Serial Communication Protocol

900 Series

Florite International, Inc.
900 Series Instrument Serial Communication Protocol

D10146-041309

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1.0 Revision History

Effective Date	Revision Enhancement
05Jul2005	1. 900 Series protocol redactions
20Jul2005	1. Section 6.4 revised for legal output link values from 0-99
25Aug2005	1. Section 5.2.2 - response added parameter <28> Log Select 2. Section 6.3 - enhanced decimal point selection to now include three places 3. Section 6.3 - revised parameter <28> from Log Type to Log Select
06Sep2005	1. Posted version above to web site and customer documents
09Sep2005	1. Section 6.3 - added for parameter <18> hardware configuration "2" as leading zero suppression
06Jan2006	1. Section 5.6.5 - revised log send format

2.0 Purpose

The purpose of his document is to describe and detail the various aspects of providing 900 Series instrument commands and responses that result in operating value programming - fundamental to employing the system for acquiring and communicating measured information - and providing for process control output.

3.0 System Overview

The structural basis of this instrument class is a general platform into which are installed certain standard or special operating modules. This document focuses on standard universal input-output module offerings. The platform supports universal input measurements for current, volts, ohms and pulse-frequency; Control output signals for current, volts and isolated relay. The platform additionally supports the communication facilities.

4.0 Serial Command Organization

4.1 Command Structures

This protocol was selected to service the need for serial error control while operating in local or wide area networks to transfer information between a unit and host computer.

4.1.1 Elements

The command format is a free form variable entry type, enabling expeditious economic means of achieving required programming results. Commands are comprised of the following structural elements:

4.1.1.1 Block Prelimiter - sentinel indicating start of multiple packets message

4.1.1.2 Packet Prelimiter - sentinel indicating start of a packet message

4.1.1.3 Information Frame - contains comma prelimited fields which start with the first character immediately following the message prelimiter and includes all successive characters up to and including a comma which immediately precedes the first ascii-hex character of the checksum.

4.1.1.4 Checksum - is two ascii-hex characters created for a mod256 negated sum of all message characters which is used by a host computer to check a packets validity.

4.1.1.5 Packet delimiter - sentinel indicating end of a packet message

4.1.1.6 Block Delimiter - sentinel indicating end of multiple packets message

4.1.2 Transfer - all messages are serial half duplex send-response types.

4.1.3 Mastering - the protocol initiator or originator is the master. The master is responsible for managing the communication link connection status. The wide area network link master is the party that first sends, or places a call to another, and is first to initiate the conversation.

4.2 Command Addressing

4.2.1 Units are assigned a unique [xxxxx] address from 0-65535 which must be pre-programmed prior to deployment in a network system. A units ports are designated with an appended [.xx] sub-address.

4.2.2 The five digit address may be omitted when operating a single un-network unit - but must be used in multiple unit networks to differentiate the units.

4.2.3 Command arguments are single ASCII (ascii) alpha non-case sensitive characters.

HOST SEND

```
AZ     xxxxx          .xx     K       <cr>
|      |              |       |         |
|      |              |       |         + -- delimiter
|      |              |       |
|      |              |       +-- argument
|      |              |
|      |              +-- port sub-address
|      |
|      +-- unit address
|
+-- prelimiter
```

AZ [.xx]	<argument> <cr>	Non-networked port sub-addressed
AZ [xxxxx.x]	<argument> <cr>	Networked port sub-addressed
AZ <cr>		Restart command operation

RESPONSE - command argument dependent

5.0 Command Operation

5.1 General Commands

These commands are general basic utility types not described in any particular order.

5.1.1 Reset Command

This command string terminates commands that may be presently in process and resets the command state machine operation to the initial ready state. It can be sent to units in a network to provide command state machine synchronization.

HOST SEND

<esc>AZ<cr>

UNIT RESPONSE

<none>

5.1.2 Menu Command

This command is provided for terminal oriented use and causes display of a menu of the basic available command arguments, make, model, code version and object code start vector. The menu does not include special factory diagnostic and production test commands.

