VP Process Inc.

Model: VP-EC-2000-BD Controller

User Manual

Ver: 4.0
July, 2014

VP-EC-2000-BD
Controller

Industrial Process Controls

Gas Detection,

Monitoring & Control

➢ Up to 64 Remote Transmitters

➢ Transmitters can be either Digital (MODBUS RTU), Analog 4-20 mA or Wireless (VP Zigbee Devices)

➢ 8 Control Relays (SPDT 10A) Standard, expandable to 128

➢ MODBUS over TCP/IP (Ethernet) and RS485 Standard

➢ Email on Alarm

➢ Data Logging
Internal 48 Event Datalogger
"Enviro-Cloud" 10 Year Datalogger

➢ MODBUS Port for Remote Transmitters and Relay Units

➢ 2x20 LCD and up to 32 Bi-Colour Alarm Status Leds

➢ Door Mounted Audible Standard

➢ 16 Function Keypad for User Interface

➢ Optional Alarm Strobe (as shown)

➢ Internal Web Server for programming and remote access

➢ "Enviro-Cloud"™ Ready

➢ Optional Zigbee Wireless (802.15.4 ISM 2.4 GHz)

VP-EC-2000-BD Controller

The VP-EC-2000-BD can be used in applications ranging from simple gas detection and ventilation controls to sophisticated temperature monitoring and control with evaporator defrost cycling controls. The heart of the VP-EC-2000-BD is a flash programmable microprocessor and a large catalogue of application software available from VP Process Inc.

Standard features like 2x20 character LCD's, LED alarm indicators, keypad interface, relay outputs, universal power supply with 24 VDC field power, and a comprehensive data communications I/O package gives the VP-EC-2000-BD ultimate flexibility. Scalable accessories such as RS485 enabled transmitters, remote relay output units, analog input units are available. Need to measure a combination of some gas leak detection points, some ambient temperature with a humidity points? No problem. Need to send emails (or SMS messages) on specific alarms? No problem. Need to map out zoning with overlap complete with time delays and preset timers? No problem.

The built in web server gives the user flexibility in custom programming the VP-EC-2000-BD to suit their application . The "Enviro-Cloud" remote secure server gives the user up to 10 years of data retention with graphing and remote programming capabilities. The ALMB Alarm Beacon option provides increased visual alarm indication.

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1. GENERAL SPECIFICATIONS

POWER INPUT	Standard: 88 to 264 VAC Input, 24 VDC 4.5 A Output, Switching Power Suppy (Closed Frame), DIN Rail Mounted Optional: 24 VDC or 12 VDC Power Input - Consult Factory
ENCLOSURE	15.68"L x 11.72" W x 6.29" H (398mm x 297 mm x 159 mm) Plastic, Polycarbonate Ratings: IP65, IP66, NEMA 1,2,4,4X,12,13 Metal Enclosures available as an option, please consult factory
WEIGHT	Approximately 10lbs, depending options and number of IO Modules
LCD DISPLAY	2 line x 20 character LCD display, White Characters on Blue Backlighting
LED DISPLAY	16 LEDS standard, Optional 32 LEDS GREEN = OK AMBER = LOW ALARM AMBER FLASHING = MID ALARM RED = HIGH ALARM RED FLASHING = SENSOR FAULT GREEN FLASHING = OFFLINE FAULT (Sensor not communicating on RS485)
KEYPAD	4 x 4 Matrix Membrane Keypad 0 thru 9, S for SILENCE, . (Decimal), MENU, UP, DOWN, ENTER
RELAY OUTPUTS	Standard: 8 SPDT Relays, 12 Amp Contacts, SPDT, 120 VAC Rating, All contacts have MOV Protection Optional: Model: VP-EC-8KO 8 point Relay Modules (RS-485), Up to 16 modules total, 128 Contacts Mounted externally to the VP-EC-2000-BD
INPUTS	RS-485 Transmitters – Series VP-E-100, VP-TX120, VP-TX200, VP-TX300, Typically up to 64 Transmitters RS-485 Connection via 4 Point Terminal Block
ANALOG INPUTS	Optional: Model VP-EC-8AI 8 channel 4-20 mA Input Modules, Up to 8 modules, 64 Analog 4 - 20 mA Inputs Each analog input either 24 or 12 VDC field power, 12 bit A/D resolution
AUDIBLE	Audible driver will operate any 24 VDC audible device Audible Buzzer (90db) mounted on door (Factory Installed) Typically, Relay output K1 is used to operate remote Audible/Siren (-ALMB Alarm Beacon Option)and is acknowledged with the Silence keypad switch
REAL TIME CLOCK	Standard, with built in Battery Backup (CR123 Lithium Battery)
NETWORK CONNECTION	Standard: 10/100Base-T Ethernet RJ45 Connector VP Process Web Server standard, Optional "Enviro-Cloud"™ Connection
MODBUS	Standard: Modbus RS485 on Remote RS485 Port

PART NUMBER: VP-EC-2000-BD-8KO-120VAC   Basic Controller with 8 Relays

OPTIONS:
- -8AI   Analog Inputs
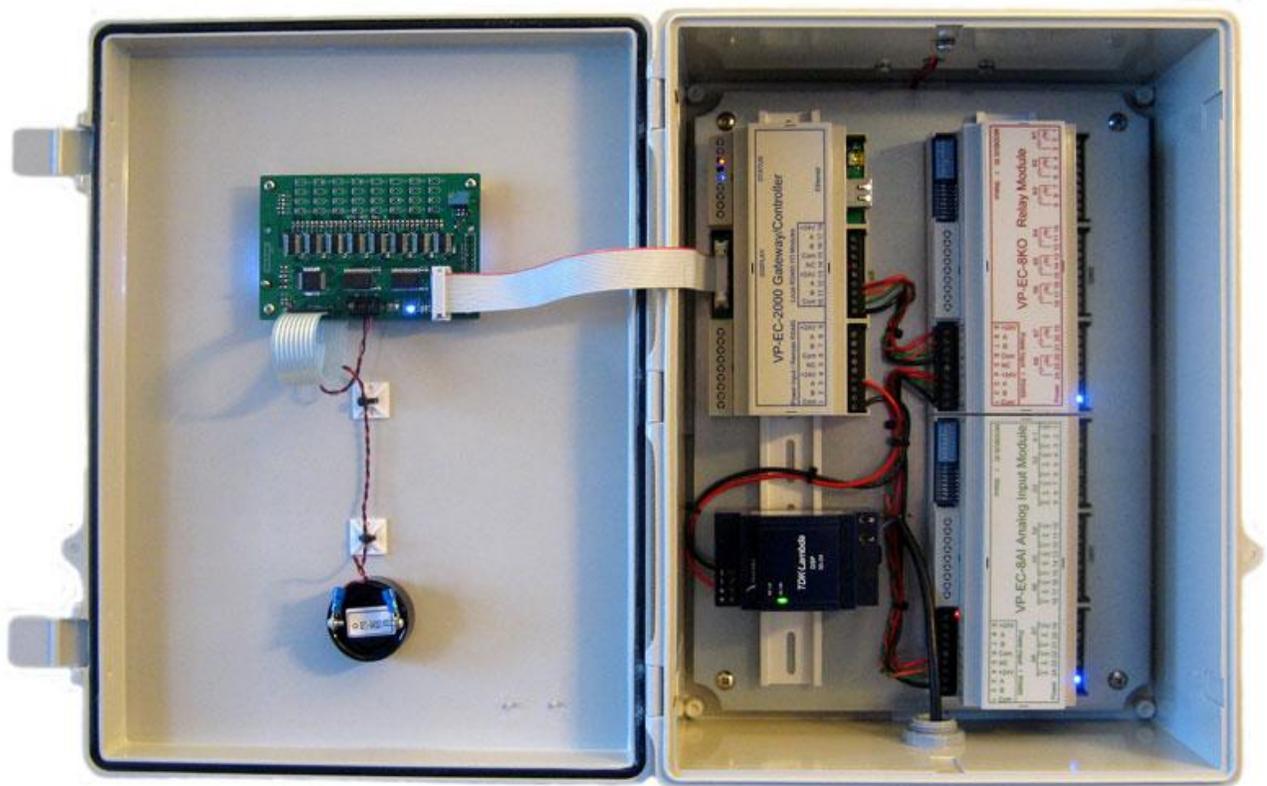- -ALMB   Alarm Beacon
- -24VDC   Prime Power = 24 VDC

Other options available, please consult the factory with your requirement and application.

2.   GENERAL DESCRIPTION AND FEATURES

The VP-EC-2000-BD is a control system designed with 6 key components:

1.	VP-EC-2000	Gateway / Controller	(Blue DIN Enclosure)
2.	VP-EC-8KO	8 Point Relay Module	(Red DIN Enclosure)
3.	VP-EC-8AI	8 Point Analog Input Module	(Green DIN Enclosure)
4.	Power Supply	88-240VAC to 24 VDC	(Dark Blue DIN Enclosure)
5.	VP-EC-2000	User Interface Unit	(PCB mounted on the door)
6.	VP-WEB-Server	Web Based User Interface for display, programming, data logging, Email Alerts, "Enviro-Cloud" secure server, etc.	

INTERNAL VIEW (Typical Controller)

VP-EC-2000-BD-8KO-8AI-120VAC-ALMB

Controller as shown: 8 Relay Ouputs
                        8 Analog (4-20mA) Inputs
                        88-240VAC Input Power Supply, 24 VDC 4.5A Output
                        Alarm Beacon Option (-ALMB)

3.   CONTROLLER MODULE

The VP-EC-2000 Gateway/Controller is the heart of the system. This unit contains the main processor and firmware, Ethernet port and RS485 Ports. The optional Zigbee Coordinator module is also contained in this module.

