



Der's Guide

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CN32Pt, CN16Pt, CN16DPt, CN8Pt, CN8DPt, CN8EPt DP32Pt, DP16Pt, DP8Pt, DP8EPt

Platinum Configurator



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Change History

Revision	Description	Date
1.6	Revised to match configurator version 1.4.0	7/1/2016
1.5	Updated screens, added virtual device section	10/2/2015
1.4	Updated per features found in release 1.2.0.7	5/28/15
1.3	Clean up / edit, updated screen for Charting and Configuration	4/14/15
1.2	Updated Transaction Monitor Screen for Ethernet support	04/08/15
1.1	Change name to Platinum Configurator	04/02/15
	Updated Transaction Monitor screen	
1.0	Initial Release	03/27/15

1 Introduction

1.1 Purpose

The Platinum Configurator software has been developed to provide a PC (Windows) based configuration and monitoring support package. These software tools were originally developed for internal engineering support to specifically test the functionality of the Platinum product. The tools provide a 'grass roots' interface and expose all internal functionality of the Platinum product.

As an engineering tool the Platinum Configurator will continue to grow as new features and capabilities are added to the Platinum family.

The Platinum Configurator operates over one of the communication channels provided on Platinum based products. All Platinum products are provided with a USB channel that is configured to operate as a Virtual Com device (slave to HOST device).

Many products are offered with an optional serial port (RS232, RS485 etc.). These communication channels are supported, although in most instances the PC interface will rely on a USB to Serial adaptor, suggesting that the native USB connection is the most straight forward solution.

Other communication channel support may be provided in future releases.

The Platinum Configurator may be run in a 'Virtual Device' mode with no physical device connected. A 'Virtual Device' configuration may be loaded using the File/Load option, the configuration screens may be modified and the resulting configuration may be then saved. The file format used by the Load and Save command is compatible that used by the Platinum controller, allowing configurations to be updated offline.

The Platinum Configurator uses the Modbus protocol (ASCII or RTU) and has been developed and tested using Visual Studio operating under Windows 7.



No support is provided to users of the Platinum Configurator software.

1.2 Definition of Terms and Acronyms

12C	2-wire serial interface	ADC	Analog to Digital Converter
Base	Device connected to slave device	DAC	Digital to Analog Converter
Device			
Smart	Device supporting 1 or more	RS485	Electrical signals used for serial
Input	Input sensors		communications
Smart	Device supporting 1 or more	RS232	Electrical signals used for serial
Output	Output Elements		communications
Sensor	One of the physical sensing	CSV	Comma Separated Values
Element	elements on a Smart Output		
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)

1.3 Applicable Documents

Doc. #	Name / Description	Rev. #
M5458	Platinum Modbus Interface	1.0
M5457	Platinum Load and Save File Format	1.0
AP-8	Platinum Ramp and Soak Processing	1.0
M5452	Serial Communication Protocol Specification	V1.1b3

2 Installation

The Installation of the Platinum Configurator on a Windows based platform consists of two components, a 'device interface' which allows the Window application to communicate with the Platinum device and the Platinum Configurator application program.

2.1 Device Interface

The Platinum Configurator application supports three 'com channel' device interfaces: USB, Ethernet and Serial. Within the Windows operating system serial and Virtual Com devices are treated equivalently although the Serial channel requires establishing specific baud rate, parity, start bits and stop bit information.

2.1.1 USB Virtual Com

When using the native USB Device interface under Windows 7/8/10, a Device Driver 'INF' file (OmegaVCP.inf) must be installed to enable the Windows Operating system to correctly identify and enumerate the Platinum USB Device.

The file <u>OmegaVCP.inf</u> is included in the Platinum Configurator release software or may be downloaded from <u>www.Omega.com</u>. The file must be copied to the <u>c: /Windows/inf</u> folder.



Administrator rights may be required to copy this file.

After installing <u>OmegaVCP.inf</u> the system should automatically detect and enumerate the Platinum product when connected via a USB cable.

Parameter	Value	Description
VID	0x2a72	Omega Engineering USB Vendor ID
PID	0x0400	Product Identification indicating the device is operating as a Virtual COM device

The OmegaVCP.inf file contains the following key parameters.

When installed, the Platinum device will appear as an enumerated com device and is assigned a name such as COMxx, where xx is assigned by the operating system.

2.1.2 RS232/RS485

Windows 7/8/10 has native RS232 and RS485 device driver interfaces and no additional driver is required. The hardware (or external USB serial converters) will be assigned a name such as COMxx, where xx is assigned by the operating system.

A wide variety of USB to Serial Adaptors are available. To use a serial channel the Platinum Configurator must use the same communication parameter settings as the Platinum device. The Platinum configuration settings may be set using the front panel menu: INIT/COMM/SER/C.PAR.

Parameter	Options	Description
bUS.F	232C	Selects between RS232 and RS485. RS485
	485	required for multi-drop and longer
		distance.
bAUd	1200, 2400, 4800, 9600, 19.2,	Data rate
	57.6,115.2	
PRty	Even, Odd, None	Parity Bit, inserted for data verification.
dAtA	7, 8	Number of data bits. Note that
		Modbus/RTU requires 8 bits.
StoP	1, 2	Number of stop bits.

2.1.3 Ethernet

The Platinum Ethernet channel supports 10 and 100 Mbit data rates and is provided with an internal web accessible configuration page that allows setting the Ethernet channel communication parameters.

2.1.3.1 Ethernet TCP (Modbus ASCII)

When used in TCP mode the interface supports Modbus/ASCII formats.

The Platinum Ethernet connection configuration may be done thru the built in web pages of the device. Using a PC internet browser (Explorer, Chrome etc.) connection to web page: 192.168.1.200 (Platinum default IP Address.