HOST SEND

AZM <cr>	Non-network
AZ [xxxxx] M <cr>	Network

RESPONSE

<cr><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf><lf>
FLORITE COMMANDS - 990MAX11 01.03.21 FD00
<cr><lf><lf>
[M] Command Select Menu<cr><lf>
[V] Display All Values<cr><lf>
[K] Output Accumulated Values<cr><lf>
[I] Product Identify<cr><lf>
[P] Program New Values<cr><lf>
[Z] Reset Accumulated Values<cr><lf>
[F] Set Control Amount<cr><lf>
[G] Log Record Control<cr><lf>

5.1.3 View Programmed Port Values

This command enables a terminal operator to view all present port programmed values.

HOST SEND

AZ .xx V <cr>	Non-network
AZ [xxxxx.x] V <cr>	Network

RESPONSE

The response is dependent upon whether the port is off, input, output or system and will be further described as provided in subsequent sections.

5.1.4 Identify Command

This command causes the addressed unit to respond with a string providing identity information about the unit. This command is useful to determine the unit inventory complement within a network. More detailed structural information is available in Section 6.0 below.

The responding unit checksum may be validated by the host who may request the information again should the received packet be in error.

HOST SEND

AZI <cr>	Non-network
AZ [xxxxx] I <cr>	Network

RESPONSE

AZ,00000,4,FLORITE,920MAX11,02,01.01.13,FD00,<sum><cr><lf>

FIELDS

AZ	Packet prelimiter
,00000	Unit address
,4	Response type
,FLORITE	Make
,990MAX11	Model
,06	Available port count
,01.01.13	Revision date yy-mm-dd
,FD00	Start vector
,<sum>	Negated mod256 sum
<cr><lf>	Packet delimiter

5.1.5 Serial Character Pacing Controls

These commands act to provide a means for the terminal or host to suspend character sending, or to re-enable the unit to continue to send. This facility is particularly useful when the unit is sending large data amounts such as with logged information.

The AZH command acts as an XOF to temporarily suspend the unit from sending further characters.

HOST SEND

AZH<cr>	Non-network
AZ [xxxxx]<cr>	Network

RESPONSE

<none>

The AZS command acts as an XON to re-enable the unit to continue to send further characters.

HOST SEND

AZS<cr>	Non-network
AZ[xxxxx]S<cr>	Network

RESPONSE
<none>

5.1.6 Serial Message Error Control

These commands provide for error control of information packets sent by the unit. They are particularly useful when transferring information over wide area networks, and cause the unit to continue to send the next packet, or resend the previously sent packet.

The send-resend determination is made by the receiving host based on having computed a checksum from the received characters - then thereafter comparing its computed checksum with the checksum sent by the unit in the packet.

The unit must be pre-configured to enable the error control protocol.

5.1.6.1 Positive Acknowledge Command
This command must be issued by the receiving host to enable the unit to send its packet which is next eligible. Should the unit not receive positive acknowledgement within four seconds, it will resend the previous packet up to four times before abandoning the send session.

HOST SEND

AZA<cr>	Non-network
AZ [xxxxx] A <cr>	Network

RESPONSE
<none>

5.1.6.2 Negative Acknowledge Command
This command may be issued from the terminal or host to cause the unit to resend its previous packet. Should the unit not receive negative acknowledgement prior to a lapse of four seconds - it will automatically resend the previous unacknowledged packet up to four times before abandoning the send session.

HOST SEND

AZN<cr>	Non-network
AZ [xxxxx] N <cr>	Network

RESPONSE
<none>

5.2 Input Port Commands

5.2.1 Get Measured Values

This command is used to gather measured information from input ports.

HOST SEND

AZ [.xx] K <cr>	Non-network send one input ports packet values
AZ K <cr>	Non-network send all input port packets values with [Comport] set to [Report]
AZ [xxxxx.xx] K <cr>	Network send one input ports packet values
AZ [xxxxx] K <cr>	Network send all input ports packet values with [Comport] set to [Report]

RESPONSE - PACKET

AZ,00000.00,4,00000000.00,00000000.00,- 0000050.00,- 0000049.90,00024,<sum><cr><lf>

RESPONSE - BLOCK

<dle><stx>
AZ,00000.00,3,00000000.00,00000000.00,- 0000050.00,- 0000049.90,00024,<sum><cr><lf>
AZ,00000.00,4,00000000.00,00000000.00, 0000050.00, 0000049.90,00024,<sum><cr><lf>
AZ,00000.00,5,00000000.00,00000000.00,+0000050.00,+0000049.90,00024,<sum><cr><lf>
<dle><etx>

5.2.2 View Input Port Operating Values

This command enables a terminal operator to view the present state of all input port programmed values.

