

READ AND SAVE THESE INSTRUCTIONS



## VAPOR-LOGIC® VERSION 6

Humidifier Control System

### Installation and Operation Manual

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DriSteem® Technical Support  
800-328-4447









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# Warnings and cautions

 <b>WARNING</b>	<b>CAUTION</b>
Indicates a hazardous situation that could result in death or serious injury if instructions are not followed.	Indicates a hazardous situation that could result in damage to or destruction of property if instructions are not followed.

 <b>WARNING</b>	
	<p><b>Read all warnings and instructions</b></p> <p>This page provides important safety instructions; it is intended to supplement — not replace — the humidifier's Installation, Operation, and Maintenance Manual (IOM). Read the IOM that was provided with the humidifier before performing service or maintenance procedures on any part of the system. Failure to follow all warnings and instructions could produce the hazardous situations described here and in the IOM, resulting in property damage, personal injury, or death.</p> <p>If the IOM is missing, <b>go to <a href="http://www.dristeem.com">www.dristeem.com</a> to download a replacement.</b></p>
 	<p><b>Hot surfaces and hot water</b></p> <p>Steam humidification systems have extremely hot surfaces, and water in tanks, electrode cylinders, steam pipes, and dispersion assemblies can be as hot as 212 °F (100 °C). To avoid severe burns, allow the entire humidification system to cool.</p> <p>Follow the cool-down procedure in the humidifier's IOM before performing service or maintenance procedures on any part of the system.</p>
   	<p><b>Shut down the energy source</b></p> <p>Before performing service or maintenance procedures on any part of the humidification system, verify that all energy sources are off. Energy sources can be electricity, gas, steam, or hot liquid. Failure to shut down the energy source could result in carbon monoxide poisoning, fire, explosion, electrical shock, and other hazardous conditions. These hazardous conditions could cause property damage, personal injury, or death.</p> <p>Contact with energized circuits can cause property damage, severe personal injury or death as a result of electrical shock or fire. Do not remove the shroud/cover, electrical panel cover/door, access panels, or heater terminal cover until electrical power is disconnected.</p> <p>Follow the shutdown procedure in the humidifier's IOM before performing service or maintenance procedures on any part of the system.</p>

<b>CAUTION</b>
<p><b>Hot discharge water</b></p> <p>Discharge water can be as hot as 212 °F (100 °C) and can damage the drain plumbing.</p> <p>Humidifiers equipped with a water tempering device need fresh make-up water in order to function properly. Make sure the water supply to the water tempering device remains open during draining.</p> <p>Excessive supply water pressure</p> <p>Supply water pressure greater than 80 psi (550 kPa) can cause the humidifier to overflow.</p>



# Vapor-logic capabilities

## **ACCURATE, RESPONSIVE CONTROL**

The Vapor-logic controller provides accurate, responsive RH control. PID control tunes the system for maximum performance.

**Modbus®, BACnet®, or LonTalk®** allow interoperability with multiple building automation systems. Modbus is standard, and BACnet or LonTalk are available options.

**Web interface,** provides the capability to set up, view, and adjust humidifier functions via Ethernet, either directly or remotely through a network.

**USB port** allows easy firmware updates, and data backup and restore capability.

**Real-time clock** allows time-stamped alarm and message tracking, and accurate drain and flush scheduling.

**Auxiliary temperature sensor/transmitter** allows temperature compensation control to prevent window condensation, or air temperature monitoring, such as in a duct.

**Programmable outputs** allow remote signaling and device activation.

**Multiple-humidifier control** allows staged control of up to 8 humidifiers with one controller.

**Controller data,** such as RH, air temperature, water use, energy use, and alerts can be downloaded to a PC for viewing and analysis. RH, alerts, and messages can also be viewed on the display and Web interface.

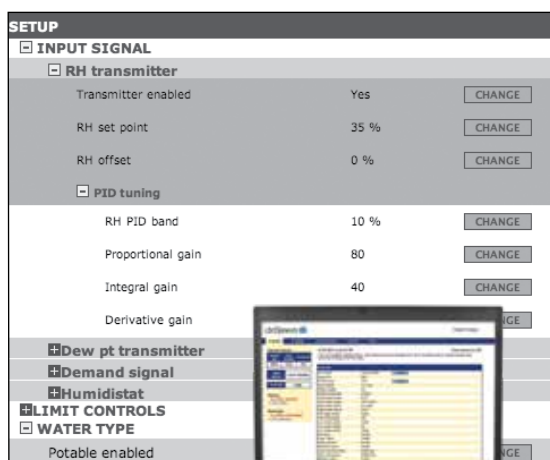


**More capabilities on the next page >**

# Vapor-logic capabilities

**Enhanced diagnostics** include:

- **Test outputs** function using display or Web interface to verify component operation
- **Test humidifier** function using simulated demand to validate performance



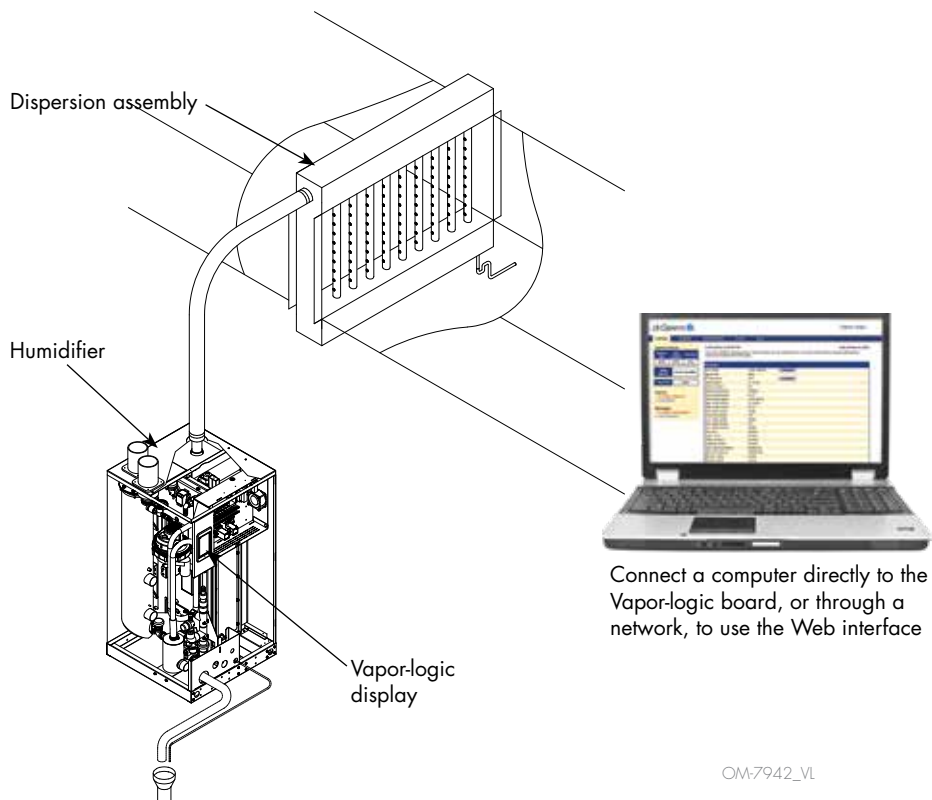
Use the Vapor-logic display or the standard Web interface, shown here, to control your humidification system.



Insert a USB flash drive into the Vapor-logic board's USB port to perform software updates, download data logs, and back up and restore data.

# Humidification system overview

**FIGURE 3-1: TYPICAL HUMIDIFICATION SYSTEM LAYOUT (GTS HUMIDIFIER SHOWN)**



Every humidification system with a Vapor-logic controller has a display connection and an Ethernet connection for connecting to a Web interface on a computer. A GTS humidifier is shown here, with display mounted on the cabinet. Other types of DriSteem humidifiers can have the display contained within a control cabinet or mounted remotely.

## OPERATING CONDITIONS

The Vapor-logic main board and display must be operated and stored within the limits listed below. Exceeding these limits can result in poor display performance and/or damage to the unit.

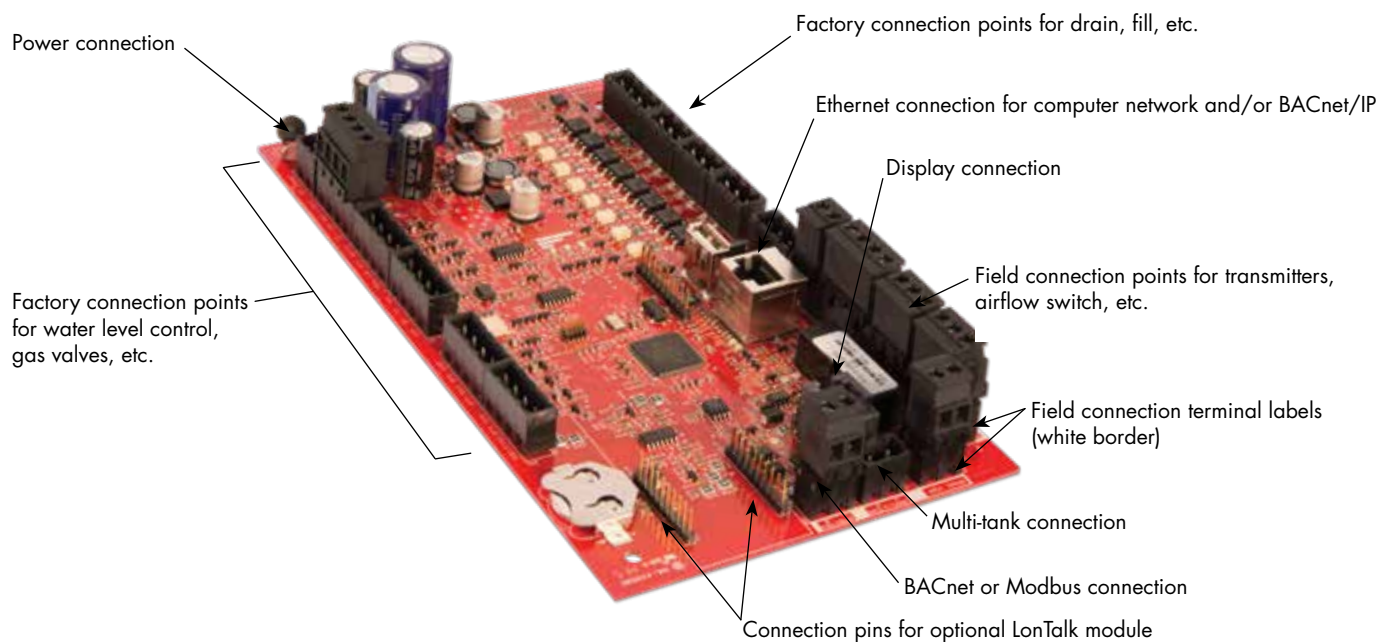
### Main board

Operating temperature:	32 °F to 158 °F (0 °C to 70 °C)
Storage temperature:	-40 °F to 185 °F (-40 °C to 85 °C)
Operating humidity range:	<95% noncondensing

### Display

Operating temperature:	32 °F to 158 °F (0 °C to 70 °C)
Storage temperature:	-22 °F to 176 °F (-30 °C to 80 °C)
Operating humidity range:	<90% noncondensing

# Vapor-logic board: Components

**FIGURE 4-1: VAPOR-LOGIC CONTROL BOARD**

The photo above shows key components of the Vapor-logic control board. See the illustration on the next page for more detail.



# Vapor-logic board: Connections

**FIGURE 5-1: VAPOR-LOGIC CONTROL BOARD CONNECTIONS**

P1:  
24vac = Power to board  
⊥ = Ground for power return

P2:  
Low = Low water probe  
Mid = Mid water probe  
Top = Top water probe  
⊥ = Ground for water probe

P3:  
GV1 = Gas valve 1 (24vac input)  
BT1 = Blower tach 1 (pulse tach input)  
LW = Flue or tank overtemp (24vac input)  
FPsw = Flue pressure switch (24vac input)

P4:  
lsw = Interlock switch (24vac input)  
TT = Tank temp sensor (RTD input)  
⊥ = Ground for tank temp sensor  
CS1 = Flue temp sensor

P5:  
GV2 = Gas valve 2 (24vac input)  
BT2 = Blower tach 2 (pulse tach input)

P6:  
21vdc = 21vdc  
CS2 = Analog input (4-20 mA)/  
Drain temp sensor

P19:  
⊥ = Ground for blower or steam valve  
SSR/BL = All blowers

P18: (all are 24VAC outputs)  
CT4 = GTS LX refill valve  
CT2 = Ignition module 2

P17: (all are 24VAC outputs)  
CT1 = Ignition module 1  
Drain = Drain valve  
Fill = Fill valve

P16: (all are 24VAC outputs)  
SDU = Space Distribution Unit/Area type  
NO-2 = Normally open #2.  
\* See Caution below.

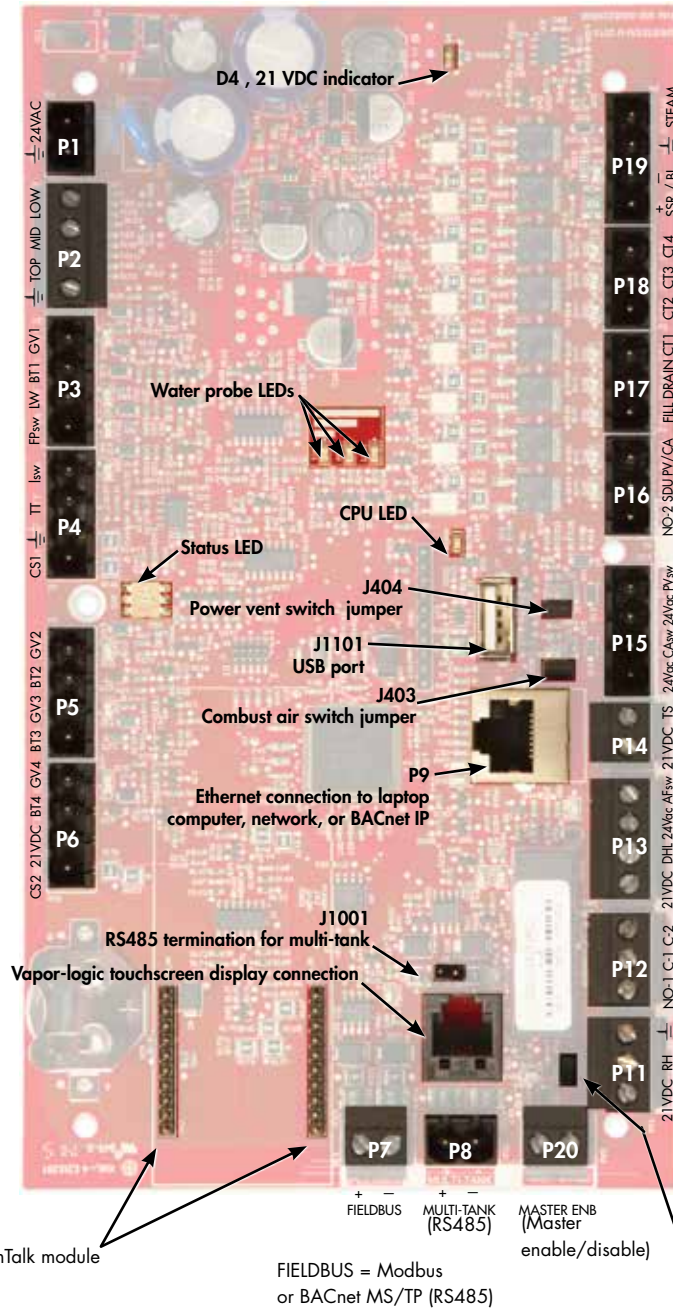
P15:  
n/a

P14:  
TS = Aux. temp. sensor or temp. comp. sensor (4-20 mA input)  
temp. comp. sensor

P13:  
AFsw = Airflow proving switch (24vac input)  
24vac = Power to airflow proving switch  
DHL = Duct high limit switch/transm. (4-20 mA input)  
21vdc = Power to duct high limit switch or transmitter

P12:  
Programmable relay #1  
\* See Caution below.  
C-2 = Common #2  
C-1 = Common #1  
NO-1 = Normally open #1

P11:  
⊥ = Ground for demand signal by others  
RH = Space RH input (RH transmitter, dew point transmitter, humidistat, or demand signal by others (4-20 mA or 0-16vdc typical)  
21vdc = Power to space RH sensor



Connection pins for optional LonTalk module

FIELD BUS = Modbus  
or BACnet MS/TP (RS485)

J402 Master enable jumper

## Notes:

- Programmable relay functions are defined using the display or Web interface during the Setup process.
- For most applications, field connections are made at terminals on the board that are surrounded with a white border (P7, P8, P11-P16, P20).

## CAUTION

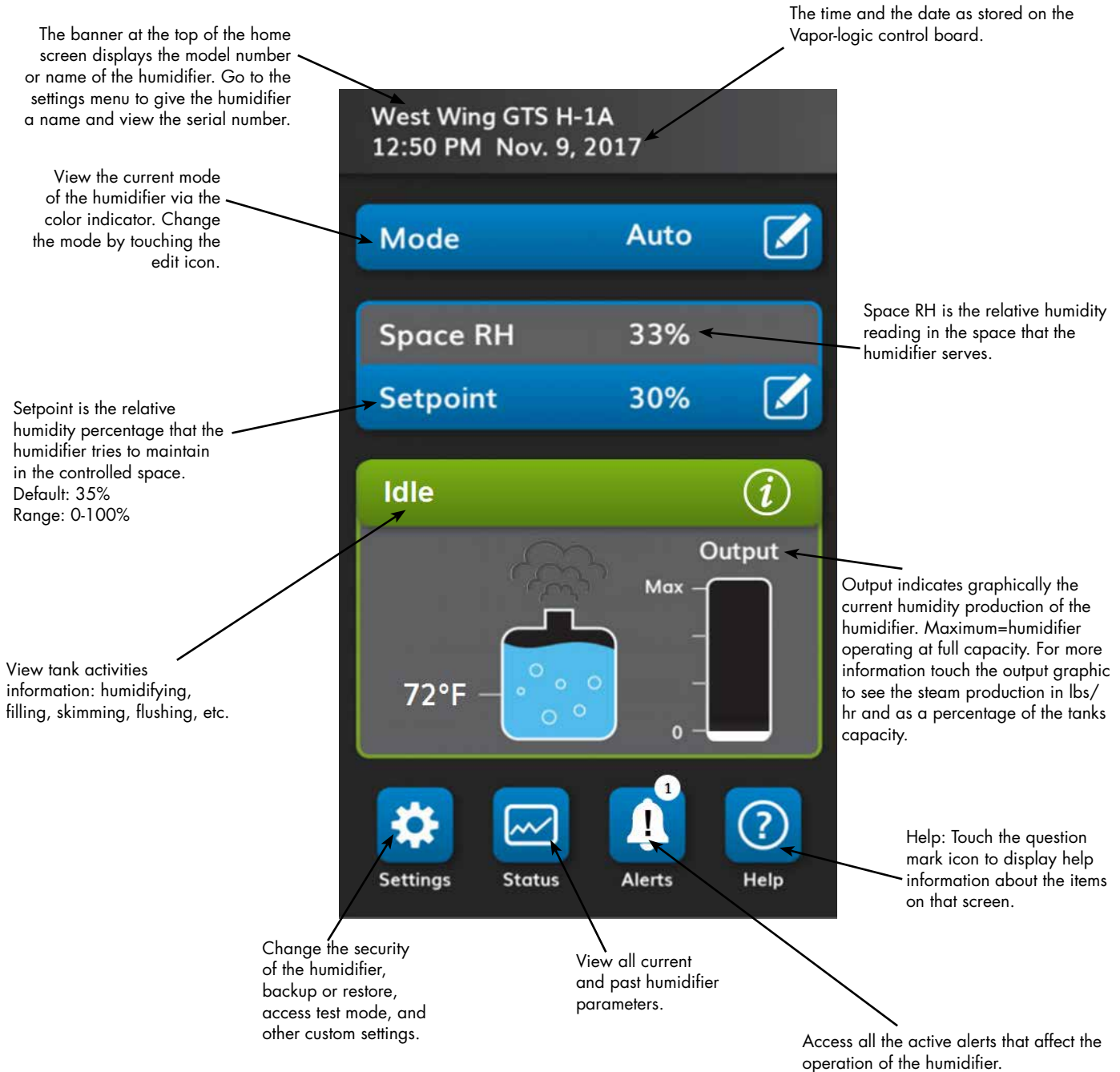
### Programmable relay maximum electrical ratings

Programmable relays are rated for 125 VAC, 3 Amp or 30 VDC, 3 Amp maximum. Exceeding these maximum ratings can cause the relay components on the Vapor-logic board to fail.

# Display

**FIGURE 6-1: USING THE VAPOR-LOGIC DISPLAY**

## Typical Home screen



# Web interface

**FIGURE 7-1: USING THE VAPOR-LOGIC WEB INTERFACE (SETUP SCREEN SHOWN)**

Click on a tab label to move to another screen

**STATUS** **ALARMS** **DIAGNOSTICS** **SETUP** **HELP**

**System Status**

DEMAND	OUTPUT
73.3%	0%

**RUN MODE** Auto

**TANK STATUS** Idle

**Alarms**  
0 active alarms  
> [View Alarms](#)

**Messages**  
1 active message  
> [View Messages](#)

Click here to view alarms

Click here to view messages

Click on label to contract (-) or expand (+) menu item

**Tuesday, May 22, 2012 4:30:14 PM** **Data stream is LIVE**

Set or change all humidifier settings below. Humidifiers are sent from the factory configured as ordered. However, some settings are unknown at the factory and need to be defined on this page.

**SETUP**

- + INPUT SIGNAL
- + LIMIT CONTROLS
- WATER MANAGEMENT
  - End of season drain
 

EOS enabled	Yes	<a href="#">CHANGE</a>
Idle time for EOS	72 hours	<a href="#">CHANGE</a>
  - Service interval
 

Service interval	30000 lbs	<a href="#">CHANGE</a>
------------------	-----------	------------------------
- + FAN-BASED DISPERSION
- + COMMUNICATIONS
- + PROGRAMMABLE OUTPUTS
- + SET DATE AND TIME
- + LANGUAGE
- + UNITS
- + SECURITY
- + CAPACITY ADJUST
- + RESET TO DEFAULTS

Click on CHANGE to change value

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# Pre-installation Checklist

- ☐ See Figure 8-1 for field terminal block locations. Note that field wiring connection locations on the Vapor-logic board are surrounded with a white border.
- ☐ See the figure on the next page for instructions on how to make wiring connections.
- ☐ See the wiring drawings and manuals that shipped with your humidifier.
- ☐ When making field connections, do not route low voltage wires near line voltage wires. Do not route low voltage wires in the same conduit as line voltage wires.
- ☐ Humidistat, room/duct transmitter, temperature sensor, and airflow proving switch wiring must be minimum 18-gauge (1 mm<sup>2</sup>) plenum rated, shielded (screened), twisted pair wire with a bare drain wire for grounding.
- ☐ Connect the shield (screen) wire [with a length less than 2" (50 mm)] to the shield (screen) ground terminal on the electric subpanel. Do not ground the shield (screen) wire on the humidistat or transmitter end.

**FIGURE 8-1: VAPOR-LOGIC CONTROL BOARD DETAIL**

Board detail showing white border

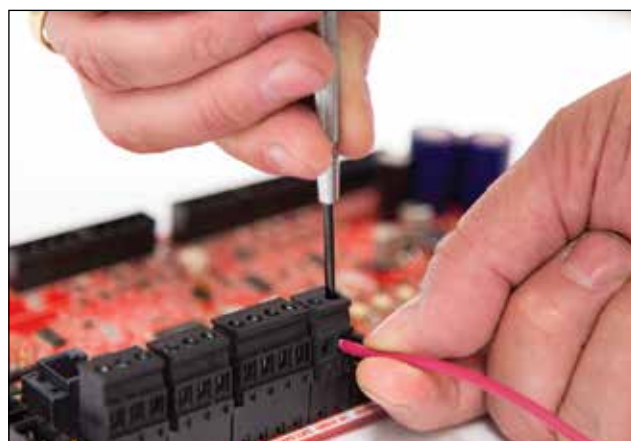
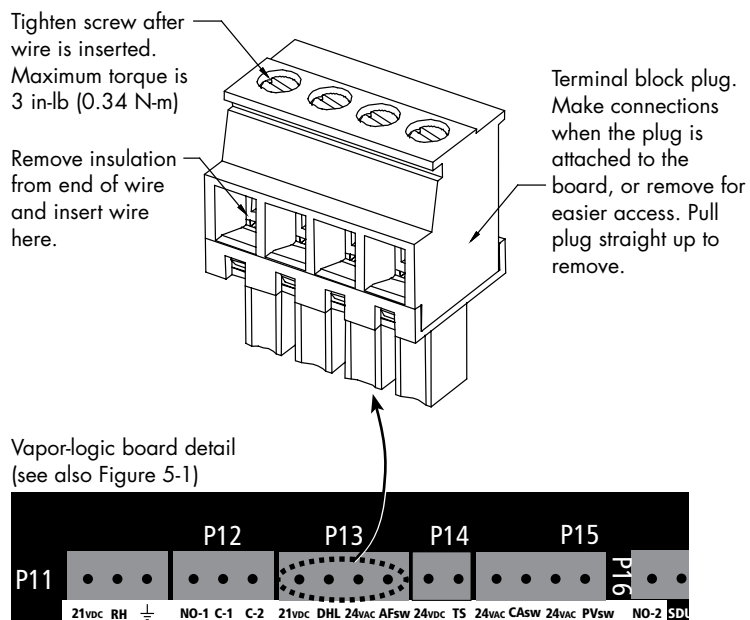


Field connection terminals. Terminals P-11 through P-16 have a white border on the Vapor-logic board. This is where you will make most of your field wiring connections.

Field connection terminals.

# Pre-installation Checklist

**FIGURE 9-1: VAPOR-LOGIC TERMINAL BLOCK DETAIL AND CONNECTION INSTRUCTIONS**





# Installation process

The Vapor-logic board is designed to make installation very easy:

- Terminal blocks that require field connections are outlined in white.
- Terminal plugs can be removed to allow easy access when inserting wires and tightening screws.
- For most applications, humidifiers ship with the control board fully configured, with drain, fill, and other humidifier components factory-wired to the board, and the display attached to the humidifier and connected to the Vapor-logic board.