Power Input / Remote RS485: This is the RS485 for remote MODBUS applications where the VP-EC-2000-BD is required to communicate with building management systems, the remote VP-EC-REMLED remote display unit, etc. Standard MODBUS RTU protocols are observed, the communication protocol is 9600 BAUD, N81, and the FUNCTION commands implemented are FUNCTION "03", Read Holding Registers.

Prime Power (24VDC) is applied to the COM and +24VDC terminals to power the system. Typically supplied from the internal power supply.

Local RS485 I/O Modules: This the RS485 Port for digital transmitters, relay units, analog units, and other RS485 modules. Standard MODBUS RTU protocols are observed, the communication protocol is 9600 BAUD, N81.

Ethernet: Standard 10/100 Base-T Ethernet Port. Standard feature include MODBUS over TCP/IP, and the VP-WEB-SERVER. DCHP and programmable STATIC IP addressing.

Status Indicators: Power, Status LEDs, Zigbee Rx/Tx Indicators.

Display: 16 pin ribbon cable connection for the User Interface Module.

NOTE: The USB connection shown in the picture is used for factory setup and programming only and may not be present on some units
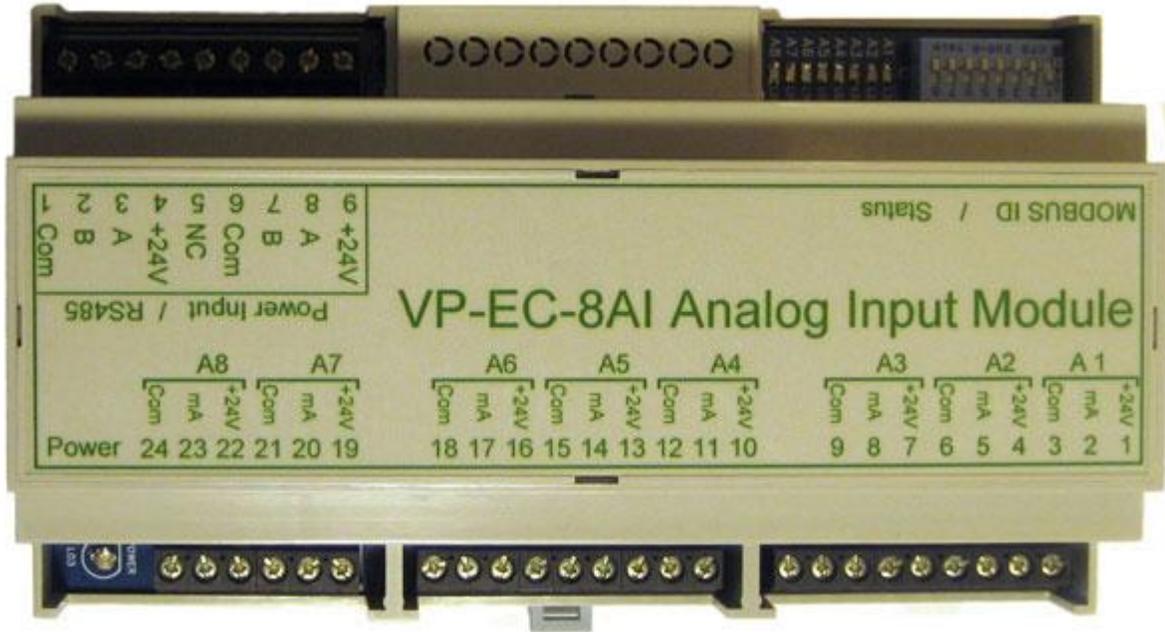
4.   RELAY MODULE

SPECIFICATIONS

POWER INPUT: 24 VDC

ENCLOSURE: DIN Rail, Plastic, ABS/PC Blend
                         6.280" L x 3.551" W x 2.264" (159.51mm x 90.20mm x 57.51mm)

RELAY OUTPUTS: 8 SPDT 10 A 120 VAC Rating

PROTECTION: Varistor across each contact

MODBUS ID: Dipswitch selectable from 1 thru 253

STATUS INDICATORS: Blue Power LED
                         8 Relays Status RED LEDs, LED ON when relay is energized

RS485:   Dual terminal block connections
                         9600 BAUD, N81
                         MODBUS RTU Protocol
   MODBUS Commands:

FUNCTION	DESCRIPTION
01	Read Coils
05	Write Single Coil
15	Write Multiple Coils

5.   ANALOG INPUT MODULE

SPECIFICATIONS

POWER INPUT: 24 VDC

ENCLOSURE: DIN Rail, Plastic, ABS/PC Blend
                              6.280" L x 3.551" W x 2.264" (159.51mm x 90.20mm x 57.51mm)

ANALOG INPUTS: 8 x 4 - 20 mA input 150 Ohm Load

PROTECTION: Each Input 50 MA PTC Fuse

MODBUS ID: Dipswitch selectable from 1 thru 253

STATUS INDICATORS: Blue Power LED
                              8 Analog Status GREEN LEDs,   LED ON when analog input > 2 mA.

RS485:   Dual terminal block connections
                              9600 BAUD, N81
                              MODBUS RTU Protocol
                              MODBUS Commands:

FUNCTION	DESCRIPTION
03	Read Holding Registers
04	Read Input Registers
06	Write Single Register
16	Write Multiple Registers

6.   USER INTERFACE / MENU STRUCTURE

FRONT VIEW
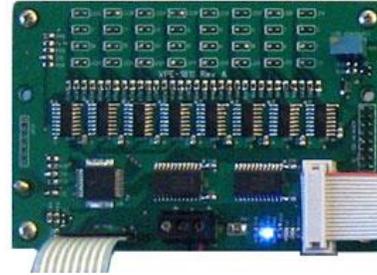
REAR VIEW

SPECIFICATIONS:

POWER: 5 VDC / 3.3 VDC

LCD: 2 Line x 20 Character, white on blue backlighting
                        Contrast Adjustment Potentiometer

LED: 32 RED/AMBER/GREEN Rectangular LED

KEYPAD: 16 (4 x 4 Matrix) Keypad
                        Overall Dimensions: 7.5" L x 4.5" W (190.5mm x 114.3mm)

AUDIBLE DRIVER: 24 VDC drive, common switched output.

INTERFACE: 56K BAUD direct serial interface to main VP-EC-2000 Gateway/Controller
                        16 Pin Ribbon Cable

MENU STRUCTURES

The user interface consists of a 20 Character by 2 line backlit LCD and 4 by 4 matrix keypad for data entry.

The Menu Structure is divided into two sections: the Main Menu for indication purposes, and the Programming Menu for user programming of different variables.

NOTE: Because the VP-EC-2000-BD has many features, the User Interface via the Keypad and Menu items is limited to a few basic items. The major programming is done via the VP-WEB-SERVER and the VP-EC-2000-BD internal web pages.

The keypad has five functions keys [MENU], [UP], [DOWN], [ENTER] and [SILENCE], There are 10 digit keys 0 thru 9 for data entry and a [.] decimal point key.

Pressing the [SILENCE] key will clear the current audible alarm

Pressing the [UP] or [DOWN] key will show up to 12 different screens. Each press of the UP key will advance the screen to a new display. If no pushbutton activity is detected for 60 seconds, the LCD display will automatically revert back to the first display.

The LEDs can be programmed for an individual sensor ID (default) or b y ZONE. The LED status indications are as follows:

STATUS	LED COLOUR	DESCRIPTION
OK	GREEN	Sensor is reading within Range
OFFLINE	GREEN FLASHING	Sensor has lost RS485 communication with the controller
CAUTION	AMBER	Low Alarm
WARNING	AMBER FLASHING	Mid Alarm
CRITICAL	RED	High Alarm
FAULT	RED FLASHING	Sensor Fault Alarms

MAIN MENU DISPLAY SCREENS

The following is a brief description of the different Main Menu display screens.

DISPLAY 1:	DEFAULT MAIN LCD SCREEN

DISPLAY 1:	ID	1	0	PPM	CO
	ZN	1	OK		

where:	ID,1	is the Sensor Point Number 1 thru 32 for a 32 channel system
	0,PPM, CO	is the Sensor Reading, Units and Sensor Type
	ZN, 1	is the Sensor Zone Number
	OK	is the Current Sensor Alarm Status

If no devices (transmitters or IO modules) are programmed or enabled, the main display will show:

DISPLAY 1:	No Devices Enabled	DEFAULT MAIN LCD SCREEN

DISPLAY 2:	TEMPERATURE / RELATIVE HUMIDITY SCREEN

DISPLAY 2:	ID	1	25.0	°C
	ZN	1	40.0	%RH

where:	ID,1	is the Sensor Point Number 1 thru 32 for a 32 channel system
	25.0, °C	is the Temperature Reading in °C
	ZN, 1	is the Sensor Zone Number
	40.0,%RH	is the Relative Humidity in %RH

If the device does not have a Relative Humidity sensor installed, the display will show:

DISPLAY 2:	ID	1	25.0	°C
	ZN	1		

where:	ID,1	is the Sensor Point Number 1 thru 32 for a 32 channel system
	25.0, °C	is the Temperature Reading in °C
	ZN, 1	is the Sensor Zone Number

If no devices (transmitters or IO modules) are programmed or enabled, the main display will show:

DISPLAY 2:	No Devices Enabled	DEFAULT MAIN LCD SCREEN

MAIN MENU DISPLAY SCREENS (cont'd)

DISPLAY 3:	NETWORK IP ADDRESS

DISPLAY 3:	**Network IP Address** **192.168.0.110**

where: 192.168.0.110 is the current IP address, DCHP or STATIC

DISPLAY 4:	CONTROLLER SERIAL NUMBER

DISPLAY 4:	**Serial Number** **02.78.E9.75.96**

where: 02.78.E9.75.96 is the Controller's Serial Number.
              This number is a partial representation of the Controller's MAC address and
              product code, and is used for "Enviro-Cloud' server registration and identification.

