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User's Guide

PV

SV

O1
O2
A1
A2
F1
F2

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CN8200 SERIES
Communications & Options Guide

OMEGAnet® On-Line Service www.omega.com	Internet e-mail info@omega.com

Table of Contents

For information and instructions related to basic operations, refer to the Series CN8200 operator's manual supplied with your controller.

Options Wiring Diagrams

Guide to Digital Communications

Option -AL2: Dual Alarm Output, N.O.

This optional hardware module provides two alarm drive outputs. LED indicators A1 and A2 are used to indicate alarm conditions as configured in the Alarm Menu.

TYPICAL OUTPUT CONNECTION

1 AMP FUSE   LOAD   20 - 240 VAC

1 AMP FUSE   LOAD   30 VAC

13   14

11   12

FIELD CONNECTIONS
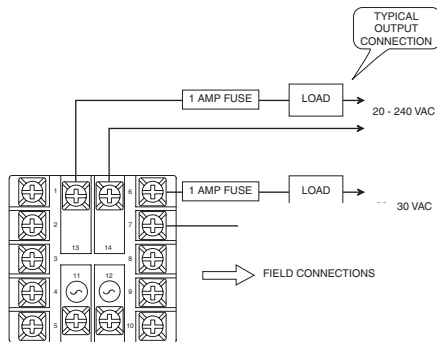
Option Description:
　　　Option -AL2: Dual alarm, N.O.

Load Limits:

Max. Load Current	1 A rms
Min. Load Current	0.5 mA rms
Power Factor Range	0.2 to 1.0 (can drive small motors, solenoids, valves, and contactors)
Max. Surge Current	
Non-repeating for 1 second	7.5 A
Max. I^2T for fusing (0.01 sec)	4.5 amp-squared seconds (1 A - ABC1 typical fuse)

Option -AL3: Dual 24 Vdc Alarm Outputs

TYPICAL CONNECTION USING PIEZOELECTRIC AUDIBLE ALARM DEVICE

MANUFACTURED WITH DUAL 24 VDC ALARM OPTION BOARD.

−
SONALERT
+

+
LED
INDICATOR
−

CONTROLLER 24V OUTPUT CONFIGURATION
25 V
1K

13   14

11   12

FIELD CONNECTIONS

TYPICAL CONNECTION USING LED INDICATOR WITHOUT LIMITING RESISTOR

14   6
13   7
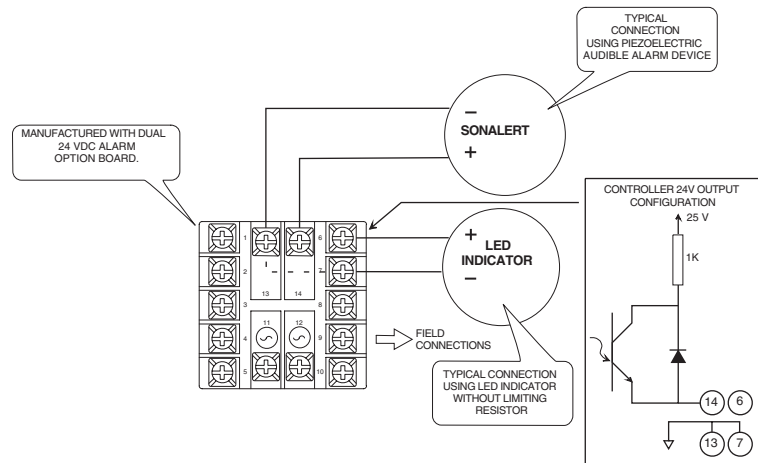
Option Description:　　Dual 24 V outputs with clamping diodes
　　　　　　　　　　　　Pins 13 & 7 are connected internally
　　　　　　　　　　　　Source current is limited to 25 mA (1000 ohm resistor)
　　　　　　　　　　　　Open circuit voltage is 25 volts

Isolation:　　　　　　　Isolation 300 volts ac/dc either output to instrument

Option -AL1: Relay, N.O. Alarm Output
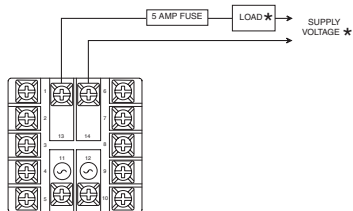
Option Description: NO (Normally open) relay contact is closed when
either alarm is active. Jumpers on the board can be
removed to activate the output for a single alarm only:
  JP1 - Alarm A1
  JP2 - Alarm A2

The relay life is greater than 100,000 operations at 5 operations per second switching full load.