## **SETUP OF VAPOR-LOGIC IS A THREE-STEP PROCESS:**

### **1. Connect field wiring from device to Vapor-logic board.**

See instructions beginning on Page 12. Note that some connections listed here may not apply to your system.

- Control input (one required)
  - RH or dew point transmitter
  - Demand signal by others (4-20 mA or 0-10 VDC typical)
  - Room or duct humidistat
  - Demand signal by BACnet, Modbus, or LonTalk
- Limit controls
  - Airflow switch (duct or SDU)
  - Duct high limit on-off switch or transmitter
  - Temperature compensation transmitter (or auxiliary temperature sensor connected to same terminal)
  - Master enable

## Installation process

- Communication connections
  - Vapor-logic display
  - Ethernet
  - Modbus
  - BACnet
  - LonTalk
  - Multiple-tank communication
- Programmable relays
- Area-type, SDU dispersion fans, or steam blowers

### **2. Complete the Setup process.**

See instructions beginning on Page 27.

### **3. Start up humidifier(s).**

See instructions on Page 35.

Refer to the Pre-installation Checklist and drawings on the previous pages, and then make the field wiring connections as described on the following pages.

# Step 1 – Field wiring: Control input

Connect control input signal wiring by inserting wires into Terminal P11 (labeled 21 vdc, RH, and ground) per the wiring diagram on the next page. Tighten screws.

Allowed inputs at Terminal P11 include:

- **RH transmitter or dew point transmitter**  
Transmitters provide a signal proportional to the RH or dew point being measured. All transmitters provided by DriSteem are two-wire devices using a 4 to 20 mA signal.
- **Demand signal by others**  
Demand signals are sent to the Vapor-logic board from another control system such as a building automation system. These systems have their own RH or dew point transmitters, calculate required humidifier output, and send a demand signal to the humidifier to create steam at a percentage of that humidifier's capacity. Demand signals are typically 0-10 VDC or 4-20 mA, but may also come from a DDC signal via Modbus, BACnet, or LonTalk.
- **A humidistat** also delivers a demand signal to the humidifier, but it is not typically used with Vapor-logic.

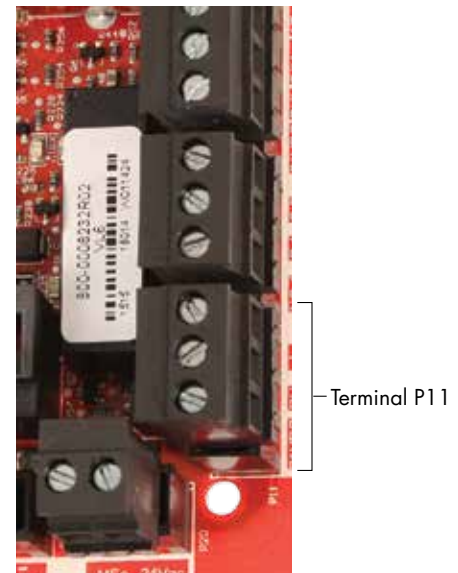
Humidistats provide either on-off control or modulating control. DriSteem humidistats are powered by a 24 VDC supply provided by the Vapor-logic control board.

When using modulating control, the signal from a humidistat directly controls the amount of output from the humidifier.

Notes:

- See Figure 13-1.
- For more information about control input signal types and operation, see "On-off control" on page 14.
- See "Modbus, BACnet, LonTalk interoperability" on page 69 for more information about input signals.

**FIGURE 12-1: TERMINAL P11**



**Terminal P11:**

21 vdc = Power to space RH sensor  
RH = Space RH input (RH transmitter, dew point transmitter, humidistat, or demand signal by others (4-20 mA or 0-10) VDC input  
⊕ = Ground for demand signal by others

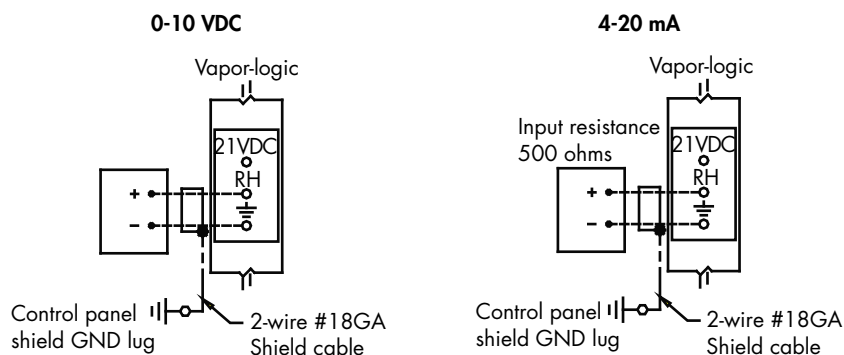
**Note:**

If you do not know which control components were ordered with your system, contact DriSteem or connect your display to the Vapor-logic board per the instructions on Page 19. Go to the instructions on Page 27 to view system parameters that were factory configured as ordered.

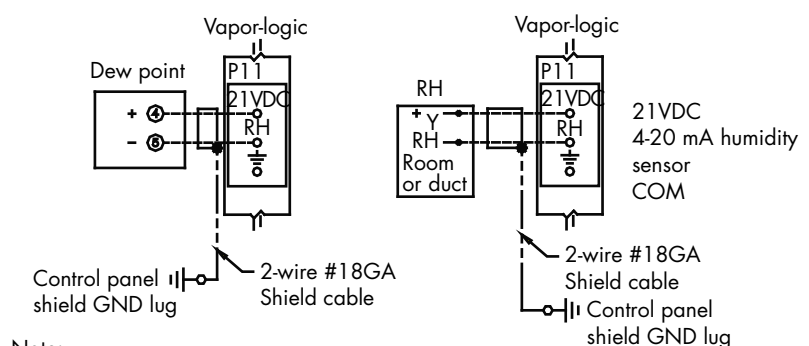
# Step 1 – Field wiring: Control input

**FIGURE 13-1: VAPOR-LOGIC CONTROL INPUT WIRING CONNECTIONS**

Signal by others



Transmitter

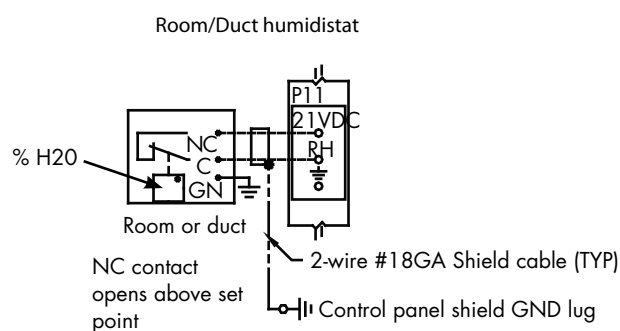


Note:

Input resistance on 4-20 mA is 500 ohms

Note: Input resistance 500 ohms

On-off RH humidistat



Key

Control circuit wiring  
Field wiring  
Optional factory

Optional field  
Break to external connections diagram

## Step 1 – Field wiring: Control input signals

DriSteem offers three control options for all its humidification systems controlled by Vapor-logic: On-off control, demand signal control, and transmitter control.

### **ON-OFF CONTROL**

On-off control—the simplest control scheme—does exactly what its name implies: the output device turns fully on, then fully off.

The humidistat that controls the humidifier has a differential between the on and off switch points. The differential is established at a range sufficient to prevent output short cycling. In other words, the humidity level has to fall below set point before the humidistat closes and energizes the humidifier. Once the humidifier is energized, the humidistat stays closed until the humidity is above set point. This creates an operating range that prevents the humidifier from running for very short periods of time.

In applications with a variable output stage, such as a GTS humidifier, the outputs are ramped up until they reach 100%.



## Step 1 – Field wiring: Control input signals

### MODULATING DEMAND SIGNAL CONTROL

With modulating demand signal control, a modulating humidistat or a building automation system sends a signal to the Vapor-logic controller, which then sends a signal to the humidifier to produce a directly proportional steam output. For example, if a humidistat operating between 4 mA and 20 mA sends a 4 mA signal, the humidifier produces no output; a 12 mA signal causes the humidifier to run at 50% of capacity; and a 20 mA signal causes the humidifier to run at 100% capacity.

With a humidistat provided by DriSteem producing this signal, the humidity set point is set at the humidistat. The display then is used for maintaining and troubleshooting the humidification system, with humidifier control stemming from the humidistat itself. With a building automation system (BAS) providing the signal, the humidity set point is established by the BAS, and the humidifier responds to the BAS commands.

### TRANSMITTER CONTROL

With transmitter control, the Vapor-logic board receives a signal that corresponds to the actual humidity level measured in the space being controlled. (With a transmitter provided by DriSteem, the signal is 4 to 20 mA, which corresponds to 0 to 100% RH). The Vapor-logic controller employs an internal PID loop that uses this humidity measurement along with a user-defined humidity set point to calculate a demand level. This demand level is the level at which the humidifier will run. See "PID tuning" on Page 51.

### Calculation of transmitter % RH

$$\% \text{ RH} = \frac{(\text{mA reading}) - 4 \text{ mA}}{16 \text{ mA}} \times 100\%$$

$$\text{Example: } \frac{12 \text{ mA} - 4 \text{ mA}}{16 \text{ mA}} \times 100\% = 50\% \text{ RH}$$

# Step 1 – Field wiring: Limit controls

## AIRFLOW PROVING SWITCH

Connect wiring for duct airflow proving switch by inserting wires into the Vapor-logic terminal block plug at P13 (labeled AFsw and 24vac) per the wiring diagram on the next page. If unit is an RTS model with 1 or 2 stages or it has a Space Distribution Unit (SDU), insert wires into the control cabinet terminal block positions AF and PS. Tighten screws; maximum torque is 3 in-lb (0.34 N-m). (An SDU is a cabinet fan dispersion assembly.)

See also "Sensor placement" on Page 26.

## DUCT HIGH LIMIT SWITCH OR TRANSMITTER

Connect wiring for a duct high limit switch or transmitter by inserting wires into the terminal block plug at P13 (labeled DHL and 21vdc) per the wiring diagram on the next page. Tighten screws.

Note: The duct high limit sensor connected at this location can be an on-off high limit switch, or it can be a duct high limit transmitter with an adjustable high limit set point (4-20 mA input).

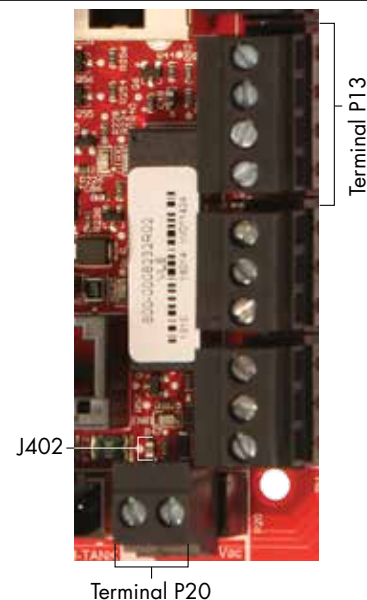
See also "Sensor placement" on Page 26.

## MASTER ENABLE INPUT

Connect wiring for an enable/disable dry-contact signal by inserting wires into the terminal block plug at P20 (labeled Master ENB). Tighten screws. Remove shunt on J402 if wiring is installed.

If an enable signal is not being used, jumper the Master ENB terminal block plug at P20 or attach the included shunt to the two pin header at J402.

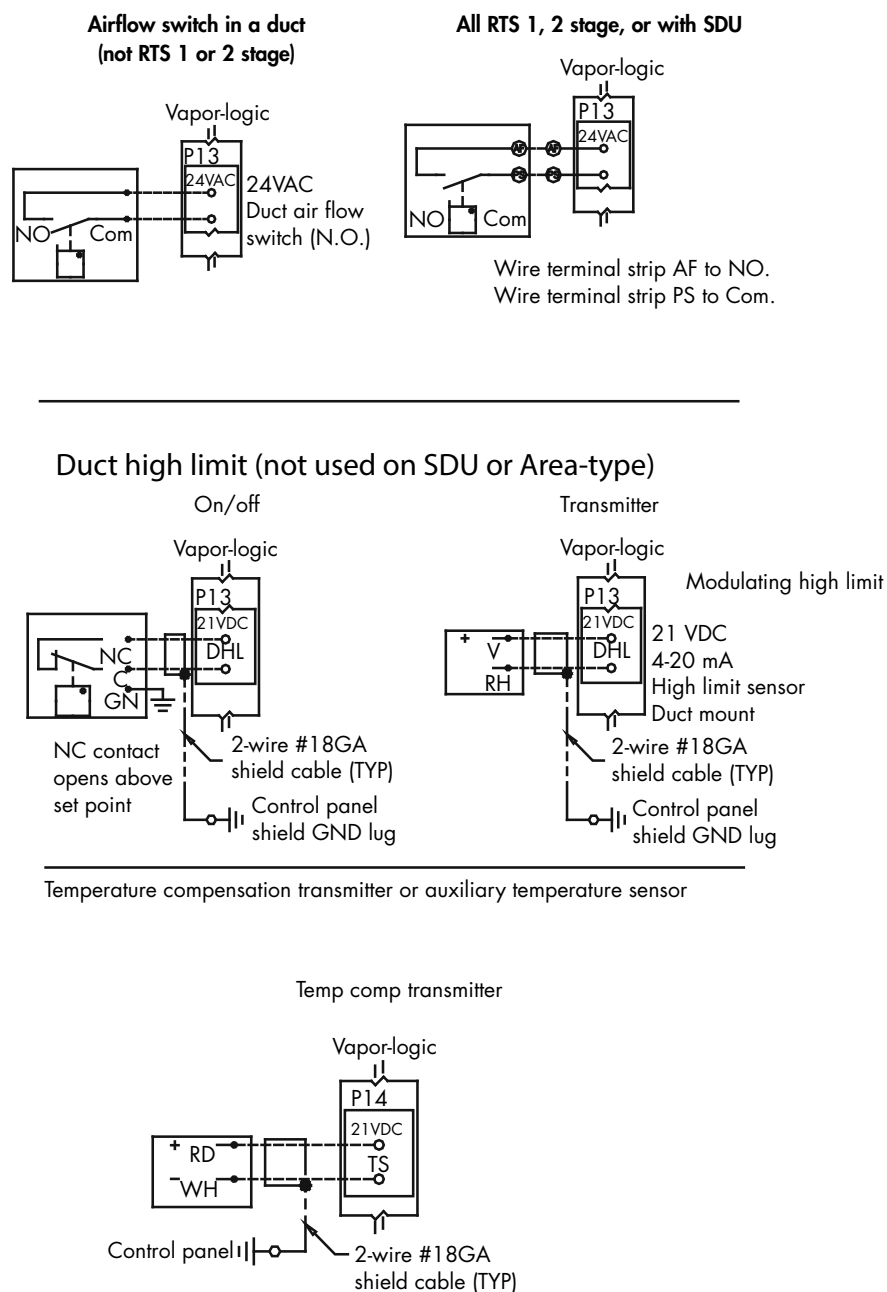
FIGURE 16-1: TERMINAL P13



Terminal P13:  
 21vdc = Power to duct high limit switch or transmitter  
 DHL = Duct high limit switch/transm. (4-20 mA input)  
 24vac = Power to airflow proving switch  
 AFsw = Airflow proving switch (24 VAC input)

# Step 1 – Field wiring: Limit controls

**FIGURE 17-1: VAPOR-LOGIC LIMIT CONTROLS WIRING CONNECTIONS**



**Notes:**

- An airflow switch must be used in any duct humidification application.
- Duct air flow switch is not used on Area-type. Install shunt at P13 (24VAC to AFSW).
- For SDU:  
Field wiring required between SDU cabinet terminal strip and control cabinet terminal switch for SOU blower and air flow switch. Duct air flow switch is in SDU cabinet.

**Key**

Control circuit wiring  
Field wiring  
Optional factory

Optional field  
Break to external connections diagram

# Step 1 – Field wiring: Limit controls

Connect wiring for a temperature compensation transmitter or an auxiliary temperature sensor by inserting wires into the terminal block plug at P14 (labeled 21vdc and TS) per the wiring diagram on the previous page. Tighten screws; maximum torque is 3 in-lb (0.34 N-m).

Note: Only one device can be connected at P14. You will identify the connected device in “Step 2 – Setup,” beginning on Page 27.

## AUXILIARY TEMPERATURE SENSOR

An auxiliary temperature sensor typically monitors duct or space air temperature. Mount the auxiliary temperature sensor wherever you want to monitor temperature. Auxiliary temperature readings are logged to the data log.

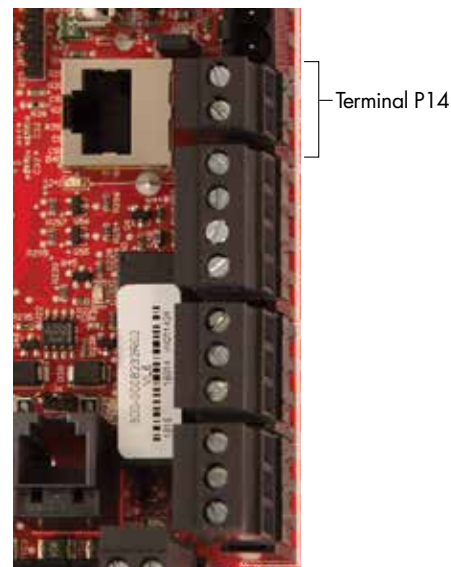
## TEMPERATURE COMPENSATION TRANSMITTER

A temperature compensation transmitter allows Vapor-logic to reduce humidifier output on cold days, reducing window condensation. Mount the temperature compensation transmitter on the inside of an outside-wall window.

To mount the temperature compensation sensor:

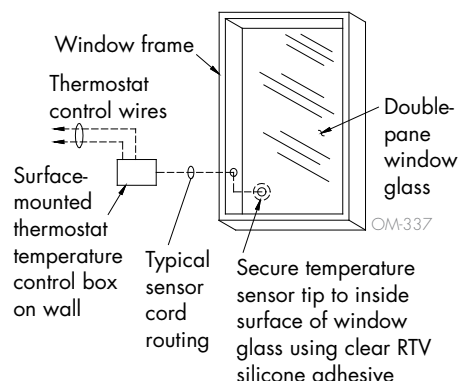
1. See Figure 18-2. Position the temperature compensation sensor control box on a wall adjacent to a window frame facing north or northeast.
2. Place the flat surface of the temperature sensor tip on the lower corner of glass surface.
3. Temporarily hold the sensor tip in place with strips of masking tape.
4. Apply a small amount of clear RTV silicone adhesive over and around the sensor tip (making sure the sensor tip is in contact with the window glass).
5. After adhesive cures, remove masking tape.
6. See the operation section of this manual for more information about the temperature compensation sensor.

**FIGURE 18-1: TERMINAL P14**



Terminal P14:  
21vdc = Power to auxiliary temperature sensor or temperature compensation sensor (transmitter)  
TS = Auxiliary temperature sensor or temperature compensation sensor (transmitter) (4-20 mA input)

**FIGURE 18-2: TEMPERATURE COMPENSATION TRANSMITTER INSTALLATION**



# Step 1 – Field wiring: Communication connections

## VAPOR-LOGIC DISPLAY

If your display is factory-mounted and connected to the Vapor-logic board, proceed to installing the next device required by your system.

If your display was shipped loose, mount the display in a location so that the provided cable is long enough to connect the display to the Vapor-logic board.

To connect a Vapor-logic display to the Vapor-logic board, insert one end of the provided cable into the Vapor-logic board at Terminal P10 (labeled Display) until you hear a click sound (see also the wiring diagram on the next page). Plug the other end of the cable into the display. This connection provides DC power and communication to the display.

See Caution at right before routing cable.

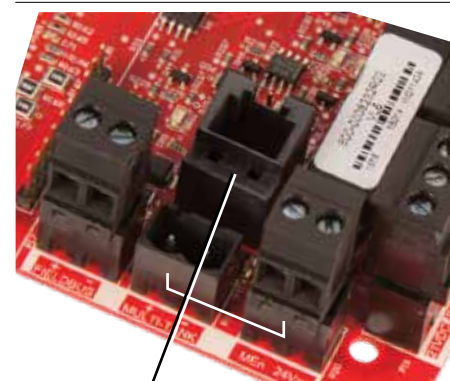
If a longer display cable is needed, order a replacement cable from DriSteem (see the replacement parts section of this manual), or use a four-conductor straight-through cable or a six-conductor, crossover, twisted pair cable connected to an RJ11 jack.

Note required operating conditions listed on Page 3.

## FIGURE 19-2: MOUNT THE TOUCHSCREEN DISPLAY ON A WALL USING THE WALL PLATE



FIGURE 19-1: TERMINAL P10



Terminal P10:  
Display

## CAUTION

### Touchscreen display cable

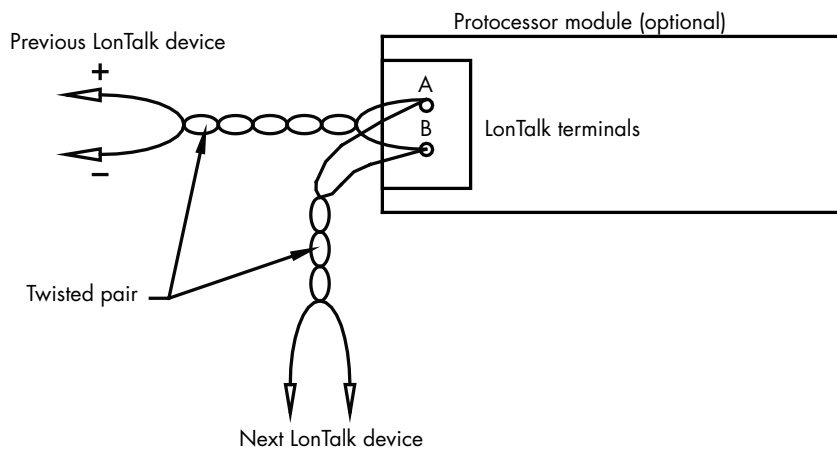
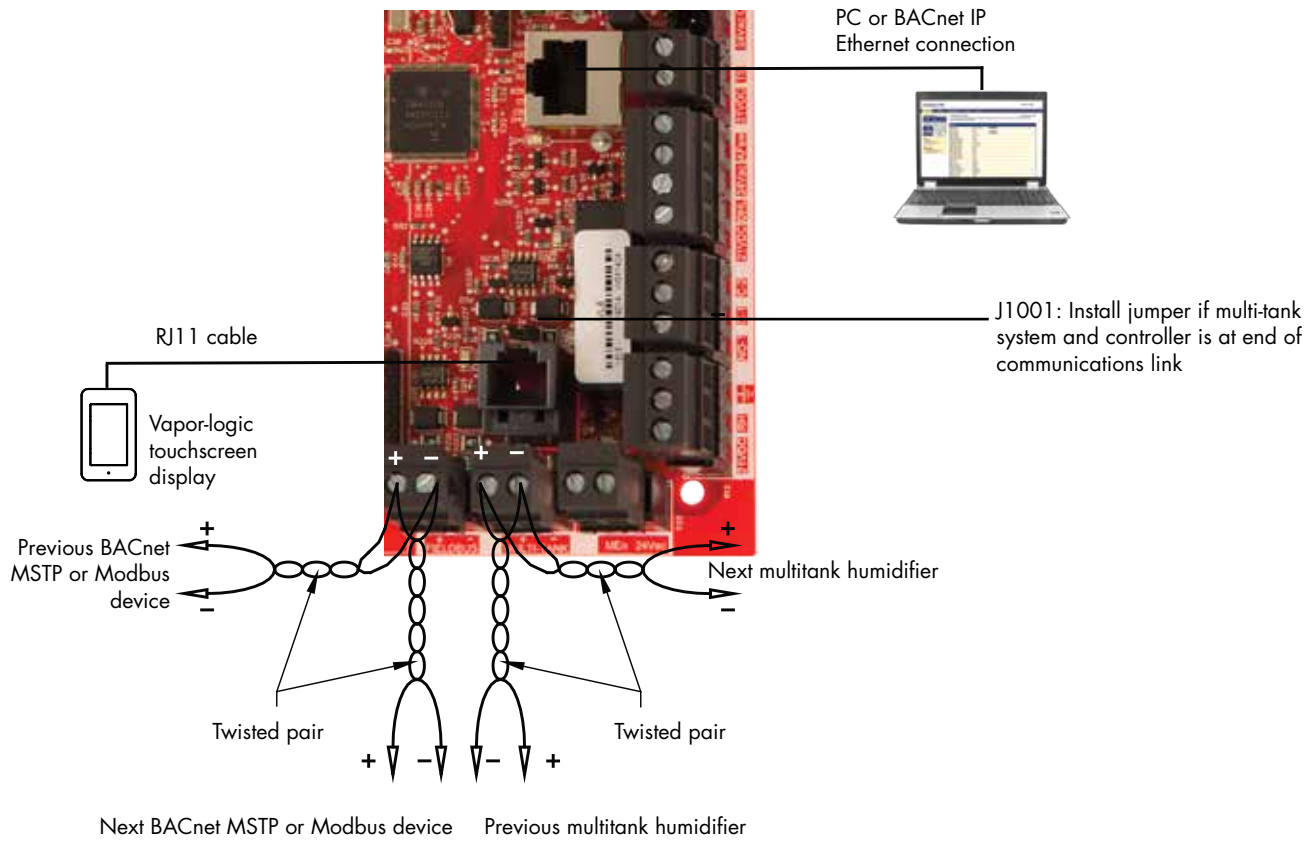
Maximum cable length is 500' (152 m).

When routing display cable, route cable away from all power wiring.



# Step 1 – Field wiring: Communication connections

**FIGURE 20-1: VAPOR-LOGIC COMMUNICATION WIRING CONNECTIONS**



# Step 1 – Field wiring: Communication connections

## WEB INTERFACE COMMUNICATION

Utilizing the Vapor-logic Web interface is optional. The humidifier can be operated using the touchscreen display and/or the Web interface. When using the Web interface, the humidifier can be accessed by a computer either directly or through a network. Each Vapor-logic controller ships with the static IP address of **192.168.1.195**. This allows users to locate the Web interface upon start-up. After initial start-up, the IP address can remain as is, be re-assigned as another static address, or configured to Auto Obtain Address, and find an IP address on the network using DHCP. See the steps below for information about connecting to the humidifier using the Web interface.