The following settings are required. The Platinum device must have the ETHN channel configured to accept Modbus ASCII data.

ngs	Query Web Link Setup	
	IP & Ethernet IP Exclusivity	Multi-Host Serial
	Network	Connection Configuration
(DHCP	
1	MAC Address	00:03:34:01:37:87
1	P Address	192.168.1.200
	Subnet Mask	255.255.255.0
0	Gateway Address	0.0.0.0
(DNS Address	0.0.0.0
H	Host Name	eip0000
F	Protocol	
ι	_ocal Port	2000
\	Neb Server Port	80
<u>۱</u>	Web Link Title	Web Link
<u>۱</u>	Web Link Address	www.newportus.com

In Ethernet serial interface must also be configured to support Modbus/ASCII data, which uses a CR+LF to Serial Data Packing Techniques and must be changed from the default settings, as shown below.

Platinu	m Interface Settings	
Serial Type	RS232 •	
Baud Rate	115200 🔹	
Data Bits	8 •	
Parity	None 🔻	
Stop Bit	1 •	
Flow Control	None 🔻	
Serial Da	ta Packing Techniques	
End Character	0x0A	
Forward End Character		
Buffering Time	1 msec	
Packet Length	0 0-256 bytes	
Co	nnection Control	
Number of Network Connections	5 🔹	
Disconnect After Data Sent		
Network Inactivity Timeout	0 0-7200 sec	
	I Data Propagation	
Propagation Type	Multicast	()

2.1.3.2 Ethernet Modbus/TCPIP

When used in Modbus/TCPIP mode, the following Ethernet options are required. The Platinum device must have the **ETHN** channel configured to accept Modbus RTU data.



When ModbusTCP is selected, the Local Port automatically switches to 502, the port designated by Modbus for use with TCPIP and the 'Serial Data Packing Techniques' options are disabled.

ngs Query Web Link Se IP & Ethernet IP Exclusiv	tup rity Multi-Host Serial	
Net	work Connection Configuration	
DHCP		
MAC Address	00:03:34:01:37:87	
IP Address	192.168.1.200	
Subnet Mask	255.255.255.0	
Gateway Address	0.0.0.0	
DNS Address	0.0.0.0	
Host Name	eip0000	
Protocol	ModbusTCP •	
Local Port	502	
Web Server Port	80	
Web Link Title	Web Link	
Web Link Address	www.newportus.com	
	Ethernet Port	
Auto-Negotiation		
Speed	100 Mbps	● 10 Mbps
Duplex	Full) Half

2.2 Installing Platinum Configurator Software

The Platinum Configurator is a self-extracting executable program which may be downloaded and installed on a Windows 7 based system.

- 1. Download the Platinum_Configurator.zip file.
- 2. Copy the <u>OmegaVCP.inf</u> file from the downloaded file to the <u>c:/windows/inf</u>/ folder.
- 3. Click on the **setup.exe file.** The program will install and a shortcut icon will be created on the desktop.



Release 01020000			
Name	Date modified	Туре	Size
L Application Files	4/14/2015 4:15 PM	File folder	
OmegaVCP.inf	3/10/2015 10:25 A	Setup Information	2 KB
Platinum.application	4/14/2015 4:06 PM	ClickOnce Applica	16 KB
💽 setup.exe	4/14/2015 4:06 PM	Application	423 KB

3 Connect to Platinum

3.1 Disabled Options

Fields which are disabled or not applicable will be shown greyed out.

3.2 Screens

The Platinum Configurator has been implemented as a series of 'screens', entered by selecting drop down options from the main screen tool bar or by clicking on any of the control buttons appearing on the main screen.

When a screen is loaded the device is read and all screen specific data is refreshed.

A manual 'Refresh' button is provided on each screen to allow updating screens where information may have changed due to configuration of unrelated data.

There is no specific 'close' option on each of the sub-screens. The screens may be collapsed or expanded to full screen mode using the standard window options. To close a screen select the 'X' option.



3.3 Connect to Platinum Controller

To connect the Platinum, the very first step is to setup communication between the configurator and the Platinum device. The communication interface is shown below.

Communication Setup			_ B _ X
1. Select Connection Type	Comm Port 🔲 Auto	Discover	Device Addr
2. Select Communication Protocol			

On this interface, please follow 1, 2, and 3 in sequence:

- 1. **Select connection type:** Available options are USB, Serial, TCP, and Offline. Other parameters will be updated to adapt to the option that you selected.
- 2. Selection Communication Protocol: Only Modbus is supported. You can check Modbus RTU to force the platinum to use Modbus RTU.

There are a few options that help you to use the configurator.

- Auto Connect at Start: once this box is checked, configurator will try to use previous saved parameters to connect to controller.
- **Save Settings:** once this box is checked, all communication parameters will be saved once the connection is succeed.
- Auto Discover: only applies to USB or serial connection.

3.3.1 Offline mode

The offline connection mode is to use "Platinum Configurator" to set platinum parameters without physically connecting to a platinum controller. Perform all functions supported by the Platinum Configurator such as adjust runtime parameters, turn on off features, etc. Users can also save configuration parameters to a file. This file can be then loaded into platinum controller or its software.

3.3.2 Modbus Format

The available Modbus formats are determined by the Platinum Channel selected.

If Ethernet / TCPIP is selected the USB and Serial options will be disabled. To select one of these channels first select Ethernet/ASCII, which re-enables all three channel types.

Channel	ASCII	RTU	TCP/IP
USB	Х	Х	
Serial	Х	Х	
Ethernet			Х
Virtual Device	N/A	N/A	N/A

3.3.3 Version Verification

If the Application or Bootloader firmware of the device requires upgrading, this warning message displays. Operation may continue, but errors may occur.



4 Monitor and Control Platinum

4.1 Main Interface

Platinum Monito	r	-	-					- D X
File Tools He	lp							
Device Information	n	Statistics			Extensions			
Device ID	0000003	Col	nnected To COM	16-1				
Version	1.4.0.4							
System Status	00000000							
Run Mode	IDLE	Process Variable Rate of Change	0.01 / second					
-			Configuration Group					
÷ 2	20.6	5	Process Input Auxiliary Input	PID Control 0.0% 0.0% Setpoints	Ala	Annunciators		
Setpoir	nt 1 Setpoin	12	0.4					
Wait	Run	Idle	Digital Input	Ramp & Soak		Outputs		
Stop	Standby	Pause		Inactive 1-1 00:00:00				
Peak 21.4	Valley 20.1	Latch Reset	Direlay	C-fabr	Evotation	Communication		
Calibrate		TARE	Display	Jaicty	Excitation			
	Manual Control		Configuration	Graphing		Refresh	fresh 2.00 🚔	Auto
								Refresh

The main interface of Platinum configurator shows controller system information, process values, and status. It provides functions for controlling the controller. The Main screen can be automatically refreshed at a user selectable 'rate'. It is recommended that a minimum of 2 second refresh timing be used. (See red box above.)

