the help menu.

Response

BAM 1020 Help Menu
 	
  1 - Report Settings
  2 - Report All Data
  3 - Report New Data
  4 - Report Last Data
  5 - Report All Flow Stats
  6 - Report New Flow Stats
  7 - Report Alarm Log
  8 - Report All 5-Min Flow
  9 - Report New 5-Min Flow
 	
  C - Clear Data Logs
 CA - Clear Alarm Log
 DT - Set Date/Time
 RV - Report Model/Part/Revision

4.15. K – Get or Set Calibration K-factor

Command	Description
`K`	Get Calibration K-factor
`K k`	Set Calibration K-factor. The `k` range is 0.5 to 1.5.

Response	Description
`K 1.000`	Returns the calibration K-factor setting

Example

`K<cr>`
`K 1.000<cr><lf>`
 	
`K 1.012<cr>`
`K 1.012<cr><lf>`

4.16. Q – Exit User Mode

Command	Description
Q	Exit User mode and enter Computer mode.

Response	Description
Exit User Mode	The command was successful.

Example
Q<cr> Exit User Mode<cr><lf>

4.17. T – Get or Set Time Only

Command	Description
T	Get the time part of the real time clock.
T HH:mm:ss	Set the time part of the real time clock.

Response	Description
T HH:mm:ss	HH – Hours 0 – 23. mm – Minutes 0 – 59. ss – Seconds 0 – 59, this parameter is optional. When omitted the value will be 0.

Example
T<cr> T 13:18:38<cr><lf> T 14:13:12<cr> T 14:13:12<cr><lf>

4.18. AR – Get or Set Analog Output Voltage Range

Command	Description
AR	Print the voltage range settings for analog output channels 1 and 2
AR 0	Get the number of analog output channels
AR c	Get the channel c analog output voltage range setting
AR c e	Set the channel c analog output to e voltage range setting
AR ?	Get the enumerator list for the voltage range setting

Response	Description
AR e-n	e – The enumerator setting, where e is 0-0-1.0 V, 1-0-5.0 V n – The voltage range name.

Example
AR<cr> AR 1,1-0-5.0 V<cr><lf> AR 2,1-0-5.0 V<cr><lf> AR 0<cr> AR 2<cr><lf> AR ?<cr> AR 1 0-0-1.0 V,1-0-5.0 V<cr><lf> AR 2 0-0-1.0 V,1-0-5.0 V<cr><lf> AR 2 0<cr> AR 2,0-0-1.0 V<cr><lf> AR<cr> AR 1,1-0-5.0 V<cr><lf> AR 2,0-0-1.0 V<cr><lf>

4.19. CA – Clear Alarm Log

Command	Description
CA Y	Clear the alarm log file.

Response
CA Y

Example
CA Y<cr> CA Y<cr><lf>

4.20. CM – Get or Set Cycle Mode

Command	Description
CM	Get the cycle mode.
CM e	Set the cycle mode, where e is 0-STANDARD, 1-EARLY

Response	Description
CM e-n	e – The enumerator setting. n – The cycle mode name.

Example
CM<cr> CM 0-STANDARD<cr><lf> CM 1<cr> CM 1-EARLY<cr><lf>

4.21. CO – Get or Set Concentration Offset

Command	Description
CO	Get the analog output concentration offset.
CO e	Set the concentration offset, where e is 0—-15 ug/m3, 1—-10 ug/m3, 2—-5 ug/m3, 3-0 ug/m3, 4-5 ug/m3

Response	Description
CO e-n	e – The enumerator setting. n – The concentration offset name.

Example
CO<cr> CO 1—0 ug/m3<cr><lf> CO 4<cr> CO 4-5 ug/m3<cr><lf>

4.23. CR – Get or Set Concentration Range

Command	Description
CR	Get the analog output concentration range.
CR e	Set the concentration offset, where e is 0-100 ug/m3, 1-200 ug/m3, 2-500 ug/m3, 3-1000 ug/m3, 4-2000 ug/m3, 5-5000 ug/m3, 6-10000 ug/m3

Response	Description
CR e-n	e – The enumerator setting. n – The concentration range name.

Example
CR<cr> CR 6—10000 ug/m3<cr><lf> CR 3<cr> CR 3-1000 ug/m3<cr><lf>

4.24. CU – Get or Set Count Units

Command	Description
CU	Get count unit setting.
CU e	Set the count unit setting, where e is 0-ug/m3, 1-mg/m3.

Response	Description
CU e-n	e – The enumerator setting. n – The unit name.

Example
CU<cr> CU 0-ug/m3<cr><lf> CU 1<cr> CU 1-mg/m3<cr><lf>

4.25. Field Descriptors

Retrieval commands are used to query the instrument for Descriptor Information Table for the CSV report. These commands can be accessed by any serial device such as a data logger or software.

Information can be retrieved in either in single line responses or in bulk. Single line responses are needed for devices with limited serial input buffer sizes.

4.25.1. DS 0 – Query Abbreviated Descriptor Information

Command	Description
`DS 0`	This command returns the general header information.

Response	Description
`DS n,id,r`	The response will indicate the general descriptor information. `n` – Number of field descriptor lines available. `id` – Location ID `r` – Reserved for future use. 0 is the default.

Example
`DS 0<cr>` `DS 18,27,0<cr><lf>`

4.25.2. **DS c – Specific Descriptor Information**

Command	Description
`DS c`	This command returns the specific channel header information in the Descriptor Information Table. `c` – Channel number.

