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Ω OMEGA™ **User's Guide**

PLATINUM™ Series



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Serial Communication Protocol



omega.com info@omega.com

Omega Engineering, Inc:

800 Connecticut Ave. Suite 5N01, Norwalk, CT 06854, USA

Toll-Free: 1-800-826-6342 (USA & Canada only)

Customer Service: 1-800-622-2378 (USA & Canada only)

Engineering Service: 1-800-872-9436 (USA & Canada only)

Tel: (203) 359-1660

Fax: (203) 359-7700

e-mail: info@omega.com

**Omega Engineering,
Limited:**

1 Omega Drive, Northbank,
Irlam Manchester M44 5BD
United Kingdom

**Omega Engineering,
GmbH:**

Daimlerstrasse 26 75392
Deckenpfronn Germany

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1 Introduction

1.1 Purpose

Defining the Platinum Series Serial Communications Protocols.

1.2 Definition of Terms and Acronyms

I2C	2-wire serial interface	ADC	Analog to Digital Converter
Base Device	Device connected to slave device	DAC	Digital to Analog Converter
Smart Input	Device supporting 1 or more Input sensors	RS485	Electrical signals used for serial communications
Smart Output	Device supporting 1 or more Output Elements	RS232	Electrical signals used for serial communications
Sensor Element	One of the physical sensing elements on a Smart Output	CSV	Comma Separated Values
AC	Alternating Current	COTS	Commercially-Off-The-Shelf
DC	Direct Current	ESD	Electro Static Discharge
CS	Chip Select	FW	Firmware
RS232	Electrical signals used for serial communications	HW	Hardware
CSV	Comma Separated Values	I/O	Input/output
COTS	Commercially-Off-The-Shelf	LED	Light Emitting Diode
ESD	Electro Static Discharge	Hexadecimal	Values expressed using base 16 (24)

2 Hardware

2.1 Communications Interfaces

The Platinum Series Protocol is designed to be an updated version of the original iSeries protocol which can be used over serial connections using RS-232, RS-485, USB and serial over Ethernet.

2.1.1 RS-232

Point-to-point connections at baud rates up to 115,200.

Hardware flow control is not supported.

2.1.2 RS-485

Multi-point connections. Up to 200 individual addresses can be assigned.

Single Ending character is supported (e.g., carrier return 0x0D). Multiple Ending character is not supported (e.g. carrier return, line feed 0x0D 0x0A).

2.1.3 USB Virtual Comm

Point-to-point connections the same as RS-232.

2.1.4 Ethernet

The serial protocol is transmitted using TCP/IP on port 2000.

Platinum Echo mode ON is recommended.

3 Protocol Description

3.1 Protocol

The protocol is command/response, based on 4 command classes:

Get (G), Put (P), Read (R) and Write (W):

- | | |
|--------------|---|
| Get | Reads the current value resident in RAM. |
| Put | Writes a parameter to RAM without committing it to non-volatile memory. |
| Read | Retrieves the value of a parameter stored in non-volatile memory. |
| Write | Commits a parameter value to non-volatile memory. |

3.2 Command Structure

The overall structure of a command packet is as follows:

- Start of frame (SOF) character – usually ‘*’
- Command class (GPRW)
- Command ID – a hex number identifying the message.
- Mandatory space if there are parameters following the command ID.
- Parameter List.
- An end of frame (EOF) character – usually a carriage return.

A unit address is optional.

An address is a hex-encoded number in the range 0-199 (00 – C7 hex) between the start of frame and the command class.

Example: to get the current process value, without an address would be:

```
“*G110 <CR>”
```

In this case the command class is ‘G’, the command ID is 110 (hex) and this command takes no parameters.

- If this were addressed to unit 100 (hex value 64), the command would be:

```
“*64G110 <CR>”
```


3.3 Response Format

The response format depends on whether a command echo has been selected. If selected, the address (if present), command class and command ID precede the parameters returned.

Example: if an echo is selected, the previous command would return:

"G110+32.0<CR>" (no address)

"64G110+32.0<CR>" (if the unit responding had address = 64 (hex)).