The Main Screen provides a Device Information summary, a pseudo image of what appears on the Platinum display, individual 'buttons' within the "Configuration Group" that allow programming and configuring the functional parameters of the device. (See blue box above.)

On the pseudo image of the Platinum device both Setpoint 1 and Setpoint 2 values are shown. If these parameters are configured as absolute values (see setpoint configuration) they may be changed by entering a new value.

- If Setpoint 1 is configured as a <u>Remote Setpoint</u>, or if Ramp and Soak is active the Setpoint 1 value will be displayed but cannot be updated.
- If Setpoint 2 is configured as a <u>Deviation Setpoint</u> the effective Setpoint 2 value will be displayed but cannot be updated.

Where appropriate the Configuration Group buttons show current 'values' of the primary underlying parameters. Digital (ON/OFF) parameters are shown as small 'display' lights that change to GREEN when active.

4.2 Reading and Control

4.2.1 Operating Modes

The 6 control buttons (Wait, Run, Idle, Stop, Standby and Pause) may be selected to change the operating mode of the device.

4.2.2 Run Mode Options

The Run Mode option buttons (Peak, Valley, and Latch Clear) mimic the functionality found in the Platinum Run Mode.

The Peak and Valley buttons include the current Peak/Valley values. Pressing either will clear the current value.

Clicking the Latch Reset button allows clearing latched alarms.

4.2.3 Calibrate

Calibrate button allows user to set user calibration mode and calibration parameters.

Offset Set	High
0	1
Offset	Gain

4.2.4 TARE

TARE button is only enabled when input is process. Click TARE button will set the current weight reading to 0.

4.2.5 Manual Control

The "Manual Control" button operates like the OPER/MANL option on the Platinum Controller. Selecting this button will open a separate window for manually setting the Input value or Control Value; the unit will be placed into IDLE mode.

Selecting the Output option sets the Control Output; and any outputs configured as PID may be set from 0 - 100% of full power.

Selecting the Input Option allows generating a 'pseudo input' within the range defined by the Input Range value.

lanual_Control	-	
Output Value	Input Value	Input Range +/- 100 🔻
0		0
O OUTPUT	INPUT	OISABLE

The Disable option disables both the Input and Output function.

4.3 System Configuration

The "System Configuration" screens are for configuring each of the internal control blocks of the Platinum Controller.

When entered, the current configuration information is read and used to build the screen.

• If a change is made to the current configuration the 'Update' button will appear, allowing the selection to be recorded.

Input Type	Process -	Filtering	X1 -					
Thermocouples	RTD		Thermistors	Process				
K (@	Winas		3.75. (8)	mA 4-20	Input	Manual Tra		TAPE Onting
1.12	2 30	417	E.OL	mA 0-24 (Manual as	Readion	TARE Options
T.C.			JUK. (10v -/+ @	Manual O	0	0	Disabled (
E (_)	Туре		TOK 1	1.0v -/+ @		-	-	Enabled (
NO	Type 385, 100 0	Dhm 🥿		0.1v -/+ @		1		Remote (
LO	Type 385, 500 (Dhm 🔘		0.05v -/+ (0)		Live Settin	nas	
R O	Type 385, 1000.0	hm				Input	Reading	_
517	Type 392, 100 (Ohm 🔿			Live ()	0	0	Capture Input
B (D	Type 3916, 1000	Chm 🖒				1	1	Capture Input 2
C (T)						Capture	DISABLE	0.000
							Se	et Linearization Op

4.3.1 Input Configuration

The "Input Configuration" screen configures all of the Input parameters. The "Input Type" 'drop-down' menu will enable the selected options. (See Red Arrow.)

The Process Range selection configures the Process Voltage/Current input as 4-20 mA, 0-24 mA, +/-10 Vdc, +/- 1 Vdc, +/- 0.1 Vdc, and +/- 0.05Vdc. Each input range has unique scaling parameters for input values to be scaled in engineering units.

The "View Settings" under the "Process" Input selection. The 'aqua' colored highlight moves to view each of the different input scaling options without changing the input range. The radio buttons select different input ranges.

4.3.1.1 Input / Output Scaling

Scaling operations translate source (input) signals to scaled output signal using a linear translation defined by a SLOPE (or gain) and an OFFSET. As shown below, (X1, Y1) and (X2, Y2) define two points on a line with a certain SLOPE and OFFSET. Knowing the SLOPE and OFFSET determines the OUTPUT value for any given INPUT value using this equation:

Output = Input X SLOPE + OFFSET, where

GAIN = (Y2 - Y1) / (X2 - X1)

OFFSET = Y1 - (GAIN * X1).



If (X2 - X1) == 0, the GAIN is set to 1 and the OFFSET is set to 0.

For MANUAL scaling the two points are entered directly, as values, in the "Manual Settings" screen area.

4.3.1.2 Linearization

Platinum supports 10-Point Linearization in process input. The 10-point linearization enters up to 10 Reading/Input value pairs, and is used to internally calculate 10 gain/offset parameters. Select combo box on the UI to change point.

Number of Points	0	Manual Live
Point #	Input	Reading
Point #1	100	120
	Capt	ure Input
	U	pdate

4.3.1.3 Live Scaling

For LIVE scaling, the Reading values for point 1 and 2 are directly entered, and the corresponding process input levels are 'captured' from the measured value.