## CONNECTING WEB INTERFACE DIRECTLY TO A COMPUTER NOT ON A NETWORK

### 1. Connect the Ethernet cable.

Insert one end of an RJ45 Ethernet cable into the Vapor-logic board at P9 (labeled Ethernet; see Figure 21-1) until you hear a click sound. Insert the other end of the cable into a computer. Since the Ethernet port on the Vapor-logic board is auto-sensing, either a straight-through or crossover cable will work.

### 2. Check the current IP address of your computer.

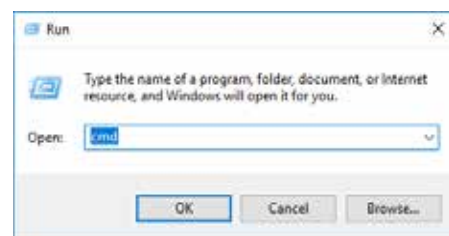
Connecting a computer to the humidifier requires that the computer being used has the same network address range as Vapor-logic. In order to validate this, check the IP address of the computer being used by going to the computer's Start menu and pull up a search window. In the search box type **cmd**.

**FIGURE 21-1: TERMINAL P9**



Terminal P9:  
Ethernet

**FIGURE 21-2:  
CHECKING YOUR IP ADDRESS**

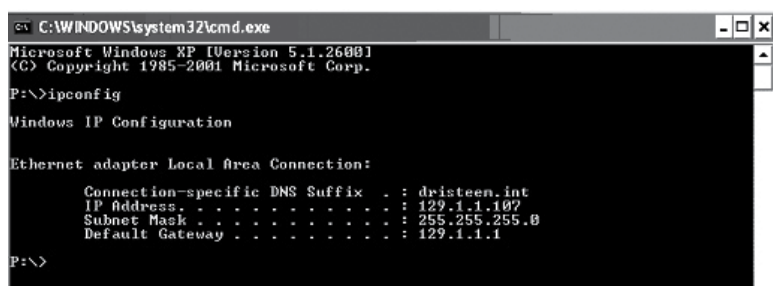


**Vapor-logic default IP address**  
192.168.1.195

## Step 1 – Field wiring: Communication connections

After a system prompt appears, type in **ipconfig** and then hit Enter. The current IP address for the Ethernet adapter Local Area Connection should appear. If the first three segments of that IP address are different than the first three segments of the humidifier's default IP (192.168.1.xxx), you must change either your computer or Vapor-logic's IP address such that they match each other.

**FIGURE 22-1: CHECKING YOUR IP ADDRESS**



### 3. Change the IP address of your humidifier or computer if necessary.

#### a. Change the IP address of the humidifier to work with your computer.

The most straightforward way to change the IP address of the humidifier using Vapor-logic is to use the touchscreen display. Go to Settings/Communications/IP Addressing on the touchscreen display and change the IP address such that the first three segments of the first three segments of the humidifiers address match. Make sure the last digit of the IP address is different between the humidifier and the computer. Cycle power of Vapor-logic board for address change to take effect.

#### b. Change the IP address of your computer to match the humidifier.

Changing the IP address of the computer being used will likely require administrative privileges for your company's network. Please consult your IT department for this task.

# Step 1 – Field wiring: Communication connections

## 4. Connect to the humidifier.

- Using a computer connected to the Vapor-logic board, open a Web browser such as Mozilla® Firefox® or Internet Explorer®.
- Find the browser address bar (see Figure 23-1), delete all existing text in the browser address bar, type the Vapor-logic IP address into the browser's address bar, and press Enter.

Note: The Vapor-logic default IP address is **192.168.1.195**

### CONNECTING WEB INTERFACE TO AN ETHERNET NETWORK

See Caution at right before proceeding.

If your network uses DHCP (Dynamic Host Configuration Protocol), use the touchscreen display to navigate to:  
Settings/Communications/IP Addressing. Select "Auto Obtain Address" and restart the Vapor-logic board.

The most current IP address can always be found by using the touchscreen display to navigate to:  
Settings/Communications/IP Addressing.

**Important:** DHCP cannot be enabled from the Web interface; it must be enabled using the touchscreen display.

### OTHER COMMUNICATION CONNECTIONS

For BACnet or LonTalk installation instructions, see Page 69.  
For multiple-tank installation instructions, see Page 77.

**FIGURE 23-1: ENTERING THE IP ADDRESS**



### CAUTION

#### Vapor-logic IP address

Before you connect a Vapor-logic device to a network, please contact your IT department. Given that the Vapor-logic controller ships with a static IP address, it is important to ensure that there is not another device with that same IP address already on the network. Work with your IT department before network connection will help ensure the integrity of the network and the devices on that network

#### DHCP and IP address

When DHCP is enabled, the server can dynamically change the IP address of Vapor-logic, making existing bookmarks unusable.

# Step 1 – Field wiring

## PROGRAMMABLE RELAYS (DRY CONTACT)

See “Programmable relay maximum current” in Caution below.

See Figure 25-1. Connect wiring for remote signaling using a programmable relay (dry contact) by inserting wires into the terminal block plug at P12 or P16, per the wiring diagram in Figure 25-1. Tighten screws.

This connection allows remote activation of devices such as fans or signal lights. Output parameters are defined during Step 2 of the installation process.

**FIGURE 24-1: TERMINAL P12 AND P16**



### Terminal P16:

NO-2 = Relay 2, normally open  
 PV/CA = Power vent/combustion air control signal (24 vac output)  
 SDU = Space Distribution Unit (24 vac output)

### Terminal P12:

Programmable relay (dry contact)  
 NO-1 = Relay 1, normally open  
 C-1 = Common 1  
 C-2 = Common 2

## CAUTION

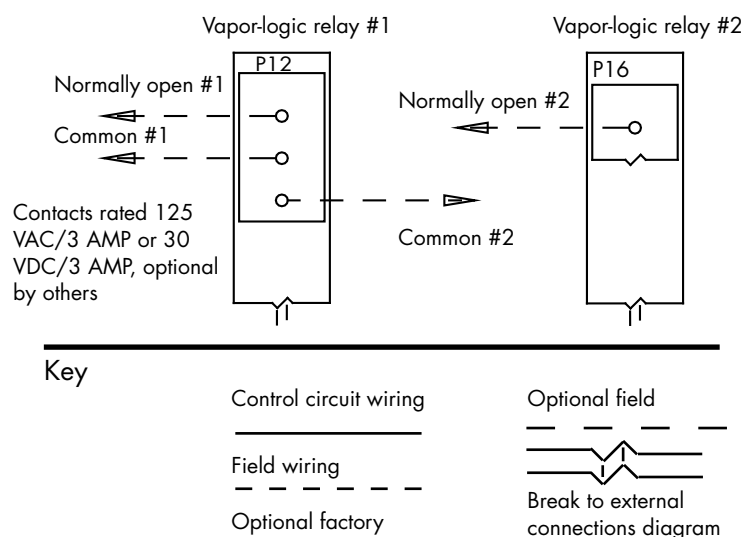
### Programmable relay maximum current

Programmable relay (dry contact) (P12) is rated for 125 VAC, 3 AMP or 30 VDC, 3 AMP maximum. Exceeding this maximum rating can cause the relay component or the Vapor-logic board to fail.

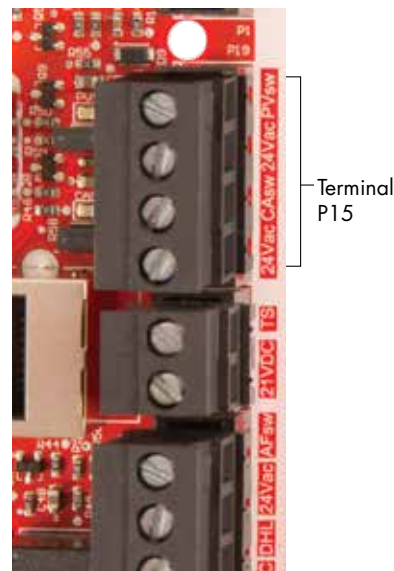


# Step 1 – Field wiring

**FIGURE 25-1: VAPOR-LOGIC PROGRAMMABLE RELAY WIRING CONNECTIONS**



**FIGURE 25-2: TERMINAL P15**



Terminal P15:  
 24vac = Power to combustion air switch  
 CAsw = Combust. air sw. (24vac input)  
 24vac = Power to power vent switch  
 PVsw = Power vent switch (24vac input)

## AREA-TYPE AND SDU DISPERSION FANS

Connect wiring for Area-type and Space Distribution Unit (SDU) dispersion fans by inserting the wire into the terminal block plug at P16 (labeled SDU). Tighten screws.

## OPTIONAL COMBUSTION AIR SWITCH AND POWER VENT

Connect wiring for GTS combustion air switch and/or GTS power vent by inserting wires into the terminal block plugs at P15 and P16. Tighten screws. Remove shunt on J403 (combustion air) or J404 (power vent) if it is installed.

The combustion air switch is on the combustion air damper. The power vent switch indicates airflow at the power venter.

# Step 1 – Field wiring: Sensor placement

## HUMIDISTAT AND SENSOR LOCATIONS ARE CRITICAL

Humidistat and sensor location have a significant impact on humidifier performance. In most cases, do not interchange duct and room humidity devices. Room humidity devices are calibrated with zero or little airflow; whereas duct humidity devices require air passing across them.

Recommended sensor locations (see Figure 26):

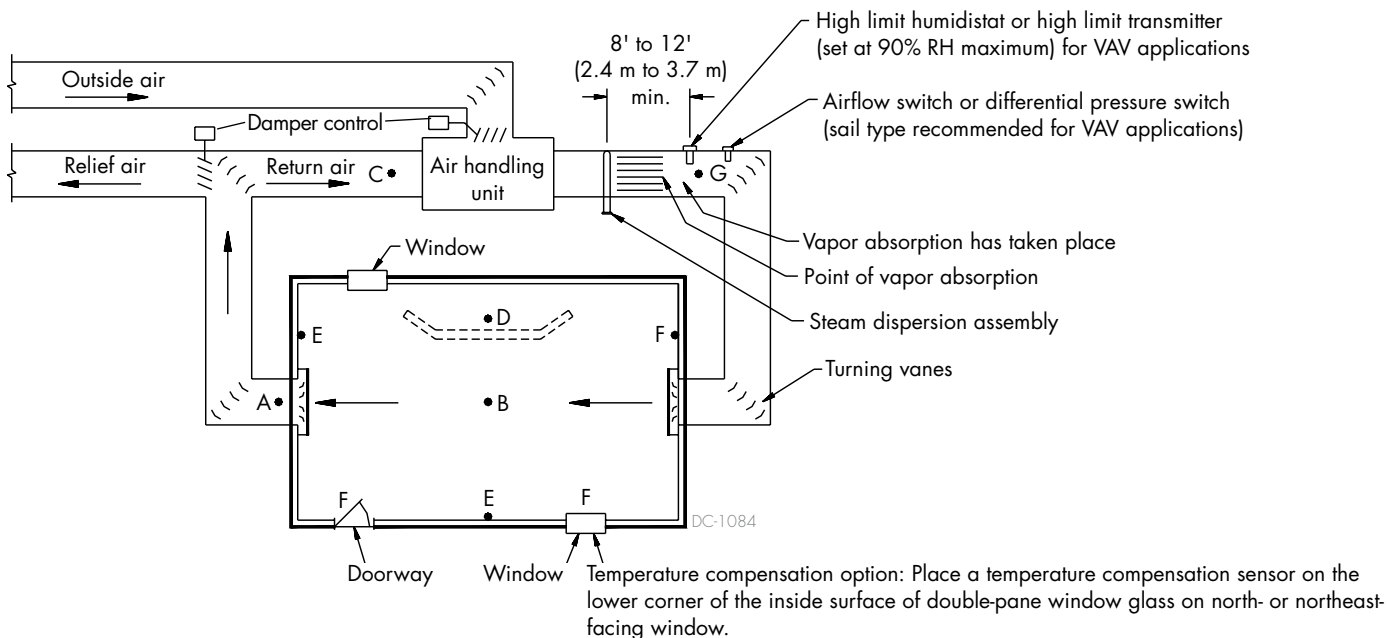
- A Ideal. Ensures the best uniform mix of dry and moist air with stable temperature control.
- B Acceptable, but room environment may affect controllability, such as when sensor is too close to air grilles, registers, or heat radiation from room lighting.
- C Acceptable. Provides uniform mixture of dry and moist air. If extended time lag exists between moisture generation and sensing, extend sampling time.
- D Acceptable (behind wall or partition) for sampling entire room if sensor is near an air exhaust return outlet. Typical placement for sampling a critical area.
- E Not acceptable. These locations may not represent actual overall conditions in the space.
- F Not acceptable. Do not place sensors near windows, door passageways, or areas of stagnant airflow.
- G Best sensing location for a high-limit humidistat or humidity transmitter and airflow proving switch.

## Other factors affecting humidity control

Humidity control involves more than the controller's ability to control the system. Other factors that play an important role in overall system control are:

- Size of humidification system relative to load
- Overall system dynamics associated with moisture migration time lags
- Accuracy of humidistats and humidity transmitters and their location
- Dry bulb temperature accuracy in space or duct
- Velocities and airflow patterns in ducts and space environments
- Electrical noise or interference

**FIGURE 26-1: RECOMMENDED SENSOR LOCATION**



## Step 2 – Setup

To simplify the field-installation process, humidifiers are sent from the factory configured as ordered. However, some settings are unknown at the factory and need to be defined during the setup process using the Settings menu. The Settings menu is also where you make future system setting changes.

To begin the field setup process, go to the Settings menu on either the touchscreen display or Setup on the Web interface. Settings menu parameters are listed in Table 29-1. Options and defaults are the same whether viewed from the touchscreen display or Web interface. However, labels may be different on the Web interface.

### USING THE TOUCHSCREEN DISPLAY

To access the Settings on the touchscreen display, press the gear icon labeled Settings.

After entering the settings menu, touch a title bar to choose a category. Use the Help icon in the lower right corner to get a description of all the Settings categories.

**FIGURE 27-1: USING THE VAPOR-LOGIC TOUCHSCREEN DISPLAY**

Typical Home screen



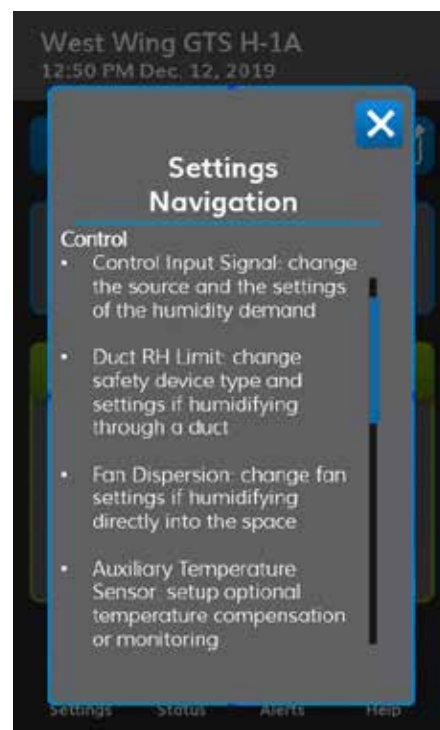
Press the Settings gear icon to access a list of all changeable system parameters.

Press the Help question mark for a complete description of everything on a screen.

**FIGURE 27-2: SETTINGS**



**FIGURE 27-3: SETTINGS HELP**



## Step 2 – Setup

### USING THE WEB INTERFACE

Although not required for humidifier operation, the Web interface allows convenient and remote access to Vapor-logic.

See Page 21 for Web interface connection and IP address instructions.  
Follow the instructions below to complete the setup process.

**FIGURE 28-1: USING THE VAPOR-LOGIC WEB INTERFACE (SETUP SCREEN SHOWN)**

The screenshot shows the Vapor-Logic Web Interface with the **SETUP** tab selected. The interface includes a top navigation bar with tabs for STATUS, ALARMS, DIAGNOSTICS, **SETUP**, and HELP. A callout points to the **SETUP** tab with the text: "Click on a tab label to move to another screen".

On the left sidebar, there are sections for **System Status** (DEMAND: 73.3%, OUTPUT: 0%, RUN MODE: Auto, TANK STATUS: Idle), **Alarms** (0 active alarms, View Alarms), and **Messages** (1 active message, View Messages). Callouts point to these sections: "Click here to view alarms" points to the Alarms section, "Click here to view messages" points to the Messages section, and "Click on label to contract (-) or expand (+) menu item" points to the expand/collapse icons in the sidebar.

The main content area displays the date and time: "Tuesday, May 22, 2012 4:30:14 PM" and a status "Data stream is LIVE". Below this is a message: "Set or change all humidifier settings below. Humidifiers are sent from the factory configured as ordered. However, some settings are unknown at the factory and need to be defined on this page." The **SETUP** section is divided into several expandable/collapsible categories:

- + INPUT SIGNAL**
- + LIMIT CONTROLS**
- WATER MANAGEMENT**
  - End of season drain**

EOS enabled	Yes	<b>CHANGE</b>
Idle time for EOS	72 hours	<b>CHANGE</b>
  - Service interval**

Service interval	30000 lbs	<b>CHANGE</b>
------------------	-----------	---------------
- + FAN-BASED DISPERSION**
- + COMMUNICATIONS**
- + PROGRAMMABLE OUTPUTS**
- + SET DATE AND TIME**
- + LANGUAGE**
- + UNITS**
- + SECURITY**
- + CAPACITY ADJUST**
- + RESET TO DEFAULTS**

A callout points to the **CHANGE** button for "EOS enabled" with the text: "Click on CHANGE to change value".

The footer contains the copyright notice: "© Copyright 2010 DRI-STEEM Corporation. All rights reserved. Vapor-logic is a registered trademark of DRI-STEEM Corporation."

# Step 2 – Setup

Table 30-1: Settings menu					
Menu item	Default value	Minimum value	Maximum value	Units	Notes
<b>Control</b>					
<b>Control Input Signal</b>	-	-	-	-	
Control Input Signal (type)	-	-	-	-	Type chosen must match hard wired input
<b>RH Transmitter</b>	-	-	-	-	4-20mA room or duct sensor
RH Setpoint	35	0	100	%	
RH Offset	0	-20	20	%	
PID tuning	-	-	-	-	
PID band	10	0	50	%	DriSteem recommends using default values for offsets and PID settings when first setting up your humidifier.
Proportional gain	80	0	1000	-	
Integral gain	40	0	1000	-	
Derivative gain	0	0	1000	-	
<b>Dew pt transmitter</b>	-	-	-	-	
Dew point set point	50	20	80	°F	
	10	-6	26	°C	
Dew point minimum	0	-100	Maximum	°F /°C	DriSteem recommends using default values for offsets and PID settings when first setting up your humidifier.
Dew point maximum	100	Minimum	100	°F /°C	
PID tuning	-	-	-	-	
Dew point PID band	10	1	20	°F	
	5	1	20	°C	
Proportional gain	80	0	1000	-	
Integral gain	40	0	1000	-	
Derivative gain	0	0	1000	-	
<b>VDC Demand</b>	-	-	-	-	Voltage signal by others or modulating humidistat
VDC Settings	-	-	-	-	
0% output (VDC)	1.0	0.0	Maximum	VDC	
100% output (VDC)	9.0	Minimum	16.0	VDC	
<b>mA Demand</b>	-	-	-	-	Current signal by others
mA Settings	-	-	-	-	
0% output (mA)	4.0	0.0	Maximum	mA	
100% output (mA)	20.0	Minimum	20.0	mA	
<b>Fieldbus</b>	-	-	-	-	BACnet, LonTalk or Modbus communicated signal by others
(See <b>Communications</b> settings)	-	-	-	-	
<b>Humidistat</b>	-	-	-	-	On-off humidistat

# Step 2 – Setup

Table 30-1:  
Settings menu (continued)

Menu item	Default value	Minimum value	Maximum value	Units	Notes
<b>Duct RH Limit</b>					
<b>Limit Type</b>	Switch	–	–	–	
<b>Switch</b>	–	–	–	–	Humidistat (switch) installed in duct
<b>Transmitter</b>	–	–	–	–	Humidity sensor installed in duct
High Limit Settings	–	–	–	–	
Duct HL Setpoint	80	5	95	%	
Duct HL Span	6	0	20	%	Span (throttle span) is a threshold below the high limit setpoint where the humidifier reduces output but does not turn off until the device high limit set point is reached.
Duct HL Offset	0	-20	20	%	
<b>Not Used</b>	–	–	–	–	
<b>Fan Dispersion</b>					
Fan Type	–	–	–	–	
Space Distribution Unit	–	–	–	–	
Fan Off Delay	5	1	30	Minutes	
<b>Area-Type Fan</b>	–	–	–	–	
<b>Auxiliary Temperature Sensor</b>					
Purpose	Not Used	–	–	–	
<b>Temperature Compensation</b>	–	–	–	–	
Sensor Offset	0	-20	20	°F	
	0	-11	11	°C	
<b>Temperature Monitoring</b>	–	–	–	–	
Sensor Offset	0	-20	20	°F	
	0	-11	11	°C	
<b>Not Used</b>	–	–	–	–	
<b>Programmable Outputs</b>					
<b>Dry Contact 1 or 2</b>	–	–	–	–	<b>CAUTION</b> Programmable dry contact maximum current Programmable dry contact (P12 or P16) is rated for 125 VAC, 3 AMP or 30 VDC, 3 AMP maximum. Exceeding this maximum rating can cause the dry contact (relay) component or the Vapor-logic board to fail.
Contact Behavior	Normally open	Normally open	Normally closed	–	Contact action on event
Contact Purpose	Default Alerts	–	–	–	
<b>Default Alerts</b> View Default Alerts	–	–	–	–	A dry contact activates whenever there is an alert, which does not auto-clear.
<b>Selected Alerts</b> Alert selection	–	–	–	–	A dry contact activates whenever there are alerts selected from the alert selection list.

## Step 2 – Setup

Table 30-1:  
Settings menu (continued)

Menu item	Default value	Minimum value	Maximum value	Units	Notes
<b>Alert on Low RH</b>	–	–	–	–	
Alert below RH	50	0	100	–	Contact toggles whenever the space humidity falls below the low RH setting. Adjust the contact behavior to either open or close when the space RH gets low. To use this feature the control input signal type must be an RH transmitter.
<b>Steam Yes/No</b>	–	–	–	–	A dry contact activates when the tank temperature reaches boiling
<b>Heat On/Off</b>	–	–	–	–	A dry contact activates when the humidifier is heating.
<b>Not Used</b>	–	–	–	–	
<b>Water Management</b>					
<b>Automatic Drain Sequence</b>	–	–	–	–	When enabled, the humidifier automatically drains and then flushes the tank at user-defined (User) or automatic (Smart) intervals.
Drain Interval Choice	Smart Drain	–	–	–	
<b>Draining Disabled</b>	–	–	–	–	
<b>Smart Full Drain</b>	–	–	–	–	Vapor-logic automatically adjusts the drain usage interval based on calculated water quality. Humidification will pause and the tank will drain completely.
<b>Smart Mini-Drain</b>	–	–	–	–	Vapor-logic automatically adjusts the drain usage interval based on water quality. The tank will drain partially while maintaining production.
<b>User Full Drain</b>	–	–	–	–	Humidifier automatically drains and then flushes the tank at user-defined intervals. Humidification will pause.
<b>User Mini-Drain</b>	–	–	–	–	Humidifier automatically drains partially at user-defined intervals while maintaining output.
Allowed Drain Times	–	–	–	–	
Restrict Hour to Drain	Yes	–	–	–	
Hour to Drain	0 (12 AM)	0	23	Hours	Select time of day (24 hour clock) auto drain/flush starts once usage requirement is met
Allowed Days	All	–	–	–	Select days of week auto drain/flush is allowed once usage requirement is met.
Sunday	Yes	–	–	–	
Monday	Yes	–	–	–	
Tuesday	Yes	–	–	–	
Wednesday	Yes	–	–	–	
Thursday	Yes	–	–	–	
Friday	Yes	–	–	–	
Saturday	Yes	–	–	–	
User Drain Interval	Model-specific	0	2,200,000	lbs	Select amount of water to be converted to steam before auto drain/flush starts.
		0	1,000,000	kg	
	Tanks boiled	1	999	tanks	
Drain Duration	Model-specific	0	120	Minutes	Select number of minutes for drain valve to remain open during auto drain/flush. Default value is based on tank and valve size.