Response
`DS c,FieldName,MeasureType,units,prec,math,max,min`

Parameter	Description
`c`	Field number – 1 based.
`FieldName`	Field name string in printable ASCII. This is the user selected name for the measurement. Example: AT1 for air temp, FT1 for flow temp, etc.
`MeasureType`	Measurement type string in printable ASCII See the definitions in Appendix A of the 7500 Protocol document
`units`	Engineering units string in printable ASCII. See the definitions in Appendix B of the 7500 Protocol document.
`prec`	Display value precision.
`math`	Math type field. Vector (V), Scalar (S), Total (T), Minimum (MIN), Maximum (MAX), Standard Deviation (STD), Top-of-Hour (TOH), Bitwise OR (OR), No Math (NO).
`max`	Maximum measurement value.
`min`	Minimum measurement value.

Example
`DS 3<cr>` `DS 3,ConcS,CONC,mg/m3,4,TOH,100.0000,-0.0150<cr><lf>`

4.25.3. **DS – Get All Descriptor Information**

Command	Description
DS	This command returns all of the general and header information. The command can be used for devices that have a large serial input buffer size.

Example

```
DS<cr>
DS 1,Time,TIME,,0,NO,0,0<cr><lf>
DS 2,Conc,CONC,mg/m3,4,TOH,100.0000,-0.0150<cr><lf>
DS 3,ConcS,CONC,mg/m3,4,TOH,100.0000,-0.0150<cr><lf>
DS 4,Qtot,VOL,m3,3,TOH,3.000,0.000<cr><lf>
DS 5,QtotS,VOL,m3,3,TOH,3.000,0.000<cr><lf>
DS 6,no,NA,V,3,S,1.000,0.000<cr><lf>
DS 7,no,NA,V,3,S,1.000,0.000<cr><lf>
DS 8,no,NA,V,3,S,1.000,0.000<cr><lf>
DS 9,no,NA,V,3,S,1.000,0.000<cr><lf>
DS 10,RH,RH,%,0,S,100,0<cr><lf>
DS 11,AT,AT,C,1,S,70.0,-50.0<cr><lf>
DS 12,BP,BP,mmHg,1,S,825.0,375.0<cr><lf>
DS 13,FRH,RH,%,0,S,135,-26<cr><lf>
DS 14,FT,AT,C,1,S,-51.3,95.8<cr><lf>
DS 15,FP,BP,mmHg,1,S,820.0,230.0<cr><lf>
DS 16,Flow,FLOW,lpm,2,S,20.00,0.00<cr><lf>
DS 17,Memb,CONC,mg/cm2,4,TOH,2.0000,0.0000<cr><lf>
DS 18,Status,INFO,,0,OR,0,0<cr><lf>
```

4.25.4. **DSCRC – Descriptor table CRC**

Command	Description
DSCRC	This command returns the instrument descriptor table CRC. The intent is for the system or software to query and save this CRC. The value is then compared on subsequent reads to check for any instrument configuration changes. If the CRC does not match the previous CRC then check for a change in the field configuration parameters.

Response	Description
DSCRC hhhh	hhhh – The CRC value in hexadecimal.

Example
DSCRC<cr> DSCRC 1AE4<cr><lf>

4.26. DT – Get or Set Date and Time

Command	Description
DT	Get the date and time part of the real time clock.
DT yyyyMMddHHmmss DT yyyy-MM-dd HH:mm:ss	Set the date and time part of the real time clock.

Response
DT yyyy-MM-dd HH:mm:ss

Parameter	Description
yyyy	Years 2000 – 2037
MM	Months 1 – 12
dd	Days 1 – 31
HH	Hours 0 – 23
mm	Minutes 0 – 59
ss	Seconds 0 – 59

Example
DT<cr> DT 2013-01-08 11:39:23<cr><lf> DT 2013<cr> DT 2013-01-01 00:00:00<cr><lf> DT 20130108<cr> DT 2013-08-08 00:00:00<cr><lf> DT 2013-01-081141<cr> DT 2013-01-08 11:41:00<cr><lf>

4.28. GW – Get or Set Gateway Address

Command	Description
GW	Get the gateway address.
GW a.a.a.a	Set the gateway address, where a.a.a.a is the gateway address.

Response	Description
GW a.a.a.a	a.a.a.a is the gateway address.

Example
GW<cr> GW 0.0.0.0<cr><lf> GW 192.168.0.3<cr> GW 192.168.0.3<cr><lf>

4.29. ID – Get or Set Location ID

Command	Description
ID	Get the Location ID.
ID id	Set the Location ID. The range is 1 to 999.

Response	Description
ID id	id – The location ID. The ID value is three characters with leading zero's.

Example
ID<cr> ID 001<cr><lf> ID 2<cr> ID 002<cr><lf>

4.30. IT – Get or Set Inlet Type

Command	Description
IT	Get the Inlet Type.
IT ?	Get the Inlet Type enumerator list.
IT e	Set the Inlet Type setting to e.

Response	Description
IT e-n	e – The enumerator setting, where e is 0-TSP,1-PM10,2-PM2.5,3-PM1 n – The Inlet Type name.

Example
IT<cr> IT 1-PM10<cr><lf> ID ?<cr> IT 0-TSP,1-PM10,2-PM2.5,3-PM1<cr><lf> IT 3<cr> IT 3-PM1<cr><lf>

4.31. MA – Get or Set Modbus Address

Command	Description
MA	Get the Modbus address.
MA a	Set the Modbus address. The range is 1 to 247.

Response	Description
MA a	a – The Modbus address.

Example
MA<cr> MA 1<cr><lf> MA 2<cr> MA 2<cr><lf>

4.32. MN – Get or Set Maintenance

Command	Description
MN	Get the Maintenance setting.
MN ?	Get the Maintenance enumerator list.
MN e	Set the Maintenance setting, where e is 0-OFF,1-ON.