- If echo is not selected, in both cases, only "+32.0<CR>" would be returned.

For Put (P) and Write (W) type transactions, only the command is echoed if echo is on.

Thus, "*Pxxx yyyyyy<CR>" will echo "Pxxx<CR>".

3.4 Error Messages

In the event of an error in the message format, an error string is returned:

"Command Failed Decode 0"

4 Platinum Series Messages

4.1 Input Configuration

Input Configuration						
ID	Classes	Parameters				
0x100	RW	STYPE	SI1	SI2		

The parameters are as follows:

STYPE - Sensor Type	
Value	Type
0	Thermocouple
1	RTD
2	Process Input
3	Thermistor
4	Remote

The meaning of the two sensor info fields, SI1 and SI2 depends on the sensor type indicated in the STYPE field.

For thermocouple type (STYPE = 0):

SI1 – Sensor Info 1 Thermocouple Type)	
Value	Type
0	J
1	K
2	T
3	E
4	N
5	Reserved
6	R
7	S
8	B
9	C
10	Reserved
11	Reserved

For thermocouple, the SI2 field is irrelevant.

Example: to set input type to Type K thermocouple: “*W100 010<CR>”

For RTD Sensor type (STYPE = 1):

SI1 – Sensor Info 1 RTD Configuration	
Value	Type
0	2 Wire
1	3 Wire
2	4 Wire

SI2 – Sensor Info 1 RTD ACRV Ohm Types	
Value	Type
0	385 Curve, 100 ohms
1	385 Curve, 500 ohms
2	385 Curve, 1000 ohms
3	392 Curve, 100 ohms
4	3916 Curve, 100 ohms

For Process Input (STYPE = 2):

SI1 – Process Range	
Value	Range
0	4 – 20 mA
1	0 – 24 mA
2	*NS
3	*NS
2	*NS
5	+/- 10 Vdc
6	+/- 1.0 Vdc
7	+/- 0.1 Vdc

*NS – Not currently supported.

SI2 – Sensor Info 2 Process Manual/Live	
0	Live
1	Manual

For Thermistor Type (STYPE = 3):

SE1 – Sensor Info 1 - Thermistor Type	
0	2.25 K
1	5K
2	10K

The Sensor Info 2 Field is irrelevant when STYPE = 3.

For Remote Sensor Type (STYPE = 4).

This is not currently supported and is for future expansion.

4.2 Filter Constant

Filter Constant						
ID	Classes	Parameters				
0x101	RW	FC				

The parameters are as follows:

FC	
Value	Effect
0	No filtering (1 X rate)
1	X 2 filtering
2	X 4 filtering
3	X 8 filtering
4	X 16 filtering
5	X 32 filtering
6	X 64 filtering
7	X 128 filtering

Example: To set input filter to x2 `"*W101 1<CR>"`

4.3 Current Reading

Current Reading						
ID	Classes	Parameters				
0x110	G					

This does not take any parameters.

To get current process reading: `"*G110<CR>"`

4.4 Peak Reading

Peak Reading							
ID	Classes	Parameters					
0x111	G						

This command does not take any parameters.

4.5 Valley Reading

Valley Reading							
ID	Classes	Parameters					
0x112	G						

This command does not take any parameters.

4.6 TC Calibration Type

TC Calibration Type							
ID	Classes	Parameters					
0x120	RW	Mode					

The parameters are as follows:

Mode	
Value	Effect
0	No Calibration
1	1 Point
2	2 Point
3	Ice Point

4.7 TC Calibration Single Point

TC Calibration Single Point		
ID	Classes	Parameters
0x121	RW	Value (float)

4.8 TC Calibration Double Point Low

TC Calibration Double Point Low		
ID	Classes	Parameters
0x122	RW	Value (float)

4.9 TC Calibration Double Point High

TC Calibration Double Point High		
ID	Classes	Parameters
0x123	GPRW	Value (float)

4.10 Process Reading 1 (Low)

Process Reading 1 (Low)				
ID	Classes	Parameters		
0x130	RW	PR	ML	Value (float)

PR – Process Range	
Value	Range
0	4 – 20 mA
1	0 – 24 mA
2	*NS
3	*NS
4	*NS
5	+/- 10 Vdc
6	+/- 1.0 Vdc
7	+/- 0.1 Vdc

ML – Manual/Live	
Value	Range
0	Manual Mode
1	Live Mode

*NS – not currently supported.

4.11 Process Range Input 1 (Low)

Process Range Input - Low				
ID	Classes	Parameters		
0x131	RW	PR	ML	Value (float)

The parameters PR and ML, are the same as defined for command ID = 0x130.

4.12 Process Range Reading 2 (High)

Process Range Reading (High)				
ID	Classes	Parameters		
0x132	RW	PR	ML	Value (float)

The parameters PR and ML, are the same as defined for command ID = 0x130.

4.13 Process Range Input 2 (High)

Process Range Input - High				
ID	Classes	Parameters		
0x133	RW	PR	ML	Value (float)

The parameters PR and ML, are the same as defined for command ID = 0x130.

4.14 Tare Mode

Tare Mode							
ID	Classes	Parameters					
0x140	RW	TM					

TM – Tare Mode	
Value	Effect
0	Tare Disabled
1	Tare Enabled
2	Tare Remote Control

4.15 Tare Reset

Tare Reset							
ID	Classes	Parameters					
0x141	GP	EN					

EN – Enable Tare	
Value	Action
0	Disable Tare
1	Enable Tare

4.16 Number of Linearization Points

Number of Linearization Points							
ID	Classes	Parameters					
0x142	RW	N					

N – Number of Linearization Points	
Value	Action
[0..A]	0 to 10 Number of Linearization points

4.17 Linearization Reading

Linearization Reading							
ID	Classes	Parameters					
0x143	RW	P	Value (float)				

P –Linearization Point	
Value	Action
[0..A]	Select Linearization Point from 0 to 10
Value	Linearization Reading Value

4.18 Linearization Input

Linearization Input			
ID	Classes	Parameters	
0x144	RW	P	Value (float)

P –Linearization Point	
Value	Action
[0..A]	Select Linearization Point from 0 to 10
Value	Linearization Input Value

4.19 Annunciator Mode

Annunciator Mode				
ID	Classes	Parameters		
0x145	RW	N.ANN	Mode	

N.ANN - Annunciator Number	
Value	Select
[0..6]	Select Annunciator Number from 0 to 6

Mode - Annunciator Mode	
Value	Action
0	Disable Annunciator
1	Annunciator activated by Alarm 1
2	Annunciator activated by Alarm 2
3	Annunciator activated by Output 1
4	Annunciator activated by Output 2
5	Annunciator activated by Output 3
6	Annunciator activated by Output 4
7	Annunciator activated by RE.ON bit
8	Annunciator activated by SE.ON bit
9	Annunciator activated during any RAMP cycle
10	Annunciator activated during any SOAK cycle

4.20 Display Rounding

Display Rounding		
ID	Classes	Parameters
0x146	RW	Value (float)

4.21 Rate Mode

Rate Mode			
ID	Classes	Parameters	
0x147	RW	EN	

EN – Rate Mode	
Value	Effect
0	Disable Rate Mode
1	Disable Rate Mode

4.22 Process Type

Process Type							
ID	Classes	Parameters					
0x148	RW	PT					

PT – Process Type	
Value	Type
0	Single Ended
1	Differential
2	Ratiometric

4.23 Display Configuration

Display Configuration							
ID	Classes	Parameters					
0x200	RW	DP	UNIT	COLOR	BRT		

The parameters are as follows:

DP - Decimal Point	
Value	Effect
0	Display as F.FFF
1	Display as FF.FF

Units	
Value	Effect
0	No units applied
1	Values converted to °C
2	Values converted to °F

Color	
Value	Effect
1	GREEN
2	RED
3	AMBER

BRT - Brightness	
Value	Brightness
0	LOW
1	MEDIUM
2	HIGH

4.24 Excitation Voltage

Excitation Voltage						
ID	Classes	Parameters				
0x210	RW	EV				

The parameters are as follows:

EV – Excitation Voltage	
Value	Voltage
0	0 Volts
1	5 Volts
2	10 Volts
3	12 Volts
4	24 Volts

4.25 Safety Configuration

Safety Configuration						
ID	Classes	Parameters				
0x220	RW	POR	OR	LBE		

The parameters are as follows:

POR – Power On Run	
Value	Voltage
0	Go to standby when powered on
1	Go to run when powered on

OR – Operate Run	
Value	Voltage
0	Disabled
1	Enabled

LBE - Loop Break Enabled	
Value	Enabled/Disabled
0	Disabled
1	Enabled

4.26 Loop Break Configuration

Loop Break Configuration							
ID	Classes	Parameters					
0x221	RW	LBE	MINMS	MINLS	SECMS	SECLS	

LBE - Loop Break Enabled	
Value	Enabled/Disabled
0	Disabled
1	Enabled

The parameters MINMS, MINLS define the minutes in the loop break time. MINMS is the most significant part of the minutes, MINLS the least significant. Both are in hex format.

For example: to encode 100 minutes, MINMS = 6, MINLS = 4. (64 hex).

The second's portion of the loop break time is similarly defined in SECMS, SECLS.

4.27 Set Point Low Limit

Set Point Low Limit		
ID	Classes	Parameters
0x222	RW	Value (float)

4.28 Set Point High Limit

Set Point High Limit		
ID	Classes	Parameters
0x223	RW	Value (float)

4.29 Serial Communication Address

Serial Communications Address							
ID	Classes	Parameters					
0x300	RW	AMS	ALS				

The parameters are as follows:

AMS and ALS are the most significant and least significant nibble of the serial communications address in hex format. The address must be in the range 0 to 199 (decimal).

For example: if an address of 100 (decimal) is to be used, the hex value of the address would be 0x64 so AMs would be '6' and ALS would be '4'.

4.30 USB Communication Address

USB Communications Address							
ID	Classes	Parameters					
0x301	RW	AMS	ALS				

The format and parameter usage is the same as for the serial communications address.

4.31 Ethernet Communication Address

Ethernet Communications Address						
ID	Classes	Parameters				
0x302	RW	AMS	ALS			

The format and parameter usage is the same as for the serial communications address.

4.32 Serial Communication Config

Serial Communications Configuration							
ID	Classes	Parameters					
0x310	RW	PROT	DM	LFE	ECHO	SEP	

The parameters are as follows:

PROT- Protocol	
Value	Protocol
0	Omega Protocol
1	Modbus Protocol

Data Mode – Data Mode	
Value	Voltage
0	Command
1	Continuous

LFE – Line Feed Enabled	
Value	Voltage
0	Don't insert line feed on responses
1	Insert line feed

ECHO – Response Echo Enabled	
Value	Voltage
0	No echo.
1	Echo command in response

SEP - Separation Character (Omega Protocol)	
Value	Effect
0	Use <space> character between records
1	Use <CR> between records

The Serial Communications Configuration must be set before the Serial Data Mode (ID = 0x311).

4.33 Serial Data Mode Config

Serial Communications Data Mode Config			
ID	Classes	Parameters	
0x311	RW	MODE	Interval - seconds (variable length - float)

MODE – (Omega Protocol)	
0	Interactive command mode
1	Continuous mode

Serial Modbus Mode Config

The interval is specified as a floating point number in seconds when the continuous mode is specified.

Example: setting serial to continuous mode with 5 second interval:

“*P311 1 5.0<CR>”

4.34 Serial Modbus Mode

Serial Modbus Mode			
ID	Classes	Parameters	
0x314	RW	MODE	

MODE - Modbus	
Value	Mode
0	RTU
1	ASCII

4.35 Serial Data Format

Serial Data Format						
ID	Classes	Parameters				
0x312	RW	AS	RE	PE	VE	UE

AS – Alarm Status Enabled in Continuous Mode	
Value	Voltage
0	Don't send alarm status in cont. mode
1	Send alarm status

RE – Readings Enabled in Continuous Mode	
Value	Voltage
0	Don't send readings in cont. mode
1	Send readings

PE – Peak Readings Enabled in Continuous Mode	
Value	Voltage
0	Don't send peak readings in cont. mode
1	Send peak readings

VE – Valley Readings Enabled in Continuous Mode	
Value	Voltage
0	Don't send valley readings in cont. mode
1	Send valley readings

UE – Valley Readings Enabled in Continuous Mode	
Value	Voltage
0	Don't append measurement units in cont. mode
1	Append measurement units in cont. mode.

4.36 Serial Communications Parameters

Serial Communications Parameters							
ID	Classes	Parameters					
0x313	RW	MODE	BR	PAR	DB	SB	

MODE - Serial Mode	
Value	Mode
0	RS232
1	RS485

BR - Serial Baud Rate	
Value	Rate
0	300 Baud
1	600 Baud
2	1200 Baud
3	2400 Baud
4	4800 Baud
5	9600 Baud
6	19200 Baud
7	38400 Baud
8	57600 Baud
9	115200 Baud

PAR - Parity	
Value	Parity
0	None
1	Odd
2	Even

DB - Data Bits	
Value	Bits
0	7
1	8

SB - Stop Bits	
Value	Bits
0	1
1	2

4.37 USB Communications Configuration

USB Communications Configuration						
ID	Classes	Parameters				
0x320	RW	PROT	DM	LFE	ECHO	SEP

This is for use with a virtual com serial port. The usage of the parameters is the same as for the Serial Communications Message.

4.38 USB Data Mode Configuration

USB Communications Data Mode Config			
ID	Classes	Parameters	
0x321	RW	MODE	Interval - seconds (float)

The usage of the parameters for this command is the same as for the Serial Communications Data Mode (ID = 0x311).

4.39 USB Modbus Mode

USB Modbus Mode			
ID	Classes	Parameters	
0x323	RW	MODE	

MODE - Modbus	
Value	Mode
0	RTU
1	ASCII

4.40 USB Data Format

Serial Data Format							
ID	Classes	Parameters					
0x312	RW	AS	RE	PE	VE	UE	

The usage of the parameters for this command is the same as for the Serial Data Format (ID = 0x312).

4.41 Ethernet Communications Configuration

Ethernet Communications Configuration							
ID	Classes	Parameters					
0x330	RW	PROT	DM	LFE	ECHO	SEP	

The usage of the parameters for this command is the same as for the Serial Communications Configuration (ID = 0x310).

4.42 Ethernet Data Mode Configuration

Ethernet Communications Data Mode Config			
ID	Classes	Parameters	
0x331	RW	MODE	Interval - seconds (float)

The usage of the parameters for this command is the same as for the Serial Communications Data Mode (ID = 0x311).

4.43 Ethernet Data Format

Ethernet Data Format							
ID	Classes	Parameters					
0x332	RW	AS	RE	PE	VE	UE	

The usage of the parameters for this command is the same as for the Serial Data Format command (ID = 0x312).

4.44 Ethernet Modbus Mode

Ethernet Modbus Mode			
ID	Classes	Parameters	
0x333	RW	MODE	

MODE - Modbus	
0	RTU
1	ASCII

4.45 Setpoint 1

Setpoint 1		
ID	Classes	Parameters
0x400	GPRW	Setpoint Value - variable length (float)

4.46 Remote Setpoint Configuration

Remote Setpoint Configuration							
ID	Classes	Parameters					
0x401	RW	EN	PR				

EN – Enable Remote Setpoint	
Value	Action
0	Enable Remote Setpoint
1	Disable Remote Setpoint

PR - Output Process Range	
Value	Range
0	4 - 20 V
1	0 – 24 V
2	0 – 10 V
3	0 – 1 V

4.47 Setpoint 2

Setpoint 2			
ID	Classes	Parameters	
0x410	RW	TYPE	Setpoint Value - variable length (float)

TYPE - Setpoint Type	
Value	Action
0	Setpoint value given as fixed constant
1	Setpoint value is deviation (+/-) Setpoint 1 value

4.48 Remote Process Range Setpoint Min

Remote Process Range Setpoint Minimum			
ID	Classes	Parameters	
0x420	RW	PR	Setpoint Value (float – variable length)

The parameters are as follows:

PR - Output Process Range	
Value	Range
0	4 - 20 V
1	0 – 24 V
2	0 – 10 V
3	0 – 1 V

4.49 Remote Process Range Setpoint Max

Remote Process Range Setpoint Maximum			
ID	Classes	Parameters	
0x422	RW	PR	Setpoint Value (float – variable length)

The process range parameter PR is as defined for the Remote Process Range Setpoint Min command (ID = 0x420).

4.50 Remote Process Range Input Max

Remote Process Range Input Maximum			
ID	Classes	Parameters	
0x423	RW	PR	Setpoint Value (float – variable length)

The process range parameter PR is as defined for the Remote Process Range Setpoint Min command (ID = 0x420).

4.51 Remote Process Range Input Min

Remote Process Range Input Minimum			
ID	Classes	Parameters	
0x421	RW	PR	Setpoint Value (float – variable length)

The process range parameter PR is as defined for the Remote Process Range Setpoint Min command (ID = 0x420).

4.52 PID Configuration

PID Configuration							
ID	Classes	Parameters					
0x500	RW	CA	AC				

CA - Control Action	
Value	Action
0	Output active if P.V. < Setpoint
1	Output active if P.V. > Setpoint

AC – Adaptive Control	
Value	Action
0	Enable Adaptive Control
1	Disable Adaptive Control

4.53 PID Low Clamping Limit

PID Low Clamping Limit						
ID	Classes	Parameters				
0x501	RW	CLMS	CLLS			

The hex-encoded byte fields CLMS, CLLS form the hex representation of the limit (percent) 0-100

For example: if the limit were to be 35 (decimal) the hex representation would be 23, so CLMS would equal 2 and CLLS 3.

4.54 PID High Clamping Limit

PID High Clamping Limit						
ID	Classes	Parameters				
0x502	RW	CLMS	CLLS			

The encoding of the high clamping limit is the same as for the low clamping limit.

4.55 PID P Parameter

PID P-Parameter		
ID	Classes	Parameters
0x503	RW	P-parameter Value (float – variable length)

4.56 PID I Parameter

PID I-Parameter		
ID	Classes	Parameters
0x504	RW	I-parameter Value (float – variable length)

4.57 PID D Parameter

PID D-Parameter		
ID	Classes	Parameters
0x505	RW	D-parameter Value (float – variable length)

4.58 Output Mode

Output Mode							
ID	Classes	Parameters					
0x600	RW	NOUT	MODE				

NOUT – the output number (1-4)

MODE - Output Mode	
Value	Mode
0	Output maintained in OFF state
1	Output control by PID control function
2	Output controlled by ON-OFF control function
3	Output retransmits the scaled process variable
4	Output set by ALARM 1 state
5	Output set by ALARM 2 state
6	Output set by Ramp & Soak RE.ON control bit
7	Output set by Ramp & Soak SE.ON control bit

4.59 Output Type

Output Type							
ID	Classes	Parameters					
0x601	G	NOUT					

NOUT – the output number

This returns the output type for the specified output as a hex encoded string as follows:

Output Types	
Code Returned (hex encoded)	Type
000	No output available
001	Single Poll Relay
002	SSR output
004	Double Poll Relay
008	DC Pulse output
010	Analog Output
020	Isolated Analog Output

4.60 Output ON/OFF Configuration

Output On/Off Config							
ID	Classes	Parameters					
0x610	RW	NOUT	RD	Dead Band Value (float – variable length)			

NOUT is the output number (1-4)

RD – Reverse/Direct	
Value	Action
0	Reverse
1	Direct

4.61 Output Alarm Configuration

Output Alarm Configuration									
ID	Classes	Parameters							
0x620	RW	NAL	TYP	MODE	COLOR	HHEN	LAT	CNT	PO

NAL is the alarm number (1-2)

TYP- Alarm Type	
0	Alarm not active
1	Alarm triggered if PV > ALM.H
2	Alarm trigger if PV < ALM.L
3	Alarm trigger if PV > ALM.H or PV < ALM.L
4	Alarm trigger if PV > ALM.L and PV < ALM.H

MODE - Alarm Mode	
Value	Mode
0	Alarm setpoint is fixed constant
1	Alarm is offset from Setpoint 1
2	Alarm is offset from Setpoint 2

Color	
Value	Alarm Color
0	No color
1	GREEN
2	RED
3	AMBER

HHEN – HiHi Mode	
Value	Action
0	Enable Hi Hi Mode
1	Disable Hi Hi Mode

LAT- Alarm Latch Control	
Value	Action
0	Alarm does not latch
1	Alarm state will be latched, clear by front panel
2	Alarm state will be latched, clear by digital input
3	Alarm state latched, clear by front panel or input

CNT – Contact Polarity	
Value	Polarity
0	Contacts OPEN until activated
1	Contacts CLOSED until activated

PO – Power On Enable	
0	Not active on power-on
1	Active on power-on

4.62 Hi Value

Alarm Hi Value			
ID	Classes	Parameters	
0x621	RW	NAL	Hi Value (float – variable length)

NAL = alarm number (1-2).

4.63 Low Value

Alarm Low Value			
ID	Classes	Parameters	
0x622	RW	NAL	Low Value (float – variable length)

4.64 On Delay

Alarm On Delay			
ID	Classes	Parameters	
0x623	RW	NAL	On Delay - seconds (float – variable length)

NAL = alarm number (1 – 2).

4.65 Off Delay

Alarm Off Delay			
ID	Classes	Parameters	
0x624	RW	NAL	Off Delay - seconds (float – variable length)

NAL – alarm number (1-2).

4.66 HiHi Mode

HiHi Mode							
ID	Classes	Parameters					
0x625	RW	NAL	ON/OFF				

NAL – alarm number.

ON/OFF	
0	On
1	Off

4.67 HiHi Offset

Alarm HiHi Offset			
ID	Classes	Parameters	
0x626	RW	NAL	Offset (float – variable length)

4.68 Output Retransmission Reading 1

Output Retransmission Reading 1			
ID	Classes	Parameters	
0x630	RW	NOUT	Reading Value (float – variable length)

NOUT – output number (1-4).

4.69 Output Retransmission Output 1

Output Retransmission Output 1			
ID	Classes	Parameters	
0x631	RW	NOUT	Output Value (float – variable length)

NOUT – output number (1-4).

4.70 Output Retransmission Reading 2

Output Retransmission Reading 2			
ID	Classes	Parameters	
0x632	RW	NOUT	Reading Value (float – variable length)

NOUT = output number (1-4).

4.71 Output Retransmission Output 2

Output Retransmission Output 2			
ID	Classes	Parameters	
0x633	RW	NOUT	Output Value (float – variable length)

NOUT – output number (1-4).

4.72 Output Cycle Time/Pulse Width

Output Cycle Time/Pulse Width			
ID	Classes	Parameters	
0x650	RW	NOUT	Cycle Time - seconds (float – variable length)

NOUT – output number.

4.73 Output Range

Output Range							
ID	Classes	Parameters					
0x660	RW	NOUT	RANGE				

RANGE	
Value	Range
0	0 – 10V
1	0 – 5V
2	0-20V
3	4-20V
4	0-24V

4.74 Time Format

Time Format							
ID	Classes	Parameters					
0x700	RW	FMT					

FMT - Time Format	
0	MM.SS displayed
1	HH.MM displayed
2	S.MMM displayed

4.75 Multi Ramp/Soak Configuration

Ramp/Soak Config							
ID	Classes	Parameters					
0x720	RW	RS					

RS – Ramp Soak Mode	
0	Ramp/Soak Disabled
1	Ramp/Soak Enabled
2	Ramp/Soak Remote Control

4.76 Multi Ramp/Soak Profile Configuration

Multi Ramp/Soak Profile Config						
ID	Classes	Parameters				
0x721	RW	PMS	PLS	SC	TE	

PMS, PLS form the profile number in hex form. PMS is the most significant hex digit, PLS the least significant.

For example: segment 31 (0x1f) would be encoded as PMS = '1', PLS = 'f'

SC is the segment count (0 – 15) encoded as a single hex digit.