DISPLAY 6:	DATE AND TIME

DISPLAY 6:	**DATE / TIME** **2014-01-01 16:00**

where: 2014-01-01 is the date in Year-Month-Day format
              16:00 it eh time in 24 hour HH:MM format

DISPLAY 7:	CONTROLLER FIRMWARE VERSION NUMBER

DISPLAY 7:	**VP-EC-2000** **Version 4.1.0**

where: VP-EC-2000 is the Controller Name (Programmable from the VP-WEB-SERVER
              Version 4.1.0 is the operating system software version.

END OF MAIN MENU DISPLAY SCREENS

PROGRAM MENU DISPLAY SCREENS

PROGRAM MENU STRUCTURE

The programming will be described in detail in this section. The [MENU], [UP], [DOWN] and [ENTER] keys are used in this section to show program direction and operation. To enter the programming mode, press [MENU].

Depending if there is a Password the entry into the PROGRAM MENU structure may ask for a four digit Password. The default is Password = 0, and pressing [MENU] will take the user directly into the PROGRAM MENU structures. For the purpose of this manual, the Password is assumed to be programmed as 1234.

NOTE: If variables in the MENU structure are changed, they are automatically saved to the system FLASH memory.

Please Note: Because of the flexibility and extended feature set of the VP-EC-2000-BD, there are a limited number of parameters that can be programmed from the User Interface. For complete access to all program features of the VP-EC-2000-BD, please access the controller thru a network connection (or cross-over cable direct to a PC running any web browser), and enter the IP address number into the web address bar.

SCREEN	KEYPRESS	LCD DISPLAY	ACTION	DESCRIPTION

If there is no Password saved, ie Password = 0, then the first PROGRAM MENU SCREEN will be:

| SCREEN 1 | [MENU] | ** MAIN MENU **
 Use Arrow Keys | | First Menu display. Pressing [MENU] again will exit the programming mode, |
| | | | [ENTER] | |

If the Password is greater 0 and less than 9999, then the first PROGRAM MENU SCREEN will be:

SCREEN 1	[MENU]	Password Protected Press E to Continue		First Menu display. Pressing [MENU] again will exit the programming mode,
			[ENTER]	
		Enter Four Digit PassCode = 0		
				Enter 4 Digits 1234
			[ENTER]	

PROGRAM MENU STRUCTURE (Cont'd)

SCREEN	KEYPRESS	LCD DISPLAY	ACTION	DESCRIPTION
SCREEN 2	[UP] [DOWN]	**Display/Edit** **System Password**		**SYSTEM PASSWORD**
			[ENTER]	Enter Program Mode
		Old Password = 1234 **New Password = 0000**		Enter New Four Digit Password OR 0 for no Password
			[ENTER]	
SCREEN 3	[UP] [DOWN]	**Set Date and Time** **2010/04/01 24:59**		**SET DATE/TIME**
			[ENTER]	Enter Program Mode
		Current Year = 2014 **New Year = xxxx**		where xxxx = Year entered
			[ENTER]	
		Current Month = 01 **New Month = xx**		where xx = Month entered
			[ENTER]	
		Current Day = 01 **New Day = xx**		where xx = Day entered
			[ENTER]	
		Current Hour =16 **New Hour = xx**		where xx = Hour entered
			[ENTER]	
		Current Minute = 00 **New Day = xx**		where xx = Minute entered
			[ENTER]	

Note: There are guards to prevent incorrect values from being entered, if an incorrect value is entered, the following display will be shown:

Value Out Of Range
Try Again

[ENTER]

PROGRAM MENU STRUCTURE (Cont'd)

SCREEN	KEYPRESS	LCD DISPLAY	ACTION	DESCRIPTION
SCREEN 4	[UP] [DOWN]	**Display/Edit Setpoints**		**ALARM SETPOINTS**
			[ENTER]	Enter Program Mode
		Select Sensor Type x CO		where x is the sensor type number from 1 thru 15
			[UP] [DOWN] [ENTER]	Scroll thru sensor types to select Enter Program Mode
		Select Alarm xxxx		where xxx is the Alarm Type: - High Critical - High Warning - High Caution - Low Caution - Low Warning - Low Critical
			[UP] [DOWN] [ENTER]	Scroll thru sensor types to select Enter Program Mode
		Current SP = xxx New SP = yyy		where xxx is the Current Alarm where yyy is the New Alarm
			[ENTER]	Enter Program Mode
		All Done Saved to Flash		
			[ENTER]	Return to PROGRAM MENU

PROGRAM MENU STRUCTURE (Cont'd)

SCREEN	KEYPRESS	LCD DISPLAY	ACTION	DESCRIPTION
SCREEN 5	[UP] [DOWN]	**Enabled Sensors Total = 4**		**TOTAL NO. ACTIVE SENSORS**
			[ENTER]	Return to PROGRAM MENU
				NOTE: This is a read only function.
SCREEN 6	[UP] [DOWN]	**Display Scan Start = 1**		**SENSOR SCAN START**
			[ENTER]	Enter Program Mode
		Current Start = xxx New Value = yyy		where xxx is the Current Scan Start Number where yyy is the New Scan Start Number
			[ENTER]	Return to PROGRAM MENU
SCREEN 7	[UP] [DOWN]	**Display Scan Stop = 4**		**SENSOR SCAN STOP**
		Current Stop = xxx New Value = yyy		where xxx is the Current Scan Stop Number where yyy is the New Scan Stop Number
			[ENTER]	Return to PROGRAM MENU

PROGRAM MENU STRUCTURE (Cont'd)

SCREEN	KEYPRESS	LCD DISPLAY	ACTION	DESCRIPTION
SCREEN 8	[UP] [DOWN]	**Controller ID** **MODBUS ID = 100**		**CONTROLLER MODBUS ID**
			[ENTER]	Enter Program Mode
		Current ID = xxx **New ID = yyy**		where xxx is the Current MODBUS ID Number where yyy is the New MODBUS ID Number
			[ENTER]	Return to PROGRAM MENU

END OF PROGRAM MENU STRUCTURES

7.   RS485 AND MODBUS

MASTER – SLAVE:
Only master can initiate transaction. The sensor is a slave and will never initiate communication. The host system initiates transactions to read GAS value from the corresponding register. The host system shall also check status of the sensor periodically (say every 2 sec) in order to determine if it is running without faults detected.

PACKET IDENTIFICATION:
Any message (packet) starts with a silent interval of 3.5 characters. Another silent interval of 3.5 characters marks message end. Silence interval between characters in the message needs to be kept less than 1.5 characters. Both intervals are from the end of Stop-bit of previous byte to the beginning of the Start-bit of the next byte.

PACKET LENGTH:
According to the Modbus specification, the packet length shall be maximum 253 bytes including address and CRC. Maximum length of packet (serial line PDU including address byte and 2 bytes CRC) supported by the sensor is 28 bytes. Packets of larger size are rejected without any answer from sensor even if the packet was addressed to the sensor.

MODBUS DATA MODEL:
There are 4 primary data tables (addressable registers):
• Discrete Input (read only bit).   (Not Implemented)
• Coil (read / write bit).   (Not Implemented)
• Input register (read only 16 bit word, interpretation is up to the application).   (Not Implemented)
• Holding register (read / write 16 bit word).   MODBUS FUNCTION 3
Note: The sensor does not support bitwise access of registers.

EXCEPTION RESPONSES:
Slave will send answer to the master only in the case of valid message structure.
Nevertheless, it can send exception response because of detection of:
• Invalid function code.
• Invalid data address (requested register doesn't exist in given device).
• Invalid data.
• Error in execution of requested function.

RTU transmission mode is the only mode supported by the VP-EC-2000-BD Controller

DEFAULT CONFIGURATION:

- 8 - bit binary
- 1 start bit
- 8 data bits, least significant bit first
- NO Parity
- 1 Stop bit

BAUD RATE: 9600 BAUD

The following HOLDING REGISTERS can be accessed either from the Remote RS485 Port or the TCP/IP (Ethernet) port using standard MODBUS protocol.