Response	Description
MN e-n	e – The enumerator setting. n – The enumerator name

Example
MN<cr> MN 0-OFF<cr><lf> MN ?<cr> MN 0-OFF,1-ON<cr><lf> MN 1<cr> MN 1-ON<cr><lf>

4.33. MP – Get or Set Modbus Port

Command	Description
MP	Get the Modbus port.
MP e	Set the Modbus port, where e is 0-RS-232, 1-MODEM, 2-COM 3

Response	Description
MP e-n	e – The enumerator setting. n – The port name

Example
MP<cr> MP 0-RS-232<cr><lf> MP 1<cr> MP 1-MODEM<cr><lf>

4.34. NW – Get or Set <Esc> Network Mode

Command	Description
NW	Get the <Esc A> network mode.
NW m	Set the network mode where m is 0 for Off, 1 for On.

Response	Description
NW m	m – network mode setting 0 for Off, 1 for On.

Example
NW<cr> NW 0<cr><lf> <Esc>A 1 NW*cs<cr> NW 1<cr><lf>

4.35. OP – Get or Set Operation State

Command	Description
`OP`	Get the current operation state.
`OP n`	Set the operation state where `n` is `0` is stop operation, `1` is start operation

Response	Description
`OP e-n`	`e` – the current state enumerator `n` – the name of the current state

Example

`OP<cr>`
`OP 0-WAITING TOH<cr><lf>`
 	
`OP 1<cr>`
`OP 16-STOP<cr><lf>`

4.36. PR – Print Report

Command	Description
PR f ts	Print the f file in CSV format starting from the timestamp ts.

f	File Description
0	Settings file
1	User data file
2	Alarm file
3	Diagnostic file
4	Flow Stats file
5	5-Minute Flow filw

ts	Timestamp Description
	No parameter prints all the data
-1	Print the new data
1 to 2000	Print from the previous n-hours
YYYY-MM-dd HH:mm:ss YYYY-MM-dd HH:mm YYYY-MM-dd HH YYYY-MM-dd YYYY-MM YYYY	Print from the timestamp value

4.37. PT – Get or Set Protocol Type

Command	Description
PT	Get the Protocol Type setting.
PT ?	Get the Protocol Type enumerator list.
PT e	Set the Protocol Type setting, where e is 0-STANDARD,1-GENERATION 2.

Response	Description
PT e-n	e – The enumerator setting. n – The enumerator name. 0-STANDARD: Serial commands comply to this STANDARD 7500 protocol. 1-GENERATION 2: Serial commands comply to the second-generation BAM 1020 protocol.

Example
PT<cr> PT 0-STANDARD <cr><lf> PT ?<cr> PT 0-STANDARD,1-GENERATION 2<cr><lf> PT 1<cr> PT 1-GENERATION 2<cr><lf>

4.38. PW – Unlock User Commands

Command	Description
PW n	This command Unlocked the user protected commands. The password is set from the Setup Password screen. The user commands are not locked when the password setting is '0'.

Response	Description
PW Unlocked	If the user password is correct, you will see this response.

Example
PW 1234<cr> PW Unlocked<cr><lf>

4.39. QH – Print Data Record Header

Command	Description
QH	Print data record header.

Response – The RT command determines the record header format

- RT 1-STANDARD

```
Time,Conc(mg/m3),ConcS(mg/m3),Qtot(m3),QtotS(m3),no(V),no(V),no(V),no(V),
RH(%),AT(C),BP(mmHg),FRH(%),FT(C),FP(mmHg),Flow(lpm),Memb(mg/cm2),Status
```

- RT 2-GENERATION 2

```
Time,Conc(mg/m3),Qtot(m3),no(V),no(V),no(V),FRH(%),FT(C),AT(C),Status
```

- RT 3-CHINA HJ 653

```
Time,Conc(mg/m3),Qtot(m3),no(V),no(V),no(V),FRH(%),FT(C),AT(C),ConcS(mg/m3),
QtotS(m3),BP(kPa),Flow(lpm),Status
```

4.40. RQ – Print Last Record

Command	Description
RQ	Print the instantaneous measurement record.

Response – The RT command determines the record header format and the data values are the same as the 4-command but with real time values.

4.41. RT – Get or Set CVS Report Type

Command	Description
RT	Get the CVS Report Type setting.
RT ?	Get the CVS Report Type enumerator list.
RT e	Set the CVS Report Type setting, where e is 1-STANDARD,2-GENERATION 2,3-CHINA HJ 653.

Response	Description
RT e-n	e – The enumerator setting. n – The enumerator name. 1-STANDARD: Standard CSV report type. 2-GENERATION 2: Second generation CSV report type. 3-CHINA HJ 653: China HJ 653 CSV report type.

Example
RT<cr> RT 1-STANDARD<cr><lf> RT ?<cr> RT 1-STANDARD,2-GENERATION 2,3-CHINA HJ 653<cr><lf> RT 3<cr> RT 3-CHINA HJ 653<cr><lf>

4.42. RV – Report Model, Firmware, Revision

Command	Description
RV	Report the model number, firmware part number, and revision string. Instruments with more than one processor or programmable devices will include more than one part number and revision on the next subsequent lines.

Response	Description
RV m, p, r	m – Device model name. p – Firmware part number. r – Firmware revision.

Example
RV<cr> BAM 1020, 82893, R8.0.0<cr><lf> Display, 82451, R1.0<cr><lf>

4.43. RV 0 – Report the number of processor/devices supported

Command	Description
RV 0	Report the number of processor or programmable devices.

Response	Description
RV n	n – Number processor or programmable devices.