HOST SEND

AZ [.xx] V <cr>	Non-network
AZ [xxxxx.x] V <cr>	Network

RESPONSE

PROGRAM VALUES - Port 1

< 0> Port Type	In 0-20mA x12v
<10> Time Base	min
< 3> Decimal Point	x.xx
< 4> Measure Units	uuu

```
<27>  Scale Factor      0000001.000
< 6>  Low  Value       0000000.000    mA
< 7>  Low  Units       00000000.00    uuu/m
< 8>  High Value       0000010.000    mA
< 9>  High Units       00000010.00    uuu/m
<11>  Rate Filter      +0             dbHz
<14>  Low  Rate Lim    00000000.00    uuu/m
<15>  High Rate Lim    00000000.00    uuu/m
<26>  Rate Lim Dly     000            sec
<12>  Qty1 Limit       00000000.00    uuu
<13>  Qty2 Limit       00000000.00    uuu
<16>  Time Limit       0000           hrs
<18>  Comm Port        Sio Report
<28>  Log Select       Rate
```

5.2.3 Set Input Port Operating Values

Each of the input port programmed operating values can be individually queried or changed in accordance with Section 6.0.

5.2.4 Clear Accumulated Values

This command allows any one input port accumulated value to be independently reset to zero.

HOST SEND

AZ [.xx] Z n <cr>	Non-network
AZ [xxxxx.xx] Z n <cr>	Network

n=0	Quantity 1
n=1	Quantity 2
n=2	Quantity 1, Quantity 2, Time
n=3	Time
n=4	Program values - set factory defaults

RESPONSE

<none>

5.3 Control Output Port Commands

5.3.1 View Control Output Port Values

This command enables a terminal operator to view the present state of all output port programmed values.

HOST SEND

AZ [.xx] V <cr>	Non-network
AZ [xxxxx.x] V <cr>	Network

RESPONSE

PROGRAM VALUES - Port 2

< 2> Control Type	Monitor	
< 0> Port Type	Out 0-10V <1	
< 1> Ctrl Amount	00000100.00	uuu/m
<11> Pid Response	+0	dbHz
< 7> Low Units	00000000.00	uuu/m
< 6> Low Value	0000002.000	V
< 9> High Units	00000010.00	uuu/m
< 8> High Value	0000010.000	V

5.3.2 Set Control Output Port Values
Each of the output port programmed operating values can be individually queried or changed in accordance with Section 6.0.

5.3.3 Special Output Service Commands
These commands are provided to invoke certain special case output port operation.

5.3.3.1 Batch Command
This command is used to start a new batch quantity process, or stop a batch process that may currently be in progress.

The output port [Control Function] must be programmed as [Batch], and the output must have a [Link] to an input port that is programmed to accumulate quantity.

HOST SEND

	Non-network
AZ [.xx] F 0010.00<cr>	Start port batch 10.00 units
AZ [.xx] F<cr>	Stop port batch
	Network
AZ [xxxxx.xx] F 10.00 <cr>	Start port batch 10.00 units
AZ [xxxxx.xx] F <cr>	Stop port batch

RESPONSE

AZ, [xxxxx.xx],5,FOK,DA,<cr><lf>	batch started
AZ, [xxxxx.xx],5,FDONE,4E,<cr><lf>	batch completed
AZ, [xxxxx.xx],5,FERROR,5D,<cr><lf>	command error

5.3.3.2 Manual Output Control

This command provides direct serial control over the state of an output port to cause the output to be either ON or OFF for the [Port Type]s as follows:

Relay

ON causes contacts closed
OFF causes contacts open

Analog (Volts or mA)

ON causes the programmed High Value to be output
OFF causes the programmed Low Value to be output

The output port [Control Function] must be programmed to [Manual] to enable direct output port control.

HOST SEND

	Non-network
AZ [.xx] O 0<cr>	OFF
AZ [.xx] O 1<cr>	ON

	Network
AZ [xxxxx.xx] O 0<cr>	OFF
AZ [xxxxx.xx] O 1<cr>	ON

RESPONSE

<none>

5.4 System Port Value Services

5.4.1 View System Port Operating Values

This command enables a terminal operator to view the present state of the system port programmed values.

The system port number is one greater than the maximum number of available ports for any particular instrument.

HOST SEND

AZ [.xx] V <cr>	Non-network
AZ [xxxxx.x] V <cr>	Network

RESPONSE

PROGRAM VALUES - Port Sys

<17> Network Addr 00990
<25> Log Freq 010 min

<22> Date-Time 08Jul05 17:42:21
<23> Report Start 10Jan06 00:00:00
<24> Report Freq 030 min
<19> Alarm Phone 0000000000000000
<20> Report Phone 0000000000000000
<21> Answer Rings 000

5.4.2 Set System Port Operating Values

Each of the system port programmed operating values can be individually queried or changed in accordance with Section 6.0.

5.5 Communication Message Fundamentals

Messages between host and unit are either polled or un-polled, where the host is the polling party. The unit either responds to a host poll - or based on how the unit is programmed, it can send un-polled messages to the host to send information concerning either the occurrence of an event, or as a periodic report which is invoked based on a programmed scheduled frequency.

5.5.1 Message Structure

A packet is a group of information from a single port. A block is a group of packets sent together to form a message, with examples as follows:

PACKET

AZ,00909.00,2,00000988.93,00162871.43,-0000003.27,+0000003.27,00022,Q,X,H,L,X,<sum><cr><lf>

BLOCK

<dle><stx>
AZ,00909.02,2,00000988.93,00162871.43,-0000003.27, 0000003.27,00022,Q,X,H,L,X,<sum><cr><lf>
AZ,00909.03,2,00000988.93,00162871.43, 0000003.27,+0000003.27,00022,Q,X,H,L,X,<sum><cr><lf>
<dle><etx>

5.5.2 Message Format

BLOCK PRELIMITER

<dle><stx>	Start of multi-port block

PACKET PRELIMITER

AZ	Start of a port packet

ADDRESS - unit and port(s) providing the information

,xxxxx	unit address
.xx	port sub-address

TYPE - message purpose

Un-polled Types		
,0		Alarm
,1		Report scheduled
,2	[QTY]+[RATE] keys	Com install test
,3	[ZERO]+[CHAN] keys	Service acknowledge
,6		Log data scheduled report
Polled Types		
,4		Information request response
,5		Control batch status
,6		Log data request
,7		<reserved>
,8		<reserved>
,9		<reserved>

MEASURE - port values - sign convention as +, space(+), or -

,QTY1	Quantity 1
,QTY2	Quantity 2
,RATE	Rate-Value
,<reserved>	<reserved>
,HOURS	Time

ALARMS - based on programmed alarm limit values

,X	No alarm <default>
,Q	Quantity 1
,C	Quantity 2
,H	Rate-Value high
,L	Rate-Value low
,T	Time

CHECKSUM

,<sum>	Negated mod256 sum

PACKET DELIMITER

<cr><lf>	Packet end

BLOCK DELIMITER

<dle><etx>	Block end

5.5.3 Message Procedures - Wide Area Network

5.5.3.1 The unit performs an un-polled link connection with the host and delays 10 seconds to insure the host link negotiation is complete which nominally requiring about 5 seconds before taking further action.

5.5.3.2 Prior to link negotiate delay expiration - the host may send an AZH (XOF) command causing the unit to suspend sending its un-polled message until the host thereafter sends an AZS (XON) command releasing the suspend condition.

Once the unit is enabled to send - the host has become the line master and the field unit will stay connected for a maximum of 8 minutes, unless the link is first disconnected by the host.

5.5.3.3 The unit sends the message to the host that had originally been the cause to acquire the host link.

5.5.3.4 Four seconds are allowed for the host to receive the first information packet and acknowledge its receipt during which time the host compares the checksum sent by the unit against its own calculated value. The host then sends a positive acknowledge (AZA) to the unit if the checksums are equal, indicating the message was correctly received. Otherwise - the host may either not send a positive acknowledge, or send a negative acknowledge (AZN), either of which indicates the received packet was in error.