8.   HOLDING REGISTERS

HOLDING REGISTERS		FUNCTION "03"
REGISTER	**FUNCTION**	**DESCRIPTION**

Read Only Registers

Dec	Hex		
00	0x0000	Not Used	Not Used
01	0x0001	ID 1 Gas Reading	Real Time Gas Reading x Scaler
"	"	"	"
64	0x0040	ID 64 Gas Reading	Real Time Gas Reading x Scaler

65	0x0041	ID 1 Gas Type	Type = 1 thru 15
"	"	"	"
128	0x0080	ID 64 Gas Type	Type = 1 thru 15

129	0x0081	ID 1 Temperature	°C Reading x Scaler
"	"	"	"
192	0x00C0	ID 64 Temperature	°C Reading x Scaler

193	0x00C1	ID 1 Temperature	°C Reading x Scaler
"	"	"	"
256	0x0100	ID 64 Temperature	°C Reading x Scaler

HOLDING REGISTERS   FUNCTION "03"

REGISTER	FUNCTION	DESCRIPTION

REGISTER	FUNCTION		DESCRIPTION
257	0x0101	ID 1 Status	
"	"	"	
320	0x0140	ID 64 Status	Where:

Status   Description
0x0000 OK
0x0001 NOT INITIALIZED
0x0002 LOW CAUTION
0x0003 LOW WARNING
0x0004 LOW CRITICAL
0x0005 HIGH CAUTION
0x0006 HIGH WARNING
0x0007 HIGH CRITICAL
0x0008 FAULT
0x0009 OFFLINE

REGISTER	FUNCTION	FUNCTION	DESCRIPTION
321	0x0141	Gas Reading Scaler	Typically this value is set to 100 100 PPM would read 10000
322	0x0142	°C Reading Scaler	Typically this value is set to 100 25.0 °C would read 2500
323	0x0143	%RH Reading Scaler	Typically this value is set to 100 40.0 %RH would read 4000
324	0x0144	Product Serial Number	HIGH byte of the serial number ie: if the serial number = 02.78.E9.75.96 Holding Register # 324 = 0x78E9
325	0x0145	Product Serial Number	LOW byte of the serial number ie: if the serial number = 02.78.E9.75.96 Holding Register # 325 = 0x7596

END OF HOLDING REGISTERS

9.   WEB SERVER / INTERFACE / PROGRAMMING

The VP-EC-2000-BD offers the user a complete programming package that is available from the built in web server. We call this the VP-WEB-SERVER. To access the interface, the VP-EC-2000-BD should be plugged into a network with the Ethernet connection. The default Network configuration for the controller is DCHP and on power up, the controller should be assigned an IP address from the network router. If this is not the case, please contact your IT department for assistance.

In those cases where a network is not available, the VP-EC-2000-BD can be connected directly to a PC (desktop or laptop) using a crossover cable. Configure the network connection on the PC as a router.

the IP address is available from the VP-EC-2000-BD main display screen (Display SCREEN 3). Using any web browser (The VP-EC-2000-BD has been optimized to run under FIREFOX), type in the IP address in the web browser address bar, hit enter, and the VP-EC-2000-BD will come to life!

The BP-WEB-SERVER has been organized into four main sections which can be accessed via the buttons just below the main banner.

The four sections are:

> **LATEST PAGE**   Shows the current status and reading of the transmsitters
>
> **SETTINGS PAGE**   The main programming section for the VP-EC-2000-BD
>
> **DATA LOG PAGE**   The Data logger
>
> **CONTACT PAGE**   Where to contact VP PROCESS INC.

Every Page is accessible from any page with the correct LOG IN credentials.

The LATEST PAGE , DATA LOG PAGE and CONTACT PAGE is freely accessible by anyone visiting the IP address. The Settings page where all programming is done can only be accessed with a Username and Password: The defaults are:

> USERNAME: admin
>
> PASSWORD: admin

The password is case sensitive. The USERNAME and PASSWORD can be changed and reprogrammed from the settings page. Please note: the web access PASSWORD is different from the 4 digit access PASSWORD found in the PROGRAM MENU STRUCTURE section of this manual.

The following examples were based on the VP-EC-2000-EC having 4 Digital Transmitters, CO Gas, with Temperature and Humidity Sensors.

LATEST PAGE

Shows the most recent (latest) data associated with each Device. This page has two display modes. The initial display mode is the compact, or short, display which shows the Device's ID, Name, current Status and the primary sensors Reading.

The second display mode is the extended, or long, display which adds the Temperature , Relative Humidity, Battery, Last Update, Pulse, and Signal (Stregnth) columns to the compact display. Toggle between these display modes using the ▶ and ◀ symbols at the bottom, right corner of the table.

LATEST PAGE COLUMNS

ID: The numeric identifier for the Device. Used in the SCAN START and STOP functions

Name: **T**he configured name for the Device. The controller and each transmitter device can be programmed with a unique name.

Status: The current state of the Device, which is the highest Alarm state of its sensors. See Status Table below for examples.

Reading: The current reading with unit and abbreviation of the Devices primary Gas Sensor. See Status Table below for examples. The label of this column can be modified under General Settings

Temperature: Most Devices (non-analog transmitters) have a Temperature sensor in addition to the primary Gas Sensor. This column shows the current reading and the unit configured.

Humidity: Some Devices (non-analog transmitters) have a Relative Humidity sensor in addition to the primary Gas Sensor and Temperature Sensor. This column shows the current reading and the unit configured.

Battery: Wireless Devices are battery operated and this column shows the current voltage of the batteries.

Last Update: For wireless Devices this is the amount of time since the Controller last received data from the Device. For all other types (Controller, Digital and Analog) this is the amount of time since the Controller last logged (local and remote) the Devices data.

Pulse: For wireless Devices this is the amount of time the Controller expects to wait for new data to arrive from the Device. For all other types (Controller, Digital and Analog) this is the amount of time the Controller will wait until the next time it logs (local and remote) the Devices data. This value is set based the Devices Pulse times and its current state.

Signal: The signal strength of the last received transmission of a wireless Device. Measured in dBm the range for this value starts at -26 dBm (very strong) to -94 dBm (very weak). This is exclusively used with wireless Devices.

STATUS TABLE

The following table shows the possible states, what will be displayed for the Device's Status and what will be displayed for the each sensor (primary, Temperature and Battery). The Battery sensor is used to exemplify Low Alarms and the CO primary sensor is used to exemplify the other states. The sensors unit and the abbreviation are shown with the primary Gas Sensor the unit is show with the Temperature and Battery sensors.

Possible States	Device Status	Sensor Status
Initialized (No Alarm)	INIT	-
OK (No Alarm)	OK	0 PPM (CO)
Low Caution	LOW CAUTION	2.60 V
Low Warning	LOW WARNING	2.55 V
Low Critical	LOW CRITICAL	2.50 V
High Caution	HIGH CAUTION	35 PPM (CO)
High Warning	HIGH WARNING	50 PPM (CO)
High Critical	HIGH CRITICAL	100 PPM (CO)
Fault	FAULT	FLT
Offline	OFFLINE	-

ENTERING SETUP PAGES

To enter the SETUP PAGE, press the SETTINGS button, and the following Authentication Pop-Up will appear.
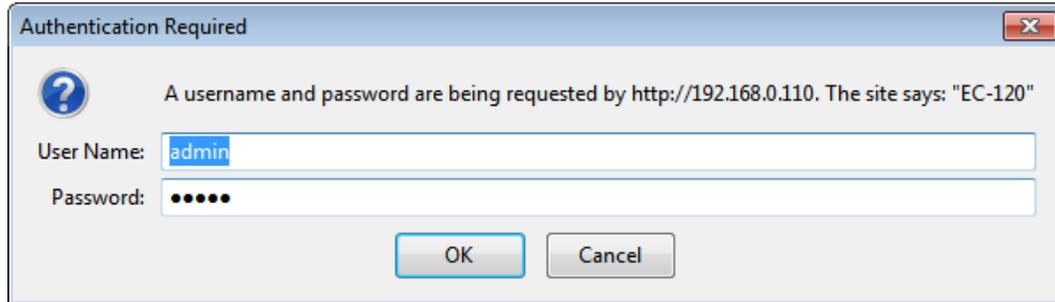
The default PASSWORD from the factory is "admin" , case sensitive.

SETTINGS PAGE - DEVICES

The SETTINGS PAGE when opened defaults to the DEVICES side bar button.

The programming is divided in to DEVICES and SENSORS, since a device can have more than one sensor. For example, the VP-TX300-CO-T has a CO Gas Sensor and a Temperature Sensor, the VP-TX120-NH3-RH has a NH3 Gas Sensor, a Temperature Sensor and a Relative Humidity Sensor. Therefore, we tend to define transmitters as DEVICES and the individual sensor elements as SENSORS.

EDIT DEVICE: This drop down menu shows what devices (Transmitters) are already programmed, and this is the part where new devices (Transmitters) are added.

ID = 0: The VP-EC-2000-BD always has and ID = 0 since it is the Master.

SERIAL NUMBER: The Serial Number is a combination of the Product Code and MAC Address of the Processor module and cannot be programmed.

NAME: This is a programmable Tag that can be used to identify the VP-EC-2000-BD and the attached Devices in a unique manner.

ENABLED: This drop down menu is used to enable or disable devices. (On or Off0
The VP-EC-2000-BD cannot be turned off.

CURRENT DEVICES: This is a list of devices that are currently programmed into the VP-EC-2000-BD

ADDING OR MODIFYING A SENSOR

There are three types of devices that can be added to t he VP-EC-2000-BD at the same time, Wireless, Digital and Analog. After Each change or addition and the User is satisfied, the SAVE Button must be pressed to save the changes and additions to the VP-EC-2000-BD. If not to be saved or to cancel any additions or changes, select a different page without pressing the SAVE button.