Example
RV 0<cr> RV 2<cr><lf>

4.44. RV n – Report individual processor/device information

Command	Description
`RV n`	Report the model number, firmware part number, and revision for a specified processor or programmable device `n`.

Response	Description
`RV e m, p, r`	`e` – Device enumerator. `m` – Device model name. `p` – Firmware part number. `r` – Firmware revision.

Example

`RV 1<cr>`
`RV 1 BAM 1020, 82893, R8.0.0cr><lf>`
 	
`RV 2<cr>`
`RV 2 Display, 82451, R1.0<cr><lf>`

4.45. SB – Get or Set Serial Baud Rate

Command	Description
SB	Get the serial baud rate setting.
SB ?	Get the serial baud rate enumerator list.
SB e	Set the serial baud rate where e is 3-2400,4-4800,5-9600,6-19200,7-38400,8-57600,9-115200.

Response	Description
SB e-n	m – Serial baud rate enumerator. n – enumerator name.

Example
SB<cr> SB 5-9600<cr><lf> SB 9<cr> SB 9-115200<cr><lf>

4.46. SS – Get Serial Number

Command	Description
SS	Get the product serial number.

Response	Description
SS A99999	A99999 – Follows the MOI standard definition.

Example
SS<cr> SS U16445<cr><lf>

4.47. ST – Get or Set Sample Time

Command	Description
ST	Get the Sample Time setting.
ST ?	Get the Sample Time enumerator list.
ST e	Set the Sample Time setting. e – the Sample Time, where e is 0-1 MIN,1-5 MIN,2-10 MIN,3-15 MIN,4-30 MIN,5-1 HR

Response	Description
ST e-n	e – The enumerator value. n – The current Sample Time name.

Example
ST ?<cr> ST 0-1 MIN,1-5 MIN,2-10 MIN,3-15 MIN,4-30 MIN,5-1 HR<cr><lf> ST<cr> ST 5-1 HR<cr><lf> ST 1<cr> ST 1-5 Min<cr><lf>

4.48. TS – Get or Set Timestamp Mode

Command	Description
`TS`	Get Timestamp Mode setting.
`TS ?`	Get the Timestamp Mode enumerator list.
`TS e`	Set the Timestamp Mode setting, where `e` is `0-ENDING,1-BEGINNING`.

Response	Description
`TS e-n`	`e` – The enumerator setting. `n` – The enumerator name.

Example

`TS ?<cr>`
`TS 0-ENDING,1-BEGINNING<cr>`
 	
`TS<cr>`
`TS 1-BEGINNING<cr><lf>`
 	
`TS 0<cr>`
`TS 0-ENDING<cr><lf>`

4.49. UN c – Get Specific Channel Available Field Units

Command	Description
`UN c`	Get the list of available channel/field units. `c` – Desired channel/field

Response	Description
`UN c e-n,...`	Returns the available units for the channel/field units. `2-n` – The enumerator and name `...` – More enumerators and names If a field has no units associated with it, a single response with an enumerator of 0 is returned with a unit name of N/A

Example

`UN 2<cr>`
`UN 2 1-ug/m3,2-mg/m3<cr><lf>`
 	
`UN 1<cr>`
`UN 1 0-N/A<cr><lf>`

4.50. UN c u – Set Specific Channel Field Units

Command	Description
`UN c e`	Set the channel/field units. `c` – Desired channel/field `e` – Enumerated unit (1, 2, 3 etc.) Enumerators are 1 based. Sending a 0 enumerator to this command will echo back the current setting with no changes.

Response	Description
`UN c e-n`	Returns the enumerator and unit name after the change. `c` – channel/field `e-n` – The enumerator and unit name

Example

`UN 2 2<cr>`
`UN 2 2-mg/m3<cr><lf>`
 	
`UN 2 1<cr>`
`UN 2 1-ug/m3<cr><lf>`

4.51. BCT – Get or Set Beta Count Time

Command	Description
BCT	Get the Beta Count Time setting.
BCT ?	Get the Beta Count Time enumerator list.
BCT e	Set the Beta Count Time setting. e – the Beta Count Time, where e is 0-4-MINUTE,1-6-MINUTE,2-8-MINUTE

Response	Description
BCT e-n	e – The enumerator value. n – The enumerator name.

Example
BCT ?<cr> BCT 0-4-MINUTE,1-6-MINUTE,2-8-MINUTE<cr><lf> BCT<cr> BCT 0-4-MINUTE<cr><lf> BCT 2<cr> BCT 2-8-MINUTE<cr><lf>

4.52. BST – Get or Set BAM Sample Time

Command	Description
BST	Get the BAM Sample Time setting.
BST ?	Get the BAM Sample Time setting range in minutes.
BST m	Set the BAM Sample Time setting. m – the BAM Sample Time, where m is 1 to 200 minutes.

Response	Description
BST m	Where m is 1 to 200 minutes.

Example
BST ?<cr> BST 1 to 200<cr><lf> BST<cr> BST 50<cr><lf>   BST 42<cr> BST 42<cr><lf>

4.53. CEV – Get or Set Concentration Error Value

Command	Description
CEV	Get the Concentration Error Value setting.
CEV ?	Get the Concentration Error Value enumerator list
CEV e	Set the Concentration Error Value setting, where e is 0-FULL SCALE VALUE,1-MIN SCALE VALUE,2-"ERROR" TEXT

Response	Description
CEV e-n	e – The enumerator value. n – The Concentration Error Value name.

