SV2 Series Valve Programming Tools

HMITOOL-000

PCTOOL-000

USER MANUAL

CONTENTS

INTRODUCTION

The HMI and PC Tools are used to communicate with the SV2 Series intelligent valves for setup, monitoring and troubleshooting purposes. SV2 Series valve programmable features, which are model dependent, include:

- Valve Modbus address + communication speed
- Low gas pressure limit reset type and setting
- High gas pressure limit reset type and setting
- VPS (valve proving system)
- Fuel/air firing curve (future release)
- Leak detection sequence (future release)
- Fuel metering functionality (future release)

IMPORTANT
- **You DO NOT have to enable and utilize the intelligent valve features.**
- **Any intelligent features used do require completion of setup and verification during the initial valve setup using the HMI or PC tools before the valve will be operational.**
- **When using the Pressure Module, you MUST use both the low gas pressure and high gas pressure settings.**

The HMI and PC Tools communicate to the SV2 Series valve via RS-485 Modbus. For the PC Tool, a USB to RS-485 converter is required, which comes with the PC Tool software, cable, Modbus connector and instructions when the PCTOOLKIT-000 part number is ordered.

Up to 8 valves may be connected to a single HMI or PC Tool after initial setup of each valve is completed; for setup only a single valve can be wired to the HMI or PC Tool at a time due to the default Modbus addressing for each valve being the same from the factory.

APPLICABLE MODELS / VERSIONS

This manual revision covers SV2 Series valves programming tools functionality for on/off valves and covers HMI Tool software revision 0.17 and PC Tool software revision 1.00.
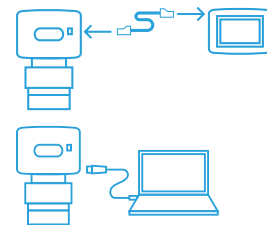
FEATURES

- Guided setup
- Connect up to 8 valves to a single HMI or PC Tool
- Trending
- Onboard diagnostics
- HMI screen capture
- Onboard reports
- HMI downloads to USB drive
- Monitoring

INSTALLATION

Refer to the HMI and PC Tools installation instructions for specifications, wiring and installation information.

- 32-00030, HMI Tool Installation Instructions
- 32-00037, PC Tool Installation Instructions

SAFETY FEATURES

The HMITOOL and PCTOOL contain software that incorporates many features that are designed to guide you safely through the commissioning process. Safety, however, is your responsibility.

Read all documentation carefully and respond appropriately to all fault and warning messages.

⚠ WARNING

Explosion Hazard.

Improper fuel/air valve configuration can cause fuel buildup and explosion.

Improper user operation may result in PROPERTY LOSS, PHYSICAL INJURY or DEATH.

Using the HMI display or PC Tool to setup or change parameters must be attempted only by experienced and/or licensed burner/boiler operators and mechanics.

This device and valve must be setup according to all applicable national and local codes, ordinances and regulations.

CYBER SECURITY NOTICE

SV2 Series products contain electronics and software. Care should be taken by the installer / facility management to guard against unauthorized access to the valve and to the programming interface for parameter modification (if applicable).

Unauthorized access to change the valve wiring interface, replace parts, change device hardware or software should not be permitted. Failure to do so may pose a safety risk.

A tamper evident label has been placed inside the valve electrical enclosure to indicate if access has occurred. The label resides between the valve main electronics assembly and the electrical enclosure which houses it.

NOTE: The valve main electronics assembly is field replaceable and as such, this seal must be broken in order to replace it.

GETTING STARTED

When the HMI or PC Tool is initially powered / run, the guided setup wizard is started and the welcome page appears as shown in Fig. 1. Select the arrow button to begin the guided setup. If the HMI screen is dim, check pins 7 and 8 on the HMI wiring connector.
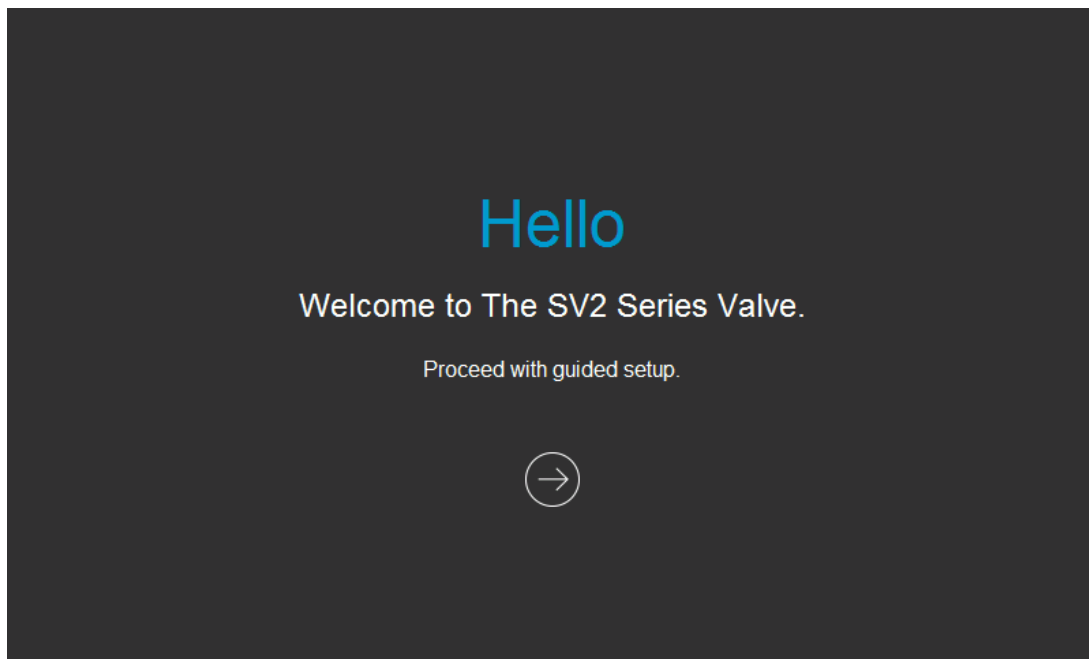
Fig. 1. SV2 Series Welcome Screen.

NOTES:

- The HMI and PC Tools will timeout from the commissioning mode after 10 minutes of inactivity. The installer will be able to operate the valve outside of the Hi-/Lo-Gas Pressure Limits, VPS (Valve Proving Sequence) and any other setup screens as required.

- When changing any safety-related parameters, the Verify Safety Parameters procedure will be required before leaving the commissioning mode. Even though the valve will be operational while in the commissioning mode and the 47-Safety parameter verification fault will be present, once the 10 minute commissioning screen timeout occurs, the valve will have a hard lockout for this condition, requiring the installer to perform the Verify Safety Parameters procedure and valve reset before the valve will be operational.

- DO NOT leave the commissioning mode without performing the Verify Safety Parameters procedure, if required, otherwise the valve will not be operational.

→ Selected above.

WARNING

En français

Fire or Explosion Hazard.
Improper fuel/air configuration can cause fuel buildup and explosion.
Can cause property loss, serious injury or death.

- The setup or changing of safety parameters should only be performed by trained, experienced combustion technicians who understand this control system and also understand applicable safety requirements.

- This device must be setup according to all applicable national and local codes, ordinances and regulations.

Cancel   Understand and Agree

AVERTISSEMENT

English

Risque d'incendie ou d'explosion.
Une configuration incorrecte du carburant/de l'air peut provoquer une accumulation de combustible et une explosion.
Peut causer des dommages matériels, des blessures graves, voire mortelles.

- La configuration ou la modification des paramètres de sécurité doivent être effectuées uniquement par des techniciens en combustion expérimentés et formés qui comprennent ce système de contrôle et les exigences de sécurité qui s'appliquent.

- Cet appareil doit être configuré conformément aux codes, aux lois et aux règlements nationaux et locaux en vigueur.

Annuler   Comprends et Accepte

Fig. 2. Warning screens.

En français / English — Language selection.

Annuler / Cancel — Exits commissioning mode and returns to the Welcome screen.

Comprends et Accepte / Understand and Agree — Allows user to enter setup mode.

NAVIGATION OVERVIEW

When the HMI or PC Tool is connected to an uncommissioned valve, the guided setup wizard will first move through several screens for programming tool and valve setup. All setup screens must be completed before the valve will be operational.

NOTES:

• **You DO NOT have to enable and utilize the intelligent valve features.**

• **Any intelligent features used do require completion of setup and verification during the initial valve setup using the HMI or PC Tools before the valve will be operational.**

• **When using the Pressure Module, you MUST use both the low gas pressure and high gas pressure settings.**

There are certain repeating icons on most screens. Their meaning is illustrated below. Non-repeating icons and fields are shown on each navigation page in this document.

Exit Selecting Exit button will exit the Guided Valve Setup process and revert to the Setup & Tests menu (refer to Fig. 34).

Pressing the information button will open a secondary screen, which contains further information for the user on the current process.

(HMI only) Pressing the camera button on any screen will trigger the current screen shot to be stored in the HMI Tool memory. The screen shot(s) may be copied to a USB drive. With the PC Tool, screen captures may be taken and stored on the PC hard drive.

NOTE: The HMI Tool has limited memory for screen shots and reports. The contents in memory will have to be copied / removed once the memory is full in order to save more data.

The padlock indicates whether the screen is locked or unlocked for editing of safety parameters.

NOTE: Commissioning mode times out after 10 minutes of user inactivity.

Dots indicate where in the setup process the user is currently.

Select back arrow to navigate to the previous page of the Guided Setup wizard.

Select the right arrow button to proceed to the next section Guided Setup wizard.

NOTE: Typically, when two versions of the same screen are shown, the display/HMI version is always shown first and the PC Tool version is shown second.
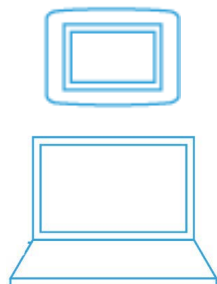
INITIAL DISPLAY/PC TOOL SETUP

Upon initial power-up and use, the HMI and PC Tools require setup of general settings, communication interface with the valve(s) and general valve setup.

Comprends et Accepte **Understand and Agree** Selected on Warning screen.
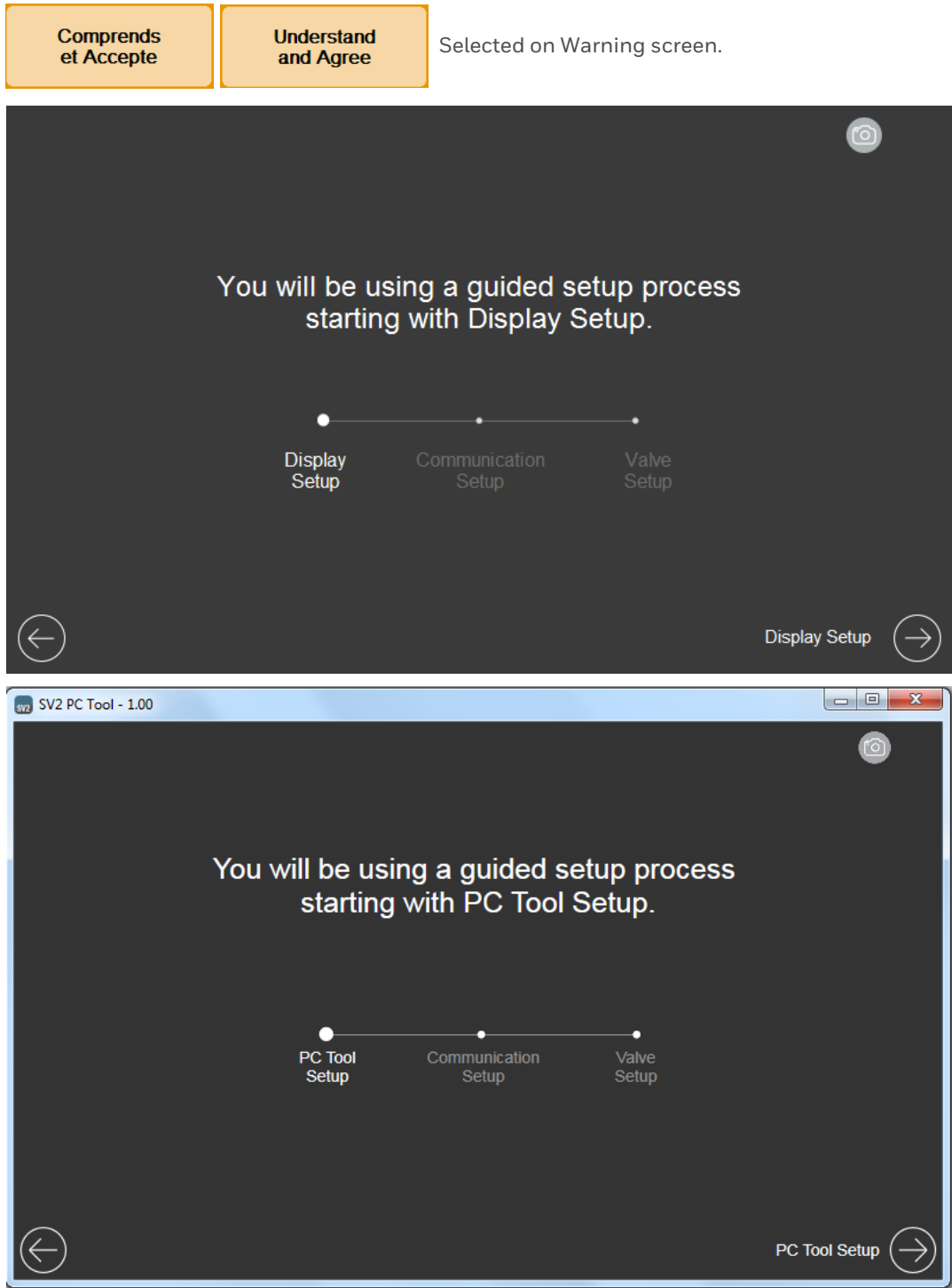
Fig. 3. Guided setup initial page.

Display Setup →
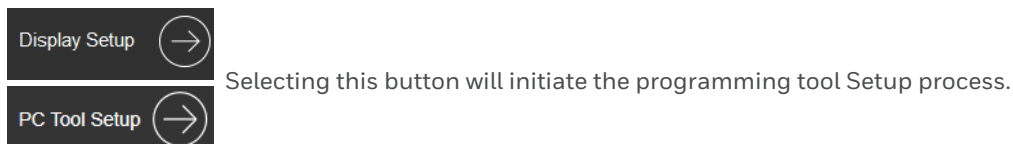
PC Tool Setup → Selecting this button will initiate the programming tool Setup process.

Display Setup → or PC Tool Setup → Selected on Display (PC Tool) Setup page.

Display Settings

Display Settings

Language	English ▼
Date	MM/DD/YYYY ▼	07/14/2015
Time	12 Hour ▼	09:16 AM
Volume	⊖ ▮▮▮▮▮▮▮ **30**	⊕
Brightness	⊖ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ **85**	⊕

← • — • Communication Setup →

PC Tool Settings

PC Tool Settings

Language	English ▼
Date Format	MM/DD/YYYY ▼	04/11/2016
Time Format	12 Hour ▼	3:16 PM

← • ——— • ——— • Communication Setup →
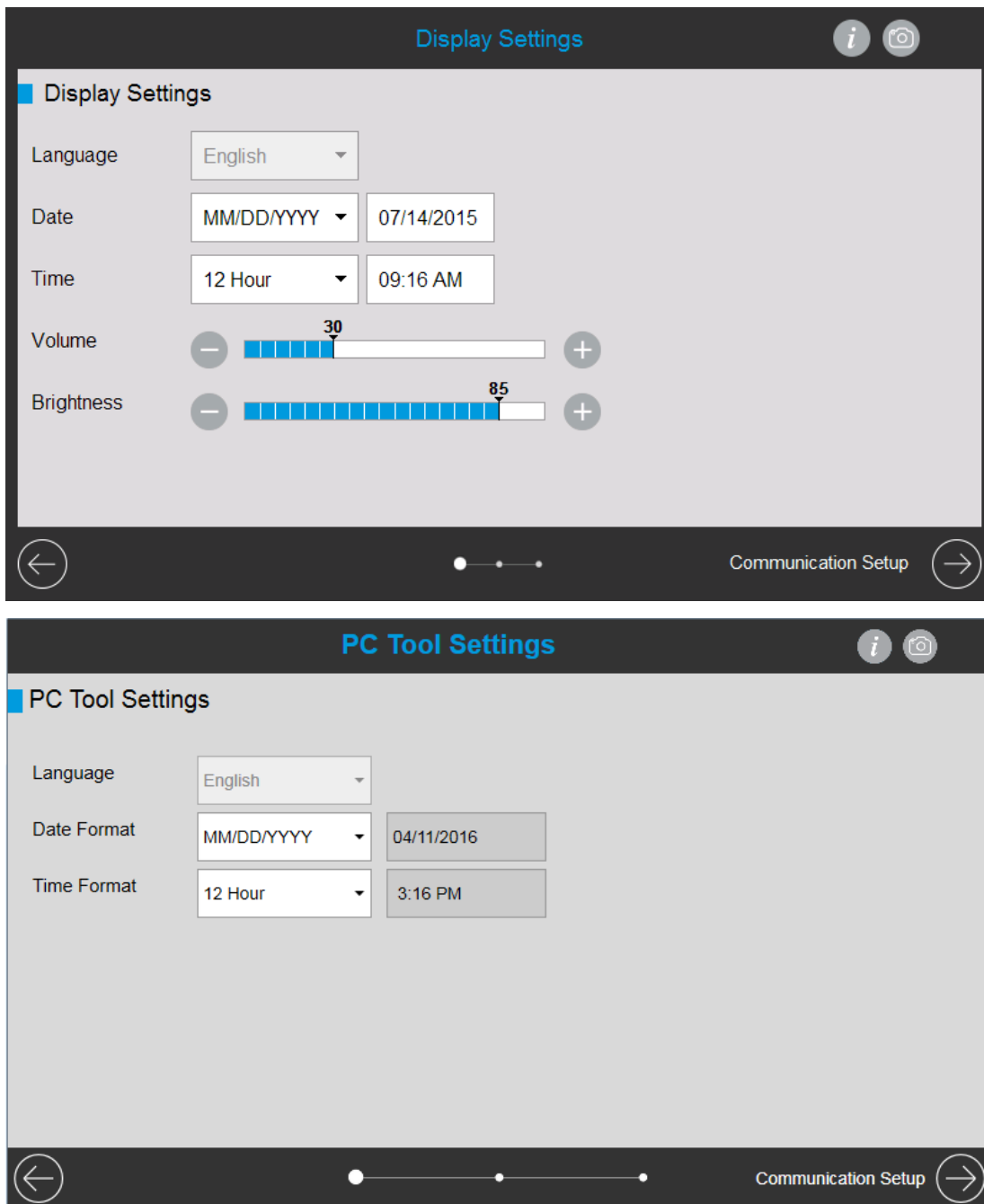
Fig. 4. Settings.

Language Future enhancement for language selection.

Date Set current date format and date. Options are MM/DD/YYYY, DD/MM/YYYY or YYYY/MM/DD

Time Set current time. User may choose a 12 or 24 hour clock.

NOTE: The HMI has a battery back-up for keeping time and date information.

Volume   (HMI only) Set volume for any audible functions.

Brightness   (HMI only) Set brightness of display screens.

Select back arrow to navigate to the guided setup page. Refer to Fig. 3.

Select the right arrow button to proceed to Communication Setup. Refer to Fig. 5.

The settings selected on this screen will be global settings carried throughout all screens. These are display/PC Tool only settings; not valve settings.

NOTE: Settings may be accessed via the Home / Display (PC) Setup menus after initial setup is completed via the guided setup. Refer to Fig. 26 and Fig. 27.

Communication Setup → Selected on Setup page.
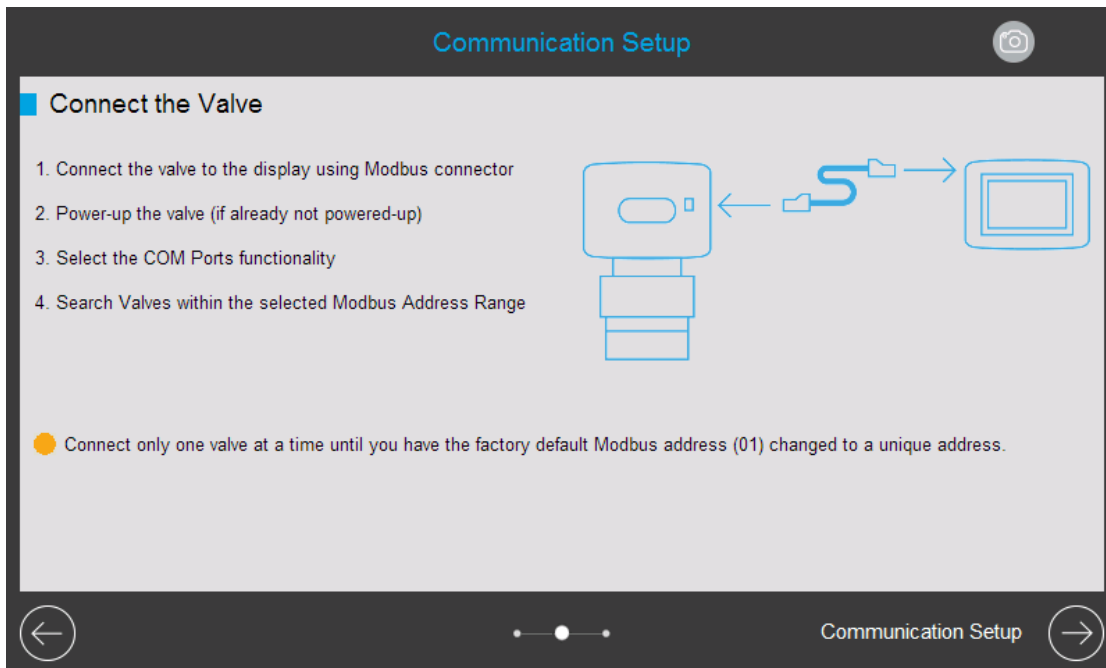
Fig. 5. Communication Setup informational page.

Provides installer / user information regarding how to proceed with valve communication setup by connecting to HMI or PC Tools.

← Select back arrow to navigate to Settings. Refer to Fig. 4.

→ Select the right arrow button to proceed to Communication Setup. Refer to Fig. 6.

NOTES:

- Up to 8 valves may be connected to a single HMI or PC Tool after initial setup of each valve is completed.
- For setup only a single valve can be wired to the HMI or PC Tool at a time due to the default Modbus addressing for each valve being the same from the factory.
- When each valve is connected to the programming tool, it must be given a unique Modbus address on the Valve General Settings page. Refer to Fig. 11. After completing setup of a particular valve, the programming tool will ask whether you would like to connect another valve, provide directions for doing so and ask whether you would like to perform the guided setup for it.
- Once all valves that are to be connected have been individually programmed, they can be wired in a daisy chain fashion to a single port on the HMI or PC Tool. For detailed wiring information and cable requirements, refer to the HMI and PC Tools Installation Instructions, documents 32-00030 and 32-00037, respectively.
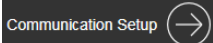
 Communication Setup → Selected on previous Communication Setup informational page.
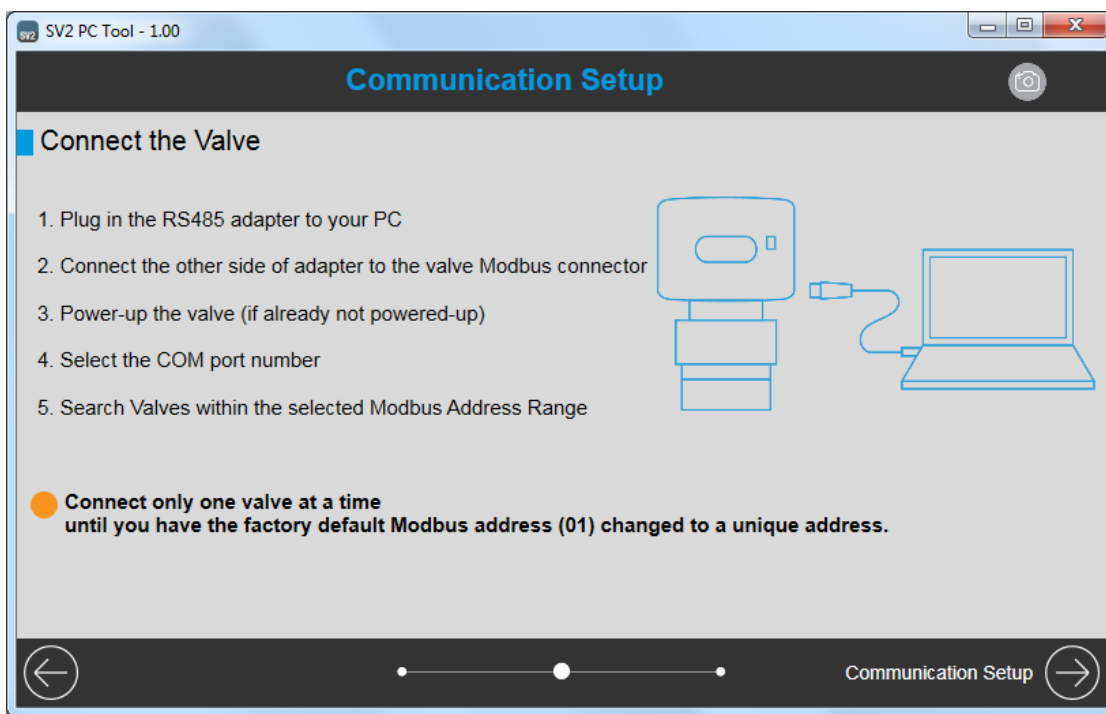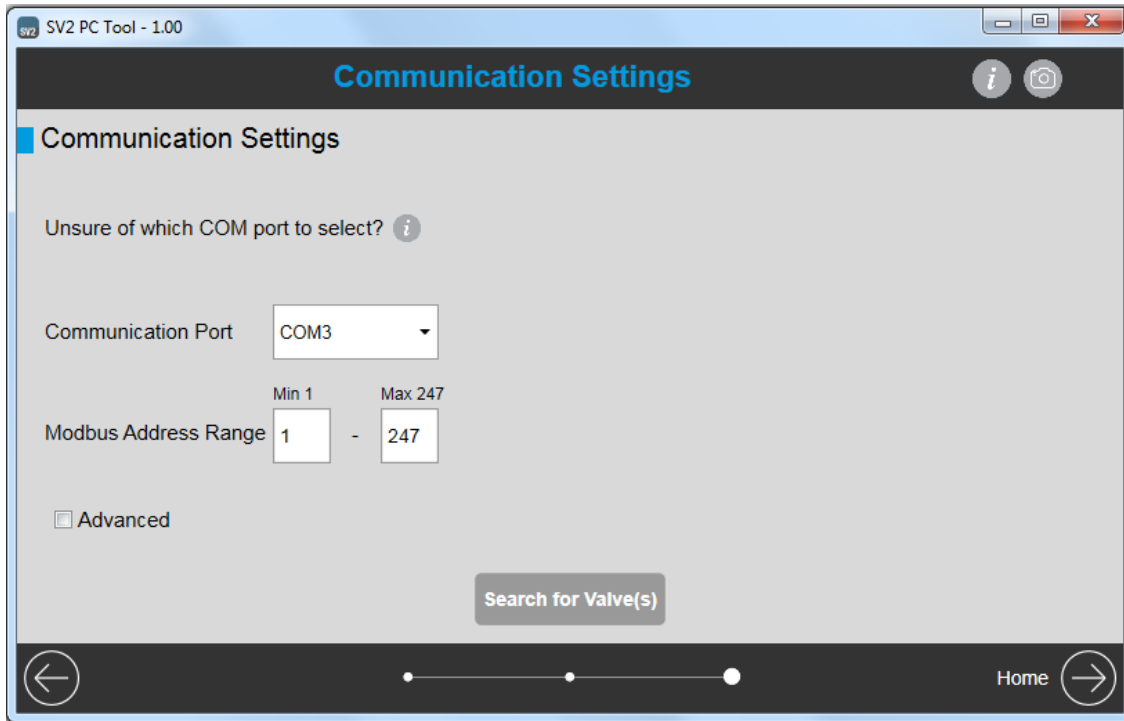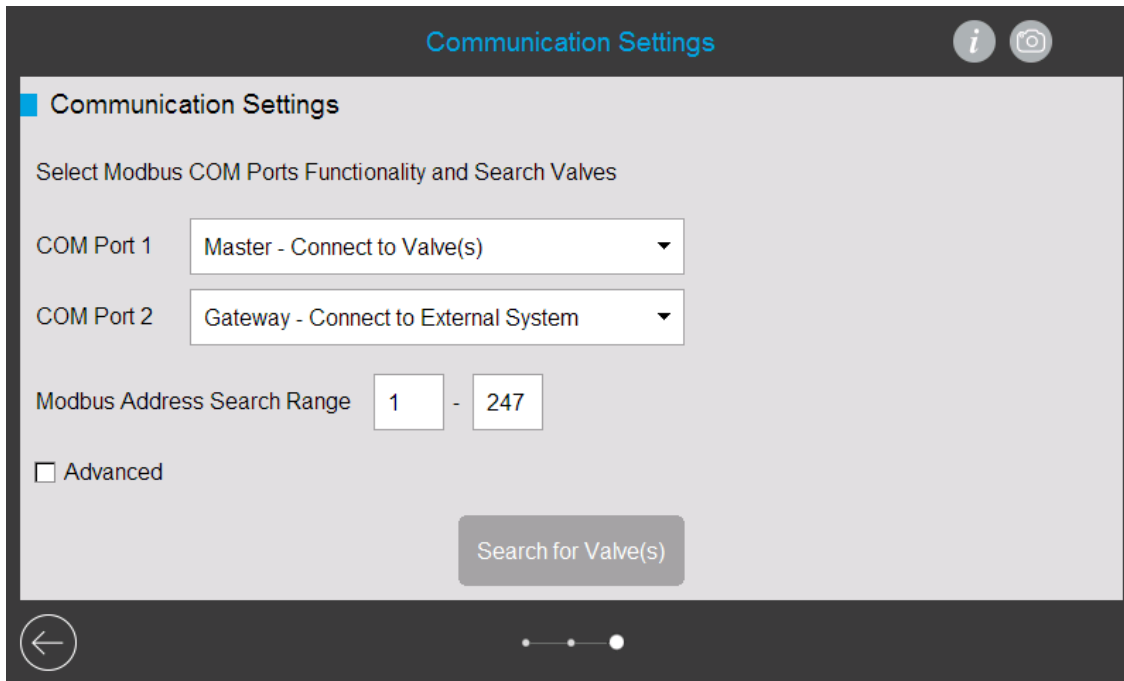

Fig. 6. Communication Setup.

COM Port 1 **COM Port 2** (HMI only) Select function for each display COM Port. Options are Disabled, Master–Connect to Valves or Gateway–Connect to External System. See ⓘ below for details on these options.

Communication Port (PC only) Select applicable PC COM Port being used by the USB to RS485 converter.

NOTE: To help determine the correct PC Tool port, select the ⓘ after **Unsure of which COM port to select?** .
Otherwise, communication between the PC tool and valve(s) may not be established. Refer to Fig. 7.

Modbus Address Search Range Select starting and ending Modbus address search range for any connected valve(s). Minimum is 1 and maximum is 247. From the factory, valves have a default Modbus address of 1.

☐ **Advanced** When selected, allows Baud Rate selection for applicable programming tool port(s) to any connected devices. Options are 9600, 19200, 38400 and 57600 bps.

NOTES:

• The default HMI / PC Tool and valve Modbus Baud Rates are 38400 bps. Both baud rates may be changed AFTER THE PROGRAMMING TOOL AND VALVE CONFIGURATION ARE COMPLETED.

• Communication must first be established with the valve at the default 38400 bps rate with the programming tool, then the valve baud rate may be changed, followed by the programming tool baud rate. Refer to Figs. 35 and 29 in the General Navigation section of this document after completing the following HMI/PC tool and valve guided setup procedure as outlined in Fig. 6 to Fig. 22.

• If the HMI is connected to an external device via the 'Gateway–Connect to External System' selection, make sure the Baud Rates match.

Search for Valve(s) When selected, program will automatically search for connected valves and indicate the quantity found. Select 'Done' then 'OK' to complete connected valves search. Screen will automatically advance to the Home screen where the user can select which connected valve to display and setup.

NOTE: You must search for connected valve(s) and find at least one in order to proceed with the setup process.

Done Appears after **Search for Valve(s)** is selected. Press Done button when the correct quantity of connected valve(s) is found to terminate the search function.

OK Appears after **Done** is selected. Press OK button to exit the Search for Valve(s) function.

← Select back arrow to navigate to Communication Setup informational page. Refer to Fig. 5.