# Step 2 – Setup

Table 30-1:  
Settings menu (continued)

Menu item	Default value	Minimum value	Maximum value	Units	Notes
Flush Duration	Model-specific	0	15	Minutes	Select number of minutes for fill valve to remain open during flushing.
<b>Skim</b>	–	–	–	–	
Skim Feature	Enabled	–	–	–	
Skim Duration	Model-specific	0	120	Seconds	Water allowed to overflow to remove minerals from tank.
<b>End of Season</b>	–	–	–	–	
End of Season Drain	Enabled	–	–	–	If enabled, the humidifier tank drains after the humidifier has been idle for a user-defined time.
Idle Time Before Drain	72	1	336	Hours	
<b>Aquastat</b>	–	–	–	–	
Aquastat Feature	Enabled	–	–	–	The minimum aquastat setting prevents tank water freezing. Higher settings keep tank water warm, reducing time required to bring water to boiling after a call for humidity.
Aquastat Setpoint	50	40	180	°F	
	10	4	82	°C	
<b>Service Interval</b>	–	–	–	–	
Service Interval	Model-specific	0	2,200,000	lbs	Select amount of water to be converted to steam or hours that humidifier runs before service interval is reached.
Service Interval	Model-specific	–	1,000,000	kg	
<b>Fill Fault Time-Out</b>	–	–	–	–	
Fill Fault Time-Out	40	10	250	Minutes	Amount of fill time before an alert will occur.
<b>Drain Tempering</b>	–	–	–	–	
Drain Tempering Feature	Enabled	Disabled	Enabled	–	Enable drain tempering to keep drain water below 140°F (60°C)
Drain Valve	Normally Closed	Normally Closed	Normally Open	–	Changing drain valve action requires changing the drain valve. Not all options available for all models.
<b>Test</b>					
<b>Test Outputs</b>	–	–	–	–	Choose “Start” to turn on the output for a few seconds. Choose “Back” if you do not want to test the output at this time. Once the test starts it cannot be cancelled. After the test the mode will change to Standby.
Fill Valve	5	5	5	Seconds	
Pulse Fill Valve(s)	5	5	5	Seconds	
Drain Valve	10	10	10	Seconds	
Fan Control	5	5	5	Seconds	
Ignition Module 1 or 2	8	8	8	Seconds	
Blower Speed Control	10	10	10	Seconds	
Dry Contact 1 or 2	5	5	5	Seconds	
<b>Test Run</b>	–	–	–	–	Simulate a demand for steam production when there isn't one so that the humidifier can produce steam for a specific amount of time. Humidifier will return to Standby mode.
Test Run Percent	100	0	100	%	
Test Run Time	5	1	30	Minutes	
Start/Stop Test Run	–	Start	Stop	–	

# Step 2 – Setup

Table 30-1:  
Settings menu (continued)

Menu item	Default value	Minimum value	Maximum value	Units	Notes
<b>Communications</b>					
<b>IP Addressing</b>	–	–	–	–	Automatically obtain an IP address from a network server or assign a static IP address
IP Address	192.168.1.195	0.0.0.0	255.255.255.255	–	
IP Mask	255.255.255.0	0.0.0.0	255.255.255.255	–	
Gateway	192.168.1.1	0.0.0.0	255.255.255.255	–	
Auto Obtain Address	No	–	–	–	Use the touchscreen display to access this menu item. This item is not available when using the Web interface.
<b>Communication Type</b>	Modbus	–	–	–	
<b>BACnet MS/TP</b>	–	–	–	–	
Comm Channel	38400	19200	76800	–	
<b>BACnet MS/TP Settings</b>	–	–	–	–	
Device Instance	255	0	4194303	–	
Max Masters	127	1	127	–	
MAC Address	1	0	127	–	
Max Info Frames	1	1	127	–	
<b>BACnet IP</b>	–	–	–	–	
Device Instance	255	0	4194303	–	
UDP port (47808)	47808	1024	65535	–	
<b>Modbus</b>	–	–	–	–	
Modbus Baud Rate	19200	4800	38400	–	
Modbus Address	99	0	255	–	
<b>LonTalk</b>	–	–	–	–	
<b>Display</b>					
<b>Date and Time</b>	–	–	–	–	
Set Date	1999	–	–	–	
Set Time	0:00	0:00	23:59	–	24 hour clock
<b>Humidifier Info</b>	–	–	–	–	
Unit Name	order-specific	1	20	Characters	Press the edit icon to edit the name of the humidifier. This name is not communicated by BACnet, LonTalk or Modbus.
Model	order-specific	–	–	–	Displays humidifier model
Serial Number	order-specific	–	–	–	Displays humidifier serial number
Voltage	–	–	–	–	
Phase	–	–	–	–	
Factory String	order-specific	–	–	–	Displays as-shipped configuration
Current String	–	–	–	–	Display current configuration string

# Step 2 – Setup

Table 30-1:  
Settings menu (continued)

Menu item	Default value	Minimum value	Maximum value	Units	Notes
Firmware Version	–	–	–	–	Displays current firmware version of Vapor-logic control board and date of firmware release.
Display Version	–	–	–	–	Displays current firmware version of board internal to touch screen display and date of firmware release
<b>Language</b>	English	–	–	–	
English	–	–	–	–	
<b>Units</b>	inch-pound	–	–	–	
inch-pound	–	–	–	–	
SI units	–	–	–	–	
<b>Idle Time-Out</b>	–	–	–	–	
Idle Time-Out	5	1	120	Minutes	Select number of minutes the touchscreen display remains idle before returning to the Home screen.
<b>Brightness</b>	–	–	–	–	
Adjust Brightness	60	10	100	%	Use 100% brightness outdoors.
Clean Screen	30	30	30	Seconds	Touch input will be disabled for 30 seconds so the user can wipe it with a soft cloth.
<b>Capacity Calibration</b>	–	–	–	–	
Capacity Calibration	100	0	245	%	Changing the capacity calibration setting changes reported, not actual, humidifier output
<b>Security</b>					
Require Passcode	No	No	Yes	–	
Set Passcode	0000	0000	9999	–	Enter four digits, numbers only, and define the time-out period (minutes of inactivity before Vapor-logic reverts to read-only mode). The default passcode is 0000.
Passcode Time-Out	5	1	120	Minutes	
<b>Backup / Restore Settings</b>					
<b>Backup to USB</b>	–	–	–	–	Humidifier settings can be backed up to or restored from a USB flash drive
<b>Restore from USB</b>	–	–	–	–	
<b>Reset to Defaults</b>	–	–	–	–	<b>CAUTION</b> These actions cannot be reversed.
Reset to Defaults	–	–	–	–	Select this if you want to reset all humidifier settings to factory defaults
Reset Ignition Counts	–	–	–	–	Select this if you want to reset the GTS ignitor counts

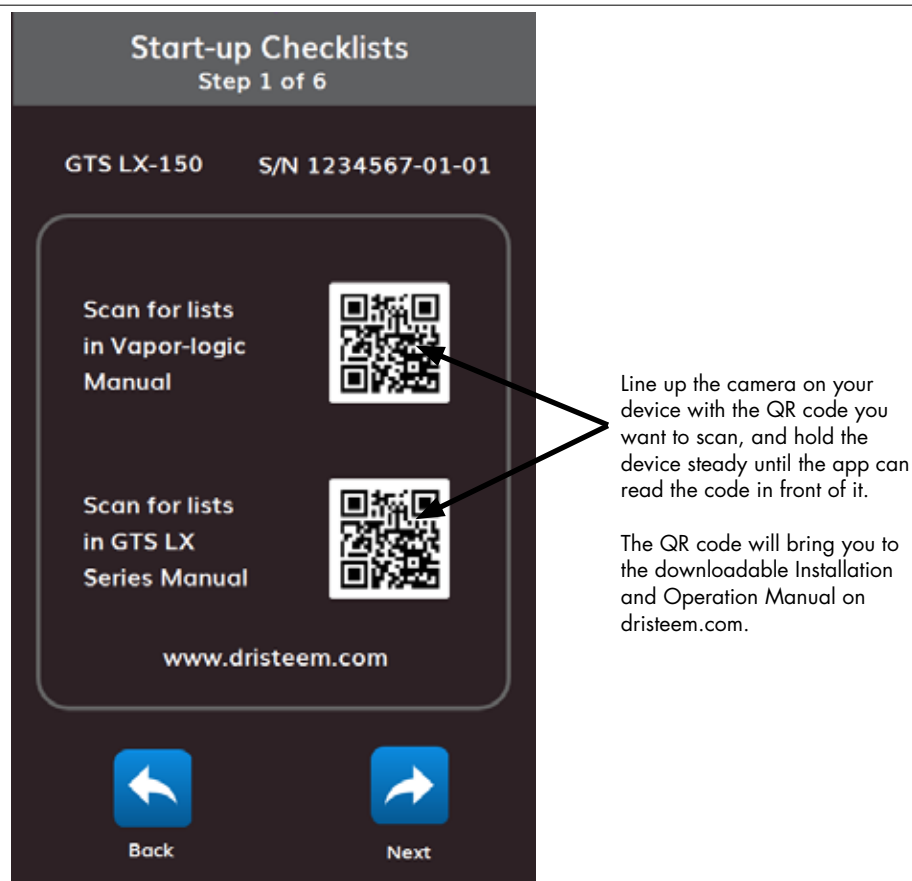
## Step 3 – Startup

### STARTING UP THE HUMIDIFIER

The touchscreen will guide you through common setup procedures with an on-screen wizard the first time the humidifier powers up.

1. Press Initial Setup to begin. For step one, verify that all installation and startup checklist items in this manual and in the humidifier's Installation, Operation, and Maintenance manual have been completed.
2. Use the next button to set the date, time and custom humidifier name.
3. Address any alerts that might prevent humidifier operation and press next.
4. Close the wizard by choosing the Home icon and then put the humidifier in Auto mode to start it up.

**FIGURE 35-1: START-UP**



## Using menus and screens

### VAPOR-LOGIC DISPLAY HAS THE FOLLOWING MENUS AND SCREENS:

- Home screen
- Submenus:
  - Status
  - Help
  - Alerts
  - Settings

The items on the Web interface Diagnostics screen have been moved on the touchscreen. Go to Settings to access test functions, see humidifier configuration info and do a settings backup. Go to Status to Download Data. Use the Alerts icon to view messages.

### Vapor-logic Web interface has the following screens:

- Status
- Diagnostics
- Alarms
- Setup
- Help

**FIGURE 36-1:**

**TOUCHSCREEN DISPLAY HOME SCREEN**



# Using menus and screens

**FIGURE 37-1: USING THE VAPOR-LOGIC WEB INTERFACE (STATUS SCREEN SHOWN)**

Click on a tab label to move to another screen

Click here to view alarms

Click here to view messages

Click on CHANGE to change value. Note that most system parameters are changed in the Settings menu.

Drag scroll bar to view more of the window

**STATUS** **ALARMS** **DIAGNOSTICS** **SETUP** **HELP**

**System Status**

RH	SET POINT	OUTPUT
34%	35%	0%

**RUN MODE** Auto mode

**TANK STATUS** Filling

**Alarms**  
2 active alarms  
> [View Alarms](#)

**Messages**  
1 active message  
> [View Messages](#)

**Fri Feb 8 15:13:36 2008** **Data stream is LIVE**

View all humidifier settings below. Some settings can be changed here. Go to the Setup tab to change settings that cannot be changed from this page.

**TANK STATUS:**

Tank run mode	Auto mode	<a href="#">CHANGE</a>
Space RH	34%	
RH set point	35%	<a href="#">CHANGE</a>
Input signal	9.4 mA	
Steam output	0%	
Steam production	0 lbs/hr	
Tank temperature	64°F	
Tank temp signal	1027 Ohms	
High water probe	Water	
Mid water probe	Water	
Low water probe	Water	
Low water sensor	Water	
Fill valve	Closed	
Drain valve	Closed	
Airflow switch	Flow	
Interlock switch	Closed	
H2O until drain/flush	164948 lbs	
H2O until service	823961 lbs	
Blower 1 tach	0 rpm	
Blower 2 tach	0 rpm	
Blower 3 tach	0 rpm	
Blower 4 tach	0 rpm	
Gas valve 1	Closed	
Gas valve 2	Closed	
Gas valve 3	Closed	
Gas valve 4	Closed	
Combust air switch	Closed	
Power vent switch	Closed	
Flue pressure switch	Closed	

## Home screen (touchscreen display)

Vapor-logic returns to the Home screen on the touchscreen display after a user-defined period of idleness. The Home screen displays the items most frequently viewed: Actual space RH or dew point, RH or dew point set point, tank/system output or steam demand, humidifier mode, and tank activities such as starting up, humidifying, heating, and auto drain.

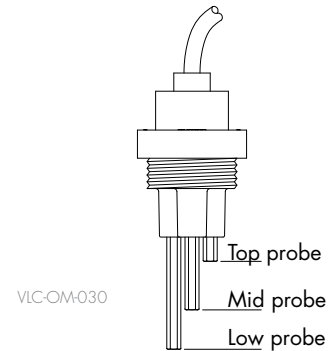
There is a tank level indicator on the left side of the screen. See the table below for a description of tank level indicators.

To the left of the tank level indicator is a tank temperature display showing actual tank temperature.

### CHANGING MODE AND SET POINT

Mode and Setpoint can be changed from the Home screen. Use the edit icons to the right of the value to change the Mode or Setpoint. All other parameters shown on the Home screen are for viewing only and cannot be changed. Go to the Settings menu to change these items.

**FIGURE 38-1: WATER LEVEL CONTROL**



Tank-level icons indicate water level at the water level control probe. See "Water level control" on Page 55.



## Home screen (touchscreen display)

### TANK ACTIVITIES DEFINED

- **Disabled:** Mode is Standby, waiting for user to change the mode to Auto.
- **Probe check:** The Vapor-logic control is verifying water probe operation and checking water quality.
- **Starting up:** The Vapor-logic controller is turning on the heating source.
- **Heating:** The heating source is ON, but water is not yet boiling.
- **Humidifying:** There is a demand for humidity and water in tank is boiling; humidifier has output.
- **Filling:** Fill valve remains open until water reaches operating level.
- **Skimming:** Fill valve is open to allow water to flow through the overflow port, skimming off precipitated minerals.
- **Flushing:** Fill and drain valve are open to flush tank.
- **Idle:** Humidifier is waiting for demand.
- **Auto Drain:** Humidifier is doing a periodic drain to get excess minerals out of the tank.
- **Tempering:** Fill valve is open during a drain to decrease drain water temperature.
- **Draining:** User has changed the mode to Drain.
- **Stopped:** There is an active Red Alert, indicating a fault condition or the humidifier is in Standby mode.
- **End of Season Drain:** Tank is draining because there has been no demand for a user-definable time period.
- **Foam Drain:** Humidifier is doing an immediate drain to get foam out of the tank.
- **Keep Cool:** Fill and drain cycles operate to cool an overheated humidifier.
- **Unavailable:** Secondary tank is not communicating to the main tank.

FIGURE 39-1: FILL ICON



**Empty:** Water is below low probe.



**Two thirds full:** Water is between mid and top probes.



**Full:** Water is above the mid probe.

# Status screen

Using either the touchscreen display or the Web interface, the Status screen is where all humidifier parameters can be viewed. On the touchscreen only Quick Diagnosis provides a way to view if all requirements for safe operation have been met. It reports why a humidifier is not making steam. Access Quick Diagnosis from the Status menu or from the status bar, tank icon, or output icon on the Home screen.

See the tables on the following pages for Status screen item descriptions for both the touchscreen display and Web interface. On the touchscreen use the Help icon to get a description of status items.

FIGURE 40-1: WEB INTERFACE STATUS SCREEN

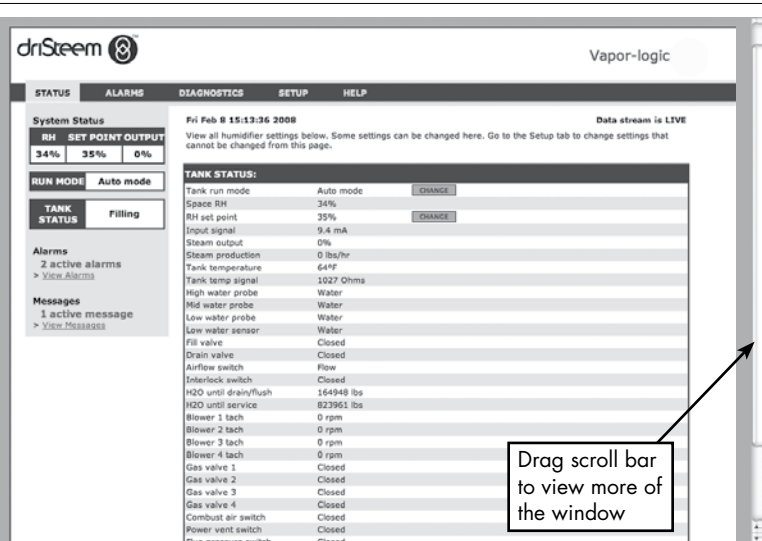


FIGURE 40-2: STATUS



FIGURE 40-3: QUICK DIAGNOSIS

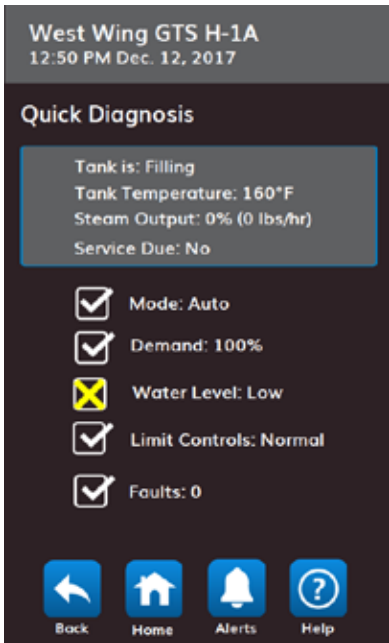
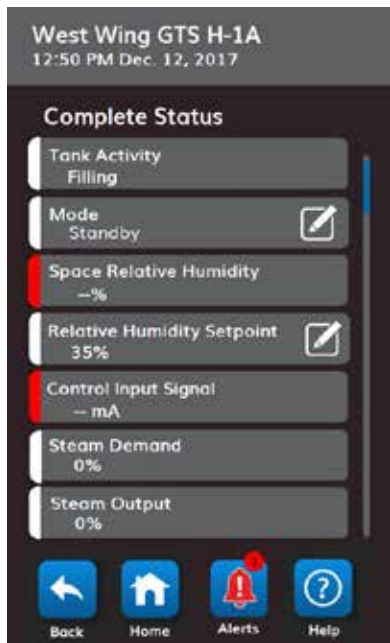


FIGURE 40-4: COMPLETE STATUS



# Status screen

**Table 41-1:**  
**Status screen**

Note: Your system might not have all of the items listed in this table (Pages 41 and 42).

Menu item	Default value	Minimum value	Maximum value	Units	Notes
Mode	Standby	-	-	-	Operating mode of humidifier. Choose from Auto, Standby, or Drain. <ul style="list-style-type: none"> <li>In <b>Auto mode</b>, the humidifier operates normally. All humidifier components are monitored and controlled. If there is a call for humidification, the system reacts.</li> <li>In <b>Standby mode</b>, the humidifier is offline. All humidity control inputs appear but are not acted upon; however, if the tank temperature falls below the freeze protect set point, the drain valve opens.</li> <li>In <b>Drain mode</b>, the automatic drain valve (if so equipped) opens and the tank drains. All humidifier operation is suspended, and the drain valve remains open until the unit is taken out of Drain tank mode.</li> <li>See the Diagnostics section for information about <b>Test outputs</b> and <b>Test run</b> modes.</li> </ul>
Space RH	-	0	100	%	
RH set point	35	0	100	%	
Input signal	-	0	10	VDC	
	-	0	20	mA	
Dew point	-	0	100	°F	
	-	-17	37	°C	
Dew point set point	50	20	80	°F	
	10	-6	26	°C	
Inlet pressure switch	-	No water	Water	-	
Steam demand	-	0	100	%	Displays steam demand as a percent of capacity
Steam output	-	0	100	%	Displays steam output as a percent of capacity
Steam production	-	0	100,000	lbs/hr	
	-	0	100,000	kg/h	
Duct RH	-	0	100	%	
Duct HL switch	-	Open	Closed	-	
Duct HL set point	80	5	95	%	
Duct HL signal	-	0	20	mA	
Tank temperature	-	-30	275	°F	
	-	-34	135	°C	
Tank temp signal	-	0	2200	Ohms	
Aux temperature	-	-20	160	°F	
	-	-29	71	°C	
Aux temp signal	-	0	26	mA	

Continued

## Status screen

**Table 41-1:**  
**Status screen (continued)**

Menu item	Default value	Minimum value	Maximum value	Units	Notes
Board voltage	24	0	30	VAC	
Board temp	-	0	200	°F	
High probe signal	-	0	14000	counts	
High water probe	-	Water	No water	-	
Mid probe signal	-	0	14000	counts	
Mid water probe	-	Water	No water	-	
Low probe signal	-	0	14000	counts	
Low water probe	-	Water	No water	-	
Airflow switch	-	Flow	No flow	-	
Interlock switch	-	Open	Closed	-	
Water until drain/flush	-	-	2,200,000	lbs	Displays amount of water to be converted to steam before automatic drain sequence (ADS) can begin
	-	-	1,000,000	kg	
Water until service	-	-	2,200,000	lbs	Displays amount of water to be converted to steam before next recommended maintenance service
	-	-	1,000,000	kg	
Blower 1 tach	-	0	7000	rpm	Displays rotation speed of Blower 1
Blower 2 tach	-	0	7000	rpm	Displays rotation speed of Blower 2
Gas valve 1	-	Open	Closed	-	
Gas valve 2	-	Open	Closed	-	

## Status screen

**Table 41-1:**  
**Status screen (continued)**

Menu item	Default value	Minimum value	Maximum value	Units	Notes
Combust air switch	–	Flow	No Flow	–	
Power vent switch	–	Open	Closed	–	
Flue pressure switch	–	Open	Closed	–	
Flue temperature	–	32	212	°F	
	–	0	100	°C	
Drain temperature	–	32	212	°F	
	–	0	100	°C	
Temperature switches	–	Open	Closed	–	For flue and tank temperature

# System alerts

**FIGURE 44-1: TOUCHSCREEN**



The active Alerts menu displays active system alarms and messages as Red, Yellow and White alerts. Using the touchscreen, go to the Alerts menu by pressing the Alerts icon, or by pressing the Home icon and then the Alerts icon. The Alerts menu displays the alert name, date and time of occurrence and the word Clear. To get troubleshooting information about the alert touch the name of the alert on the alert bar. Touch the word Clear to request Vapor-logic to manually clear the alert when you are sure that the condition that caused the alert has abated. When the alert status changes to cleared, the alert will move from the active Alerts menu to the Alert Log. Using the Web interface, click on the View Alarms link in the upper left corner of any screen to show all alerts, both active and historical.

The Alerts Log displays the alerts name, date and time of occurrence, plus whether the alarm is active, has been cleared by an operator, or auto-cleared by Vapor-logic. The Alerts Log lists active alerts at the top of the list, followed by cleared alerts in chronological order. The Alerts Log holds 60 alerts. As alerts are cleared, they move down the list below active alerts. When the Alarms list reaches 60 alerts, new alerts add to the top of the list and the oldest, cleared alerts leave the list. Alert information is retained in nonvolatile memory if the Vapor-logic board loses power.

The color of an alert indicates severity. In the active Alerts screen the alerts are ordered Red, Yellow, White. The alert icon will be the color of the highest level of active alert.

- **Red:** faults requiring immediate attention
- **Yellow:** environmental conditions preventing unit operation
- **White:** diagnostic or service messages; events that will or have occurred that do not prevent unit operation

See Table 46-1 for alarms and their descriptions.

Alert causes and recommended actions are listed in the troubleshooting section in this manual.

# System alerts

**FIGURE 45-1: VAPOR-LOGIC WEB INTERFACE ALARMS SCREEN**

The screenshot displays the Vapor-logic web interface. At the top, the driSteem logo is on the left and 'Vapor-logic' is on the right. A navigation bar contains links for STATUS, ALARMS, DIAGNOSTICS, SETUP, and HELP. The main content area is divided into several sections:

- System Status:** A table showing RH (34%), SET POINT (35%), and OUTPUT (0%).
- RUN MODE:** A dropdown menu currently set to 'Auto mode'.
- TANK STATUS:** A dropdown menu currently set to 'Filling'.
- Alarms:** A section indicating '2 active alarms' with a link to 'View Alarms'.
- Messages:** A section indicating '1 active message' with a link to 'View Messages'.
- ALARMS LOG:** A table listing active alarms with columns for Alarm Details, Status, and Action.