TE- Tracking Enabled	
0	Disabled
1	Enabled

4.77 Multi Ramp/Soak Segment Event Configuration

Multi Ramp/Soak Event Config						
ID	Classes	Parameters				
0x730	RW	NSEG	RE	SE		

PMS, PLS identify the profile number as in Multi Ramp/Soak Profile Configuration (ID = 0x721).

NSEG is the segment number encoded as a single hex digit (0-F).

RE – Ramp enabled (1) or disabled (0) for segment.

SE – Soak enabled (1) or disabled (0) for segment.

4.78 Multi Ramp/Soak Profile Segment Ramp Time

Multi Ramp/Soak Segment Ramp Time			
ID	Classes	Parameters	
0x731	RW	NSEG	Ramp Time Seconds (float, variable length)

NSEG is a single hex digit identifying the segment number.

4.79 Multi Ramp/Soak Profile Segment Soak Process Value

Multi Ramp/Soak Segment Soak Process Value			
ID	Classes	Parameters	
0x732	RW	NSEG	Soak Value (float, variable length)

NSEG is a single hex digit identifying the segment number.

4.80 Multi Ramp/Soak Profile Segment Soak Time

Multi Ramp/Soak Segment Soak Time			
ID	Classes	Parameters	
0x733	RW	NSEG	Soak Time - seconds (float, variable length)

PMS, PLS pair identify the profile number as in the Multi-Ramp Profile Config message (ID = 0x721).

NSEG is a single hex digit identifying the segment number.

4.81 INIT Password

INIT Password							
ID	Classes	Parameters					
0xF00	RW	EN	PWD3	PWD2	PWD1	PWD0	

EN – Enable Init (1) / Disable Init (0)

The parameters PWD0-3 form a hex encoded number. The range of each must be 0-9.

For Example; '1234' would be encoded as PWD3 = 1, PWD2 = 2, PWD1 = 3, PWD0 = 4.

4.82 Program Password

Program Password							
ID	Classes	Parameters					
0xF01	RW	EN	PWD3	PWD2	PWD1	PWD0	

EN – Enable Programming (1) / Disable Programming (0)

The parameters PWD0-3 form a hex encoded number. The range of each must be 0-9.

4.83 Version Number

Version Number							
ID	Classes	Parameters					
0xF20	G						

This command returns the current firmware version number as a hex encoded string. The format is:

- Major (2 bytes)
- Minor (2 bytes)
- Fix (2 bytes)
- Build (2 bytes)

Example: If the current version is 01.00.05.00 the command “*GF20<CR>” would return “01000500”

4.84 Version Upgrade

Version Upgrade							
ID	Classes	Parameters					
0xF21	P	SEL					

This command forces a firmware upgrade, followed by a reboot.

The SEL parameter determines the method to be used.

SEL – Firmware Upgrade Method	
1	EIP Serial Port
2	User Serial Port
3	USB Thumb drive.

Example: to upgrade using the USB Thumb drive the drive would be inserted into the USB port, followed by the serial command “*PF21 3<CR>”

4.85 Bootloader Version

Bootloader Version Number							
ID	Classes	Parameters					
0xF22	G						

This retrieves the bootloader version number in exactly the same manner as the version number command (ID = 0xF20).

4.86 Run Mode

Run Mode							
ID	Classes	Parameters					
0xF23	GP	SS					

SS - System State		
0	LOAD	File transfer in progress
1	IDLE	Idle, no control
2	INPUT_ADJUST	Adjusting input value
3	CONTROL_ADJUST	Adjusting output value
4	MODIFY	Modify parameter in OPER mode
5	WAIT	Waiting for RUN condition
6	RUN	System is running
7	STANDBY	Standby mode
8	STOP	Stopped mode
9	PAUSE	Paused mode
10	FAULT	Fault detected
11	SHUTDOWN	Shutdown condition detected
12	AUTOTUNE	Autotune in progress

4.87 Set Factory Defaults

Bootloader Version Number							
ID	Classes	Parameters					
0xF30	P	EN					

To reset factory defaults, use the command `"*PF30 1<CR>"`

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