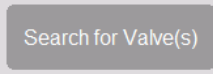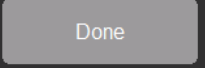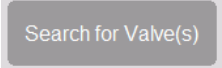ⓘ HMI COM 1 and COM 2 ports are flexible in that the function for each port is selectable during the setup process. Each port may be disabled, used to connect to valve(s) or as a gateway to connect to an external system, such as a building automation system.

The 'Master–Connect to Valves' selection enables the display to be the local master to any connected valve(s). The HMI or PC Tool can be used to program, monitor and troubleshoot up to 8 connected valves. Note that each valve must first be individually connected, programmed and given a unique Modbus address. Once this is complete, all valves may be wired in a daisy chain fashion to a single HMI port or to the PC Tool USB to RS485 converter.

The 'Gateway–Connect to External System' selection enables the display to share data with an external control. The external control will need to be programmed for the proper Modbus registers in order to obtain information. Refer to section of this manual entitled Modbus Addresses for Modbus register information. Connection to an external Modbus master is not possible with the PC Tool.

If connecting to an external Building Automation System via the display Gateway selection, be sure to match the valve and display Baud Rate with the Building Automation System for proper communication.

Be sure to connect the valve and Building Automation System to the proper display port per the user setup.

Changing the Modbus Address Search Range enables the display or PC Tool to search a user determined range of Modbus addresses for more than 1 connected valve or for addresses with a high address value.

NOTES:

• The programming tool and valve communication settings including port selection(s), Modbus address and baud rate may be accessed after initial setup is completed via the guided setup procedure as outlined in Figs. 6 to 22.
• To change baud rates, communication with the programming tool must be established first, then the valve baud rate may be changed, followed by the programming tool baud rate.
• Valve communication settings may be accessed via the Home / connected valve / Setup & Tests / Settings menus. Refer to Figs. 26, 33, 34 and 35.
• Programming tool Communication Settings may be accessed via the Home / Display (PC Tool) Setup menus. Refer to Figs. 26 and 29.

Unsure of which COM port to select? Selected on Communication Setup page for PC Tool.
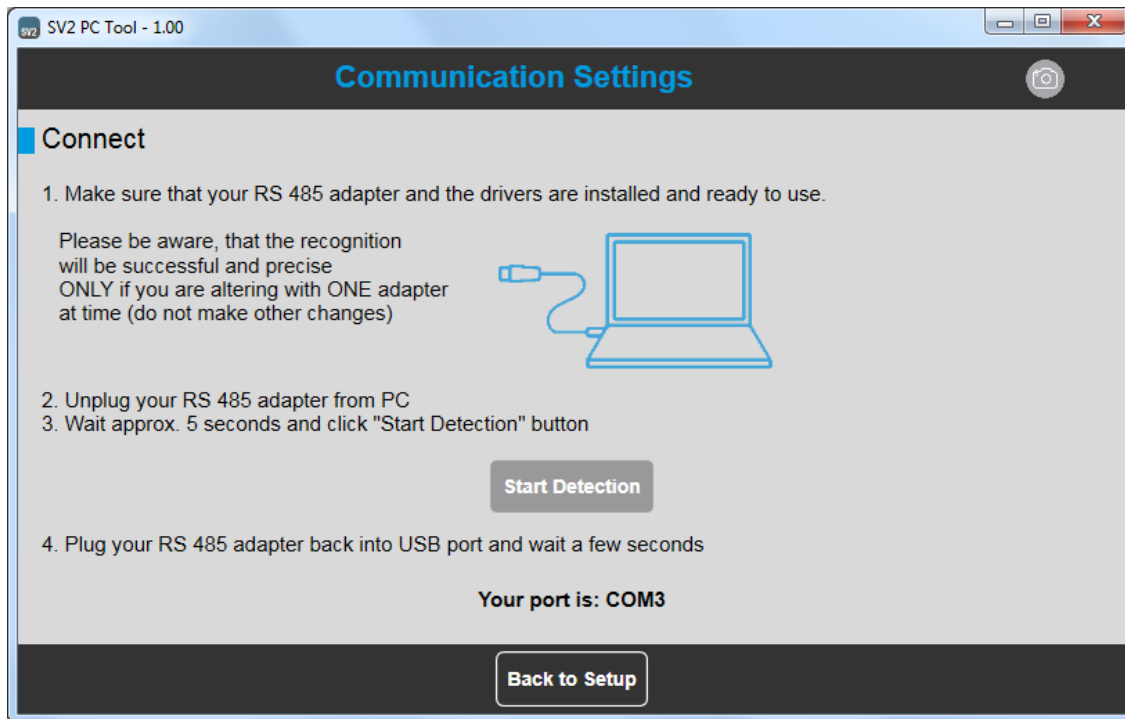
Fig. 7. PC Tool COM port test.

When using the PC Tool, if you are unable to establish communications with the connected valve(s), the procedure outlined on this page will help determine which COM port the USB to RS485 converter is using on your PC.

Start Detection Starts the converter COM port detection process.

Back to Setup Returns to the Communications Setup page to finish valve communication process. Refer to Fig. 6.

☐ **Advanced** Selected on Communication Settings page. Refer to Fig. 6.
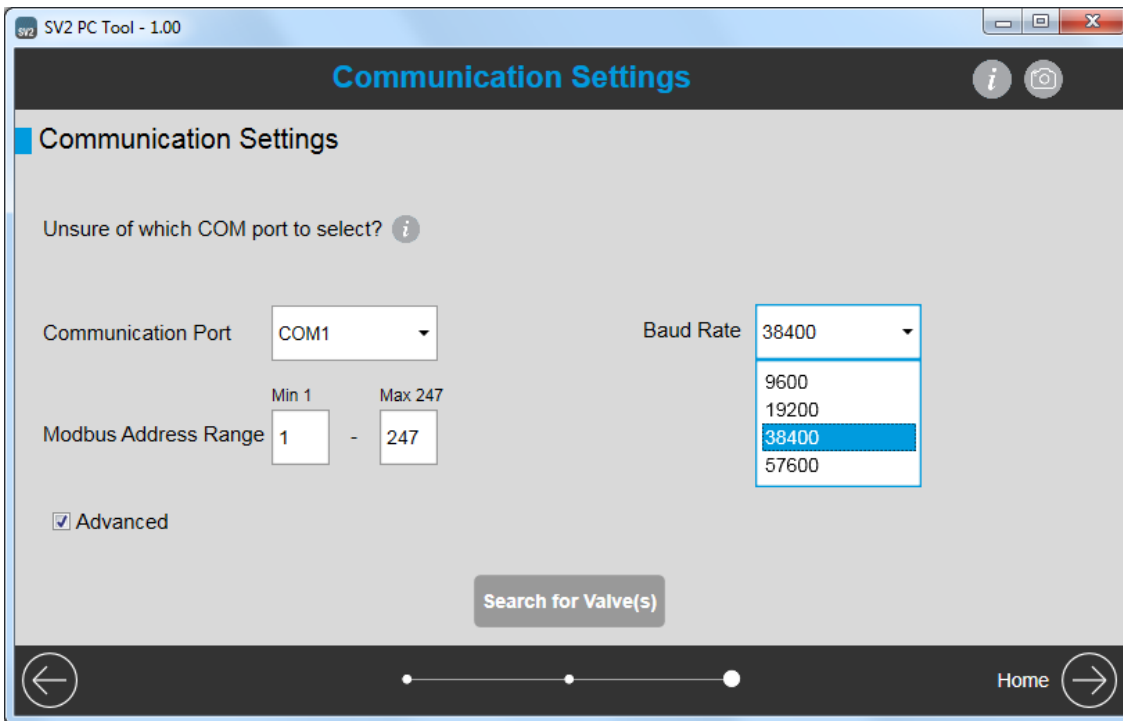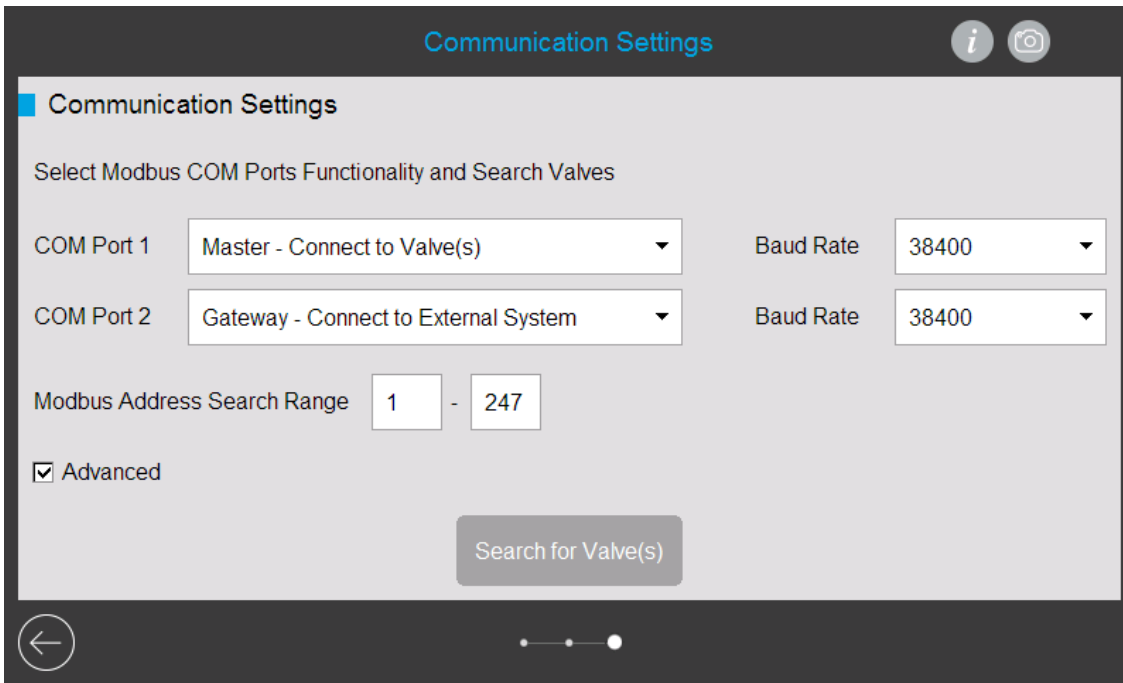
Fig. 8. Communication Setup – Advanced Settings.
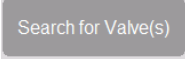
Baud rates may be selected individually for both HMI COM Port 1 and COM Port 2. Available baud rates are 9600, 19200, 38400 and 57600 bps

NOTES:

- The default HMI / PC Tool and valve Modbus Baud Rates are 38400 bps. Both baud rates may be changed AFTER THE PROGRAMMING TOOL AND VALVE CONFIGURATION ARE COMPLETED.

- Communication must first be established with the valve at the default 38400 bps rate with the programming tool, then the valve baud rate may be changed, followed by the programming tool baud rate. Refer to Figs. 35 and 29 in the General Navigation section of this document after completing the following valve guided setup procedure as outlined in Figs. 6 to 22.

- You must select [Search for Valve(s)] and find at least one connected valve in order to proceed with the setup process.

- If the HMI is connected to an external device via the 'Gateway-Connect to External System' selection, make sure the Baud Rates match.

Once all of the proper HMI / PC Tools communication settings are selected, you must search for connected valves.

Select [Search for Valve(s)] on Communication Settings page. Refer to Figs. 6 and 8.

Then select [Done] when the correct number of valves are found.

Finally select [OK].

Fig. 9. Home screen.

SV2 - 247
Unconfigured
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Any populated white area indicates a connected or previously connected valve. Select the appropriate valve box to view that valve and/or continue valve setup. A blue box █ indicates a configured valve, amber box █ indicates an unconfigured valve and a red box █ indicates a disconnected valve that was previously connected.

Search for Valve(s) When selected, program will automatically search for connected valves and indicate the quantity found. Select 'Done' to complete connected valves search. Screen will automatically show all connected valves.

Display Setup Allows changing of display or PC setup including General and Communication settings. The setup of these features was accomplished upon initial programming tool power-up and use (refer to Figs. 3-4 and 6-8).

PC Tool Setup From the Display / PC Tool Setup screen, other accessible features include screen calibration (HMI only), screenshot maintenance (delete, copy, etc.) (HMI only), report maintenance (delete, copy, etc.) (HMI only) and information about the programming tool software revisions. Refer to Figs 27-32. Reports generated from the PC Tool are saved to the connected PC hard drive. Refer to Fig. 50.

NOTE: To proceed with Guided Valve Setup to complete valve commissioning, select the white box indicating the correct connected unconfigured SV2 valve

SV2 - 247
Unconfigured
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, then select Yes when prompted to run the Setup Wizard.

GUIDED VALVE SETUP

The Guided Valve Setup is a user friendly wizard designed to progressively direct the user through all of the required steps to setup the valve for use in an application. The wizard can be used for initial setup or anytime parameters need to be changed.

Select [Yes] when prompted to run the Setup Wizard on Home page after selecting an unconfigured connected valve. Refer to Fig. 9.
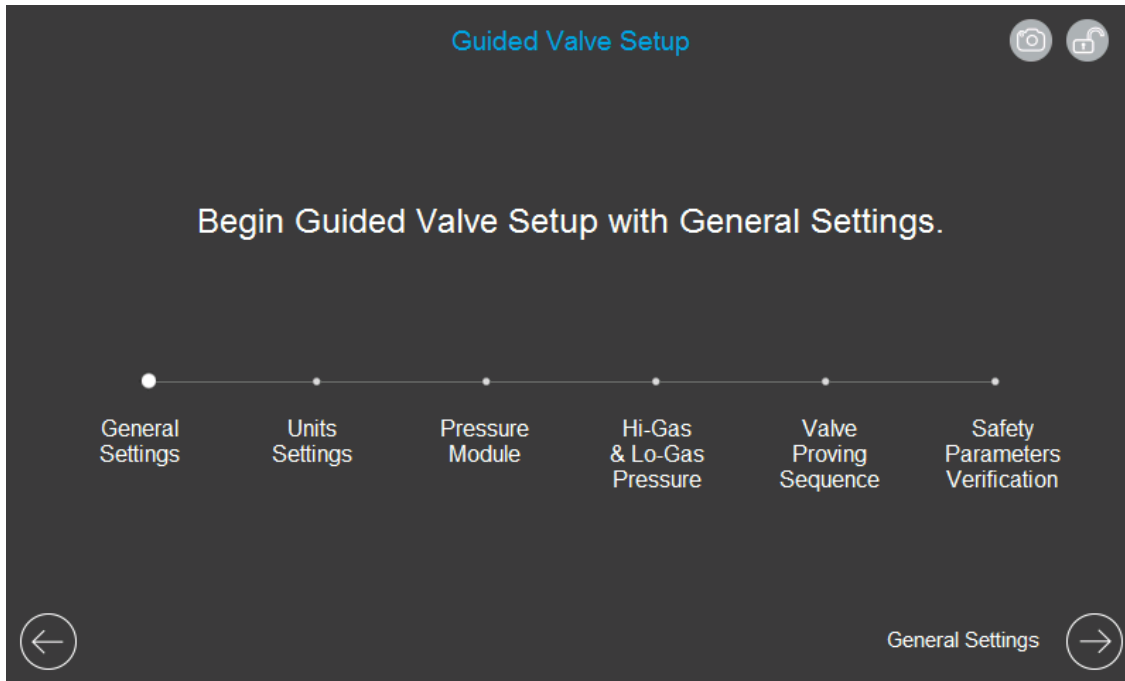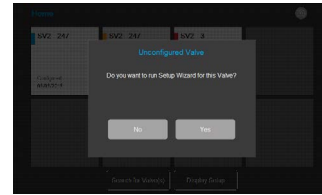
Fig. 10. Setup & Tests – Guided Valve Set Up.

The guided setup wizard directs the user through valve General Settings, Units Settings, Pressure Module, Hi-Gas & Lo-Gas Pressure, Valve Proving Sequence and Safety Parameters Verification.

There are information tips available for most screens as well as illustrations and user-friendly screens.

 Returns to the Setup & Tests menu. Refer to Fig. 34.

 Starts the Guided Valve Setup sequence. Refer to Fig. 11.

NOTE: Guided Valve Set Up can also be accessed via the Home / Setup & Tests menus:

Select [Guided Valve Set Up] on Setup & Tests page. Refer to Figs. 9 and 34.
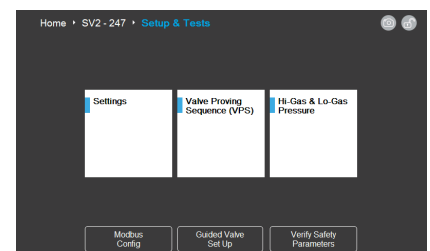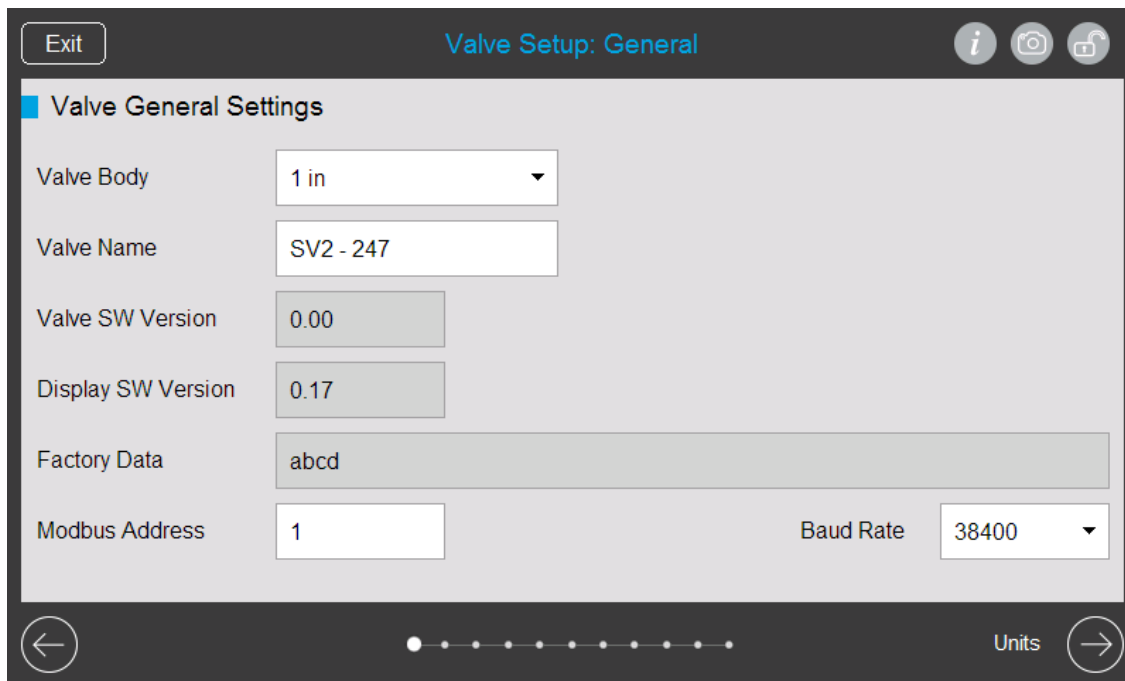
Fig. 11. Guided Valve Setup – Valve General Settings.

NOTE: General Valve Settings can also be accessed via the Setup & Tests / Settings menu. Refer to Figs. 34 and 35.

Valve Body Indicates the body size of the attached valve. From the factory, the programming tool will know the applicable body size. This field will typically be used for field replacement of the electronics. If a change to this field is required, press the white space. The login screen will appear to unlock the parameters for editing. The password is '7777'. Body size options are 1 in, 2 in or 3 in. There are two valve sizes within a body size designation; 1 in comprises ¾ and 1 inch valves, 2 in comprises 1 ½ and 2 inch valves and 3 in comprises 2 ½ and 3 inch valve sizes. Select the appropriate valve body size as required.

NOTE: Any changes in Valve Body size will require the completion of the Safety Parameter Verification process before the valve will be operational. The Safety Parameters Verification is the last step in the Guided Valve Setup. Refer to Fig. 21.

Valve Name Field provided for user to identify / name the valve for easy identification. Field is limited to 10 characters.

Valve SW Version Displays the valve software revision.

Display SW Version or **PC Tool Version** Displays the HMI or PC Tool software revision.

Factory Data Data for factory use only.

Modbus Address Current Modbus address of the connected valve. If a change is desired, press the white space. The login screen will appear to unlock the parameters for editing. The password is '7777'. Possible Modbus addresses are 1–247.

NOTE: The default valve Modbus Address is 1. If you intend to connect more than 1 valve to the programming tool, make sure each connected valve is given a unique Modbus Address.

Baud Rate Current Modbus baud rate of the connected valve. Baud rate options are 9600, 19200, 38400 or 57600 bps.

NOTES:

- **The default valve and HMI / PC Tool Modbus Baud Rates are 38400 bps. Both baud rates may be changed AFTER THE PROGRAMMING TOOL AND VALVE CONFIGURATION ARE COMPLETED.**

- **Communication must first be established with the valve at the default 38400 bps rate with the programming tool, then the valve baud rate may be changed, followed by the programming tool baud rate. Refer to Figs. 35 and 29 in the General Navigation section of this document after completing the following valve guided setup procedure as outlined in Figs. 9 to 22.**

- **If the valve is connected to a different external control, make sure it and the valve have the same baud rates.**

Select to navigate to the Guided Valve Setup page. Refer to Fig. 10.

Select to proceed to the Units section. Refer to Fig. 12.

Add or change a Valve Name to identify it amongst other valves in the facility or to coordinate with an appliance name/designation.

The valve name should be non empty, and also should contain at least one letter or digit.

Valid characters are: "a-z" "A-Z" "0-9" space ( ) { } [ ] + – _ = ' . \

Change the connected Valve Modbus Address as desired or required if more than 1 valve is connected to the programming tool or if the valve is connected to a larger Modbus network.

Make sure each connected Valve (Modbus slave) has a unique Modbus Address.
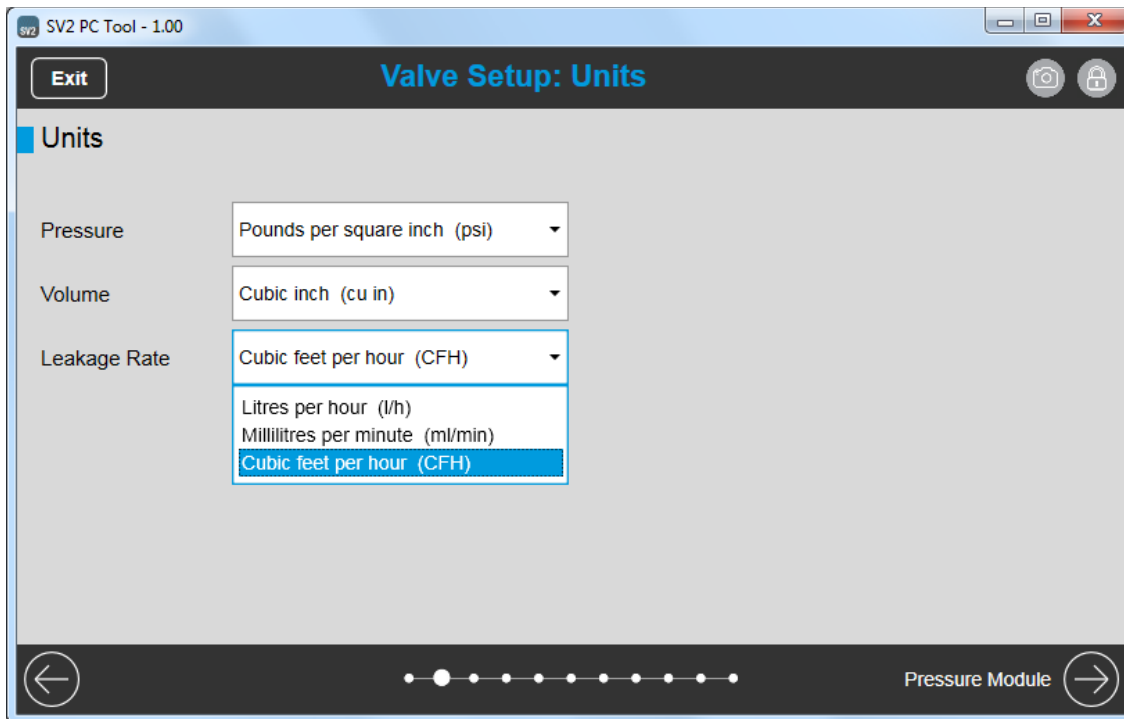
Fig. 12. Guided Valve Setup – Units.

NOTE: Units can also be accessed via the Setup & Tests / Settings menu. Refer to Figs. 34 and 36.

Pressure Selection of global pressure units used throughout valve setup process as well as any future monitoring. Options include Millibar (mbar), Pounds per square inch (psi) and Inches water column (in WC).

Volume Selection of global volume units used throughout valve setup process as well as any future monitoring. Options include Millitre (ml) and Cubic inch (cu in).

Leakage Rate Selection of global leakage rate units used throughout valve setup process, for valve proving sequence and future monitoring. Selectable options are Litres per hour (l/h), Milliters per minute (ml/min) or Cubic feet per hour (CFH).

⬅ Select to navigate to the Valve General Settings page. Refer to Fig. 11.

➡ Select to proceed to the Pressure Module section. Refer to Fig. 13.
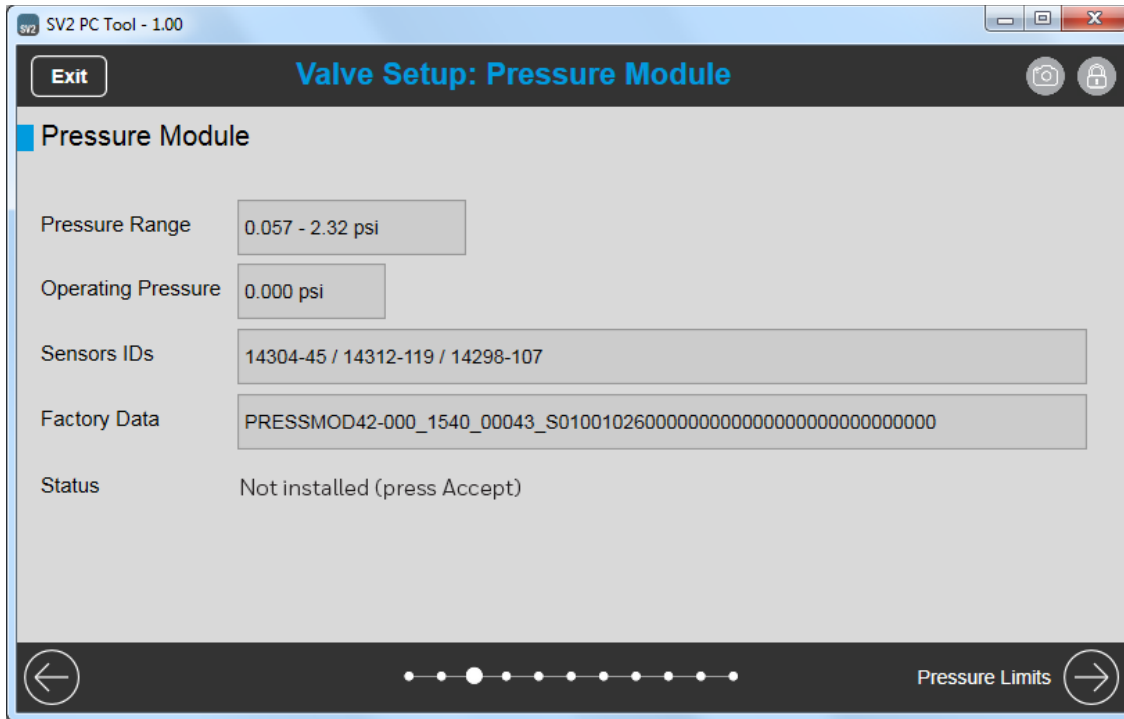
Fig. 13. Guided Valve Setup – Pressure Module.

NOTES:

- Default Status of the Pressure Module will be Not installed (press Accept).
- If the Pressure Module will not be used or setup, you may skip this step as well as the following 7 steps for the Pressure Limits, Hi-Gas, Lo-Gas, Summary and Test as well as the Valve Proving Sequence Setup and Test. Refer to Figs. 14 to 20.
- After setup is complete, Verification of Safety Parameters procedure must be completed before valve will be operational.
- Pressure Module information can also be accessed via the Setup & Tests / Settings menu (Refer to Figs. 34 and 37).

Pressure Range   Pressure range of the connected Pressure Module with the units selected in Fig.12.

Operating Pressure   Current operating pressure as measured by the Pressure Module internal sensors.

Sensors IDs   Identifying information for the internal Pressure Module sensors. For factory use only.

Factory Data   Pressure Module model and identifying information for factory use only.

Status   Indicates current status of the attached Pressure Module. Possible status conditions include Not installed (press Accept), Disabled, Accepted – In Use or No communication. Accepted – In Use appears if the Pressure Module and limits have previously been setup. To change the Pressure Module settings, proceed through the Guided Valve Setup by selecting the right arrow.

NOTE: If status is No communication, the Pressure Module sensors or wiring is likely faulty and the Pressure Module may have to be replaced. Refer to the Pressure Module installation instructions, document 32-00017, for further advice.

Accept   Appears if the Pressure Module Status is Not installed, which means it has not been acknowledged. To acknowledge and continue setup of the Pressure Module, press Accept.

NOTE: In order to setup and use the Pressure Module, you will need to press the Accept button.

Returns to the Units page. Refer to Fig. 12.

Proceeds to the Pressure Limits section. Refer to Fig. 14.
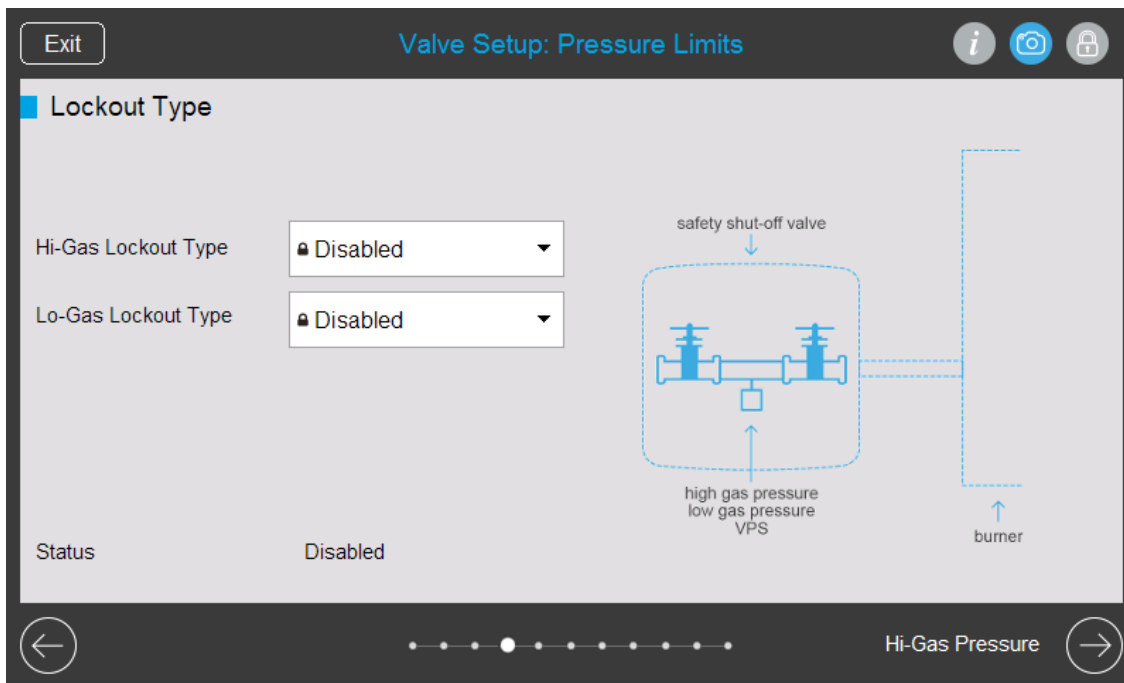
Fig. 14. Guided Valve Setup – Pressure Limits.

NOTES:

- Default status for both the Hi-Gas and Lo-Gas is Disabled.

- When using the Pressure Module, you MUST use both the Hi-Gas pressure and Lo-Gas pressure settings if the Lockout Type for either is changed from Disabled.

- The Lockout type selected for each may be different.

- In order for the valve to be operational, the Verification of Safety Parameters operation must be completed if any intelligent features are setup. Refer to Fig. 21.