The following steps are recommended:

1. Disable the unit conversion using the Display (Miscellaneous) screen and set unit to IDLE mode (NONE).

Hiscellaneous		
Display Settings		
Decimal Points	FFF.F	•
Units	NONE	•
Display Color	GREEN .	•
Brightness	HIGH 🗖	•
Time Format	MM.SS -	-

2. Set the scaling mode to LIVE and enable the "Capture ENABLE" button. The "Capture Disable value is displayed, and when the function is turned off, the current unscaled input value is displayed.

		rittering	×0 •						
nemocouples	RTD		Thermistors	Process					
ĸ©	Wires		2.25k 🔘	mA 4-20 🔘	Input	Manual Set	tings		
10 70	2 🔘 3 🔘	4 ()	5.0k 🔿	mA 0-24 🔘		Input	Reading		
FO	Type		10k 🔘	10v -/+ 🥥	Manual 🔘	-10.0 🔺	-10.0 🔺		
NO	Type 385, 100	Ohm 🔘		1.0v -/+ 🔘		10.0	10.0		
1.0	Type 385, 500	Ohm 🔿		0.1v -/+ 🔘					
RO	Type 385, 1000	Ohm 🔿				Live Setting Input	s Reading		
sO	Type 392, 100	Ohm 🔘		2	Live 🥥	0	0.0 🚔	Capture Input 1	
вÔ	Type 3916, 100	Ohm 🔘		View Settings		4.456	5.0 🌲	Capture Input 2	
0.0									
						Capture	DISABLE	4.456	

- Adjust the input value that will define data point 1 and click the "Capture Input 1" button. The current input value will be transferred to the Live Settings Input 1 display.
- 4. Type in the corresponding Reading value for data point 1.
- 5. Repeat steps 3 & 4 for the data point 2 values and press Update. The values will be transferred to the unit.
- 6. Press the "Capture Disable" button to re-enable the scaling function.
- 7. Restore, "Refresh" the desired Units.

4.3.2 Auxiliary Input

mA 4-20 🥥	Scale Settings	3
mA 0-24 🔘	Reading	Input
10.0v 🔘	32.0 🚔	4.00
1.0v 🔘	212.0 🚔	24.00 🚔
0		
View Settings		

The Auxiliary Input Configuration screen (also referred to as Remote Setpoint) configures all of the Auxiliary Input parameters.

The radio buttons select different input ranges, while the "View Settings" moves the 'aqua' colored highlight to view each of the different input scaling options without changing the input range.

The input value is shown on the main screen.

4.3.3 Digital Input

		23
0	A V	
0	A W	
D N	¢ Ō	
te	Refr	esh

The Platinum Configurator includes (disabled) parameters, but are not currently offered in the Platinum controller digital input.

The state of the digital input (ON/OFF) is shown on the main screen.

4.3.4 PID Control

PID 1			PID 2		
Bounds		Action	Bounds		Action
Minimum Low (%)	-100.0	Reverse ()	Minimum Low (%)	-100.0 🗮	Reverse 🥥
Maximum High (%)	100.0 🚔	Direct 🔘	Maximum High (%)	100.0 🚔	Direct 🔘
Control Offset (%)	0.0	Reverse/Direct 🔘	Control Offset (%)	0.0	Reverse/Direct 🔘
Deadband (*)	0.0		Deadband (°)	0.0	
Degagana ()				in the second seco	
Relative Cool Gain	1.0 2		Relative Cool Gain Adaptive Control	1.0 🛧	
Adaptive Cool Gain	1.0 🔄		Relative Cool Gain Adaptive Control Tuning	1.0 🛓	
Adaptive Cool Gain Adaptive Control Tuning Proportional Gain (P)	1.0 ÷	Auto Tune	Relative Cool Gain Adaptive Control Tuning Proportional Gain (P)	1.0 * Enable V 1.000 *	Auto Tune
Adaptive Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I)	1.0 Enable V 125.655 31.414	Auto Tune	Relative Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I)	1.0 ★ Enable ♥ 1.000 ★ 0.000 ★	Auto Tune
Adaptive Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I) Derivative Gain (D)	1.0 ÷ Enable V 125.655 ÷ 31.414 ÷ 125.655 ÷	Auto Tune	Relative Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I) Derivative Gain (D)	1.0 ★ 1.00 ★ 1.000 ↓ 0.000 ↓ 0.000 ↓	Auto Tune
Adaptive Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I) Derivative Gain (D) Max Rate (/min)	1.0 ★ 1.0 ★ 125.655 ★ 31.414 ★ 125.655 ★ 28.650 ★	Auto Tune	Relative Cool Gain Adaptive Control Tuning Proportional Gain (P) Integral Gain (I) Derivative Gain (D) Max Rate (/min)	1.0 ★ 1.000 ★ 0.000 ★ 0.000 ★ 0.000 ★	Auto Tune

The PID configuration screen sets the PID control parameters and initiates an Autotune cycle. User can use this dialog to adjust PID parameters for both PID 1 and PID 2.

• If the Auto Tune button is selected the system will start an AUTOTUNE cycle and the status / input value is shown on the main screen. At the completion of the cycle the REFRESH button may be used to review the calculated P, I and D values.

The calculated PID Output power is shown on the main screen. Following an Autotune cycle select the Refresh button to update the new P, I and D parameters.



Before initiating an Autotune cycle, ensure that the appropriate output has been configured for PID control.

4.3.5 Setpoints

Setpoints					
Setpoint 1 Setpoint	80.0	 Absolute Remote Ramp & Soak 	Setpoint 2 Absolute Deviation +/-	32.0 ×	 Absolute Deviation
					Refresh

The Setpoint configuration screen sets the mode for Setpoint 1 and Setpoint 2.

On the Platinum Configurator, the setpoint mode may be easily set. Setpoint 1 mode on the Platinum is set by enabling the Ramp & Soak or Remote Setpoint functions.

Setpoint 2 mode may be set to either Absolute or a Deviation (+/-) from setpoint 1. The value displayed on the pseudo device image of the main screen will be the effective value.

Example: (Setpoint 2 Deviation mode) Setpoint 1 = 100.0 Setpoint 2 Deviation value = 5

Effective Setpoint 2 value = 105

4.3.6 Ramp & Soak

The Platinum controller supports up to 99 Ramp and Soak profiles each supporting up to 8 ramp/soak segments. The ramp and soak profiles may be daisy-chained together using a profile LINKING option.