WIRELESS: Wireless transmitters such as the VP-TX190 dual temperature transmitters, the VP-MRM wireless H2S transmitter, et. This setting will ask for the following information found on the transmitter itself:

        ID: Device Number from 1 thru 32
        Serial Number: From the wireless transmitter
        Sensor Type: 1 thru 15 from the drop down menu
        Name: Unique name, User defined
        Enabled: On or Off

DIGITAL: Digital transmitters such as the VP-TX120, VP-TX200, VP-TX300

        ID: Device Number from 1 thru 32
        MODBUS ID: MODBUS ID Number for the RS485 Network
        Sensor Type: 1 thru 15 from the drop down menu
        Name: Unique name, User defined
        Enabled: On or Off

ADDING OR MODIFYING A SENSOR (Cont'd)

ANALOG: Analog transmitters such as the VP-TX120, VP-TX200, VP-TX300

ID: Device Number from 1 thru 32
MODBUS ID: MODBUS ID Number for the RS485 Network for the 8
                  channel Analog Module (VP-EC-8AI)

Sensor Number: 1 thru 8, each Analog Module has 8 sensor inputs
Sensor Type: 1 thru 15 from the drop down menu
Name: Unique name, User defined
Enabled: On or Off

SELECT A DEVICE TYPE:

WE SELECT A DIGITAL TRANSMITTER:

SETTINGS PAGE - SENSORS
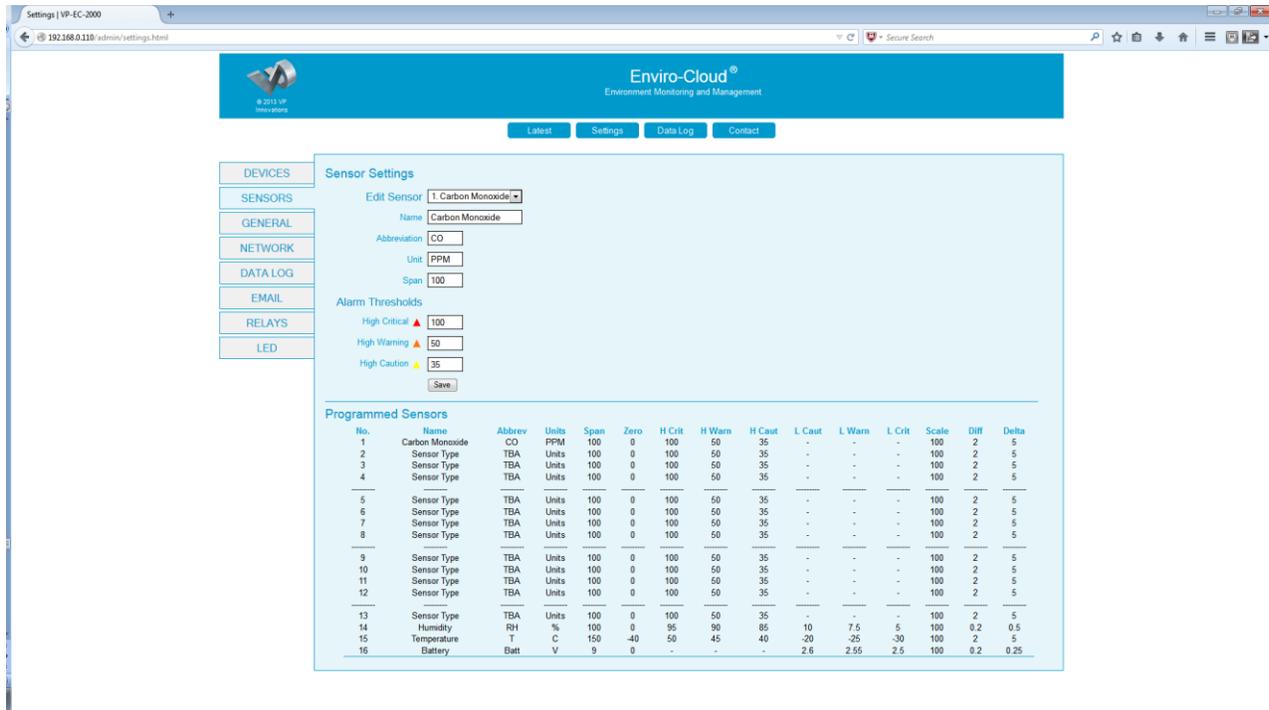
There are 15 programmable SENSOR Types. The last three are defaulted to Humidity, Temperature and Battery Voltage, the other 12 are fully User Programmable.

EDIT SENSOR: This drop down menu selects with sensor is to be edited.

NAME: This is the long NAME for the sensor type, such as "Carbon Monoxide"

ABBREVIATION: This would be the short name (ie: Chemical Formula) for the Sensor, such as "CO"

UNIT: The Sensor Units of Measure

SPAN: Full Scale Range of the Sensor

ALARM THRESHOLDS

HIGH CRITICAL: High Critical Alarm Threshold (Setpoint)

HIGH WARNING: High Warning Alarm Threshold (Usually between CAUTION and CRITICAL)

HIGH CAUTION: High Caution Alarm Threshold

SETTINGS PAGE - SENSORS (ADVANCED OPTIONS)

If the advanced option is selected from the SETTINGS GENERAL PAGE, and the ADVANCED BUTTON is pressed, the extra program features will be enabled:

DIFFERENTIAL: Deadband setting between going into and out of alarm

DELTA: Primarily used for WIRELESS transmitters, this value will determine the next transmission (or Data Log Point) if the Delta (Absolute value) exceeds the last baseline value stored.

ZERO: Most sensors start reading from 0 Value, if not, then this is where the Zero Value will be entered.

SCALE: Determines the SCALE factor for the readings. For example, all VP-TX transmitter sensor values are scaled by 100, so a reading of say 23.43 °C is stored as a value of 23.43 x 100 = 2343

DECIMAL POINTS: Number of Decimal Points to be shown on the displays.

SETTINGS PAGE - SENSORS (ADVANCED OPTIONS) (Cont'd)

THRESHOLD ENABLING

HIGH: Enables the HIGH CRITICAL, WARNING and CAUTION Thresholds

WARNING: Some applications do not require three levels of alarms, if the WARNING is turned off, then only the CAUTION and CRITICAL Alarms will be active.

LOW: Some sensors (such as Temperature, Humidity, Oxygen (O2)) require LOW alarms, where this setting would be turned on.

ALARM LATCHING   There are two alarm acknowledgement types:

                             Self Acknowledge   ie: NON - LATCHING (default setting)

                             User Acknowledge   ie: LATCHING - required a User to Acknowledge the Alarm

                             Each of the Alarm Types (CRITICAL, WARNING and CAUTION) can be programmed to be either User or Self Acknowledged

PROGRAMMED SENSORS:

                             This is a list of the programmed sensors in the VP-EC-2000-BD along with all the programmed variables

SETTINGS PAGE - GENERAL

This GENERAL PAGE is where various application variable are stored and programmed.

UPDATE FROM COMPUTER   As long as the VP-EC-2000-BD is connected to a network and the internet, pressing this button will automatically set the date and time to the local time zone date and time.

WEB USER: Program a new Authentication User Name

WEB PASSWORD: Program a new Authentication Password (Case Sensitive)

!!!! CAUTION !!!   **Programming a new WEB USER NAME and PASSWORD cannot be retrieved if forgotten - Please store the new name and password in a safe place !!**

SETTINGS PAGE - GENERAL (Cont'd)

CONTROLLER PASSWORD: This is the 4 digit PIN password to gain access to the PROGRAM MENU
Structures on the VP-EC-2000-BD itself from the User Interface Keypad

CONTROLLER MODBUS ID: Used to set and read the MODBUS ID used by the Remote RS485 Port and
the MODBUS over TCP/IP

ANALOG MODULE MA FAULT: This Value (Scaled 100 ie: 200 = 2.0 mA) is the Analog mA level at which a
FAULT condition is set for Analog Sensors

SETTINGS MODE: BASIC Selection Hides the ADVANCED setiings
ADVANCED setting enables the Advanced features

SERVER CONNECTIVITY: This should be ENABLED ONLY if the User has subscribed tothe
"Enviro-CLoud" Secure Server Service
For more information, please visit the www.vpprocess.com website

BILLING TOKEN: Only used if the User has has subscribed tothe
"Enviro-CLoud" Secure Server Service
For more information, please visit the www.vpprocess.com website

SENSOR LABEL: This is a programmable Tag for the Lates Page
If changed from "Reading" (Default) to "GAS", the first column after
STATUS will now read GAS instead of READING

AUDIBLE

SETTING: There are four settings for the AUDIBLE from the drop down menu:
Disable, Caution, Warning and Critical

ON DELAY: Default to 0 Seconds

OFF DELAY: Default to 0 Seconds

SEND SETTINGS EMAIL   If the Email Settings Page is filled out and enabled, it is advisable to send the
Email Settings page to the person in the TO: setting of the Settings page. This
email will contain everything in all sections of the SETIINGS PAGE.