- YOU MUST KEEP THE HI-GAS AND LO-GAS LOCKOUT TYPE IN <u>DISABLED STATUS</u> WHILE PROGRAMMING THE PRESSURE LIMITS if the wiring between the valve and burner management system is in place. ALSO, YOU MUST KEEP THE EXTERNAL VPS CONTROL <u>DISABLED</u>, IF USED. The burner needs to be run in order to properly measure the pressure at the valve and thus set the Hi-Gas and Lo-Gas limits accordingly. Because the Hi-Gas and Lo-Gas functions are in the burner management interlock string, which is run through the SV2 Series valve, the burner management system will likely lockout due to the interlock string being open if the Hi-Gas and Lo-Gas Lockout Type are changed from Disabled before proceeding with setup. Additionally, when the burner starts, the VPS control may try to perform the VPS test and thus lockout due to the Pressure Module not being programmed or verified.

- Pressure Module setup can also be accessed via the Setup & Tests / Hi-Gas & Lo-Gas Pressure menu. Refer to Figs. 34 and 40-43.

Hi-Gas Lockout Type	Selectable Lockout Type for each function. Options include Disabled, Auto Reset or Manual Reset.
Lo-Gas Lockout Type	**NOTE: Leave as Disabled while programming the Pressure Limits if the wiring between the valve and burner management system is in place.**
Status	Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas selections above.
⬅	Returns to the Pressure Module page. Refer to Fig. 13.
➡	Proceeds to the Hi-Gas Pressure section. Refer to Fig. 15.
ⓘ	When using the Pressure Module, both the Hi-Gas and Lo-Gas Switch function must be used when the Hi-Gas and Lo-Gas Switch function is Enabled.

The user may select the Hi-Gas and Lo-Gas Lockout Type individually. Lockout Type must be selected properly for the appliance type and capacity per national and local codes as appropriate.

Press the Set button to lock in the Hi-Gas or Lo-Gas Limit setting only after the Operating Pressure* value has stabilized.

Set the Hi-Gas and Lo-Gas Limit settings as directed by the burner manufacturer, the appliance needs and/or applicable codes.

User may set the Hi-Gas and Lo-Gas Limit as a % of the measured Operating Pressure*.

Refer to the valve Installation Instructions, document 32-00018, for appropriate wiring to the burner management system.

NOTE: The pressure as used for the Hi-Gas and Lo-Gas functions is being measured between the 2 valve seats via the internal pressure sensors in the Pressure Module. As a result, the reading may differ from measurements taken external to the valve. Accordingly, the burner must be run to measure and set the Hi-Gas and Lo-Gas Pressure settings.
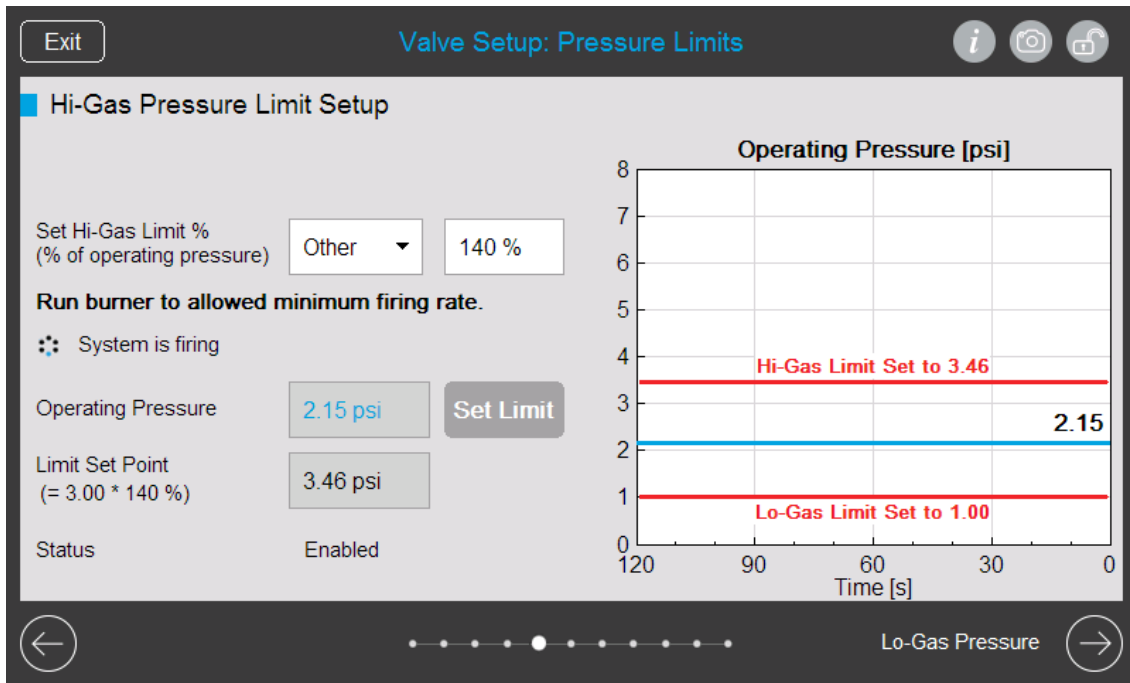
Fig. 15. Guided Valve Setup – Hi-Gas Pressure Limit Setup.

NOTES:

- **To set the Hi-Gas Pressure Limit, the burner must be run to minimum firing rate as directed on the screen.**
- **The Pressure Module internal sensors must measure the pressure in order to properly set the Limit setpoint.**
- **Only press the Set Limit button to set the limit reading after the pressure reading has fully stabilized.**

Set Hi-Gas Limit % (% of operating pressure) — Other — 140 %   Selection of the Hi-Gas Pressure Limit setting as a % of the measured operating pressure at the minimum firing rate. Pressure reading as measured by the internal Pressure Module sensors. Options include 125%, 150% or Other. When Other is selected, the user may change the % manually by touching the box next to it. The possible range is 125% to 150%.

Operating Pressure   Shows the current pressure reading as measured by the internal Pressure Module sensors.

Set Limit   Sets the Hi-Gas Pressure Limit.

Limit Set Point   Shows the applicable Hi-Gas Limit setpoint based on the current Operating Pressure reading and Hi-Gas Limit % selections.

Status   Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas Lockout selections on the Pressure Limits page. Refer to Fig. 14.

(←)   Returns to the Pressure Limits page. Refer to Fig. 14.

(→)   Proceed to the Lo-Gas Pressure section. Refer to Fig. 16.
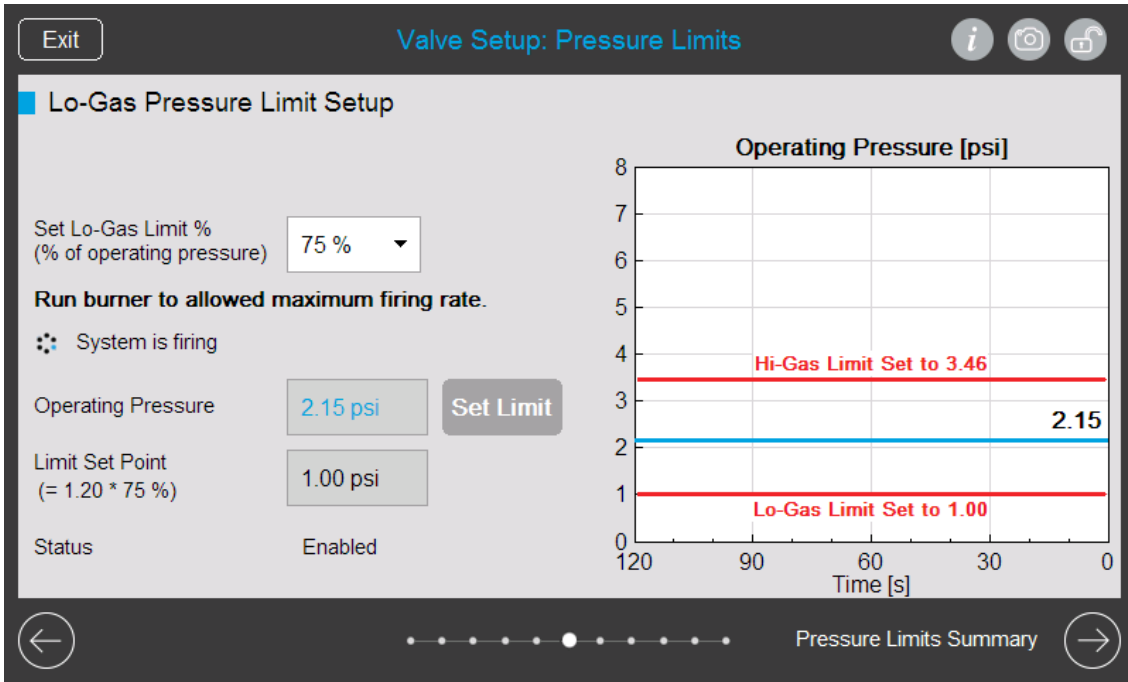
Fig. 16. Guided Valve Setup – Lo-Gas Pressure Limit Setup.

NOTES:

- **To set the Lo-Gas Pressure Limit, the burner must be run to maximum firing rate as directed on the screen.**
- **The Pressure Module internal sensors must measure the pressure in order to properly set the Limit setpoint.**
- **Only press the Set Limit button to set the limit reading after the pressure reading has fully stabilized.**

Set Lo-Gas Limit % Selection of the Lo-Gas Pressure Limit setting as a % of the measured operating pressure at **(% of operating pressure)** | **75 %** | the maximum firing rate. Pressure reading as measured by the internal Pressure Module sensors. Options include 50%, 75% or Other. When Other is selected, the user may change the % manually by touching the box next to it. The possible range is 50% to 75%.

Operating Pressure Shows the current pressure reading as measured by the internal Pressure Module sensors.

Set Limit Sets the Lo-Gas Pressure Limit.

Limit Set Point Shows the applicable Lo-Gas Limit setpoint based on the current Operating Pressure reading and Lo-Gas Limit % selections.

Status Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas Lockout selections on the Pressure Limits page. Refer to Fig. 14.

Returns to the Hi-Gas Pressure page. Refer to Fig. 15.

Proceeds to the Pressure Limits Summary. Refer to Fig. 17.

32-00031—01
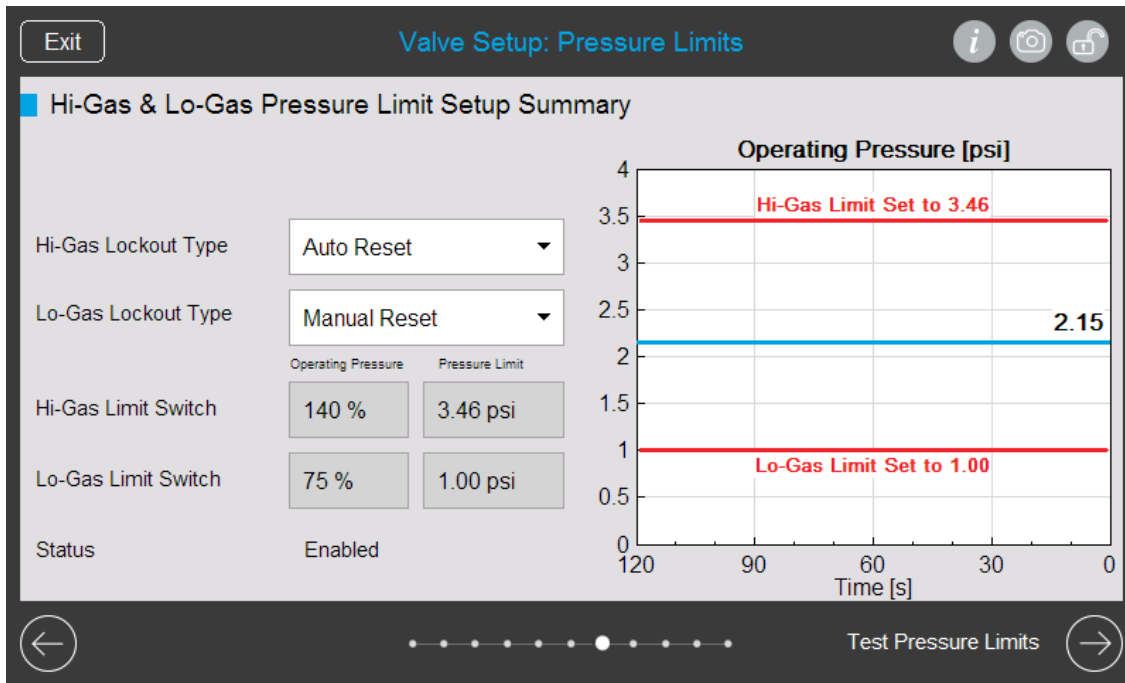
Fig. 17. Guided Valve Setup – Hi-Gas & Lo-Gas Limit Setup Summary.

Hi-Gas Lockout Type Selectable Lockout Type for each function. Options include Disabled, Auto Reset or Manual Reset.

Lo-Gas Lockout Type NOTE: Once the Hi-Gas and Lo-Gas Limit Switch Pressure Limits are set, you can now select the appropriate Hi-Gas/Lo-Gas Lockout Type for each. Options include Disabled, Auto Reset or Manual Reset. You MUST use both functions when using the Pressure Module.

| Hi-Gas Lockout Type | Auto Reset ▼ |
| Lo-Gas Lockout Type | Manual Reset ▼ |

Reflects the selected Operating Pressure % and actual measured pressure when the Limit was locked in during setup.

Status Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas Lockout selections on the Pressure Limits page. Refer to Fig. 14.

← Returns to the Lo-Gas Pressure page. Refer to Fig. 16.

→ Proceeds to the Test Pressure Limits section. Refer to Fig. 18.
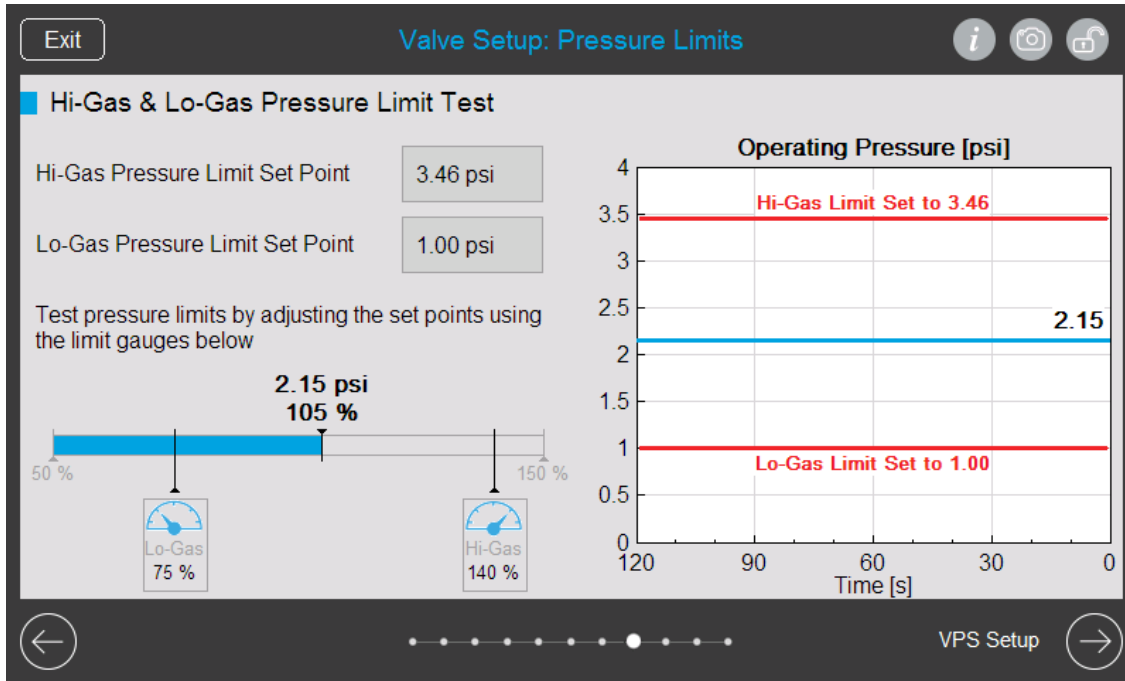
Fig. 18. Guided Valve Setup – Hi-Gas & Lo-Gas Limit Test.

Hi-Gas Pressure Limit Set Point
Lo-Gas Pressure Limit Set Point Reflects the actual limit setpoints based on the measured pressures + % of operating pressure during setup.

Indicates where the Lo-Gas and Hi-Gas Pressure Limits were set and provides for testing the trip point of the Pressure Limit settings. Per the directions on the screen, slide the appropriate limit gauge icon to the right or left, approaching the current operating pressure as shown on top of the bar, to test the lockout of each setting.

NOTES:

- **Upon successful lockout, the valve and likely the burner management system will need to be reset and the burner restarted to test the second Limit Set Point.**
- **When the valve is reset, the Limit Set Points will be automatically reset back to their original settings.**

Returns to the Hi-Gas & Lo-Gas Limit Setup Summary page. Refer to Fig. 17.

Proceeds to the VPS Setup section. Refer to Fig. 19.

Test the Hi-Gas and Lo-Gas Pressure Limit Set Points for proper lockout functionality.

By sliding the Lo-Gas or Hi-Gas buttons, change the applicable settings to cause a lockout. When complete, the display / PC Tool will change the setting back to its original setting.
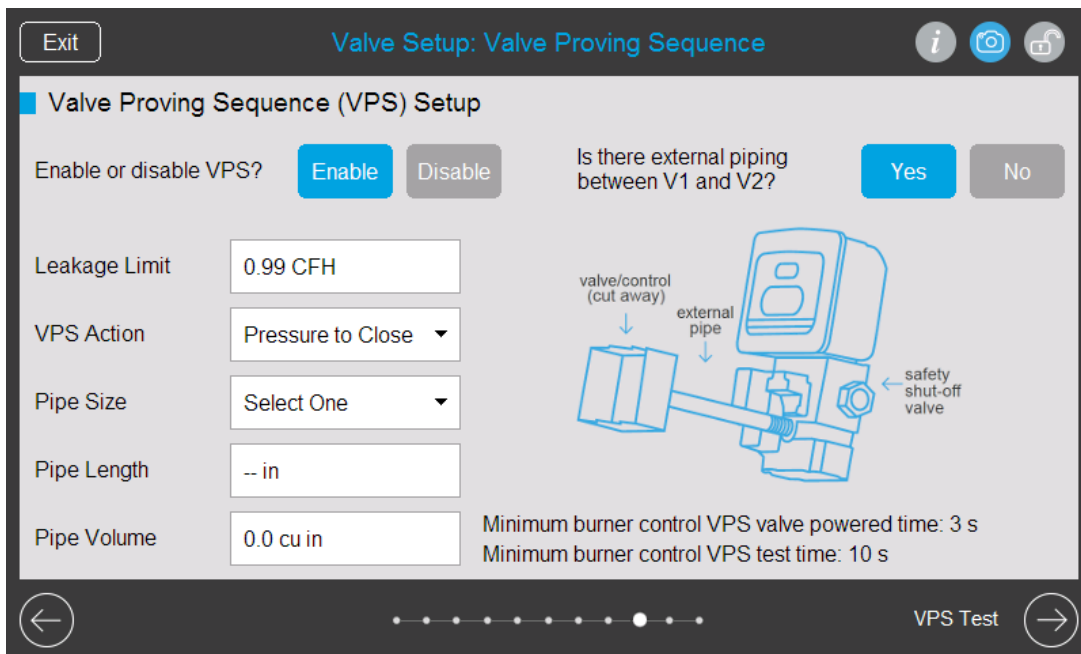
Fig. 19. Guided Valve Setup – Valve Proving Sequence (VPS).

NOTES:

- Initially, VPS will be Disabled and the external piping selection will be No.

- For the VPS feature, the SV2 Series Pressure Module must be used.

- The units shown will reflect chosen units in the Valve Setup: Units at the beginning of the Guided Valve Setup procedure (refer to Fig. 12) or in the Setup & Tests / Settings menu (Refer to Figs. 34 and 36).

- The first time VPS is run, V1 test results may be inaccurate until operating pressure has been learned.

- In order for the valve to be operational after setup is complete, the Verification of Safety Parameters procedure must be completed. Refer to Fig. 21.

- YOU MUST KEEP THE EXTERNAL VPS CONTROL <u>DISABLED</u> WHILE PROGRAMMING THE VPS SETUP AND PRESSURE LIMITS if the wiring between the valve and burner management system is in place. The burner needs to be run in order to properly measure the pressure at the valve and thus set the Hi-Gas and Lo-Gas limits accordingly. When the burner starts, the VPS control may try to perform the VPS test and thus lockout due to the Pressure Module not being programmed or verified.

 Enables or disables the Valve Proving Sequence feature in the valve.

Indicates whether external piping exists between the valve V1 and V2 seats, such as for pilot-take off.

 NOTE: On valve versions utilizing VPS functionality, a NOVV (normally open vent valve) cannot be present unless it is powered during the entire VPS test time. The SV2 Series valves do not provide for cycling the NOVV.

 Shows the default applicable leakage rate, based on the confirmed valve body size and units selection (refer to Figs. 11 and 12). User can enter a different leakage rate based on applicable appliance standards and local codes. Refer to the programming tool 'i' screen or the notes below for details regarding different leakage rates.

 Action to be taken via valve VPS contact output once the sequence is complete. VPS contact output must be wired to the external control performing the VPS sequencing. VPS action selection should be based on requirements of the external control performing VPS; Pressure to Close the contacts or Pressure to Open the contacts.

NOTE: The VPS output contact is only present on valve models which are capable of using the Pressure Module along with an external control for performing the VPS sequencing. The valves in question have an intelligent feature level of Standard or Enhanced. These models have an Intelligent Feature designation of 6 or 7, which is the 9th digit in the valve part number.

Pipe Size   Pipe diameter of the external piping run between the valve connection and the actual pilot take–off valve/ control connection if Yes has been selected. Options include NPT or DN sizes, all of which are based on a nominal schedule 40 pipe.

NOTE: The maximum allowed pipe size per valve is:

- ¾ in (DN20) for ¾ / 1 in (DN20/25) valves
- 1 in (DN25) for 1.5 / 2 in (DN40/50) valves
- 1 ¼ in (DN32) for 2.5 / 3 in (DN65/80) valves

Pipe Length Length of the external pipe run between the valve connection and the actual pilot take-off valve/control connection if Yes has been selected. The maximum allowed pipe length is 2 meters (6.6 feet).

Pipe Volume Calculated pipe volume of the external piping connected between V1 and V2 if Yes has been selected and based on the above selections.

NOTE: The pipe volume is automatically calculated based on the above variables. This value may be required for programming the external VPS functionality.

Minimum burner control VPS valve powered time: 3 s
Minimum burner control VPS test time: 10 s

Settings required for external control that is performing the VPS sequencing. The 'Minimum burner control VPS powered time' is required to fill the valve intermediate chamber. The 'Minimum burner control VPS test time' is needed for the valve to mechanically close, pressures to balance internally, pressures to be read and actuate the VPS contact.

NOTE: Use the calculated Pipe Volume as well as the 'Minimum burner control VPS valve powered time' and 'Minimum burner control VPS test time' to program the external control Valve Proving Sequence as required.

Returns to the Test Pressure Limits page. Refer to Fig. 18.

Proceeds to the VPS Test section. Refer to Fig. 20.

This VPS Setup is required when:

- Using the SV2 Series Pressure Module for VPS measurement.
- -VPS is performed via the burner management system (i.e. external VPS).
- Below are some leakage limits for North American and the EU (European Union). If in doubt which leakage rate to enter, consult the applicable codes for your appliance type and size.
- 1.00 CFH (= 28.3 l/h = 472 ml/min) equals leakage limit for a POC (proof of closure switch) per ANSI Z21.21-2012 / CSA 6.5-2012 for automatic valves for gas appliances.
- 1.76 CFH (= 50 l/h = 833 ml/min) for EU or replacing a NOVV (normally open vent valve) per EN1643-2000-10 and ISO23551-4
- Other: Per EN1643-2000-10, leakage rate starting over 50 l/h and up to a maximum value of 0.1% of the burner heat input (0.1% of the fuel flow rate in l/h)

NOTE: Maximum valve leakage value is limited to:

- 50 l/h for ¾ / 1 in (DN20/25) valves
- 142 l/h for 1.5 / 2 in (DN40/50) valves
- 283 l/h for 2.5 / 3 in (DN65/80) valves

Refer to the valve Installation Instructions, document 32-00018, for appropriate wiring to the burner management system.

Fig. 20. Guided Valve Setup – Valve Proving Sequence (VPS) Test.

NOTES:

- Valve Proving Sequence (VPS) is conducted by an external device by selectively powering one valve seat at a time on MV1 / MV2 inputs to the SV2 Series valve. The SV2 Series valve models compatible with external VPS functionality will detect that the VPS sequence is being performed and automatically start the valve internal leak detection routine. SV2 valves use the integrated Pressure Module sensors to monitor pressure rise or decay in the volume between the two safety shut off valve seats. The readings are then compared with the user–selected Leakage Limit threshold (refer to Fig. 19). Based on that comparison, the SV2 Series valve VPS contact output is toggled as selected in the VPS Action setup (pressure to close or pressure to open). Refer to Fig. 19. The contact output action is the same as in a traditional VPS system with a separate pressure switch. Based on the VPS contact output, the external device performing VPS will determine if the VPS test passed or failed. As shown in Fig. 20, the valve leakage test results are stored in the valve memory.

- The V2 seat leak test part of the sequence requires a minimum starting pressure to complete the test. If the pressure is not above the minimum requirement, no leakage level will be reported. However, the VPS contact will be toggled to indicate a failed test so that the burner control shuts down and a valve fault condition will be indicated. The minimum starting pressure is based on the Pressure Module model used.

  - PRESSMODx1: 5mbar / 2.0 in wc / 0.07 psi
  - PRESSMODx2: 5mbar / 2.0 in wc / 0.07 psi
  - PRESSMODx3: 8mbar / 3.2 in wc / 0.12 psi
  - PRESSMODx4: 16mbar / 6.4 in wc / 0.23 psi

- In case the SV2 Series valve cannot take reliable pressure readings during the external VPS sequence, the SV2 Series valve will lockout.

- Very low leakage levels of less than 2 liters/hour (= 33.3 ml/min = 0.07 CFH), which are well below any allowed level, may result due to transient pressure changes caused by the valve balance diaphragm. Any rates below this level will be recorded as 0 and will not be included in trending data.

i During a VPS sequence, this screen shows the status of each valve seat in terms of the test sequence, the valve seat leakage rate and the number of valve seat cycles and hours.

If a test is not currently being performed, the data shown is for the last VPS test sequence occurrence.

Note that the Valve 1 and Valve 2 cycles may not match and that the 'Valve 1 / Valve 2 last test occurred at' cycles and hours shown were captured when the last VPS test sequence occurred on that valve seat.

The cycles counter is incremented by one when either valve seat is powered.

The counter can increment by more than one in one heat cycle if VPS tests are performed.

Hours displayed is the accumulated time counted when both Valve 1 and Valve 2 are powered together.

VPS last test results (including captured hours and cycles) are stored in the Pressure Module EEPROM.

Returns to the Valve Proving Sequence (VPS) Setup page. Refer to Fig. 19.

Proceeds to the Safety Verification section. Refer to Fig. 21.

Valve Setup: Safety Parameters Verification

Exit

■ Safety Parameters Verification

Press Begin to start verification

Begin

Finish Setup

Valve Setup: Safety Parameters Verification

Exit

■ Safety Parameters Verification

Valve body = 1 in
VPS enable = Enabled
VPS leakage limit = 0.99 CFH
VPS pipe volume = 8.6 cu in
VPS action = Pressure to Close
LGP lockout type = Disabled
HGP lockout type = Disabled

Are these parameters set to proper values? Confirm in 175 seconds.

No   Yes

Finish Setup

Fig. 21. Guided Valve Setup – Safety Parameters Verification.

NOTES:

- **Safety Verification must be completed for any programmed intelligent safety features in order for the valve to be operational. Verification is required for initial setup and any time safety parameters are changed in the field.**

- **A lockout will occur after exiting commissioning mode if the safety parameters have not been verified.**

| Begin | Starts verification process. The user will be asked a series of questions relating to the valve setup previously completed. |

| No | Yes | Choose proper button to indicate that the shown parameters are either not set to the proper values or are set to the proper values. No/Yes confirmation is required within 180 seconds. |

When all questions and confirmations are completed, you will be directed to press the valve reset button within 30 seconds. This final step is required to make the valve operational. Once complete, the screen will show 'All safety parameters are OK'.

NOTE: If the valve is powered during the safety verification procedure, it will not be un-powered, unless a fault occurs.

Select back arrow to navigate to the VPS Test page. Refer to Fig. 20.

Select the right arrow button to proceed to the Finish Setup section. Refer to Fig. 22.

When the valve is initially programmed or any time valve safety parameters have been changed, the Safety Parameter Verification procedure must be performed.

This procedure guides the user through the various parameters that have been setup or changed and has them verify and acknowledge the settings they entered as being accurate.

Once the procedure is complete, the user must press the Reset button on the valve to lock in the new parameter settings.

NOTES:

- **If the user does not respond to the screen requests within 10 minutes, the valve will fault and lock out.**

- **When the Verification of Safety Parameters procedure is complete, the user must press the Reset button on the valve to lock in the new parameter settings.**

Fig. 22. Setup Complete page.
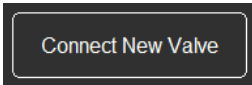
 Select if another valve is to be setup. Disconnect the current valve from the programming tool and connect the new valve. The screen will advance for setup of the next valve. Refer to Fig. 23.
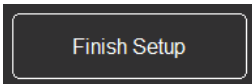
 Select Finish Setup to proceed to connected valve Home page. Refer to Fig. 24.

 Select back arrow to navigate to the Safety Parameters Verification page. Refer to Fig. 21.

| Connect New Valve | Selected on Setup Complete page. |
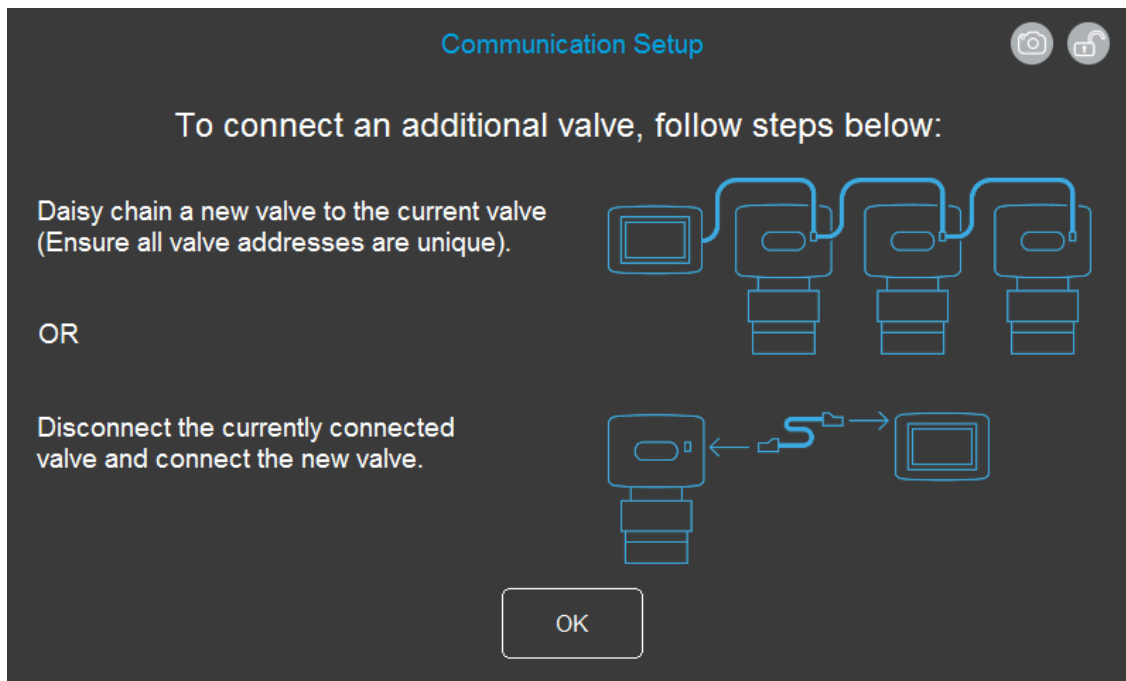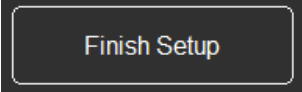
Fig. 23. Connect new valve page.
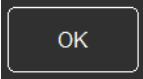
| OK | Select this button once the previous valve is disconnected and the new valve is physically wired to the programming tool. The programming tool will advance to the Home screen to where you can search for the new connected valve and proceed to complete its setup. Refer to Fig. 24. |

Select [Finish Setup] on Setup Complete page. Refer to Fig. 22.

or
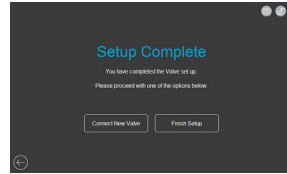
Select [OK] on Connect new valve page. Refer to Fig. 23.
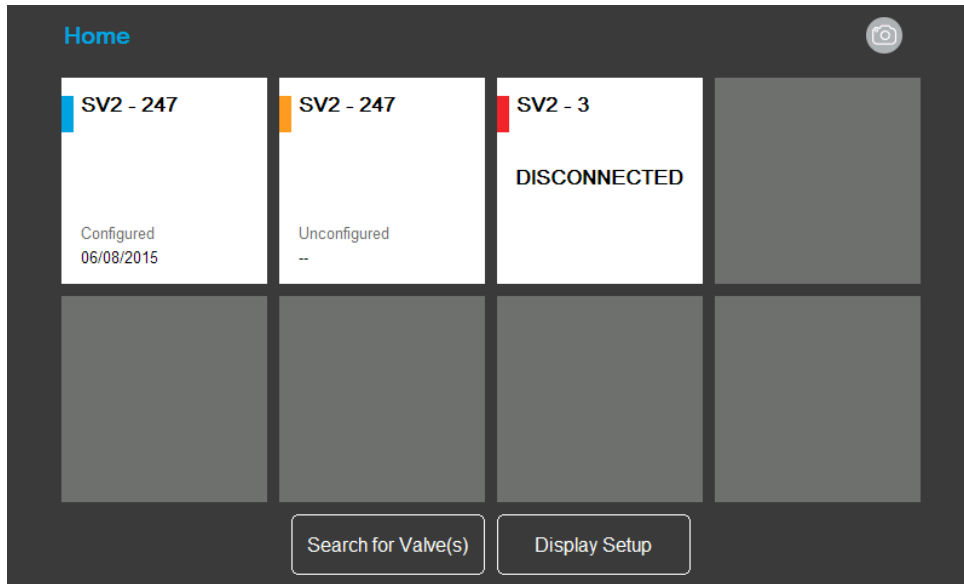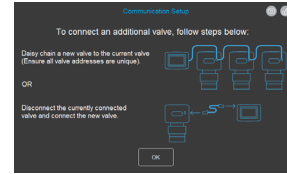
Fig. 24. Home screen.
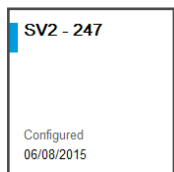
Any populated white area indicates a connected or previously connected valve. Select the appropriate valve box to view that valve and/or continue valve setup. A blue box indicates a configured valve, amber box indicates an unconfigured valve and a red box indicates a disconnected valve that was previously connected.
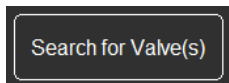
[Search for Valve(s)] Select this button to search for the any newly connected valve(s). Program will indicate the quantity found. Select 'Done' to complete connected valves search.