Example
CEV ?<cr> CEV 0-FULL SCALE VALUE,1-MIN SCALE VALUE,2-ERROR TEXT<cr><lf> CEV<cr> CEV 0-FULL SCALE VALUE<cr><lf> CEV 1<cr> CEV 1-MIN SCALE VALUE<cr><lf>

4.54. DNS – Get or Set DNS Server Address

Command	Description
DNS	Get the DNS Server Address setting.
DNS a.a.a.a	Set the DNS Server Address setting, where a.a.a.a is the DNS Server Address.

Response	Description
DNS a.a.a.a	a.a.a.a – the DNS Server Address setting.

Example
DNS<cr> DNS 192.168.0.17<cr><lf> DNS 0<cr> DNS 0.0.0.0<cr><lf>

4.55. HTR – Get or Set Inlet Heater Mode

Command	Description
HTR	Get the Inlet Heater Mode setting.
HTR ?	Get the Inlet Heater Mode enumerator list
HTR e	Set the Inlet Heater Mode setting, where e is 0-OFF,1-FILTER RH.

Response	Description
HTR e-n	e – The enumerator setting. n – The enumerator name.

Example
HTR ?<cr> HTR 0-OFF,1-FILTER RH<cr><lf> HTR<cr> HTR 0-OFF<cr><lf> HTR 1<cr> HTR 1-FILTER RH<cr><lf>

4.56. RHC – Get or Set the RH Control Mode

Command	Description
RHC	Get the RH Control Mode setting.
RHC ?	Get the RH Control Mode enumerator list
RHC e	Set the RH Control Mode setting, where e is 0-OFF,1-MANUAL,2-AUTO.

Response	Description
RHC e-n	e – The enumerator setting. n – The enumerator name.

Example
RHC ?<cr> RHC 0-OFF,1-MANUAL,2-AUTO RHC<cr> RHC 0-OFF<cr><lf> RHC 2<cr> RHC 2-AUTO<cr><lf>

4.57. ROP – Get or Set Operation State Report

Command	Description
ROP	Get the Operation State Report setting.
ROP e	Set the Operation State Report setting, where 0 is off and 1 is on.

Response	Description
ROP e	e – The Operation State Report setting.

Example
ROP<cr> ROP 0<cr><lf> ROP 1<cr> ROP 1<cr><lf>

Operation State Report Example
2017-10-02 17:59:05,o,WAITING TOH 2017-10-02 18:00:00,st,START SHUTTLE RESET 2017-10-02 18:00:00,o,SHUTTLE RESET 2017-10-02 18:00:00,st,MOVE NOZ UP 2017-10-02 18:00:00,st,WAIT NOZ UP 2017-10-02 18:00:00,st,TAPE NOZ UP 2017-10-02 18:00:00,st,WAIT MEMBRANE 2017-10-02 18:00:00,st,MOVE NOZ UP 2017-10-02 18:00:00,o,TAPE FORWARD 1 2017-10-02 18:00:00,st,WAIT NOZ UP 2017-10-02 18:00:00,st,TAPE NOZ UP 2017-10-02 18:00:00,st,ALL FORWARD 2017-10-02 18:00:00,st,LEAVE WINDOW 2017-10-02 18:00:00,st,WINDOW DELAY 2017-10-02 18:00:00,st,CHECK CAPSTAN MOVED 2017-10-02 18:00:00,st,WAIT FORWARD 2017-10-02 18:00:03,st,+1 Window Time -62550 mS 2017-10-02 18:00:03,st,TAPE OK 2017-10-02 18:00:03,o,MEASURE I0 2017-10-02 18:04:03,o,I0,909768 2017-10-02 18:04:03,st,MOVE NOZ UP 2017-10-02 18:04:03,o,CAPSTAN FORWARD 4 2017-10-02 18:04:03,st,WAIT NOZ UP

4.58. SPW – Get or Set User Password

Command	Description
SPW	Get the user password.
SPW pw	Set the user password, where pw range is 0 to 9999 and where 0 is no password required.

Response	Description
SPW ----	---- - The user password has not been entered and therefore cannot be shown.
SPW pw	pw – The current user password.

Example
SPW<cr> SPW ----<cr><lf> PW 1234<cr> PW Unlocked<cr><lf> SPW<cr> SPW 1234<cr><lf> SPW 0<cr> SPW 0000<cr><lf>

4.59. USW – Get or Set USW Absorption Coefficient

Command	Description
`USW`	Get the USW Absorption Coefficient setting.
`USW n`	Set the USW Absorption Coefficient, where `n` is from `0.1` to `0.5`. Warning: this should never be changed by the user.

Response	Description
`USW n`	`n` – the USW Absorption Coefficient setting value

Example

`USW<cr>`
`USW 0.285<cr><lf>`
 	
`USW 0.305<cr>`
`USW 0.305<cr><lf>`

4.60. XRD – Report the X-Modem Record Descriptors

Command	Description
XRD e	Report the X-modem record descriptors, where e is 1 the Data file.

Response Example

```
XRD<cr>
XRD 1,3,23,1,BE*00831<cr><lf>
XRD 1 3 18 1 LE*00797<cr><lf>
1,Time,,0,S,DATETIME,1.0E+00,0.0E+00,2.5E+00*02578<cr><lf>
2,Status,,0,OR,UINT32,1.0E+00,0.0E+00,2.5E+00*02734<cr><lf>
3,Conc,ug/m3,1,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00*02933<cr><lf>
4,ConcS,ug/m3,1,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00*03017<cr><lf>
5,Qtot,m3,3,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00*02707<cr><lf>
6,QtotS,m3,3,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00*02791<cr><lf>
7,no,V,3,S,FLOAT,0.0E+00,0.0E+00,2.5E+00*02279<cr><lf>
8,no,V,3,S,FLOAT,0.0E+00,0.0E+00,2.5E+00*02280<cr><lf>
9,no,V,3,S,FLOAT,0.0E+00,0.0E+00,2.5E+00*02281<cr><lf>
10,no,V,3,S,FLOAT,0.0E+00,0.0E+00,2.5E+00*02321<cr><lf>
11,RH,%,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02205<cr><lf>
12,AT,C,2,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02232<cr><lf>
13,BP,mmHg,2,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02556<cr><lf>
14,FRH,%,0,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02277<cr><lf>
15,FT,C,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02239<cr><lf>
16,FP,mmHg,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02562<cr><lf>
17,Flow,lpm,2,S,FLOAT,1.0E+00,0.0E+00,2.5E+00*02758<cr><lf>
18,Memb,mg/cm2,4,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00*03078<cr><lf>
```

