



Medical Vacuum Systems-PBMI

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Description

CONTROL PANEL

The Medical Vacuum System is controlled by a (Programmable Logic Controller) PLC. The operating status is displayed on the Powerex Building Management Integrator (PBMI) 6" color touch Screen panel on the front of the unit. The PBMI controls are contained in a NEMA 4/12 enclosure for multiplex configurations and meet NFPA 99 requirements for medical vacuum. The panel is UL508A listed and labeled. The panel door will also include: audible and visual alarms with an acknowledge button and an HOA switch for each pump.

The PBMI controls allow the user to view system functions, the factory set points, and navigate through the screens to get more information about the operation of the individual vacuum modules. Staff can receive email notifications for service alerts and system alarms, the details of which are also displayed on the built-in webpage.

Dry contacts for remote signaling include: reserve pump in use and a general fault to indicate the following: high temperature, motor overload trip, and reserve transformer in use. The PBMI controls contain a Building Automation System (BAS) communication gateway with BacNet® protocol and Web server features. The BAS communication gateway can support hundreds of pre-configured, labeled, and listed individual data points and utilizes a 10/100 BaseT Operation Ethernet port connection. Web server features include email notifications in case the system is in alarm for any reason or has achieved one of its maintenance intervals and requires service.

General Safety Information

A SEPARATE SAFETY BOOKLET IS PROVIDED ALONG WITH THIS MANUAL. READ AND UNDERSTAND THE SAFETY BOOKLET. This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. MAKE SURE EVERYONE OPERATING OR SERVICING THE COMPRESSOR READS AND UNDERSTANDS ALL THE INFORMATION PROVIDED.

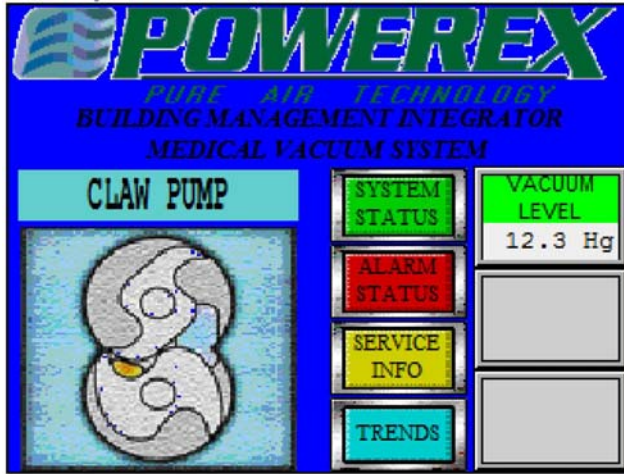
CONTROL PANEL - DISPLAY AND INPUT

The Powerex Medical Vacuum System has a HMI panel on the front to allow operation and monitoring of the unit. Once the unit is turned on, the main screen should appear (see example below). The picture of the pump on the main screen should match the type of pump technology on your system and will display either a claw pump, an oil-less rotary vane pump, or an oil-sealed rotary vane pump as appropriate. From the main screen, select the PUMP STATUS button for information about each pump on the system. Select ALARM STATUS to view the alarm screen and alarm history information. Select TRENDS to view daily load factor and total system run hours. Select SERVICE INFO for our service contact information, to expand the number of pumps on your system, the system model and serial number, to adjust the screen contrast, or adjust time and date.



Table of Contents	
Status Screens	Pg 2
Alarm Screens	Pg 3
Maintenance Screens	Pg 5
Gateway Start-Up	Pg 7
Gateway Troubleshooting	Pg 8
BACnet/IP Server Settings	Pg 9
Alarm Configuration	Pg 9
Email Configuration	Pg 10
System Status	Pg 10
Locking the System/ Username and Password	Pg 11

PG1—'MAIN'



- Displays Vacuum level
- Vacuum level will change from green to orange when low; will change from orange to red when in alarm
- System Status, Alarm Status, Service Info and Trends buttons will redirect to those specific pages

PG2—'SYSTEM STATUS'

Go to MAIN

Go to ALARM STATUS

Current Date and Time

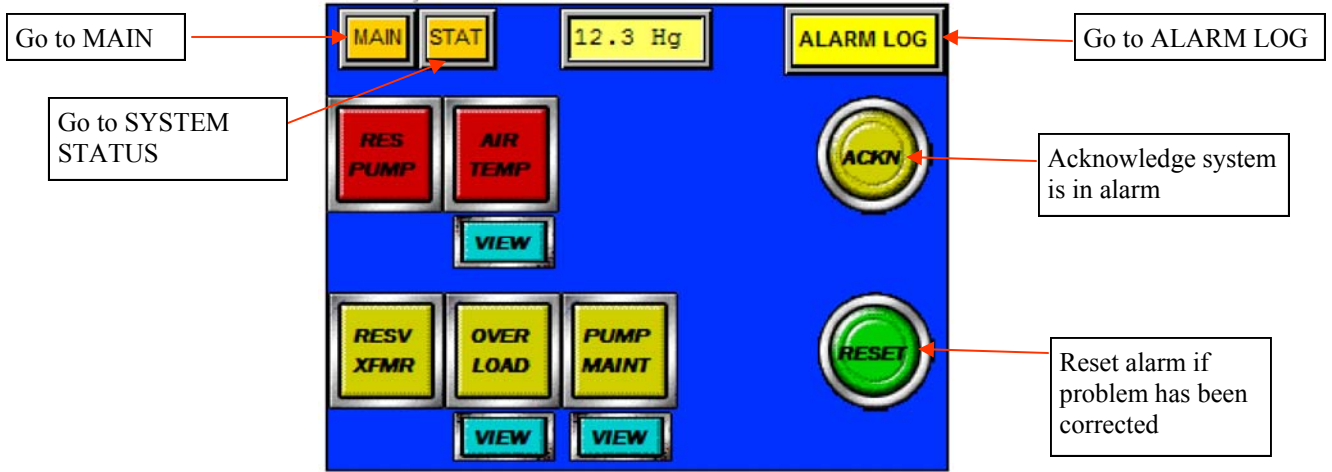
Run hours of pump

Go to PUMP MAINTENANCE

- Displays operating status, run hours, NFPA alarms, and Service alert of each pump on the system
- Displays Vacuum level of system like on MAIN page

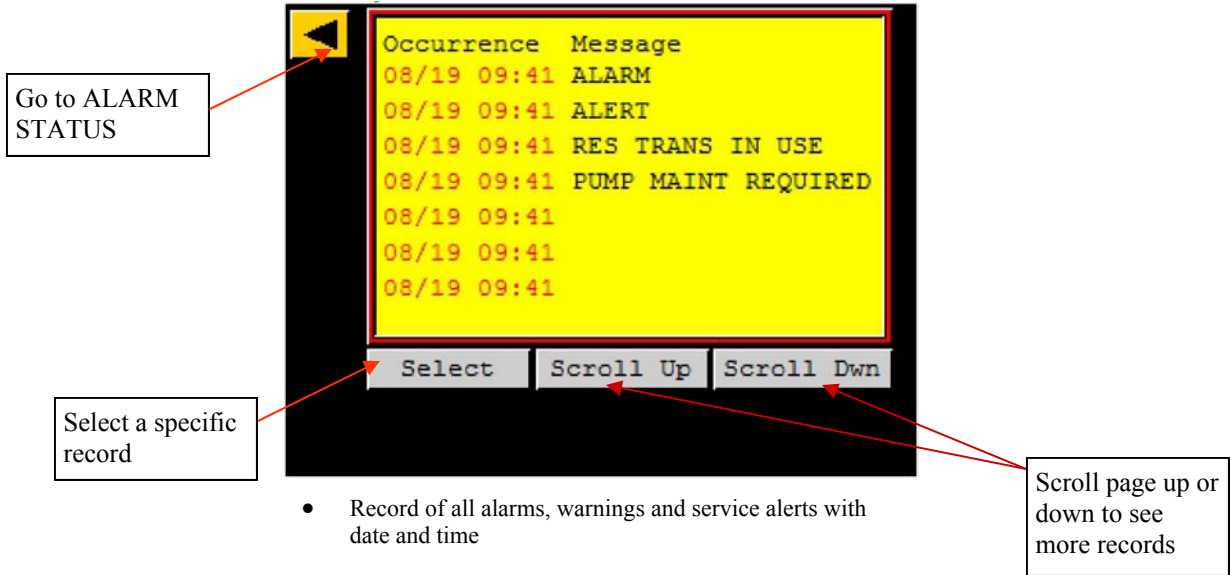
ALARM SCREENS

PG3—'ALARM STATUS'



- Displays NFPA alarms and service alerts
- Acknowledge and reset alarms
- Displays Vacuum Level

PG4—'ALARM LOG'



- Record of all alarms, warnings and service alerts with date and time

Medical Vacuum—PBMI

PG5—'SERVICE'

Go to MAIN

For service call **POWEREX @ 888-769-7979**

SYSTEM MODEL # ABCDEFGHIJKLMNO

SYSTEM SERIAL # 1234567890

PLEX MODE INPUT
12345

FOR EXPANSION, PRESS DISPLAY ENTER # OF PUMPS

SEQUENCE OF OPERATION

ADJUST SCREEN CONTRAST

SET TIME, DATE

Go to SEQUENCE OF OPERATION

Make screen contrast lighter or darker

Set time and date

If system is expandable, re-adjust number of pumps

- Displays model number, serial number, service phone number
- If system is expandable, use Plex Mode Input to adjust PLC Program to additional pumps

TO SET TIME AND DATE:

MAIN For service call **POWEREX @ 888-769-7979**

SYSTEM MODEL # ABCDEFGHIJKLMNO

SYSTEM SERIAL # 1234567890

PLEX MODE INPUT
12345

FOR EXPANSION, PRESS DISPLAY ENTER # OF PUMPS

SEQUENCE OF OPERATION

ADJUST SCREEN CONTRAST

SET TIME, DATE

Press time, date button

THIS SCREEN WILL APPEAR

IDEC HG2G
SYSTEM MODE TOP PAGE

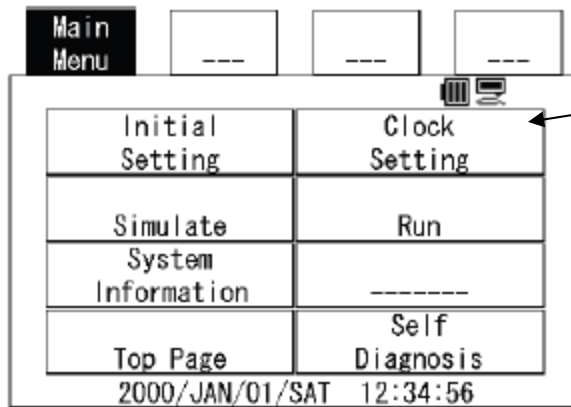
Run Simulate Offline

MAC ADDRESS : FF.FF.FF.FF.FF.FF
2000/JAN/01/SAT 12:34:56

CONTRAST 16

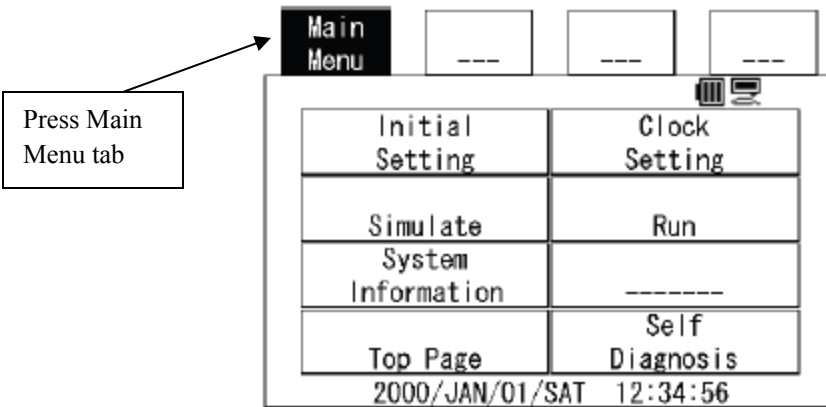
Press Offline

THIS SCREEN WILL APPEAR



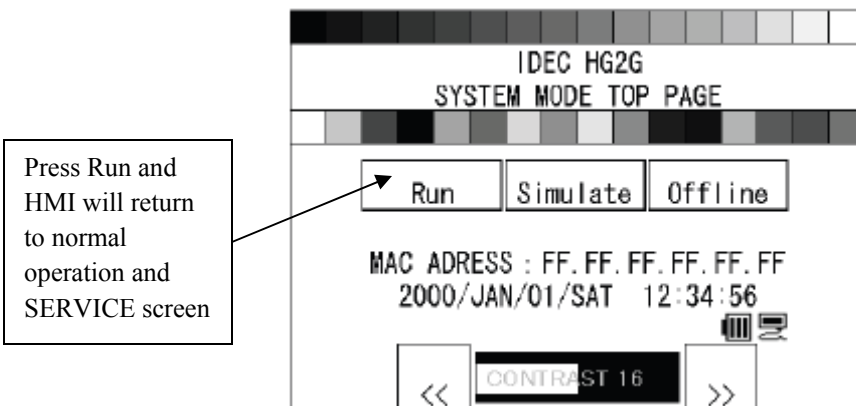
Press Clock Setting and enter time and date.

TO RETURN TO RUN MODE:



Press Main Menu tab

THIS SCREEN WILL APPEAR



Press Run and HMI will return to normal operation and SERVICE screen

PG6—'SEQUENCE OF OPERATION'

During normal operation the PBMI controller will signal the Lead compressor to run when pressure drops below lead cut-in set point and stop when the pressure reaches the lead cut-out set point. Lead alternation to the next pump, will occur with each lead run signal or every 10-minutes (which ever happens first). If demand cannot be satisfied by the lead pump, the lag pump(s) will start and stop based upon the lag cut-in and cut-out set-points and lead alternation will occur when the lowest cut-out set-point is satisfied, or 10-minutes (which ever happens first).

The RPUI (Reserve Pump In Use) alarm, H-Temp (High Discharge Air Temp) alarm, Motor Overload trip alarm, Reserve Transformer in use and Pump Service Required warnings will cause the touch screen to default to the Alarm Status Screen. Any and all alarms must be "Acknowledged" before navigating to other screens. The Pump Status Screen will indicate which pumps are running, any alarms, warnings and hour

BACK

NEXT

PG7—'DAILY LOAD FACTOR'

Go to MAIN

MAINTENANCE SCREENS

PG8—'PUMP MAINTENANCE'

Go to MAIN

- At specific preset hour intervals, pump maintenance instructions will be displayed; this is specific to each pump

Gateway Start-Up

REQUIRED TOOLS AND DATA

You will need the following tools:

OVERVIEW

The 460MX-S027 Gateway device seamlessly connects Modbus RTU Slave devices to a BACnet[®]/IP client. By following this guide, you will be able to configure the 460MX-S027 Gateway for basic operation. You will set the device's network settings and parameters to the proper configuration for initial operation and physically place the device in the network.

- ◆ The 460MX-S027 Gateway
- ◆ The provided CD-ROM
- ◆ A Working PC (Windows based)
- ◆ The Supplied Ethernet Crossover Cable
- ◆ A 7-30 VDC power source (T-strip)

NETWORK CONNECTIONS

The Gateway is shipped out with a Default IP Address of 172.16.3.159 and a Subnet of 255.255.248.0. In order to browse for the gateway's main page and begin configuring the gateway, you must change your PC to be on the same network as the gateway.

- 1) Change the IP Address of your PC to be 172.16.3.158.
- 2) Change the Subnet of your PC to be 255.255.248.0.
- 3) Open IPSetup.exe and browse for the gateway under select a unit.
- 4) Change the IP Address and Subnet to be on your network.
- 5) Click Set.
- 6) Change the PC's IP Address and Subnet back to its original settings.
- 7) Browse for the Unit using IPSetup.exe and launch the webpage.

ACCESSING THE MAIN PAGE

Before you can configure the gateway itself, you must configure the network settings to connect the gateway. The following steps will connect the gateway properly.

- 1) Connect the 7-30 VDC power source to the device.
- 2) Using the supplied crossover cable, connect the device to the PC.
- 3) Insert the provided CD-ROM.
- 4) Run the IPSetup program from the CD-ROM.
- 5) Configure the IP Settings based on your subnet.
- 6) Click **Set**.
- 7) Click **Launch Webpage**. The Main page should appear.