NOTE: To complete setup of any newly connected unconfigured valves, select the white box indicating the appropriate connected SV2 valve [ ], then select Yes when prompted to run the Setup Wizard. For Setup Wizard, refer to Figs. 10 to 22.
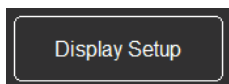
[Display Setup] Allows changing of display or PC setup including General and Communication settings. The setup of these features was accomplished upon initial programming tool power-up and use (refer to Figs. 3-4 and 6-8).

[PC Tool Setup] From the Display / PC Tool Setup screen, other accessible features include screen calibration (HMI only), screenshot maintenance (delete, copy, etc.) (HMI only), report maintenance (delete, copy, etc.) (HMI only) and information about the programming tool software revisions. Refer to Figs 27-32. Reports generated from the PC Tool are saved to the connected PC hard drive. Refer to Fig. 50.

SV2 - 247	
Configured 06/08/2015	
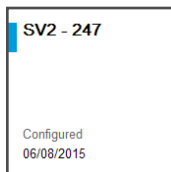
Selected from Home screen for a configured valve. Refer to Fig. 24.
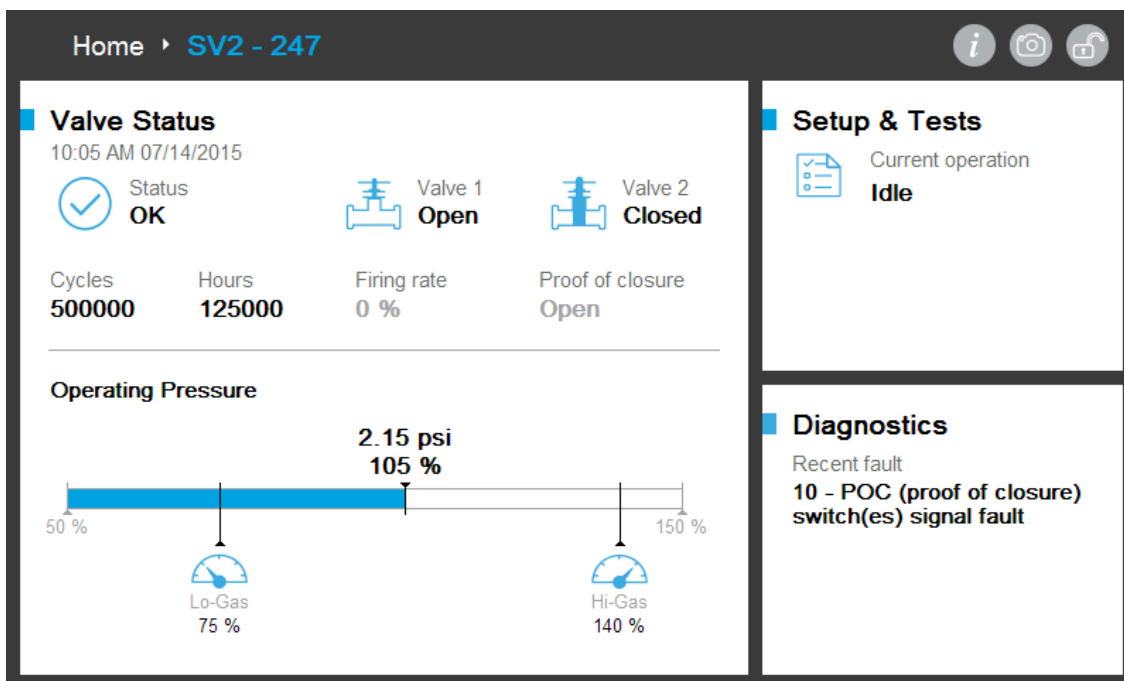
Fig. 25. Connected valve status.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 24.

Valve Status The valve status screen for the selected connected valve shows general valve status information:

- Valve operational status
- Valve seat 1 and 2 open or closed status
- Valve current cycles and hours
- Firing rate (future enhancement for fuel/air valves)
- Proof of closure open or closed status (future enhancement)
- Pressure Module commissioned Lo-Gas/Hi-Gas settings and current pressure reading (if enabled and verified)
- Current valve operation
- Recent valve fault condition

The valve status screen also provides access to the Setup & Tests menu and the Diagnostics menu as detailed in the General Navigation section starting on the next page.

Setup & Tests Shows current valve operational state. Also provides access to valve Settings, VPS Setup, Hi-Gas/Lo-Gas Pressure setup, Modbus Config, Guided Valve Setup and Verification of Safety Parameters. Refer to Fig. 34.

Diagnostics Shows recent valve fault condition, if any. Also provides access to Active Faults and remediation steps, Fault History, Trending and Reports. Refer to Figs. 46-50.

i The Valve Status indicates the current conditions the valve is experiencing.

Valve 1 and Valve 2 Open and Closed icons along with the Proof of closure indication show valve status if the valve has an installed Proof of Closure switch from the factory.

If a Proof of Closure switch is not installed on the valve from the factory, the Valve 1 and Valve 2 Open and Closed icons indicate whether the valve seat is powered or not powered.

Cycles displayed is the higher value from either Valve 1 or Valve 2 cycles and indicates the number of times the valve seats have been powered. The counter is incremented by one when either valve seat is powered. Counter can increment by more than one in one heat cycle if VPS tests are performed.

Hours displayed is the accumulated time counted when both Valve 1 and Valve 2 are powered together.

Hours indicates the approximate number of hours the valve seats have been open.

Operating pressure shows the Lo-/Hi-Gas settings and the current pressure reading if the Pressure Module is used.

Setup & Tests provides access to the user interface setup and valve setup features.

Diagnostics provides access to current and historical fault conditions with remediation steps.

GENERAL NAVIGATION

After a valve has been setup and is operational, upon connection to the programming tool, a search for connected valve(s) will start, indicating the number of discovered valve(s). After the correct number of valve(s) are discovered, exit the search mode by pressing 'Done'.

From the Home page there are several navigation options. This manual section will show a navigation route that is similar in layout to the Guided Valve Setup navigation as previously described.
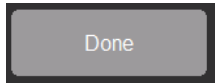
Done Selected upon connection to programming tool and connected valve search.
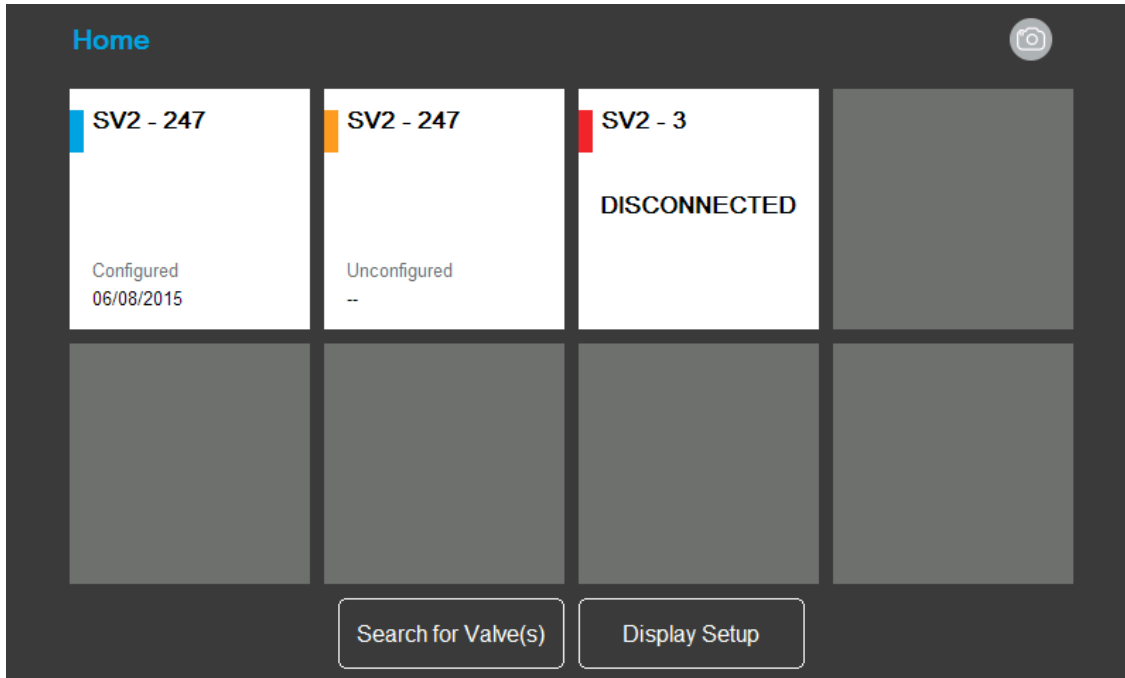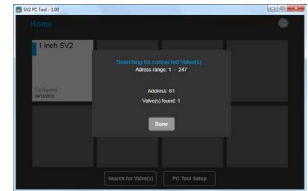
Fig. 26. Home screen.
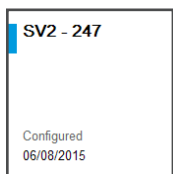
Any populated white area indicates a connected or previously connected valve. Select the appropriate valve box to view that valve and/or continue valve setup. A blue box indicates a configured valve, amber box indicates an unconfigured valve and a red box indicates a disconnected valve that was previously connected.

NOTE: If an unconfigured valve is selected, you will be asked if you would like to run the Setup Wizard.
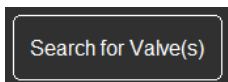
Search for Valve(s) When selected, program will automatically search for connected valves and indicate the quantity found. Select 'Done' to complete connected valves search. Screen will automatically show all connected valves.
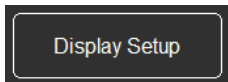
Display Setup Allows user to change display or PC setup including General and Communication settings. The setup of these features was accomplished upon initial programming tool power-up and use (refer to Figs. 3-4 and 6-8).
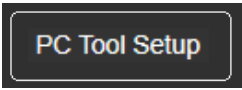
PC Tool Setup

From the Display / PC Tool Setup screen, other accessible features include screen calibration (HMI only), screenshot maintenance (delete, copy, etc.) (HMI only), report maintenance (delete, copy, etc.) (HMI only) and information about the programming tool software revisions. Refer to Figs 27-32. Reports generated from the PC Tool are saved to the connected PC hard drive. Refer to Fig. 50.

Display Setup or **PC Tool Setup** Selected on Home screen. Refer to Fig. 26.
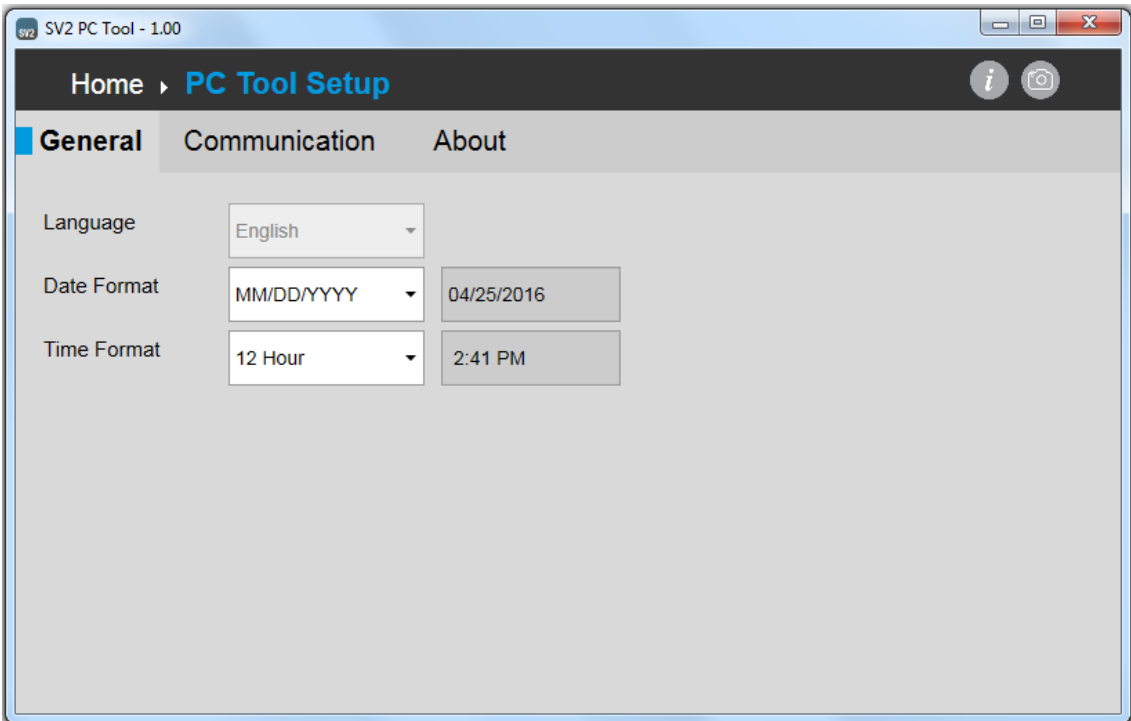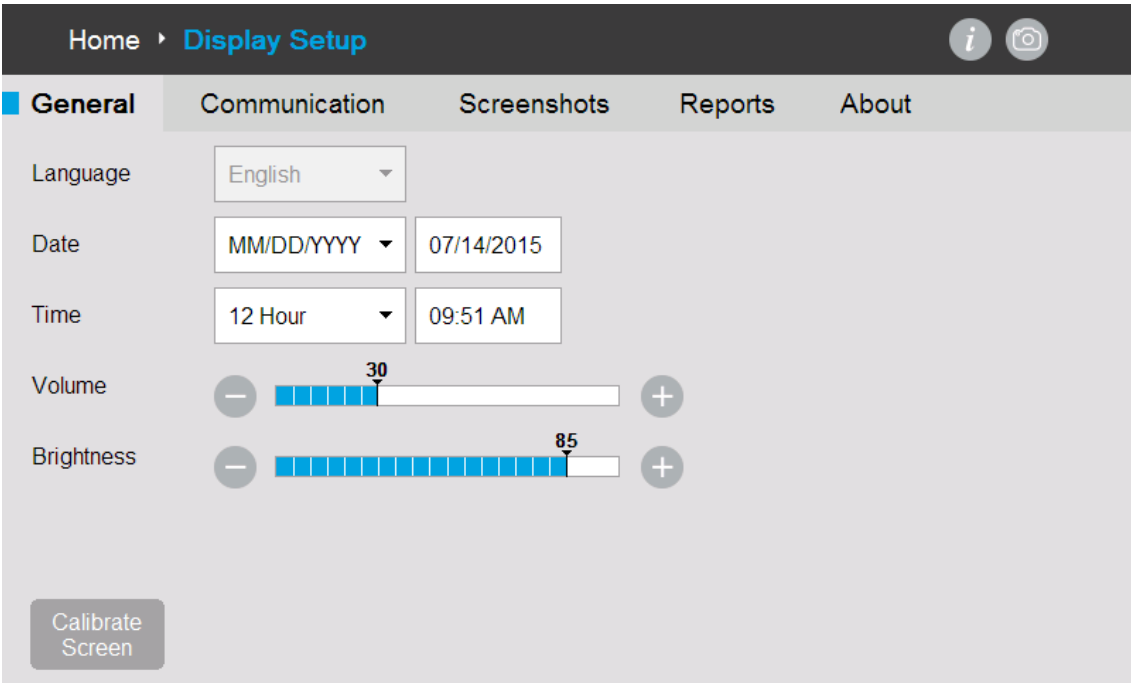
Fig. 27. Display/PC Tool Setup – General tab.

NOTE: General and Communication setup is part of the initial setup when a valve is first connected to the HMI or PC Tools. Refer to Figs. 3–4 and 6–8.

Home Reverts back to the Home menu, where user can select from 1 of up to 8 connected valves for monitoring purposes. Refer to Fig. 26.

Communication Allows modification of COM port selections, Modbus search range and Baud Rate. Refer to Fig. 29.

Screenshots (HMI only) Provides for screenshot maintenance including rename, delete, copy and view. Refer to Fig. 31.

Reports (HMI only) Provides for reports maintenance including rename, delete, copy and view. Refer to Fig. 31.

NOTE: With the PC Tool, the reports are saved on the PC hard drive and thus can be selected, renamed, deleted, copied or viewed from the applicable folder.

About Shows display/PC tool software revision information. Refer to Fig. 32.

Language Future enhancement for language selection.

Date Set current date format and date. Options are MM/DD/YYYY, DD/MM/YYYY or YYYY/MM/DD

Time Set current time. User may choose a 12 or 24 hour clock.

NOTE: HMI has a battery back-up for keeping time and date information.

Volume (HMI only) Set volume for any audible functions.

Brightness (HMI only) Set brightness of display screens.

Calibrate Screen Allows for HMI screen calibration. Only available after initial HMI setup. Refer to Fig. 28.

The settings selected on this screen will be global settings carried throughout all screens. These are display/PC Tool only settings; not valve settings.

Calibrate Screen Selected on Display Setup General tab. Refer to Fig. 27.

Carefully press and briefly hold stylus on the center of the target.
Repeat as the target moves around the screen.
Press the Esc key to cancel.

┼

New calibration settings have been measured.
Press the Enter key to accept the new settings.
Press the Esc key to keep the old settings.
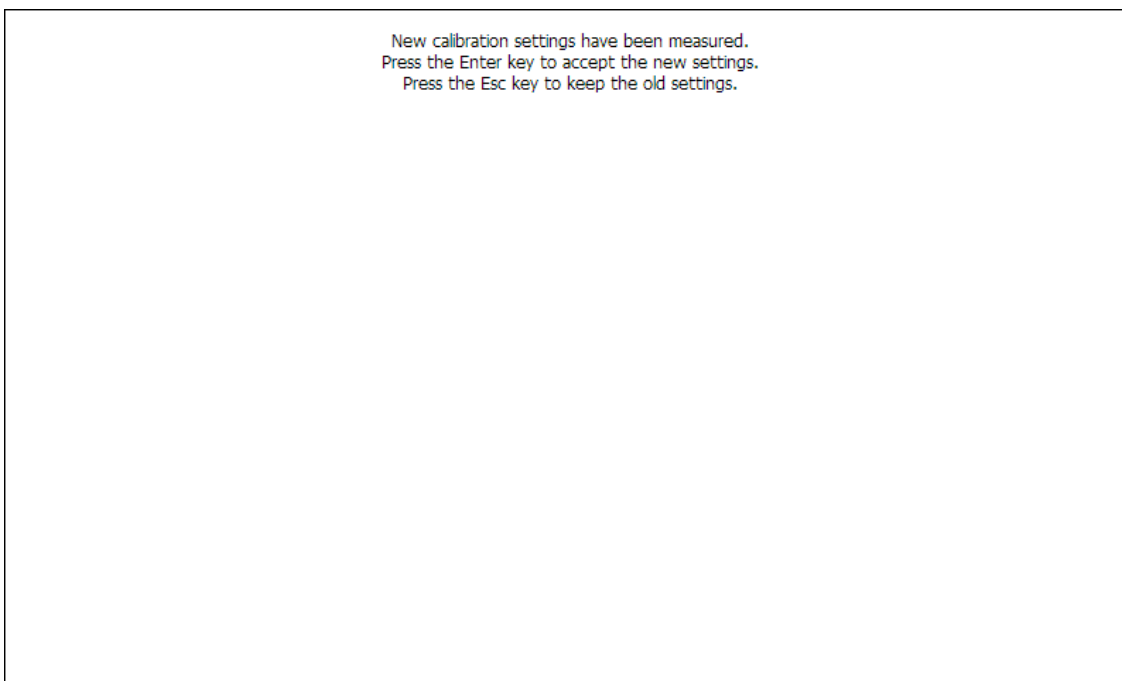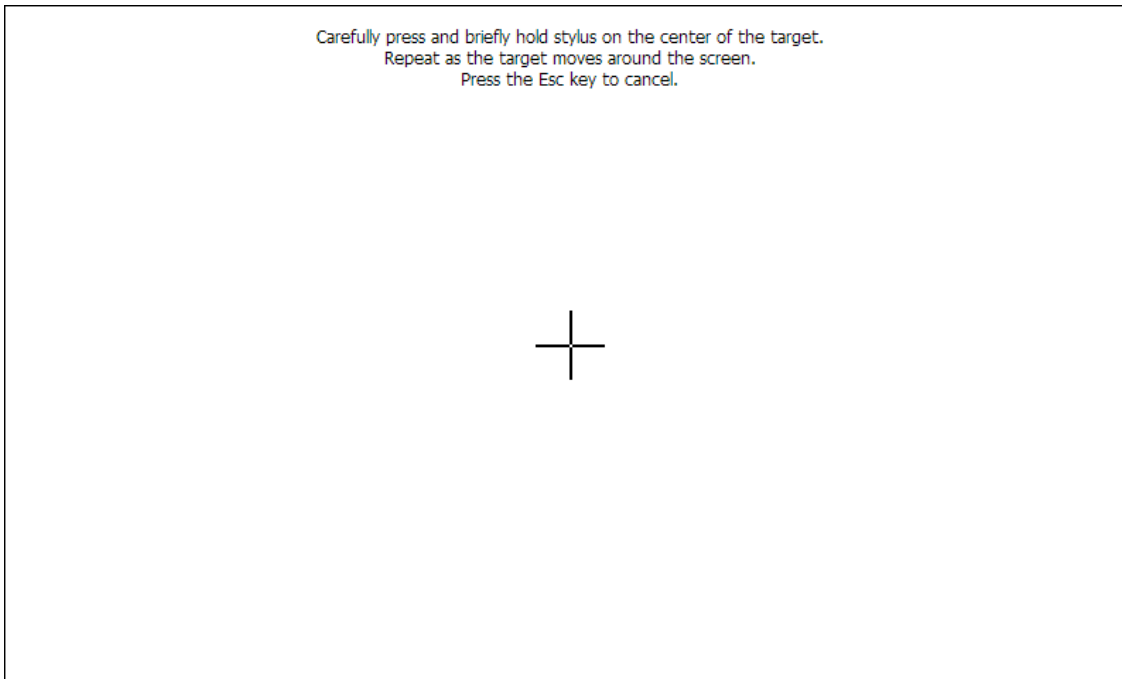
Fig. 28. (HMI only) Display Setup – General tab Calibration Screen.

NOTES:

- Once calibration is started, it must be completed in order to exit this screen.
- The screen will indicate to press the ESC key to exit, which does not exist on the HMI. This is a consequence of the operating system used; the text cannot be changed.
- It is recommended to use a stylus to perform screen calibration.
- Once the calibration procedure is complete, click anywhere on the screen to confirm the calibration and exit the procedure.

Communication Tab selected on Display/PC Tool Setup screen. Refer to Fig. 27.

Fig. 29. Display/PC Tool Setup – Communication tab.

NOTES:

- General and Communication setup is part of the initial setup when a valve is first connected to the HMI or PC Tools. Refer to Figs. 3-4 and 6-8.

- Up to 8 valves may be connected to a single HMI or PC Tool after initial setup of each valve is completed.

- For setup only a single valve can be wired to the HMI or PC Tool at a time due to the default Modbus addressing for each valve being the same from the factory.

- To connect another valve, disconnect the previous valve and connect the new valve. From this screen, select Search for Valve(s). Once the newly connected valve is discovered, navigate to the Home screen, then select the new valve box. If the valve is unconfigured, you will be asked if you would like to run the Setup Wizard. Refer to Figs. 9 and 10. Be sure to change the valve Modbus address to a unique value. The valve Baud Rate may be changed AFTER setup is completed.

- Once all valves that are to be connected have been individually programmed, they can be wired in a daisy chain fashion to a single port on the HMI or PC Tool. For detailed wiring information and cable requirements, refer to the HMI and PC Tools Installation Instructions, documents 32-00030 and 32-00037, respectively.

Home Reverts back to the Home menu, where user can select from 1 of up to 8 connected valves for monitoring purposes. Refer to Fig. 26.

Screenshots (HMI only) Provides for screenshot maintenance including rename, delete, copy and view. Refer to Fig. 31.

Reports (HMI only) Provides for reports maintenance including rename, delete, copy and view. Refer to Fig. 31.

About Shows display/PC tool software revision information. Refer to Fig. 32.

COM Port 1 COM Port 2 (HMI only) Select function for each display COM Port. Options are Disabled, Master-Connect to Valves or Gateway-Connect to External System. See ⓘ below for details on these options.

Communication Port (PC only) Select applicable PC COM Port being used by the USB to RS485 converter.

NOTE: To help determine the correct PC Tool port, select the ⓘ after **Unsure of which COM port to select?**. Otherwise communication between the PC tool and valve(s) may not be established. Refer to Fig. 30.

Modbus Address Search Range Select starting and ending Modbus address search range for any connected valve(s). Minimum is 1 and maximum is 247. From the factory, valves have a default Modbus address of 1.

☐ Advanced When selected, allows Baud Rate selection for applicable programming tool port(s) to any connected devices. Options are 9600, 19200, 38400 and 57600 bps.
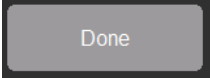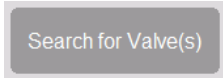
Baud Rate Select applicable HMI / PC Tool baud rate for applicable COM port(s).

NOTES:

- The default HMI / PC Tool and valve Modbus Baud Rates are 38400 bps. Both baud rates may be changed.

- Communication must first be established with the valve at the default 38400 bps rate with the programming tool, then the valve baud rate may be changed, followed by the programming tool baud rate. Refer to Fig. 35 for valve communication settings, then return to Fig. 29 to complete the programming tool communicating settings changes.

- If the HMI is connected to an external device via the 'Gateway-Connect to External System' selection, make sure the Baud Rates match.

Search for Valve(s) When selected, program will automatically search for connected valves and indicate the quantity found. Select 'Done' then 'OK' to complete connected valves search. Screen will automatically advance to the Home screen where the user can select which connected valve to display and setup.

NOTE: You must search for connected valve(s) and find at least one in order to proceed with the setup process.

Done Appears after **Search for Valve(s)** is selected. Press Done button when the correct quantity of connected valve(s) are found to terminate the search function.

OK Appears after **Done** is selected. Press OK button to exit the Search for Valve(s) function.

> HMI COM 1 and COM 2 ports are flexible in that the function for each port is selectable during the setup process. Each port may be disabled, used to connect to valve(s) or as a gateway to connect to an external system, such as a building automation system.

The 'Master-Connect to Valves' selection enables the display to be the local master to any connected valve(s). The HMI or PC Tool can be used to program, monitor and troubleshoot up to 8 connected valves. Note that each valve must first be individually connected, programmed and given a unique Modbus address. Once this is complete, all valves may be wired in a daisy chain fashion to a single HMI port or to the PC Tool USB to RS485 converter.

The 'Gateway-Connect to External System' selection enables the display to share data with an external control. The external control will need to be programmed for the proper Modbus registers in order to obtain information. Refer to section of this manual entitled Modbus Addresses for Modbus register information. Connection to an external Modbus master is not possible with the PC Tool.

If connecting to an external Building Automation System via the display Gateway selection, be sure to match the valve and display Baud Rate with the Building Automation System for proper communication.

Be sure to connect the valve and Building Automation System to the proper display port per the user setup.

NOTES:

- **The programming tool and valve communication settings including port selection(s), Modbus address and baud rate may be accessed after initial setup is completed via the guided setup procedure as outlined in Figs. 9 to 22.**

- **To change baud rates, communication with the programming tool must be established first, then the valve baud rate may be changed, followed by the programming tool baud rate.**

- **Valve communication settings may be accessed via the Home / connected valve / Setup & Tests / Settings menus. Refer to Figs. 26, 33, 34 and 35.**

- **Programming tool Communication Settings may be accessed via the Home / Display (PC Tool) Setup menus. Refer to Figs. 26 and 29.**

Changing the Modbus Address Search Range enables the display or PC Tool to search a user determined range of Modbus addresses for more than 1 connected valve or for addresses with a high address value.

Unsure of which COM port to select? Selected on PC Tool Setup / Communication tab. Refer to Fig. 29.
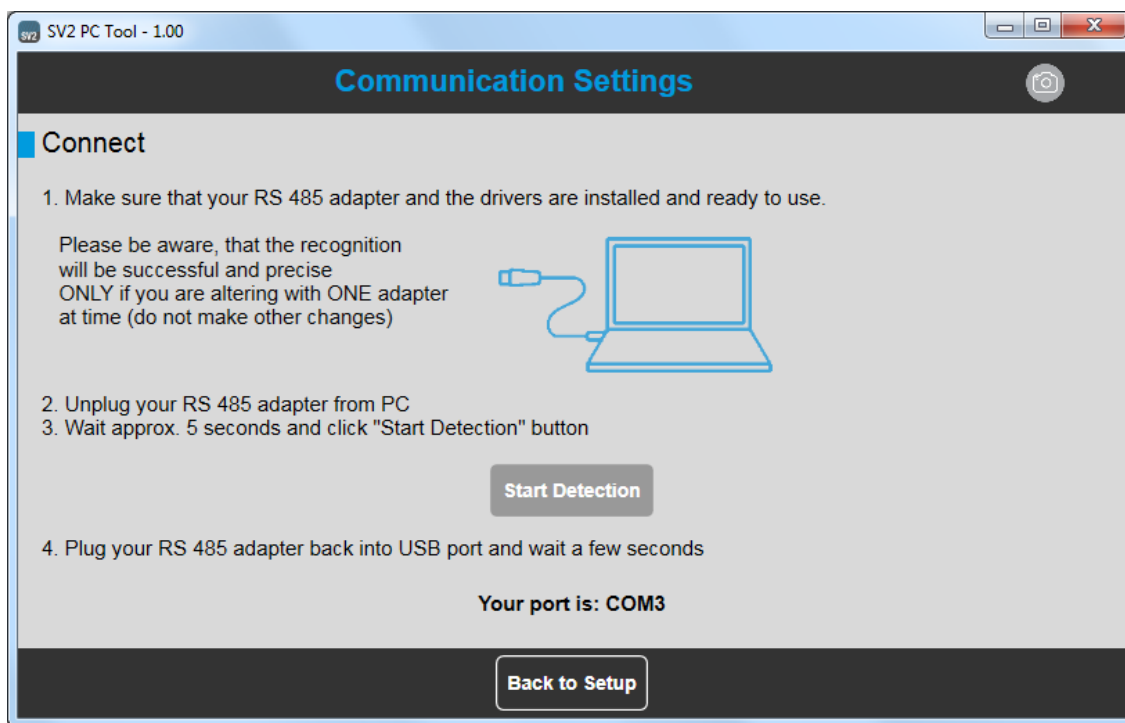
Fig. 30. PC Tool COM port test.