The Ramp & Soak Control section programs the overall Ramp and Soak control, including enabling the Ramp & Soak mode. Start the profile to use the tracking mode, and a number of segments in each specific profile; and the action to be taken at the end of the profile.

The Profile select control selects which profile data is to be displayed.

The time format is maintained and displayed as hours:minutes:seconds. The time values may be adjusted using the Up/Down scroll buttons or enter the time value manually into the "Ramp Time" field. Note that when entering time values: spaces, commas, and periods or semi-colons are used to separate the hour, minute and second fields. (See Red Box below.)

Manually entered time values will be normalized when entered. For example, 01:63:67 will be converted to 02:04:07. Leading zeros are not required.

Ramp - Soak Control			Seament 1										
R&S Control	NO	•	Ramp Time	05:10:00	RE	v	Setpoint	200.0 🚔	Soak Time	01:30:00	¢ s	E	Update
Start Profile		1	Segment 2	00:40:00		- 🕡	Sotopint	225.0 🍝	Sock Time	00:25:00	^ c	- 7	
Profile			Rainp Time	00.40.00	+ nL	- V	Serbolin	223.0	Soak Hille	00.25.00	- J		Update
Tracking Mode	RAMP	•	Segment 3										
Number of Segments (In Profile)		1	Ramp Time	00:10:00	‡ RE		Setpoint	32.0	Soak Time	00:10:00	¢ s	E	
End of Profile Action	STOP	•	Segment 4										
No Linking		0	Ramp Time	00:10:00	‡ RE		Setpoint	32.0 🌲	Soak Time	00:10:00	¢ s	E	
		Refresh	Segment 5										
			Ramp Time	00:10:00	‡ RE		Setpoint	32.0 🌲	Soak Time	00:10:00	¢ s	E	
			Segment 6										
			Ramp Time	00:10:00	‡ RE		Setpoint	32.0	Soak Time	00:10:00	¢ s	E	
			Segment 7										
			Ramp Time	00:10:00	‡ RE		Setpoint	32.0	Soak Time	00:10:00	\$ S	E	
Profile			Segment 8										
Select Profile 1			Ramp Time	00:10:00	‡ RE		Setpoint	32.0 🌲	Soak Time	00:10:00	÷ s	E	

The RE and SE checkboxes enable the annunciators and outputs based on the Ramp and Soak states.

4.3.7 Annunciators

iator To Configure
4 5 6
•
Refresh

Platinum annunciators appear on the front display and are activated based on the state of the Alarms and Outputs. Total 6 annunciators are supported by the controller. User can select annunciator number to change annunciator mode.

The Platinum Configurator extends the annunciator options to trigger the annunciator based on individual RE.ON or SE.ON states including 'any RAMP' or 'any SOAK' status.

Available Annunciator Modes:

- Disabled Annunciator is disabled
- Alarm1 Annunciator is linked to Alarm1
- Alarm2 Annunciator is linked to Alarm2
- SPST Relay1 Annunciator is linked to SPST Relay1
- DCPulse1 Annunciator is linked to DCPulse1
- Isol DCPulse1 Annunciator is linked to isolated DCPulse 1
- Isol DCPulse2 Annunciator is linked to isolated DCPulse 2
- RE.ON Annunciator is linked to RE.ON state
- SE.ON Annunciator is linked to SE.ON state
- Ramping Annunciator is active when PID control is in ramping stage
- Soaking Annunciator is active when PID control is in soaking stage
- Sensor Error Annunciator is active when sensor is in fault state
- Output Error Annunciator is active when output is in fault state

4.3.8 Alarms

Varm.1	Alarm.2
Alarm Mode	Alarm Mode
Mode ABOVE -	Mode BELOW -
Absolute/Deviation Absolute (©) Deviation From:	Absolute/Deviation Absolute () Deviation From:
SP1 💿 SP2 🔘 C.SPT 🔘	SP1 💿 SP2 🔘 C. SPT 🔘
Alarm Limits Absolute Deviation Low 0.0 $\stackrel{\bullet}{\searrow}$ Low 1.0 $\stackrel{\bullet}{\searrow}$ High 0.0 $\stackrel{\bullet}{\Longrightarrow}$ High 10.0 $\stackrel{\bullet}{\Longrightarrow}$ High-High 0.0 $\stackrel{\bullet}{\clubsuit}$ Enable \checkmark	Alam Limits Absolute Deviation Low 0.0 1 Low 5.0 1 High 0.0 1 High 0.0 1 High-High 0.0 1 Enable 1
Alarm Color No Change () Red () Green () Amber ()	Alam Color No Change () Red () Green () Amber ()
Activation Control	Activation Control
On Delay Off Delay	On Delay Off Delay
0.0	0.3 🔹 0.0 🛎
Output	Output
Activate 🔘 Deactivate 🔘	Activate 🔘 Deactivate 🔘
Power On Behavior	Power On Behavior
Active 🔘 Inactive 🧕	Active 🔘 Inactive 🧕
	Latch Options
Latch Options	
Latch Options No Latching	No Latching 💿 Either Clear 🔘
Latch Options No Latching Bither Clear Hear Remote Clear	No Latching 💿 Either Clear 🔿 Panel Clear 🔿 Remote Clear 🔿

The Platinum controller supports 2 alarm control blocks. The state of each alarm is shown on the main screen. User can change alarm mode and set alarm parameters/options using the alarm dialog.