SETTINGS PAGE - NETWORK
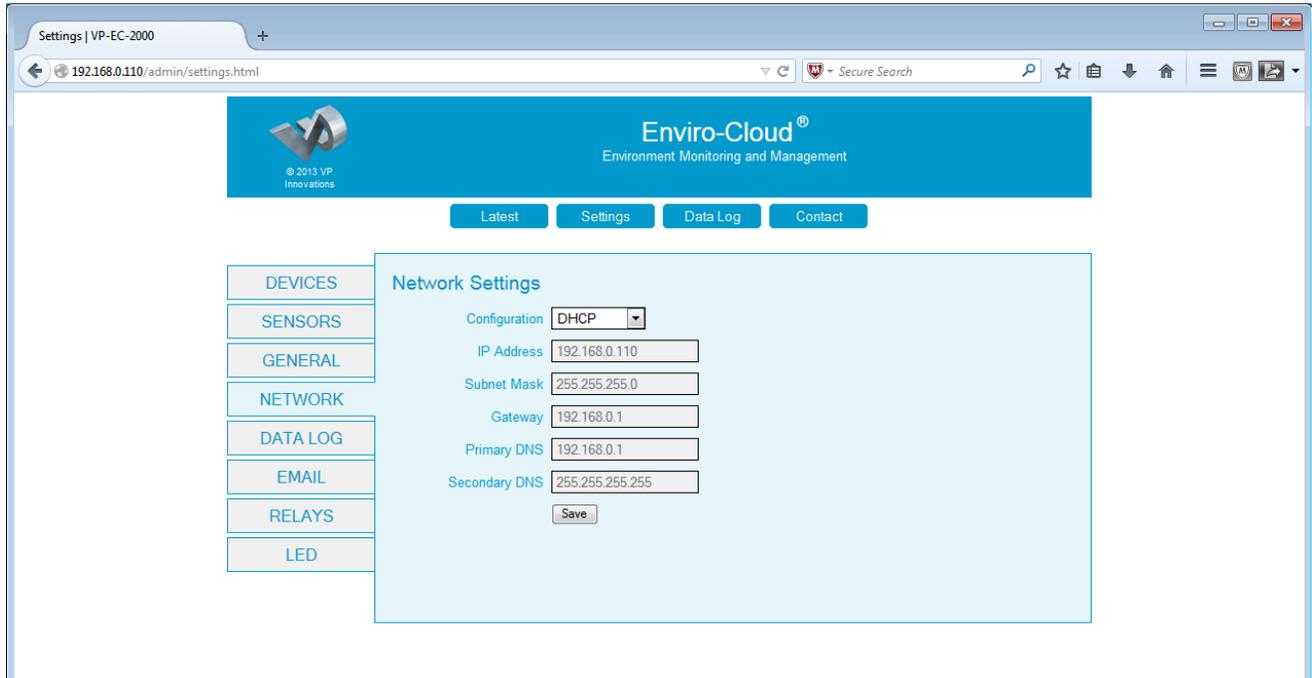
The default configuration for the NETWOKR is DCHP. The greyed out settings show the default settings assigned by the router to the VP-EC-2000-BD Controller.

STATIC IP Addressing is available and the following WARNING is enabled when STATIS is Enabled:
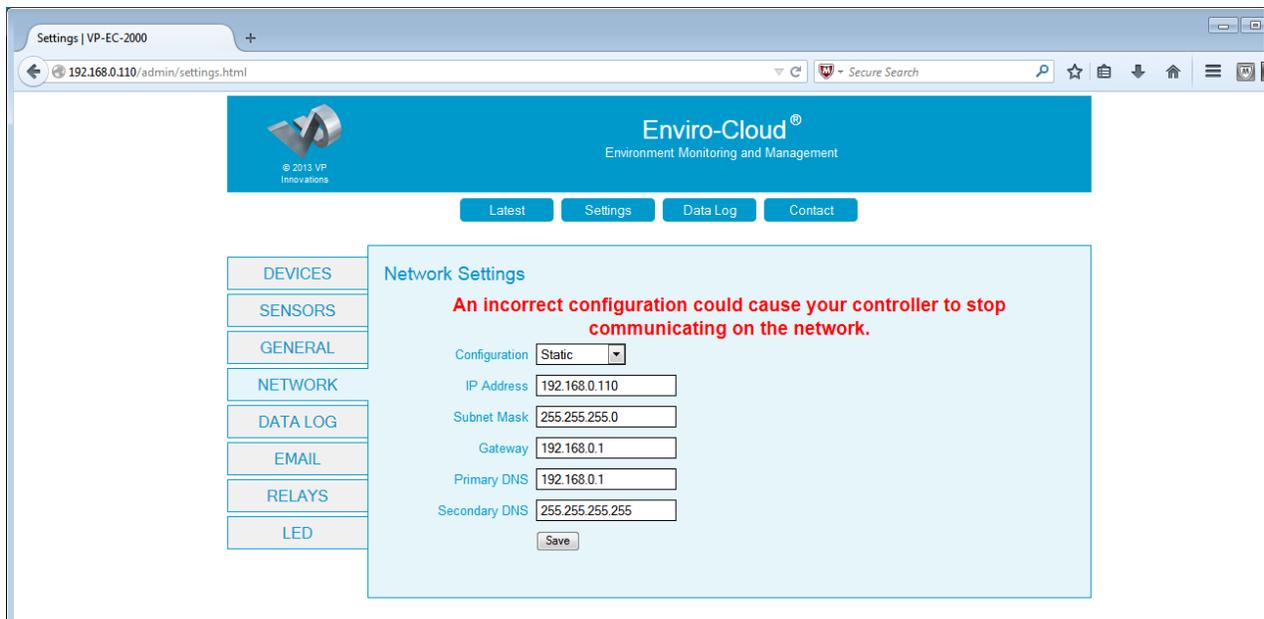
SETTINGS PAGE - DATA LOG
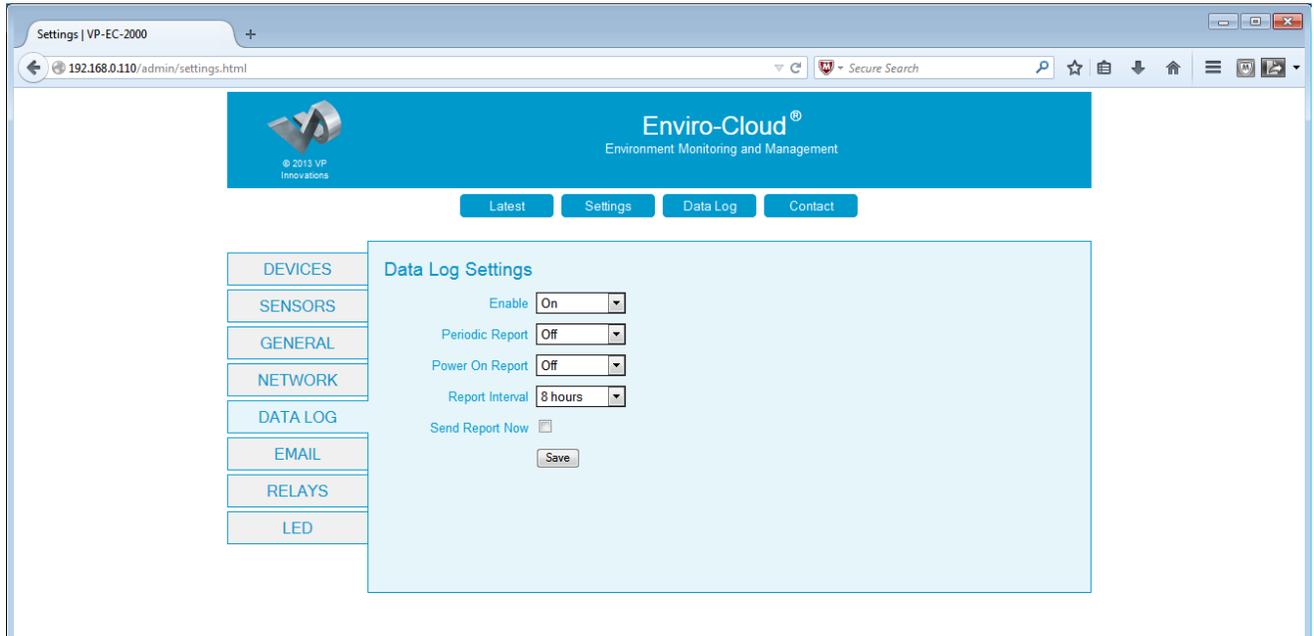
These settings enable and set up the internal 48 event Data Logger in the VP-EC-2000-BD to be used in conjunction with the Email settings. If Email Settings are disabled, then these settings can be left disabled as well.

DATA LOG SETTINGS

ENABLE: Turn ON or OFF

PERIODIC REPORT: Turn ON or OFF Periodic Email Reports

POWER ON REPORT: Turn ON or OFF an email report when power is first applied

REPORT INTERVAL: This Drop Down Menu selects how often the Data Log Report is emailed.
Select Between: 4, 6, 8, 12, 16, 24 and 48 Hours

SEND REPORT NOW: Checking the Box and pressing the SAVE button will initiate a Report and reset the Report Interval

SETTINGS PAGE - EMAIL

This page sets up the VP-EC-2000-BD internal email engine.

ENABLE:　　　　　　Turn ON or OFF

TO ADDRESS:　　　　To where the alerts, data lof reports and setting should be emailed

FROM ADDRESS:　　　Any valid email format address (ie: vpec2000bd@myenvirocloud.com

SERVER:　　　　　　Server Address ie: mail.server.com

PORT:　　　　　　　Server Port Number, varied by provider

USER:　　　　　　　User's email account, usually their email address

PASSWORD:　　　　　User's email account password.

NOTE:　　　　　　　If the User subscribes to the "Enviro-Cloud" subscription service, a complementary email account is provided and all credentials for this page are also provided.