**System Status**

RH	SET POINT	OUTPUT
34%	35%	0%

**RUN MODE** Auto mode

**TANK STATUS** Filling

**Alarms**  
2 active alarms  
> [View Alarms](#)

**Messages**  
1 active message  
> [View Messages](#)

**ALARMS LOG**

Alarm Details	Status	Action
<b>Excessive boil time</b> 2008-01-14 10:19:40 Humidifier continues to add water when there is no demand, or tank temperature is not decreasing signifying unit continues to make steam. All units are put into a 'Keep cool state' where fill and drain cycles operate to keep heating elements submerged in nonboiling water, except STS and LTS humidifiers, which go into 'Drain tank mode.' Clear alarm and reset power to resume normal operation.	Active	<a href="#">CLEAR</a>
<b>Burner 4</b> 2008-01-08 11:43:06 GTS only: Burner tried one or more times to light and did not succeed. Once this fault is active, GTS locks out burner and does not try to light it again until fault is cleared. Other burners can run.	Active	<a href="#">CLEAR</a>



# System alerts

Table 46-1:  
Alerts menu

Alert label	Description	Does alert auto-clear?
<b>Red Alerts</b>		
Tank temp sensor failed	Tank temp sensor has failed.	No
Tank overtemp	Fault occurs at boiling temperature plus 25 °F (13 °C). All units are put into a keep cool state where fill and drain cycles operate to keep tank cool. First resolve any safety issues, then resolve whatever is causing the problem. Restart the controller to clear the alarm.	No
Space RH signal out of range	RH signal is out of range.	Yes
Dew point signal out of range	Dew point signal is out of range.	Yes
Demand signal out of range	Demand signal is out of range.	Yes
Duct RH signal out of range	Duct RH signal is out of range. Sensor may be faulty.	Yes
Aux temp sense out of range	Auxiliary temp sensor signal is out of range.	Yes
Check water probe	Water probe head is dirty, faulty, or miswired.	Yes
Faulty water probe	Water probe readings are suspect, likely caused by scale on probe.	No
Excess fill time	Fill valve has been on too long during initial tank fill. Bottom probe is not in contact with water.	Yes
Excess refill time	Re-filling is taking too long. Top probe is not in contact with water.	Yes
Tank not draining	Drain valve has been open for the prescribed amount of time based on the humidifier model, and water is still touching the low water probe.	Yes
Excessive boil time	Humidifier continues to add water when there is no demand, signifying humidifier is continuing to make steam. Humidifier is put into a keep-cool state where fill and drain cycles operate to keep tank water from boiling. First resolve any safety issues, then resolve whatever is causing the problem. Restart the controller, and clear the alarm.	No
No SDU airflow	Airflow proving switch in the SDU (space distribution unit, a fan-based dispersion assembly) indicates no airflow. No steam is produced while alarm is active.	Yes
Overtemp cutout	Overtemp cutout circuit has opened. First resolve any safety issues, then resolve whatever is causing the problem. Restart the controller to clear the alarm.	No
Blocked flue	Flue pressure switch indicates positive pressure in flue. Burner will not ignite when this fault is active.	Yes
Burner 1 or 2 fault	Burner tried one or more times to light and did not succeed. Once this fault is active, Vapor-logic locks out the burner and does not try to light it again until fault is cleared. Other burners can run.	No
Ignition mod. 1 or 2 fault	Ignition module has not opened the gas valve. Once this fault is active, Vapor-logic locks out the ignition module and does not try to start it again until fault is cleared. Other ignition modules can run.	No
Blower 1 or 2 fault	Blower is turning at less than the specified minimum RPM. Unit not allowed to run.	Yes
Gas valve 1 or 2 fault	Gas valve is on when it should be off. Unit not allowed to run.	Yes

Continued

# System alerts

**Table 47-1:**  
**Alerts menu (continued)**

Alerts label	Description	Does alarm auto-clear?
Flue or tank over-temp cutout	The listed flue temperature switch or tank temperature switch has opened. These switches will close after the system has cooled.	Yes
Flue sensor out of range	Flue temperature sensor signal is out of range.	Yes
Drain sensor out of range	Drain temperature sensor signal is out of range.	Yes
<b>Yellow Alerts</b>		
No airflow	No duct airflow.	Yes
Interlock open	Interlock safety switch is open.	Yes
Freeze drain	Tank has drained to prevent freezing.	Yes
End-of-Season (EOS) active	The humidifier is draining or has drained and remains inactive until receiving another call for humidity.	Yes
Clean probes	Water level control probes need cleaning. Check tank for cleaning.	No
Duct HL trip	Duct relative humidity has risen above the high limit set point, or high limit switch has opened.	Yes
Insufficient water	The low water probe is not in contact with water when there is a demand for humidity.	Yes
Master enable open	Indicates demand signal is being ignored due to Master enable input being open.	Yes
Hot drain water temp	The drain temperature has exceeded 145 °F (63 °C) for at least one minute	Yes
Excessive foaming	During normal operation top probe indicated "water", which was interpreted as foam. Foam drain will occur.	Yes
Aux temp sense out of range	Auxiliary temp sensor signal is out of range.	Yes
<b>White Alerts</b>		
Service unit	Regularly scheduled unit servicing is due.	No
Drain pending	Auto drain/flush will occur at next scheduled time.	Yes
Temp comp on	Humidifier output has been reduced because temperature compensation sensor reads a temperature on the inside-pane of an outside-wall window that could cause condensation.	Yes
Duct HL span	Duct high limit transmitter has entered the throttle span range and is approaching duct high limit set point.	Yes
Replace ignitors soon	Replace ignitors soon. Ignitors have been cycled to 80% of their expected life or there are other indications the ignitors may be worn out.	No
Replace contactors	Contactors have reached their expected life as indicated by the contactor cycle counter. Replace contactors.	No
High flue temp, output reduced	Flue temperature is close to exceeding rated value. The output will temporarily be reduced by 50% to allow the flue to cool.	Yes
Hot drain water	The drain temperature has exceeded 145°F (63° C) for one minute. The drain tempering device may not be working properly.	Yes
Boiling temp calibrated	Indicates actual humidifier boiling temperature at time of reading. This reading is taken after power-up by the tank sensor at the time of first steam creation.	Yes
<b>Notes:</b> <ul style="list-style-type: none"> <li>• See the "Troubleshooting" section, beginning on Page 86, for alert possible causes and recommended actions.</li> <li>• The Alerts Log displays alert name, date and time of occurrence, plus "Active," "Cleared" or "Auto-cleared."</li> <li>• Active alerts display first in the Alerts Log, followed by cleared alerts (auto-cleared and/or manually-cleared) listed in order of occurrence.</li> <li>• The Alerts Log displays maximum 60 alerts. Cleared alerts leave the log first.</li> <li>• If an alert event occurs and is not manually cleared or auto-cleared during unit operation, the alert will remain until there is demand and the unit is running.</li> </ul>		

## Status LED (Vapor-logic control board)

### **STATUS LED (VAPOR-LOGIC CONTROL BOARD)**

The Vapor-logic control board includes a diagnostic Status LED that shows multiple humidifier control conditions. The Status LED blinks in a 3-stage cycle over approximately four seconds. The Status LED is always "blinking". It will be easy to see that the board is powered and operating because, at a minimum, it is running the Status LED.

The blinking will be in a 3-stage cycle starting from being dark with the LED brightness illuminating up to the first stage of indication.

Timing of the 3-stage cycle will be over approximately four seconds.

See "Vapor-logic control board LED indicators" on page 49.

### **FIRST BLINK: FAULTS**

A yellow first LED blink indicates there is one (or more) of four conditions present that will prevent the humidifier from operating. These conditions can be viewed as a message through the Vapor-logic display:

1. The interlock switch on cabinet or tank is open (connected at ISW input on control board).
2. There is no airflow.
3. The duct humidity high limit has been exceeded.
4. The Master Enable input is open (P20 input on control board).

A red Status LED blink indicates there is an active fault preventing the unit from operating. These conditions can be viewed as alerts through the Vapor-logic display.

If the first Status LED blink is blue, the unit is set to Standby or Test mode. Unit must be set to Auto Mode to enable operation. The Mode can be set through the touchscreen, or through an associated building automation system (BAS).

A green Status LED blinks Auto mode with no faults.

### **SECOND BLINK: COMMUNICATION STATUS**

For single-tank installations, green or red indicates communications status to the associated touchscreen display.

If the humidifier is part of a multi-tank system, Green indicates communications is occurring between the controller and other controllers and/or the touchscreen display. Red indicates there is no communications occurring. If the Status LED is red, check the communications wiring between the main and other secondary units.

### **THIRD BLINK: HUMIDIFICATION DEMAND**

Without humidification demand the humidifier will not run, and the third blink in the Status LED sequence will be blue. Demand is created through a connected humidistat, humidity transmitter, or through an external source such as building automation system (BAS). When there is a call for humidification (demand), the third Status LED blink sequence will be green.

## Status LED (Vapor-logic control board)

### VAPOR-LOGIC CONTROL BOARD STATUS LED (CONTINUED)

Table 49-1: Vapor-logic control board LED indicators			
LED Indicator	First Blink	Second Blink	Third Blink
	Faults	Communications status	Demand/call for humidification
<b>Green</b>	Auto mode: no faults	Touchscreen display is attached and working	Humidification demand is present
<b>Yellow</b>	Auto mode: active message preventing unit from running	—	—
<b>Red</b>	Auto mode: active fault preventing unit from running	Touchscreen display is not communicating with controller	—
<b>Blue</b>	Standby or test mode: unit will not run	—	No humidification demand present

## Status LED (Touchscreen)

### STATUS LED (TOUCHSCREEN)

The LED on the Vapor-logic touchscreen is located on the front, just below the active touch area. It remains solidly lit as long as there is power (even when the Touchscreen is in sleep mode). The color indications are similar to those for the Vapor-logic LED but it does not have a three blink sequence.

Table 50-2:  
Touchscreen LED indicators

LED Indicator	Mode	Demand/call for humidification
Green	Auto mode: no faults	Humidification demand is present
Yellow	Auto mode: active alert preventing unit from running	—
Red	Auto mode: active fault preventing unit from running	—
Blue	Standby mode or auto mode	No humidification demand present

## PID tuning

When your system has a humidity or dew point transmitter, you can adjust and control the set point through the touchscreen or Web interface using a proportional, integral, and derivative (PID) control loop.

### IMPROVES HUMIDIFIER RESPONSE TIME

With a PID loop, you can tune your system for maximum performance using the proportional (Kp), integral (Ki), and derivative (Kd) gain terms.

Kp = Proportional gain factor

Ki = Integral gain factor

Kd = Derivative gain factor

These gain factors work in the following way: The overall demand in a PID system is made up of three distinct parts—the proportional, the integral, and the derivative. Each of these parts is calculated and then multiplied by its corresponding gain factor. These gain factors are the setup variables you have access to from the Settings menu. By making a gain factor larger, you increase its overall influence on system demand. Once each PID component is multiplied by its gain factor, all three terms are added together to determine the overall demand percentage.

### THE PROPORTIONAL TERM

The proportional term is the difference between the RH set point and the actual humidity multiplied by the proportional gain. For example, with a Kp of 80 and the actual humidity 5% below the RH set point, the proportional contribution to the demand is:

$5 \times 80 \times 0.085 = 33\%$  (the 0.085 is an internal scalar used to increase the usable span of Kp).

There is a problem with using only proportional gain to control the RH. In almost all applications there is some constant load on the humidifier just as there is a constant load on heating equipment. If the proportional term is all that is used, the actual humidity must be less than the set point for the humidifier to be on.

What happens is the humidifier finds a happy medium where the actual humidity is something less than the set point, which allows the humidifier to continue to run. This difference between the set point and the actual running humidity level is called the droop. This droop can be corrected using the next term, the integral.

### Settings menu

The Settings menu is where system parameters can be changed. This menu is used primarily during initial installation, but can also be used for making changes or adjustments as needed during operation. Note that while all parameters can be changed, many changes also require a corresponding hardware change. Vapor-logic firmware will warn you of this during the setup process.

See Setup, beginning on Page 27, for more information about the Settings menu.

# PID tuning

## THE INTEGRAL TERM

The integral term is an accumulation of RH error over time multiplied by the integral gain. Every 1/10 second when the demand is updated, the instantaneous RH error (RH set point – actual RH) is added to a temporary variable that accumulates the error. This accumulated error is multiplied by the integral gain to create the integral term. The integral gain affects how fast the humidifier corrects a droop condition. The higher the integral gain ( $K_i$ ), the faster the reaction. (An integral gain of zero disables this variable and allows the unit to run on the proportional term only.)

With an integral gain term greater than zero and an actual humidity below set point, the demand increases slightly with each update. If the actual humidity is above set point, the demand decreases slightly. The amount it increases or decreases depends on the magnitude of the RH error and the integral gain value. The closer you are to the set point, the smaller the addition or subtraction.

When looking at this control scheme, an interesting pattern occurs. The total demand signal for the humidifier is the sum of the proportional part, the integral part, and the derivative part. As the actual humidity approaches the set point, the integral portion makes up the majority of the demand, and the proportional part makes up very little. Once the set point is reached and the unit stabilizes, the entire demand is made up of the integral part because the proportional part is zero.

If the actual humidity goes over the set point, the integral term starts to decrease. In addition, the proportional term becomes negative and actually starts to subtract from the total system demand. These two terms work in conjunction with each other to bring the humidifier back to set point.



# PID tuning

## THE DERIVATIVE TERM

The derivative term is the measured change in error over time multiplied by the derivative gain (differentiating error with respect to time).

If the actual measured RH is below set point and is rising, the derivative term subtracts from the demand in anticipation of the approaching set point.

If the actual measured RH is below set point and is falling, the derivative term adds to the demand in anticipation of the need to get the demand up faster and start climbing toward set point.

If the actual measured RH is above set point and falling, the derivative term adds to the overall demand in anticipation of the approaching set point. It generally is used to increase damping and, in some cases, improves the stability of the system.

However, in the majority of control situations, the derivative term is not needed and is simply set to zero. The proportional term and integral term provide tight, accurate control without the addition of the derivative term.

## PID BAND

The last user-controlled term in the PID equation is the PID band. The PID band defines the range of measured RH values (°F/°C for dew point control) where the PID loop is in operation. The PID loop is in operation when the measured RH is in the range of (RH set point – PID band) to (RH set point + PID band). If the measured RH is below the PID band, the PID calculations are suspended and the demand is set to 100%. Conversely, if the measured RH is above the PID band, the demand is set to 0%.

For example, if starting with an RH set point of 35% and a PID band of 10%, the PID loop operates when the actual humidity is in the range of 25% to 45%. If the actual humidity is lower than 25%, the humidifier is full on. If the actual humidity is above 45%, the humidifier demand is 0%. The PID band aids in speeding the response time of the system. It allows the RH to get somewhat close to the set point and then lets the PID loop precisely control the RH when it is within the PID band. The default value for the PID band is 10%.

Large spaces where the humidification system influences the RH very slowly typically benefit from a smaller PID band. Small spaces where the humidification system can quickly influence the RH typically benefit from a larger PID band. Rarely should it be set to less than 10%.

# PID tuning

## **PID SETUP TIPS**

A large PID band (10% to 20%) yields tighter and more stable control with longer response times. A small PID band produces quicker response times, but control may become unstable if the RH regularly goes outside the band.

As a rule, start with a PID band of 10%. When the humidifier is operating at steady state, make sure the RH does not go outside the PID band. The intent of the PID band is to quickly get the RH into a controllable range. To increase or decrease the effect of the proportional term on system performance, adjust the proportional gain (Kp).

However, for the majority of systems, the factory default setting of 80 is sufficient. Generally speaking, a large integral gain (Ki) quickens the system response but may cause it to oscillate and become unstable. A small integral gain yields tighter, more stable control at the expense of a long response time.

These principles can be applied in the following examples: If a system eventually reaches the desired RH level but takes a long time to do so without overshooting the set point, faster response can be achieved by increasing the integral gain. If the measured RH oscillates above and below the set point numerous times before finally reaching set point, decrease the integral gain.

Typically, if a large adjustment is made to the integral gain, better response is achieved by decreasing the magnitude of the change. Then, modify the proportional gain slightly in the same direction the integral gain was changed. RH history data, available for download from the Diagnostics menu, can aid when doing PID loop tuning.

## Universal water level control

The Universal Water system allows the Vapor-logic controller to identify the water type using a three-probe assembly. All water types and conductivities work with the universal water system. The user does not need to select a new water type or change hardware to change water types. Additional valves and Vapor-logic algorithms measure and control the water level for optimum efficiency and low water safety conditions. Vapor-logic automatically provides a steady output while maintaining the water level between the bottom and middle probes.

Water must remain in contact with the probe surface for three seconds for Vapor-logic to determine that the water is at the probe's level. Conversely, water must stay out of contact with the probe surface for three seconds for Vapor-logic to determine that the water is below the probe's level. This three-second delay ensures that turbulence does not cause an incorrect level reading. If the water level falls below the low-water cutoff probe for a time period determined by Vapor-logic, heating outputs are disabled; this provides low-water protection for the heating outputs. If Vapor-logic detects water on the top probe Vapor-logic will assume there is foam and a foam drain will start immediately.

The humidifier will perform probe checks to insure that the probes are being read accurately and to determine the quality of the incoming water. The humidifier status on the home screen will show "Probe Check" and humidification will pause for a few minutes. When the drain type is Full Drain, the check happens on the days of the week and at the time specified in the ADS settings, and humidification may pause briefly. When the drain type is Mini-Drain, the check happens during a mini-drain and humidification does not pause. If the signal from the probe assembly begins to deteriorate, the "Clean probes" or "Check Water Probe" message appears in the Alert log. Once the probe system reaches its maximum usable life, the humidifier shuts down and the user gets a "Faulty Water Probe" active alert.

### CAUTION

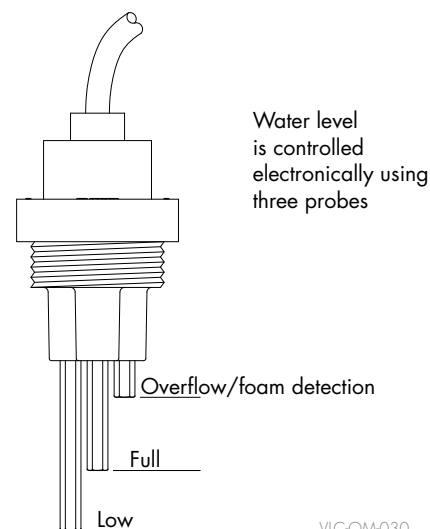
#### Chloride corrosion

Damage caused by chloride corrosion is not covered by your DriSteem warranty.

Chloride corrosion can result from a variety of causes, including, but not limited to

- Improper water deionization processes
- Improper water softening processes
- Humidifier's supply water

**FIGURE 55-1: WATER LEVEL CONTROL**



VLC-OM-030

## Automatic drain sequence, all water types

Vapor-logic uses an automatic drain sequence (ADS) to reduce mineral accumulation in the tank and drain line, which decreases tank maintenance. Choose from four variations of the automatic drain sequence.

### SEQUENCE OF OPERATIONS:

- **Smart Full Drain\*:** When the Smart Drain interval has elapsed and it is an allowed time, humidifier operation stops and the drain valve opens to empty the tank fully. When the drain duration ends, the fill and drain valves remain open to flush the tank. The humidifier resumes normal operation. All Smart Drain selections allow Vapor-logic to determine the frequency of the drains based on water quality.
- **Smart Mini-Drain:** This sequence starts automatically when the Smart Drain interval has elapsed. The humidifier first over-fills to skim some minerals out of the tank. The drain opens to remove approximately 15-30% of the water and then closes. The humidifier maintains normal operation throughout the sequence. The internal drain tempering feature does not function with mini-drain enabled. An external mechanical drain tempering device would need to be installed to temper the drain water.
- **User Full Drain:** When the User Drain interval has elapsed and it is an allowed time, humidifier operation stops and the drain valve opens to empty the tank fully. After the drain duration, the fill and drain valves remain open to flush the tank. The humidifier resumes normal operation. The user defines how often drains happen. Decrease the drain interval to increase the draining frequency.
- **User Mini-Drain:** The sequence starts automatically when the User Drain interval has elapsed. The humidifier first over-fills to skim some minerals out of the tank. The drain opens to remove approximately 15-30% of the water and then closes. The humidifier maintains normal operation throughout the sequence. The internal drain tempering feature does not function with mini drain enabled. The user can define how often drains happen. Decrease the drain interval to increase the draining frequency.
- **Draining Disabled:** The tank will not drain automatically. If selected, DriSteem recommends that the humidifier be manually drained at least once every three months to protect the tank from aggressive water or mineral accumulation.

\*Smart Full Drain is the default drain interval selection. Drains are scheduled to only be allowed at 12am.

## Automatic drain sequence, all water types

**Table 57-1:**  
**Comparison of Drain Interval Sequence of Operations**

	Full Drain	Partial Drain	Drains only per allowed times	Drains based on water cleanliness	Drains when usage surpasses user-defined interval	Humidifier stays operational during drain
Smart Full Drain*	X		X	X		
Smart Mini-Drain		X		X		X
User Full Drain	X		X		X	
User Mini-Drain		X			X	X

\*Smart Full Drain is the default drain interval selection. Drains are scheduled to only be allowed at 12am.

**Table 57-2:**  
**Comparison of Benefits**

	Minimizes down time	Minimizes water usage	Maximizes tank cleanliness	Internal drain tempering available to use
Smart Full Drain*		X	X	X
Smart Mini-Drain	X	X		
User Full Drain			X	X
User Mini Drain	X			

\*Smart Full Drain is the default drain interval selection. Drains are scheduled to only be allowed at 12am.

# Options and features

## **TEMPERATURE COMPENSATION CONTROL OPTION**

When selected as an option, DriSteem provides a temperature compensation transmitter. The temperature compensation transmitter continually monitors interior window glass temperature and transmits this temperature to Vapor-logic.

Vapor-logic assumes a 70 °F (21 °C) room temperature and uses the glass temperature and the RH in the space being controlled to calculate the dew point (°F or °C) for the space.

If the window temperature falls below the dew point, Vapor-logic automatically decreases the RH set point so moisture does not form on windows. The Home screen displays the modified RH set point, and an alert of "Temp Comp On" appears in the Alert Log of the touchscreen and a message appears on the Web interface, denoting that temperature compensation has taken control of the RH set point. When the interior window glass temperature rises above the dew point, Vapor-logic restores system control to the normal RH set point for the space, and the "Temp comp on" message and alerts automatically clears.

The temperature compensation control option is available only when the system is equipped with an RH transmitter. It is not available when a remote humidistat, dew point transmitter, or building automation system is used to control the humidifier.

The transmitter provided with Vapor-logic is calibrated for -20 °F to 160 °F (-29 °C to 71 °C) with output from 4 to 20 mA. For example, a temperature reading of 70 °F (21 °C) should produce a measurement of 12 mA. You can calibrate the sensor by adjusting the offset in the auxiliary temp sensor section of the Status menu of the touchscreen or Diagnostics menu of the Web interface menu.

## **AUXILIARY TEMPERATURE SENSOR OPTION**

When selected as an option, DriSteem provides a temperature sensor for monitoring temperature in a duct or space. Temperature from this sensor can be viewed from the Status menu ("Aux temperature").

## **TANK PREHEAT FEATURE**

The tank preheat feature heats the water in the tank to near boiling to allow a rapid response to a demand signal. If the tank is cold when a small demand signal is present, the Vapor-logic controller overrides the demand signal and heats until the tank temperature increases to the boiling point. At this point, control is returned to the original demand signal.

Preheating allows the system to respond quickly to small demand requests. When preheating, the word "Heating" appears on the Home screen.

## Options and features

### **FOAM DRAIN**

When foam reaches the top probe of the water probe assembly Vapor-logic initiates an immediate Foam Drain. The humidifier is not allowed to produce steam with foam in the tank because the water detection system may read inaccurately, causing a safety issue. The Foam Drain sequence will drain the foam, flush the foam out, refill the tank and then restart. The Foam Drain feature cannot be disabled. This feature is similar to the Auto Drain for the Automatic Drain Sequence but it does not wait for Usage or allowed time and day requirements.

### **DUCT HIGH LIMIT SWITCH OPTION**

When a duct high limit option is ordered, DriSteem provides either a duct high limit switch or a duct high limit humidity transmitter (4 to 20 mA output, 0 to 100% RH range) for duct mounting.

The duct high limit switch prevents duct saturation by turning off the humidifier when reaching the device set point. When this occurs, a "Duct HL trip" message appears in the Alert Log of the touchscreen and a message appears in the Messages Log and autoclears when duct RH drops below the duct high limit set point.

### **MODULATING HIGH LIMIT TRANSMITTER OPTION**

The modulating high limit transmitter operates in conjunction with the room/duct controlling transmitter or demand signal through the Vapor-logic control system to prevent excess humidification in the duct. Vapor-logic starts lowering the humidifier output when the duct relative humidity is within a user-defined percentage (default is 5%) of the duct high limit set point. This value is called the duct high limit span and is defined during Setup.

When duct relative humidity enters this range, a "Duct HL span" alert appears in the Alert Log of the touchscreen and a message appears in the Message Log of the Web interface. If necessary, the reduction of the humidifier output continues until maximum high limit set point is reached, shutting off the humidifier completely. If this occurs, a "Duct HL trip" alert appears in the Alert Log of the touchscreen and a message appears in the Message Log of the Web interface.

When the high relative humidity starts to decrease in the duct, Vapor-logic slowly starts to increase steam production. When the duct relative humidity decreases to greater than the defined percentage below the duct high limit set point, the control transmitter or signal by others demand signal is restored as the primary controller, returning the control system to normal operation, and the messages in the Message Log of the Web interface and active alerts automatically clear.

# Options and features

## **AQUASTAT SET POINT FEATURE**

The aquastat set point is the minimum tank temperature the Vapor-logic controller maintains when there is no call for humidity or when safety circuits are not satisfied (e.g., high limit or airflow proving switch). The aquastat set point is adjusted through the water management section of the Settings menu. This feature shortens the tank preheat time, providing a rapid response to a call for humidity.

For example, if the aquastat is set at 180 °F (82 °C) when a call for humidity occurs, the tank only needs to warm up 32 °F (18 °C) to reach the boiling point. However, if the aquastat is at its minimum default setting of 40 °F (4 °C) and the tank is in an average-temperature occupied room, when a call for humidity occurs, the tank needs to warm up from room temperature to the boiling point before producing steam. When an aquastat call is heating the tank, the word "Heating" appears on the Home screen. Aquastat heating will occur with high-limit and airflow alarm conditions.

## **FREEZE PROTECTION**

Freeze protection is similar to aquastat operation with some exceptions. The freeze protect set point is fixed at 40 °F (4 °C). Its purpose is to prevent the tank from freezing in cold environments. Unlike aquastat, if a condition exists that prevents the heaters, burners, and valves from firing (such as an alarm, an external interlock switch is open, or the humidifier is in Standby mode), instead of remaining idle, the controller switches to manual drain run mode and the tank drains to prevent freezing. Change mode to Auto to resume operation.

When the tank is heating to prevent freezing, the word "Heating" appears on the Home screen. When the tank is draining or has drained to prevent freezing, the "Freeze drain" message appears in the Messages Log of the Web interface and an alert appears in the Alert Log of the touchscreen.

## **FAN-BASED DISPERSION OPERATION**

If your humidifier is equipped with a Space Distribution Unit (SDU) or an Area-type fan, it is enabled after the Vapor-logic controller receives a call for humidity and the tank water is approaching boiling temperature.

When the humidifier no longer receives a call for humidity, it stops heating and the SDU or Area-type fan continues to run for the time delay period (as defined in the fan-based dispersion section Settings menu).

Note: The Fan Dispersion option appears in the Settings menu of the touchscreen only if the humidifier was originally ordered with fan or SDU dispersion. To change to duct dispersion, consult with DriSteem technical support and use the Web interface to choose Fan Dispersion.



# Options and features

## **SENSOR OFFSETS**

All external transmitters shipped with Vapor-logic can be field calibrated from the Settings menu. For example, if the system is equipped with an RH transmitter, there is an RH offset setting.

The factory default for all transmitter offset settings is zero. The sensors that have this adjustment capability are the humidity, duct high limit, temperature compensation, and dew point transmitters.

## **SKIM TIMER**

The Vapor-logic controller has a skim timer. This timer is activated at the end of each probe check. The timer keeps the fill valve open (for a user-determined amount of time) to skim minerals off the water surface. The skim time is adjusted through water management in the Settings menu.

## **END-OF-SEASON DRAIN**

If there is no call for humidity for a user-defined time period, the humidifier performs an end-of-season (EOS) drain where the drain valve remains open for ten hours to allow the tank to drain and then closes. If the humidifier receives a call for humidity after the ten-hour end-of-season drain-down period has begun, the controller stops the end-of-season draining, the tank refills, and the humidifier resumes normal operation. The user-defined inactivity time period (idle time) is defined in the end-of-season drain section of the water management settings menu.