4.61. XRF – X-modem Read File

Command	Description
XRF f	Start a X-Modem Read where f is 1-User Data

Response	Description
	The X-Modem data transfer protocol.

Example
XRF 1<cr>

4.62. BKGD – Get or Set Background Offset

Command	Description
BKGD	Get the Background Offset setting.
BKGD n	Set the Background Offset setting, where n is from -0.050 to 0.050.

Response	Description
BKGD n	n – the Background Offset setting value

Example
BKGD<cr> BKGD 0.0000<cr><lf> BKGD 0.0035<cr> BKGD 0.0035<cr><lf>

4.63. FLOW – Get or Set Flow Report

Command	Description
FLOW	Get the Flow Report setting. This is a flow control diagnostic report. Parameters are reported once-a-second.
FLOW e	Set the Flow Report setting, where e is 0 for OFF and 1 for ON.

Response	Description
FLOW e	e – is 0 for OFF and 1 for ON.

Example
FLOW<cr> FLOW 0<cr><lf> FLOW 1<cr> FLOW 1<cr><lf> Time,Key,Ctrl,Flow(lpm),AT(C),BP(mmHg),FP(mmHg),InReg,OutReg

4.64. G2CO – Get or Set Generation 2 Offset

Command	Description
G2CO	Get the Generation 2 Offset offset setting.
G2CO e	Set the Generation 2 Offset setting, where e is 0—-15 ug/m3, 1—-10 ug/m3, 2—-5 ug/m3, 3-0 ug/m3, 4-5 ug/m3

Response	Description
G2CO e-n	e – The enumerator setting. n – The Generation 2 Offset name.

Example
G2CO<cr> G2CO 1—0 ug/m3<cr><lf>   G2CO 4<cr> G2CO 4-5 ug/m3<cr><lf>

4.65. G2CR – Get or Set Generation 2 Concentration Range

Command	Description
G2CR	Get the Generation 2 Concentration Range setting.
G2CR e	Set the Generation 2 Concentration Range, where e is 0-100 ug/m3, 1-200 ug/m3, 2-500 ug/m3, 3-1000 ug/m3, 4-2000 ug/m3, 5-5000 ug/m3, 6-10000 ug/m3

Response	Description
G2CR e-n	e – The enumerator setting. n – The concentration range name.

Example
G2CR<cr> G2CR 6—10000 ug/m3<cr><lf> G2CR 3<cr> G2CR 3-1000 ug/m3<cr><lf>

4.66. G2CT – Get or Set Generation 2 Concentration Type

Command	Description
G2CT	Get the Generation 2 Concentration Type setting.
G2CT ?	Get the Generation 2 Concentration Type setting enumerator list.
G2CT e-n	Set the Generation 2 Concentration Type, where e is 0-ACTUAL,1-STANDARD.

Response	Description
G2CT e-n	e – The enumerator setting. n – The enumerator name.

Example
G2CT ? <cr> G2CT 0-ACTUAL,1-STANDARD<cr><lf> G2CT<cr> G2CT 0-ACTUAL<cr><lf> G2CT 1<cr> G2CT 1-STANDARD<cr><lf>

4.67. G2FT – Get or Set Generation 2 FT Log

Command	Description
G2FT	Get the Generation 2 FT Log setting.
G2FT ?	Get the Generation 2 FT Log setting enumerator list.
G2FT e	Set the Generation 2 FT Log, where n is from 0 to 500.

Response	Description
G2FT n	n – the Generation 2 FT Log setting.

Example
G2FT ? <cr> G2FT 0-NO,1-YES<cr><lf> G2FT<cr> G2FT 0-NO<cr><lf> G2FT 1<cr> G2FT 1-YES<cr><lf>

4.68. LPWR – Get or Set the Inlet Heater Low Power

Command	Description
LPWR	Get the Inlet Heater Low Power setting.
LPWR n	Set the Inlet Heater Low Power setting, where n is from 0.0 to 100.0.

Response	Description
LPWR n	n – the Inlet Heater Low Power setting value

Example
LPWR<cr> LPWR 20.0<cr><lf> LPWR 35<cr> LPWR 35.0<cr><lf>

4.69. RHSP – Get or Set the RH Set Point

Command	Description
RHSP	Get the RH set point.
RHSP n	Set the RH set point, where n is from 0.0 to 99.0.

Response	Description
RHSP n	n – the RH set point value

Example
RHSP<cr> RHSP 50<cr><lf> RHSP 35<cr> RHSP 35<cr><lf>

4.70. RPOL – Get or Set the External Reset Input Polarity

Command	Description
RPOL	Get the External Reset Input Polarity setting.
RPOL ?	Get the External Reset Input Polarity setting enumerator list.
RPOL e	Set the External Reset Input Polarity setting, where e is 0-NORMAL OPEN,1-NORMAL CLOSE.