5.5.3.5 When the unit receives a AZN, or no positive host response in 4 seconds, the unit will resend the packet that was in error.

5.5.3.6 The object is to communicate the information to the host. The unit allows 3 more such tries to resend a particular packet - after which it will disconnect the link; reinitiate the entire send process after two minutes for a total of four such re-initiations; and if each continues to be unsuccessful - re-initiation of all of the above will occur every twenty-four hours thereafter.

5.6 Log Record Sub-System

A unit may optionally be installed with the log sub-system which allows periodic sampling of input port information that is then stored as sequential date-time stamped records in the logging memory.

This section describes the serial command operation for the logging sub-system of a unit. The ability of a unit to perform logging operation requires that the unit be installed with a logging memory, and for the sub-system to be configured to ON.

5.6.1 Serial Control Commands

Serial control commands duplicate the manual key log control functions.

5.6.1.1 Start Logging

This operation automatically clears existing records and starts logging new records at the present date-time.

KEYS - [START]

HOST SEND

AZG2<cr>	Non-network
AZ [xxxxx] G 2<cr>	Network

RESPONSE

<none>

5.6.1.2 Send Log Records

This operation stops logging, if not already stopped, and sends all records from the date-time this logging session was started.

KEYS - [RATE] <pending revision>

HOST SEND

AZG0<cr>	Non-network
AZ [xxxxx] G 0<cr>	Network

RESPONSE

<none>

5.6.1.3 Clear Log Records

This operation causes all previous records to be deleted from the log memory.

KEYS - [ZERO]

HOST SEND

AZG1<cr>	Non-network
AZ [xxxxx]G 1<cr>	Network

RESPONSE

<none>

5.6.1.4 Stop Logging

This operation causes the logging process to stop with all existing log records retained for host acquisition.

KEYS - [STOP]

HOST SEND

AZG3<cr>	Non-network
AZ [xxxxx] G 3<cr>	Network

RESPONSE

<none>

5.6.2 Record Pacing Controls

The log send process can be paced using the above described pacing commands.

5.6.3 Error Control

The log send process can be error controlled using the above described error control commands.

5.6.4 Compression

The log send process can have the value portions of records sent as compressed signed binary which doubles the time required to send records.

5.6.5 Log Record Send Structure

Log records are sent in block structured format for easy Excel import as follows:

BLOCK

```
<dle><stx>Addr,Port,Type,Value,Units,Date,Time<cr><lf>
00990,,Stamp,,,07Jan06,07:12:39<cr><lf>> ← Starting Time Stamp
00990,01,Qty1,00000183.33, ml,07Jan06,07:12:39<cr><lf>
00990,02,Rate,00000000.28, øC,07Jan06,07:12:39<cr><lf>
00990,08,Qty2,00000247.15,gal,07Jan06,07:12:39<cr><lf>
00990,01,Qty1,00000183.33, ml,07Jan06,07:12:41<cr><lf>
00990,02,Rate,00000000.28, øC,07Jan06,07:12:41<cr><lf>
00990,08,Qty2,00000247.15,gal,07Jan06,07:12:41<cr><lf>
00990,,Stamp,,,07Jan06,07:12:58<cr><lf>  ← Time Stamp Change Record
00990,01,Qty1,00000188.42, ml,07Jan06,07:12:58<cr><lf>
00990,02,Rate,00000000.29, øC,07Jan06,07:12:58<cr><lf>
00990,08,Qty2,00000247.15,gal,07Jan06,07:12:58<cr><lf>
00990,01,Qty1,00000188.42, ml,07Jan06,07:13:00<cr><lf>
00990,02,Rate,00000000.29, øC,07Jan06,07:13:00<cr><lf>
00990,08,Qty2,00000247.16,gal,07Jan06,07:13:00<cr><lf>
<dle><etx>
```

COLUMNS

Addr	Unit network address
Port	Measure input port number
Type	Measure description
Value	Numeric value
Units	Measure units
Date,Time	Sample date-time stamp 24 hr format
Stamp	Revised date-time stamp

5.6.6 Clock Time Stamp Record

The logging function may be in process when power to the logger is lost. When power is restored - the logger checks whether it was logging before the time power was lost. If logging was previously in process - a clock record of the present date-time is inserted into the logging memory to indicate that all records sequentially following the clock record, have occurred at the programmed logging rate after the time indicated by the inserted clock record.

Clock records are sent sequentially in time order integrated with sample data frames. They are sent as uncompressed characters without prefix, or with a compressed 8000h prefix.

6.0 Serial Programming

This section is organized into reading and programming values. The [index] is a numeric designator which is unique for a particular value type that is desired to be read or programmed.

6.1 Read a Programmed Value

HOST SEND

AZ [.xx] P[index] ? <cr>	Non-network
AZ [xxxxx.xx] P[index] ? <cr>	Network

RESPONSE

<200ms delay>

AZ,xxxxx.xx,4,Pyy,<present value>,<cksm><cr><lf>

A received response indicates that no error condition was detected.

EXAMPLE

AZ,00123.08,4,P08,04.000,DF<cr><lf>

6.2 Program a New Value

HOST SEND

AZ [.xx] P[index] = <new value> <cr>	Non-network
AZ [xxxxx.xx] P[index] = <new value> <cr>	Network

RESPONSE

<200ms delay>

AZ,xxxxx.xx,4,Pyy,<new value>,<cksm><cr><lf>

A correct received response indicates that no error condition was detected.

Software should validate the responding units message check-sum, followed by the unit message address, port number, value index, and the new value to determine that the desired value was successfully programmed.

6.3 Input Port Values

Index	Value Title	Value	Range	Notes
Input port function with universal input module installed				
0	Port Type			1 or 2 ascii chars
		0	Off	
		6	Input 0-20mA	1 ascii char min
		7	Input 0-10V	
		8	Input 0-4096mV	
		9	Input Ohms	
		:	Input TTD	
		;	Input Pulse-Freq	
		<	Input Digital	
	Input Excitation			1 ascii char optional
		0	+5v	
		1	+12v	
		2	Vin	
		NOTE: excitation will be zero when only type byte is received		
Measurement magnitude range				
3	Decimal Point	0-3	xxx./xx.x/x.xx/.xxx	1 ascii char
Character string identifying the physical measurement type				
4	Measure Units	uuu	<see Data Sheet>	1-3 ascii chars auto right justified
Pulse-frequency measurement conversion constant determining the pulse per rate-value proportionality				
5	Pulse Constant	xxxxxxx.xxx	0.001 to 9,999,999.999	1-11 ascii chars fix dp
Analog interpolator representing the smallest measured electrical signal				
6	Low Value	xx.xxx	0.000 to 20.000	1-6 ascii chars fix dp

Analog interpolator representing the engineering value of the smallest measured electrical signal

7	Low Units	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp

Analog interpolator representing the greatest measured electrical signal

8	Hi Value	xx.xxx	0.000 to 20.000	1-6 ascii chars fix dp

Analog interpolator representing the engineering value of the greatest measured electrical signal

9	Hi Units	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp

Measurement per unit time relationship

10	Rate Time Base	0	Scalar	1 ascii char
		1	sec	
		2	min	
		3	hrs	
		4	day	

Low pass filter

11	Rate Filter	0-9	+0 to -20	1 ascii char fix dbHz

Alarm limit value for quantity 1

12	Qty 1 Lim	xxxxxxxxxx	0 to 9,999,999,999	1-11 ascii chars var dp

Alarm limit value for quantity 2

13	Qty 2 Lim	<same as 12>		

Rate-value representing a measured amount below which a low alarm condition is detected

14	Low Rate Lim	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp

Rate-value representing a measure amount above which a high alarm condition is detected

15	High Rate Lim	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp

NOTE: Rate-value measurements are four quadrant bipolar - with both low and high able to be programmed to operate together in an exclusive fashion. However, when the low value is set to be less than the high value - inclusive detection is enabled.