4.3.9 Outputs

🖳 Outputs					
Output.1 SPST Relay 1 Mode The Value	Output 2 DCPulse 1 Mode OFF Value	Output.3 Analog 1 Mode OFF • Value	Output.4 Isolated DCPulse Mode OFF • Value •	Output.5 Isolated DCPulse Mode PID Value	Output.6 Isolated Analog 1 Mode OFF Value
Output Action Reverse Image: Construction of the second	Output Action Reverse Image: Construction of the process of the proces of the process of the proces of the process of the proces	Output Action Reverse Image: Construct Construction of the options Direct Setpoint Setpoint 2 Image: Construction of the options Deadband 5.0 Deadband 5.0 Digtal Options Cycle Time Output 0.0 Image: Construction of the options Output 0.0 Output 1.00 Image: Construction of the options Output Range 0.10	Output Action Reverse Image: Construction of the options Direct Setpoint Setpoint 2 Deadband 5.0 Digital Options Cycle Time I.0 $\frac{1}{\sqrt{2}}$ Retransmission Scaling Reading Reading Output I.0.0 $\frac{1}{\sqrt{2}}$ - Analog Options Output Range Output Range 0.10	Output Action Reverse Image: Setpoint Setpoint Direct Setpoint Setpoint 2 Direct Digtal Options 5.0 + Cycle Time 1.0 + Retransmission Scaling Reading Retransmission Scaling 0.00 + 100.0 + 1.00 + Output Range 0.10 +	Output Action Reverse On-Off Options Setpoint Setpoint Setpoint 2 Deadband 5.0 ‡ Digital Options Output Oycle Time 1.0 ‡ Retransmission Scaling Reading 0.0 ‡ 1.00 ‡ 100.0 ‡ 1.00 ‡ Analog Options Output Range 0.10 ‡ 1.00 ‡

The Platinum controller supports 6 outputs (future products may expand this capability), and each output configuration may be refreshed or updated independently.

The "Output Mode" selection assigns the output to a specific mode of operation, and defines which parameters apply and enables the corresponding control blocks.

The state of each output is shown on the main screen.

Available outputs modes are:

- OFF output is turned off
- PID output is set to output PID control value
- ON.OFF output is set to On or Off based on set point value
- ALARM1 output is linked to alarm1
- ALARM2 output is linked to alarm2
- RAMP ON output is linked to PID control ramping stage
- SOAK ON output is linked to PID control soaking stage
- PID 2 output is set to output PID 2 control value.
- SENSOR ERROR output is turned on if there is sensor fault
- OPEN LOOP output is set on when the control loop is open



NOTE: that only valid parameters/options for selected mode will be enabled when user switch output mode.

4.3.10 Display, Safety, Excitation

The "Display, Safety and Excitation" control screens have been grouped into one miscellaneous control screen.

Note that several control values, such as Time Format have been grouped within the miscellaneous screen due to common functionality, and may appear in alternate menu positions on the actual device.

Display Settings			Safety Power On Mode		Output Bre	eak Detect			
Decimal Points	FFF.F	-	Po	wer On Resume 🔘	Output	Mode	Enable	Deviation (°)	Timeout (min)
Units	CELCIUS	•	Power On Run 🔘	Power On Wait 🔘	STR1	OFF		10.0	10.0
Display Color	GREEN	-	Oper Run Mode		DC1	OFF		10.0	10.0 👘
Brightness	HIGH	•	Return to Run 🔘	Return to Wait (AN1	OFF		10,0	10.0 *
Time Format	MM.SS	•	Setpoint Limits		IDC1	OFF		10.0 🕂	10.0
			Low Limit	-1000.(🚔	IDC2	PID		10.0 🛖	10.0
		Refresh	High Limit	2000.0	IAN1	OFF		10.0 👙	10.0 ≑
Excitation			Sensor Loop Break						
Voltage	5	•	Break Detect 🔲 Br	eak Timeout 60.0 🚔					
		Refresh	Open Detect	Latch Sensor Error 📝				Latch Outp	ut Error 🔽
			Sensor Status	Output Status	Arte	Rafrach Sta	5 00 B	<u>.</u>	Refreek

Each of the sub-groups may be individually refreshed or updated.

Output break detection could be enable if the output is set to non OFF mode. Once the break detection is enabled, the deviation and timeout parameters will be used for detection. User can turn on latch output error option if he/she wants to has the output error stay on when there is an error occured.

4.3.11 Communications

The Platinum product supports 3 COMM channels: USB, Ethernet and Serial. USB is standard on all products.

Each COMM channel supports either Omega or Modbus protocol. Within the Omega protocol there are a variety of options. Within the Modbus protocol both Modbus RTU and Modbus ASCII formats are supported.

The serial channel supports a variety of data formats and transmission speeds. The configuration options group will be disabled if the module is not supported or is the module that is currently connected.

Note se

The channel used by the Platinum Configurator must be configured for Modbus RTU, Modbus TCP/IP or Modbus ASCII. Following a Factory Default (F.DFT) selection the device will revert to Omega Protocol.

The Serial channel has additional parameters allowing the setting of baud rate, parity, stop and start bits. Changing these values while connected thru a serial channel will result in a loss of communications.

When connecting to the device, if the Platinum Configurator is connected using a USB connection and the USB/MODBUS RTU options are selected the device USB configuration will be automatically reconfigured. For all other connection options the device must be <u>set to match the Platinum Configurator connection</u> options.