SETTINGS PAGE - RELAYS
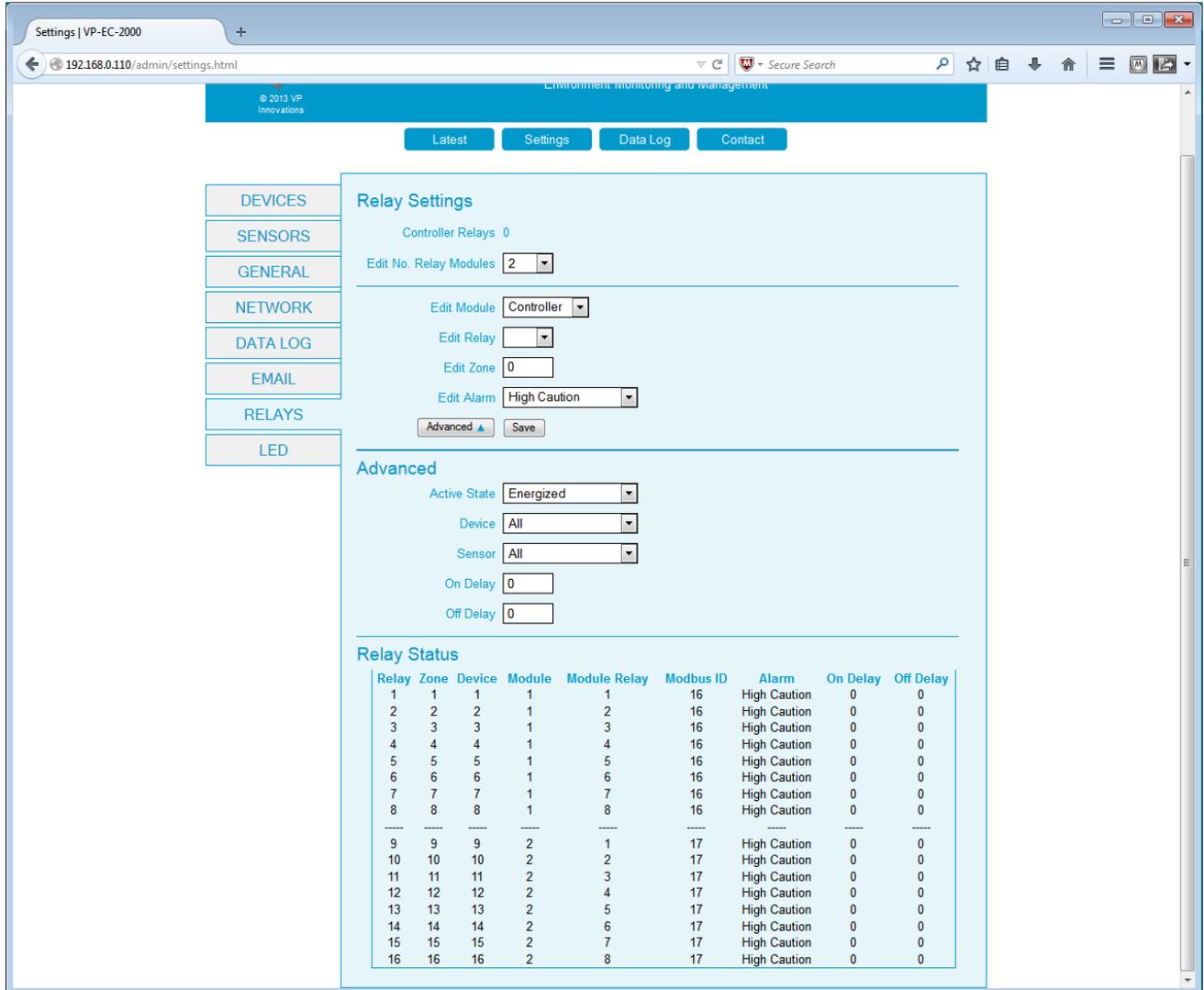
This page sets up the relay programming for the VP-EC-2000-BD. Module MODBUS ID addressing is automatically set by the VP-EC-2000-BD.

RELAY SETTINGS

CONTROLLER RELAYS: There are no relays directly on the VP-EC-2000 Gateway, all relays are accessed via remote 8 point VP-EC-8KO relay modules

EDIT NO. RELAY MODULES: The VP-EC-2000-BD can control up to 64 relays in 8 point relay modules. This setting sets the number of remote VP-8KO Relay Modules

SETTINGS PAGE - RELAYS (Cont'd)

EDIT MODULE: Selects the Relay Module to be Programmed (1 thru 8) (8 thru 64 relays)
NOTE: MODBUS ID for first relay module is defaulted to 129

EDIT RELAY: Selects the Relay Number on the Module (1 thru 8)

EDIT ZONE: Selects the ZONE for Relay operation

EDIT ALARM: There are 13 settings that can be assigned to any individual relay from the Drop Down Menu:

- ANY ALARM	Common Alarm for Everything
- ANY CRITICAL	Common Critical Alarm
- ANY WARNING	Common Warning Alarm
-ANY CAUTION	Common Caution Alarm
-AUDIBLE	Used for Remote Audible Functions Like ALMB Option
-OFFLINE	Device (RS485) Transmition problems
-FAULT	Sensor Fault
-HIGH CRITICAL	Common High Critical Alarms
-HIGH WARNING	Common High Warning Alarms
-HIGH CAUTION	Common High Caution ALarms
-LOW CAUTION	Common Low Caution Alarms
-LOW WARNING	Common Low Warning Alarms
-LOW CRITICAL	Common Low Critical Alarms

ADVANCED

ACTIVE STATE: Select ENEGIZED for Relay to turn ON in Alarm
Select DE_ENERGIZED for Relay to turn OFF in Alarm

DEVICE: Select ALL devices or a specific device

SENSOR: Select a SENSOR for the Sensor Table, 1 thru 15

ON DELAY: Default to 0 Seconds

OFF DELAY: Default to 0 Seconds

RELAY STATUS: Shows a list of all activated relays and their respective programming

SETTINGS PAGE - LED
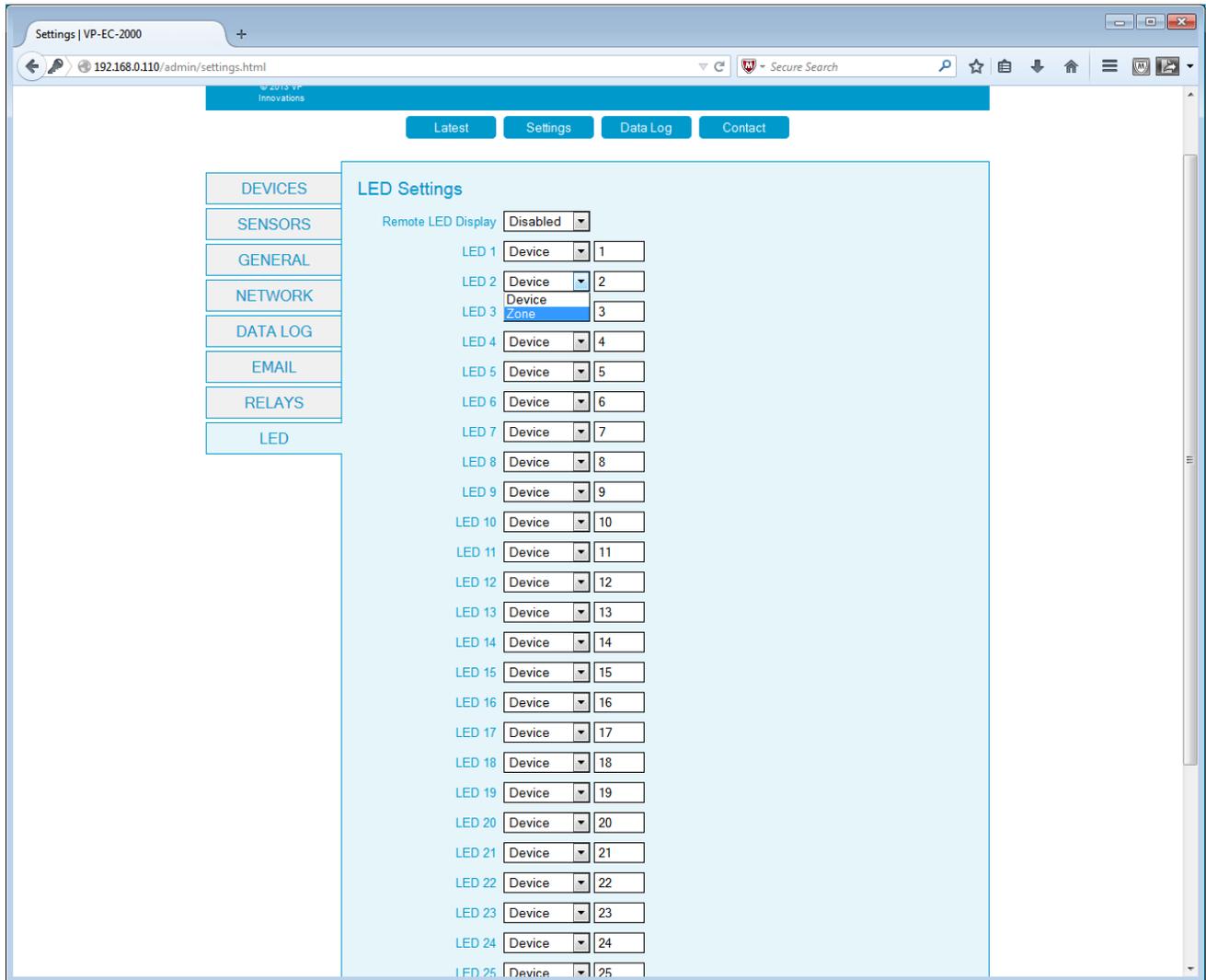
LEDs can be programmed for either a POINT (related directly to the ID of the Device (Transmitter), or grouped together into ZONES.