When using the PC Tool, if you are unable to establish communications with the connected valve(s), the procedure outlined on this page will help determine which COM port the USB to RS485 converter is using on your PC.

Start Detection Starts the converter COM port detection process.

Back to Setup Returns to the Communications Setup page to finish valve communication process. Refer to Fig. 29.

Screenshots or Reports Tab selected on Display Setup screen. Refer to Figs. 27 or 29.

Home ▸ **Display Setup**				
General	Communication	■ **Screenshots**	Reports	About

2015-07-14_095257_Home
2015-07-14_095301_General_Settings
2015-07-14_095304_Communication_Settings
2015-07-14_095308_Screenshots

| Select All | Rename | Delete | Copy To USB | View |

Home ▸ **Display Setup**				
General	Communication	Screenshots	■ **Reports**	About

2015-12-22_171144_SV2 Valve

| Select All | Rename | Delete | Copy To USB | View |

Fig. 31. Display Setup – Screenshots and Reports.

NOTES:

- Reports can also be accessed via the Home / connected valve / Diagnostics menus. Reports may only be created on that menu. Refer to Figs. 26, 30 and 50.
- For the HMI, reports and screenshots are managed from this menu.
- For the PC Tool, reports may be managed from the Diagnostics menu and/or the applicable PC folder in which they are stored. Refer to Fig. 50. Screenshots must be taken and managed separately on the user's PC.

Home Reverts back to the Home menu, where user can select from 1 of up to 8 connected valves for monitoring purposes. Refer to Fig. 26.

About Shows display/PC tool software revision information. Refer to Fig. 32.

Select All (HMI only) Selects all listed screenshots or reports on page for further action.

Rename (HMI only) Allows user to rename the selected screenshot(s) or report(s).

Delete (HMI only) Allows user to delete the selected screenshot(s) or report(s).

Copy To USB (HMI only) Pressing this will copy the selected screenshot(s) or report(s) onto a USB drive which is plugged into the HMI.

View (HMI only) When pressed, will show the selected screenshot or report content on the screen.

NOTE: The HMI Tool has limited memory for screen shots and reports. The contents in memory will have to be copied and/or deleted once the memory is full in order to save more data.

About Tab selected on Display/PC Tool Setup screen. Refer to Figs. 27 or 29.

Home ▸ **Display Setup**

General   Communication   Screenshots   Reports   ■ **About**

Display SW Version: 0.17 (build Tue 07/14/2015 9:42:18.27)

OS Version: Mon 02/18/2013 10:05:08.38

Free RAM: 17.8 MB / 38.3 MB

USB Status: Inserted   Disk Usage:

0   1 %   3.7 GB

SV2 PC Tool - 1.00

Home ▸ **PC Tool Setup**

General   Communication   ■ **About**

PC Tool Version   1.00 - 2581

Build Date   10 Jul. 2015
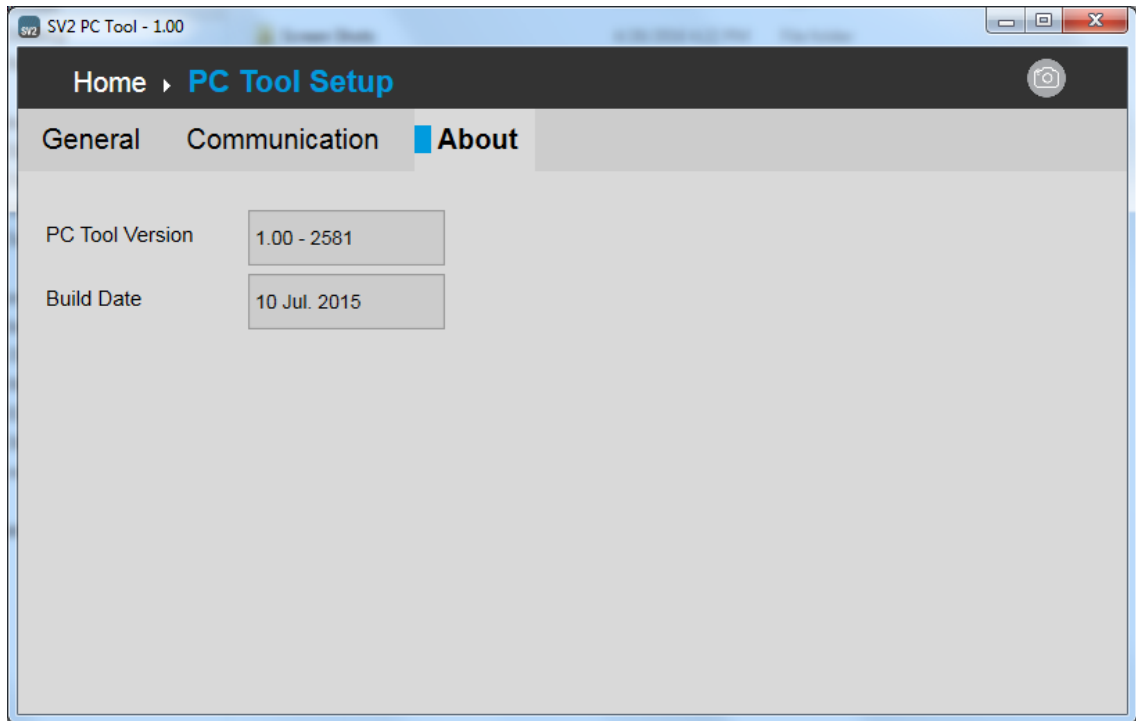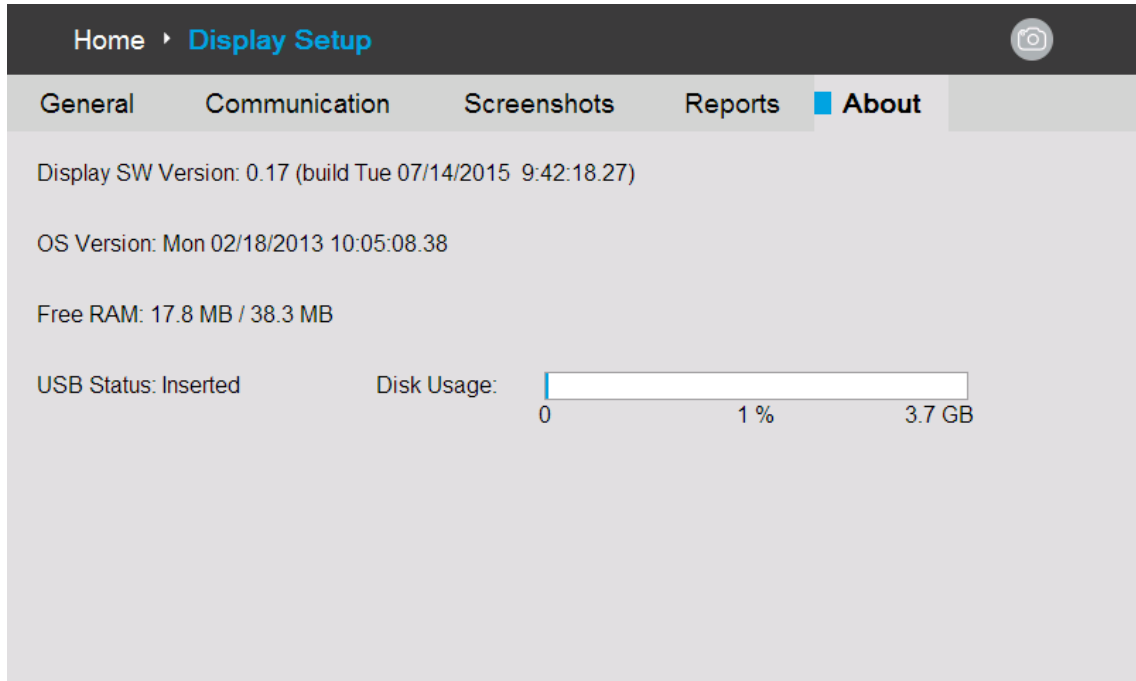
Fig. 32. Display/PC Tool Setup – About.

Home Reverts back to the Home menu, where user can select from 1 of up to 8 connected valves for monitoring purposes. Refer to Fig. 26.

Display SW Version or **PC Tool Version** Shows display/PC tool software revision information.
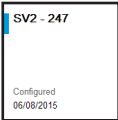
Free RAM: (HMI only) Shows free memory space.

USB Status: Inserted (HMI only) Indicates whether a USB drive is currently inserted into the HMI.

Disk Usage: (HMI only) Current HMI disk space usage.

To proceed to the next section, you will need to return to the Home page and then go to the status page for the connected valve.

First select **Home** on Display Setup page. Refer to Fig. 32.

Then select [SV2 - 247 Configured 06/08/2015] on Home page for a configured valve. Refer to Fig. 26.
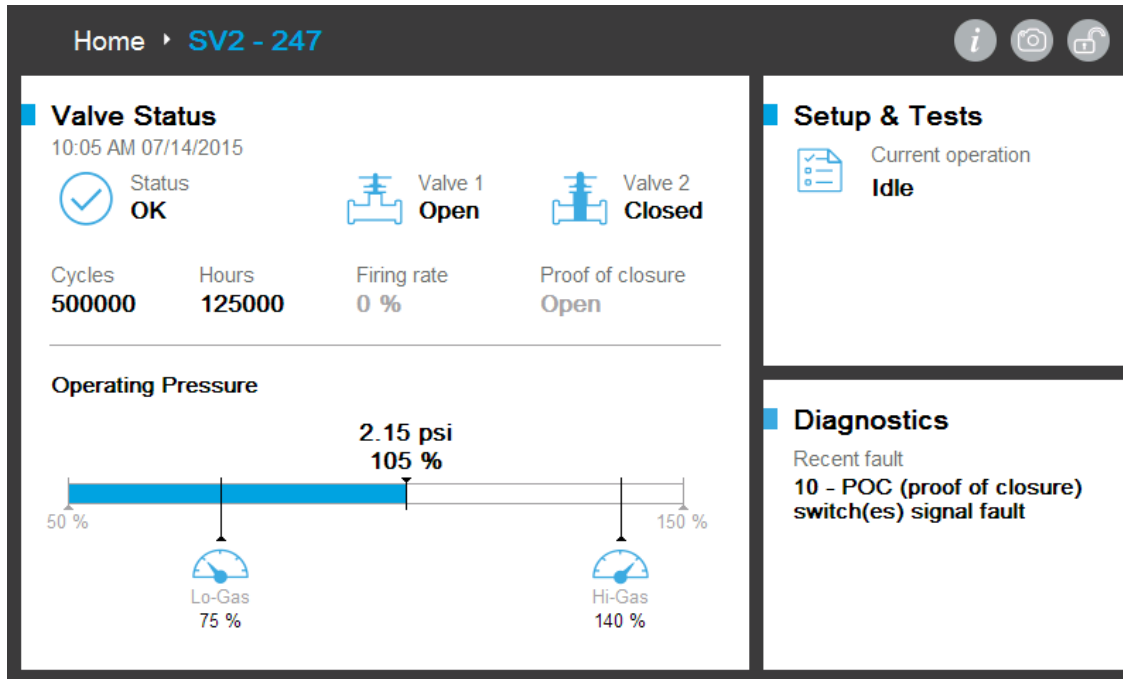
Fig. 33. Connected valve status.

From this screen, the user can view valve status, finish/change setup of the connected valve(s) and view diagnostics information.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 26.

Valve Status The valve status screen for the selected connected valve shows general valve status information:

• Valve operational status

• Valve seat 1 and 2 open or closed status

• Valve current cycles and hours

• Firing rate (future enhancement for fuel/air valves)

• Proof of closure open or closed status (future enhancement)

• Pressure Module commissioned Lo-Gas/Hi-Gas settings and current pressure reading (if enabled and verified)

• Current valve operation

• Recent valve fault condition

The valve status screen also provides access to the Setup & Tests menu and the Diagnostics menu as detailed in the General Navigation section starting on the next page.

Setup & Tests Shows current valve operational state. Also provides access to valve Settings, VPS Setup, Hi-Gas/ Lo-Gas Pressure setup, Modbus Config (HMI only), Guided Valve Setup and Verification of Safety Parameters. Refer to Fig. 34.

Diagnostics Shows recent valve fault condition, if any. Also provides access to Active Faults and remediation steps, Fault History, Trending and Reports. Refer to Figs. 46-50.

ⓘ The Valve Status indicates the current conditions the valve is experiencing.

Valve 1 and Valve 2 Open and Closed icons along with the Proof of closure indication show valve status if the valve has an installed Proof of Closure switch from the factory.

If a Proof of Closure switch is not installed on the valve from the factory, the Valve 1 and Valve 2 Open and Closed icons indicate whether the valve seat is powered or not powered.

Cycles displayed is the higher value from either Valve 1 or Valve 2 cycles and indicates the number of times the valve seats have been powered. The counter is incremented by one when either valve seat is powered. Counter can increment by more than one in one heat cycle if VPS tests are performed.

Hours displayed is the accumulated time counted when both Valve 1 and Valve 2 are powered together.

Hours indicates the approximate number of hours the valve seats have been open.

Operating pressure shows the Lo-/Hi-Gas settings and the current pressure reading if the Pressure Module is used.

Setup & Tests provides access to the user interface setup and valve setup features.

Diagnostics provides access to current and historical fault conditions with remediation steps.

Setup & Tests Selected on Valve Status page. Refer to Fig. 33.
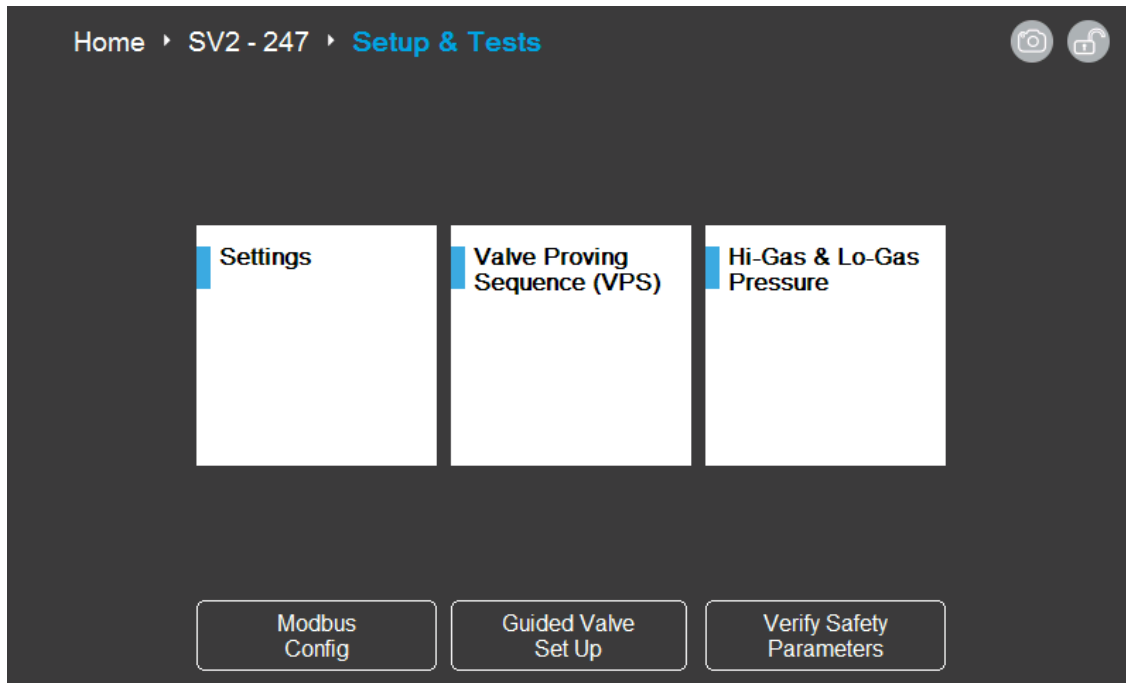
Fig. 34. Setup & Tests.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 26.

Settings Provides access to General setup, Units setup and Pressure Module informational pages. Refer to Figs. 35-37.

Valve Proving Sequence (VPS) Provides access to Valve Proving Sequence (VPS) setup pages. Refer to Figs. 38-39.

Hi-Gas & Lo-Gas Pressure Provides access to Hi-Gas and Lo-Gas Pressure setup pages for Pressure Module functions. Refer to Figs. 40-43.

NOTE: The Settings, VPS setup and Hi-Gas & Lo-Gas Pressure setup are also accessible via the Guided Valve Set Up selection.

Modbus Config (HMI only) Can be used to read Modbus registers (input / holding) and write holding registers. Register address and value can be displayed / entered in decimal (base 10) or hexadecimal (base 16) formats, always unsigned 16 bit integers. Signed integers, 32 bit integers, ASCII strings, bitfields, etc. are not supported. Refer to Fig. 45.

Guided Valve Set Up Starts the guided setup wizard, which progressively directs the user through General Settings, Units Settings, Pressure Module, Hi-Gas & Lo-Gas Pressure, Valve Proving Sequence and Safety Parameters Verification. Refer to Fig. 51.

NOTE: Guided Valve Set Up can be run any time the user wishes to change/update the valve settings.

Verify Safety Parameters Directs user to the Safety Parameter Verification page, which directs them through a series of setup verification questions. Refer to Fig. 44.

NOTE: If any intelligent safety–related features are setup or changed, Verification of Safety Parameters must be completed before the valve will be operational. Verification is required for initial setup and any time safety parameters are changed in the field.
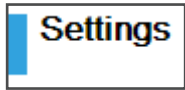
Settings Selected on Setup & Tests page. Refer to Fig. 34.

Fig. 35. Setup & Tests – Settings: General.

NOTE: General Valve Settings can also be accessed via the Guided Valve Setup menu. Refer to Figs. 51 and 10–25.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 26.

Units Gives access to global selection for pressure, volume and leakage rate. Refer to Fig. 36.

Pressure Module Provides access to Pressure Module information and acceptance. Refer to Fig. 37.

Valve Body Indicates the body size of the attached valve. From the factory, the programming tool will know the applicable body size. This field will typically be used for field replacement of the electronics. If a change to this field is required, press the white space. The login screen will appear to unlock the parameters for editing. The password is '7777'. Body size options are 1 in, 2 in or 3 in. There are two valve sizes within a body size designation; 1 in comprises ¾ and 1 inch valves, 2 in comprises 1 ½ and 2 inch valves and 3 in comprises 2 ½ and 3 inch valve sizes. Select the appropriate valve body size as required.

NOTE: Any changes in Valve Body size will require the completion of the Safety Parameter Verification process before the valve will be operational. Refer to Fig. 44.

Valve Name Field provided for user to identify / name the valve for easy identification. Field is limited to 10 characters.

Valve SW Version Displays the valve software revision which has the Modbus address shown.

Display SW Version or **PC Tool Version** Displays the HMI or PC Tool software revision.

Factory Data Data for factory use only.

Modbus Address Current Modbus address of the connected valve. If a change is desired, press the white space. The login screen will appear to unlock the parameters for editing. The password is '7777'. Possible Modbus addresses are 1–247.

NOTE: The default valve Modbus Address is 1. If you intend to connect more than 1 valve to the programming tool, make sure each connected valve is given a unique Modbus Address.

Baud Rate Current Modbus baud rate of the connected valve. If a change is desired, press the white space. The login screen will appear to unlock the parameters for editing. The password is '7777'. Baud rate options are 9600, 19200, 38400 or 57600 bps.

NOTES:

- The default valve and HMI / PC Tool Modbus Baud Rates are 38400 bps. Both baud rates can be changed.
- Communication must first be established with the valve at the default 38400 bps rate with the programming tool, then the valve baud rate may be changed, followed by the programming tool baud rate. Refer to this Fig. 35 for valve communication settings, then return to Fig. 29 to complete the programming tool communicating settings changes.
- To connect another valve to the programming tool, refer to the NOTES for Fig. 29.
- If the valve is connected to a different external control, make sure it and the valve have the same baud rates.

ℹ️ Add or change a Valve Name to identify it amongst other valves in the facility or to coordinate with an appliance name/designation.

The valve name should be non empty, and also should contain at least one letter or digit.

Valid characters are: "a–z" "A–Z" "0–9" space ( ) { } [ ] + – _ = ' . \

Change the connected Valve Modbus Address as desired or required if more than 1 valve is connected to the programming tool or if the valve is connected to a larger Modbus network.

Make sure each connected Valve (Modbus slave) has a unique Modbus Address.

Units Tab selected on Settings page. Refer to Fig. 35.
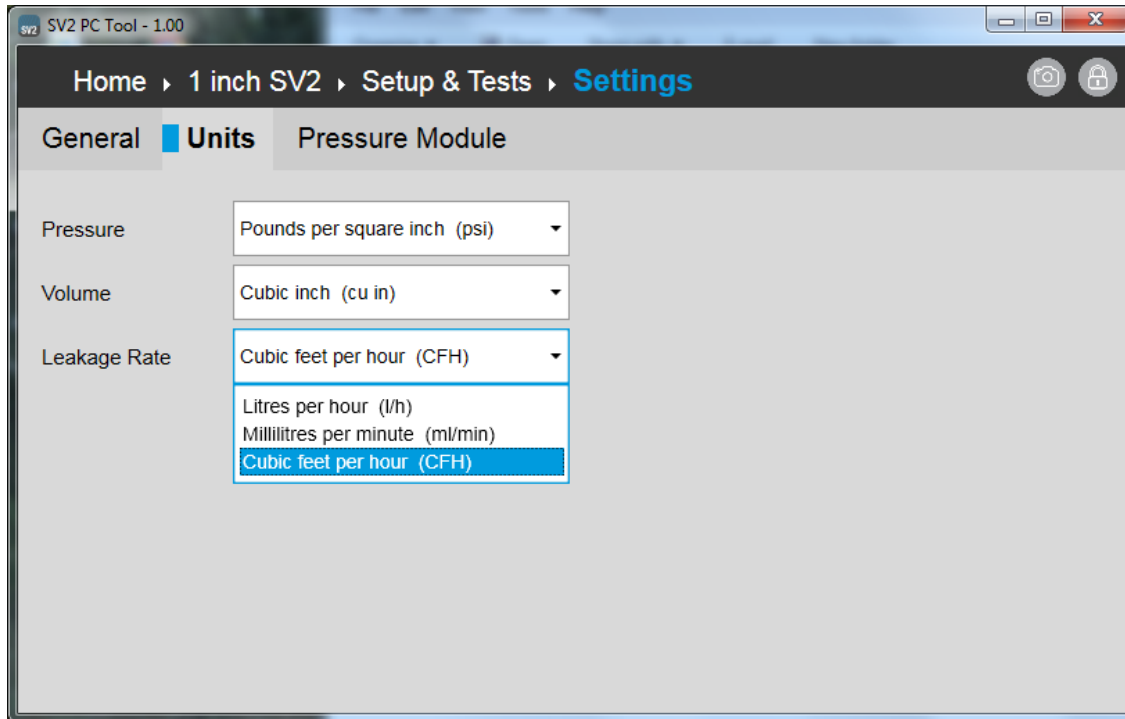
Fig. 36. Setup & Tests – Settings: Units.

NOTE: Units can also be accessed via the Guided Valve Setup menu. Refer to Figs. 51 and 10–25.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 26.

Pressure Module Provides access to Pressure Module information and acceptance. Refer to Fig. 37.

Pressure Selection of global pressure units used throughout valve setup process as well as any future monitoring. Options include Millibar (mbar), Pounds per square inch (psi) and Inches water column (in WC).

Volume Selection of global volume units used throughout valve setup process as well as any future monitoring. Options include Millitre (ml) and Cubic inch (cu in).

Leakage Rate Selection of global leakage rate units used throughout valve setup process, for valve proving sequence and future monitoring. Selectable options are Litres per hour (l/h), Milliters per minute (ml/min) or Cubic feet per hour (CFH).

Pressure Module Tab selected on Settings page. Refer to Fig. 36.
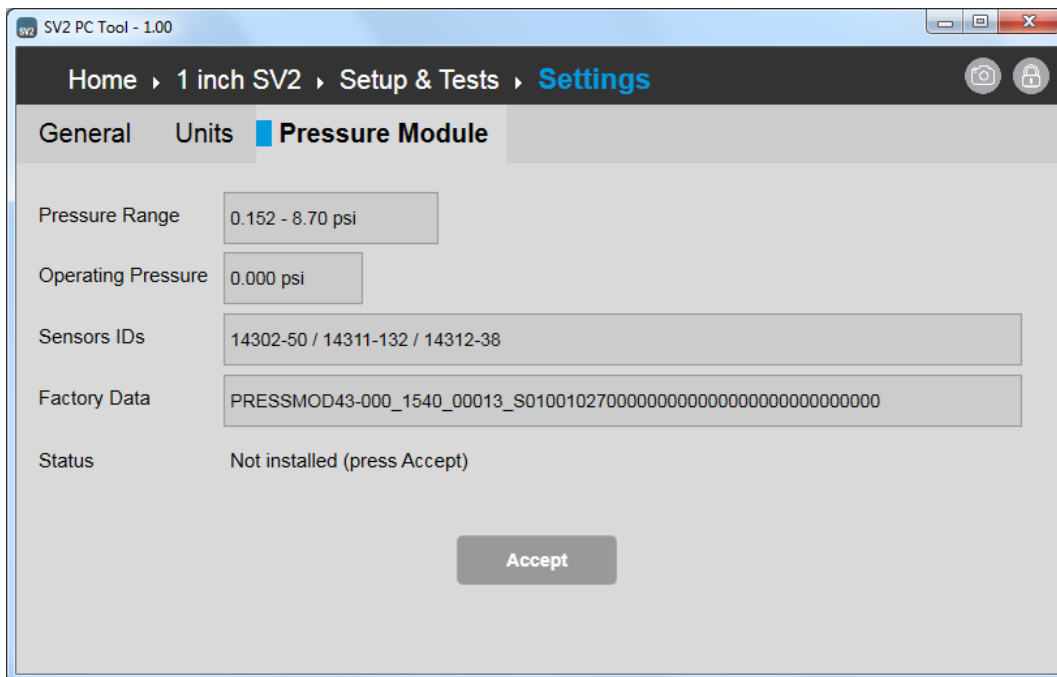
Fig. 37. Setup & Tests – Settings: Pressure Module.

NOTES:

- Default Status is of the Pressure Module will be Not installed (press Accept).
- If the Pressure Module will not be used or setup, you may skip this step as well as the 6 steps for the Valve Proving Sequence Setup and Test, Hi-Gas & Lo-Gas Setup, Summary and Tests. Refer to Figs. 38 to 43.
- After setup is complete, Verification of Safety Parameters procedure must be completed before valve will be operational. Refer to Figs. 34 and 44.
- This menu can also be accessed via the Guided Valve Setup menu. Refer to Figs. 50 and 10–25.

Home Goes to the Home screen, which shows all of the connected valve(s). Refer to Fig. 26.

Pressure Range Pressure range of the connected Pressure Module in the units selected on the Units tab. Refer to Fig. 36.

Operating Pressure Current operating pressure as measured by the Pressure Module internal sensors.

Sensors IDs Identifying information for the internal Pressure Module sensors. For factory use only.

Factory Data Pressure Module model and identifying information for factory use only.

Status Indicates current status of the attached Pressure Module. Possible status conditions include Not installed (press Accept), Disabled, Accepted – In Use or No communication. Accepted – In Use appears if the Pressure Module and

limits have previously been setup. To change the Pressure Module settings, proceed through the Guided Valve Setup by selecting the right arrow.

NOTE: If status is No communication, the Pressure Module sensors or wiring is likely faulty and the Pressure Module may have to be replaced. Refer to the Pressure Module installation instructions, document 32-00017, for further advice.

Accept   Appears if the Pressure Module Status is Not installed, which means it has not been acknowledged. To acknowledge and continue setup of the Pressure Module, press Accept.

NOTES:

- In order to setup and use the Pressure Module, you will need to press the Accept button.
- If you are not already logged in, you will need to do so using the 4-digit pin of '7777' in order to make any changes to the setup.

FIELD REPLACEMENT NOTES:

The SV2 Series valves have internal algorithms that prevent the accidental or intentional removing of the Pressure Module once the valve has been fully setup and is in use.

- If the installed/operational Pressure Module connector is disconnected and reconnected, a 19-Pressure Module reading fault will occur and can be cleared via the valve reset button.
- When a Pressure Module is replaced on the valve, two lockouts will occur; 19-Pressure Module reading fault and 22- Lo-/ Hi-Gas pressure not configured.
  - The faults cannot be fully cleared until the new Pressure Module is Accepted and the Hi-Gas/Lo-Gas Limits and/or VPS are re-programmed.
  - Note that the previously selected Lockout Type for the Hi-Gas/Lo-Gas Limits remain intact as well as the VPS setup, but the Limit Setpoints are deleted and must be setup in order to make the Limits operational.

To make the valve operational:

- Accept the new Pressure Module and serial number either via the Guided Valve Set Up or the Pressure Module tab in the Setup & Tests / Settings menus.
  - If this step is not performed, 3 faults will occur upon entering the Hi-Gas/Lo-Gas Pressure or VPS setup screens. In order to allow setup functions, the Pressure Module must be Accepted and the valve reset button pushed.
- Perform the Pressure Module setup procedures for Hi-Gas Pressure, Lo-Gas Pressure and/or VPS again to ensure proper setup, since the original Limit Setpoints will be deleted.
- Perform the Safety Parameters Verification procedure before the Pressure Module features and the valve will be operational.

From the Settings page (Refer to Fig. 37.), select **Setup & Tests** .

Then select **Valve Proving Sequence (VPS)** from the Setup & Tests page. Refer to Fig. 34.
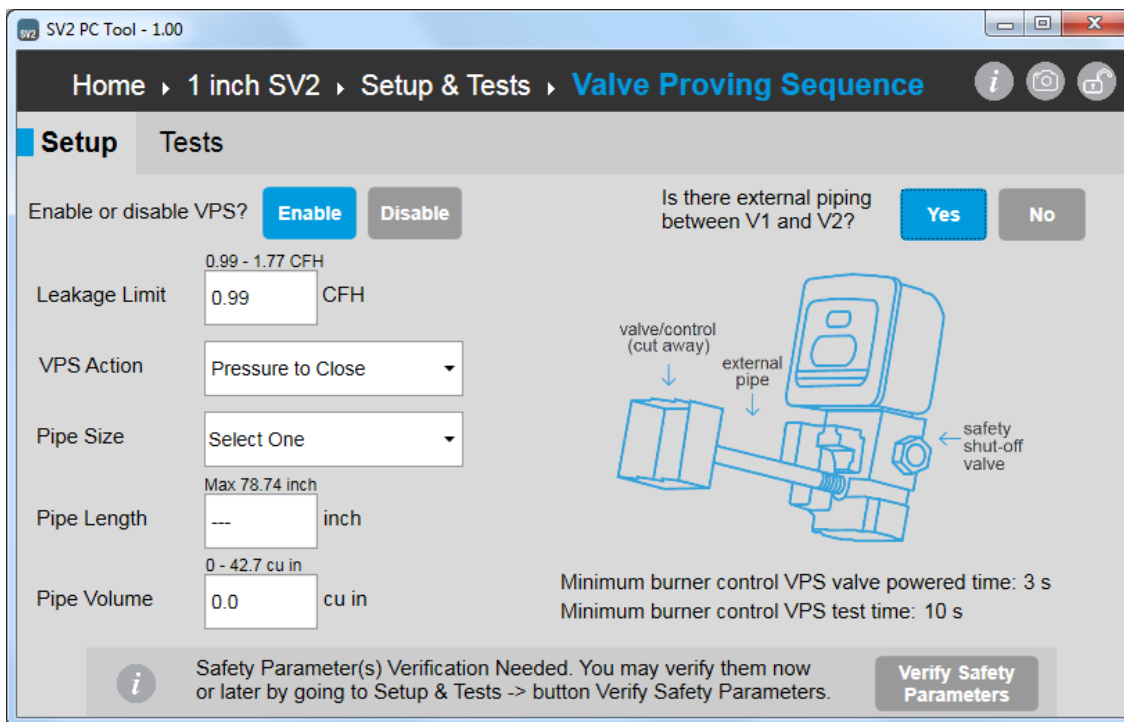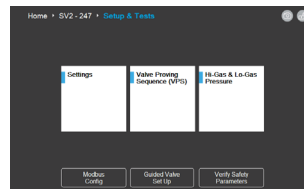
Fig. 38. Setup & Tests – Valve Proving Sequence (VPS): Setup.

NOTES:

- Initially, VPS will be Disabled and the external piping selection will be No.
- For the VPS feature, the SV2 Series Pressure Module must be used.
- The units shown will reflect chosen units in the Valve Setup: Units at the beginning of the Guided Valve Setup procedure (refer to Fig. 12) or in the Setup & Tests / Settings menu (Refer to Figs. 34 and 36).
- The first time VPS is run, V1 test results may be inaccurate until operating pressure has been learned.
- In order for the valve to be operational after setup is complete, the Verification of Safety Parameters procedure must be completed. If all setup to be performed in done, you can perform the procedure by selecting the button at the bottom of the screen. Otherwise, continue with setup and perform the procedure afterward. Refer to Fig. 44.
- YOU MUST KEEP THE EXTERNAL VPS CONTROL <u>DISABLED</u> WHILE PROGRAMMING THE VPS SETUP AND PRESSURE LIMITS if the wiring between the valve and burner management system is in place. The burner needs to be run in order to properly measure the pressure at the valve and thus set the Hi-Gas and Lo-Gas limits accordingly. When the burner starts, the VPS control may try to perform the VPS test and thus lockout due to the Pressure Module not being programmed or verified.
- The Valve Proving Sequence setup can also be accessed via the Guided Valve Setup menu. Refer to Figs. 34 and 10–25.
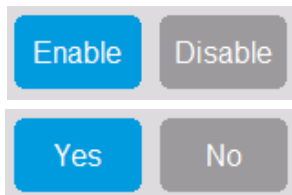
Enables or disables the Valve Proving Sequence feature in the valve.

Indicates whether external piping exists between the valve V1 and V2 seats, such as for pilot–take off.

NOTE: On valve versions utilizing VPS functionality, a NOVV (normally open vent valve) cannot be present unless it is powered during the entire VPS test time. The SV2 Series valves do not provide for cycling the NOVV.

Leakage Limit Shows the default applicable leakage rate, based on the confirmed valve body size and units selection (refer to Figs. 35 and 36). User can enter a different leakage rate based on applicable appliance standards and local codes. Refer to the programming tool 'i' screen or the [i] notes below for details regarding different leakage rates.

VPS Action Action to be taken via valve VPS contact output once the sequence is complete. VPS contact output must be wired to the external control performing the VPS sequencing. VPS action selection should be based on requirements of the external control performing VPS; Pressure to Close the contacts or Pressure to Open the contacts.

NOTE: The VPS output contact is only present on valve models which are capable of using the Pressure Module along with an external control for performing the VPS sequencing. The valves in question have an intelligent feature level of Standard or Enhanced. These models have an Intelligent Feature designation of 6 or 7, which is the 9th digit in the valve part number.

Pipe Size Pipe diameter of the external piping run between the valve connection and the actual pilot take-off valve/control connection if Yes has been selected. Options include NPT or DN sizes, all of which are based on a nominal schedule 40 pipe.

NOTE: The maximum allowed pipe size per valve is:

- ¾ in (DN20) for ¾ / 1 in (DN20/25) valves
- 1 in (DN25) for 1.5 / 2 in (DN40/50) valves
- 1 ¼ in (DN32) for 2.5 / 3 in (DN65/80) valves

Pipe Length Length of the external pipe run between the valve connection and the actual pilot take-off valve/control connection if Yes has been selected. The maximum allowed pipe length is 2 meters (6.6 feet).

Pipe Volume Calculated pipe volume of the external piping connected between V1 and V2 if Yes has been selected and based on the above selections.

NOTE: The pipe volume is automatically calculated based on the above variables. This value may be required for programming the external VPS functionality.

Minimum burner control VPS valve powered time: 3 s
Minimum burner control VPS test time: 10 s Settings required for external control that is performing the VPS sequencing. The 'Minimum burner control VPS powered time' is required to fill the valve intermediate chamber. The 'Minimum burner control VPS test time' is needed for the valve to mechanically close, pressures to balance internally, pressures to be read and actuate the VPS contact.

NOTE: Use the calculated Pipe Volume as well as the 'Minimum burner control VPS valve powered time' and 'Minimum burner control VPS test time' to program the external control Valve Proving Sequence as required.

Verify Safety Parameters Initiates the verification of safety parameters procedure in order to make the valve operational.

[i] This VPS Setup is required when:

- Using the SV2 Series Pressure Module for VPS measurement.
- VPS is performed via the burner management system (i.e. external VPS).

Below are some leakage limits for North American and the EU (European Union). If in doubt which leakage rate to enter, consult the applicable codes for your appliance type and size.

- 1.00 CFH (= 28.3 l/h = 472 ml/min) equals leakage limit for a POC (proof of closure switch) per ANSI Z21.21-2012 / CSA 6.5-2012 for automatic valves for gas appliances.
- 1.76 CFH (= 50 l/h = 833 ml/min) for EU or replacing a NOVV (normally open vent valve) per EN1643-2000-10 and ISO23551-4
- Other: Per EN1643-2000-10, leakage rate starting over 50 l/h and up to a maximum value of 0.1% of the burner heat input (0.1% of the fuel flow rate in l/h)

NOTE: Maximum valve leakage value is limited to:

- **50 l/h for ¾ / 1 in (DN20/25) valves**
- **142 l/h for 1.5 / 2 in (DN40/50) valves**
- **283 l/h for 2.5 / 3 in (DN65/80) valves**

Refer to the valve Installation Instructions, document 32-00018, for appropriate wiring to the burner management system.

**Test** Tab selected on Valve Proving Sequence page. Refer to Fig. 38.
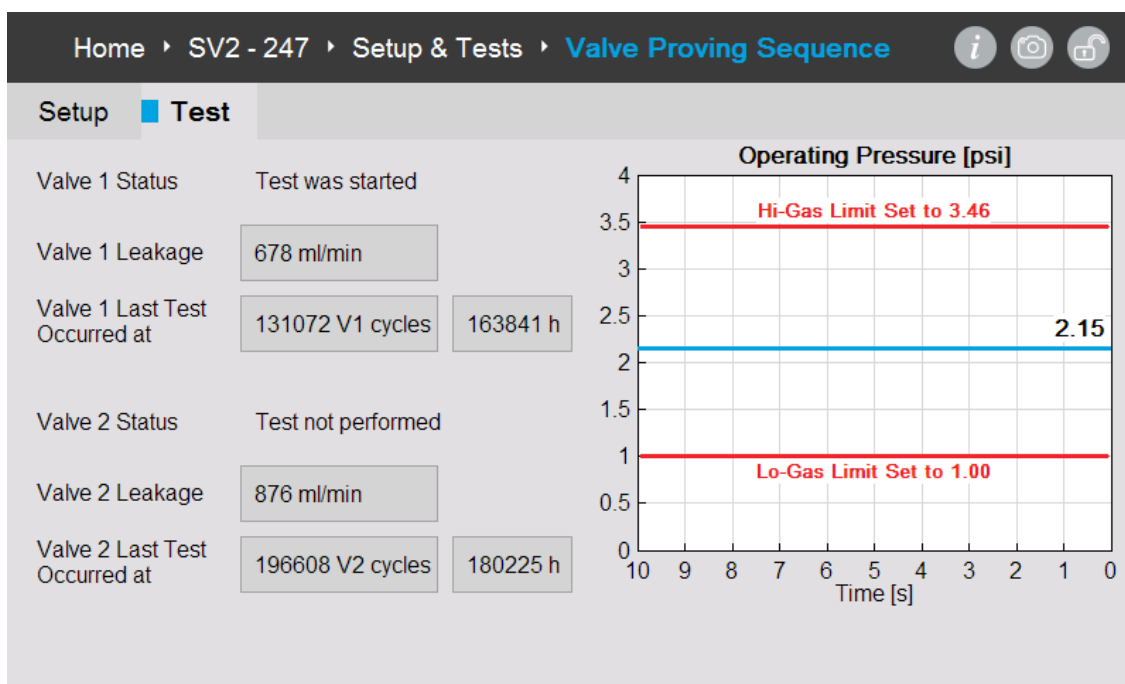
Fig. 39. Setup & Tests – Valve Proving Sequence (VPS): Test.

NOTES:

• Valve Proving Sequence (VPS) is conducted by an external device by selectively powering one valve seat at a time on MV1 / MV2 inputs to the SV2 Series valve. The SV2 Series valve models compatible with external VPS functionality will detect that the VPS sequence is being performed and automatically start the valve internal leak detection routine. SV2 valves use the integrated Pressure Module sensors to monitor pressure rise or decay in the volume between the two safety shut off valve seats. The readings are then compared with the user–selected Leakage Limit threshold (refer to Fig. 38). Based on that comparison, the SV2 Series valve VPS contact output is toggled as selected in the VPS Action setup (pressure to close or pressure to open). Refer to Fig. 38. The contact output action is the same as in a traditional VPS system with a separate pressure switch. Based on the VPS contact output, the external device performing VPS will determine if the VPS test passed or failed. As shown in Fig. 39, the valve leakage test results are stored in the valve memory.

• The V2 seat leak test part of the sequence requires a minimum starting pressure to complete the test. If the pressure is not above the minimum requirement, no leakage level will be reported. However, the VPS contact will be toggled to indicate a failed test so that the burner control shuts down and a valve fault condition will be indicated. The minimum starting pressure is based on the Pressure Module model used.

  – PRESSMODx1: 5mbar / 2.0 in wc / 0.07 psi

  – PRESSMODx2: 5mbar / 2.0 in wc / 0.07 psi

  – PRESSMODx3: 8mbar / 3.2 in wc / 0.12 psi

  – PRESSMODx4: 16mbar / 6.4 in wc / 0.23 psi

• In case the SV2 Series valve cannot take reliable pressure readings during the external VPS sequence, the SV2 Series valve will lockout.

• Very low leakage levels of less than 2 liters/hour (= 33.3 ml/min = 0.07 CFH), which are well below any allowed level, may result due to transient pressure changes caused by the valve balance diaphragm. Any rates below this level will be recorded as 0 and will not be included in trending data

ⓘ During a VPS sequence, this screen shows the status of each valve seat in terms of the test sequence, the valve seat leakage rate and the number of valve seat cycles and hours.

If a test is not currently being performed, the data shown is for the last VPS test sequence occurrence.

Note that the Valve 1 and Valve 2 cycles may not match and that the 'Valve 1 / Valve 2 last test occurred at' cycles and hours shown were captured when the last VPS test sequence occurred on that valve seat.

The cycles counter is incremented by one when either valve seat is powered.

The counter can increment by more than one in one heat cycle if VPS tests are performed.

Hours displayed is the accumulated time counted when both Valve 1 and Valve 2 are powered together.

VPS last test results (including captured hours and cycles) are stored in the Pressure Module EEPROM.

From the Valve Proving Sequence page (Refer to Fig. 39.), select **Setup & Tests** .
Then select **Hi-Gas & Lo-Gas Pressure** from the Setup & Tests page. Refer to Fig. 34.
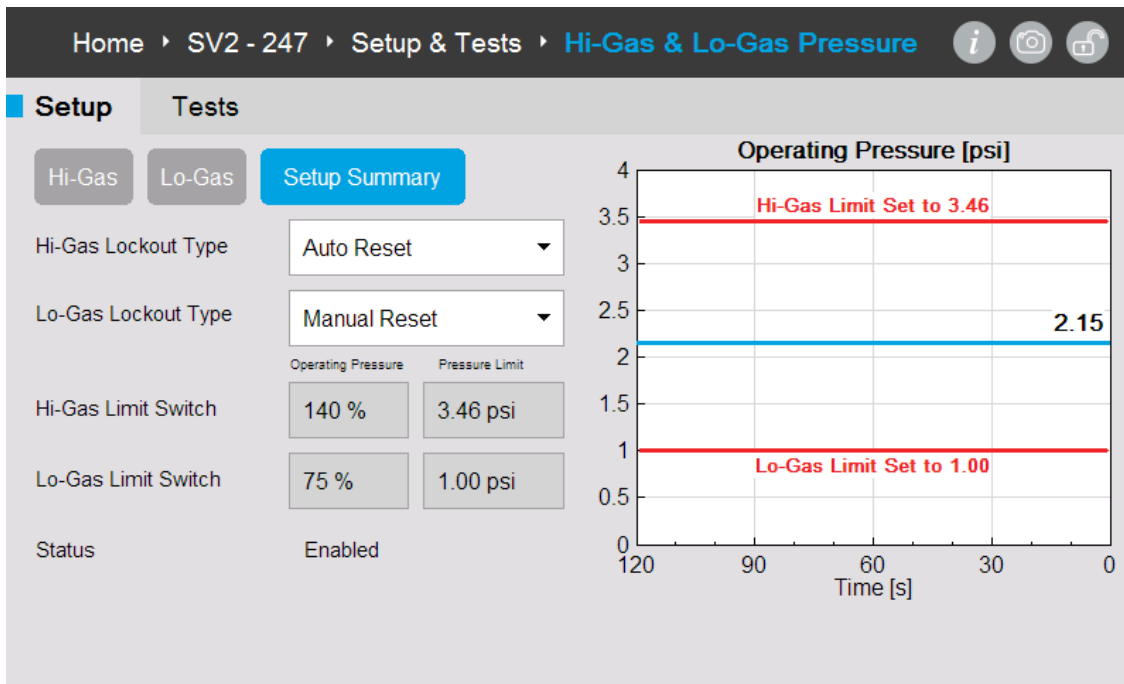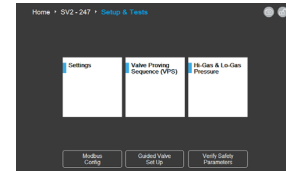
Fig. 40. Setup & Tests – Hi-Gas & Lo-Gas Pressure: Setup Summary.

NOTES:

- Default status for both the Hi–Gas and Lo–Gas is Disabled.
- When using the Pressure Module, you MUST use both the Hi–Gas pressure and Lo–Gas pressure settings if the Lockout Type for either is changed from Disabled.
- The Lockout type selected for each may be different.
- In order for the valve to be operational, the Verification of Safety Parameters operation must be completed if any intelligent features are setup. Refer to Figs. 34 and 44.
- YOU MUST KEEP/CHANGE THE HI–GAS AND LO–GAS LOCKOUT TYPE IN DISABLED STATUS WHILE PROGRAMMING THE PRESSURE LIMITS if the wiring between the valve and burner management system is in place. ALSO, YOU MUST KEEP THE EXTERNAL VPS CONTROL <u>DISABLED,</u> IF USED. The burner needs to be run in order to properly measure the pressure at the valve and thus set the Hi–Gas and Lo–Gas limits accordingly. Because the Hi–Gas and Lo–Gas functions are in the burner management interlock string, which is run through the SV2 Series valve, the burner management system will likely lockout due to the interlock string being open if the Hi–Gas and Lo–Gas Lockout Type are changed from Disabled before proceeding with setup. Additionally, when the burner starts, the VPS control may try to perform the VPS test and thus lockout due to the Pressure Module not being programmed or verified.
- The Hi–Gas & Lo–Gas Pressure setup Sequence can also be accessed via the Guided Valve Setup menu. Refer to Figs. 34 and 10–25.
- When accessing this menu, the warning screen will pop up. Refer to Fig. 2.
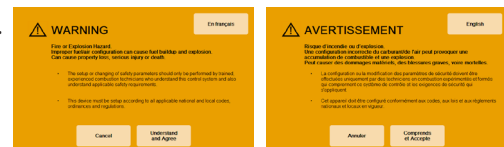
Hi-Gas   Accesses Hi-Gas menu where the limit value can be set/changed.

Lo-Gas   Accesses Lo-Gas menu where the limit value can be set/changed.

Hi-Gas Lockout Type   Selectable Lockout Type for each function. Options include Disabled, Auto Reset or Manual Reset.

Lo-Gas Lockout Type   NOTE: Leave as Disabled while programming the Pressure Limits if the wiring between the valve and burner management system is in place.

	Operating Pressure	Pressure Limit
Hi-Gas Limit Switch	140 %	3.46 psi
Lo-Gas Limit Switch	75 %	1.00 psi

Reflects the selected Operating Pressure % and actual measured pressure when the Limit was locked in during setup.

Status   Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas selections above.

i   When using the Pressure Module, both the Hi-Gas and Lo-Gas Switch function must be used when the Hi-Gas and Lo-Gas Switch function is Enabled.

The user may select the Hi-Gas and Lo-Gas Lockout Type individually. Lockout Type must be selected properly for the appliance type and capacity per national and local codes as appropriate.

Press the Set button to lock in the Hi-Gas or Lo-Gas Limit setting only after the Operating Pressure* value has stabilized.

Set the Hi-Gas and Lo-Gas Limit settings as directed by the burner manufacturer, the appliance needs and/or applicable codes*.

User may set the Hi-Gas and Lo-Gas Limit as a % of the measured Operating Pressure*.

Refer to the valve Installation Instructions, document 32-00018, for appropriate wiring to the burner management system.

*NOTE: The pressure as used for the Hi-Gas and Lo-Gas functions is being measured between the 2 valve seats via the on-board pressure sensors in the Pressure Module. As a result, the reading may differ from measurements taken external to the valve. Accordingly, the burner must be run to measure and set the Hi-Gas and Lo-Gas Pressure settings.

Hi-Gas Tab selected on the Hi-Gas & Lo-Gas Pressure page. Refer to Fig. 40.
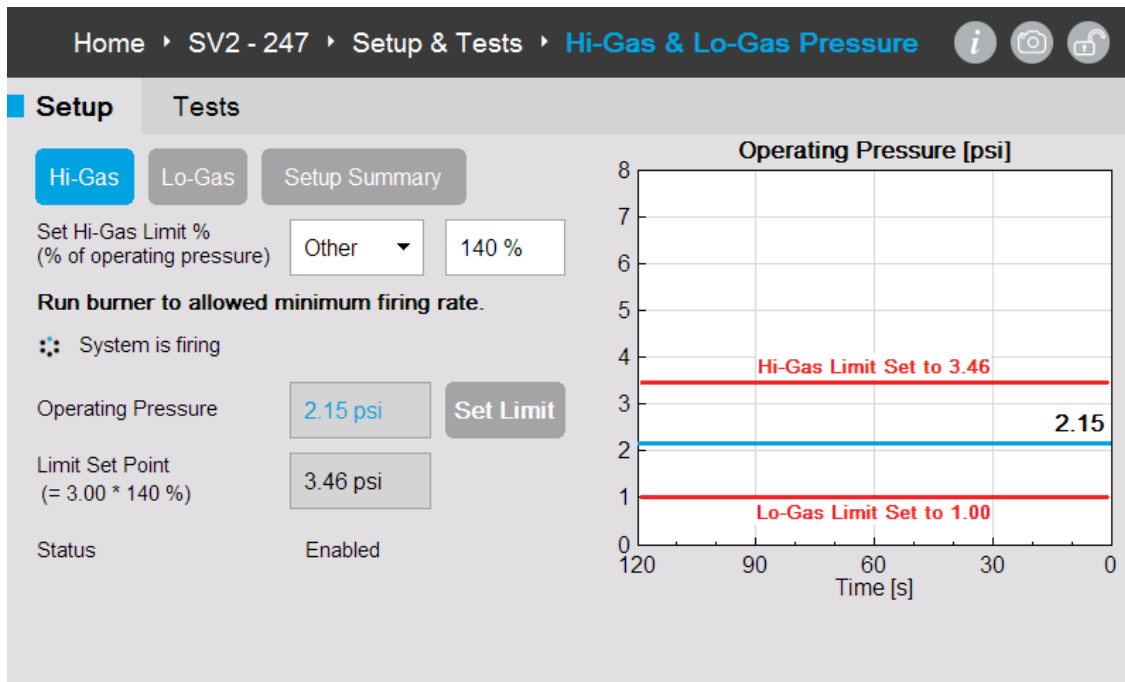
Fig. 41. Setup & Tests – Hi-Gas & Lo-Gas Pressure: Hi-Gas Setup.

NOTES:

- **To set the Hi-Gas Pressure Limit, the burner must be run to minimum firing rate as directed on the screen.**
- **The Pressure Module internal sensors must measure the pressure in order to properly set the Limit setpoint.**
- **Only press the Set Limit button to set the limit reading after the pressure reading has fully stabilized.**

Set Hi-Gas Limit % (% of operating pressure) [Other ▼] [140 %] Selection of the Hi-Gas Pressure Limit setting as a % of the measured operating pressure at the minimum firing rate. Pressure reading as measured by the internal Pressure Module sensors. Options include 125%, 150% or Other. When Other is selected, the user may change the % manually by touching the box next to it. The possible range is 125% to 150%.

Operating Pressure Shows the current pressure reading as measured by the on-board Pressure Module sensors.

Set Limit Sets the Hi-Gas Pressure Limit.

Limit Set Point Shows the applicable Hi-Gas Limit setpoint based on the current Operating Pressure reading and Hi-Gas Limit % selections.

Status Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas Lockout selections on the Setup Summary tab. Refer to Fig. 40.

Lo-Gas Tab selected on the Hi-Gas & Lo-Gas Pressure page. Refer to Figs. 40-41.
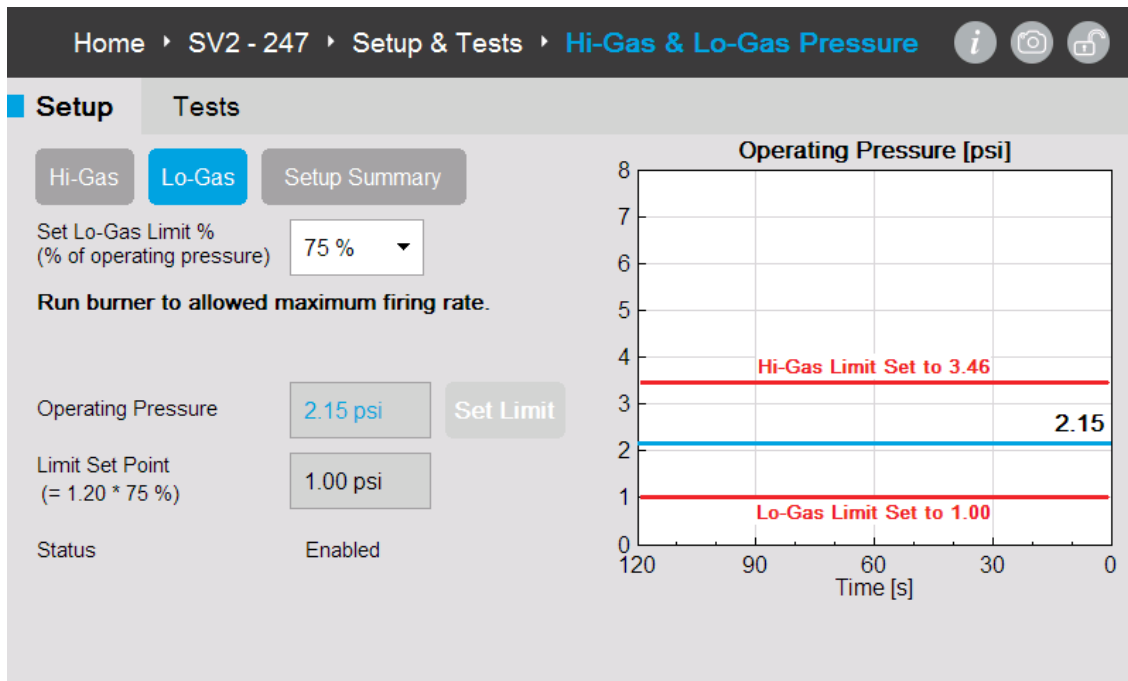
Fig. 42. Setup & Tests – Hi-Gas & Lo-Gas Pressure: Lo-Gas Setup.

NOTES:

- **To set the Lo-Gas Pressure Limit, the burner must be run to maximum firing rate as directed on the screen.**
- **The Pressure Module internal sensors must measure the pressure in order to properly set the Limit setpoint.**
- **Only press the Set Limit button to set the limit reading after the pressure reading has fully stabilized.**
- **Once the Hi-Gas and Lo-Gas Limit Switch settings are set, you can go back to the Setup Summary tab and select the desired lockout type for each. Options include Auto Reset or Manual Reset. Refer to Fig. 40.**

Set Lo-Gas Limit % (% of operating pressure) **75 %** ▼   Selection of the Lo-Gas Pressure Limit setting as a % of the measured operating pressure at the maximum firing rate. Pressure reading as measured by the internal Pressure Module sensors. Options include 50%, 75% or Other. When Other is selected, the user may change the % manually by touching the box next to it. The possible range is 50% to 75%.

Operating Pressure   Shows the current pressure reading as measured by the on-board Pressure Module sensors.

Set Limit   Sets the Lo-Gas Pressure Limit.

Limit Set Point   Shows the applicable Lo-Gas Limit setpoint based on the current Operating Pressure reading and Lo-Gas Limit % selections.

Status   Indicates current status of the attached Pressure Module. Can be either Disabled or Enabled. This status reflects the Hi-Gas and Lo-Gas Lockout selections on the Setup Summary tab. Refer to Fig. 40.

NOTE: Once both the Hi-Gas and Lo-Gas Limit Switch Pressure Limits are set, you can now select the appropriate Hi-Gas/Lo-Gas Lockout Type for each by selecting the Setup Summary tab. Lockout Type options include Disabled, Auto Reset or Manual Reset. You MUST use both functions when using the Pressure Module.

Test Tab selected on the Hi-Gas & Lo-Gas Pressure page. Refer to Figs. 40-42.
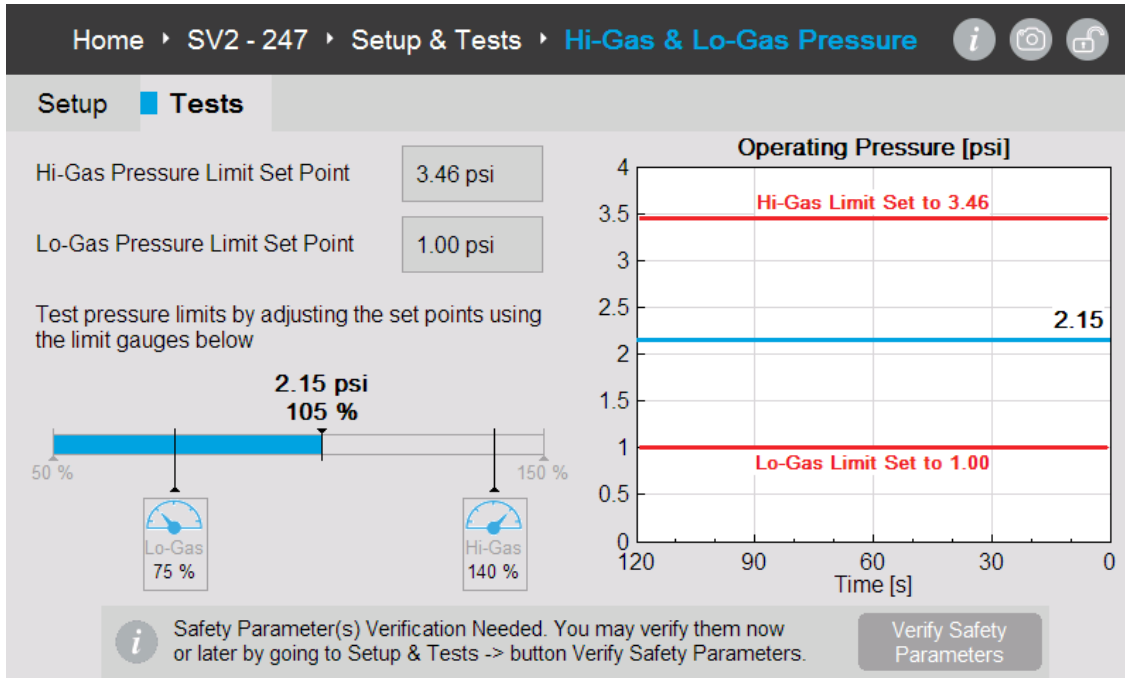
Fig. 43. Setup & Tests – Hi-Gas & Lo-Gas Pressure: Tests.

Hi-Gas Pressure Limit Set Point
Lo-Gas Pressure Limit Set Point Reflects the actual limit setpoints based on the measured pressures + % of operating pressure during setup.

 Indicates where the Lo-Gas and Hi-Gas Pressure Limits were set and provides for testing the trip point of the Pressure Limit settings. Per the directions on the screen, slide the appropriate limit gauge icon to the right or left, approaching the current operating pressure as shown on top of the bar, to test the lockout of each setting.

NOTES:

- Upon successful lockout, the valve and likely the burner management system will need to be reset and the burner restarted to test the second Limit Set Point.

- When the valve is reset, the Limit Set Points will be automatically reset back to their original settings.

Verify Safety Parameters Initiates the verification of safety parameters procedure in order to make the valve operational. If all setup to be performed in done, you can perform the procedure by selecting this button. Otherwise, continue with setup and perform the procedure afterward. Refer to Fig. 44.

_i_ Test the Hi-Gas and Lo-Gas Pressure Limit Set Points for proper lockout functionality.

By sliding the Lo-Gas or Hi-Gas buttons, change the applicable settings to cause a lockout. When complete, the display / PC Tool will change the setting back to its original setting.

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From the Hi-Gas & Lo-Gas Pressure page (Refer to Fig. 43.), select **Verify Safety Parameters** .

or
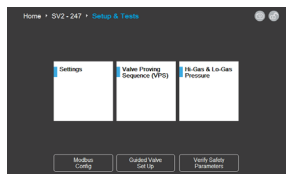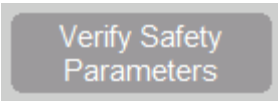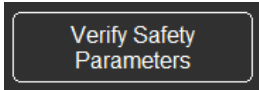
Select **Setup & Tests** then select **Verify Safety Parameters** from Setup & Tests page. Refer to Fig. 34.
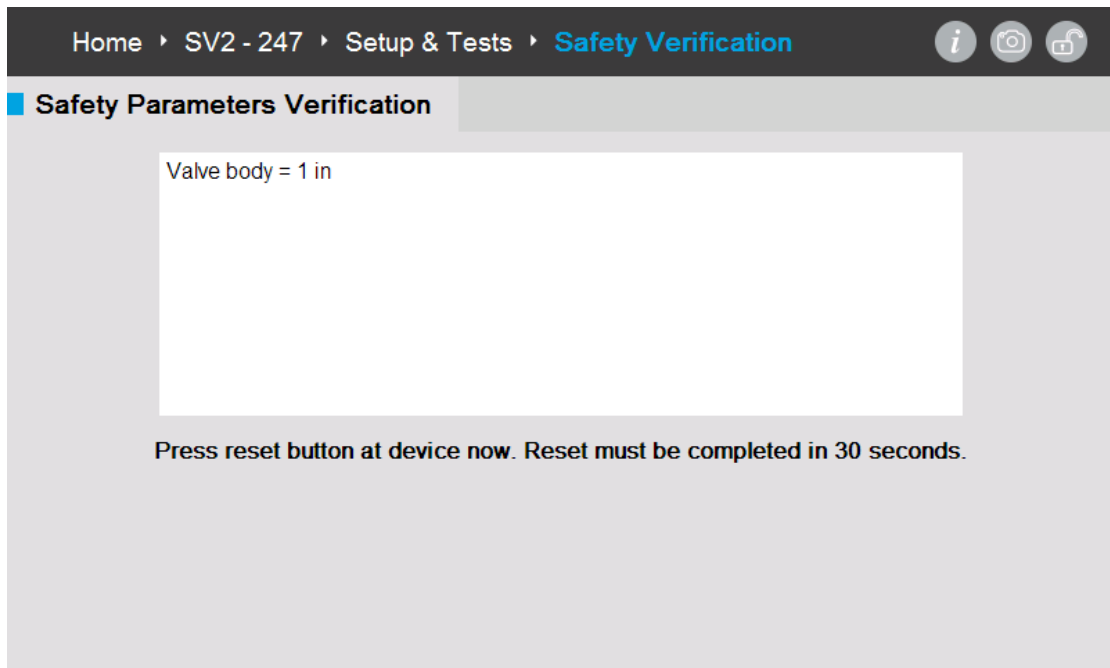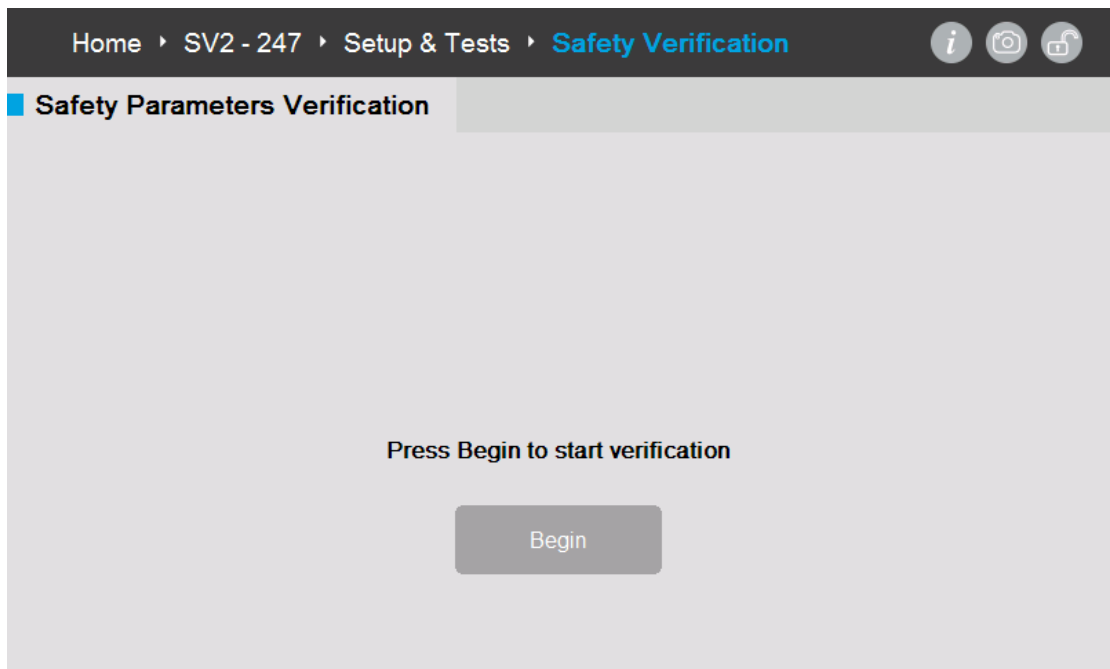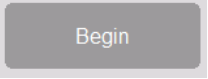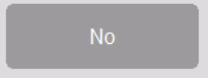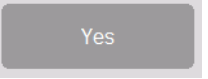
Fig. 44. Setup & Tests – Verify Safety Parameters.

NOTES:

- **Safety Verification must be completed for any programmed intelligent safety features in order for the valve to be operational. Verification is required for initial setup and any time safety parameters are changed in the field.**

- **A lockout will occur after exiting commissioning mode if the safety parameters have not been verified.**

| Begin | Starts verification process. The user will be asked a series of questions relating to the valve setup previously completed. |

| No | Yes | Choose proper button to indicate that the shown parameters are either not set to the proper values or are set to the proper values. No/Yes confirmation is required within 180 seconds. |

When all questions and confirmations are completed, you will be directed to press the valve reset button within 30 seconds. This final step is required to make the valve operational. Once complete, the screen will show 'All safety parameters are OK'.

NOTE: If the valve is powered during the safety verification procedure, it will not be un-powered, unless a fault occurs.

When the valve is initially programmed or any time valve safety parameters have been changed, the Safety Parameter Verification procedure must be performed.

This procedure guides the user through the various parameters that have been setup or changed and has them verify and acknowledge the settings they entered as being accurate.

Once the procedure is complete, the user must press the Reset button on the valve to lock in the new parameter settings.

NOTES:

- **If the user does not respond to the screen requests within 10 minutes, the valve will fault and lock out.**

- **When the Verification of Safety Parameters procedure is complete, the user must press the Reset button on the valve to lock in the new parameter settings.**

From the Safety Verification page, select **Setup & Tests** . Refer to Fig. 44.

Then select [**Modbus Config**] on Setup & Tests page. Refer to Fig. 34.
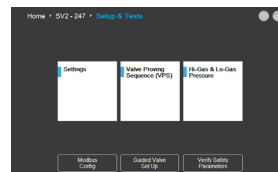
NOTE: Modbus Config applies to HMI only.
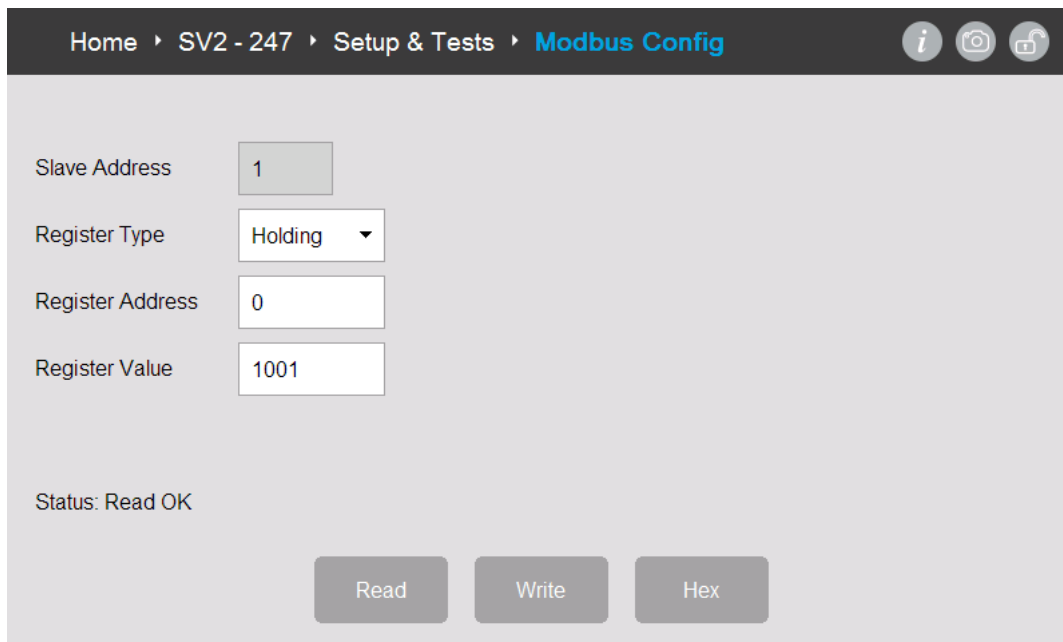
Fig. 45. Setup & Tests – Modbus Config (HMI only).

Can be used to read Modbus registers (input / holding) and write holding registers. Register address and value can be displayed / entered in decimal (base 10) or hexadecimal (base 16) formats, always unsigned 16 bit integers. Signed integers, 32 bit integers, ASCII strings, bitfields, etc. are not supported.

Slave Address Modbus address of selected SV2 Series valve.

NOTE: Modbus address can be changed on the General Settings page, which is accessed via the Settings menu. Refer to Figs. 34 and 35.

Register Type Select register type. Options are Holding (read/write) and Input (read only).

Register Address Select addressing Holding or Input register to access. The possible range is 0 to 65535 (0xFFFF).

NOTE: For the complete list of available registers, refer to the MODBUS ADDRESSING section in this document.

Register Value Shows value of selected register after Read button is pressed. To edit a Holding register, touch the white space followed by Write button. User can select Read button again to ensure value has been written correctly to the valve.

Status Shows the result of the last operation performed; Idle, Read OK, Write OK, error / exception messages.

Read When selected, prompts programming tool to read the selected Holding or Input register.

Write When selected, prompts programming tool to write to the selected Holding register.

Hex Toggles format of displayed Register Address and Value between decimal and hexadecimal.

To get to the Diagnostics page, you must first navigate to the connected valve page, then the Diagnostics page.

Select **SV2 - 247** on Modbus Config or any other general navigation page. Refer to Fig. 45.

Then select **Diagnostics** on connected valve page. Refer to Fig. 33.
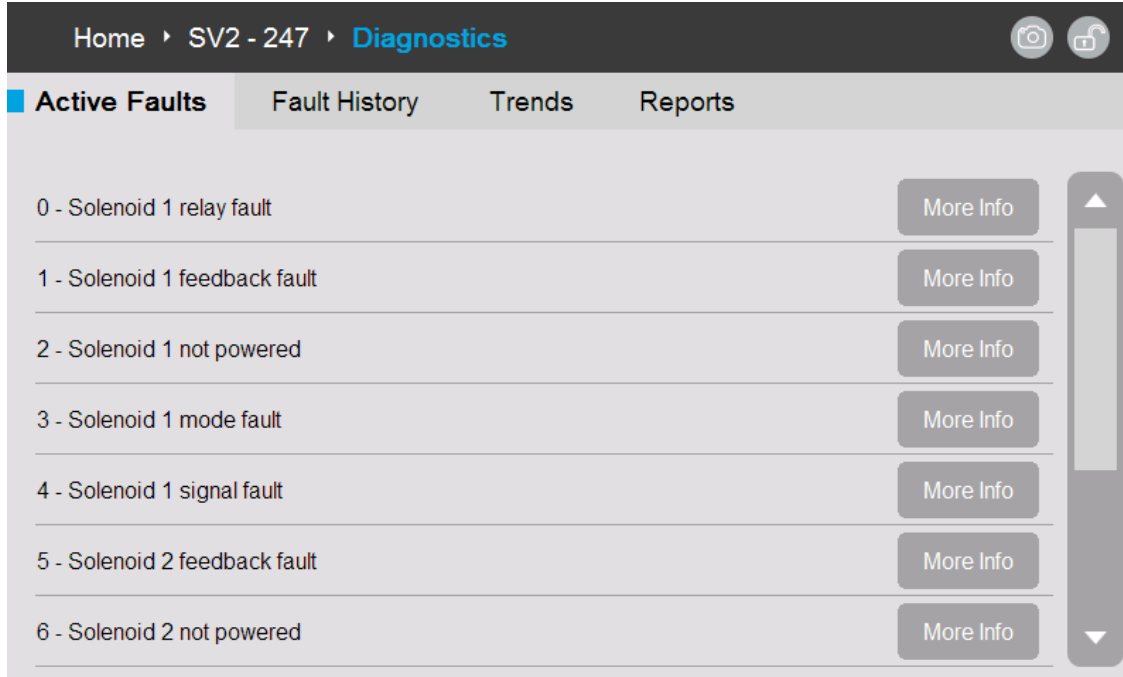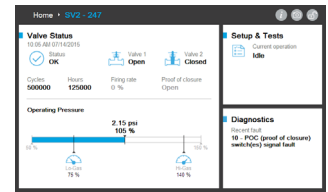
Fig. 46. Diagnostics – Active Faults.
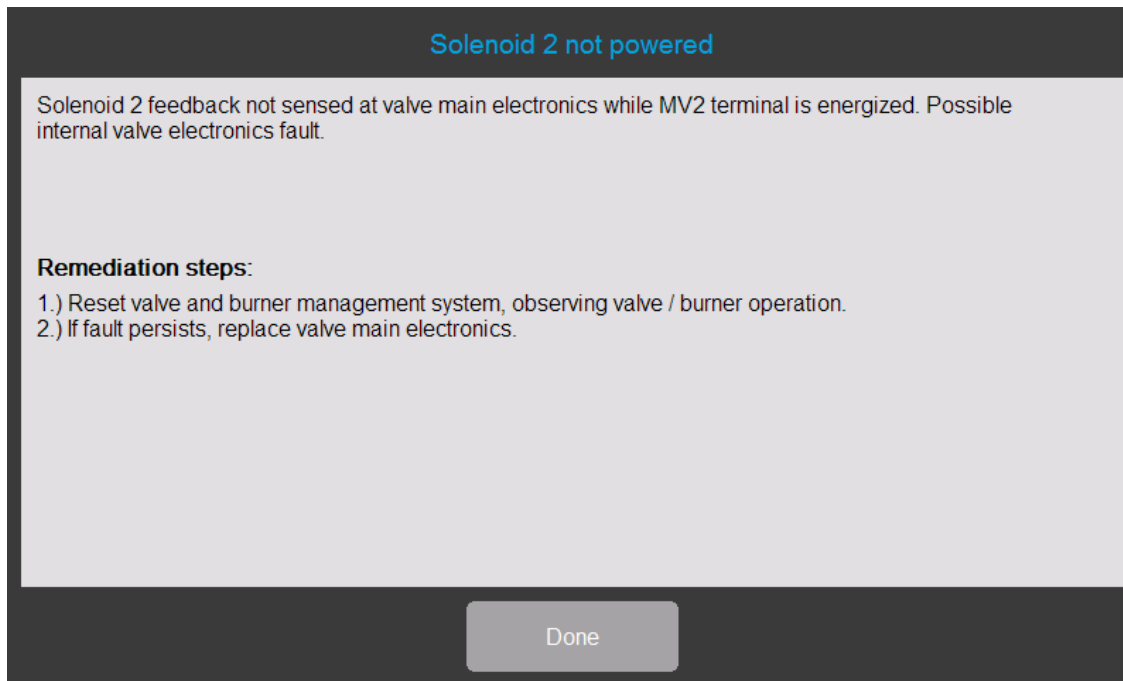
Fig. 47. Diagnostics – More Info.

Fault History   Opens the Fault History tab, which contains information on historical faults. Refer to Fig. 48.

Trends   Opens the Trends tab, which shows trending over time for user-selected parameters. Refer to Fig. 49.

Reports   Opens the Reports tab, which allows user to create, view, save and copy reports regarding the valve. Refer to Fig. 50.

More Info   Gives information about the fault including a detailed explanation and remediation steps the user might take to rectify the fault condition. Refer to Fig. 47.
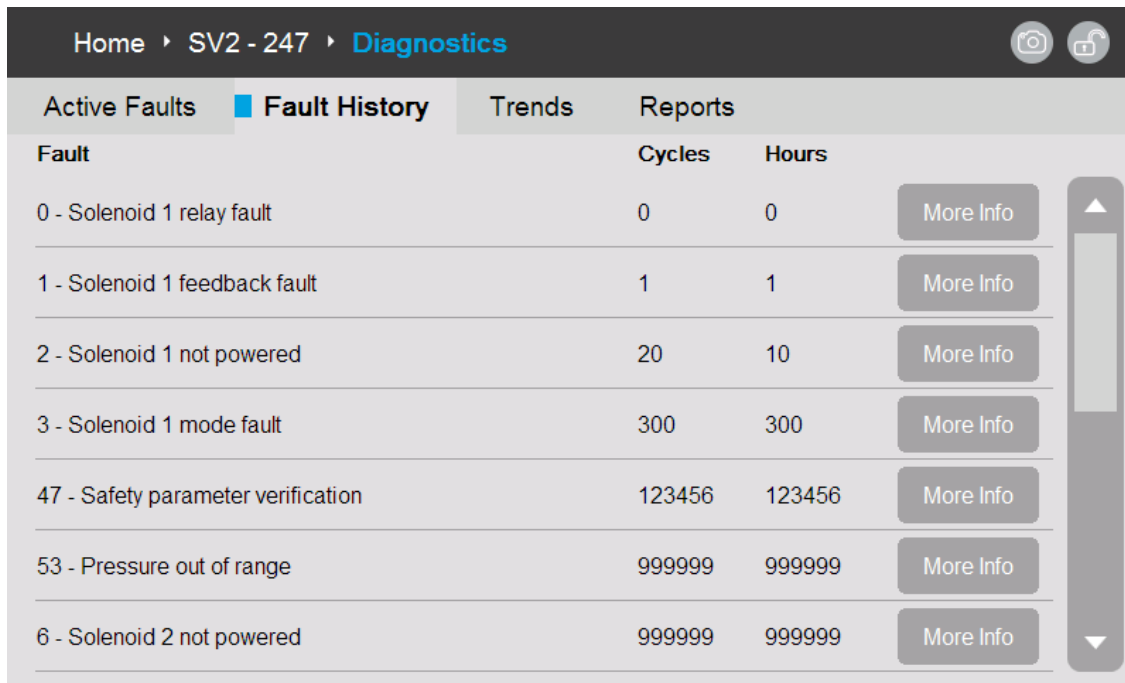
Use scroll bar to view any other active faults that do not fit on the current screen.

Done   Closes the More Info box for active faults.

Fault History Tab selected on Diagnostics page. Refer to Fig. 46.

Fig. 48. Diagnostics – Fault History

Shows the fault history, in order of occurrence, including the valve cycles and hours at which each fault occurred. The last 15 faults are stored in the valve memory.

Trends Opens the Trends tab, which shows trending over time for user-selected parameters. Refer to Fig. 49.

Reports Opens the Reports tab, which allows user to create, view, save and copy reports regarding the valve. Refer to Fig. 50.

More Info Provides the same extra information regarding fault codes as on the Active Faults tab. This information includes a detailed explanation and remediation steps the user might take to rectify the fault condition. Refer to Fig. 47.

Use scroll bar to view any other historical faults that do not fit on the current screen.

Trends Tab selected on Diagnostics page. Refer to Figs. 46 and 48.
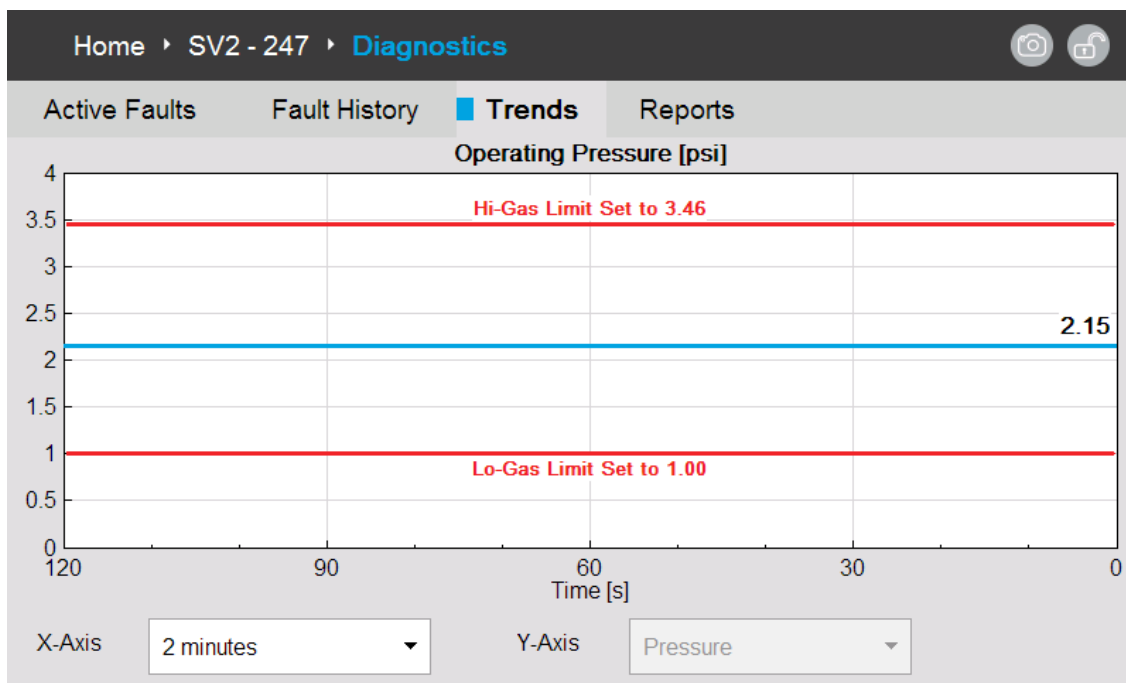
Fig. 49. Diagnostics – Trends.

Shows the trending over time for the user–selected parameters.

Reports Opens the Reports tab, which allows user to create, view, save and copy reports regarding the valve. Refer to Fig. 50.

X-Axis User can select different time periods for the trending. Options include 1, 2, 5 or 10 minutes.

Y-Axis User may select from different items to trend. Initially, Pressure will be the only option, dependent on the use of the Pressure Module.

Reports Tab selected on Diagnostics page. Refer to Figs. 46 and 48-49.
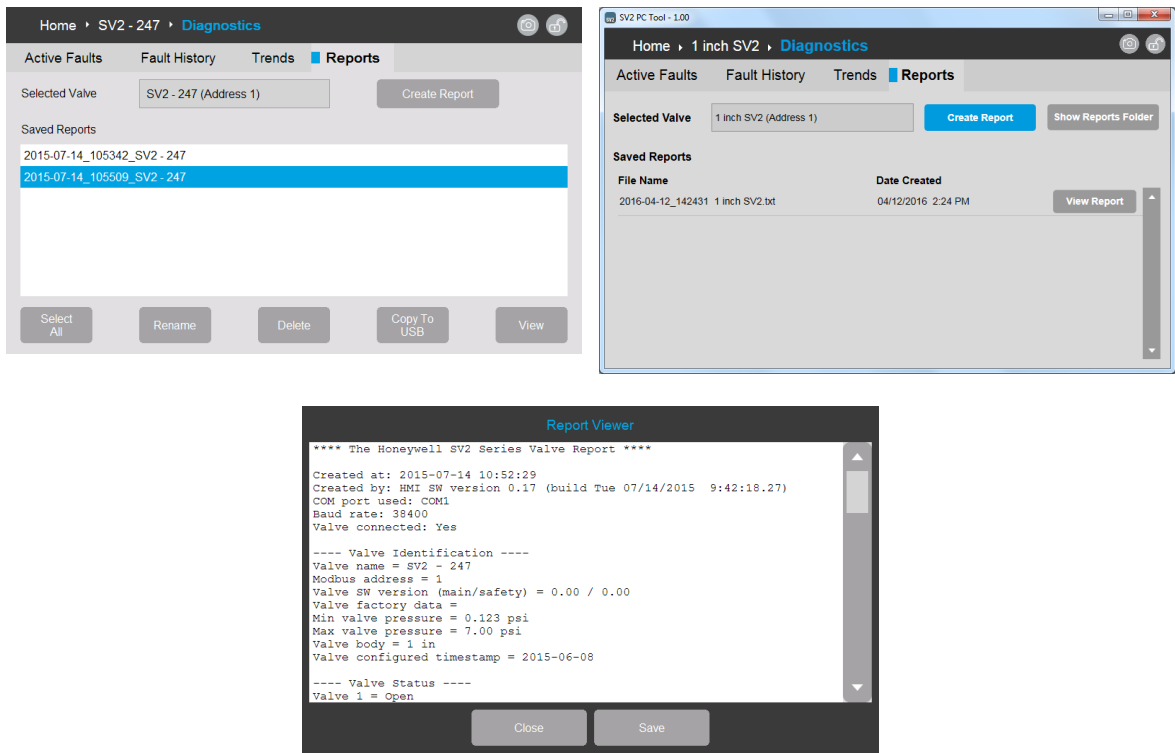
Fig. 50. Diagnostics – Reports.

NOTES:

• On the HMI, Reports may also be accessed via the Home / Display Setup menus. Refer to Figs. 26 and 31. Reports can only be managed on that menu and cannot be created.

• With the PC Tool, the reports are saved on the PC hard drive and can be selected, renamed, deleted, copied or viewed from the applicable folder.

Create Report Creates a report for the currently selected SV2 Series valve. Report contains the creation date/time, COM port used, baud rate, valve name, Modbus address, software version, min and max valve pressures, valve body size, valve status, cycles and hours, firing rate and proof of closure status (future enhancements), lockout status, connected Pressure Module information, commissioned Hi-/Lo-Gas and VPS information, active faults and fault history.

Show Reports Folder (PC Tool only) Opens the reports folder on the PC hard drive where they can be selected, renamed, deleted, copied or viewed.

Select All (HMI only) Selects all listed reports on page for further action.

Rename (HMI only) Allows renaming of the selected report(s).

Delete (HMI only) Allows user to delete the selected report(s).

Copy To USB (HMI only) Pressing this will copy the selected report(s) onto a USB drive which is plugged into the HMI.

View or **View Report** When pressed, will show the selected report on the screen.

Close Closes the report window that was opened when 'View" was selected.

Save Saves the generated report to the HMI / PC memory.

NOTE: The HMI Tool has limited memory for screen shots and reports. The contents in memory will have to be copied / removed once the memory is full in order to save more data.

The last general navigation item is accessing the Guided Valve Setup, identical to the navigation route the user is directed through when initially connecting and programming a valve.

The guided setup wizard will progressively direct the user through General Settings, Units Settings, Pressure Module, Hi-Gas & Lo-Gas Pressure, Valve Proving Sequence and Safety Parameters Verification.

There are informational tips available for most screens as well as illustrations and user-friendly screens.

Select **SV2 - 247** on Diagnostics page. Refer to Fig. 50.
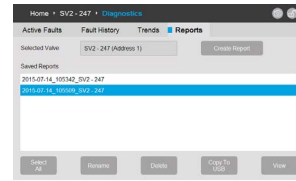
Then select **Setup & Tests** on Valve Status page. Refer to Fig. 33.
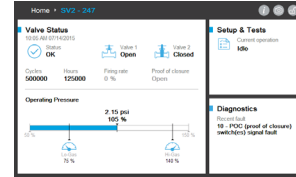
Finally select **Guided Valve Set Up** on Setup & Tests page. Refer to Fig. 34.
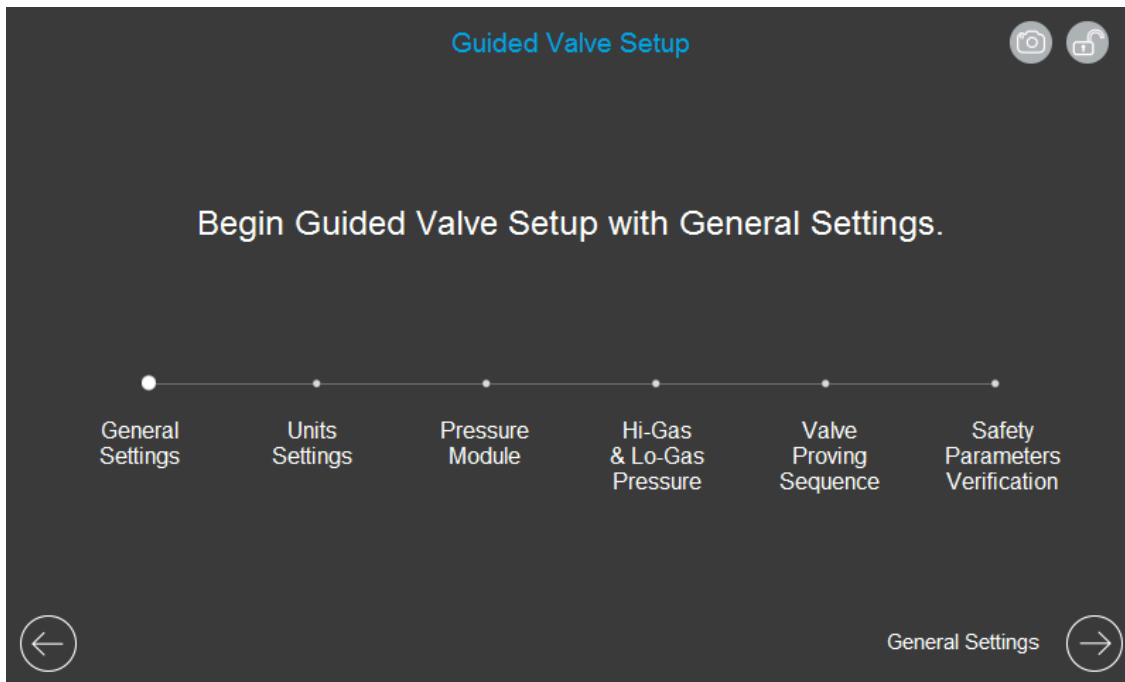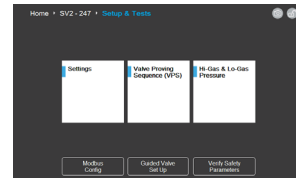
Fig. 51. Setup & Tests – Guided Valve Set Up.

NOTES:

• Guided Valve Set Up can be run any time the user wishes to change / update the programming tool and/or valve settings.

• Refer to Figs. 10-25 for the Guided Valve Set Up sequence.

MODBUS ADDRESSING

Introduction

The SV2 Series valve communicates via RS-485 Modbus RTU open protocol. It can communicate with:

- The SV2 Series HMI or PC programming tools directly
- An external Modbus master device such as a building automation system directly
- An external Modbus master device via the HMI Tool second port with 'Gateway – Connect to External Systems' selection. Refer to Figs. 6 and 29. With this communication option, the HMI Tool would likely be permanently installed.

The HMI or PC Tools automatically read all appropriate Modbus registers. Also note that the HMI or PC Tools are required for initial setup of any intelligent features and are helpful for troubleshooting, but permanent connection is not required afterward. After initial valve setup completion via the HMI or PC Tools, whichever Modbus master configuration shown above is used, it can monitor and/or control the connected valve(s). Certain writable features may be dependent on the connected Modbus master device.

Up to 8 SV2 Series valves may be connected to a single HMI or PC Tool. When an external Modbus master device is connected to the valve directly or through the HMI Tool secondary port, it must be programmed for the proper Modbus registers in order for proper communication to occur. This document section addresses all of the requirements for communication with an external Modbus master device.

The RS-485 interface between the valve and the externally connected device must be setup properly including wiring, bias and termination resistor selection at valve, baud rate and Modbus addressing. Refer to the following documents for proper SV2 Series valve and Programming Tools Modbus wiring and setup:

- 32-00018, SV2 Series Installation Instructions
- 32-00029, SV2 Series User Manual
- 32-00030, HMI Tool Installation Instructions
- 32-00037, PC Tool Installation Instructions

The SV2 Series valve and HMI / PC Tools support RS-485 Modbus RTU communications with:

- 1 start bit
- 8 data bits
- 1 stop bit
- no parity

The default baud rate for both the valve and HMI or PC Tools is 38400 bps. The baud rate for all can be changed via the interface screens on the HMI or PC Tools. Refer to Figs. 5–8 and 29 of this manual for detailed instructions.

Addressing

Table 1. Valve and Programming Tools Supported Functions.

Supported Function Description	Function Code
Read input register	4
Read holding register	3
Write single register	6
Write multiple registers	16
Read SV2 Series valve status (refer to Tables 2, 3 and 4)	17

Table 2. Query Message Format for SV2 Series Valve Status / Function Code 17.

Node Address	Function Code	CRC
Varies (1 byte)	17 (1 byte)	Low, High (2 bytes)

Table 3. Response Message Format for SV2 Series Valve Status / Function Code 17.

Node Address	Function Code	Number Response Bytes	SV2 Valve State Number	SV2 Valve Factory Data	CRC
Varies (1 byte)	17 (1 byte)	35	Refer to Table. 4. (1 byte)	String terminated by 0 or maximum size 62 characters	Low, High (2 bytes)

Table 4. System States.

State Number	Alias	Description
0	NormalOperation	SV2 valve is operable.
1	SoftLockout	Soft-lockout. Recovery after 1 hour or upon a user reset.
2	HardLockout	Soft-lockout. Recovery upon a user reset.
3	Lockout	Hard or Soft lockout(s) are active.
6	GasON	Gas is running – both SSOVs are opened.
7	GasOFF	Gas is stopped – at least one SSOV is closed.
13	StartUp	Safety tests performed after power-up or after lockout is terminated.
14	Reset	User has pressed a push-button during normal operation. Gas valves are turned OFF and faults are cleared.
15	Run	Valve has gone through StartUp and is running.
16	InterlockStringTest	An interlock string test performed after power-up or after lockout is cleared.
17	SafetyRelayTest	A safety relay test performed after power-up or after lockout is cleared.

The SV2 Series valve Modbus address space is organized in two segments; holding registers and input registers. Refer to Table. 5 for the read and write access function codes.

Table 5. SV2 Series Modbus registers.

Segment	Read Access Function Code	Write Access Function Code	Access
Holding registers	3	6 or 16	Read / Write
Input registers	4	----	Read Only

The Holding Register limits and attributes are as follows:

- The minimal value that can be written into a Holding Register <address> can be read from the Holding Register <address + 10000>.
- The maximum value that can be written into a Holding Register <address> can be read from the Holding Register <address + 20000>.

The bit array register attributes of a Holding Register <address> can be read from the Holding Register <address+30000>. The meaning of Holding Register bits 0–3 can be found in Table 6.

Table 6. Holding Register Attributes.

Holding Register Bit	Meaning
0	Register exists
1	Register is writable
2	Safety parameter register
3	Safety parameter register was changed. Need to perform Safety Parameters Verification process.

Table 7. Holding Register Mapping.

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Read/ Write	Content	Range		Default Value
Dec	Hex								Min	Max	
40073	0049	General	All	Standard, Enhanced, Full, Elite	Selectable units for temperature	Enum	W	0=Fahrenheit 1=Celsius	0	1	
40074	004A	General	All	Standard, Enhanced, Full, Elite	Selectable units for pressure	Enum	W	0=Mbar 1=PSI 2=inches WC	0	2	
40075	004B	General	All	Standard, Enhanced, Full, Elite	Selectable units for volumetric flow	Enum	W	0=Liters per hour (l/h) 1=Milliters per min (ml/min) 2=Cubic feet per hour (CFH)	0	2	
40078	004E	General	All	Standard, Enhanced, Full, Elite	Selectable volu-metric units	Enum	W	0=Milliliter (ml) 1=Cubic inch (cu in)	0	1	
40079	004F	General	All	Standard, Enhanced, Full, Elite	Remote reset command	U16	R	If it is read it will return number of remote resets remaining. If value 0xAA55 is written and remaining number of re-sets >0 then reset action will be performed. NOTE: All national and local codes must be followed in regards to the allowance of remote reset.	0	65535	5
40090	005B	General	All	Standard, Enhanced, Full, Elite	SV2 valve Mod-bus slave address	U16	W	Low byte contains address and high byte its negated value, otherwise default address is used.	0	65535	
40091	005C	General	All	Standard, Enhanced, Full, Elite	Modbus com-munication baud rate	U16	W	9600, 19200, 38400 or 57600 bps Default value 38400	9600	57600	38400

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Read/ Write	Content	Range		Default Value
Dec	Hex								Min	Max	
40107	006B	PM									
40108	006C	PM									
40109	006D	PM									
40110	006E	PM									
40111	006F	PM									
40112	0070	PM									
40113	0071	PM									
40114	0072	PM									
40115	0073	PM									
40116	0074	PM									
40117	0075	PM									
40118	0076	PM									
40119	0077	PM									
40120	0078	PM									
40121	0079	PM									
40122	007A	PM	All	Standard, Enhanced, Full, Elite	Pressure Module factory data	62 x Char	R	String of chars ended by either ASCII-0 or end of register array. Two chars per register.			
40123	007B	PM									
40124	007C	PM									
40125	007D	PM									
40126	007E	PM									
40127	007F	PM									
40128	0080	PM									
40129	0081	PM									
40130	0082	PM									
40131	0083	PM									
40132	0084	PM									
40133	0085	PM									
40134	0086	PM									
40135	0087	PM									
40136	0088	PM									
40137	0089	PM									
40148	0094	General	All	Standard, Enhanced, Full, Elite	Valve MV1 / MV2 LED orientation indication change	Bool	R	0=Factory default; no change 1=MV1/MV2 LEDs swapped	0	1	0
40149	0095	General	All	Standard, Enhanced, Full, Elite	Body size of attached valve	Enum	R	Valve body size in inches 0=Unknown Refer to Table 9.	0	3	0
40150	0096	VPS	All	Standard, Enhanced, Full, Elite	VPS disable / enable status	Bool	R	0=VPS disabled 1=VPS enabled	0	1	
40151	0097	VPS	All	Standard, Enhanced, Full, Elite	Max allowed leakage in user units	U16	R	Volumetric flow. See Holding Register 75 for selected units.	28l/h	Refer to Table 9.	NV
40152	0098	VPS	All	Standard, Enhanced, Full, Elite	Space between valves volume. Units according to selected volu-metric units.	U16	R	Volume. See Holding Register 78 for selected units.	0.7	Refer to Table 9.	NV

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Read/ Write	Content	Range		Default Value
Dec	Hex								Min	Max	
40153	0099	VPS	All	Standard, Enhanced, Full, Elite	Extra chamber space for external piping between V1 and V. Units according to selected volumetric units	U16		Volume. See Holding Register 78 for selected units.	0	Refer to Table 9.	NV
40154	009A	VPS	All	Standard, Enhanced	VPS relay polarity. Selectable action during setup.	Bool	R	0=Pressure to close 1=Pressure to open	0	1	
40156	009C	HGP / LGP	All	Standard, Enhanced, Full, Elite	Low gas pressure (LGP) limit lockout type	Enum	R	0=Disabled 1=Auto reset 2=Manual reset Other value invokes an invalid setup	0	2	
40157	009D	HGP / LGP	All	Standard, Enhanced, Full, Elite	High gas pressure (HGP) limit lockout type	Enum	R	0=Disabled 1=Auto reset 2=Manual reset Other value invokes an invalid setup	0	2	
40159	009F	HGP / LGP	All	Standard, Enhanced, Full, Elite	Maximum High gas pressure (HGP) limit % deviation of stored operating pressure selected by user during setup process	S16	R	Value in % % offset = +100%	25	50	
40160	00A0	HGP / LGP	All	Standard, Enhanced, Full, Elite	Maximum Low gas pressure (LGP) limit % deviation of stored operating pressure selected by user during setup process	S16	R		−50	−25	
40161	00A1	HGP / LGP	All	Standard, Enhanced, Full, Elite	Low gas pressure (LGP) and High gas pressure (HGP) setup indication	U16	R	Pressure limits setup indication 0 =LGP limit set value is valid 1 =LGP pressure value too low 2 =LGP selection is below usable pressure module range 3 =LGP pressure value too high 8 =HGP limit set value is valid 9 =HGP pressure value too low 10=HGP selection is below usable pressure module range 11=HGP pressure value too high	0	65535	0

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Read/ Write	Content	Range		Default Value
Dec	Hex								Min	Max	
40162	00A2	HGP / LGP	All	Standard, Enhanced, Full, Elite	Calculated Low gas pressure (LGP) Limit Set Point in user selected pressure units. Based on selected Lo-Gas Limit % of operating pressure and actual measured Operating Pressure during setup (refer to Holding Register 159).	U16	R	0=Invalid value Pressure in user selected units. See Holding Register 74 for selected units.			
40163	00A3	HGP / LGP	All	Standard, Enhanced, Full, Elite	Calculated High gas pressure (HGP) Limit Set Point in user selected pressure units. Based on selected Hi-Gas Limit % of operating pressure and actual measured Operating Pressure during setup (refer to Holding Register 160).	U16	R	0=Invalid value Pressure in user selected units. See Holding Register 74 for selected units.			
40255	00FF	General	All	Standard, Enhanced, Full, Elite	User entered Valve Name	U16	R	2 bytes each = 2 ASCII characters Maximum string length = 10 characters If the registers contain invalid values (not ASCII characters), the default name is displayed	0	65535	
40256	0100	General				U16	R		0	65535	
40257	0101	General				U16	R		0	65535	
40258	0102	General				U16	R		0	65535	
40259	0103	General				U16	R		0	65535	
40285	011D	General	All	Standard, Enhanced, Full, Elite	Date stamp selected by user during setup	U16	R	Year 7 Month 4 Day 5 Year offset of 2000	0	65535	

Table 8. Input Register Mapping

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
30002	0002	General	All	Standard, Enhanced, Full, Elite	Valve electronic software revision	U8 + U8	High byte major Low byte minor
30005	0005	General	All	Standard, Enhanced, Full, Elite	# of currently active alarms with highest priority	S16	–32768=No alarm active alarm
30006	0006	General	All	Standard, Enhanced, Full, Elite	Valve status information	Bit array	0=Reset button 1=MV1 open 2=MV2 open 4=Pressure Module communication OK 6=Safety parameter verification required 7=Lockout 8=Valve cycle counter limit reached
30024	0018	HGP / LGP	All	Standard, Enhanced, Full, Elite	Minimum applicable pressure range for Pressure Module used. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units.

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
30025	0019	HGP / LGP	All	Standard, Enhanced, Full, Elite	Maximum applicable pressure range for Pressure Module used. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units.
30032	0020	PM	All	Standard, Enhanced, Full, Elite	Current Pressure Module pressure reading. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units.
30033	0021	PM	All	Standard, Enhanced, Full, Elite	Pressure Module status	Enum	0 =Operation is not requested 1 =Powered but communication not established 3 =Operating correctly 0x82=Parameters are not valid 0x83=PM used is out of acceptable range 0x85=PM has not been accepted via programming tool 0x89=Sensor state error 0x91=Sensor value comparison error 0xA1=PM EEPROM has not been detected 0xC1=Sensor communication error
30036	0024	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 1 status	Enum	0=No communication established with sensor
30037	0025	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 2 status	Enum	1=Sensor is operating correctly
30038	0026	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 3 status	Enum	2=Sensor is in command mode 4=Sensor diagnostic error 8=Communication error
30041	0029	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 1 serial number	U16	Number
30043	002B	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 2 serial number	U16	Number
30045	002D	PM	All	Standard, Enhanced, Full, Elite	Pressure Module sensor 3 serial number	U16	Number
30054	0036	General	All	Standard, Enhanced, Full, Elite	Valve test mode state	Enum	–1=No test mode is active 2=Installer test/commissioning mode is active
30055	0037	VPS	All	Standard, Enhanced	VPS minimum calculated valve powered time requirement for burner control	U16	Time in seconds
30056	0038	VPS	All	Standard, Enhanced, Full, Elite	VPS Valve 1 status	Enum	0 =Test has not been performed yet 1 =Test was started 3 =Leakage has been calculated 4 =Test is finished 0x83=Leakage is over leakage limit 0x84=Wrong pressure level detected during initialization of VPS test 0xFF=VPS function disabled
30057	0039	VPS	All	Standard, Enhanced, Full, Elite	VPS Valve 2 valve status	Enum	0 =Test has not been performed yet 1 =Test was started 3 =Leakage has been calculated 4 =Test is finished 0x83=Leakage is over leakage limit 0x84=Wrong pressure level detected during initialization of VPS test 0xFF=VPS function disabled
30060	003C	VPS	All	Standard, Enhanced, Full, Elite	Valve 1 maximum leakage detected during last VPS sequence. Shown in user selected flow units.	S16	Volumetric flow. See Holding Register 75 for selected units.

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
30061	003D	VPS	All	Standard, Enhanced, Full, Elite	Valve 2 maximum leakage detected during last VPS sequence. Shown in user selected flow units.	S16	Volumetric flow. See Holding Register 75 for selected units.
30062	003E	VPS	All	Standard, Enhanced, Full, Elite	VPS minimum test time requirement for burner control	S16	Time in seconds
30063	003F	HGP / LGP	All	Standard, Enhanced, Full, Elite	Hi-/Lo-Gas Pressure function status	Enum	0 =HGP and LGP function disabled 1 =HGP and/or LGP function enabled; no pressure setup has been performed 2 =HGP and/or LGP function enabled; pressure is within requested limits 0x10 =In commissioning mode 0x20 =In HGP/LGP test mode 0x81 =Invalid HGP and/or LGP parameters 0x82 =Detected pressure lower than Lo-Gas limit setting 0x83 =Detected pressure higher than Hi-Gas limit setting
30064	0040	HGP / LGP	All	Standard, Enhanced, Full, Elite	Operating pressure value stored for Low gas pressure (LGP) limit setpoint during setup as measured during maximum burner firing rate. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units. 0=Invalid value
30065	0041	HGP / LGP	All	Standard, Enhanced, Full, Elite	Operating pressure value stored for High gas pressure (HGP) limit setpoint during setup as measured during minimum burner firing rate. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units. 0=Invalid value
30078	004E	General	All	Standard, Enhanced, Full, Elite	Valve system states	Enum	Refer to Table 3.
30095	005F	General	All	Standard, Enhanced, Full, Elite	Valve VAC signal status	Bit array	Low status word. Refer to Table 8.
30096	0060	General				Bit array	High status word. Refer to Table 8.

Note: Input registers 139 – 213 contain the fault history. The last 15 fault records are stored. Each record consists of 5 consecutive input registers; 1 input register holds the fault code, 2 input registers hold the time stamp and 2 input registers hold the valve cycle count recorded at the moment of fault occurrence. The time stamp is recorded with resolution 0.25 hr.

The 4 time stamp / cycle count input registers for each fault contain a 32-bit value stored in mode 3-2-1-0. The input register with lower number contains the upper bytes of the 32-bit number (bytes 3 and 2) and the input register with higher number contains the lower bytes of the 32-bit number (bytes 1 and 0).

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
30139	008B	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of most recent fault	U16	Number
30140	008C	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of most recent fault	U16	Upper 2 bytes
30141	008D	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30142	008E	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of most recent fault	U16	Upper 2 bytes
30143	008F	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30144	0090	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of previous fault	U16	Number
30145	0091	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of previous fault	U16	Upper 2 bytes
30146	0092	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30147	0093	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of previous fault	U16	Upper 2 bytes
30148	0094	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30149	0095	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 2nd previous fault	U16	Number
30150	0096	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 2nd previous fault	U16	Upper 2 bytes
30151	0097	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30152	0098	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 2nd previous fault	U16	Upper 2 bytes
30153	0099	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30154	009A	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 3rd previous fault	U16	Number

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
30155	009B	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 3rdprevious fault	U16	Upper 2 bytes
30156	009C	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30157	009D	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 3rd previous fault	U16	Upper 2 bytes
30158	009E	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30159	009F	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 4th previous fault	U16	Number
30160	00A0	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 4th previous fault	U16	Upper 2 bytes
30161	00A1	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30162	00A2	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 4th previous fault	U16	Upper 2 bytes
30163	00A3	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30164	00A4	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 5th previous fault	U16	Number
30165	00A5	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 5th previous fault	U16	Upper 2 bytes
30166	00A6	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30167	00A7	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 5th previous fault	U16	Upper 2 bytes
30168	00A8	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30169	00A9	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 6th previous fault	U16	Number
30170	00AA	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 6th previous fault	U16	Upper 2 bytes
30171	00AB	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30172	00AC	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 6th previous fault	U16	Upper 2 bytes
30173	00AD	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30174	00AE	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 7th previous fault	U16	Number
30175	00AF	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 7th previous fault	U16	Upper 2 bytes
30176	00B0	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30177	00B1	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 7th previous fault	U16	Upper 2 bytes
30178	00B2	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30179	00B3	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 8th previous fault	U16	Number
30180	00B4	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 8th previous fault	U16	Upper 2 bytes
30181	00B5	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30182	00B6	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 8th previous fault	U16	Upper 2 bytes
30183	00B7	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30184	00B8	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 9th previous fault	U16	Number
30185	00B9	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 9th previous fault	U16	Upper 2 bytes
30186	00BA	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30187	00BB	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 9th previous fault	U16	Upper 2 bytes
30188	00BC	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30189	00BD	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 10th previous fault	U16	Number
30190	00BE	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 10th previous fault	U16	Upper 2 bytes
30191	00BF	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30192	00C0	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 10th previous fault	U16	Upper 2 bytes
30193	00C1	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30194	00C2	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 11th previous fault	U16	Number
30195	00C3	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 1th previous fault	U16	Upper 2 bytes
30196	00C4	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30197	00C5	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 11th previous fault	U16	Upper 2 bytes
30198	00C6	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30199	00C7	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 12th previous fault	U16	Number
30200	00C8	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 12th previous fault	U16	Upper 2 bytes
30201	00C9	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30202	00CA	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 12thprevious fault	U16	Upper 2 bytes
30203	00CB	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
30204	00CC	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 13th previous fault	U16	Number
30205	00CD	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 13th previous fault	U16	Upper 2 bytes
30206	00CE	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30207	00CF	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 13th previous fault	U16	Upper 2 bytes
30208	00D0	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30209	00D1	Alarms	All	Standard, Enhanced, Full, Elite	Fault code of 14th previous fault	U16	Number
30210	00D2	Alarms	All	Standard, Enhanced, Full, Elite	Time stamp of 14th previous fault	U16	Upper 2 bytes
30211	00D3	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30212	00D4	Alarms	All	Standard, Enhanced, Full, Elite	Cycle count of 14th previous fault	U16	Upper 2 bytes
30213	00D5	Alarms	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes Resolution 0.25 hr
30214	00D6	General	All	Standard, Enhanced, Full, Elite	Valve accumulated operation time in hours	U16	Upper 2 bytes
30215	00D7	General	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes Resolution 0.25 hr
30216	00D8	General	All	Standard, Enhanced, Full, Elite	Valve accumulated number of cycles. Either MV1 or MV2, whichever is higher.	U16	Upper 2 bytes
30217	00D9	General	All	Standard, Enhanced, Full, Elite		U16	Lower 2 bytes
30270	010E	VPS		Standard, Enhanced, Full, Elite	Valve 1 accumulated hours recorded during last VPS sequence	U16	Upper word
30271	010F	VPS		Standard, Enhanced, Full, Elite		U16	Lower word
30272	0110	VPS		Standard, Enhanced, Full, Elite	Valve 1 accumulated cycles recorded during last VPS sequence	U16	Upper word
30273	0111	VPS		Standard, Enhanced, Full, Elite		U16	Lower word
30274	0112	VPS		Standard, Enhanced, Full, Elite	Valve 2 accumulated hours recorded during last VPS sequence	U16	Upper word
30275	0113	VPS		Standard, Enhanced, Full, Elite		U16	Lower word
30276	0114	VPS		Standard, Enhanced, Full, Elite	Valve 2 accumulated cycles recorded during last VPS sequence	U16	Upper word
30277	0115	VPS		Standard, Enhanced, Full, Elite		U16	Lower word
30288	0120	Safety Parameter	All	Standard, Enhanced, Full, Elite	Safety Parameters Verification status	Enum	0x0 =Initial state; parameters have not been verified 0x1 =All safety parameters verified 0x82 =Modifications have been made, waiting for verification 0x83 =Parameters verified, valve waiting for reset button 0x8000=There are unverified parameter(s)

Table 9. VAC Signals Status.

Bit	Vac Signal	Signal State
0	Valve 1 demand	0=Inactive (off)
1		1=Active (on)
2	Valve 2 demand	2=Invalid
3		
4	Interlock string	
5		
6	Proof of closure feedback	
7		
8	Solenoid 1 feedback – full power mode	
9		
10	Solenoid 2 feedback – full power mode	
11		
12	Solenoid 1 feedback – power save mode	
13		
14	Solenoid 2 feedback – power save mode	
15		
16	Solenoid 1 feedback for MV1 relay test – full power mode	
17		

Table 10. Table 10. VPS valve body dependent parameter limits.

Valve Body (HR149)	Maximum of Leakage Limit (HR151)	Chamber Volume (HR152)	Maximum of Extra Volume (HR153)	Description
0	50 liters/hour	0	0.7	Non defined value
1	50 liters/hour	0.44	0.7	0.75/1.0 inch (DN20/25) valves
2	142 liters/hour	1.50	1.2	1.5/2.0 inch (DN40/50) valves

FAULT CODES

There are several possible fault conditions, some of which are dependent on the valve configuration ordered and installed accessories. The HMI and PC Tools provide detailed fault code descriptions and remediation steps for the operator to follow to rectify any fault condition. The information in this section details all of the possible fault codes and their remediation steps.

NOTE: Upon valve reset after a fault, the software will not allow the valve seats to be re-powered by the burner control for 7 seconds to accommodate various flame failure response timings.

Table 11. SV2 Series Fault Conditions.

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Data Error	EEPROM corrupt	Main electronics EEPROM is corrupt.	1.) Reset valve and burner management system then cycle power. 2.) If fault persists replace main electronics. 3.) Recommission all valve parameters.	
Data Error	EEPROM lockout code mis-match	Main electronics EEPROM lockout code storage value incorrect.	1.) Reset valve and burner management system then cycle power. 2.) If fault persists replace main electronics.	
Data Error	Valve body parameter missing	Valve body parameters not defined in electronics memory. This may occur when the valve main electronics have been replaced in the field.	Set valve body parameters by accessing the valve guided setup screens.	
ILK	Valve Interlock Out (ILK OUT) signal fault	Valve ILK OUT terminal signal is not valid. Frequency or duty is out of expected range.	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect ILK OUT and ILK IN wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper operation in conjunction with burner management system inputs. 3.) Measure ILK voltage for proper tolerance per valve nameplate and documentation. 4.) If fault persists, repeat above steps for L1 and N connections. 5.) If fault persists, replace valve main electronics.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
ILK	Valve Interlock Out (ILK OUT) signal mis-match	Valve Interlock Out (ILK OUT) terminal energized while valve internal ILK relay is not energized. Possible internal valve fault, mis-wiring, stuck/welded relay or jumper present.	1.) Measure ILK OUT voltage and verify it does not exist during lockout. 2.) Reset valve and burner management system, observing valve / burner operation. Measure ILK IN and ILK OUT voltages and verify proper values during a burner/valve run state. **3.) Remove power and shut-off gas supply as necessary.** 4.) Verify no jumpers exist between L1 and valve ILK OUT terminals or ILK IN and ILK OUT terminals. 5.) Verify that ILK IN and ILK OUT are not reversed; check against wiring diagrams in valve installation instructions, 32-00018. 6.) Replace cover and restore power and gas. Cycle valve and burner and monitor for proper operation in conjunction with burner management system inputs as in step 2.). 6.) If fault persists, replace valve main electronics.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments

ILK	Valve Interlock In (ILK IN) not energized	Valve Interlock In (ILK IN) terminal not energized while MV1 and MV2 are energized.
		
		Possible improper burner management timing/wiring, jumper or internal valve fault.
			⚠️ **WARNING**
			Explosion Hazard.
			Can cause severe injury, death or property damage
			
			1.) Remove power and shut–off gas supply
			
			2) Remove valve front electrical enclosure and
			
			  a.) Verify no jumpers exist between L1 and MV1 / MV2 and any wiring errors that could provide power to MV1 / MV2 terminals. Correct any errors.
			
			  b.) Verify proper ILK IN and ILK OUT wire routing from and to burner management system; check against wiring diagrams in valve installation instructions, 32-00018.
			
			  c.) Inspect wiring connections for wire engagement, seating, pin engagement and cleanliness.
			
			  d.) Check for voltage between L2 / neutral and earth ground at the valve and at the burner management system. Correct any wiring errors providing a powered ground, floating neutral or improper ground reference.
			
			3.) Replace cover and restore power (NOT gas). Reset valve and burner management system, monitoring for proper operation in conjunction with burner management system inputs.
			
			4.) Verify valve ILK IN voltage exists when a call for heat demand is present to burner management system. Verify valve ILK OUT voltage exists during a burner/valve run state.
			
			5.) If fault persists, replace burner management system or contact manufacturer for advice.
			
			6.) If fault persists, replace valve main electronics.
			
			7.) When fault is corrected, restore gas supply.	

ILK	Valve Interlock Out (ILK OUT) relay fault	Valve Interlock Out (ILK OUT) safety relay internal drive fault detected.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Main Electronics	Reset button fault	Reset button has been pressed too long or is stuck.	1.) Attempt valve reset by depressing and holding button for 2 seconds. 2.) If fault persists, replace valve main electronics.	
Main Electronics	Solenoid internal VAC feedback	Solenoid 1 and/or solenoid 2 internal feedback VAC signal shorted as sensed by valve main electronics.	1.) Reset valve and burner management system. 2.) If fault persists, replace valve main electronics.	
Main Electronics	Analog to digital test failure	The valve main electronics low voltage supply or AD (analog to digital) converter has failed	1.) Reset valve and burner management system. 2.) If fault persists, replace valve main electronics.	
Main Electronics	PM or FARMOD power supply fault	There is a power supply fault on the valve main electronics assembly for the Pressure Module and/or Fuel/Air Module.	**Remove power and shut-off gas supply** 1.) Remove valve front electrical enclosure and disconnect Pressure Module and Fuel/Air Module connections, if present. 2.) Restore power. 3.) Reset valve and burner management system 4.) If fault persists, replace valve main electronics. 5.) Reconnect Pressure Module (if present) to valve main electronics. 6.) If fault persists, replace Pressure Module. 7.) Reconnect Fuel/Air Module (if present) to valve main electronics. 8.) If fault persists, replace Fuel/Air Module. 9.) Replace electrical enclosure cover, restore power and gas supply and reset valve and burner management system.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
MV1	MV1 signal fault	MV1 (Main Valve 1) terminal signal is not valid. Frequency or duty is out of expected range.	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect MV1, L1 and N wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Ensure MV1 is wired to proper terminals on burner management system. 3.) Replace cover and restore power and gas. Reset valve and burner management system. 4.) If fault persists, repeat above steps for L1 and N connections on the burner management system. 5.) If fault persists, replace valve main electronics.	
MV2	MV2 signal fault	MV2 (Main Valve 2) terminal signal is not valid. Frequency or duty is out of expected range.	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect MV2, L1 and N wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Ensure MV2 is wired to proper terminals on burner management system. 3.) Replace cover and restore power and gas. Reset valve and burner management system. 4.) If fault persists, repeat above steps for L1 and N connections on the burner management system. 5.) If fault persists, replace valve main electronics.	
Phase	Incoming voltages out of phase	Valve incoming L1 VAC to POC or VPS or L1 VAC from burner management system to valve ILK IN, MV1 / MV2 is out of phase.	1.) Reset valve and burner management system, monitoring for proper operation. 2.) Check the valve power supply to make sure that both frequency and voltage meet the specifications. 3.) Verify that the valve, burner management system and associated devices are fed from the same phase. If a VFD (variable frequency drive) is present, ensure that it does not share a common neutral or ground.	Warning indication for SV2 valve.

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Pressure Limits	Lo-Gas pressure lockout	Low gas pressure below threshold	1.) Reset valve and burner management system, observing burner operation for proper pressures. 2.) Adjust appliance regulator as necessary. 3.) Recommission Low gas pressure setting as necessary.	
Pressure Limits	Hi-Gas pressure lockout	High gas pressure above threshold	1.) Reset valve and burner management system, observing burner operation for proper pressures. 2.) Adjust appliance regulator as necessary. 3.) Recommission High gas pressure setting as necessary.	
Pressure Limits	Lo-/Hi-Gas pressure not configured	Pressure Module not configured for low and high gas pressure functions	**NOTE: Low and High gas pressure settings must be configured before valve will be operational** 1.) Commission Low and High gas pressure settings as necessary.	
Pressure Limits	Hi-Gas pressure setting not usable	Selected Hi-Gas Limit Switch Operating Pressure % results in a pressure which is above the usable Pressure Module range. Hi-Gas Limit Switch setting cannot be set.	1.) Decrease valve inlet pressure or select a higher rated Pressure Module. 2.) If Hi-Gas Pressure Limit is above 10 psi / 689mbar / 0.7 kg/mm2 you cannot use this valve and Pressure Module.	Warning indication for SV2 valve.
Pressure Limits	Hi-Gas pressure setting above range	Selected Hi-Gas Limit Switch Operating Pressure % results in a pressure which is above the usable Pressure Module range. Hi-Gas Limit Switch % decreased and Hi-Gas Limit changed to a usable Pressure Module range.	If new Hi-Gas Pressure Limit is not acceptable, decrease valve inlet pressure or select a higher rated Pressure Module.	Warning indication for SV2 valve.
Pressure Limits	Lo-Gas pressure setting not usable	Selected Lo-Gas Limit Switch Operating Pressure % results in a pressure which is below the usable Pressure Module range. Lo-Gas Limit Switch setting cannot be set.	Increase valve inlet pressure or select a lower rated Pressure Module.	Warning indication for SV2 valve.

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Pressure Limits	Lo-Gas pressure setting below range	Selected Lo-Gas Limit Switch Operating Pressure % results in a pressure which is below the usable Pressure Module range. Lo-Gas Limit Switch % increased and Lo-Gas Limit changed to a usable Pressure Module range.	If new Lo-Gas Pressure Limit is not acceptable, increase valve inlet pressure or select a lower rated Pressure Module.	Warning indication for SV2 valve.
Pressure Limits	Pressure out of allowed range	Valve pressure is out of the allowed Pressure Module range.	1.) Verify the Pressure Module rating is correct for the application. 2.) If the pressure module is correct, reset valve and burner management system, observing burner operation for proper pressures. 3.) Adjust appliance regulator as necessary. 4.) If inlet pressure is higher than Pressure Module rating, remove power and shut off gas supply and replace Pressure Module with higher rated model.	
Pressure Module	Pressure Module reading fault	Pressure Module communication fault or pressure measurement reading error	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and verify the Pressure Module terminating connector is fully inserted in the socket labeled 'PRESSURE' in the electrical enclosure. 2.) Check for a nearby source of strong electro-magnetic interference. Reset valve and burner management system when corrected. 3.) Remove Pressure Module from valve body. 4.) Inspect the O-ring provided on the Pressure Module to ensure that it is clean and fully seated in its oval groove. 5.) Verify the Pressure Module is correctly seated on the valve body locating posts, is flush against the valve casting and the O-ring is compressed. 6.) Verify the correct mounting location and pressure port are being used for the valve model – refer to documents 32-00017 and 32-00029. 7.) Recommission Low and High gas pressure settings as necessary.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Pressure Module	Pressure Module over pressure	System pressure above Pressure Module rating	1.) Verify the Pressure Module rating is correct for the application. 2.) If the Pressure Module rating is correct, reset valve and burner management system, observing burner operation for proper pressures. 3.) Adjust appliance regulator as necessary. 4.) Recommission Low and High gas pressure settings as necessary. 5.) Test Low and High gas pressure trip points as necessary. 6.) If inlet pressure is higher than Pressure Module rating, remove power and shut off gas supply and replace Pressure Module with higher rated version.	
Solenoid 1	Solenoid 1 relay fault	Solenoid 1 relay was detected closed during SSOV cycle test	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	
Solenoid 1	Solenoid 1feeback fault	Solenoid 1 feedback sensed at valve main electronics while MV1 terminal is not energized. Possible internal valve electronics fault.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	
Solenoid 1	Solenoid 1 not powered	Solenoid 1 feedback not sensed at valve main electronics while MV1 terminal is energized. Possible internal valve electronics fault.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	
Solenoid 1	Solenoid 1 mode fault	Solenoid 1 expected and detected mode do not match.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Solenoid 1	Solenoid 1 signal fault	Solenoid 1 terminal signal is not valid. Frequency or duty is out of expected range.	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect SOLENOID 1 and MV1 wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Ensure MV1 is wired to proper terminals on burner management system. 3.) Replace cover and restore power and gas. Reset valve and burner management system. 4.) Measure MV1 voltage for proper tolerance per valve nameplate and documentation. 5.) If fault persists, repeat above steps for L1 and N connections. 6.) If fault persists, replace valve main electronics. 6.) If fault persists, replace valve main electronics.	
Solenoid 2	Solenoid 2 feedback fault	Solenoid 2 feedback sensed at valve main electronics while MV2 terminal is not energized. Possible internal valve electronics fault.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics.	
Solenoid 2	Solenoid 2 not powered	Solenoid 2 feedback not sensed at valve main electronics while MV2 terminal is energized. Possible internal valve electronics fault.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics	

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Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
Solenoid 2	Solenoid 2 signal fault	Solenoid 2 terminal signal is not valid. Frequency or duty is out of expected range.	**Remove power and shut-off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect SOLENOID 2 and MV2 wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Ensure MV2 is wired to proper terminals on burner management system. 3.) Replace cover and restore power and gas. Reset valve and burner management system. 4.) Measure MV2 voltage for proper tolerance per valve nameplate and documentation. 5.) If fault persists, repeat above steps for L1 and N connections. 6.) If fault persists, replace valve main electronics.	
Solenoid 2	Solenoid 2 mode fault	Solenoid 2 expected and detected mode do not match.	1.) Reset valve and burner management system, observing valve / burner operation. 2.) If fault persists, replace valve main electronics	
Verification Needed	Safety parameter verification	One or more safety parameters have been modified and/or waiting for verification procedure.	Perform safety parameters verification procedure. Go to Setup & Tests screen, press button Verify Safety Parameters.	
VPS	VPS Test Failure	Correct VPS sequence hasn't been detected yet	1.) Perform VPS sequence 2.) If this state is still indicated, verify if VPS valve open time is set to 3s and VPS measure time is set to 10s or higher.	Warning indication for SV2 valve. But this condition will likely cause a burner controller lockout.

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments
VPS	VPS Test Failure	Input pressure detected during VPS is too low	**Remove power and shut–off gas supply as necessary.** 1.) Remove valve front electrical enclosure and inspect SOLENOID 1 and SOLENOID 2 wiring connections for proper placement, wire engagement, seating, pin engagement and cleanliness. 2.) Verify if the V2 seat is experiencing a large leakage rate. 3.) Verify the Pressure Module rating is correct for the application. 4.) Replace cover and restore power and gas. Reset valve and burner management system as required. 5.) Adjust appliance regulator to higher pressure.	Warning indication for SV2 valve. But this condition will likely cause a burner controller lockout.

HMI TOOL SOFTWARE UPDATES

Occasionally HMI software updates will be available for various product releases and other necessary updates. Typically, a communication regarding software updates will be distributed to customers to alert them of the updates and how to proceed in obtaining the software files, if required.

To update the HMI software the following steps must be followed:

- Place the files directly on the root directory of a USB drive.
- Power down the HMI.
- Place the USB drive in the USB slot on the back of the HMI.
- Power up the HMI. The update will automatically take place via the attached USB drive. Once the Welcome screen appears, remove the USB drive.
- The HMI can now be used.

PC TOOL SOFTWARE UPDATES

Occasionally PC Tool software updates will be available for various product releases and other necessary updates. Typically, a communication regarding software updates will be distributed to customers to alert them of the updates and how to proceed in obtaining the software files and updating the PC program, if required.

Disposal and Recycling

Waste electrical products should not be disposed of with general waste.

Please recycle where these facilities exist. Check with your local authority for recycling advice.

For more information on this product and the entire SV2 Series product line, please refer to the SV2 Series User Guide located on our website at
http://www.combustion.
honeywell.com/SV2Series

Honeywell

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