NOTE

Browser configuration is only Internet Explorer compatible. The use of FireFox is not supported.

Default IP address is 172.16.3.159

POWEREX
PURE AIR TECHNOLOGY

THE LEADER IN PURE AIR TECHNOLOGY

Powerex Building Management Integrator

Description	Enter an application description.	<input type="button" value="Edit"/>
Network Configuration	IP address: 172.16.3.159 Subnet mask: 255.255.248.0 Default gateway: 0.0.0.0 DNS address: 0.0.0.0 MAC address: 00-03-F4-05-3E-61	<input type="button" value="Edit"/>
Protocol Configuration	BACnet/IP Server Device Instance: 50 Device Name: Description: Location: Number of Objects to Expose: AI: 0, AO: 0, BI: 0, BO: 0	<input type="button" value="Edit"/>
Alarm Configuration	Alarms Configured	<input type="button" value="Edit"/>
Email Configuration	Email Configured	<input type="button" value="Edit"/>

Part # PE000447AV

Modbus RTU Master / BACnet/IP Server

Revision 1.15.5

Support: (888) 769-7979

System Serial Number 0

System Model Number

Compatible with Internet Explorer Only

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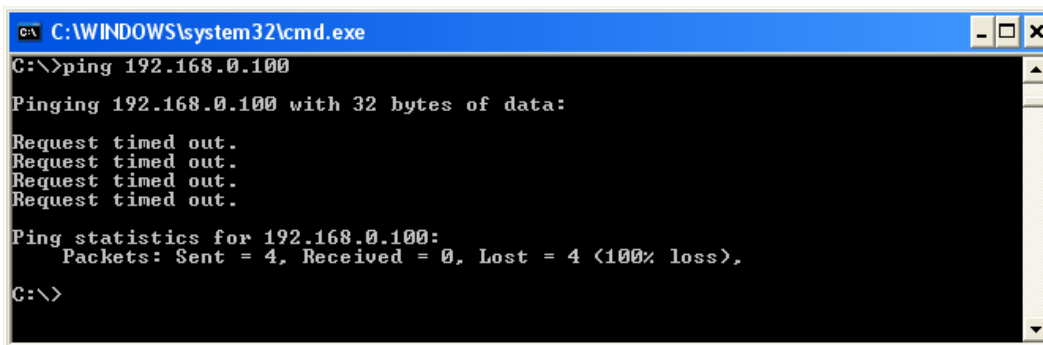
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Fax: (513) 367-3125 Ph: (888) 769-7979

Gateway Trouble-shooting

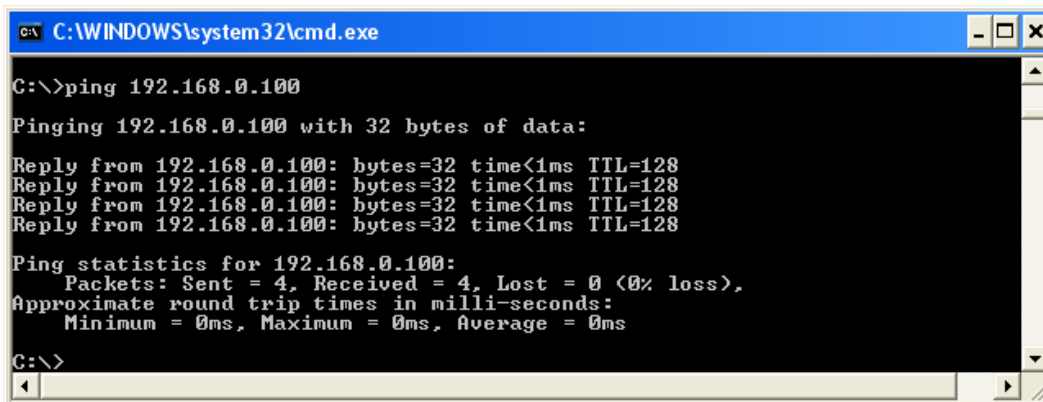
ERROR: MAIN PAGE DOES NOT LAUNCH

If the Main Page does not launch the IP Address is most likely incorrect. Correct the IP Address and try again. If you do not know the IP Address use the following procedure:

