

A Company devoted to Your Energy Needs

WB/HVS LPG-Vaporizer / Air Mixing Systems

Water Bath Vaporizer with Venturi - Type Mixing System

- Natural Gas Backup Systems
- Capacities from 14 MM BTU/h to over 200 MM BTU/h
- Complete with Vaporizer, Vapor/Air Mixer, Steel Skid, Controls and Surge Tank
- PLC Controls with Touch Screen Operator Interface for all systems
- Conforms to ASME, NFPA, NEC
- FM / IRI / CSA approved
- Vaporizers with ‘Smart’ Liquid Carryover Protection
- Mixers with dual Solenoid Valves (“dynamic” and “safety”)
- Small Footprint
- High Efficiency



Options

- Remote Monitoring and Control
- Enlarged Control Room (Maintenance House)
- Large-Size Operator Interface
- Wireless Ethernet Connection
- Integration into Plant Control Systems

Model Numbers and Capacities

For higher capacities, call factory !

WB- 168 / HVS- 14 MM	14 MMBTU/h	WB-1205 / HVS-100 MM	100 MMBTU/h
WB- 208 / HVS- 17 MM	17 MMBTU/h	WB-1505 / HVS-110 MM	110 MMBTU/h
WB- 258 / HVS- 20 MM	20 MMBTU/h	WB-1505 / HVS-120 MM	120 MMBTU/h
WB- 308 / HVS- 27 MM	27 MMBTU/h	WB-1505 / HVS-130 MM	130 MMBTU/h
WB- 358 / HVS- 30 MM	30 MMBTU/h	WB-1805 / HVS-140 MM	140 MMBTU/h
WB- 408 / HVS- 37 MM	37 MMBTU/h	WB-1805 / HVS-150 MM	150 MMBTU/h
WB- 458 / HVS- 40 MM	40 MMBTU/h	WB-2005 / HVS-160 MM	160 MMBTU/h
WB- 555 / HVS- 50 MM	50 MMBTU/h	WB-2005 / HVS-170 MM	170 MMBTU/h
WB- 755 / HVS- 60 MM	60 MMBTU/h	WB-2005 / HVS-180 MM	180 MMBTU/h
WB- 855 / HVS- 70 MM	70 MMBTU/h	WB-2205 / HVS-190 MM	190 MMBTU/h
WB-1005 / HVS- 80 MM	80 MMBTU/h	WB-2205 / HVS-200 MM	200 MMBTU/h
WB-1005 / HVS- 90 MM	90 MMBTU/h	WB-2505 / HVS-210 MM	210 MMBTU/h

What are Vaporizer/Mixer Systems ?

LPG vapor is not directly compatible with NatGas and must be mixed with air before it can be used in equipment and appliances that are set up for NatGas. LPG vaporizer/mixer systems consist of a vaporizer to convert liquid LPG into LPG vapor, and a vapor/air mixer to mix the vapor with air at a pre-set ratio. They produce a gas mixture that is directly compatible with NatGas. This allows users to switch back and forth between NatGas supplied by their utility company and their own, LPG-based backup system, without having to change the setup of their burners, boilers, etc.

The vaporizer/mixer systems described in this brochure are designed for intermittent use as NatGas backup systems. They are the combination of a horizontal water bath vaporizer (see brochure "Water Bath LPG Vaporizers") and a Hallberg Venturi Mixer (see brochure "LPG Vapor/Air Mixing Systems - Venturi Type), generating gas pressures of up to 8 (12) psi without the need of compressed air supply. The absence of a compressor makes these systems very economical to operate. For even larger capacities and/or high pressure applications, vaporizer/mixer systems based on Water Bath Vaporizers and our patented Piston Operated Mixing Systems, POM-10 to POM-60, are available.

How do Alternate Energy Systems' Vaporizer/Mixer Systems with Water Bath Vaporizer work ?

Vaporizer/Mixer Systems from AES are designed for easy installation and long, trouble-free service. They come complete with vaporizer, venturi arrangements, surge tank, electronic controls, and all other equipment necessary for safe operation. They are factory tested and ready to be placed on a concrete slab or other, non-combustible ground cover. After connection to liquid LPG, mixed gas line and electrical supply, they can be ready to produce "Synthetic Natural Gas" within a few hours after arrival of the system at the job site.

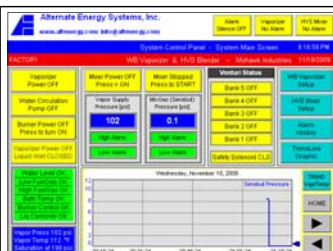
Liquid LPG from a storage tank is transferred to the vaporizer. Typically, a liquid LPG transfer pump is installed in the liquid supply line, keeping liquid pressure at approximately 100 psi. After vaporization of the LPG in the vaporizer, vapor enters the inlet header of the mixing system and then passes through a pressure regulator. From there, the pressure-adjusted vapor flows through the high precision nozzle and the venturi tube section of the HVS into the surge tank. While the vapor passes through the tube section, the venturi effect "siphons" ambient air through the air-intake/check-valve combination and sends it into the surge tank together with the LPG vapor.

All systems have a full-size vaporizer control room and use Rosemount pressure transmitters and a programmable logic controller (PLC; Siemens or Allen-Bradley) to monitor and control all system functions. The PLC also communicates with a color LCD display with touch screen, indicating system pressures, Venturi ON/OFF status, and any trouble conditions that may occur. Standard language is English with US Engineering Units; metric Engineering Units and other languages are user-selectable.