＊Connect load and supply voltage per the following table:

Load Type	5 Amp Voltage Limit
Resistive DC	30 Vdc
Inductive DC (L/R = 7 ms)	20 Vdc
Resistive AC	250 Vac
Inductive AC (pF = 0.4)	150 Vac
Motor, AC, 1/6 hp	250 Vac
Tungsten Lamp, 360 W	120 Vac

Option -C2: RS-232 (one-to-one) Communications
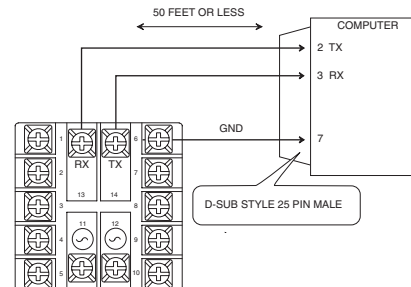
Option Description: Provides a one-to-one connection between
the controller and an RS-232 port.
Computers, PLCs, or dumb terminals may
be used to set and access controller data.

Option -C4: RS-485 (one-to-many) Communications
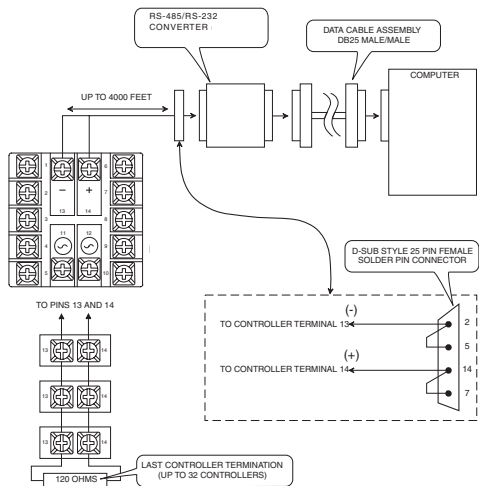
Option Description: Provides one-to-many communications.

If run exceeds 1000 ft., terminate the controller furthest from the computer by connecting a 120-ohm, 1/4-watt resistor between terminals 13 and 14.

*Converter is supplied with a wallplug-mount power transformer.

Options -RSP1, -RSP2, -RSP3 Remote Setpoint Switch, with Alarm (Contact Digital Input)

Input Option Menu

Display	Parameter	Selection	Default
C-dI	Func Function	dIS Switch Disabled	S.SP.S
		S.SP.S Second Setpoint Select	
		StbY Remote Standby	
		rS.rH Ramp/Soak Run-Hold	
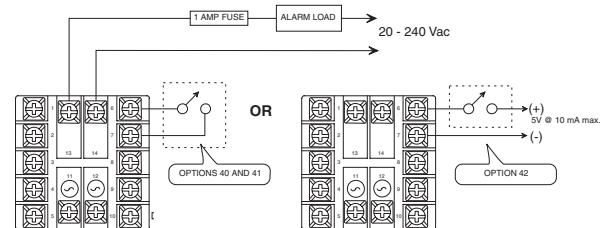
Option Description: Dual function board (functions unrelated)
   a. Output alarm is energized when either A1 or A2 is active.
   b. Digital input controls Remote Standby, Ramp-Soak Run/Hold, OR Second Setpoint Select.

Options -C4-DIC, -C4-DIO, -C4-DIV, -C4-MOD, -C4-MOD-DIC, -C4-MOD-DIO, -C4-MOD-DIV: Digital Input plus RS-485 Communications

RS-485/RS-232 CONVERTER*

RS232 DATA CABLE ASSEMBLY DB25 MALE/MALE

COMPUTER

TO PINS 13 AND 14

UP TO 4000 FEET

13 14

13 14

13 14

120 OHMS

LAST CONTROLLER TERMINATION (UP TO 32 CONTROLLERS)

Options -C4-DIC, -C4-DIO, -C4-MOD-DIC, -C4-MOD-DIO

OR

(+)
5V @ 10 mA max.
(-)