Hobbs hour meter alarm limit used for maintenance, service or operation

16	Time Limit	xxxx	0-9,999	1-4 ascii chars fix hrs

Un-polled port designation for use in sending messages for alarms, reports and log records

18	Comm Port			1-4 ascii chars
	Serial Non-polled			1 ascii char
		0	Off	
		1	Sio Alarm	
		2	Lan Alarm	
		3	WAN Alarm	
		4	Sio Report	
		5	Lan Report	
		6	WAN Report	

Hardware configuration and facility attributes

System Configuration			1-3 ascii numeric bit mapped chars
	1	Log	0=off, 1=on
	2	Lead Zero Suppress	0=none, 1=suppress
	4	Error control	0=off , 1=on
	8	Compression	0=ascii, 1=sign bin
	16	Security	0=off , 1=on
	32	Port lock	0=off , 1=on
	64	Bulk batch	0=off , 1=on
	128	Audio	0=on, 1=off

Time required for a rate-value alarm to be persistent prior to declaring an alarm condition

26	Rate Limit Dly	xxx	0-255	1-3 ascii chars fix sec

Reference or scale constant multiply used for application dependent measured value re-proportioning

27	ReferenceValue Scale Factor	xxxxxxx.xxx	0-9,999,999.999	1-11 ascii chars fix dp

Selection for measured value type desired to be incorporated in log records

28	Log Select			1 ascii char
		0	Off	
		1	Rate-Value	
		2	Quantity 1	

		3	Quantity 2	

6.4 Output Port Values

Index	Value Title	Value	Range	Notes
Output port function with universal output module installed in the port.				
0	Port Type			1 or 2 ascii chars
		0	Off	1 ascii char min
		1	Output 20mA Source	
		2	Output 20mA Sink	
		3	Output 10V	
		4	Output Relay	
		5	Output Dig	
	Output Link			1 or 2 ascii char(s)
		0	Plc custom	
		1-99	Input port number	
Rate, value or quantity used as target for batching, dosing, PID and manual set-point control processes				
1	Ctrl Amount	xxxxxxxxxx	0 to 1,999,999,999 -999,999,999	1-11 ascii char var dp
Selection of output control types				
2	Control Type	0	Monitor	1 ascii char
		1	Manual	
		2	Batch	
		3	Dose	
		4	Pid	
		5	Digital	
Analog de-interpolator representing the smallest electrical signal to be output				
6	Low Value	xx.xxx	0.000 to 20.000	1-6 ascii chars fix dp
Analog de-interpolator representing the engineering value of the smallest electrical signal to be output				
7	Low Units	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp
Analog de-interpolator representing the greatest electrical signal to be output				
8	Hi Value	xx.xxx	0.000 to 20.000	1-6 ascii chars fix dp

Analog de-interpolator representing the engineering value of the greatest electrical signal to be output

9	Hi Units	xxxxxxxxxx	0 to 1,999,999,999 - 999,999,999	1-11 ascii chars var dp

Qik-Tune value determining match to the controlled plant bandwidth

11	Pid Response	0-9	+0 to -20	1 ascii char fix dbHz

6.5 System Port Values

Index	Value Title	Value	Range	Notes
Unit base address for communication activities				
17	Network Addr	xxxxx	0-65535	1-5 ascii chars
Host address for communicating alarm conditions				
19	Alarm Phone	xxxxxxxxxxxxxxxx	<see Data Sheet>	1-16 ascii chars auto right justified
Host address for communicating reports and log records				
20	Report Phone	<same as 19>		
Wide area PSTN media access rings				
21	Answer Rings	xxx	0-255	1-3 ascii chars count
Clock Date-Time				
22	Date-Time			dd mon yy hh mm ss
	Day	dd	01-31	2 ascii chars
	Month	mon	01-12	2 ascii chars
	Year	yy	00-99	2 ascii chars
	Hrs	hh	00-23	2 ascii chars
	Min	mm	00-59	2 ascii chars
	Sec	ss	00-59	2 ascii chars
Host report processing beginning date-time				
23	Report Start	<same as 22>		
Recurring period for sending un-polled value information to host				
24	Report Freq	<nnn><unit>		4 ascii chars
		nnn	000-999	3 ascii chars

	unit		
	0	sec	1 ascii char
	1	min	
	2	hrs	
	3	day	
	4	mon	

Recurring period for acquiring measured input port information for inclusion in log records

25	Log Freq	<same format as 24>

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