USB Comm Options	3	Ethernet Comm Op	tions
Protocol	Modbus Mode	Protocol	Modbus Made
Omega 🔘	ASCII	Omega 🥥	ASCII
Modbus 🥥	RTU 🔍	Modbus 🔘	RTU 🔘
Cont. Record	Mode Terminator	Cont. Record	Mode Termina
Rate 1.0 🗼	Cont 🔘 CR+LF 🔘	Rate 1.0 🛓	Cont CR+LF
Status	Cmd () CR ()	Status	Cmd O CR
Reading V	Field Separator	Reading V	Field Separator
Peak	CR between fields ()	Peak	CR between field:
Vallov 🗆	SPACE between fields 〇	Vellow	SPACE between fields
vaney		valley	
Units	Address 1	Units	Address 1
Serial Comm Optior	Refresh		Ret
and the second	IS		
Protocol	Modbus Mode		
Protocol Omega ()	Modbus Mode ASCII ①	Serial Parameters	
Protocol Omega (a) Modbus (C)	Modbus Mode ASCII () RTU ()	Serial Parameters	
Protocol Omega (a) Modbus (Cont. Record	Modbus Mode ASCII ① RTU ④	Serial Parameters RS485 RS232 •	Â
Protocol Omega (a) Modbus (Cont. Record Rate 1.0 (Cont. Record	Modbus Mode ASCII () RTU () Mode Cont () CR+LF ()	Serial Parameters RS485 RS232 Baud Rate 1920	· .
Protocol Omega (a) Modbus (c) Cont. Record Rate (1.0 (c) Status (c)	Modbus Mode ASCII () RTU () Mode Cont () Cmt () Cmd () Cmd () Cm ()	Serial Parameters RS485 RS232 Baud Rate 1920 Parity ODD	
Protocol Omega (a) Modbus (b) Cont. Record Rate 1.0 (c) Status (c) Reading (7)	Modbus Mode ASCII () RTU () Mode Cont () Cmd () Cmd () Cmd () Field Separator	Serial Parameters RS485 RS232 Baud Rate 1920 Parity 0DD	
Protocol Omega (a) Modbus (b) Cont. Record Rate 1.0 (c) Status (c) Reading (c) Peak (c)	Modbus Mode ASCII () RTU () RTU () Mode Cont () Cmd	Serial Parameters RS485 RS232 Baud Rate Parity Data Bits 7 Bit	
Protocol Omega (a) Modbus (b) Cont. Record Rate 1.0 (c) Status (c) Reading (c) Peak (c) Valley (c)	Modbus Mode ASCII () RTU () RTU () Mode Cont () Creture Creture Creture Creture Creture Creture Creture SPACE between fields ()	Serial Parameters RS485 RS232 Baud Rate 1920 Parity 0DD Data Bits 7 Bit Stop Bits 1 Sto	
Protocol Omega (a) Modbus (c) Cont. Record Rate (1.0 (c) Status (c) Reading (c) Peak (c) Valley (c)	Modbus Mode ASCI () RTU () RTU () Mode Terminator Cont () CR+LF () Cmd () CR () Field Separator CR between fields () SPACE between fields ()	Serial Parameters RS485 RS232 Baud Rate Parity Data Bits Stop Bits 1 Stop	
Protocol Omega (a) Modbus (c) Cont. Record Rate (1.0 (c) Status (c) Status (c) Reading (c) Peak (c) Valley (c) Units (c)	Modbus Mode ASCII () RTU () Mode Cont () Creture Cretu	Serial Parameters RS485 RS232 Baud Rate 1920 Parity 0DD Data Bits 7 Bits Stop Bits 1 Sto	
Protocol Omega (a) Modbus (b) Cont. Record Rate (1.0 (c) Status (c) Reading (c) Peak (c) Valley (c) Units (c)	Modbus Mode ASCII () RTU () Mode Cont () Cmd () CR+LF () Cmd () CR+LF () CR () Freid Separator CR between fields () SPACE between fields () Address 1 ()	Serial Parameters RS485 RS232 Baud Rate Parity Data Bits Stop Bits 1 Stop	

4.4 Controller Configuration

The Configuration screen reviews the current device configuration, order part numbers and versions of the device firmware. The user can upgrade firmware for optional modules.

When the Refresh button is clicked, the current device configuration is read and displayed. Alternate part numbers may be reviewed by selecting different options.



No changes are made to the actual device.

Device ID	FFFFFFA	Configuratio	n: PT8-145-700-C24-EIP	
Version	1.3.0.14			
Bootloader Version	1.1.0.0			
Base Output Version	1.0.0.0			
Smart Output Version	1,5.0.0			
solated Output Version	1.3.0.4		Fa	ctory
Order Options Brand Omega Newport Case Size 1/32 DIN 1/16 DIN 1/8 DIN Power AC DC Primary Display Small Large 6 Char		Model Controller Meter Output Options Base Board Outputs Smart Outputs	er (14-) SPST Relay, DC Pulse (5) Isolated DC Pulse Upgrade Firmware	•
		Isolated Outputs	(776) Isolated DC Pulse, DC Pulse, Analog Upgrade Firmware	•
Second Display Installed		Communications Serial 🔽 Ethern	et 🔽	

4.4.1 Firmware Update

Use the "Update" function to update optional modules. In Configuration interface, click the Update button to bring up firmware update UI. The default selection is "Isolated Output"; and on the top right side is the current device ID and firmware version of selected device. To program the device, click "Program Enable" button to enable function. This button will also select image files in "hex" format, and program the hex file to the device.

Isolated Ouput		Device ID: 00000001	Firmware: 1.3.0.4
Program Brable			
Reset			
Load Address			
Record Size			
Record Type			
Load			
Verify			
Program			
	Display Contents	Refresh	Clear

Isolated Oup	ut		Device ID:	0000001	Firmware	: 1.3.0.4		_
Progra	🧟 Open	s_fr ▶ De	bug	+ 4y	Search Del	nug	1	× ,0
	Organize New folder							0
Load Address		*	Name	1.2		Size		Date
Record Size Record Type	🕌 beta user group 🧑 buildserver	Solated_Analog_Outputs_FR 18 K					18 KB	1/11/
-	🧭 eip 🚯 iseries2							
V	 iseries-pc-sw isolated_analog_outputs_fr 							
Pn	.git							
	.settings							
	o Debug							
	itargetConfigs	1	•	Ш				
	File name: Isolated	_Analog_C)utputs_FR.h	nex 🔻	hex files (*.b	t)	Cancel	•

Once the file is selected, the program process starts and the interface shows the progress of the firmware update.

solated Oup	put	Device ID: 00000001 Firmware: 1.3.0.4
Property Eyester		204400005A152183C14D0000C60C07436A464F4A5F4F085E3FF0F0FF3F90510014343 - F90AD -20442000500042240F9302208000A64835801000022080009248358020007D25358010
	Reset	0099 2044400033258000AA483F80600041243F802000022080008C483F8010000220800086 487A
oad Address	8h0000	204460003F80100002248000AA485F425A1CEF41821C82935E1C28344F4A3F8009001 72469 204480003F80670005243F80400018248000AA4839404000495A79900300062C4949D
Record Size	8h00	24909 2044 5000 100000 100000 5 4 400 74000 EEE 50 0000 EE 10 ED 260 4000 10000 ET 20 7 560
Record Type	šh01	38009D :2044C000D24A1490821CF13D3740008BEE3D4C4A3C8040003D402000B012C05A494
	Load	C699288 :2044E000402CCF0944184F5F4A8F7A8048004C4A4F4944180F5F5F4F41803FF007005 D4FDA
	Venty	204500002A5FB012AC5CC24E5A1C5F425A1CEF41821C4F4944180F5F5F4F41803FF0 0700D6 :204520005F4F2A5F1F835E425A1C0E9FBE214C4A4F4944180F5F5F4F41803FF007005
	Program	D4FB7 204540002A5FB012AC5C4D4C494959021C496A1C4D4D3D500F003E40821CB012285
		Display Contents
		Detect Day Ed

4.5 Graphing

The Graphing option opens a data charting function. Save data to csv file at any time during the graphing.