## **SERVICE INTERVAL**

The Vapor-logic controller tracks the amount of water converted to steam by the humidifier and the number of hours the humidifier runs. When the amount of steam or hours of run time exceeds the user-defined service interval (pounds, kilograms, or hours, adjusted in the Settings menu), "Service unit" appears in the Messages Log on the Web interface or in the Alert Log on the touchscreen display. On the touchscreen display Status and Quick Diagnosis screens the user will also see the words Service Due: Yes.

The humidifier continues to operate after the alert appears. The alert notifies the user that the service interval was reached and the humidifier should be cleaned. The alert remains active until the user manually clears it, indicating that the cleaning was completed.

# Options and features

## **SETTING DATE AND TIME**

The Vapor-logic controller contains a real-time clock that is used for several features including the drain and flush sequence and alarm logging. If you need to reset the date or time, go to the Settings menu.

Note: Verify the date and time settings after every firmware upgrade.

## **BATTERY BACKUP, NONVOLATILE MEMORY**

If there is a power outage, date and time settings will be saved. Alerts, unit configuration, and usage timers will remain in nonvolatile memory indefinitely. When the battery is getting low a "Check Battery" alert will appear in the Alert Log on the touchscreen and in the Message Log of the Web interface.

## **SECURITY/PASSWORD**

To control who can change Vapor-logic settings, enable the security function and define a password in the Settings menu. Enter four digits, numbers only, and define the time-out period (minutes of inactivity before Vapor-logic reverts to read-only mode). The Web interface and the touchscreen can have separate passwords.

**Important:** Write down the password and keep in a secure location.

## **PASSCODE FOR TOUCHSCREEN DISPLAY**

On the touchscreen display choose a passcode immediately following the choice of Require Passcode: Yes. If security is required and the passcode was not set, try the Vapor-logic default of 0000. If a passcode has been set and then forgotten, contact DriSteem Technical Support.

## Options and features

### DOWNLOADING HISTORICAL DATA

Vapor-logic acquires data at a default interval of once a minute and retains it for 21 rolling days or 30,000 data points, including the most recent 60 alerts. Download the data to a USB storage device and then view with a spreadsheet program such as Microsoft Excel or Google Sheets. The data, available for download and sorting, contain the details shown in Table 63-1.

Note: Data is saved to nonvolatile memory every 60 minutes. If unit power is lost, up to 60 minutes of data could be lost.

Go to the **Download data** section of the Diagnostic screen for download options.

Table 63-1:

Sample of data log downloaded and sorted

Time	SpaceRH or Demand	Aux Temp (°F)	Tank Temp (°F)	BTU's used	Lbs steam	Output (%)	Alarm/Msg	Alarm/Msg Status	Current Config: xx##xx#x###xx	Factory Config: xx##xx#x###xx
1/26/10 9:36 AM	23	0	212	567019018	421066	23			—	—
1/26/10 9:37 AM	23	0	212	567021350	421068	23				
1/26/10 9:38 AM	23	0	211	567023681	421070	23				
1/26/10 9:39 AM							low_water_cutout	Auto cleared message		
1/26/10 9:40 AM	23	0	210	567028344	421073	23				
1/26/10 9:41 AM	23	0	211	567030677	421075	23				
1/26/10 9:42 AM	23	0	212	567033008	421077	23				
1/26/10 9:43 AM	23	0	212	567035339	421079	23				
1/26/10 9:44 AM							Unit Start	Auto cleared message		

To sort data (as shown above) with alerts listed in the order they occurred:

1. Import the data into a spreadsheet program, such as Microsoft Excel.
2. Set the Time column to be displayed in the date-time format.
3. Sort all rows by "Time" in ascending order.

### BACKING UP AND RESTORING SETTINGS

Vapor-logic settings can be backed up to and restored from a USB flash drive. The backup file contains all information relative to the humidifier, including firmware, user settings, model number, serial number, and the configuration string.

Backup files use the serial number in the backup file name so that the file is easily matched to a particular humidifier.

# Firmware updates

## BACKING UP AND RESTORING SETTINGS

To create a backup file:

NOTE: The USB flash drive must not contain Vapor-logic firmware files.

1. Insert a USB flash drive into the USB port on the Vapor-logic board.
2. Go to Settings/USB backup-restore/Back up settings
3. Select Yes. The display will prompt you when backup is complete.

To restore from a backup file:

1. Insert a USB flash drive with that humidifier's backup file into the USB port on the Vapor-logic board.
2. Go to Settings/USB backup-restore/Restore settings.
3. Select Yes. Note that the serial number of the humidifier and backup file must match to complete the restore process.

## DOWNLOADING FIRMWARE UPDATES

The Vapor-logic controller and the touchscreen display firmware can be field upgraded to the latest firmware version via the USB port on each device. Firmware updates are available at no charge on the DriSteem website. One download from the DriSteem web site will give you all files needed to update both Vapor-logic and the touchscreen display.

To update your Vapor-logic controller and/or touchscreen display to the latest firmware version, perform the following procedure:

1. Navigate to [www.dristeem.com](http://www.dristeem.com).
2. Go to **Support & Literature** on the site navigation menu.
3. Select **Technical Support**.
4. Click on **firmware updates**.
5. Plug a reliable USB flash drive into a USB port on your computer, and prepare the flash drive as follows:
  - a) Move or delete all files from the drive.
  - b) Make sure it has at least 16 MB of free space.
  - c) Make sure it is not partitioned into multiple drives.
6. Navigate to **Vapor-logic6** and click version download link.
7. Perform the procedure in Table 65-1.

# Firmware updates

Table 65-1:

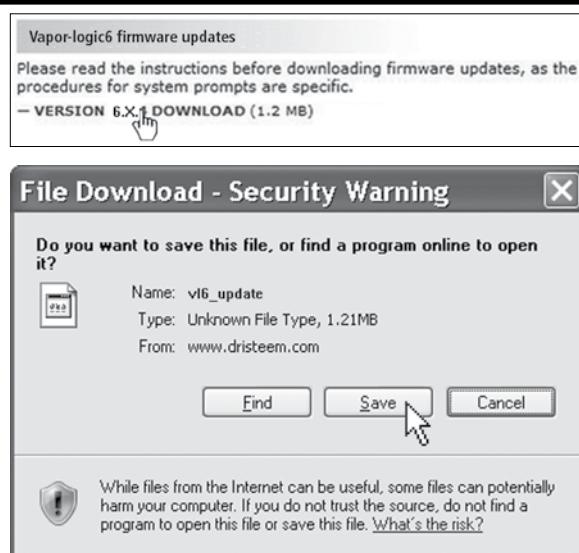
## Downloading Vapor-logic firmware updates

1. Click the link shown to the right on the **Vapor-logic firmware updates** page of [www.dristeem.com](http://www.dristeem.com).

If a security window appears, click the **Save** button.

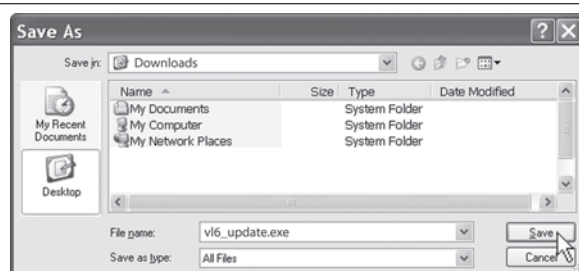
### Notes:

- Your browser and operating system might be set up differently, the screenshots are provided as a general road map.
- Chrome or Firefox browsers are recommended. Microsoft Edge will block the executable file from downloading.



2. If prompted for a save location, choose downloads.

3. Click the **Save** button.



4. In your downloads folder, double-click the new **vl6\_update.exe** file or click the executable directly from the browser download button.



5. If a Security Warning appears, click the **Run** button.

A WinZip Self-Extractor window appears.

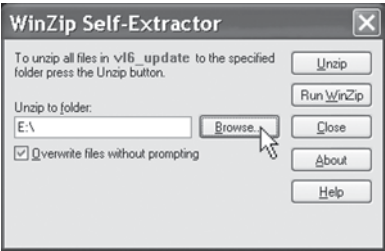
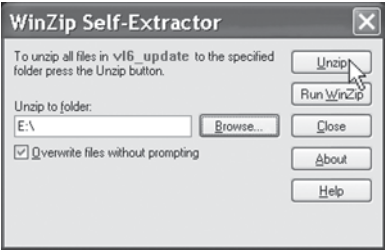


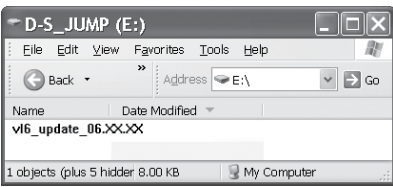
### Notes:

- If Microsoft Defender SmartScreen prevents the app from starting, click More Info and then Run.
- If Microsoft Edge must be used, click for more options to choose to keep the file and the Show More to choose Keep.



Continued

Firmware updates

<b>Table 65-1:</b> <b>Downloading Vapor-logic firmware updates (continued)</b>	
6. Click the <b>Browse</b> button in the WinZip Self-Extractor window, and select your USB flash drive as the target location.	
7. Click the <b>Unzip</b> button in the WinZip Self-Extractor window.	
<p>A WinZip window opens to confirm that the firmware update has been unzipped.</p>	
8. Click the <b>OK</b> button.	
9. Click the <b>Close</b> button to close the WinZip Self-Extractor window.	
10. Open your USB flash drive. Confirm that it contains a folder named <b>vl6_update_xx.xx.xx</b> (where x represents the version number) and a <b>dristeem_tsd</b> folder that it has today's timestamp.	
11. Remove the USB flash drive from your computer.	
12. Proceed to "Installing firmware updates" on Page 67.	

# Firmware updates

## INSTALLING FIRMWARE UPDATES

1. Place the humidifier system in Standby mode. Disconnect the display, Ethernet, multi-tank and Fieldbus wires.
2. **IMPORTANT:** To prevent static damage to the USB flash drive and controller, ground yourself by briefly touching the humidifier's electrical subpanel before touching any part of the controller board or doing Step 3. See the Warning.
3. With the board powered, insert the USB flash drive loaded with the unzipped firmware update folder into the Vapor-logic board USB port.

### CAUTION

#### Do not remove USB flash drive or cycle power early

During Steps 4 and 5, do not remove the USB flash drive or cycle the power until the signal occurs as explained in Step 5.

4. The update process begins immediately and takes up to 1 minute. Wait for the relay on the Vapor-logic board to begin clicking continuously. The water probe LEDs on the board will blink during the update process.
5. When the relay on the Vapor-logic board begins to click continuously, remove the USB flash drive from the Vapor-logic board USB port. When the USB flash drive is removed, the Vapor-logic controller and display reboot with the updated firmware.

Note: Some USB sticks will not click. If this happens, confirm the USB stick has been inserted at least one minute and the water probe LEDs are at a steady state.

6. Verify the update by checking the Vapor-logic firmware version as follows:
  - a. Select Settings in the touchscreen display Main menu.
  - b. Select Humidifier info.
  - c. Scroll down to Firmware version.

The firmware version displayed should match the version number of the **vl6\_update xx.xx.xx** folder on the USB flash drive (where x represents the version number).

7. With the board still powered:
  - a. Insert the USB stick with the unzipped firmware into the touchscreen display. The display will reboot.
  - b. Go to Settings/Display/Humidifier Info and verify that the display firmware version has been updated.

8. Verify humidifier operation, and return it to service.

Not all USB drives perform equally. If a USB flash drive fails to update the Vapor-logic firmware, perform the procedure with a USB flash drive of a different brand and size.

### WARNING

#### Electric shock hazard

**All circuits must be energized for this firmware update procedure.** Contact with energized circuits can cause severe personal injury or death as a result of electric shock.

To prevent shock when grounding to the electrical subpanel, touch the subpanel along its edge, away from wires and components.

## Test outputs and test run

### TEST OUTPUTS

When completing an installation or repair, cycle all outputs, such as fill valve, drain valve, etc., to verify operation. Go to the test outputs section of the Settings menu and scroll through each connected output to verify operation. During testing, the humidifier mode changes to Standby and the tank status changes to Test.

### TEST RUN

Vapor-logic has a test run capability to confirm system functionality. This capability allows a technician to simulate a demand for steam production when there isn't one (such as when performing routine maintenance). To confirm functionality, go to the test run section of the Settings menu. Set system demand percent and set test run time duration. During testing, the humidifier mode changes to Standby and the tank status changes to Test.

**Table 68-1:**  
Test outputs and test run

Menu item	Default value	Minimum value	Maximum value	Units	Description
Test outputs					
Fill valve	–		–		Cycles output to verify operation.
Pulse fill valve	–		–		
Drain valve	–		–		Cycles output to verify operation.
Fan control	–		–		
Dry contact relay 1 or 2	–		–		
Ignition module 1 or 2 (GTS)	–		–		
Blower speed control (GTS)	–		–		Tests both blowers
Contactors 1 or 2 (RTS)					
SSR Control 1 or 2 (RTS)					
Test run*					
Test run percent	0	0	100	%	Set demand percent value between 0 and 100 to test.
Test run time	0	0	30	minutes	Set test run time duration between 1 and 30 minutes.
Start					
Stop					

\* Humidifier test run will not occur if safety circuits (for example, duct high limit switch, airflow proving switch, or safety interlock switch) are not operating correctly.



# Modbus, BACnet, LonTalk interoperability

Vapor-logic comes standard with Modbus or BACnet, or with LonTalk if ordered. Vapor-logic can connect to building automation systems using these protocols. Variables are defined in the tables on the following pages.

Note: For LonTalk installations, contact your local DriSteem representative to purchase a LonTalk upgrade.

## CONNECTIONS

1. If connecting to a Modbus or BACnet MS/TP system, connect Modbus or BACnet system wiring to terminal P7 on the Vapor-logic board (positive to positive, negative to negative).  
If connecting to a BACnet/IP system, connect BACnet system wiring to the Ethernet connection.
2. If connecting to a LonTalk system, connect the LON ProtoCessor module per Step 3 in Figure 69-1.
3. Disconnect power to the Vapor-logic board, wait 5 seconds, and reconnect power.
4. Set up communication with Vapor-logic using your Modbus, BACnet, or LonTalk network manager, referencing Table 70-1.

## INSTALLING LONTALK AS A RETROFIT

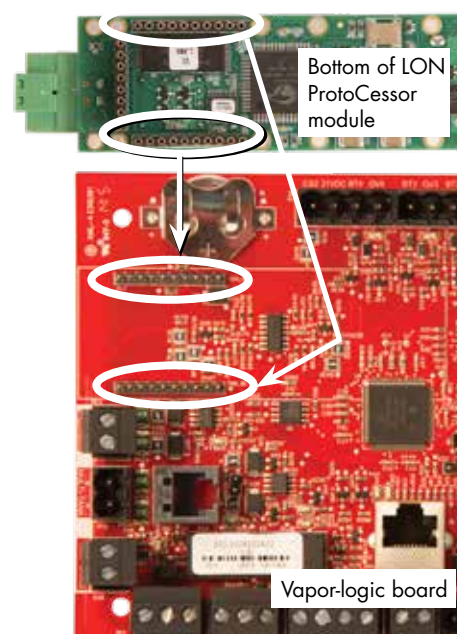
1. Turn off power to the unit.
2. Touch the unit's bare metal frame before handling the LON ProtoCessor module, and hold onto frame while handling the module.
3. While handling the module, hold it by the edge. Avoid touching the components or circuit board.
4. Plug LON ProtoCessor module into mounting pins (as shown in Figure 69-1) with LonTalk connector at the edge of the board. Make sure all pins are seated in the connector.
5. Connect LonTalk system wires to LON ProtoCessor module as shown in Step 3 at right.
6. Turn on power to the unit.
7. Using either the touchscreen or Web interface go to the Communications section of the Settings menu to enable LonTalk communication.
8. Set up communication with Vapor-logic using your LonTalk network manager, referencing Table 70-1.

**FIGURE 69-1: LON PROTOCESSOR MODULE INSTALLATION**

1. Remove LON ProtoCessor module from box.



2. Insert LON ProtoCessor module into pins on Vapor-logic board.



3. Connect wiring from LonTalk system to LON ProtoCessor module on Vapor-logic board.



NOTE: Orient the LON ProtoCessor module as shown, with wire connectors end at the side of the Vapor-logic board.

# Modbus, BACnet, LonTalk interoperability

**Note:** The interoperability partner will see the full list with points that apply to other models. The following is a subset of that list and includes only the points that are applicable to the GTS humidifier LX series.

**Table 70-1:**  
GTS humidifier LX series interoperability variable and object names

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Read-only analog variables									
Space_RH	RO	IR-1 30001	AI-01	nvoSpaceRH	Relative humidity content of the air in the space being humidified.	%	%	0 to 100	0 to 100
Space_dew_point	RO	IR-2 30002	AI-02	nvoSpaceDewPoint	Dew point of the air in the space being humidified.	°F	°C	20 to 80	-6 to 26
Duct_RH	RO	IR-3 30003	AI-03	nvoDuctRH	Relative humidity content of air in the duct.	%	%	0 to 100	0 to 100
Steam_demand_mass	RO	IR-4 30004	AI-04	nvoSteamDmndMass	Steam demand in pounds or kilograms per hour.	lbs/hr	kg/h	0 to 100,000	0 to 100,000
Steam_demand_percent	RO	IR-5 30005	AI-05	nvoSteamDemandP	Steam demand as a percentage of the humidifier's total capacity.	%	%	0 to 100	0 to 100
Aux_temp	RO	IR-6 30006	AI-06	nvoAuxTemp	Temperature of auxiliary temperature sensor.	°F	°C	-20 to 160	-29 to 170
Water_temp	RO	IR-7 30007	AI-07	nvoTankTemp	Temperature of the water in the humidifier's evaporating chamber.	°F	°C	-240 to 265	-151 to 129
Steam_output_mass	RO	IR-8 30008	AV-1	nvoSteamOutMass	Estimated amount of steam the humidifier is producing in pounds or kilograms per hour.	lbs/hr	kg/h	0 to 100,000	0 to 100,000
Steam_output_percent	RO	IR-9 30009	AV-2	nvoSteamOutputP	Estimated amount of steam the humidifier is producing as a percentage of the humidifier's total capacity.	%	&	0 to 100	0 to 100
Water_until_ADS	RO	IR-10 30010	AV-3	nvoWaterUntilADS	Pounds or kilograms of water remaining to be converted to steam before the next automatic drain sequence (ADS) cycle.	100 lbs	100 kg	0 to 2,200,000	0 to 1,000,000
Water_until_service	RO	IR-11 30011	AV-4	nvoWaterTilSrv	Pounds or kilograms of water remaining to be converted to steam before next service cycle.	100 lbs	100 kg	0 to 2,200,000	0 to 1,000,000

\* See Note 1 on Page 76.

\*\* See Note 2 on Page 76.

Continued

# Modbus, BACnet, LonTalk interoperability

**Table 71-1:**  
GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Read-only analog variables (continued)									
MT_sys_output_mass_hr	RO	IR-23 30023	AI-08	nvoMT_SteamOMass	MT steam demand mass	lbs/hr	kg/h	0 to 100000	0 to 100000
MT_sys_output_pctnt	RO	IR-25 30025	AI-09	nvoMT_SteamOP	MT steam demand percent	%	%	0 to 100	0 to 100
Setup variables									
Run_mode	Write	HR-1 40001	MSV-01	nviRunMode	Mode of the unit or system. The defined options are: 1 Auto 2 Local standby 3 System standby 4 Manual drain	-	-	1 to 4	1 to 4
	Read	HR-1 40001	MSV-01	nvoRunMode	Mode of the unit or system. The defined options are: 1 Auto 2 Local standby 3 System standby 4 Manual drain 5 Test outputs 6 Test run	-	-	1 to 6	1 to 6
Space_RH_set_point	Write	HR-2 40002	AV-05	nviSpaceRHsetPt	Humidity set point for the space being humidified.	%	%	0 to 100	0 to 100
Space_dew_point_set_point	Write	HR-3 40003	AV-06	nviSpaceDewPtSP	Dew point set point for the space being humidified.	°F	°C	20 to 80	-6 to 26
Duct_high_limit_set_point	Write	HR-4 40004	AV-07	nviDuctHLsetPt	Duct high limit set point.	%	%	0 to 100	0 to 100
* See Note 1 on Page 76. ** See Note 2 on Page 76.									

Continued

# Modbus, BACnet, LonTalk interoperability

Table 72-1:

GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Setup variables (continued)									
Fieldbus_demand_mass	Write Only	HR-5 40005	AV-08	nviFbusDemndMass	Steam output (as demanded via fieldbus) in pounds or kilograms per hour. If the request exceeds the unit's capacity, the unit will run at 100% capacity.	lbs/hr	kg/h	0 to 100,000	0 to 100,000
Fieldbus_demand_%	Write Only	HR-6 40006	AV-09	nviFldBusDemandP	Steam output (as demanded via the fieldbus) as a percentage of the humidifier's total capacity.	%	%	0 to 100	0 to 100
PID_band	RW	HR-7 40007	AV-10	nciPIDband	PID band.	%	%	0 to 50	0 to 50
PID-Kp	RW	HR-8 40008	AV-11	nciPIDkp	PID-Kp (proportional gain) factor.	–	–	0 to 1000	0 to 1000
PID-Ki	RW	HR-9 40009	AV-12	nciPIDki	PID-Ki (integral gain) factor.	–	–	0 to 1000	0 to 1000
PID-Kd	RW	HR-10 40010	AV-13	nciPIDkd	PID-Kp (derivative gain) factor.	–	–	0 to 1000	0 to 1000
MT_runmode	Write	HR-14 40014	MSV-02	nviMTRunMode	"MT runmode; 1 = system standby, 2 = system auto"	–	–	1 to 2	1 to 2
	Read	HR-14 40014	MSV-02	nvoMTRunMode	"MT runmode; 1 = system standby, 2 = system auto"	–	–	1 to 2	1 to 2
MT_steam_req_mass_hr	Write Only	HR-15 40015	AV-14	nviMT_FBDmndMass	MT fieldbus request for steam in pounds or kilograms per hour	lbs/hr	kg/h	0 to 100000	0 to 100000
MT_steam_req_sys_pcmt	Write Only	HR-17 40017	AV-15	nviMT_FBDmndP	MT fieldbus request for steam in percentage of system capacity	%	%	0 to 100	0 to 100
* See Note 1 on Page 76.									
** See Note 2 on Page 76.									

Continued

# Modbus, BACnet, LonTalk interoperability

**Table 73-1:**  
GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Read-only digital I/O									
Airflow_proving_switch	RO	DI-1 10001	BI-01	nvoAirflowSwitch	0=Open; 1=Closed	-	-	-	-
Duct_HL_switch	RO	DI-2 10002	BI-02	nvoDuctHLswitch	0=Open; 1=Closed				
Safety_interlock	RO	DI-3 10003	BI-03	nvoSafetyI-lock	0=Open; 1=Closed				
Combustion_air_damper_ (GTS)	RO	DI-4 10004	BI-04	nvoCombustAirDmp	0=Damper Closed; 1=Damper Open				
Flue_pressure_switch (GTS)	RO	DI-5 10005	BI-05	nvoFluePressurSw	0=Open; 1=Closed				
Power_vent_switch_ (GTS)	RO	DI-6 10006	BI-06	nvoPowerVentSwch	0=Vent Off; 1=Vent On				
Fill_valve	RO	DI-8 10008	BO-01	nvoFillValve	0=Closed; 1=Open				
Drain_valve	RO	DI-9 10009	BO-02	nvoDrainValve	0=Not Draining; 1=Draining				
MT_active_fault_exists_somewhere	RO	DI-10 10010	BI-08	nvoMt_AlarmSomWr	0=No; 1=Yes	Multi-tank only			
MT_active_message_exists_somewhere	RO	DI-11 10011	BI-09	nvoMt_MsgSomWr	0=No; 1=Yes	Multi-tank only			
* See Note 1 on Page 76. ** See Note 2 on Page 76.									

Continued

# Modbus, BACnet, LonTalk interoperability

**Table 74-1:**  
GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Faults and alarms									
ProgOutput1_status	RO	DV-1 1	BV-01	nvoDryContact1	0=Open; 1=Closed	-	-	-	-
ProgOutput2_status	RO	DV-2 2	BV-02	nvoDryContact2					
Active manual clear alarms exit	RO	DV-3 3	BV-03	nvoAlarms					
Clear all active alarms	RW	DV-4 4	BV-04	nviClearAllFault	When set will clear all active faults				
Tank temp sensor failed	RW	DV-5 5	BV-05	nvoAlrmTnkTmpSen	See Table 49-1, Alarms menu				
Tank overtemp, Unit reboot required	RW	DV-6 6	BV-06	nvoAlrmOvertemp					
Signal at RH input out of range	RW	DV-7 7	BV-07	nvoAlrmRHsignal nvoAlrmDewPtSgnl nvoAlrmDemndSgnl					
Duct RH sig out of range	RW	DV-8 8	BV-08	nvoAlrmDuctRHSig					
Aux temp sense out of range	RW	DV-9 9	BV-09	nvoAlrmAuxTemp					
Check water probe	RW	DV-10 10	BV-10	nvoAlrmProbeWire					
Faulty water probe	RW	DV-11 11	BV-11	nvoAlrmProbeFail					
Excessive fill time	RW	DV-12 12	BV-12	nvoAlrmFillTime					
Excessive refill time	RW	DV-13 13	BV-13	nvoAlrmRefilTime					
Tank not draining	RW	DV-14 14	BV-14	nvoAlrmNoDrain					
Excessive boil time, Unit reboot required	RW	DV-15 15	BV-15	nvoAlrmXessWater					
No SDU airflow	RW	DV-16 16	BV-16	nvoAlrmNoSDUair					
No power vent airflow (GTS)	RW	DV-17 17	BV-17	nvoAlrmPrVentAir					
No combustion airflow (GTS)	RW	DV-18 18	BV-18	nvoAlrmNoCombAir					
Blocked flue (GTS)	RW	DV-19 19	BV-19	nvoAlrmBlockdFlu					
Burner 1 fault (GTS)	RW	DV-20 20	BV-20	nvoAlrmBurner1					

\* See Note 1 on Page 76.

\*\* See Note 2 on Page 76.