- 1) Open an MS-DOS Command Prompt.
- 2) Type ipconfig and press enter.
- 3) Note the IP address. (The previous example was 192.168.0.1)
- 4) To test the communication between the PC and the unit type ping (###.###.###.###) in the prompt and press Enter. The (###.###.###.###) is the IP address of the unit you used in step 5 of network configuration, which is 192.168.0.100 by default. If the device is connected to the network the ping will show a response. If you get no response check the crossover cable.



```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.100
Pinging 192.168.0.100 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```



```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.100
Pinging 192.168.0.100 with 32 bytes of data:
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

Gateway Start-Up

BACnet®/IP Server Settings

- 1) Click Edit next to the BACnet® Server row. Verify that the Enabled box is checked.
- 2) Enter the Device Instance that corresponds with your BACnet®/IP Server device.
- 3) In the Device Name field enter a unique name for the device.
- 4) The Description and Location fields are optional. Filling in this information is recommended to identify the device on a network.
- 5) Beneath # of Objects to Expose, enter in the number of Analog Input (AI), Analog Output (AO), Binary Input (BI), and/or Binary Output (BO) objects that you will be accessing from the BACnet®/IP Client.
- 6) Click **Save**.

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Powerex Building Management Integrator

Part # PE000447AV

Modbus RTU Master / BACnet/IP Server

Revision 1.15.5

Main Page

Support: (888) 769-7979

System Serial Number 0

System Model Number

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Comm Module	Action	Detail
BACnet/IP Server	Edit	Device Instance: 50 (0-4194303) Device Name: <input type="text"/> Description: <input type="text"/> Location: <input type="text"/> # of Objects to Expose: AI: 0 (enter 0-150) AO: 0 (enter 0-150) BI: 0 (enter 0-1600) BO: 0 (enter 0-1600)

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ALARM CONFIGURATION

- 1) Click Edit next within the Alarm Configuration section from the Main Page
- 2) To enable an alarm, check the box within the Enable/Disable column.
- 3) If an alarm is enabled, then the Low Alarm and High Alarm must be set.
- 4) If the value of the point falls below the Low Alarm, the alarm is set and an e-mail is generated if e-mail is configured.
- 5) If the value of the point reaches the High Alarm, the alarm is set and an e-mail is generated if e-mail is configured.
- 6) Scroll to the bottom and Save.

POWEREX THE LEADER IN PURE AIR TECHNOLOGY

Powerex Building Management Integrator

Part # PE000447AV

Modbus RTU Master / BACnet/IP Server

Revision 1.15.3

Main Page

Support: (888) 769-7979

System Serial Number 1234567

System Model Number 1234567889ABCDE

Compatible with Internet Explorer Only

Modbus Address	Modbus Name	Enable/Disable	Slave - #1	
			Low Alarm	High Alarm
400906	System Pressure (PSI)	<input type="checkbox"/>	0.000000	0.000000
400911	CO Level (ppm)	<input type="checkbox"/>	0.000000	10.000000
400916	Dewpoint level (Deg F)	<input type="checkbox"/>	0.000000	35.000000
400071	Daily Load Factor %	<input type="checkbox"/>	0.000000	0.000000
400049	Total System Run Hours	<input type="checkbox"/>	0.000000	0.000000
300501	Alternation Timer (sec)	<input type="checkbox"/>	0.000000	0.000000
300521	Pump-1 Hour Meter	<input type="checkbox"/>	0.000000	0.000000
300522	Pump-2 Hour Meter	<input type="checkbox"/>	0.000000	0.000000
300523	Pump-3 Hour Meter	<input type="checkbox"/>	0.000000	0.000000
300524	Pump-4 Hour Meter	<input type="checkbox"/>	0.000000	0.000000

EMAIL CONFIGURATION

- 1) Click Edit next to the Email Configuration section from the Main Page
- 2) Enter a SMTP Mail Username. This e-mail must have SMTP capability set up.
- 3) If the SMTP device requires authentication, please enter in the Password for the SMTP Mail Username.
- 4) Enter in the SMTP Server that is being used.
- 5) Enter in the Email Address of the sender. This is going to be the same field as Step 2
- 6) Enter in the Email Address of the recipient.
- 7) Repeat steps 2-6 for multiple recipients.
- 8) Enter the Subject of the Email to be sent. This will be used for all 3 e-mail's
- 9) Enter an extension of the Message Body. Every Email will have a Body of Email that specifies the Alarm and the value of the current alarm that was triggered. This field will be added after the standard body.
- 10) Click **Save**.
- 11) Click Send Test Email to verify all of the Email settings are correct.