LED SETTINGS: Turn ON or OFF the REMOTE LED Panel

LED1 (thru 32):   Select whether the LED will be a DEVICE or ZONE, and then the ZONE Number

DATA LOG PAGE

The Data Log Page shows the last 48 Events with all Devices including the VP-EC-2000-BD Controller. For more detailed Data Logging with graphs, trending and 10 Year Data Retention, the User should look at the "Enviro-Cloud" subscription Service.
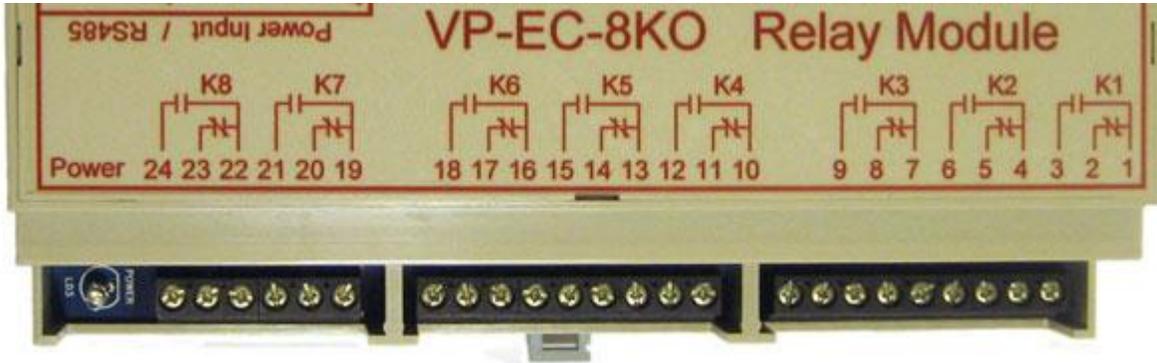
CONTACT PAGE
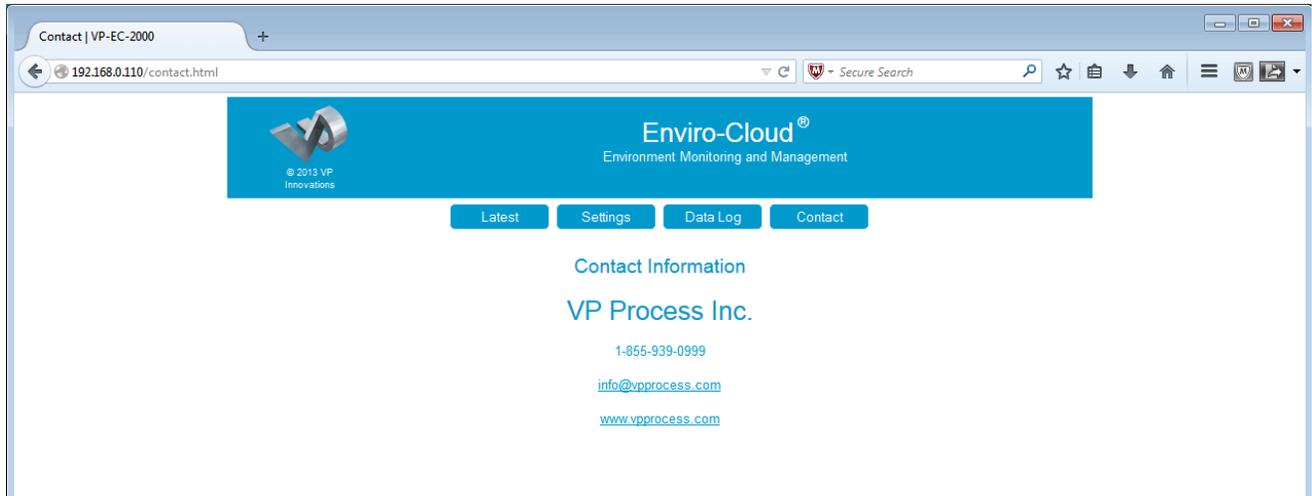
END OF WEB SERVER / INTERFACE / PROGRAMMING

10.   FIELD WIRING

The VP-EC-2000-BD comes factory prewired internally with all modules interconnected and tested.

The User applies Prime Power (Typically 120 VAC) to the DIN Rail mounted power supply. The relay output wiring and ANalog input wiring are clearly identied on the VP-EC-8KO and VP-EC-8AI DIN Modules.

For remote RS485 Devices, the wiring +24VDC, DATA A , DATA B, and COMMON are connected to the LOCAL RS485 Port Clearly identified on the VP-EC-2000 Gateway / Controller DIN Moule.
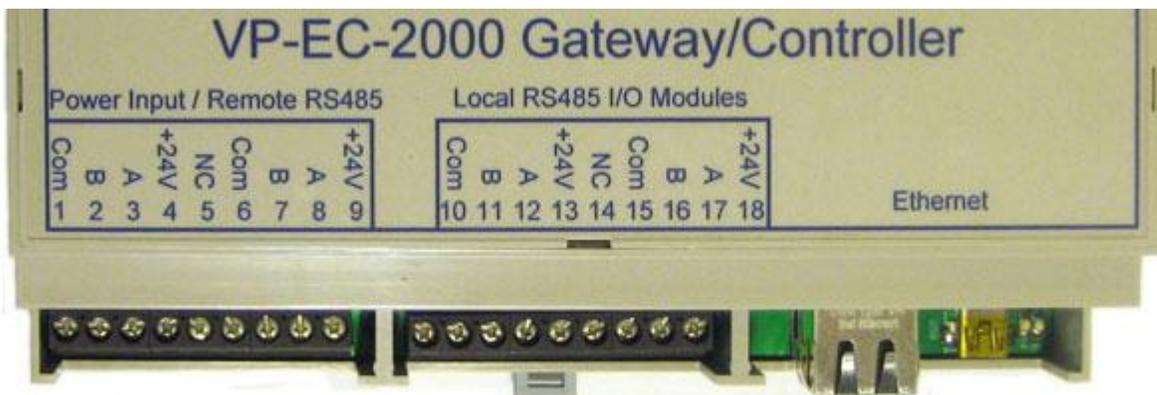
11.   PROPRIETARY STATEMENT

VP Process Inc. owns propriety rights in the information disclosed within. By receiving this document, the recipient agrees that neither this document nor the information disclosed within nor any part shall be reproduced or transferred to other documents or used or disclosed to others for manufacturing or for any other purpose except as specifically authorized in writing by VP Process Inc.

12.   DISCLAIMER

Under no circumstances will VP Process Inc. be liable for any claims, losses, or damages resulting from or arising out of the repair or modification of the equipment by a party other than VP Process Inc. or its authorized Service representatives, or by operation or use of the equipment other than in accordance with the printed instructions provided by VP Process Inc. or if the equipment has been improperly maintained or subject to neglect or accident. Any of the foregoing will void the warranty.

13.   REVISIONS TO MANUAL

All information contained in this manual is believed to be true and correct at the time of printing. However, as part of its continuing efforts to improve its products and their documentation, VP Process Inc. reserves the right to make changes at any time without notice. Any revised copies of this manual can be obtained by writing VP Process Inc.

14.   SERVICE POLICY

VP Process Inc. maintains an instrument service facility at the factory. VP Process Inc. assumes no liability for service performed by other than VP Process Inc. personnel. Repairs are warranted for 90 days from date of shipment. Should your instrument require non-warranty repair, you may contact the distributor from whom it was purchased, or you may contact VP Process Inc. directly.

If VP Process Inc. is to do the repair work for you, you may send the instrument, prepaid, to VP Process Inc. ATTN: Service Department. Always include your address, purchase order number, shipping and billing information, and a description of the defect, as you perceive it. If you wish to set a limit to the authorized repair cost, please state a "not to exceed" figure. If you must have a price quotation before you can authorize the repair cost, so state, but understand that this involves extra cost and extra handling delay. The Company's policy is to perform all needed repairs to restore the instrument to full operating condition.

To expedite the repair operation, it is required to call in advance to VP Process Inc 250.769.8220, obtain a Return Materials Authorization number (RMA#), describe the nature of the problem and provide a purchase order number. If this is the first time you are dealing directly with the factory, you will be asked to provide credit references, prepay, or authorize COD shipment. Pack the instrument and all its accessories (preferably in its original packing). Enclose your Purchase Order, shipping and billing information, RMA#, and any special instructions.

15. CONTACT INFORMATION

VP Process Inc.

1406 Parkinson Rd.
West Kelowna, BC
Canada, V1Z 3M6

TEL: 1-250-769-8220

WEB: www.vpprocess.com
Email: info@vpprocess.com

16. STANDARD WARRANTY

VP Process Inc. warrants equipment manufactured and sold by us to be free from defects in materials and workmanship for a period of one year from date of shipment from VP Process Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge, f.o.b. factory. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired or replaced on a routine basis.

Warranty is voided by abuse including rough handling, mechanical damage, and operation, alteration, or repair procedures not in accordance with instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

VP Process Inc.'s obligation under this warranty shall be limited to repairing or replacing, and returning any product which VP Process Inc. material review board examination shall disclose to its satisfaction to have been defective. To receive warranty consideration, all products must be returned to VP Process Inc. its manufacturing facilities with transportation charges prepaid.

This warranty is expressly in lieu of any and all other warranties and representations, expressed or implied, and all other obligations or liabilities on the part of VP Process Inc. including but not limited to, the warranty of merchantability or fitness for a particular purpose. In no event shall not be limited to, the warranty of merchantability or fitness for a particular purpose. In no event shall VP Process Inc. be liable for indirect, incidental or consequential loss or damage of any kind connected with the use or its products or failure of its products to function or operate properly.

This warranty covers instruments and parts sold (to users) only by authorized distributors, dealers and representatives as appointed by VP Process Inc.