Response	Description
RPOL e-n	e – the External Reset Input Polarity enumerator n – the External Reset Input Polarity value name

Example
RPOL ? <cr> RPOL 0-NORMAL OPEN,1-NORMAL CLOSE<cr><lf> RPOL<cr> RPOL 0-NORMAL OPEN<cr><lf> RPOL 1<cr> RPOL 1-NORMAL CLOSE<cr><lf>

4.71. SPAN – Get or Set the Span Membrane Mass

Command	Description
SPAN	Get the Span Membrane Mass setting.
SPAN n	Set the Span Membrane Mass, where n is from 0.1 to 1.0.

Response	Description
SPAN n	n – the Span Membrane Mass setting verification value.

Example
SPAN<cr> SPAN 0.805<cr><lf> SPAN 0.816<cr> SPAN 0.816<cr><lf>

4.72. SPCK – Get or Set the Span Membrane Check Mode

Command	Description
SPCK	Get the Span Membrane Check Mode setting.
SPCK ?	Get the Span Membrane Check Mode setting enumerator list.
SPCK e	Set the Span Membrane Check Mode setting, where e is 0-OFF,1-1 HR,2-24 HR.

Response	Description
SPCK e-n	e – the Span Membrane Check Mode enumerator n – the Span Membrane Check Mode value name

Example
SPCK ? SPCK 0-OFF,1-1 HR,2-24 HR SPCK<cr> SPCK 2-24 HR<cr><lf> SPCK 1<cr> SPCK 1-1 HR<cr><lf>

4.73. STDT – Get or Set the Standard Temperature

Command	Description
STDT	Get Standard Temperature setting.
STDT	Get the Standard Temperature setting enumerator list.
STDT e	Set the Standard Temperature, where e is 0-0 C,1-20 C,2-25 C.

Response	Description
STDT e-n	e – the Standard Temperature enumerator n – the Standard Temperature value name

Example
STDT ?<cr> STDT 0-0 C,1-20 C,2-25 C<cr><lf> STDT<cr> STDT 2-25 C<cr><lf> STDT 1<cr> STDT 1-20 C<cr><lf>

4.74. TPOL – Get or Set the Telemetry Fault Input Polarity

Command	Description
TPOL	Get the Telemetry Fault Input Polarity setting.
TPOL ?	Get the Telemetry Fault Input Polarity setting enumerator list.
TPOL e	Set the Telemetry Fault Input Polarity, where e is 0-NORMAL OPEN,1-NORMAL CLOSE.

Response	Description
TPOL e-n	e – the Telemetry Fault Input Polarity enumerator n – the Telemetry Fault Input Polarity value name

Example
TPOL<cr> TPOL 0-NORMAL OPEN,1-NORMAL CLOSE<cr><lf> TPOL<cr> TPOL 0-NORMAL OPEN<cr><lf> TPOL 1<cr> TPOL 1-NORMAL CLOSE<cr><lf>

4.75. DSCRC – Descriptor Table CRC

Command	Description
DSCRC	This command returns the instrument descriptor table CRC. The intent is for the system or software to query and save this CRC. The value is then compared on subsequent reads to check for any instrument configuration changes. If the CRC does not match the previous CRC then check for a change in the field configuration parameters.

Response	Description
DSCRC hhhh	hhhh – The CRC value in hexadecimal.

Example
DSCRC<cr> DSCRC 1AE4<cr><lf>

4.76. RHEAT – Get or Set Heater Report

Command	Description
RHEAT	Get the Heater Report setting. This is a heater control diagnostic report. Parameters are reported once-a-second.
RHEAT e	Set the Heater Report setting, where e is 0 for OFF and 1 for ON.

Response	Description
RHEAT e	e – is 0 for OFF and 1 for ON.

Example
RHEAT<cr> RHEAT 0<cr><lf> RHEAT<cr> RHEAT 1<cr><lf> Time,Key,RH(%),AT(C),FRH(%),FT(C),HTROUT(%),RHSP(%)<cr><lf>

4.77. TPRES - Get or Set the Filter Tape Pressure Advanced Limit

Command	Description
TPRES	Get the Filter Tape Pressure Advanced Limit setting.
TPRES n	Set the Filter Tape Pressure Advanced Limit, where n is from 0 to 500.

Response	Description
TPRES n	n – the Filter Tape Pressure Advanced Limit setting.

Example
TPRES<cr> TPRES 250.0<cr><lf> TPRES 150<cr> TPRES 150.0<cr><lf>

4.78. G2FRH – Get or Set Generation 2 FRH Log

Command	Description
G2FRH	Get the Generation 2 FRH Log setting.
G2FRH ?	Get the Generation 2 FRH Log setting enumerator list.
G2FRH e	Set the Generation 2 FRH Log, where n is from 0 to 500.

Response	Description
G2FRH n	n – the Generation 2 FT Log setting.

Example
G2FRH ? <cr> G2FRH 0-NO,1-YES<cr><lf> G2FRH<cr> G2FRH 0-NO<cr><lf> G2FRH 1<cr> G2FRH 1-YES<cr><lf>

4.79. IPADDR – Get or Set IP Address

Command	Description
`IPADDR`	Get the static IP Address setting.
`IPADDR a.a.a.a`	Set the static IP Address setting, where `a.a.a.a` is the IP Address. Set the address to 0.0.0.0 for DHCP mode.

Response	Description
`IPADDR a.a.a.a`	`a.a.a.a` – the static IP Address setting.

Example

`IPADDR<cr>`
`IPADDR 192.168.1.138<cr><lf>`
 	
`IPADDR 0<cr>`
`IPADDR 0.0.0.0<cr><lf>`

4.80. XRDCRC - Get the File Descriptor CRC

Command	Description
`XRDCRC 1`	Get the file descriptor CRC.

Response	Description
`XRDCRC f hhhh`	`f` – the file number. `hhhh` – the file record descriptor CRC value in hexadecimal.

Example
`XRDCRC 1<cr>` `XRDCRC 1 7923<cr><lf>`

4.81. NETMASK – Get or Set Subnet Mask Address

Command	Description
NETMASK	Get the Subnet Mask Address setting.
NETMASK a.a.a.a	Set the Subnet Mask Address setting, where a.a.a.a is the Subnet Mask Address.

Response	Description
NETMASK a.a.a.a	a.a.a.a – the Subnet Mask Address setting.

Example
NETMASK<cr> NETMASK 192.168.1.138<cr><lf> NETMASK 0<cr> NETMASK 0.0.0.0<cr><lf>

4.82. IPCONFIG – Report IP Configuration

Command	Description
IPCONFIG	Report IP configuration.

Example
IPCONFIG<cr> MAC Address, DE:AD:BE:EF:1F:5B<cr><lf> IP Address, 192.168.1.77:7500<cr><lf> Subnet Mask, 255.255.248.0<cr><lf> Gateway, 192.168.0.3<cr><lf> DNS Server, 192.168.0.17<cr><lf>

5. Modbus Map

5.1. 3x Modbus Map

Name	Address	Type	Points	Description
Dword	1	Uint32	2	Fixed value of 123456789
Float	3	Float32	2	Fixed value of 123456.0
String	5	String	3	Fixed value of “ABCDE”
Year	100	Uint16	1	Current time Year
Month	101	Uint16	1	Current time Month
Day	102	Uint16	1	Current time Day
Hour	103	Uint16	1	Current time Hour
Minute	104	Uint16	1	Current time Minute
Second	105	Uint16	1	Current time Second
Date/Time	106	Uint32	2	Current Unix time (Seconds since Jan 1 1970)
N Channel	200	Uint16	1	Number of channels in data record
Serial Number	201	String	4	MOI serial number (8 Bytes including 0 terminator)
Revision	205	String	20	Product Model, part number, and revision
Digital Revision	225	String	20	Digital sensor Model, part number, and revision

5.1.1. **Instantaneous real time readings**

Name	Address	Type	Points	Description
Date/Time	1000	Uint32	2	Current Unix time (Seconds since Jan 1 1970)
Status	1002	Uint32	2	Current alarm status
Conc	1004	Float	2	Top-of-hour Actual concentration (ug/m3 or mg/m3)
ConcS	1006	Float	2	Top-of-hour Standard concentration (ug/m3 or mg/m3)
Qtot	1008	Float	2	Top-of-hour Actual sample volume (m3)
QtotS	1010	Float	2	Top-of-hour Standard sample volume (m3)
Flow	1012	Float	2	Sample flow rate (lpm)
WS	1014	Float	2	Wind Speed (m/s)
WD	1016	Float	2	Wind Direction (Deg)
AT	1018	Float	2	Ambient temperature (C)
RH	1020	Float	2	Relative humidity (%)
BP	1022	Float	2	Barometric pressure (mmHg or kPa)
FT	1024	Float	2	Filter tape Temperature (C)
FRH	1026	Float	2	Filter tape relative humidity (%)
FP	1028	Float	2	Filter tape pressure (mmHg or kPa)
Memb	1030	Float	2	Membrane area density (mg/cm2)

The Conc, ConcS, Qtot, QtotS and Memb values are updated at the top-of-hour.

5.1.2. **Last data record readings**

Name	Address	Type	Points	Description
Date/Time	2000	Uint32	2	Current Unix time (Seconds since Jan 1 1970)
Status	2002	Uint32	2	Current alarm status
Conc	2004	Float	2	Top-of-hour Actual concentration (ug/m3 or mg/m3)
ConcS	2006	Float	2	Top-of-hour Standard concentration (ug/m3 or mg/m3)
Qtot	2008	Float	2	Top-of-hour Actual sample volume (m3)
QtotS	2010	Float	2	Top-of-hour Standard sample volume (m3)
Flow	2012	Float	2	Sample flow rate (lpm)
WS	2014	Float	2	Wind Speed (m/s)
WD	2016	Float	2	Wind Direction (Deg)
AT	2018	Float	2	Ambient temperature (C)
RH	2020	Float	2	Relative humidity (%)
BP	2022	Float	2	Barometric pressure (mmHg or kPa)
FT	2024	Float	2	Filter tape Temperature (C)
FRH	2026	Float	2	Filter tape relative humidity (%)
Memb	2028	Float	2	Membrane area density (mg/cm2)

The Conc, ConcS, Qtot, QtotS and Memb values are updated at the top-of-hour.

The Flow, FT, and FRH are averaged at the BAM Average time.

The WS, WD, AT, RH, and BP values are averaged at the Met Average time.

5.2. 4x Modbus Map

Name	Address	Type	Points	Description
Modbus Address	0	Int16	1	Modbus address
Byte Order	1	Int16	1	Value 1 to 4
Year	100	Uint16	1	Set time Year
Month	101	Uint16	1	Set time Month
Day	102	Uint16	1	Set time Day
Hour	103	Uint16	1	Set time Hour
Minute	104	Uint16	1	Set time Minute
Second	105	Uint16	1	Set time Second
Date/Time	106	Uint32	2	Set Unix time (Seconds since Jan 1 1970)

Writing to the Second register sets the clock.

Writing to the Date/Time register sets the clock.

Warning: The recommended time to set the clock when the BAM is sampling is between minute 30 and minute 40. Setting the clock outside this range may cause the BAM to sample past the top-of the hour.