Options -C4-DIV, -C4-MOD-DIV

D-SUB STYLE 25 PIN FEMALE SOLDER PIN CONNECTOR

(-)
TO CONTROLLER TERMINAL 13

(+)
TO CONTROLLER TERMINAL 14

2
5
14
7
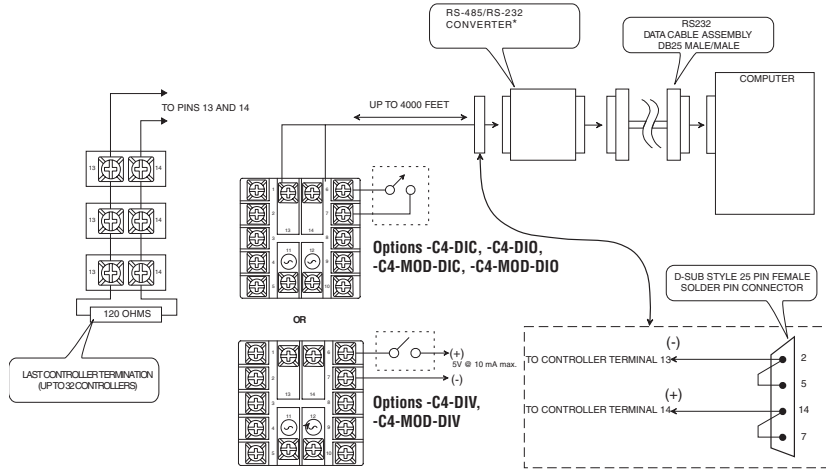
Note: See previous page for control input menu selections

Option Description: Provides one-to-many communications.

If run exceeds 1000 ft., terminate the controller furthest from the computer by connecting a 120-ohm, 1/4-watt resistor between terminals 13 and 14.

*Converter is supplied with a wallplug-mount power transformer.

Option -RSP1: Active when switch closed.
Option -RSP2: Active when switch open.
Option -RSP3: Active when 5 V input present

Load Limits:
Max. Load Current:	1 A rms
Min. Load Current:	0.5 mA rms
Power Factor Range:	0.2 to 1.0 (can drive small motors, solenoids, valves, and contactors)

Max. Surge Current,
Non-Repeating for
1 second: 7.5 A
Max. I^2T for fusing (0.01 sec):   4.5 amp-squared secs (1A - ABC1 typical fuse)

Transducer Excitation

Option -XP1, -XP2, -XP3, -XP4: Transducer Excitation
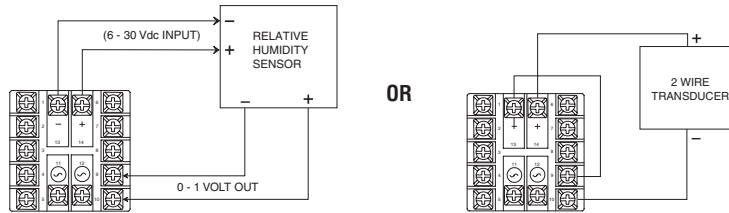
Option Description: The transducer excitation option provides power to remote transducers. The transducer outputs, in turn, provide a signal to the controller input which can be scaled in the appropriate engineering units.
Option -XP1: 15 Vdc
Option -XP2: 12 Vdc
Option -XP3: 10 Vdc
Option -XP4:   5 Vdc

All options will provide at least 20 mA. The transducer circuitry is thermally protected from short circuits.

Auxiliary Output

Option -PVSV1, -PVSV2: Process Output Option Menu
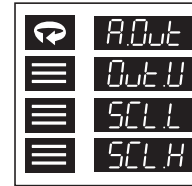
Display	Parameter	Selection		Default
`Out.U`	Variable	`Proc`	Process Variable	Process Variable
		`SP`	Setpoint Value	
`SCL.L`	Low Scale	Full Scale		Sensor Low Scale (PV retransmit)
				Setpoint Low Scale (SV retransmit)
`SCL.H`	High Scale	Full Scale		Sensor High Scale (PV retransmit)
				Setpoint High Scale (SV retransmit)

Auxiliary Output

Option -PVSV1, -PVSV2: Auxiliary Output
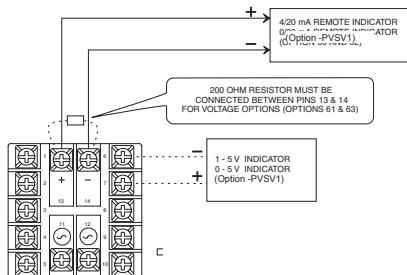
Option Description: The Setpoint Variable or Process Variable is
transmitted to a remote device (chart recorders,
indicators, data recorders, computers, process
controllers, etc.) with 1 of 4 different interfaces:
Option -PVSV1: 4-20 mA
Option -PVSV2: 0-5 V

The output signal is scalable in the Auxiliary Output Menu. Multiple remote
indicators may be driven by the controller.