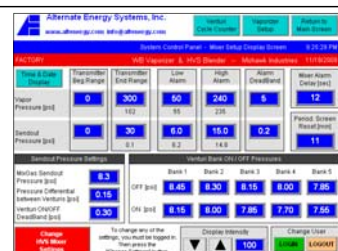
The systems monitor the gas pressure in the surge tank with a Rosemount pressure transmitter. An increase in demand results in a momentary drop in the tank pressure. If the tank pressure falls below adjustable setpoints, one or more additional venturi assemblies are activated. The venturi assemblies will stay active until the surge tank pressure has recovered above their respective setpoint, and will then sequentially go off-line.

The sendout pressure, and the ON/OFF setpoints for the venturi assemblies can easily be adjusted through simple inputs at the touch screen.

In addition to the standard control system configurations, specific customer requirements, such as integration with existing plant monitoring systems or remote monitoring and control, can easily be accommodated.



Main Screen of a typical color LCD display with touch screen operator interface. The intuitive screen layout with colored buttons and status indicators minimizes operator training and shows the system status at a glance.



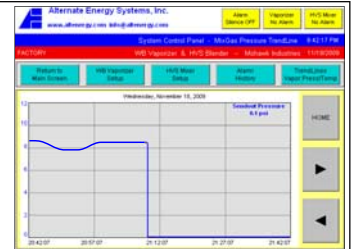
Typical Mixer Setup Screen with ranges settings for the transmitters, and setpoints for low and high alarms, sendout pressure, Venturi ON/OFF pressures, and Mixer Alarm Delay.

All systems offer a number of convenient system status information screens. Among them are trend graphics for all system pressures, and the alarm history screens.

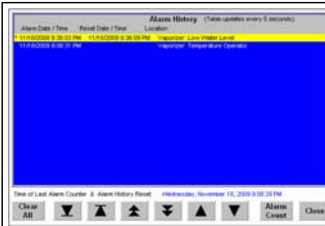
The trend graphics typically store 30 hours of pressure data in 15-second intervals. This data, with date and time stamp, can be recalled any time.



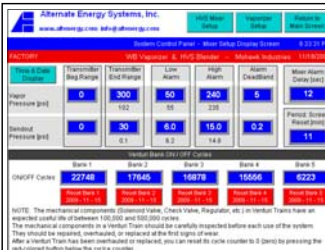
Typical Graphic TrendLine screen. This particular screen shows recorded data for vapor pressure at the outlet of the vaporizer, vapor pressure at the inlet of the mixer, and vapor temperature at the outlet of the vaporizer.



TrendLine screen for Mixer Sendout Pressure (after system shutdown; note the pressure display in the upper-right of the screen shows 0.1 psi tank pressure). The time stamp is at the bottom of the graphic, the date stamp is in the header.



The alarm history screen is most useful for trouble shooting. If any of the monitored system functions indicate a problem, time and date are recorded, allowing operators or maintenance personnel to quickly locate the root cause of the problem.



deciding when preventative maintenance should be performed at the dynamic venturi solenoids (replace the solenoid valve, or install a repair kit), and other mechanical components that are cycled with each OFF/ON transition (check valves; regulator; ...). The average life expectancy of these components is between 0.5 and 2 million cycles.

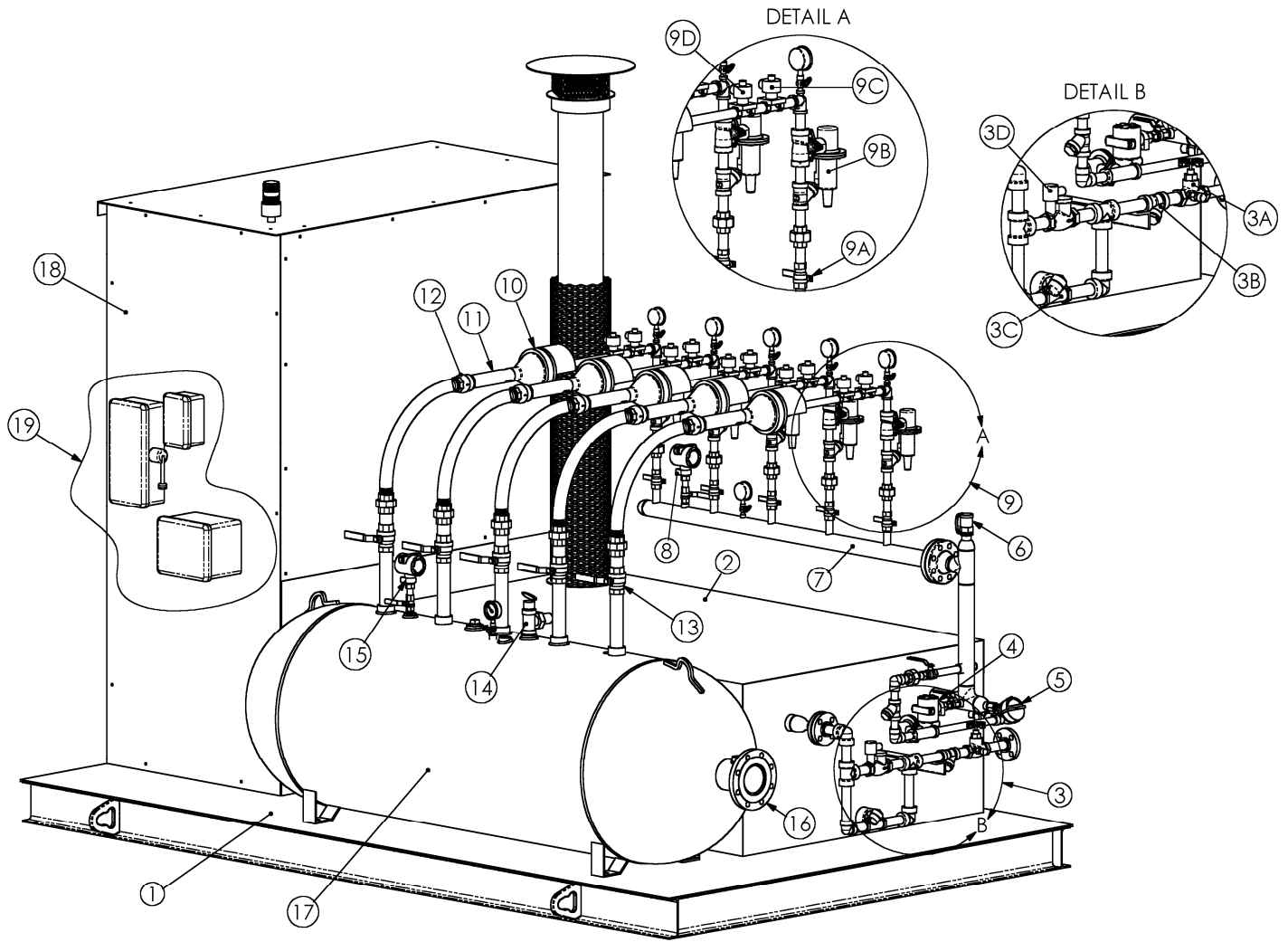
This screen shows the cycle counters for each venturi bank. The counters are incremented with each OFF-to-ON transition of a venturi bank.