Continued

# Modbus, BACnet, LonTalk interoperability

**Table 75-1:**  
GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Faults and alarms (continued)									
Burner 2 fault (GTS)	RW	DV-21 21	BV-21	nvoAlrmBurner2	See Table 49-1, Alarms menu	-	-	-	-
Ignition module 1 fault (GTS)	RW	DV-24 24	BV-24	nvoAlrmIgnitMod1					
Ignition module 2 fault (GTS)	RW	DV-25 25	BV-25	nvoAlrmIgnitMod2					
Blower 1 fault (GTS)	RW	DV-28 28	BV-28	nvoAlrmBlower1					
Blower 2 fault (GTS)	RW	DV-29 29	BV-29	nvoAlrmBlower2					
Gas valve 1 fault (GTS)	RW	DV-32 32	BV-32	nvoAlrmGasValve1					
Gas valve 2 fault (GTS)	RW	DV-33 33	BV-33	nvoAlrmGasValve2					
GTS: Low water RTS: Over-temp cutout, Unit reboot required	RW	DV-36 36	BV-36	nvoAlrmLowWater					
Replace ignitors! (GTS)	RW	DV-37 37	BV-37	nvoAlrmFoaming2					
* See Note 1 on Page 76. ** See Note 2 on Page 76.									

Continued

# Modbus, BACnet, LonTalk interoperability

**Table 76-1:**  
GTS humidifier LX series interoperability variable and object names (continued)

Variable name and BACnet object name	Read Only (RO) or Read Write (RW)	Modbus register number*	BACnet Object Type and Instance	LonTalk variable names**	Description	Units		Range	
						I-P units	SI units	I-P units	SI units
Messages									
GTS: Replace ignitors soon RTS: Replace contactors	RW	DV-38 38	BV-38	nvoMsgReplCntctr	See Table 68-1, Diagnostics menu	-	-	-	-
Service unit	RW	DV-39 39	BV-39	nvoMsgSrviceUnit					
Drain pending	RW	DV-40 40	BV-40	nvoMsgDrainPend					
No airflow	RW	DV-41 41	BV-41	nvoMsgNoDuctAir					
Interlock open	RW	DV-42 42	BV-42	nvoMsgllockOpen					
Freeze drain	RW	DV-43 43	BV-43	nvoMsgFreezDrain					
End of season drain active	RW	DV-44 44	BV-44	nvoMsgEOSactive					
Temp comp on	RW	DV-45 45	BV-45	nvoMsgTempCompOn					
Clean probes	RW	DV-46 46	BV-46	nvoMsgCleanProbe					
Duct HL trip	RW	DV-47 47	BV-47	nvoMsgDuctHLtrip					
Duct HL span	RW	DV-48 48	BV-48	nvoMsgDuctHLspan					
Insufficient water flow	RW	DV-49 49	BV-49	nvoMsgH2Ocutout					
Boiling temp calibrated	RW	DV-50 50	BV-50	nvoMsgBoilTempCl					
Master enable open	RW	DV-60 60	BV-60	nvoMsgMasterEnb					
Notes: 1. Modbus Input Registers (IR1-IR44) 16 bit read only Modbus Holding Registers (HR1-HR21) 16 bit read/write Modbus Discrete Input Registers (DI1-DI7) single bit read only Modbus Coil Registers (DV1-DV69) single bit read/write 2. nvi LonTalk SNVTs are write-only; nvo are read-only									



# Multiple-tank operation

## **MULTI-TANK MODE DEFINED**

In multi-tank mode, one Vapor-logic controller can control multiple humidifier tanks, and tanks in a multi-tank system can vary by energy source and capacity.

A multi-tank system has one main controller controlling up to 8 secondary tanks. The main controller receives the demand signal and controls secondary tank steam production based on

- priority group,
- wear leveling,
- fault status.

The main controller also gives permission to secondary humidifier tanks to perform functions, such as draining and flushing.

The main controller must be

- field-wired to all required control input signals,
- connected to all secondary tanks via the DriSteem fieldbus,
- powered during system operation.

## **MULTI-TANK CONTROL INTERFACE**

Most systems have one Vapor-logic touchscreen per multi-tank group.

This touchscreen ships with the tank that has the main control board. The touchscreen can be connected to any humidifier in the multi-tank group.

Maximum cable length from the touchscreen to any control board in the multi-tank group is 500' (152 m).

## **MULTI-TANK SYSTEM SETTINGS**

The following system settings can be changed only while viewing the settings of the main Vapor-logic board. Changing a system setting will affect every tank in the system or affect how the system operates. For example, security is system wide. Requiring a passcode means that the user will have to enter the system passcode to change settings for any tank. System settings are a feature new to the touchscreen interface.

# Multiple-tank operation

- **System Control settings**
  - control input signal
  - duct high limit settings for duct dispersion
  - fan type for area dispersion
  - system capacity
  - number of tanks
  - multi-tank run mode (changed from multi-tank system screen)
- **System Display Settings**
  - date and time
  - language
  - units of measurement
- **System Security Settings**
  - require passcode
  - passcode time-out
  - set passcode

Note: Multi-tank groups can also be operated using the Web interface. See “Multi-tank operation with Web interface” on Page 84.

## TANK GROUPING TO MAXIMIZE EFFICIENCY

Priority 1 and priority 2 tanks can be grouped to improve efficiency. Tanks not identified as trim or redundant tanks are factory-assigned to priority groups 1 and 2. Priority 1 tanks come online before priority 2 tanks. Because tanks in a multi-tank system can vary by capacity, this allows tank grouping to maximize efficiency, bringing tanks online in the order that best matches humidification load to individual tank capacity.

### EXAMPLE 1:

A large-capacity tank that meets humidification demand most days is assigned to priority group 1.

Smaller-capacity tanks, needed only when additional capacity is needed, are assigned to priority group 2.

### EXAMPLE 2:

A gas-fired tank that meets humidification demand most days is assigned to priority group 1.

Electric tanks, needed only when additional capacity is needed, are assigned to priority group 2

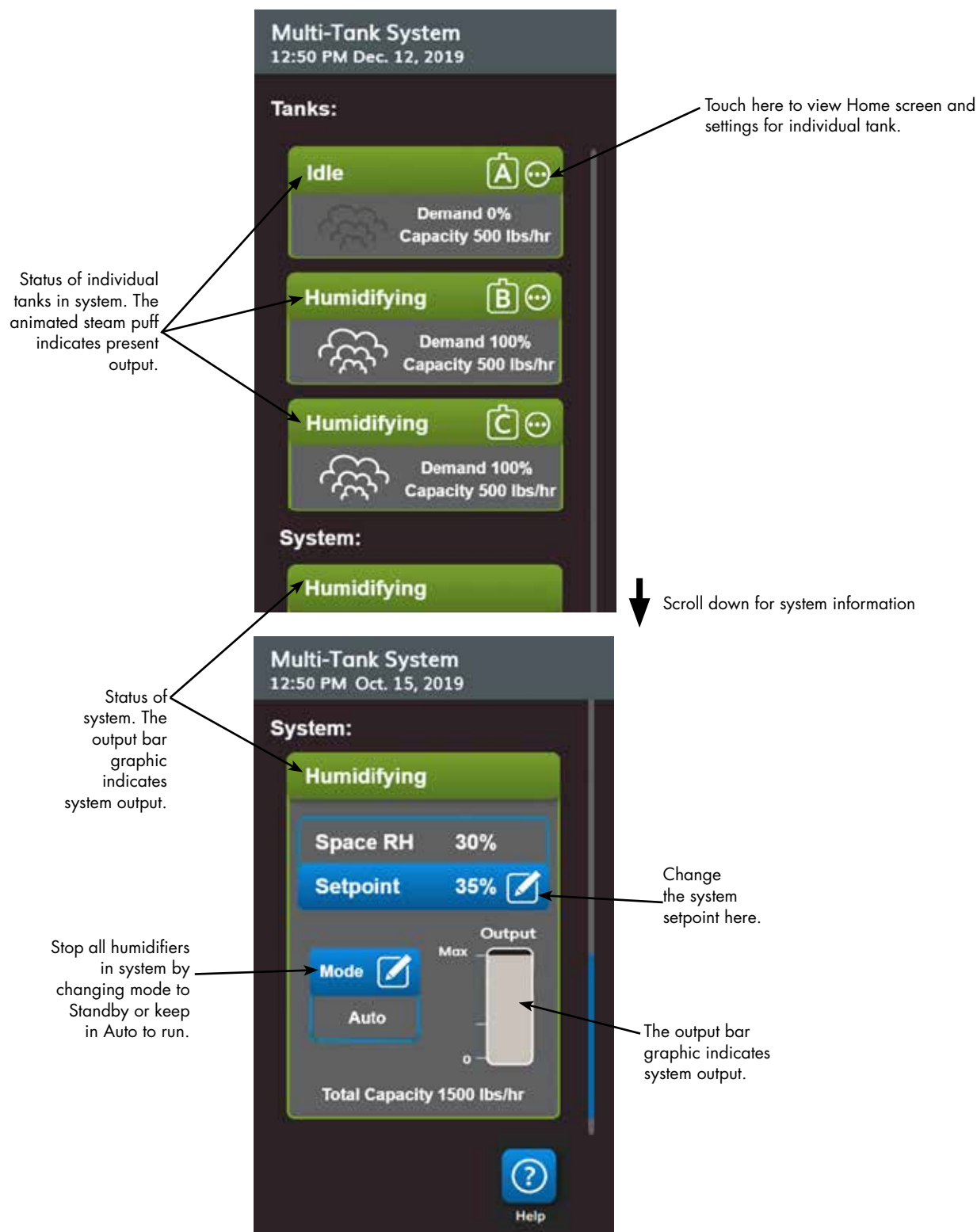
Note: Wear leveling occurs only within a priority group.

## USING THE MULTI-TANK TOUCH SCREEN DISPLAY

The top-level screen for a multi-tank system is the Multi-Tank System screen. The top of the screen has a status summary and selection bar for each tank in the system. Scroll down to view the system status, including demand on the system, system output, system capacity and system run mode. See Figure 79-1.

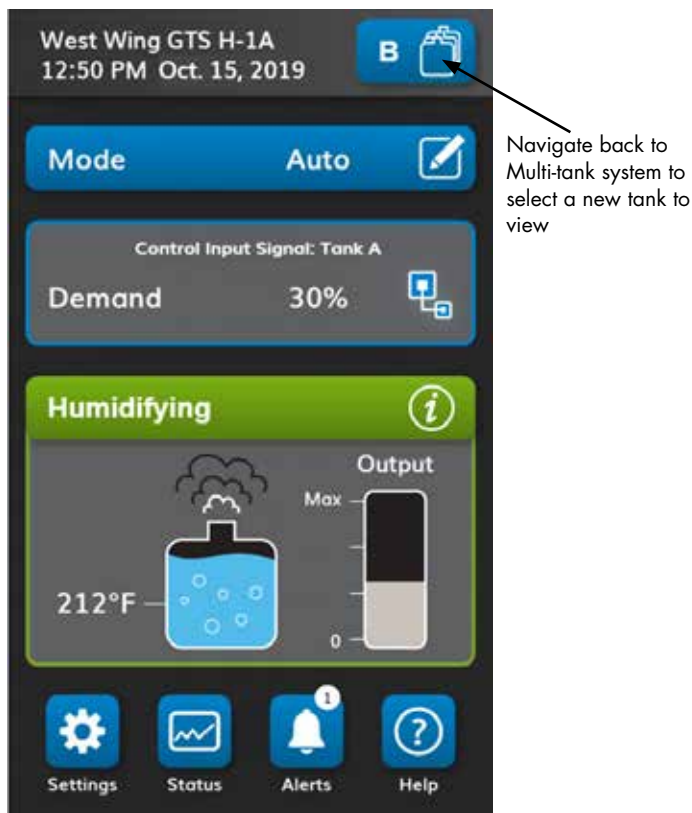
# Multiple-tank operation

**FIGURE 79-1: MULTI-TANK SYSTEM TOUCH SCREEN DISPLAY**



# Multiple-tank operation

**FIGURE 80-1: HOME SCREEN FOR INDIVIDUAL TANK**



## START-UP ORDER AND TRIM TANKS

All humidifier tanks in a multi-tank group are factory-assigned to a priority group. There are four priority groups: 0, 1, 2, and 3.

**Priority groups identify tank function** as follows:

- 0 = Trim tanks                      2 = Priority 2 tanks (peak)
- 1 = Priority 1 tanks (load)      3 = Redundant tank

### • Priority groups identify start-up order:

Tanks in priority group 0 are brought online first, followed by tanks in priority group 1, then 2. Priority group 3 designates an optional redundant tank, which comes online only if a tank in the system is unavailable and the remaining tanks cannot meet capacity.

### • Trim tank responds first:

A trim tank is assigned to priority group 0 and is brought online first — always before tanks in priority groups 1, 2, or 3. The trim tank modulates continuously, responding to system demand changes.

Multi-tank groups requiring a rapid response to changes in system demand typically have an electric element humidifier with SSR control as the trim tank.

# Multiple-tank operation

## REDUNDANT TANK FOR MISSION-CRITICAL APPLICATIONS

A redundant tank can be assigned for mission-critical applications. The system capacity of a multi-tank group is the combined capacity of tanks in groups 0, 1, and 2. Placing a tank in priority group 3 ensures that it only runs as a redundant tank. The redundant tank can be assigned to priority group 3 and will operate only if one or more of the tanks in groups 0, 1, and 2 are not available, and the remaining tanks in the multi-tank group cannot meet demand for steam production.

Note: For best performance, multiple electric humidifiers in a given priority group must all have the same heater controls. That is, they should all be 100% SSR control, or all be sequenced SSR control, or all be contactor control.

## TANK WEAR LEVELING

The main controller monitors tank wear and assigns steam production to tanks to equalize wear as much as possible within each priority group.

## FAULT TOLERANCE

The main controller monitors tank status of all tanks in a multi-tank group periodically. If a tank goes offline or is not communicating ("No comm") for a defined time period, the controller identifies that tank as unavailable and the system responds using other available tanks. If the main controller stops operating, the remaining secondary tanks continue to run for a short time at the level they were last run, and then quit.

## Configuration tips

- Use priority groups 1 and 2 to group tanks for maximum energy efficiency. For example, put gas-fired tanks in group 1 and electric tanks in group 2.
- Multiple small-capacity tanks usually operate more efficiently than one large-capacity tank meeting the same load requirement.
- Use priority groups 1 and 2 to group tanks by capacity, bringing tanks online in the order that best matches humidification load to individual tank capacities.
- If your multi-tank system has a redundant tank, configure that tank as the main controller. This will reduce system down time while the main controller tank receives servicing. Since the redundant tank operates the least in a multi-tank system, it is the tank most likely to remain online.
- Match the capacity of the redundant tank to the largest tank in the system to ensure the system's ability to meet maximum humidification load when a tank goes offline.

See Note 1 in Table 82-1.

# Multiple-tank operation

**Table 82-1:**  
Multitank priority groups application example

Priority group	Assignment	Description	Application considerations
0	Trim	<ul style="list-style-type: none"> <li>Provides humidification load “throttling,” this unit sees the small changes as demand changes.</li> <li>Generally, this should be one tank, and it should be relatively small.</li> <li>Generally, this tank should be an SSR-controlled electric resistive unit.</li> </ul>	An SSR-controlled electric resistive unit will provide the best control.
1	Load	<ul style="list-style-type: none"> <li>Carries the bulk of the load; should be the most cost-effective fuel source.</li> <li>Only sees large-step changes if a trim tank is used.</li> </ul>	GTS is the most cost effective, but any unit can be used.
2	Peak	<ul style="list-style-type: none"> <li>Makes up the demand not met by trim + load.</li> <li>Does not run often, because it is needed in only the most demanding situations.</li> <li>Because it does not run frequently (making fuel cost less of an issue), this is a good assignment for a lower-up-front-cost humidifier.</li> <li>Run time is a function of load percentage split into the peak category.</li> </ul>	Electric resistive are the most cost effective (any unit can be used).
3	Redundant	<ul style="list-style-type: none"> <li>Provides the capability to offset a tank that is offline for any reason.</li> <li>This tank will only run when a trim, load, or peak unit is shut down for service or alarm conditions and the remaining trim, load, and peak tanks cannot meet demand.</li> <li>The redundant should be as large as the largest tank in the system.</li> <li>See Note 1 below.</li> <li>If a redundant tank is used, making it the main controller improves system uptime, since you will not need to bring down the main controller to service it.</li> </ul>	<ul style="list-style-type: none"> <li>Electric humidifiers are the most cost-effective up front.</li> <li>Size should be the determining factor.</li> <li>Any unit will work.</li> </ul>

**Notes:**

1. If protection is required against multiple tanks being offline at the same time, the redundant tank should be at least as large as the sum of the X largest tanks where X is the number of tanks for which protection is desired.
2. From a fuel cost standpoint, electric should have the lowest priority. It should run last and the least.
3. From an energy standpoint, GTS generally has the lowest operating cost.
4. When calculating energy, consider heat loss from distribution and piping of steam.
5. Humidifiers within a priority group are load leveled.
6. Humidifiers within a group should have the same energy source.

# Multiple-tank operation

## WIRING A MULTI-TANK GROUP OF HUMIDIFIERS

To wire a multi-tank group of humidifiers:

1. Determine which control board is the main controller. The main controller ships with the touchscreen display. The main controller is labeled as Tank A on the touchscreen display and on the tank's product label.
2. Connect all required control inputs to the main controller board by following the instructions in "Control input" on Page 12.
3. Wire all control boards of the multi-tank group together using twisted pair wire.
  - **Important:** DriSteem recommends using one pair of wires of a Cat-5 cable. Do not use non-twisted two-conductor wire.
  - Connect controller boards together at terminal block P8. Connect positive to positive terminals, and negative to negative terminals. On the last board in the series of connected boards, jumper the pins at J1001 (located on the Vapor-logic board next to the RJ11 phone socket, see Page 5). On all other boards, J1001 should not be shunted.
4. If you plan to use the Web interface, follow the wiring instructions in "Web interface communication" on Page 21.
  - Note: Each tank must be connected via Ethernet to a network system for the Web interface to access all tanks in the multi-tank group.
5. Connect the touchscreen display cable to any control board in the multi-tank system. The main tank must be powered for the display to communicate.

## Important:

All multi-tank communication must go through the main controller to reach secondary tanks. Therefore, the touchscreen display communication requires that power is supplied to:

- The main controller (on Tank A)
- Any other tank that is hosting the display

## MULTI-TANK SYSTEM SETUP

### Factory configuration

Humidifier tanks ordered as a multi-tank group are configured at the factory. The factory configuration process includes:

- Assigning letter names to tanks (Tank A, Tank B, .... Tank P).  
Note: The main tank is always configured as Tank A.
- Assigning priority group numbers (0, 1, 2, 3)
- Configuring the controllers

### Changing factory configuration

Call DriSteem Technical Support for help changing the tank designation.

## Important:

Any change made to or from the tank controller designated as "A" will cause an approximate five-second delay while the board reboots. During this time the Web interface display will not change.

# Multiple-tank operation

## CHANGING A PRIORITY GROUP

To change a priority group, go to the Settings menu to access Multi-tank setup/Tank priority group.

To add a tank to a multi-tank system:

1. Verify that the new tank has the correct tank designator. Change, if necessary, before wiring in Step 2.
2. Connect wiring of new tank.
3. The main controller automatically adds the new tank's capacity into the total system capacity.

To permanently remove a tank from a multi-tank system:

1. Disconnect control board wiring (location P8) of the tank being removed.
2. Reset system capacity from the Multi-tank Settings menu. The controller will automatically calculate the new system capacity.

## Important:

- Each tank in a multi-tank system must have a unique tank designator (A, B, C ... P). Duplicate tank designations will cause multi-tank mode to operate incorrectly.
- Each Vapor-logic board ships with a network IP address of 192.168.1.195. When installing on an Ethernet network, assign each board a unique IP address to avoid conflict with other devices on the network.
- The number of tanks setting affects which tank designators can be displayed. Tanks always display in alphabetical order. An alphabet letter cannot be skipped.

## OTHER SYSTEM PARAMETERS AND INTEROPERABILITY

General system parameters are set the same as for stand-alone tank/controller. See the Setup section of this manual for instructions.

## MULTI-TANK OPERATION WITH WEB INTERFACE

If you plan to use the Web interface for multi-tank operation, the web interface must first be configured, see "Web interface communication" on Page 21.



# Multiple-tank operation

## USING THE WEB INTERFACE

Additional Web interface screens, described below, appear when operating in multi-tank mode.

This letter identifies which tank (A ... P) you are viewing.

Each connected tank automatically shows up as a link. Click on a tank link to view its status.  
**Important:** All system tanks must be network-connected via Ethernet for these links to function.

Click on the Setup tab to view Multi-tank setup parameters.

# Troubleshooting guide

## SOLVING ISSUES

**DriSteem Technical Support:**  
**800-328-4447**

### 1. Review issues, possible causes and recommended actions.

The troubleshooting guide on the following pages presents issues, possible causes and recommended actions for typical issues.

### 2. Review tank or dispersion manuals.

If you have a tank-related or dispersion-related issue, you may also need to refer to those specific product manuals.

### 3. If you're still having issues, call DriSteem.

If the troubleshooting guide does not help you solve your issue, call DriSteem with the following information available:

- Product name and serial number  
You'll find this information on the humidifier or control cabinet.
- Issue definition  
Example: water leaking, low humidity, high humidity, etc.
- Alerts Log items (if applicable)  
Example: Tank temp, probe wiring, etc.
- Time issue began  
Example: Always, after remodel, after a change in weather, etc.
- System changes  
Example: Pressure, new boiler, new service, new controller, relocation, change in maintenance, etc.

## CALLING DRISTEEM TECHNICAL SUPPORT

Have the following information ready before calling:

Vapor-logic firmware version \_\_\_\_\_

Humidifier model number \_\_\_\_\_

Humidifier serial number \_\_\_\_\_

Issue definition \_\_\_\_\_

Alerts Log items \_\_\_\_\_

Time issue began \_\_\_\_\_

Recent system changes \_\_\_\_\_

# Troubleshooting guide

Table 87-1:  
Troubleshooting guide

	Issue	Possible causes	Actions
Power issues	Green power indicator light is off on Vapor-logic board	<ul style="list-style-type: none"> <li>No control voltage</li> <li>Transformer secondary circuit breaker tripped</li> </ul>	<ul style="list-style-type: none"> <li>Check for proper supply voltage.</li> <li>Check for wiring shorts; reset breaker.</li> </ul>
	No remote indication of alarm light No remote activation of fan	<ul style="list-style-type: none"> <li>Dry contact connection not programmed from Settings menu</li> <li>Field wiring not installed</li> <li>Field-supplied remote fault indicator lamp is burned out</li> <li>Remote fault Vapor-logic dry contact is not switching</li> </ul>	<ul style="list-style-type: none"> <li>Go to the programmable outputs section of Settings menu to program dry contacts.</li> <li>Provide field wiring.</li> <li>Check if at remote indicator light is burned out; replace if needed.</li> <li>Check dry contact continuity (Vapor-logic terminal P12) for contact closure.</li> </ul>
	No readable information on touchscreen display	<ul style="list-style-type: none"> <li>No power or incorrect voltage to Vapor-logic board</li> <li>Modular communication cable is disconnected</li> </ul>	<ul style="list-style-type: none"> <li>Check main power supply.</li> <li>Reset control transformer circuit breaker if tripped.</li> <li>Reset thermal cutout if tripped.</li> <li>Low limit thermostat is not satisfied (outdoor enclosure only).</li> <li>Connect modular cable.</li> </ul>
	Touchscreen display does not energize	<ul style="list-style-type: none"> <li>Nonexistent supply voltage to unit</li> </ul>	<ul style="list-style-type: none"> <li>Check main fuse.</li> <li>Check main line safety switches.</li> <li>Check heater fuses.</li> </ul>
		<ul style="list-style-type: none"> <li>Nonexistent 24 VAC supply to Vapor-logic board</li> </ul>	<ul style="list-style-type: none"> <li>Check for proper supply.</li> <li>Verify proper transformer voltage characteristics.</li> <li>Verify proper wiring of transformer.</li> <li>Check for control circuit voltage, 24 VAC. If voltage is not present, check transformer circuit breaker. Reset if needed.</li> </ul>
		<ul style="list-style-type: none"> <li>Nonexistent 21 VDC supply to display</li> </ul>	<ul style="list-style-type: none"> <li>Check 21 VDC voltage supply of the board at P11. If voltage is low unplug all field wiring to see if the voltage returns. Incorrect field wiring on other terminals can draw down the voltage. If voltage does not return, replace the Vapor-logic board.</li> <li>Check cable from Vapor-logic to display is a DriSteem supplied cable. Regular phone cables will fit in the jack but will not allow voltage to the display.</li> </ul>
		<ul style="list-style-type: none"> <li>Humidifier over-temperature thermostat open</li> </ul>	<ul style="list-style-type: none"> <li>Reset manual switch located above heater below terminal cover.</li> </ul>
	Display is completely black	<ul style="list-style-type: none"> <li>Touchscreen display is overheated</li> </ul>	<ul style="list-style-type: none"> <li>Cool the touchscreen display.</li> </ul>
		<ul style="list-style-type: none"> <li>Communication cable not connected</li> </ul>	<ul style="list-style-type: none"> <li>Connect cable.</li> </ul>
		<ul style="list-style-type: none"> <li>Defective cable</li> </ul>	<ul style="list-style-type: none"> <li>Replace cable.</li> </ul>
		<ul style="list-style-type: none"> <li>Defective touchscreen display</li> </ul>	<ul style="list-style-type: none"> <li>Replace.</li> </ul>
		<ul style="list-style-type: none"> <li>Defective control board</li> </ul>	<ul style="list-style-type: none"> <li>Contact DriSteem.</li> </ul>
	Touchscreen does not respond to touch	<ul style="list-style-type: none"> <li>Touchscreen software has locked up</li> </ul>	<ul style="list-style-type: none"> <li>Unplug the communication cable to the display and re-plug it back in to cycle power.</li> </ul>

Continued

# Troubleshooting guide

Table 88-1:  
Troubleshooting guide (continued)

	Issue	Possible causes	Actions
Transmitter or humidistat issues	<b>Alert:</b> Space RH signal out of range	When transmitter or humidistat alerts appear, possible causes are: <ul style="list-style-type: none"> <li>• Open, shorted, or incorrect wiring</li> <li>• Incorrect signal</li> <li>• Ground loop</li> <li>• Signal exceeds range limits. Correct input signals are: 4-20 mA, or 0-16 VDC</li> </ul>	<ul style="list-style-type: none"> <li>• Check the Control Input Signal type in the Settings/Control menu. The selected type must match the actual sensor hardware.</li> <li>• Check voltages at board terminal P11: <ul style="list-style-type: none"> <li>– RH signal: 2-10 VDC.</li> <li>– Dew point signal: 2-10 VDC.</li> <li>– Demand signal: 0-16 VDC.</li> </ul> </li> <li>• Check voltages at board terminal P13: <ul style="list-style-type: none"> <li>– Duct high limit signal: 0-21 VDC, 2-10 VDC.</li> </ul> </li> <li>• Check voltages at board terminal P14: <ul style="list-style-type: none"> <li>– Auxiliary temp sensor or temperature compensation sensor: 2-10 VDC.</li> </ul> </li> <li>• Check output on transmitter: <ul style="list-style-type: none"> <li>– If there is no output, replace transmitter.</li> <li>– Verify output is 4-20 mA.</li> <li>– Calibrate transmitter or humidistat if necessary.</li> </ul> </li> <li>• Check 21 VDC voltage supply of the board at P11. If voltage is low unplug all field wiring to see if the voltage returns. Incorrect field wiring on other terminals can draw down the voltage. If voltage does not return, replace the Vapor-logic board.</li> <li>• Isolation control board by others may not be compatible. Consult DriSteem.</li> </ul>
	<b>Alert:</b> Dew point signal out of range		
	<b>Alert:</b> Demand signal out of range		
	<b>Alert:</b> Duct RH signal out of range		
	<b>Alert:</b> Aux temp sens out of range		
	<b>Alert:</b> No SDU airflow	<ul style="list-style-type: none"> <li>• SDU blower or airflow proving switch is incorrectly wired</li> <li>• SDU blower cover is off</li> <li>• SDU blower motor is inoperable (SDU fan does not start)</li> <li>• Breaker tripped</li> </ul>	<ul style="list-style-type: none"> <li>• Check SDU for proper wiring.</li> <li>• Install cover.</li> <li>• Replace SDU blower.</li> <li>• Reset breaker.</li> </ul>
Water level control probe issues	<b>Alert:</b> Check water probe	<ul style="list-style-type: none"> <li>• Incorrect installation</li> <li>• Dirty or oxidized probes</li> <li>• Deterioration of probe rod assembly</li> <li>• Missing probe rod</li> </ul>	<ul style="list-style-type: none"> <li>• Verify proper wiring of probe system. <b>Do not use shielded (screened) wiring.</b></li> <li>• Verify probe wiring is not routed with high voltage wiring.</li> <li>• Verify wiring between control cabinet and humidifier does not exceed the recommended 50' (15 m) limit. (Remote mount cabinets only)</li> <li>• Verify fill and drain plumbing was installed per the instructions in the humidifier's manual.</li> <li>• Verify piping from the humidifier to the dispersion assembly is installed correctly, that there are no elbows or restrictions in the piping, and that the length of the piping is not too long. See instructions in the humidifier's manual.</li> <li>• Verify there is a P-trap installed on the tank and/or that the P-trap is not plugged.</li> <li>• Verify that there is a machine ground between control cabinet and humidifier tank.</li> <li>• Clean probe, removing oxidation and/or minerals or replace if needed.</li> <li>• Drain tank water to below the probe; reset system and restart.</li> <li>• Replace probe rod assembly.</li> <li>• Replace missing probe rod if possible; otherwise, replace probe assembly.</li> </ul>
	<b>Alert:</b> Faulty water probe		

# Troubleshooting guide

Table 89-1:  
Troubleshooting guide (continued)

Filling issues	Issue	Possible causes	Actions
	<b>Alert:</b> Excessive fill time	<b>Tank is not full.</b>	
	<b>Alert:</b> Excessive refill time	• Fill and drain valve wiring reversed	• Correct wiring.
		• Low water supply pressure	• Verify water pressure is 25 psi (552 kPa) minimum.
		• In-line strainer plugged	• Clean as needed.
		• Humidifier cover interlock switch improperly wired	• Correct wiring.
		• Fill valve not open	• If 24 VAC is present across fill valve coil, replace valve.
		• Fill valve not wired properly to control board	• Verify proper fill valve wiring at terminal P17 (fill, drain) and P18 (secondary heat exchanger fill valve(s)). • Test operation by going to the Test section under the Diagnostics menu.
		• Inlet water needle valve closed or plugged	• Check if needle valve is open and free of sediment.
		• Fill valve with incorrect operating voltage	• Verify valve coil is 24 VAC.
		• Plugged fill valve	• Remove fill valve and check for foreign material plugging the valve.
		• Fill valve installed backward	• Check arrow direction on valve; or "In" should be visible on fill valve body.
		• Excessive water hammer can bend a needle valve and make it difficult to open	• Replace valve, if needed. • Install a water supply line shock arrester.
		• Orifice after fill valve may be plugged	• Service valve strainer and orifice assembly.
		• Drain valve leaking water	• Verify drain is in the Auto position and is closed.
		• Missing probe rod	• Replace missing probe rod if possible; otherwise, replace probe rod assembly.
		<b>Tank is full.</b>	
		• Probe malfunctioning	• Clean or replace probe. • Verify probe wiring is correct.
		• No tank ground	• Install tank ground.
		• Fill valve stuck open	• Check valve for foreign matter.
		• Fill valve installed backward	• Check arrow direction on valve; or "In" should be visible on fill valve body.
		• Excessive condensate is draining into the tank	• Consult DriSteem to increase the amount of water that can be converted to steam before receiving a fault.
		• Drain valve not fully closed	• If an obstruction does not allow drain valve to fully close, clean valve. • If there is a broken or weak return spring on drain valve, replace the valve. • Check if 24 VAC is present at valve. If so, check wiring of Vapor-logic control board terminal P17 (drain).
		• Poor tank ground	• Verify good machine ground.

Continued

# Troubleshooting guide

Table 90-1:  
Troubleshooting guide (continued)

	Issue	Possible causes	Actions
Filling issues	Unit does not fill with water.	• Malfunctioning fill valve	<ul style="list-style-type: none"> <li>• Unplug probe head. Fill valve should open. If fill valve does not open, verify proper 24 VAC to fill valve. If voltage is present and valve does not open, replace valve or valve coil.</li> <li>• Verify that coil is 24 VAC.</li> <li>• Verify that valve stem moves freely.</li> </ul>
		• No water supply to fill valve	<ul style="list-style-type: none"> <li>• Check if water supply line strainer is plugged.</li> <li>• Verify that manual water line shut-off valve is open and that pressure exists.</li> <li>• Check that in-line needle valve is open.</li> </ul>
		• Unit is not in Auto Mode	• Change mode to Auto.
		• Vapor-logic control is in end-of-season drain mode	• Check for humidification demand signal at control board.
		• Inlet water needle valve is closed	• Check needle valve.
		• Unit is in freeze protection draining	• Change mode to Auto.
		• Fill valve stuck in closed position	• Recycle power to recycle fill valve closing and opening.
		• Malfunctioning level control system	• See below.
	Fill valve does not close	• Open drain valve	<ul style="list-style-type: none"> <li>• If automatic drain valve is locked in the manual open position, reset to automatic.</li> <li>• Replace valve if there is a broken return spring on the drain valve.</li> <li>• Clean or replace drain valve if an obstruction in the valve does not allow complete closure.</li> <li>• Close manual drain valve if it is open.</li> <li>• If Vapor-logic shorted output to fill valve coil, replace board or drain coil.</li> </ul>
		• Malfunctioning level control system	<ul style="list-style-type: none"> <li>• Check that probe plug is plugged in fully.</li> <li>• If needed, clean probe rods or replace.</li> <li>• Replace board if Vapor-logic control board is defective.</li> <li>• Verify that system is in auto mode.</li> <li>• Verify that probe is wired correctly.</li> </ul>
		• Fill valve is stuck	<ul style="list-style-type: none"> <li>• Check if fill valve is installed backwards. If yes, repipe.</li> <li>• If there is a faulty internal spring or diaphragm in the fill valve, replace valve.</li> <li>• Check if there is an obstruction that does not allow valve to seat properly. Clean or replace valve as needed.</li> <li>• Check for control voltage across fill valve coil. (Check wiring and controls.)</li> <li>• Install water inlet shock arrestor.</li> </ul>

Continued

# Troubleshooting guide

Table 91-1:  
Troubleshooting guide (continued)

Draining issues	Issue	Possible causes	Actions
	<b>Alerts:</b> Tank not draining	• Tank drain outlet	• If the humidifier tank drain outlet is plugged, clean.
		• Water detection probes	• Clean probe or replace probe rod assembly.
		• Drain valve wiring	• Check drain valve wiring. • Check to be sure drain valve is wired to Terminal P17 (drain) on control board. • Reset Vapor-logic.
		• Fill valve	• Check for voltage present at the valve. If present, clean or replace valve. • Replace fill valve if water is leaking through.
		• System programmed for manual drain	• Run a test cycle to see if the system activates drain output.
		• Drain line backing up with water • Drain line plugged	• Insufficient drain line pitch. • Insufficient drain line size. See tank manual for drain piping size and pitch requirements.
	Unit does not perform automatic drain sequence	• Automatic drain is disabled	• Go to Settings menu to verify that auto drain/flush is enabled.
		• Drain fault, plugged drain valve, or plugged drain pipe	• Clean drain valve piping.
		• Malfunctioning automatic drain sequence	• Go to Settings menu and check auto drain/flush settings.
		• No power to the automatic drain valve	• Check if 24 VAC is present at terminal block P17 (drain) and at drain valve.
		• Defective automatic drain valve	• If voltage is present at the valve and it still does not open, replace valve.
	Unit does not perform end-of-season drain	• Input signal always has a demand	• Reduce demand signal.
		• Vapor-logic setup	• Verify in Settings menu Vapor-logic is set for end-of-season drain.
		• Drain valve	• Valve not wired, or incorrectly wired, to control board. • Check 24 VAC across valve coil during test cycle.
	<b>Alert:</b> Drain sensor out of range	• Signal outside of 4-20mA	• Check P6 voltage from CS2 to ground (2-10vdc) • Replace transmitter if no voltage output • Check voltage on P6 from 21vdc to ground is 21vdc. If not, re-check terminals for all field connections.

Continued

# Troubleshooting guide

Table 92-1:  
Troubleshooting guide (continued)

Heating issues	Issue	Possible causes	Actions
	<b>Alert:</b> Tank temperature sensor failed	<ul style="list-style-type: none"> <li>Open, shorted, or incorrect wiring of sensor</li> <li>Humidifier interlock switches and/or over-temperature thermostat</li> </ul>	<ul style="list-style-type: none"> <li>Check wiring terminals for correct wiring and voltages. 1000 Ohms = 68 °F (20 °C); 1702 Ohms = 212 °F (100 °C).</li> <li>Verify that switch or thermostat is wired.</li> <li>Verify interlock switch is set correctly and humidifier cover is on.</li> <li>Reset over-temperature thermostat if tripped.</li> </ul>
	<b>Alert:</b> Tank overtemp	<ul style="list-style-type: none"> <li>Unit has overheated; temperature is at 25 °F (14 °C) over boiling temperature</li> <li>Faulty sensor</li> </ul>	<ul style="list-style-type: none"> <li>Check for proper water level in tank.</li> <li>Replace sensor.</li> </ul>
	Reduced or not output (even though water level is correct)	<ul style="list-style-type: none"> <li>Dirty heat exchanger</li> <li>Dirty burners</li> <li>Low gas pressure</li> </ul>	<ul style="list-style-type: none"> <li>Clean.</li> <li>Clean or adjust as appropriate. See tank manual for instructions.</li> </ul>
	Tank does not heat up.	Over-temperature thermostat switch located under heater wiring cover tripped	Reset thermostat switch.
		Humidifier cover interlock switch (select models only)	Humidifier cover not wired; adjust interlock switch.
		Incorrect or nonexistent control voltage	<ul style="list-style-type: none"> <li>Check for proper supply voltage on electrical diagram.</li> <li>Verify proper transformer voltage characteristics.</li> <li>Verify proper wiring of transformer.</li> <li>Check for control circuit voltage on electrical diagram. If voltage is not present, troubleshoot boards and wiring system for potential short circuit.</li> </ul>
		Incorrect or nonexistent supply voltage to the unit	<ul style="list-style-type: none"> <li>Check main line fuse.</li> <li>Check main line safety switch.</li> <li>Check heater fuses and wiring diagram.</li> </ul>
		Duct RH above high limit set point	<ul style="list-style-type: none"> <li>Check for duct airflow.</li> <li>Verify operation of duct high limit switch or transmitter.</li> </ul>
		No demand signal	<ul style="list-style-type: none"> <li>Check signal by others.</li> <li>Check for miswired connection.</li> <li>Verify in the Settings menu that humidifier is configured for demand signal.</li> </ul>
		Humidifier is in Standby mode	Change mode to Auto.
	Humidifier tank has proper water level and is always warm.	Aquastat	<ul style="list-style-type: none"> <li>This is normal; the aquastat is maintaining a certain tank water temperature within range of 40 °F to 180 °F (4 °C to 82 °C).</li> <li>Readjust aquastat temperature to a lower set point.</li> </ul>

Continued



# Troubleshooting guide

Table 93-1:  
Troubleshooting guide (continued)

Humidity set point issues	Issue	Possible causes	Actions
	Humidity is below desired level	<ul style="list-style-type: none"> <li>Unit is operating but fails to meet required humidity level</li> </ul>	<ul style="list-style-type: none"> <li>Unit undersized; replace with a larger unit or add additional humidifier.</li> <li>Skim duration is too long.</li> <li>If drain valve does not close fully, determine the cause and clean, repair, or replace as needed.</li> <li>If drain pipe water seal is allowing steam to go down the drain, fill P-trap with water or repair as needed.</li> <li>If there is an improper water seal height, increase to the recommended height (see humidifier tank manual for water seal height).</li> <li>If there is excessive internal steam pressure, determine the cause of the high pressure (e.g., high duct static pressure, undersized orifices in dispersion tubes, water, or crushed vapor hose) and correct as required.</li> <li>Replace leaking gasket or vapor hose.</li> <li>Recalibrate if controls are out of calibration.</li> <li>If fill valve is stuck open, repair or replace.</li> <li>If zone valve will not open, repair or replace.</li> <li>Interconnecting steam piping to the dispersion assembly is too long and/or uninsulated (do not insulate steam hose).</li> </ul>
		<ul style="list-style-type: none"> <li>No call for humidity from humidistat or from control and high limit humidity transmitters</li> </ul>	<ul style="list-style-type: none"> <li>Low or no signal strength from humidistat. Check for proper wiring.</li> <li>Check humidity transmitters (4 to 20 mA output).</li> <li>Adjust set point if RH or dew point set point is too low.</li> </ul>
		<ul style="list-style-type: none"> <li>Excessive outside air volume</li> </ul>	<ul style="list-style-type: none"> <li>Verify proper operation of fans, dampers, VAV systems, etc.</li> </ul>
		<ul style="list-style-type: none"> <li>Humidity control input type not the same as Vapor-logic firmware</li> </ul>	<ul style="list-style-type: none"> <li>Check Vapor-logic control board connections P11 and P13. Consult DriSteem.</li> </ul>
		<ul style="list-style-type: none"> <li>Vapor-logic not in Auto mode</li> </ul>	<ul style="list-style-type: none"> <li>Change mode to Auto.</li> </ul>

Continued

# Troubleshooting guide

Table 94-1:  
Troubleshooting guide (continued)

Humidity set point issues	Issue	Possible causes	Actions
	Humidity above set point	• High entering relative humidity	• Dehumidify.
		• Unit oversized	• Consult DriSteem.
		• Reduced airflow	• Check fans, dampers, VAV systems, etc.
		• Improperly located humidistat or humidity transmitters	• Relocate, using guidelines in Appendix section of this manual.
		• Malfunctioning controls	• Check for incorrect supply voltage. • Check for incorrect control signal. • Check for improper wiring hookup. • If humidity controller or transmitter are out of calibration or malfunctioning, repair or recalibrate.
	Hunting (humidity swings above and below desired set point)	• Malfunctioning control system	• If there is a faulty or inaccurate humidity controller or transmitter, repair or replace. • Check for proper Vapor-logic control settings: RH set point, high limit set point, cycle rate, PID tuning, etc. • Relocate poorly located control components. See "Sensor placement" on Page 26. • Verify that the touchscreen display modular cable is isolated from power wiring.
		• Air volume varies rapidly	• Stabilize.
		• Air temperature is varying rapidly	• Stabilize to $\pm 1$ °F ( $\pm 1$ °C).
		• Proportional band is too small and/or integral gain (Ki) is too large	• If RH swings outside PID band, increase PID band using the Settings menu. • Decrease integral gain (Ki) using the Set Up menu.
		• On-off control is not adequate	• If controlling the humidifier with an on-off signal, consider changing to controlling with a modulating signal.

Continued

# Troubleshooting guide

Table 95-1:  
Troubleshooting guide (continued)

Gas-to-steam (GTS) humidifier issues	Issue	Possible causes	Actions
	<b>Alert:</b> Blocked flue	<ul style="list-style-type: none"> <li>Blocked flue sensor is open</li> </ul>	<ul style="list-style-type: none"> <li>Check venting system for obstructions.</li> <li>Check air line to flue switch for obstructions.</li> <li>Windy conditions cause downdrafts in venting system. Install a high wind vent cap or isolate as recommended by local codes.</li> </ul>
	<b>Alert:</b> Gas valve [number] fault	<ul style="list-style-type: none"> <li>Failed ignition module</li> <li>Miswired gas valve</li> </ul>	<ul style="list-style-type: none"> <li>Check ignition module. Replace if necessary.</li> <li>Check gas valve wiring.</li> </ul>
	<b>Alert:</b> Burner [number] fault	<ul style="list-style-type: none"> <li>No gas supply to unit</li> </ul>	<ul style="list-style-type: none"> <li>Verify that gas service valve is on and receiving minimum pressure to manifold per rating plate.</li> </ul>
		<ul style="list-style-type: none"> <li>Gas valve is off or there is no power to the valve</li> </ul>	<ul style="list-style-type: none"> <li>Check for 24 VAC from the ignition module to the gas valve.</li> <li>Check that gas valve plug is seated properly.</li> </ul>
		<ul style="list-style-type: none"> <li>Gas valve outlet pressure is too low</li> </ul>	<ul style="list-style-type: none"> <li>Verify outlet pressure is set per rating plate.</li> </ul>
		<ul style="list-style-type: none"> <li>Blower inlet is dirty or obstructed</li> </ul>	<ul style="list-style-type: none"> <li>Clean inlet and check for obstructions.</li> </ul>
		<ul style="list-style-type: none"> <li>Flame sensor not sensing flame</li> </ul>	<ul style="list-style-type: none"> <li>Check flame sensor wiring.</li> <li>Check polarity at incoming power. Switch if necessary.</li> <li>Stray fiber from burner touching flame sensor. Use a screwdriver to gently push down fibers near flame sensor.</li> <li>Flame sensor is cracked. Replace.</li> </ul>
		<ul style="list-style-type: none"> <li>Polarity reversed at power block</li> </ul>	<ul style="list-style-type: none"> <li>Check polarity.</li> </ul>
	<b>Alert:</b> Ignition module [number] fault	<ul style="list-style-type: none"> <li>Ignition sequence engaged without power to gas valve</li> </ul>	<ul style="list-style-type: none"> <li>Verify ignition sequence.</li> <li>Replace ignition module.</li> </ul>
		<ul style="list-style-type: none"> <li>Gas valve/ignite/sensing electrode is out of sequence</li> </ul>	<ul style="list-style-type: none"> <li>Verify wire connections to gas valve, ignitor, and flame sensing rod.</li> </ul>
	<b>Alert:</b> Blower [number] fault	<ul style="list-style-type: none"> <li>The blower is incorrectly wired, or the blower failed to meet demand speed</li> </ul>	<ul style="list-style-type: none"> <li>Check for proper blower wiring.</li> <li>Replace blower.</li> </ul>
	<b>Alert:</b> No power vent airflow	<ul style="list-style-type: none"> <li>The power venter air flow switch is open</li> </ul>	<ul style="list-style-type: none"> <li>Check for proper power vent wiring.</li> <li>Repair or replace power venter.</li> </ul>
	<b>Alert:</b> Flue temperature switch	<ul style="list-style-type: none"> <li>Flue temperature is too high</li> <li>Tank is not full</li> </ul>	<ul style="list-style-type: none"> <li>Unit automatically shuts off and cools down. The unit will automatically restart when flue temperatures return to normal.</li> </ul>
		<ul style="list-style-type: none"> <li>Flue temperature is too high</li> <li>Tank is not full</li> </ul>	<ul style="list-style-type: none"> <li>Excessive inlet water temperature (over 90°F [32°C]).</li> <li>Check if water supply line strainer is plugged.</li> <li>Clean scale from tank and heat exchanger.</li> <li>Check supply water pressure. Provide supply water pressure as specified on unit.</li> </ul>
	<b>Alert:</b> Flue or tank overtemp cutout	<ul style="list-style-type: none"> <li>Flue temperature is too high</li> <li>Excessive inlet water temperature (over 90°F [32°C]).</li> </ul>	<ul style="list-style-type: none"> <li>Unit automatically shuts off and cools down. The unit will automatically restart when flue temperatures return to normal.</li> </ul>
		<ul style="list-style-type: none"> <li>Tank is not full</li> </ul>	<ul style="list-style-type: none"> <li>Check if water supply line strainer is plugged.</li> <li>Check supply water pressure. Provide supply water pressure as specified on unit.</li> </ul>
		<ul style="list-style-type: none"> <li>Excessive scale for tank and heat exchanger</li> </ul>	<ul style="list-style-type: none"> <li>Clean scale from tank and heat exchanger.</li> </ul>
	<b>Alert:</b> Flue sensor out of range	<ul style="list-style-type: none"> <li>Signal outside of 4-20mA</li> </ul>	<ul style="list-style-type: none"> <li>Check P4 voltage from CS1 to ground (2-10vdc)</li> <li>Replace transmitter if no voltage output</li> <li>Check voltage on P6 from 21vdc to ground is 21vdc. If not, re-check terminals for all field connections.</li> </ul>

# Replacement parts

**Table 96-1:**  
Vapor-logic replacement parts

Description	Quantity	Part number
Kit (includes main controller and required Molex plugs)	1	183504-004
Touchscreen display - GTS LX series only	1	183508-001
Touchscreen display communication cable (contact DriSteem for lengths other than 27" (686 mm) and 60" (1524 mm))	27" (686 mm)	408490-014
	60" (1524 mm)	408490-009
Grip elastomeric touchscreen display	1	408494-023
Molex connector plug, 2-position	1	406246-002
Molex connector plug, 3-position	1	406246-003
Molex connector plug, 4-position	1	406246-004
LonTalk card	1	408642

**FIGURE 96-1: VAPOR-LOGIC REPLACEMENT PARTS**

Main board



Touchscreen display



Molex connector plug (2-position shown)



LonTalk card



## Notes

# Notes

## Notes

### Expect quality from the industry leader

Since 1965, DriSteem has led the industry with innovative methods for humidifying and cooling air with precise control. Our focus on ease of ownership is evident in the design of the Vapor-logic controller. DriSteem also leads the industry with a Two-year Limited Warranty and optional extended warranty.

### For more information

www.dristeem.com  
sales@dristeem.com

For the most recent product information visit our Web site: [www.dristeem.com](http://www.dristeem.com)

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Continuous product improvement is a policy of DriSteem; therefore, product features and specifications are subject to change without notice.

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Firmware Version 6.X.X  
Form No. VL6-IOM-890000-761-REVD-0321  
Part No. 890000-761 Rev D

### Two-year Limited Warranty

DRI-STEEM Corporation ("DriSteem") warrants to the original user that its products will be free from defects in materials and workmanship for a period of two (2) years after installation or twenty-seven (27) months from the date DriSteem ships such product, whichever date is the earlier.

If any DriSteem product is found to be defective in material or workmanship during the applicable warranty period, DriSteem's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DriSteem's election. DriSteem shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product. Excluded from the Limited Warranty are all consumable and wear and tear items such as cylinders, membranes, filters, or media replacements. These items are subject to usual wear and tear during usage.

DriSteem's Limited Warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DriSteem, or if the products have been modified or altered without the written consent of DriSteem, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DriSteem in writing within the stated warranty period. Defective parts may be required to be returned to DriSteem. Excluded from the Limited Warranty are all consumable and wear and tear items such as cylinders, membranes, filters, or media replacements. These items are subject to usual wear and tear during usage.

DriSteem's Limited Warranty is made in lieu of, and DriSteem disclaims all other warranties, whether express or implied, including but not limited to any IMPLIED WARRANTY OF MERCHANTABILITY, ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

DriSteem SHALL NOT, UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, REVENUE OR BUSINESS) OR DAMAGE OR INJURY TO PERSONS OR PROPERTY IN ANY WAY RELATED TO THE MANUFACTURE OR THE USE OF ITS PRODUCTS. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if DriSteem has notice of the possibility of such damages.

By purchasing DriSteem's products, the purchaser agrees to the terms and conditions of this Limited Warranty.

### Extended warranty

The original user may extend the term of the DriSteem Limited Warranty for a limited number of months past the initial applicable warranty period and term provided in the first paragraph of this Limited Warranty. All the terms and conditions of the Limited Warranty during the initial applicable warranty period and term shall apply during any extended term. An extended warranty term of an additional twelve (12) months or twenty four (24) months of coverage may be purchased. The extended warranty term may be purchased until eighteen (18) months after the product is shipped, after which time no extended warranties are available. When a DriSteem humidifier is purchased with a DriSteem RO system, an extended twenty-four (24) month coverage is included.

Any extension of the Limited Warranty under this program must be in writing, signed by DriSteem, and paid for in full by the purchaser.