For current (mA) options, the remote indicators are connected in series. The
sum of the input resistance for all remote indicators must be less than 400
ohms. For voltage options, the remote indicators are connected in parallel.
The sum of the currents for all remote indicators must be less than 10 mA.

Digital Communications Option

Three remote communications options are available for the CN8200 which allow interfacing to remote devices utilizing the most common industry standards: RS232 and RS485.

Remote Communications Options

RS-232

This method allows bidirectional data transfer via a three-conductor cable consisting of signal ground, receive input and transmit output. It is recommended for communication distances less than 50 feet between the computer terminal and the instrument. Note: Multiple instruments cannot be connected to the same port.

The RS232 port is optically isolated to eliminate ground loop problems. Typically, "Data Out" of the computer/ terminal connects to the "RCV" terminal. "Data In" connects to the "XMT" terminal. If shielded cable is used, it should be connected to the frame ground at one end only. Signal ground is to be connected at appropriate ground terminals (refer to wiring diagram on next page).

RS-485

The RS485 multipoint capability allows up to 32 controllers to be connected together in a half-duplex network or up to 100 controllers with an appropriate communications repeater.

Digital Communications Option

Note: Call factory for a recommended RS485 converter.

This method allows bidirectional data transfer over a twisted pair cable. The twisted pair cable is a transmission line; therefore, terminating resistors are required at the most distant ends of the line to minimize reflections (typically 120 ohms at each end). The RS485 circuit is fully optically isolated, eliminating ground loop problems. Parallel drops from the transmission lines should be kept as short as possible; however, the line may be daisy-chained at each controller. The polarity of the line is important and each device will specify an "A" (+) and "B" (-) connection.

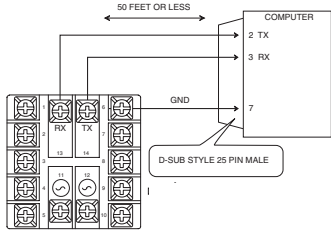**Figure 1a. Wiring diagram for RS-232 digital communications.**

Figure 1b. Wiring diagram for RS-485 digital communications.
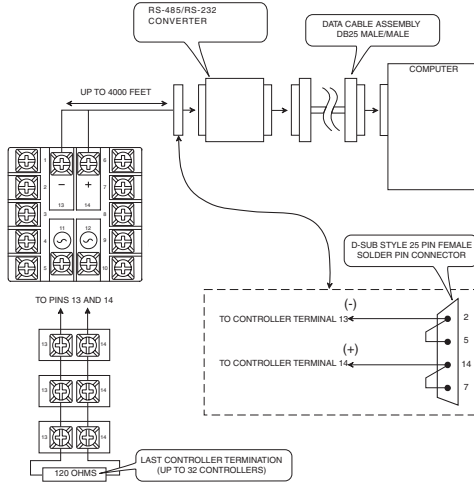
Digital Communications Option

Omega+ Protocol

The Omega+ Protocol provides an easy way to query and modify controller parameters using a personal computer and the optional digital communications option of the CN8200.

In this manual, the word "host" refers to the personal computer that's communicating with the controllers in the serial link, and the word "slave" refers to the controllers themselves.

All transactions between the host and the slaves are done with messages consisting of only printable ASCII characters. There are only two primary types of messages: Requests and Responses. Messages coming from the host are called requests and messages coming from the slaves are called responses.

With the exception of a broadcast request, for every request sent from the host, the slave will send back a response. If a slave does not respond within 100 milliseconds, then the request can be considered lost.

A broadcast request is a request having an ID of '00' (see Message Formats on next page). It is used to address all slaves on the network. All slaves on the network will perform the actions requested in a broadcast message. However, a response message will not be returned. Therefore, the host can only broadcast Write or Auxiliary Command Requests. All slaves will ignore all Read Broadcast Requests.