After a venturi train has been overhauled, reset its cycle counter by pressing its associated reset button. This feature is standard on all AES vaporizer/venturi-mixer systems.

The purpose of this counter is to help

For more detailed information and specifications about water bath vaporizers and HVS mixing systems, please refer to the following brochures: "Water Bath LPG Vaporizers" and "LPG-Vapor / Air Mixing Systems, Venturi - Type".

Main Components of Vaporizer/Mixer Systems with Hallberg Venturi and Water Bath Vaporizer

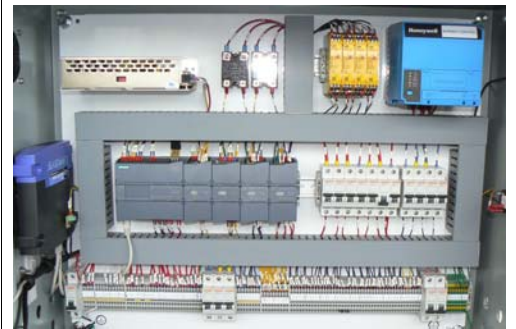


Legend (WB-555/HVS50)

- | | |
|--|---|
| 1 Steel Skid | 9 Detail A: Venturi Line |
| 2 Vaporizer | 9a Shutoff Valve |
| 3 Detail B: Liquid Inlet Train | 9b Vapor Pressure Regulator |
| 3a Inlet Shutoff Valve | 9c "Safety" Solenoid Valve <small>See Note below</small> |
| 3b Strainer | 9d "Dynamic" Solenoid Valve |
| 3c Check Valve | 10 Air Inlet with Check Valve |
| 3d Solenoid Valve | 11 Venturi Nozzle |
| 4 "Smart" Liquid Carryover Pressure Transmitter | 12 Check Valve |
| 5 "Smart" Liquid Carryover Temperature Transmitter | 13 Shutoff Valve |
| 6 Vapor Header Relief Valve | 14 Surge Tank Relief Valve |
| 7 Vapor Header | 15 Mixed Gas Pressure Transmitter |
| 8 Vapor Pressure Transmitter | 16 Mixed Gas Outlet Flange |
| | 17 Surge Tank |
| | 18 Full Size System Control Room |
| | 19 Disconnect, Load Center, Transformer, Communications Box |

The Safety Solenoid stays open as long as the Mixer Control Power is ON. It closes when the Mixer Control Power is OFF, or when a High Vapor Pressure or a High MixGas Pressure alarm condition exists.

Typical WB/HVS Control Panel



Standard Control Panel with Siemens S7-1200 PLC, Safety Relays, automatic circuit breakers, Ethernet Router, and Honeywell Flame Safeguard.

The implementation of Agency-approved Safety Relays elevates the AES vaporizer/mixer systems to "Performance Level 3" (formerly known as SIL 4).

All AES control panels are designed to meet all relevant codes and standards, and can be supplied with UL 508a stamp.

Other PLC/Display configurations are available (i.e. Allen-Bradley, GE 90-30, Bristol ControlWave Micro, etc.). Contact AES with your specific requirements.