- The "Graphing" screen provides two line graphs, the upper graph showing process variable/setpoint information, and the lower graph showing the PID control output.
- The "process" graph shows the process value, the process setpoint, which is calculated during Ramp and Soak cycles, Setpoint 1 and Setpoint 2. The associated checkboxes disable the display of any or all of the variables.
- The "control output" graph shows the current PID control parameter that display values between 0 100%.

Disabling all of the variables for a particular graph will cause the graph to be hidden, allowing the second graph to fill the entire graph area.

The X axis shows the sample count. Operating the auto-refresh at 1 second intervals results in the X axis showing 1 second intervals.

Use zoom, pan and fit to view charts. Both charts are synchronized on X axis.

Adjust maximum charting window. It is the max data windows can be shown on the screen.



5 Main Menu Functions

5.1 Configuration Files

Configuration data for a device may be saved or loaded as standard ".txt" files using file formats compatible to those used by the Platinum Controller LOAD/SAVE commands. The Platinum Configurator can reads a previously saved configuration file from a Platinum device on a USB thumb drive or modify the configuration, and then SAVE the updated configuration to a USB Memory stick to be reloaded to the device.

5.1.1 File Options Dialog

The File Options dialog may be opened under the "Tools/Options" or the "File/Options" menu selections.

File Options		×
File LOAD options Configuration Data Tuning Parameters Simulator Parameters Ramp & Soak Profiles 1	File SAVE Options Configuration Data Tuning Parameters Simulator Parameters Ramp & Soak Profiles 1 1 To 99	File Platinum_0001 Date 5/28/2015 Author Joe Hacker Project Platinum Plant Controller Version 1.3
	Y Y	Save as Defaults OK Cancel

- The File Options screen adds additional 'meta data' to the file. This information is retained in the file but is not used by the Platinum device.
- The File name will be updated when the file is SAVED and recovered when the file is LOADED.
- The LOAD and SAVE option blocks select what data is to be transferred from a file.

5.1.2 File LOAD / SAVE

The File LOAD and File SAVE option opens a standard Windows dialog to select a specific file.

Series I	► Sottware ► M	nodbus Monitor Test Data	•	✤ Search Modbus Monitor	
Drganize 🔹 New folder					2
Documents	(*)	Name		Date modified	
Jan Git		Platinum 0001 tyt		1/1/1980 5·02 AM	
🕹 Music		Platinum_0002.txt		3/11/2015 6·54 AM	
S Pictures		Platinum 0003 txt		3/11/2015 7:00 PM	
Juleos		Platinum 0004.txt		3/12/2015 10:14 PM	-
🔏 Homegroup		Platinum 0005.txt		3/15/2015 5:38 PM	
		Platinum_0006.txt		3/20/2015 7:12 PM	
Somputer	H				
💩 OS (C:)					
DVD RW Drive (D:) ZSSC Kitware and	Documenta				
🙀 Vol1 (G:)					
Prive (H:)					
acchangepstfiles (N:)	+	٠ [ا	1		
File name: Platinum_00	04.txt		•	txt files (*.txt)	*
					=

5.1.3 Load Parameters/Save Parameters/Apply

The file load parameters, save parameters and apply functions, apply to offline mode. This set of function is different from the File Load and Save. File load and save creates a shadow copy of the Modbus registers values. Load parameters/save parameters/apply only to records or changed parameters.

Load Parameters - Load previous saved parameters

Save Parameters – Save changed parameters

Apply – Apply parameters to controller

5.2 Tools

5.2.1 Set Connection

The 'Set Connection" function switches to different connections, used for switching connected controllers or switching communication type.

5.2.2 View Transactions

The "View Transactions" option checks the Modbus traffic between the configurator and the connected controller. This function helps to diagnose and troubleshoot the Controller.

🖳 Logs				
Display Transaction		Total Messages 46	Total Errors 0	
Timestamp	Command	Response	Response	
07/01/2016 10:55:57.051	01 03 02 28 00 02 45 BB	01 03 04 3B CC F	01 03 04 3B CC FF C0 76 88	
07/01/2016 10:55:57.052	01 03 05 E0 00 01 85 30	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.053	01 03 02 2D 00 01 15 BB	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.054	01 03 02 30 00 01 85 BD	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.055	01 03 02 31 00 01 D4 7D	01 03 02 00 00 B	8 44	
07/01/2016 10:55:57.056	01 03 02 32 00 01 24 7D	01 03 02 00 00 B	8 44	
07/01/2016 10:55:57.057	01 03 02 33 00 01 75 BD	01 03 02 00 00 B	8 44 ≡	
07/01/2016 10:55:57.058	01 03 02 34 00 01 C4 7C	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.059	01 03 02 35 00 01 95 BC	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.060	01 03 02 1E 00 01 E5 B4	01 03 02 00 00 B	01 03 02 00 00 B8 44	
07/01/2016 10:55:57.061	01 03 02 82 00 01 25 9A	01 03 02 00 00 B8 44		
Auto Lladato 6			v	
Clear Save Transaction Data Close				

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 61 **months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal five (5) **year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

- 1. Purchase Order number under which the product was PURCHASED,
- 2. Model and serial number of the product under warranty, and
- 3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

- 1. Purchase Order number to cover the COST of the repair,
- 2. Model and serial number of the product, and
- 3. Repair instructions and/or specific problems relative to the product.

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- Controllers, Calibrators, Simulators & Pumps
- 🗹 Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Communications-Based Acquisition Systems
- Data Logging Systems
- Wireless Sensors, Transmitters, & Receivers
- Signal Conditioners
- Data Acquisition Software

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