Omega+ Protocol (Standard)
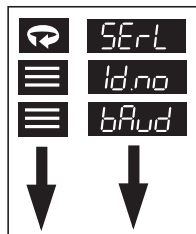
Display	Parameter	Selection	Default
Id.no	Unit ID	1-255	1
bAud	Baud Rate	300	2400
		600	
		1200	
		2400	
		4800	
		9600	
dAt.F	Data Format	7o.1	8n.1
		7E.1	
	Defined as 1 start bit / N# data bits / Parity odd, even, none / N# stop bits	7n.2	
		7o.2	
		7E.2	
		8n.1	
		8o.1	
		8E.1	
		8n.2	
tr.dL	Transmit Delay	1-100ms	0

Message Formats

All Omega+ messages adhere to the general format of:

[START CHAR][ID][ZONE][TYPE][PARAM][ERROR][DATA][CHKSUM][END CHAR]

START CHAR

This is a single character which designates the start of the message. For a Request message, this character is the ASCII '$' and for a Response message, this character is the ASCII '%'.

ID

This is a two-character ID identifying the receiving controller. Controller IDs go from 1-255 inclusively and all slaves in the network must have unique IDs. The ID number of '00', when used in a request, designates a broadcast message that is used to address all controllers in the network. See the section Request Message for an explanation of the broadcast message.

In order to represent 255 with just two ASCII characters, a number system known as the Message Code Numbering System is used. In this system, the most significant digit is represented with the numbers 0-9 and the letters A-Z and the least significant digit is represented with the numbers 0-9.

The numbers 0-9 have the same values as their decimal counterparts and the letters A-Z have the values of 100 - 350 inclusively in increments of 10.

Example:

Message Code Value	=	Decimal Value
00		$0 + 0 = 00$
99		$90 + 9 = 99$
A0		$100 + 0 = 100$
A2		$100 + 2 = 102$
B8		$110 + 8 = 118$
P5		$250 + 5 = 255$

Zone

This is a two character ID identifying the Zone number in multi-zone capable controllers. For the CN8200, this number must be 01.

Type

This is a single character identifying the type of message. The following table lists the type characters for all messages.

TYPE character	Message Type
R	Read Request or Read Response Returning a Positive Result
r	Read Response Returning a Negative Result
W	Write Positive Value Request and Response
w	Write Negative Value Request and Response
A	Auxiliary Command

For further information, see following sections on the different message types.

PARAM

This is a two character, message specific, parameter ID. For a Read/Write Request or Response message, this ID identifies the controller parameter. For an Auxiliary Command Request or Response message, this ID specifies the command.

STATUS

This is a single-character field used in all response messages, containing a status code specifying the status of the request message received.

DATA

This field contains the ASCII representation of the value of the parameter. For the Auxiliary Request or Response messages, this field either contains the ASCII representation of a numeric value or just ASCII data. The length of this field depends on the message type. The discussion on the specific message types gives the exact requirements for this field.

All ASCII representations of numeric values must be done using the characters '0'-'9', and '.'. Any use of other ASCII characters, including' ' and '-' will result in a bad message. Negative numbers **CANNOT** be represented by preceding the number with '-' character. Instead, a special message type is used. See subsequent sections for more information.

IMPORTANT: The data field in the Read and Write Request and Response messages must and will only contain the characters '0'-'9', and the decimal point '.'. All other characters are considered illegal. When the data field is listed as **Unused** or **Ignored** in an auxiliary command, it does not mean that the field can be skipped when sending in the request message. Instead, this field must be padded with any 10 alphanumeric (only letters and numbers are allowed) ASCII characters.

**Examples of valid numeric representations for a
6 character data field:**

Numeric Value	ASCII Representation
3	3.0000
	000003
	003.00
100	100.00
	0100.0
	000100
3.2	003.20
	0003.2

**Examples of invalid numeric representations for 6 character
data field: (B represents a blank, or a space, character)**

Numeric Value	Bad ASCII Representation	Why?
3	BBBBB3	Leading blanks are not allowed.
	3.0BBBB	Trailing blanks are not allowed.
-3.2	-3.20000	'-' is not allowed.

CHKSUM

This is a two character Message Code Numbering System,
representing the sum of all the ASCII values of all the char-
acters (excluding the START, CHAR, the END CHAR, and the
CHKSM themselves) in the message. The sum is computed
using the following formula:

CHKSM = SUM(All Message Characters)%256

% represents the modulus operator.