Features and Specifications

General Specifications

Model Number	Nominal System Capacity ¹ MMBTU/h	Number of Venturis ² 5 to 8 psi Systems	Number of Venturis ² 9 to 12 psi Systems	Surge Tank Capacity US-gal (m ³)	Liquid Inlet Connection @ Vaporizer	Mixed Gas Outlet Connection @ Surge Tank	Approximate System Size in inches (m) W x L x H	Approximate Shipping Weight lbs (kg)
WB - 168 / HVS - 14 MM	14	2	N/A	120 (0.450)	1" - 300# Raised Face ANSI Flange or DN25 PN40 DIN Flange	2" - 150# RF ANSI or DN50 PN10 DIN Flange 3" - 150# RF ANSI or DN80 PN10 DIN Flange	W = 60" / 1.52m L = 132" / 3.35m H = 112" / 2.54m	4200 (1905)
WB - 208 / HVS - 17 MM	17	2	N/A	120 (0.450)				4200 (1905)
WB - 258 / HVS - 20 MM	20	2	2	120 (0.450)				4200 (1905)
WB - 308 / HVS - 27 MM	27	3	N/A	120 (0.450)				4300 (1950)
WB - 358 / HVS - 30 MM	30	3	3	120 (0.450)				4300 (1950)
WB - 408 / HVS - 37 MM	37	4	N/A	120 (0.450)				4400 (1995)
WB - 458 / HVS - 40 MM	40	4	4	120 (0.450)				4400 (1995)
WB - 555 / HVS - 50 MM	50	5	5	250 (0.950)				5750 (2608)
WB - 755 / HVS - 60 MM	60	6	6	250 (0.950)				6750 (3062)
WB - 855 / HVS - 70 MM	70	7	7	250 (0.950)				6900 (3130)
WB - 1005 / HVS - 80 MM	80	8	8	500 (1.893)	2" - 300# Raised Face ANSI Flange or DN50 PN25 DIN Flange	4" - 150# Raised Face ANSI Flange or DN100 PN10 DIN Flange 6" - 150# Raised Face ANSI Flange or DN150 PN10 DIN Flange	W = 84" / 2.13m L = 164" / 4.17m H = 112" / 2.54m W = 98" / 2.49m L = 272" / 6.91m H = 112" / 2.54m	9200 (4173)
WB - 1005 / HVS - 90 MM	90	9	9	500 (1.893)				9250 (4196)
WB - 1205 / HVS - 100 MM	100	10	10	500 (1.893)				9300 (4218)
WB - 1505 / HVS - 110 MM	110	11	11	500 (1.893)				9400 (4264)
WB - 1505 / HVS - 120 MM	120	12	12	500 (1.893)				9375 (4252)
WB - 1505 / HVS - 130 MM	130	13	13	500 (1.893)				9450 (4286)
WB - 1805 / HVS - 140 MM	140	14	14	500 (1.893)				14800 (6713)
WB - 1805 / HVS - 150 MM	150	15	15	500 (1.893)				14850 (6736)
WB - 1805 / HVS - 160 MM	160	16	16	500 (1.893)				14925 (6770)
WB - 2005 / HVS - 170 MM	170	17	17	500 (1.893)				14975 (6793)
WB - 2005 / HVS - 180 MM	180	18	18	1000 (3.785)	DN50 PN25 DIN Flange or DN150 PN10 DIN Flange	Contact Factory for Weights and Dimensions.	15000 (6804)	
WB - 2205 / HVS - 190 MM	190	19	19	1000 (3.785)				
WB - 2205 / HVS - 200 MM	200	20	20	1000 (3.785)				
WB - 2505 / HVS - 210 MM	210	21	21	1000 (3.785)				
WB - 2505 / HVS - 220 MM	220	22	22	1000 (3.785)				
WB - 3005 / HVS - 230 MM	230	23	23	1000 (3.785)				
WB - 3005 / HVS - 240 MM	240	24	24	1000 (3.785)				
WB - 3005 / HVS - 250 MM	250	25	25	1000 (3.785)				

¹ Nominal Capacity for Propane/Butane @ 0°F Liquid Inlet Temperature. ² Actual number of venturi arrangements may vary with desired mixed gas pressure. Weights and dimensions are approximate and for standard configurations only. Specifications are subject to change without notice.

Mixed Gas Sendout Pressure (naturally-aspirated Venturi Mixers)

Standard Venturi type mixers use ambient air to mix with LPG vapor. The maximum achievable mixed gas delivery pressure largely depends on shape and dimension of the nozzle/venturi tube configuration, as well as on the type of the LPG feedstock (Propane/Butane mixture) and the LPG vapor pressure.

Keeping the LPG vapor at low to moderate pressures (30 psi to 60 psi), mixed gas pressures of up to 8 psi can be generated safely and reliably. Depending on the type of LPG feedstock and the installation location (lowest ambient temperatures that must be expected; altitude), these mixing systems can often be operated without the installation of a liquid LPG transfer pump.

Higher mixed gas pressures of up to 12 psi can be achieved with specially designed nozzle/venturi tube configurations, operating at vapor pressures of approximately 120 psi to 150 psi. Without exception, these systems require the installation of a liquid LPG transfer pump.

Since higher vapor pressures also lead to higher vapor dew point temperatures, the risk for liquid carryover situations increases.

To reduce these risks, the LPG vapor must be delivered (from the vaporizer) at higher temperatures and/or the vapor supply lines to the mixer must be insulated and/or heat-traced.

Mixed gas delivery pressures higher than 12 psi require the injection of compressed air into the vapor stream. All AES HVS venturi mixer systems can be equipped with this high pressure option, which consists of a separate pressure regulator and associated controls for each venturi assembly. Using this option, system pressures of up to 40 psi can be generated.