Powerex Building Management Integrator

Part # PE000447AV

Modbus RTU Master / BACnet/IP Server
Revision 1.15.3

Main Page

Support: (888) 769-7979

System Serial Number 1234567

System Model Number 1234567889ABCDE

Compatible with Internet Explorer Only

Contact 1	Contact 2	Contact 3
SMTP Mail Username:	<input type="text"/>	<input type="text"/>
SMTP Mail Password:	<input type="text"/>	<input type="text"/>
SMTP Server:	<input type="text"/>	<input type="text"/>
From Address:	<input type="text"/>	<input type="text"/>
To Address:	<input type="text"/>	<input type="text"/>
Message Subject:		
<input type="text"/>		
Message Body:		
<input type="text"/>		

Save Cancel

Send Test Email

SYSTEM STATUS

- 1) This page shows the Modbus Point, Point Name, Value, and if an Alarm is set, the Low and High Alarm.
- 2) The value will show the current value of the point upon a Refresh of this page.
- 3) If an alarm is enabled and is triggered, the point in an alarm state will be displayed in Red.

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Part # PE000447AV

Modbus RTU Master / BACnet/IP Server
Revision 1.15.3

Main Page

Support: (888) 769-7979

System Serial Number 1234567

System Model Number 123456789ABCDEF

Compatible with Internet Explorer Only

Enter an application description.

Device: Device 2 - Slave 1 - Air Duplex-Hexaplex

Refresh Reset Status Counters

Register	Name	Value	Low Alarm	High Alarm
400906	System Pressure (PSI)	0.0	0.0	0.0
400911	CO Level (ppm)	0.0	0.0	10.0
400916	Dewpoint level (Deg F)	0.0	0.0	35.0
400071	Daily Load Factor %	0.0	0.0	0.0
400049	Total System Run Hours	0.0	0.0	0.0
300501	Alternation Timer (sec)	0.0	0.0	0.0
300521	Pump-1 Hour Meter	0.0	0.0	0.0
300522	Pump-2 Hour Meter	0.0	0.0	0.0
300523	Pump-3 Hour Meter	0.0	0.0	0.0
300524	Pump-4 Hour Meter	0.0	0.0	0.0
300525	Pump-5 Hour Meter	0.0	0.0	0.0
300526	Pump-6 Hour Meter	0.0	0.0	0.0
1121	System General Fit	0	0.0	1.0
1122	Res Pump in Use	0	0.0	1.0
1123	High CO Alarm	0	0.0	1.0
1124	High Dewpoint Alarm	0	0.0	1.0
100001	High Temp Switch-1	0	0.0	0.0
100002	High Temp Switch-2	0	0.0	0.0
100003	High Temp Switch-3	0	0.0	0.0

LOCKING THE SYSTEM

To lock the system within the network, click the Lock the System button found on the Main Page.

- 1) Upon first time locking the system, enter in a Username, Password, and Re-enter the password. This will be the same Username and Password for this gateway.

If the Username and/or Password is ever forgotten, click the “Reset Username/Password”.

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Powerex Building Management Integrator

Part # PE000447AV

Modbus RTU Master /
BACnet/IP Server

Revision 1.15.5

Support: (888) 769-7979

System Serial Number
0

System Model Number

Compatible with
Internet Explorer Only

Password Page

Enter Customer Username:

Enter Customer Password:

Re-enter Customer Password:

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Fax: (513) 367-3125 Ph: (888) 769-7979

RESET THE USERNAME/PASSWORD

Please call Powerex at (888) 769-7979 with the MAC Address of the gateway. Once the correct Powerex Password is entered, you will be redirected to the Login Password and be prompted to enter in a new Username and Password.

Reset Login

Powerex Password:

MAC Address: 00-03-F4-03-6D-73

Product Name: PE000447AV

Product Revision: 1.15.03

Please write down your MAC Address and contact Powerex at (888) 769-7979.