END CHAR

This is a single character designating the end of the message.
For all messages, the character used is <CR>, the carriage
return.

Request Messages:

Request Messages are sent from the host to the slaves.
Each request will have an ID identifying the intended recipi-
ent of the request. If the ID is '00' (zero), then the request
is a broadcast message. All slaves will perform the action
requested in the broadcast request. However, a response
message will not be returned. Therefore, it only makes sense
to send Write or Auxiliary Command Requests as broadcast
requests. There are three types of Request Messages: Read,
Write, and Auxiliary Commands.

The Read Request:

The Read Request is used to query parameter values and it has the following message format:

[START CHAR][ID][ZONE][TYPE][PARAM][CHKSUM][END CHAR]

Field Description: TYPE Must contain the uppercase letter 'R'.

Request Message	Description
$Ø1Ø1RØ5C1<CR>	Queries the value of the Process Variable of Controller #1.
$Ø1Ø1RØ9C5<CR>	Queries the value of the EEPROM Setpoint 1 of Controller #1
$Ø2Ø1RØ9C6<CR>	Queries the value of the EEPROM Setpoint 1 of Controller #2.

```
END CHAR
CHKSUM
PARAM
TYPE
ZONE
ID
START CHAR
```

Examples of the responses to these requests are given in later sections on **Response Messages.**

The Write Request:

The Write Request is used to modify parameter values and it has the following message format: [START CHAR][ID][ZONE] [TYPE][PARAM][DATA][CHKSUM][END CHAR]

Field Description: TYPE This field must contain one of the following two characters.

W– Value in DATA is a positive value.
w– Value in DATA is a negative value.

DATA A six-character ASCII representation of a numeric value.

Request Message	Description
$Ø1Ø1WØ91Ø.123G7<CR>	Change both the RAM and EEPROM copies of Setpoint #1 in controller #1 to the value of 10.123
$Ø1Ø1w1Ø1Ø.123J1<CR>	Change only the RAM copy of setpoint #1 in controller #1 to the value of -10.123 (notice the lowercase 'w').

```
END CHAR
CHKSUM
DATA
PARAM
TYPE
ZONE
ID
START CHAR
```

The Auxiliary Command Request:

The Auxiliary Command Request is used to issue commands to the controllers and it has the following message format:

Field Description: TYPE   This field must contain the uppercase letter 'A'

DATA   A ten-character ASCII representation of a numeric value or 10 alphanumeric ASCII characters.

Request Message	Description
$Ø1Ø1AØ1XXXXXXXXXXL2<CR>	Tell controller #1 to load all parameters with their defaults. The 10 X's are padding characters.
$Ø2Ø1AØ2ØØ1.ØØØØØ69<CR>	Tell controller #2 to perform a low RTD calibration.

END CHAR
CHKSUM
DATA
PARAM
TYPE
ZONE
ID
START CHAR

Response Messages:

Response Messages are replies to the requests sent from the host. For each request received, the slave will reply back with a response.

For all requests, the Omega+ Protocol specifies a maximum response time of 100 milliseconds. If a response is not received after 100 milliseconds, that request can be considered lost.

There are three types of Response Messages: Read, Write, and Auxiliary Commands.

The Read Response:

The Read Response will be sent in response to a Read Request. Some examples:

Request Message	Description
%Ø1Ø1RØ5Ø21.123K8\<CR>	The value of the Process Variable is 21.123 Degrees C.
%Ø2Ø1R1Ø1G7\<CR>	A serial transmission has occurred: Framing Error
%Ø1Ø1rØ9Ø21.ØØØN8\<CR>	The value of the EEPROM setpoint #1 is -21 Degrees C (notice the lowercase 'r').

```
                    END CHAR
                   CHKSUM
                  DATA
                 STATUS
                PARAM
               TYPE
              ZONE
             ID
            START CHAR
```

The Write Response:

The Write Response will be sent in response to a Write Request. Some examples:

Request Message	Description
%Ø1Ø1WØ93I1\<CR>	A serial transmission error has occurred: Parity error. Write failed.
%Ø1Ø1w1ØØK2\<CR>	RAM copy of setpoint #1 modified successfully.

```
                END CHAR
               CHKSUM
              STATUS
             PARAM
            TYPE
           ZONE
          ID
         START CHAR
```

The Auxiliary Command Response:

The Auxiliary Command Response will be sent in response to an Auxiliary Command Request.