Approximate Vapor Pressures for various Mixed Gas Pressures

Mixed Gas Pressure	Propane (HD-5)	Propane/Butane (50/50)
5 psi	30 psi	50 psi
7 psi	50 psi	80 psi
9 psi	120 psi	n/a
12 psi	145 psi	n/a

Features and Specifications

Control System Components and Configuration

Standard Vaporizer Safety Features

Electronic Flame Safe Guard WB-x08-Series	Honeywell Satronic; PLC Input with Status Indication at Operator Interface; Alarm History.
Electronic Flame Safe Guard WB-x05-Series	Honeywell 7800-Series; PLC Input with Status Indication at Operator Interface; Alarm History.
Low Burner Fuel Gas Pressure	Flame Safe Guard Interlock; PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
High Burner Fuel Gas Pressure	Flame Safe Guard Interlock; PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
Low Water Level Cutoff	Safety Relay (Performance Level 3 [SIL4]); PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
High Bath Temperature Limit	Safety Relay (Performance Level 3 [SIL4]); PLC Input with Status Indication at Operator Interface;; Alarm History; adjustable Alarm Delay.
GasLeak Monitor in Control Room 40% LEL	Safety Relay (Performance Level 3 [SIL4]); PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
GasLeak Monitor in Control Room Trouble	Safety Relay (Performance Level 3 [SIL4]); PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
Dual E-Stop Circuits	Safety Relay (Performance Level 3 [SIL4]); PLC Input with Status Indication at Operator Interface; Alarm History; adjustable Alarm Delay.
Liquid Carryover Protection	"Smart"; Press. and Temp. transmitter in Vapor Outlet; selectable LPG Type; adjustable Safety Margin; Alarm History; adjustable Alarm Delay.
Relief Valve for Vaporization Tubes	Properly Sized for Vaporizer Capacity; UL listed relief valves for vaporizers with ASME "U"-Stamp
Relief Valve for Burner Gas Train	Second-stage Burner Fuel Regulator with internal relief; relief pipe routed to outside of vaporizer control room

Standard Mixer Safety Functions

Low Vapor Supply Pressure Alarm	Operator-adjustable setpoints through simple inputs at the touch screen; adjustable DeadBand; Alarm History; adjustable Alarm Delay.
High Vapor Supply Pressure Alarm	Operator-adjustable setpoints through simple inputs at the touch screen; adjustable DeadBand; Alarm History; adjustable Alarm Delay.
Low MixGas Discharge Pressure Alarm	Operator-adjustable setpoints through simple inputs at the touch screen; adjustable DeadBand; Alarm History; adjustable Alarm Delay.
High MixGas Discharge Pressure Alarm	Operator-adjustable setpoints through simple inputs at the touch screen; adjustable DeadBand; Alarm History; adjustable Alarm Delay.
Venturi Cycle Counter	Separate, individually resettable counters for each Venturi Bank; the counters are incremented with each OFF-to-ON transition of a venturi bank.

Vaporizer / Mixer Controls

Standard Configuration	Integrated, Full-Feature Electronic System Controls for Vaporizer and Mixing System; Siemens S7-1200 (or Allen-Bradley MicroLogix-1100) PLC with integrated Ethernet Interface; high-resolution Color LCD Display with Touch Screen Operator Interface; First Outage Monitor (Alarm History); Graphic Trend Recording.
Available Control Options	PLC: Siemens S7-200 or S7-300; Allen-Bradley CompactLogix or SLC 5/05; GE 90-30; Bristol ControlWave Micro. Remote Monitoring and Control: Siemens MP277 with built-in web server; does not require special software; Allen-Bradley Factory Talk View ME Station (single License).

System Control Configuration shown is "typical". Customized system control configurations are available. Please contact factory with your specific requirements. For additional design and feature details of the WB-vaporizers, please review the "LPG Water Bath Vaporizers" brochure.

High Pressure Option: Compressed Air Requirements (for Propane [HD-5] and Specific Gravities between 1.28 and 1.30)

The High Pressure Options are available for all our venturi mixer systems. They consist of a separate pressure regulator for the air side, associated controls for each venturi train, and an ASME "U"-stamped MixGas Surge Tank. Using this option, discharge pressures of up to 40 psi can be generated.

The table on the right shows the air requirements for various system sizes. The numbers are based on propane as the LPG feedstock and include a 15-25% safety margin for specific gravities of the MixGas of 1.28 to 1.30. The numbers are very conservative, and will be sufficient for the mixed gas to be a direct replacement for any typical NatGas with a calorific value of 900-1100 BTU/cuft.

Approximate Compressed Air Requirements		Approximate Compressed Air Requirements	
Model Number	Air Supply	Model Number	Air Supply
WB - 168 / HVS - 14 MM	103 cfm @ 100 psi	WB - 1505 / HVS - 110 MM	812 cfm @ 100 psi
WB - 208 / HVS - 17 MM	126 cfm @ 100 psi	WB - 1505 / HVS - 120 MM	886 cfm @ 100 psi
WB - 258 / HVS - 20 MM	148 cfm @ 100 psi	WB - 1505 / HVS - 130 MM	960 cfm @ 100 psi
WB - 308 / HVS - 27 MM	199 cfm @ 100 psi	WB - 1805 / HVS - 140 MM	1034 cfm @ 100 psi
WB - 358 / HVS - 30 MM	222 cfm @ 100 psi	WB - 1805 / HVS - 150 MM	1108 cfm @ 100 psi
WB - 408 / HVS - 37 MM	273 cfm @ 100 psi	WB - 1805 / HVS - 160 MM	1182 cfm @ 100 psi
WB - 458 / HVS - 40 MM	295 cfm @ 100 psi	WB - 2005 / HVS - 170 MM	1255 cfm @ 100 psi
WB - 555 / HVS - 50 MM	369 cfm @ 100 psi	WB - 2005 / HVS - 180 MM	1329 cfm @ 100 psi
WB - 755 / HVS - 60 MM	443 cfm @ 100 psi	WB - 2205 / HVS - 190 MM	1403 cfm @ 100 psi
WB - 855 / HVS - 70 MM	517 cfm @ 100 psi	WB - 2205 / HVS - 200 MM	1477 cfm @ 100 psi
WB - 1005 / HVS - 80 MM	591 cfm @ 100 psi	WB - 2505 / HVS - 210 MM	1551 cfm @ 100 psi
WB - 1005 / HVS - 90 MM	665 cfm @ 100 psi	WB - 2505 / HVS - 220 MM	1625 cfm @ 100 psi
WB - 1205 / HVS - 100 MM	738 cfm @ 100 psi	Actual requirements depend on application and may vary!	

Communication Options

Alternate Energy Systems, Inc. uses Siemens S7-1200 or Allen-Bradley MicroLogix-1100 Programmable Logic Controllers in all our products. Both PLCs have an integrated Ethernet interface for communication with the Electronic Operator Interface (EOI), and for communication with external devices such as plant monitoring systems.

The operator interfaces have color LCD displays with touch screen for intuitive system operation. The standard EOI is a 7-inch panel with high-resolution screen (800x480).

Available as standard options are EOIs with 6-inch, 8-inch, 10-inch, and 12-inch screens, both from Siemens and from Allen-Bradley.

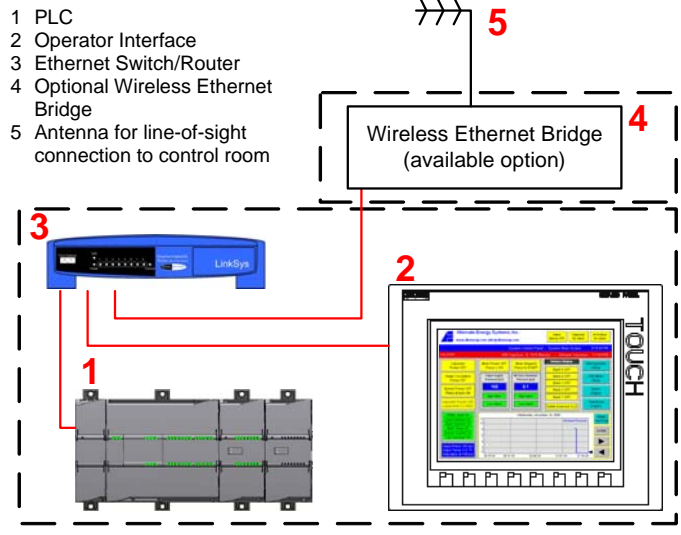
The Siemens EOIs can be equipped with an integrated web server that can be accessed via a standard web browser (such as Internet Explorer, FireFox, etc.) for remote monitoring and control without the need for special software. Systems with Allen-Bradley PLCs require a single license of Factory Talk View ME Station for remote access and control.

Other communication options, i.e. Profibus DP, Modbus, etc. are available, often at no or very little additional cost.

For locations without network connection we can provide a wireless Ethernet Bridge that can connect the system to a plant network without the expensive installation of communications cable (see example on right).

Please call AES if you require non-standard communication solutions.

Example of a Control System for a WB/HVS Mixer with Wireless Ethernet Connection to a Plant Network



Option Extended Control Room and Option Enlarged Control Room

All mixing systems with Water Bath Vaporizers have a full-size system control room (maintenance house) with light fixture, wall outlet, and door with window insert.

A standard option for 05-series vaporizers is the "Extended Control Room (Maintenance House)", where the depth of the standard control room has been extended by 3 ft. to a total of 72 inches (1.83 m). This larger space provides room for additional control and recording equipment, and weather protection for operating and maintenance personnel.

If even-larger control rooms are desired, the optional "Enlarged Control Room (Maintenance House)" is available for all AES vaporizer/mixer systems. They are typically as wide as the vaporizer/mixer skid and approximately 8 ft. long, but can be built to meet any specific requirements. They can be equipped with light fixture, AC outlet, heaters, air conditioners, gas alarm, etc.

For pricing and available options, or to discuss your specific requirements, please contact the factory or your nearest AES distributor.



WB-450/HVS-40 with Enlarged Control Room / Maintenance House

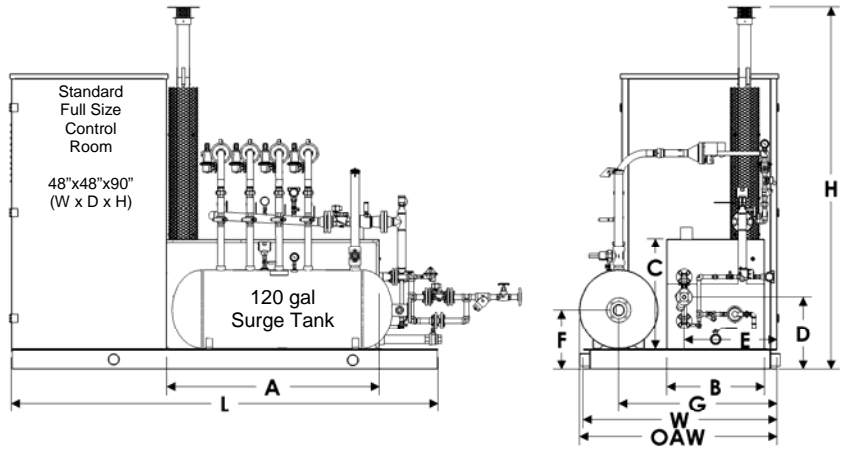
System Dimensions (in inches)

Weights and Dimensions in this brochure are approximate and are intended for planning purposes only. Contact AES for drawings with exact dimensions.

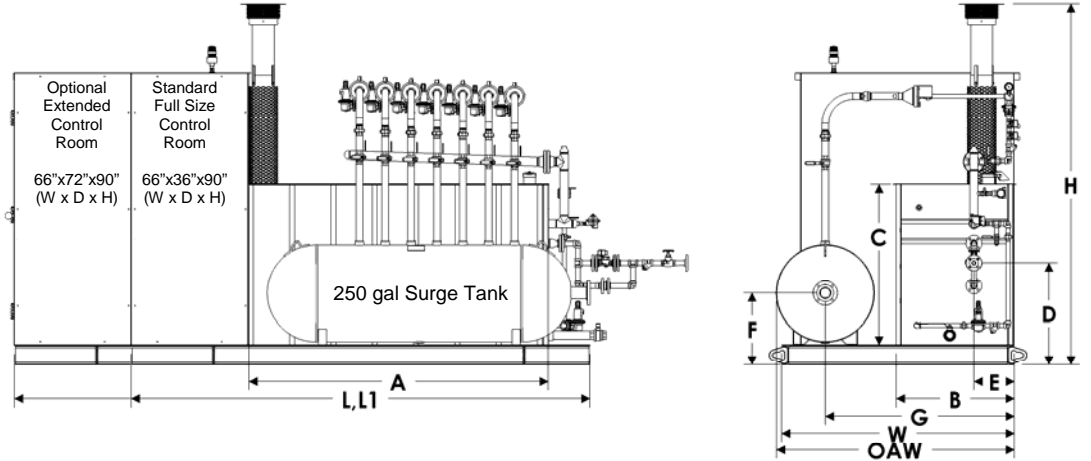
Model Number	Skid Width	Overall Width	Skid Length (Full-Size Contr. Room)	Skid Length (Extended Contr. Room)	Overall Height	Water Bath Length	Water Bath Width	Water Bath Height	Liquid Inlet (Height from Grade)	Liquid Inlet (Recess from skid)	Mixed Gas Outlet (Height from Grade)	Mixed Gas Outlet (Recess from skid)
W	OAW	L	L1	H	A	B	C	D	E	F	G	
WB - 168 / HVS - 14 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 208 / HVS - 17 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 258 / HVS - 20 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 308 / HVS - 27 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 358 / HVS - 30 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 408 / HVS - 37 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 458 / HVS - 40 MM	60	61	132	N/A	112	66	31	34	22-1/2	28-3/4	18-1/2	49
WB - 555 / HVS - 50 MM	72	73	135	174	112	80	35	36	18-7/8	19	22-1/4	59
WB - 755 / HVS - 60 MM	72	73	142	178	112	93	36	51	31-3/4	12-1/2	22-1/4	58-1/2
WB - 855 / HVS - 70 MM	72	73	142	178	112	93	36	51	31-3/4	12-1/2	22-1/4	58-1/2
WB - 1005 / HVS - 80 MM	84	90	164	200	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1005 / HVS - 90 MM	84	90	164	178	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1205 / HVS - 100 MM	84	90	164	178	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1505 / HVS - 110 MM	84	90	164	178	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1505 / HVS - 120 MM	84	90	164	178	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1505 / HVS - 130 MM	84	90	164	178	112	105	40	54	31-1/8	15-3/4	28-1/4	71-1/4
WB - 1805 / HVS - 140 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 1805 / HVS - 150 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2005 / HVS - 160 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2005 / HVS - 170 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2005 / HVS - 180 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2205 / HVS - 190 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2205 / HVS - 200 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80
WB - 2505 / HVS - 210 MM	98	100	N/A	272	112	114	55	61	40-1/8	13	28-3/4	80

Approximate Dimensions

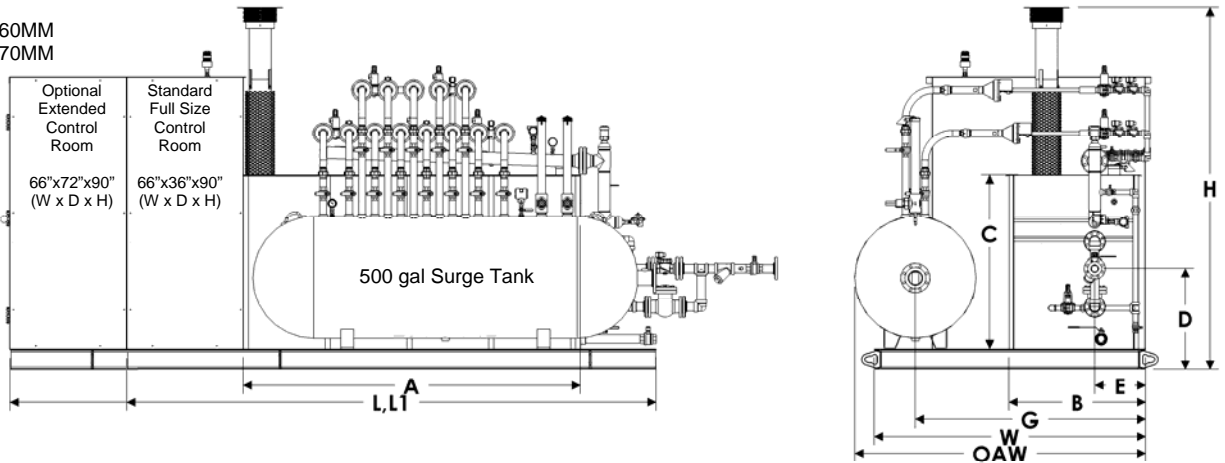
WB - 168 / HVS - 14MM
 WB - 208 / HVS - 17MM
 WB - 258 / HVS - 20MM
 WB - 308 / HVS - 27MM
 WB - 358 / HVS - 30MM
 WB - 408 / HVS - 37MM
 WB - 458 / HVS - 40MM



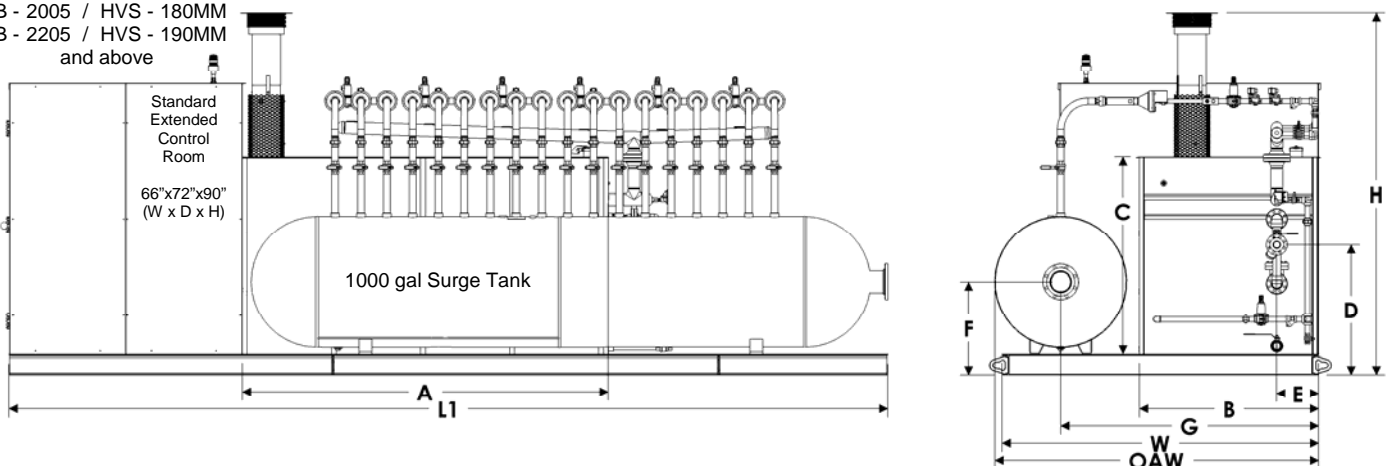
WB - 555 / HVS - 50MM
 WB - 755 / HVS - 60MM
 WB - 855 / HVS - 70MM



WB - 1000 / HVS - 80MM
 WB - 1000 / HVS - 90MM
 up to
 WB - 1800 / HVS - 160MM
 WB - 2005 / HVS - 170MM



WB - 2005 / HVS - 180MM
 WB - 2205 / HVS - 190MM
 and above



Who is Alternate Energy Systems, Inc. ?

After working for other manufacturers of LPG vaporizers and LPG / air systems for several years, John E. Hallberg founded Alternate Energy Systems, Inc. in 1974 in Peachtree City, located just 20 minutes south-west of the Atlanta airport. He successfully set out to design and manufacture products which were superior to those of his competitors. As a result, AES became very quickly known as the innovative manufacturer of quality products. Soon, the customer list included a representative cross-section of the Fortune 500 companies in the U.S.



Through the years, AES has constantly added new products, and has further improved the design of existing products, keeping us ahead of the competition. Several designs, including those for LPG/Air mixing systems, were awarded national and international patents.

Today, AES is owned by Wolfgang Driftmeier. With his manufacturing background and his experience in sales and marketing, the company focus is clearly on "... offering the best product design, combined with quality workmanship, at a competitive price, to the full satisfaction of our customers, at all times ...".

AES is committed to serving customers in the U.S. through a network of sales specialists, technical support personnel, distributors and installers, and international customers in selected countries through qualified representatives.

Please visit our web site at www.altenergy.com for updated versions of all data sheets, price lists, application notes, a list of authorized distributors, and other documents that are only available online.

Other Products from Alternate Energy Systems, Inc.

Water Bath Vaporizers
Hot Water Vaporizers
Steam Vaporizers

Electric Vaporizers
Electric Water Bath Vaporizers

Venturi Type LPG / Air Mixers
Patented Piston Operated LPG / Air Mixers

Complete Vaporizer / Mixer Systems
Peak Shaving Plants
Gas Stabilization Systems

Accessories for LPG / Air Systems
LPG Pump Packages

Service
Maintenance
Trouble Shooting

Our Address

Alternate Energy Systems, Inc.
210 Prospect Park P.O. Box 2469
Peachtree City, GA 30269, USA

Phone 770-487-8596
Fax 770-631-4306
Toll Free 800-410-9161

E-Mail info@altenergy.com
WebSite www.altenergy.com

Your AES Distributor