Some examples are:

Request Message	Description
%Ø1Ø1AØ1ØXXXXXXXXXXXØ4\<CR>	Default load all parameters has started.
%Ø2Ø1AØ2ØØ.ØØØØØØØØB6\<CR>	RTD low calibration on controller #2 has started.

END CHAR
CHKSUM
DATA
STATUS
PARAM
TYPE
ZONE
ID
START CHAR

Table 1. Communications Parameter List (Omega+ Protocol)

Parameter Number	Description	Parameter Number	Description
1	Controller Type	19	Manual Control
2	Software Version		2 Percentage
3	Communications	2Ø	Output 1 Deadband
	Version	21	Output 1 Hysteresis
4	Status Byte	22	Output 1 Proportional
5	Process Value		Band
6	Operating Mode	23	Output 2 Proportional
7	Access Level		Band
8	Contact/Digital	3Ø	Rate/Derivative Action
	Input State	32	Reset/Integral Action
9	Setpoint - RAM,	34	Manual Reset/
	EEPROM		Internal Action
1Ø	Setpoint - RAM	37	Output 2 Deadband
	Only	38	Output 2 Hysteresis
11	Second Setpoint -	39	Autotune Damping
	RAM, EEPROM	4Ø	Recipe Option
12	Second Setpoint -	41	Single Setpoint Ramp
	RAM Only		Time
13	Remote Analog	42	Ramp Time 1
	Setpoint	43	Ramp Time 2
14	Recipe Setpoint	44	Ramp Time 3
16	Output 1 Percentage	45	Ramp Time 4
17	Output 2 Percentage	46	Ramp Time 5
18	Manual Control	47	Ramp Time 6
	1 Percentage	48	Ramp Time 7

Table 1. Continued

Parameter Number	Description	Parameter Number	Description
49	Ramp Time 8	73	Soak Time 8
5Ø	Ramp Event 1	74	Soak Event 1
51	Ramp Event 2	75	Soak Event 2
52	Ramp Event 3	76	Soak Event 3
53	Ramp Event 4	77	Soak Event 4
54	Ramp Event 5	78	Soak Event 5
55	Ramp Event 6	79	Soak Event 6
56	Ramp Event 7	8Ø	Soak Event 7
57	Ramp Event 8	81	Soak Event 8
58	Soak Level 1	82	Recycle Number
59	Soak Level 2	83	Holdback Band
6Ø	Soak Level 3	84	Termination State
61	Soak Level 4	85	Power Resume
62	Soak Level 5	86	Input Bias
63	Soak Level 6	87	Input Low Scale
64	Soak Level 7	88	Input High Scale
65	Soak Level 8	89	Lower Setpoint Limit
66	Soak Time 1	9Ø	Upper Setpoint Limit
67	Soak Time 2	91	Input Filter
68	Soak Time 3	92	Input Type
69	Soak Time 4	94	Output 1 Type
7Ø	Soak Time 5	95	Output 1 Action
71	Soak Time 6	96	Output 1 Alarm Action
72	Soak Time 7		

Table 1. Continued

Parameter Number	Description	Parameter Number	Description
97	Output 1 Alarm Operation	B6	TC/RTD Decimal Position
98	Output 1 Alarm Delay	B7	Linear Decimal Position
99	Output 1 Alarm Inhibit	B8	Display Filter
AØ	Output 1 Process Alarm Setpoint	B9	Display Units
		C1	Display Blanking
A1	Output 1 Deviation Alarm Setpoint	C2	Alarm 1 Action
		C3	Alarm 1 Operation
A2	Output 1 Cycle Time	C4	Alarm 1 Delay
A3	Output 1 Low Limit	C5	Alarm 1 Inhibit
A4	Output 1 High Limit	C6	Alarm 1 Process Setpoint
A5	Output 2 Type	C7	Alarm 1 Deviation Setpoint
A6	Output 2 Action	C8	Alarm 2 Action
A7	Output 2 Alarm Action N/A	C9	Alarm 2 Operation
		DØ	Alarm 2 Delay
A8	Output 2 Alarm Operation	D1	Alarm 2 Inhibit
A9	Output 2 Alarm Delay N/A	D2	Alarm 2 Process Setpoint
		D3	Alarm 2 Deviation Setpoint
BØ	Output 2 Alarm Inhibit	D4	Communication Protocol
B1	Output 2 Process Alarm Setpoint	D5	Communication ID
		D6	Communication Baud Rate
B2	Output 2 Deviation Alarm Setpoint	D7	Communication Data Format
		D8	Communication Transmit Delay
B3	Output 2 Cycle Time		
B4	Output 2 Low Limit	E1	Output 1 Failsafe %
B5	Output 2 High Limit	E2	Output 2 Failsafe %

Table 1. Continued

Parameter Number	Description
E3	Loop Break Time
E4	Highest Reading
E5	Lowest Reading
E8	Option Selection N/A
E9	TC Zero Calibration
FØ	TC Span Calibration
F1	RTD Zero Calibration
F2	RTD Span Calibration
F3	Low-Voltage Zero Calibration
F4	Low-Voltage Span Calibration
F5	High-Voltage Zero Calibration
F6	High-Voltage Span Calibration
F7	Current Zero Calibration
F8	Current Span Calibration
G1	Auxiliary Output Variable
G2	Auxiliary Output Scale Low
G3	Auxiliary Output Scale High
G5	RAS Scale Low
G6	RAS Scale High

Parameter Number	Description
G7	Contact/Digital Switch Function
H2	Autotune State
H3	Recipe State
H5	Current Recipe Segment
H6	Active Setpoint
H7	Resume Exhaustion Flag
F4	Low-Voltage Span
H8	LED Status Indicator
H9	RTD (with decimal support) Zero Calibration
IØ	RTD (with decimal support) Span Calibration

Auxiliary Commands:

Command:	**Load Parameter Defaults**
Parameter #:	01
Description	Restore all menu parameters to their default values.
Request Data Field:	Ignored.
Response Data Field:	Ignored.
Command:	**Perform Process Low Calibration**
Parameter #:	02
Description:	Performs a Low Calibration. The data field in the request message specifies the process. Make sure the prerequisite for the calibration is satisfied before issuing a calibration command. For instance, the RTD calibration command must only be used when the input sensor type is chosen as RTD or RTD w/ Decimal.

Request Data Fields: A 10 character ASCII representation of a numeric value specifying what to calibrate.

0 - Thermocouple

1 - RTD, Resistive Thermal Device

2 - Linear

3 - RAS, Remote Analog Setpoint

Response Data Field: Ignored.

Command:	**Perform Process High Calibration**
Parameter #:	03
Description:	Performs a High Calibration. The data field in the request message specifies the process. Make sure the prerequisite for the calibration is satisfied before issuing a calibration command For instance, the RTD calibration command must only be used when the input sensor type is chosen as RTD or RTD w/ Decimal.
Request Data Field:	A 10 character ASCII representation of a numeric value specifying what to calibrate.

0 - Thermocouple

1 - RTD, Resistive Thermal Device

2 - Linear

3 - RAS, Remote Analog Setpoint

Command:	**Retrieve Display**
Parameter #:	05
Description:	Retrieves the string currently displayed on the slave's display. The data field in the request message specifies which display and the data field in the response message contains the string.
Request Data Field:	A 10 character ASCII representation of a numeric value specifying which display to retrieve data from.
	0 - Lower Display
	1 - Upper Display
Response Data Field:	The ASCII string.
Command:	**Clear Latched Alarms**
Parameter #:	10
Description:	Clear all latched alarms.
Request Data Field:	Ignored.
Response Data Field:	Ignored.

Table 2. Communications Error Codes Returned.

Code	Description
0	No error.
1	Framing error.
2	Hardware error.
3	Parity error.
4	Bad character in the TYPE field.
5	Bad message. Message cannot be understood.
6	Bad checksum. The checksum received did not match the checksum of the message.
7	Bad zone ID.
8	Bad auxiliary command ID. The auxiliary command is not supported in this controller.
9	Bad parameter ID. The parameter is not supported in this controller.
A	Bad data. Bad representation in the data field or data is out of range.
B	Attempt to write to a read only parameter.
C	Cannot write to a parameter because it's in use.

Notes

Notes

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Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

TEMPERATURE
- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE
- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL
- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY
- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION
- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS
- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL
- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments