

SV2 Series Safety Shut-off Valves

VALVE AND HMI/PC TOOL SOFTWARE REVISION 12.01 / 12.01.002 OR LATER

V2F, V2V

USER MANUAL



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CHAPTER 1: INTRODUCTION

SV2 Series valves are built on a flexible platform comprising various functions, voltages, capacities, features and accessories.

With various levels of embedded intelligence, there is an SV2 Series valve for any application.

DOCUMENTATION

This document contains background and operation information for the Honeywell SV2 Series safety shut-off valves and accessories.



Other applicable publications are:

- 32-00017, Pressure Module Installation Instructions
- 32-00018, SV2 Series Valves Installation Instructions
- 32-00028, AB Flange Kits Installation Instructions
- 32-00030, HMI Tool Installation Instructions
- 32-00031, HMI/PC Tool User Manual
- 32-00036, CD Flange Kits Installation Instructions
- 32-00037, PC Tool Installation Instructions
- 32-00038, Replacement Solenoid Installation Instructions
- 32-00039, Replacement Electronics Installation Instructions
- 32-00040, Replacement FARMOD Installation Instructions
- 32-00044, Mixing Units Installation Instructions
- 32-00151, SV2 Series Security Manual
- 32-00180, Premix Accessories Installation Instructions
- 65-0237, C6097A,B Pressure Switches Product Data
- 32-00241, Eula License Manual
- EN1R-9172 9907R1-NE, C6097A Gas Pressure Switches Instruction Sheet (EU)

All publications can be downloaded from <http://customer.honeywell.com>.

APPLICABLE MODELS / VERSIONS

This manual revision covers SV2 Series valves with on/off functionality for the 1 inch (DN25) size.

FEATURES

- Various levels of intelligence
- Side flexible, modular electronics
- Smart Pressure Module can be used for low gas pressure limit, high gas pressure limit and VPS (valve proving sequence) (model dependent)
- HMI or PC Tools for programming, monitoring and troubleshooting
- Communication BUS (model dependent)
- Power saving solenoids
- Proof of closure switch(es)

WHEN INSTALLING THIS PRODUCT...

1. Read these instructions and the appropriate product literature carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Installer must be a trained, experienced combustion service technician.
3. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application. Do not exceed the valve ratings.
4. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage.
5. All wiring must comply with the National Electric Code (NEC) and any applicable local electrical codes, ordinances and regulations.
6. After installation is complete, carry out a thorough checkout of product operation as laid out in the valve installation instructions, 32-00018.

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.

The valve and accessories 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.

VALVES

Configuration and Capacity

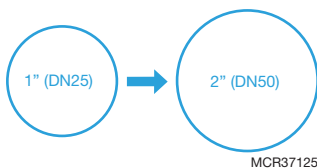
Customers must order their valve configuration, starting with identifying the valve function. Refer to [Fig. 1 Valve nomenclature](#), for full valve model structure. Current and future available valve functions include:

- V2F = On/off

Other selectable items include voltage, capacity, port threads, NEMA 1/IP20 or NEMA 4/IP66 with conduit connections enclosure rating, proof of closure switch(es), intelligence level and electronics orientation. Available features are dependent on release schedule dates.

The valve platform is comprised of two body sizes, split up into two capacity ranges per body.

- The 1 in. (DN25) valve body was designed with ¾ in. (DN20) and 1.0 in. (DN25) inserts, designated as A and B capacity ranges, respectively. The ¾ in. (DN20) is a potential future release.



- The 2 in. (DN50) valve body has 1.5 in. (DN40) and 2.0 in. (DN50) inserts, designated as C and D capacity ranges.

In the valve model number, accessories and replacement parts such as flanges, solenoids and filters, the AB and CD nomenclature is consistently used to identify the applicable valve body size / capacity.

Intelligence

There are 2 available levels of valve intelligence, however, order availability of various models may be limited to North America or the European Union plus the rest of the world. As well, only certain intelligence levels are available with certain valve functions. The 9th digit in the valve model number signifies the embedded intelligence level. Throughout this manual, reference is made to the available Intelligent Features designation as follows:

- 5 = BASIC. No Modbus or Pressure Module compatibility (SV20).
- 6 = STANDARD. Includes Modbus, Pressure Module compatible, external VPS using Pressure Module (SV200).

Communication

Valve models with intelligence levels of 6 have embedded Modbus RTU communications. When connected to the HMI or PC Tools, Modbus registers are auto-discovered so communications are automatic. With the PC Tool, a USB to RS-485 converter is required as an interface between the computer and the valve. Since the Modbus RTU communication used is an open protocol, the SV2 Series



valves may be wired to a building automation system master directly or through a secondary port on the HMI Tool.

The building automation system master control must be programmed to recognize the various SV2 Series valve Modbus registers, however. Refer to the MODBUS COMMUNICATION section of this manual for the Modbus addressing and the HMI Tool installation instructions, 32-00030, for wiring information. Wiring and installation for the PC Tool may be found in document 32-00037.

Modular Electronics

The SV2 Series valve main electronics are side flexible as well as the Pressure Modules. The electronics configuration is ordered from the factory, but may be changed in the field as required. Refer to the CHANGING VALVE / ELECTRONICS ORIENTATION section of this manual for instructions on this procedure.

ACCESSORIES

After configuring the valve model, customers may purchase accessories such as flanges, a Pressure Module or an HMI or PC programming tool. All of these items are ordered separately. For a list of available accessories, refer to the VALVE ACCESSORIES AND REPLACEMENT PARTS / [Table 1](#) section of this manual.

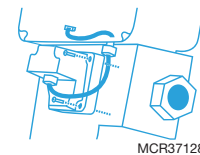
Flanges

Different flange sizes are available for each of the two valve body sizes. Each flange model follows the AB and CD size/capacity nomenclature to easily identify which valves they fit.



Pressure Modules

The Pressure Module is a compact device, which can be used for multiple functions. It may be placed in any of 4 locations on the valve, depending on the valve model and what functions are required. The Pressure Module may be used for low gas pressure limit, high gas pressure limit, VPS (valve proving sequence) and/or leak detection. It contains embedded sensors which relay pressure measurements to the valve main electronics which in turn process the information for the programmed features. The Pressure Module features are programmed via the HMI or PC Tool programming devices. Eight different models of Pressure Modules are available; NEMA 4/IP66 in 4 different pressure ranges and NEMA 1/IP20 in 4 different pressure ranges. For further information on this accessory, refer to the PRESSURE MODULE section of this manual and/or the Pressure Modules installation instructions, document 32-00017.



Pressure Switches

Traditional C6097 pressure switches are also compatible with the SV2 Series valves. C6097 models are SPDT and are available in 1/4 in. NPT and flange mount, auto or manual reset, action on pressure rise or action on pressure fall with nine (9) available pressure ranges. Flange mount C6097s may be mounted on any of 4 locations on the valve, depending on the valve model. C6097 pressure switches may be used for low gas pressure limit, high gas pressure limit or VPS (valve proving sequence) functions. Functionality may be limited by the mounting type and mounting location. For detailed information on the usage of this accessory with the SV2 Series valves, refer to the C6097 PRESSURE SWITCHES section of this manual.

HMI or PC Tools

Programming tools for the SV2 Series valves are available in an HMI (human machine interface) or in a PC version. The HMI or PC Tools are used to program the intelligent SV2 valve features including:

- Valve Modbus address + communication speed
- Pressure monitoring via Pressure Module
- Low gas pressure limit setting and reset type
- High gas pressure limit setting and reset type
- VPS (valve proving system) operation
- Fuel/air firing curve (Premix/V2V valves)

The HMI or PC Tools can also be used for SV2 valve monitoring, trending, diagnostics and troubleshooting. Troubleshooting is facilitated by on-board fault messaging with remediation steps. Up to 8 valves may be connected to a single HMI or PC Tool. For further information, refer to the following documents:

- 32-00030, HMI Tool Installation Instructions
- 32-00037, PC Tool Installation Instructions
- 32-00031, HMI / PC Tool User Manual

REPLACEMENT PARTS

Replacement parts are available so that the entire valve does not have to be replaced, depending on the service situation. Available replacement parts include the valve and HMI electrical connectors, solenoid coils, valve electronics and Pressure Modules. For a list of available replacement parts, refer to the VALVE ACCESSORIES AND REPLACEMENT PARTS / [Table 1](#) section of this manual.

Valve Connectors

Customers may purchase the Honeywell SV2 Series valve with or without required electrical connectors included (continent dependent). If purchased with electrical connectors, they

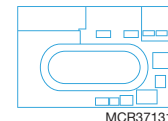
may be found in a bag assembly, housed in the box that contains the literature and spare screws for mounting the Pressure Module or C6097 pressure switch. If the valve is not purchased with the required electrical connectors, they may be purchased separately under Honeywell part number CONNECTORKIT-000 or purchased externally. For applicable connector parts, refer to the WIRING OVERVIEW section of this manual.

Solenoids

Replacement valve solenoids are available as well. Part numbers are designated by the prefix COIL, valve body size / capacity (AB, CD) and voltage.

Valve Electronics

Field replacement main valve electronics assemblies are also available. The assembly consists of the removable plastic insert and the electronics circuit board. Available replacement electronics parts are designated by 'REL' followed by the enclosure rating, voltage and IQ (intelligence) level.



Pressure Modules

Pressure Modules are ordered separately from the valve, but also may be ordered as field additions / replacements.

VALVE SPECIFICATIONS

Valve Inlet / Outlet Port Sizes:

1, 1-1/2, 2 inches
DN25, DN40, DN50

Flange Sizes:

Valve size: 1 inch (DN25):
1/2, 3/4, 1 and 1 1/4 in. NPT or BSPP
DN15, 20, 25, 32

Valve size: 1 1/2 and 2 in. (DN40 and DN50):
1, 1 1/4, 1 1/2, 2 in. NPT or BSPP
DN25, 32, 40, 50

Pressure Port Sizes:

1/8 in. (3 mm) NPT or BSP

Flange Pressure tap sizes and threads:

NPT flanges:

1/8-27" (3 mm) NPT. Torque 7±1 Nm (62±9 in-lbf).

BSP flanges:

1/8-28" (3 mm) BSP. Torque 1.5±0.15 Nm (13.3±1.3 in-lbf).

NOV Port Sizes:

1 in. (DN25) valves: 3/4 in NPT
1-1/2 and 2 in. (DN40/DN50) valves: 1 in. NPT

Capacity Ratings:

See [Table 2](#) and [Figs 7-12](#).

Valve Electrical Ratings (given per coil):

1 in. valves (DN25)
24VAC, 50/60 Hz, Vtest/Vrms
24VAC, Pull in (2 sec) 1.6 amps/35 Watts, Hold 0.8 amps/15 Watts
100-120 VAC, 50/60 Hz, Vtest/Vrms 120VAC, Pull in (2 sec) 0.5 amps/55 Watts, Hold 0.3 amps/20 Watts
200-240 VAC, 50/60 Hz, Vtest/Vrms 240VAC, Pull in (2 sec) 0.3 amps/55 Watts, Hold 0.2 amps/20 Watts
1.5 in. and 2 in. valves (DN40/50)
100-120 VAC, 50/60 Hz, Vtest/Vrms 120VAC, Pull in (2 sec) 1.0



amps/110 Watts, Hold 0.5 amps/40 Watts¹
 200-240 VAC, 50/60 Hz, Vtest/Vrms 240VAC, Pull in (2 sec) 0.6
 amps/110 Watts, Hold 0.3 amps/40 Watts

All voltages are -15%/+10%VAC

¹ Hold in voltage is 94VAC at 63°C (145°F) or -6%

All values at 20°C (68°F)

External Load Relay Ratings:

ILK / Interlock: 24, 100-240 VAC, 50/60 Hz, 8 amps

VPS / Valve Proving contact: 24, 100-240 VAC, 50/60 Hz, 0.1 amps

POC / Proof of Closure contact: 24, 100-240 VAC, 50/60 Hz, 0.1 amps

SSOV Class Ratings:

All valves Class A rated (EN161)

Safety combination valve for control of gaseous fluids in gas consuming appliances in accordance with international standards

Pressure Ratings

Fuel/air versions (V2V): 1.45 psi / 0.1 kg/cm² / 100 mbar

NOTE: In most cases the fuel/air valve inlet pressure needs to be limited/regulated between limits depending on the application.

On/off versions (V2F): 10 psi / 0.7 kg/cm² / 689 mbar

MOPD: 9.94 psi / 685 mbar

Valve Opening Time:

1 second maximum at 68 °F (20 °C)

Valve Closing Time:

1 second maximum at 68 °F (20 °C)

CV Ratings:

1.0 in (DN25) valve with flanges 0.5 in/0.75/1/1.25 = DN15/20/25/32:
 6.8/9.3/10.1/10.6

1.5 in (DN40) valve with flanges 1 in/1.25/1.5/2 = DN25/32/40/50:
 21.5/25.6/25.9/26.8

2.0 in (DN50) valve with flanges 1 in/1.25/1.5/2 = DN25/32/40/50:
 27.2/36.7/40.7/45.0

Mounting Position:

Vertical to 90 degrees from vertical, refer to [Fig. 19](#).

Material:

Valve body: Die-cast aluminum alloy

Electrical enclosure: Valox™ 553

Closing Spring:

AISI 302 steel

Valve Plunger:

11SMn30 steel with electroless nickel plating sliding on anti-friction bearing

Seals and Gaskets:

FVMQ (Fluorsilicone)

Torsion and Bending Stress:

Pipe connections meet group 2 according to EN161 requirements

Electrical Equipment:

AC rectified coils with separated rectifier and power saving circuitry inside the cover

Coil Insulation Solenoid Valves:

Insulation material is specified according to class F

Duty Cycle:

Coils are suitable for permanent energizing via SV2 Series valve electronics with power saving

Weight:

1 in. valves (DN25)

On/Off: 18.8 lb (8.5 kg)

Fuel/Air: 20.0 lb (9.1 kg)

1.5 and 2 in (DN40/50) valves

On/Off: 46.1 lb (20.9 kg)

Fuel/Air: 50.2 lb (22.8 kg)

Dimensions:

See [Figs. 2-6](#).

Approvals:

cULus (Underwriters Laboratories): Electrically operated valves. Vol 11 valve body, Vol 12 control boards. (24VAC, 100-120 VAC valves)
 File MH1639
 UL429, UL353 and UL1998.

NEMA 1 / IP20 valves: Recognized

NEMA 4 / IP66 valves: Listed

FM7400 Approved (100-120VAC, 24VAC PENDING). On/Off valves only.

CSD-1 Acceptable (24VAC, 100-120 VAC valves)

CSA Approved for US and Canada (100-120 VAC valves, 24VAC PENDING)

Certificate #70086210

ANSI Z21.20-2014 CAN/CSA-C22.2 NO. 60730-2-5-14 /

UL 60730-2-5

ANSI Z21.21-2015 CSA 6.5-2015

Commercial / Industrial Certified (24VAC, 100-120 VAC valves)

FCC Part 15, Class A Digital Device

Complies with standard ANSI Z21.21-CSA6.5 (24VAC, 100-120 VAC)

CE Approved per (100-120VAC, 200-240VAC valves):

EN 1643:2014 Safety and control devices for gas burners and gas burning appliances - Valve proving systems for automatic shut-off valves

EN 13611:2015 Safety and control devices for gas burners and gas burning appliances - General requirements

EN 1854:2010 Pressure sensing devices for gas burners and gas burning appliances

EN 161:2011 + A3:2013 Automatic shut-off valves for gas burners and gas appliances

EN 12067-2:2004 Gas/air ratio controls for gas burners and gas burning appliances. Electronic types.

EN 126:2012 Multifunctional controls for gas burning appliances

EN 298:2012 Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

Pin number 0063CQ1175

Certificate # 18GR0759/00

NOTE: The Pressure Module is not a stand-alone product and must be used with a SV2 Series valve and thus is specified as part of the valve approvals.

Applicable Gas Types:

Natural gas or liquid propane (LP) only

EU designations: 2nd and 3rd families



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Environmental Ratings:

Electrical enclosure: NEMA 1 / IP20 or NEMA 4 / IP66

Storage/Shipping Conditions:

-40 to 150 °F (-40 to 66 °C)

95% RH at 104 °F (40 °C) and 30 in. Hg (1013.25 mbar)

Maximum storage duration of 6 months at these conditions

Operating/Fluid Temperature Range:

Premix (V2V) models: +5 to 145 °F / -15 to 63 °C

On/Off (V2F) models: -40 to 145 °F / -40 to 63 °C

Operating Humidity Range:

95% RH at 104 °F (40°C) for 14 days

Non-condensing for NEMA 1 / IP20 valve versions

Environmental Usage Conditions:

Ambient Conditions

- The valve is only suitable for installation in enclosed rooms.
- Condensation and dew in and on the valve are not permitted.
- No icing permitted
- Avoid direct sunlight or radiation from red-hot surfaces on the valve.
- Avoid corrosive influences, e.g. salty ambient air or SO₂.
- Permitted relative humidity: min 5%, max 95%.
- The valve shall only be stored/installed in enclosed rooms/buildings.
- Long-term use in the upper ambient temperature range accelerates the aging of the elastomer materials and reduces the service life.
- This valve is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

Mechanical Conditions

- Gaseous fuel must be clean and dry in all temperature conditions and must not contain condensate.

Logistics

- Protect the valve from external forces (blows, shocks, vibration).
- The ambient conditions described in this document apply to transport.

SECURE MODBUS® COMMUNICATION

For SV2 Series valve configuration and monitoring, Modbus communication utilizing an RS-485 BUS is used.

The SV2 Series valves include a Honeywell-specific secure Modbus protocol. Standard Modbus RTU protocol is used, however, safety-related and writable parameters are covered by a secure layer. As a result, they are only writable when accessed using a valid user access level and an appropriate user interface, which are designed to work with the secure layer. Read only Modbus addresses can be accessed without the Honeywell user interface or the secure Modbus layer

USER ACCESS LEVELS

A 3-level user access level framework has been implemented into the SV2 Series valves, consisting of the User, Installer and OEM levels.

- **OEM** Read/write rights with the ability to assign read/write parameter groups for the OEM and Installer levels. OEM is defined at the original provider/programmer of the valve.
- **Installer** Read/write rights as assigned by the OEM.
- **User** Read only rights via HMI/PC Tool and the ability to reset fault codes via valve display.
Valves are shipped with default OEM and Installer passwords pre-configured. These passwords have to be changed before the valve can be used in an application without user observation.

NOTES:

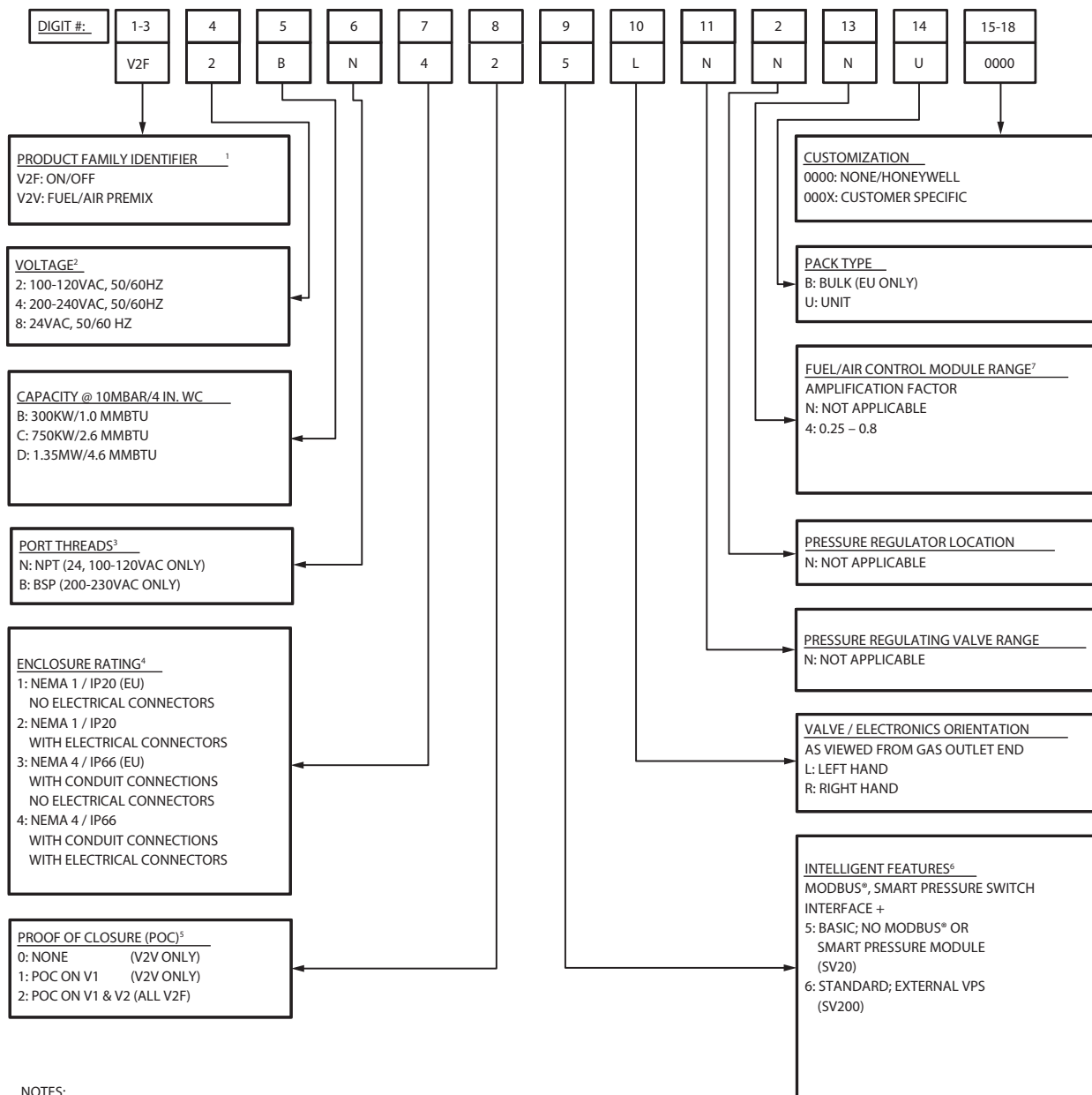
- **Default passwords are automatically pre-filled in the appropriate field during the initial user login.**
- **The OEM can choose to create the Installer main password or allow the Installer to assign it at the initial login.**
- **See CHAPTER 6 ACCESS LEVELS for detailed information regarding OEM/Installer password configuration, access level assignments and password reset procedures.**

Forgetting to change the default password results in persistent lockout when the secured session is terminated. This is a security measure that avoids using a valve in unsecure mode (without proper password configuration).

Should the Installer and/or OEM main access level passwords be lost, password reset is possible, if the reset mechanisms were enabled by the OEM. The reset mechanism will vary between the Installer and OEM levels. Note that cycling of the valve or user interface power will not defeat this methodology.

A detailed description of the user access levels and reset mechanisms can be found in Chapter 6: Access Levels in this document.

VALVE NOMENCLATURE



NOTES:

- 1 V2F MAX INLET PRESSURE: 10.0PSI (0.7 KG/CM²) (689MBAR)
V2V MAX INLET PRESSURE: 1.45 PSI (0.1 KG/CM²) (100MBAR)
- 2 ALL VOLTAGES ARE -15% / +10% VAC
ALL VOLTAGES CLASS A RATED (EN161)
- 3 PORT THREAD INCLUDES PRESSURE TAPS AND NOVV PORT
NPT ONLY AVAILABLE ON 24VAC AND 100-120VAC MODELS
BSP ONLY AVAILABLE ON 200-240VAC MODELS
- 4 OPTIONS 1 AND 2 ONLY AVAILABLE ON V2V MODELS
OPTIONS 1 AND 3 ONLY AVAILABLE ON 200-240VAC MODELS
IN EU (NO ELECTRICAL CONNECTORS INCLUDED)

- 5 POC NOT AVAILABLE ON NEMA 1/IP20 ENCLOSURES OR 200-240VAC MODELS.
ONLY 1 POC AVAILABLE ON V2V CAPACITY D MODELS WITH 100-120VAC AND
NEMA 4/IP66 ENCLOSURES.
- 6 PRESSURE MODULE REQUIRED FOR VPS FUNCTIONALITY ON STANDARD MODELS.
5=BASIC ONLY AVAILABLE ON V2F MODELS
- 7 THE REQUIRED MODULE DEPENDS ON THE GAS QUALITY RANGE WITH A
SINGLE SIZE GAS INJECTOR. GAS INJECTOR DIAMETER ALSO INFLUENCES
SELECTION. AMPLIFICATION FACTOR INFLUENCES THE ACHIEVABLE ACCURACY.
0.3-0.8 IS USED FOR FUEL/AIR PREMIX VALVES.

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Fig. 1: Valve nomenclature.

VALVE ACCESSORIES AND REPLACEMENT PARTS

The SV2 Series valve has required and optional accessories for installation, pressure limit operation and set-up. Flanges are required for each valve and must be ordered separately.

SV2 Series valves also have field replaceable electronics, modules and solenoids.

Table 1. Valve Accessories and Replacement Parts.

Category	Part Number	Description	Applicable Model(s)
Flanges	FLANGEABNPT050	0.50 in / DN15 NPT flange, B capacity models	All
	FLANGEABNPT075	0.75 in / DN20 NPT flange, B capacity models	
	FLANGEABNPT100	1.00 in / DN25 NPT flange, B capacity models	
	FLANGEABNPT125	1.25 in / DN32 NPT flange, B capacity models	
	FLANGEABBSP050	0.50 in / DN15 BSP flange, B capacity models	
	FLANGEABBSP075	0.75 in / DN20 BSP flange, B capacity models	
	FLANGEABBSP100	1.00 in / DN25 BSP flange, B capacity models	
	FLANGEABBSP125	1.25 in / DN32 BSP flange, B capacity models	
	FLANGECDNPT100	1.00 in / DN25 NPT flange, C/D capacity models	
	FLANGECDNPT125	1.25 in / DN32 NPT flange, C/D capacity models	
	FLANGECDNPT150	1.50 in / DN40 NPT flange, C/D capacity models	
	FLANGECDNPT200	2.00 in / DN50 NPT flange, C/D capacity models	
	FLANGECDDBSP100	1.00 in / DN25 BSP flange, C/D capacity models	
	FLANGECDDBSP125	1.25 in / DN32 BSP flange, C/D capacity models	
	FLANGECDDBSP150	1.50 in / DN40 BSP flange, C/D capacity models	
	FLANGECDDBSP200	2.00 in / DN50 BSP flange, C/D capacity models	
Programming Tools	HMITOOL-000	HMI touchscreen interface, 24VAC. NOTE: HMITOOL or PCTOOL required to setup intelligent features.	All models with Intelligent Features of 6
	PCTOOLKIT-000	PC interface software and USB to RS-485 converter NOTE: HMITOOL or PCTOOL required to setup intelligent features.	
Pressure Modules	PRESSMOD11-000	For NEMA 1/IP20 enclosure, pressure range 0.8-40 mBar / 0.32-16 in wc / 0.012- 0.58 psi	All models with Intelligent Features of 6
	PRESSMOD12-000	For NEMA 1/IP20 enclosure, pressure range 2.6-160 mBar / 1.1-64 in wc / 0.038 - 2.3psi	
	PRESSMOD13-000	For NEMA 1/ IP20 enclosure, pressure range 8.4-600 mBar / 3.4-241 in wc/ 0.12-8.7 psi	
	PRESSMOD14-000	For NEMA 1/ IP20 enclosure, range range 16.8-1000 mBar / 6.7-401 in wc/ 0.25-14.5 psi	
	PRESSMOD41-000	For NEMA 4 / IP66 enclosure, pressure range 1.3-40 mBar / 0.51-16 in wc / 0.018 -0.58 psi	
	PRESSMOD42-000	For NEMA 4 / IP66 enclosure, pressure range 4-160 mBar / 1.6-64 in wc / 0.057-2.32 psi	
	PRESSMOD43-000	For NEMA 4 / IP66 enclosure, pressure range 10.5-600 mBar / 4.2-241 in wc/ 0.15-8.7 psi	
	PRESSMOD44-000	For NEMA 4 / IP66 enclosure, pressure range 21-1000 mBar / 8.5-401 in wc/ 0.3-14.5 psi	
Replacement Parts	CONNECTORKIT-000	Valve replacement electrical connector kit	All
	REL4N024V5Q	Replacement electronics, NEMA 4 / IP66 enclosure, 24VAC, 50/60 Hz	IQ 5 models
	REL4N024V6Q	Replacement electronics, NEMA 4 / IP66 enclosure, 24VAC, 50/60 Hz	IQ 6 models
	REL4N230V5Q	Replacement electronics, NEMA 4 / IP66 enclosure, 100-240VAC, 50/60Hz	IQ 5 models
	REL4N230V6Q	Replacement electronics, NEMA 4 / IP66 enclosure, 100-240VAC, 50/60Hz	IQ 6 models
	REL1N024V6Q	Replacement electronics, NEMA 1 / IP20 with conduit connections, 24VAC, 50/60Hz	IQ 6 models
	REL1N230V6Q	Replacement electronics, NEMA 1/IP20, 100-240VAC, 50/60Hz	IQ 6 models
	COILAB024V-000	Coil/Solenoids, 1.0 in, 24VAC, B capacity models	All
	COILAB120V-000	Coil/Solenoid, 0.75/1.00 in, 100-120VAC, B capacity models	
	COILAB240V-000	Coil/Solenoid, 0.75/1.00 in, 200-240VAC, B capacity models	
	COILCD024V-000	Coil/Solenoids, 1.5/2.0 in, 24VAC, C/D capacity models	
	COILCD120V-000	Coil/Solenoids, 1.5/2.0 in, 100-120VAC, C/D capacity models	
	COILCD240V-000	Coil/Solenoids, 1.5/2.0 in, 200-240VAC, C/D capacity models	
	50063482-001	HMITOOL replacement bag assembly; 8-pin connector, battery, hardware, 3 clamp filters	HMITOOL
	FARMOD 14-000	Fuel/Air Module, NEMA 1 / IP20, amplification factor 0.25-0.8, BSP 1/8 in port threading	All Premix (V2V) models
	FARMOD 44-000	Fuel/Air Module, NEMA 4/IP66 with sealing cord grip, amplification factor 0.25-0.8, BSP 1/8 in port threading	

Category	Part Number	Description	Applicable Model(s)
Premix Accessories	V2MU0300-010	SV2 Series mixing unit 300kW (1.0MMBTU)	All Premix (V2V) models as needed
	V2MU0500-010	SV2 Series mixing unit 500kW (1.7MMBTU)	
	V2MU0800-010	SV2 Series mixing unit 800kW (2.7MMBTU)	
	V2MU1000-010	SV2 Series mixing unit 1000kW (3.4MMBTU)	
	V2MU2000-010	SV2 Series mixing unit 2000kW (6.8MMBTU)	
	V2MUTUBEPL-000B	Plastic feedback tubing kit. Contains (3) 50 meter (164 foot) polyethylene plastic tubing coils (6.75mm ID, 8mm OD).	
	V2MUFITPLSTR-000B	Plastic feedback tubing fittings kit, straight. Contains 300 push-in fittings.	
	V2MUFITPL90D-000B	Plastic feedback tubing fittings kit, 90 degree. Contains 300 swivel push-in fittings.	
	V2MUFITPLTEE-000B	Plastic feedback tubing fittings kit, tee. Contains 100 push-in fittings.	
	V2MUTUBEAL-000B	Metal feedback tubing kit. Contains 200 aluminum tubes (7mm ID, 8mm OD, 1000mm long).	
	V2MUFITMESTR-000B	Metal feedback tubing fittings kit, straight. Contains 300 compression fittings.	
	V2MUFITME90D-000B	Metal feedback tubing fittings kit, 90 degree. Contains 300 swivel compression fittings.	
	HEATEXCHANGER-000	Kit for premix applications. Includes heat exchanger, signal pipe insulation, mounting hardware to connect to the V2MU mixing unit and FARMOD insulating shoe. Fittings and tubing kits sold separately.	
	FARMODFILTER-000B	Field replacement pre-filter assembly for premix valves fuel/air ratio module. Bulk pack of 12.	
	FARMODSHOE-000B	Fuel/Air Ratio Module insulation shoe with spacers and mounting screws. Bulk pack of 20.	

NOTE: The purchaser of any SV2 Series valves should keep the original packaging for a period of time, should any returns be required. The original packaging will provide the appropriate cushioning and protection for the valve during shipment back to Honeywell and will ensure no damage occurs to the valve due to handling.

DIMENSIONAL INFORMATION

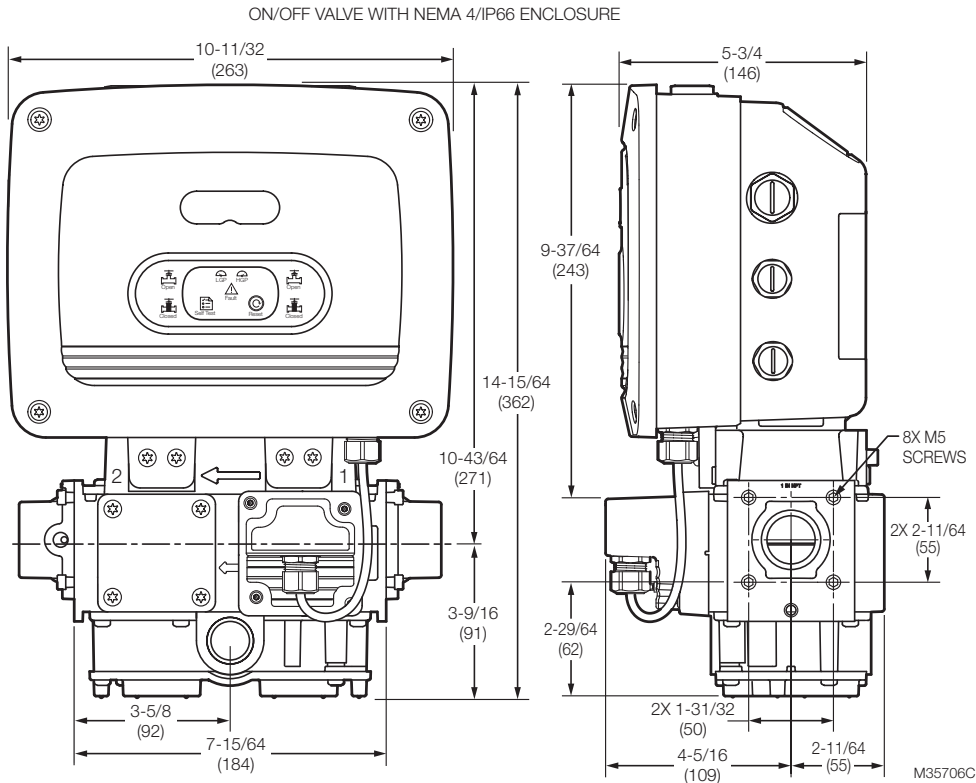


Fig. 2: 1 in (DN25) On/off valve with NEMA 4/IP66 enclosure.

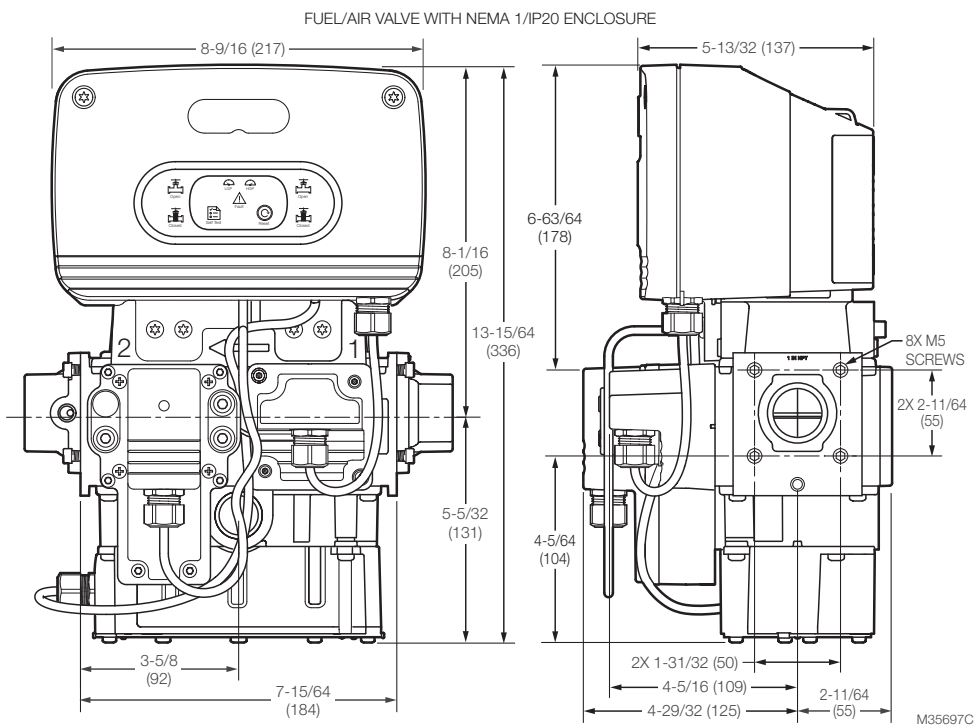


Fig. 3: 1 in (DN25) Premix valve with NEMA 1/IP20 enclosure.

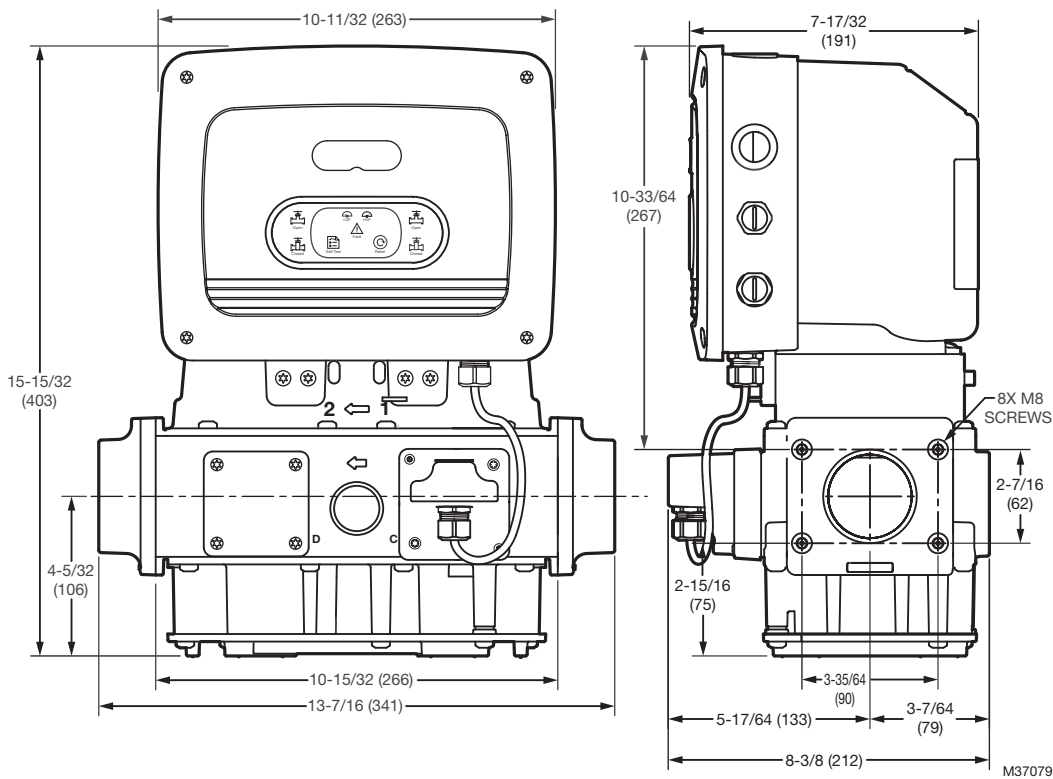


Fig. 4: 1.5/2.0 in (DN40/50) On/off valve with NEMA 4/IP66 enclosure.

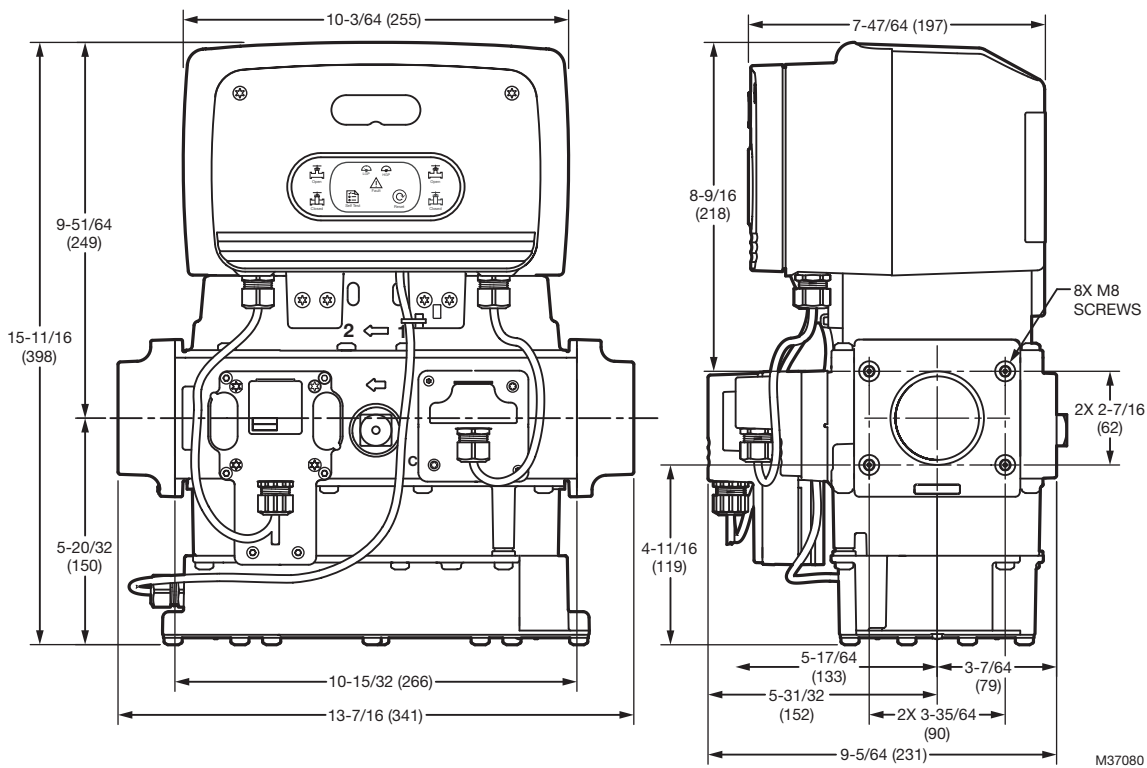


Fig. 5: 1.5/2.0 in (DN40/50) Fuel/air valve with NEMA 1/IP20 enclosure.

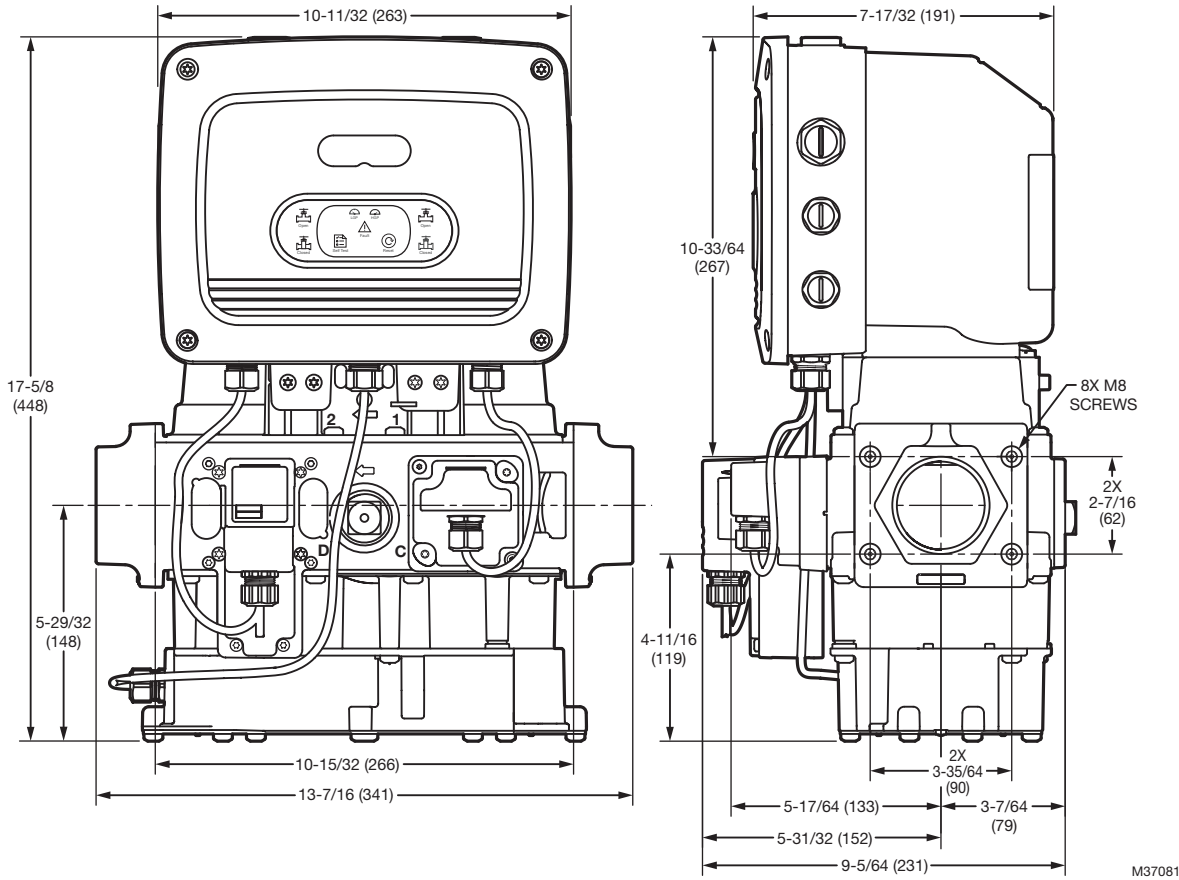


Fig. 6: 1.5/2.0 in (DN40/50) Fuel/air valve with NEMA 4/IP66 enclosure.

VALVE CAPACITY RATINGS

The SV2 Series valve ratings shown below are for both 4 in. w.c. and 1 in w.c

Table 2. Valve Capacity Rating.

Valve Capacity Designation / Internal Port Size			@ 4 in. w.c. pressure drop ^{1,2} (10 mbar)				@ 1 in. w.c. pressure drop ^{1,2} (2.5 mbar)			
			kW	MMBTU/hr	SCFH (ft ³ /hr)	M3/hr	kW	MMBTU/hr	SCFH (ft ³ /hr)	M3/hr
B	1.0 in	DN25	300	1.0	1,000	28	150	0.5	500	14
C	1.5 in.	DN40	750	2.6	2,600	74	380	1.3	1300	37
D	2.0 in	DN50	1348	4.6	4,600	130	674	2.3	2300	65

1. Refer to the notes below regarding standard conditions and conversions for different gases.
2. Stated capacities for valve with matching flange size.

VALVE CAPACITY CURVES

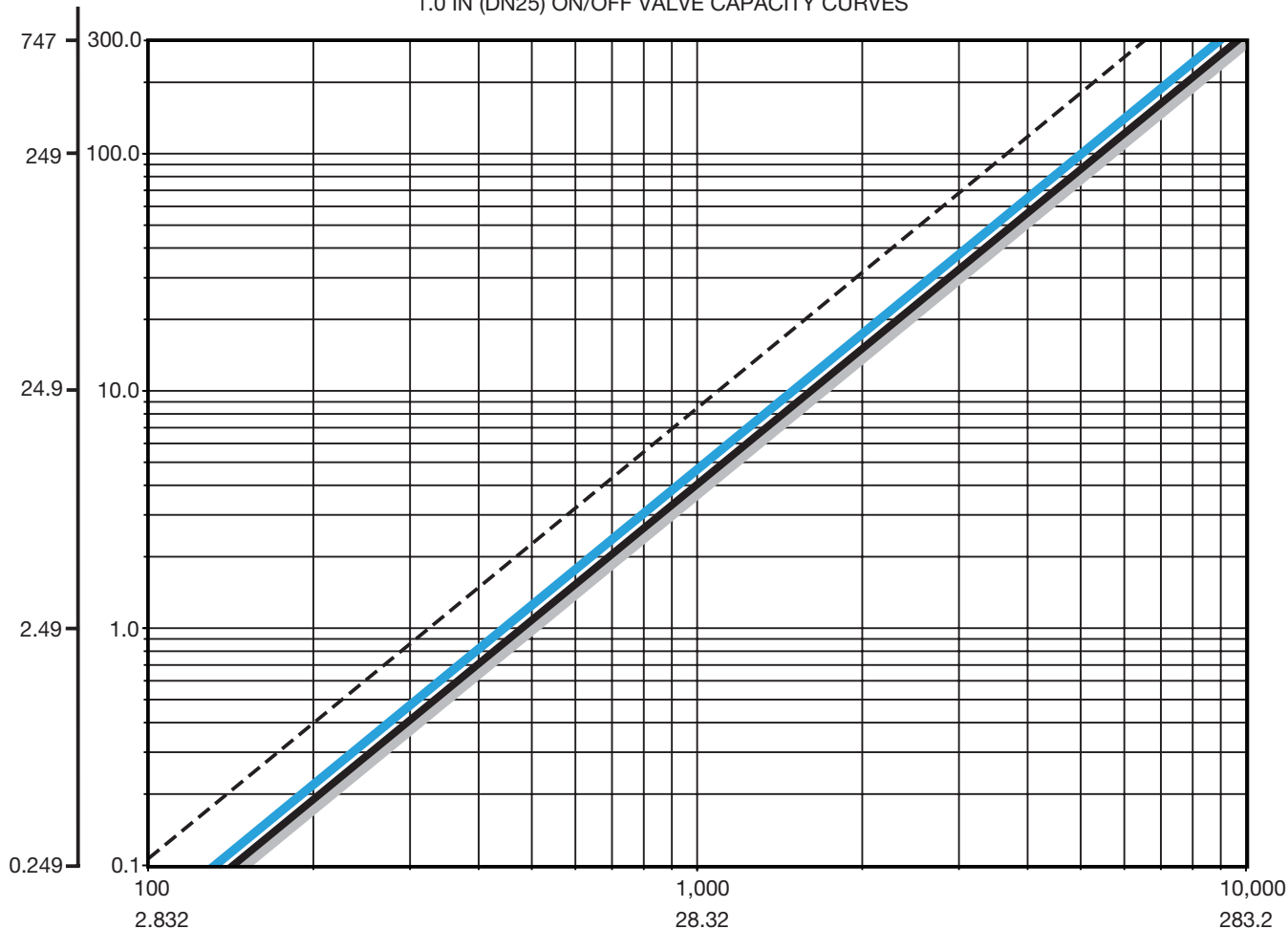
NOTES:

- Capacities for all curves and ratings shown for G20 gas (100% CH₄) with specific gravity/relative density of 0.555 at ANSI Z21.21 standard conditions of 15.6°C/60°F and 1013.5mbar / 406.9 in w.c. / 29.2 in Hg / 14.7 PSI pressure.
 - For other gas capacities, multiply the CFH or M³/HR by:
 - G25 / 86% CH₄, 14% N₂¹ (sp gr/relative density 0.612) 1.05
 - Natural gas (sp gr/relative density 0.640) 1.07
 - LP/liquid propane (sp gr/relative density 1.530) 1.66
 - G31 / 100% C₃H₈¹ (sp gr/relative density 1.550) 1.67
- ¹. Per EN437.

PRESSURE DROP

-MBAR -INCHES W.C.

1.0 IN (DN25) ON/OFF VALVE CAPACITY CURVES



NATURAL GAS FLOW –CFH (CUBIC FEET PER HOUR)
–M³/HR (METERS CUBED PER HOUR)



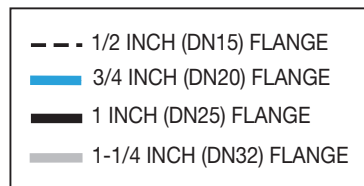
PRESSURE DROP FORMULAS PER FLANGE SIZE AND UNIT TYPES:

A.) CFH AND IN W.C.

- 1/2 IN (DN15) = 0.00001690 X (FLOW^{1.9})
- 3/4 IN (DN20) = 0.00000931 X (FLOW^{1.9})
- 1 IN (DN25) = 0.00000798 X (FLOW^{1.9})
- 1-1/4 IN (DN32) = 0.00000726 X (FLOW^{1.9})

B.) M³/HR AND MBAR

- 1/2 IN (DN15) = 0.036750 X (FLOW^{1.9})
- 3/4 IN (DN20) = 0.020240 X (FLOW^{1.9})
- 1 IN (DN25) = 0.017359 X (FLOW^{1.9})
- 1-1/4 IN (DN32) = 0.015792 X (FLOW^{1.9})



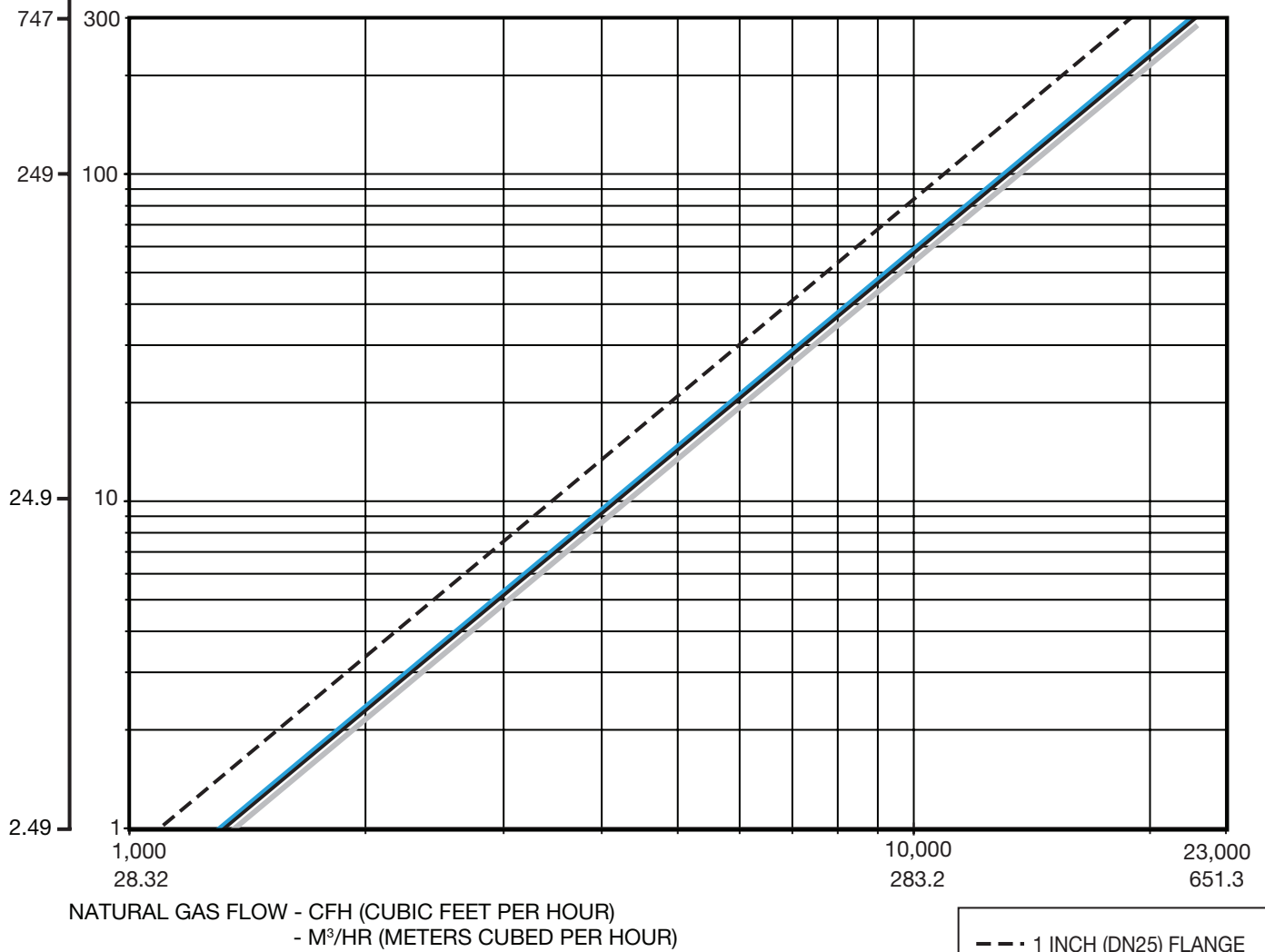
MCR37082

Fig. 7: 1 in. (DN25) On/Off valve capacity curves.

PRESSURE DROP

-MBAR - INCHES W.C.

1.5 IN (DN40) ON/OFF VALVE CAPACITY CURVES



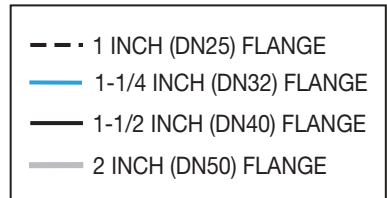
1 PRESSURE DROP FORMULAS PER FLANGE SIZE AND UNIT TYPES:

A.) CFH AND IN W.C.

- 1 IN (DN25) = 0.000000838 X (FLOW²)
- 1-1/4 IN (DN32) = 0.000000592 X (FLOW²)
- 1-1/2 IN (DN40) = 0.000000578 X (FLOW²)
- 2 IN (DN50) = 0.000000539 X (FLOW²)

B.) M³/HR AND MBAR

- 1 IN (DN25) = 0.002601 X (FLOW²)
- 1 1/4 IN (DN32) = 0.001838 X (FLOW²)
- 1-1/2 IN (DN40) = 0.0001795 X (FLOW²)
- 2 IN (DN50) = 0.0001673 X (FLOW²)

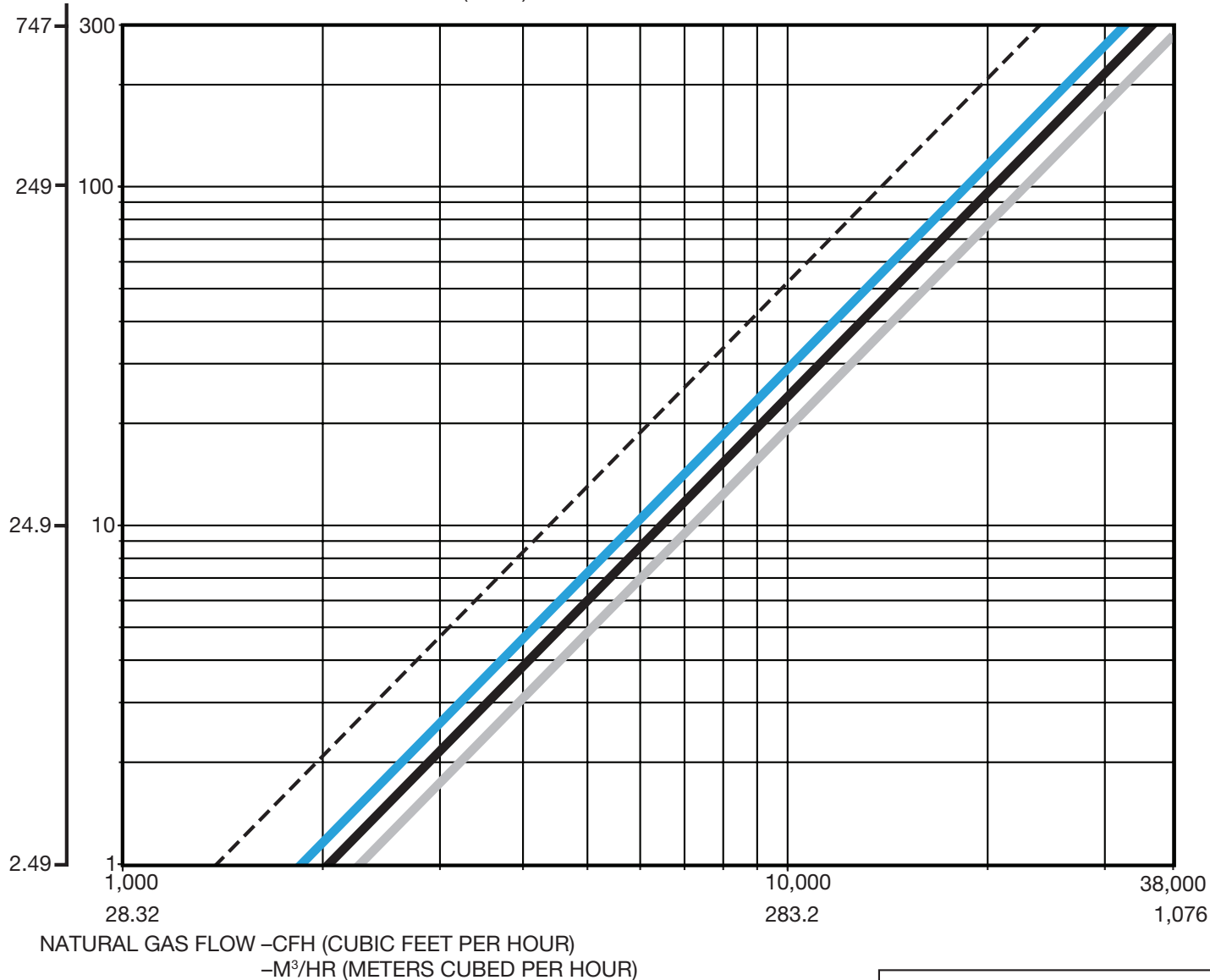


MCR37077

Fig. 8: 1.5 in (DN40) On/off valve capacity curves.

PRESSURE DROP
-MBAR -INCHES W.C.

2.0 IN (DN50) ON/OFF VALVE CAPACITY CURVES



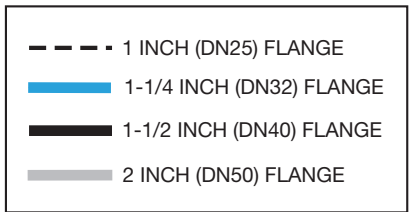
1 PRESSURE DROP FORMULAS PER FLANGE SIZE AND UNIT TYPES:

A.) CFH AND IN W.C.

- 1 IN (DN25) = 0.000000522 X (FLOW²)
- 1-1/4 IN (DN32) = 0.000000290 X (FLOW²)
- 1-1/2 IN (DN40) = 0.000000240 X (FLOW²)
- 2 IN (DN50) = 0.000000193 X (FLOW²)

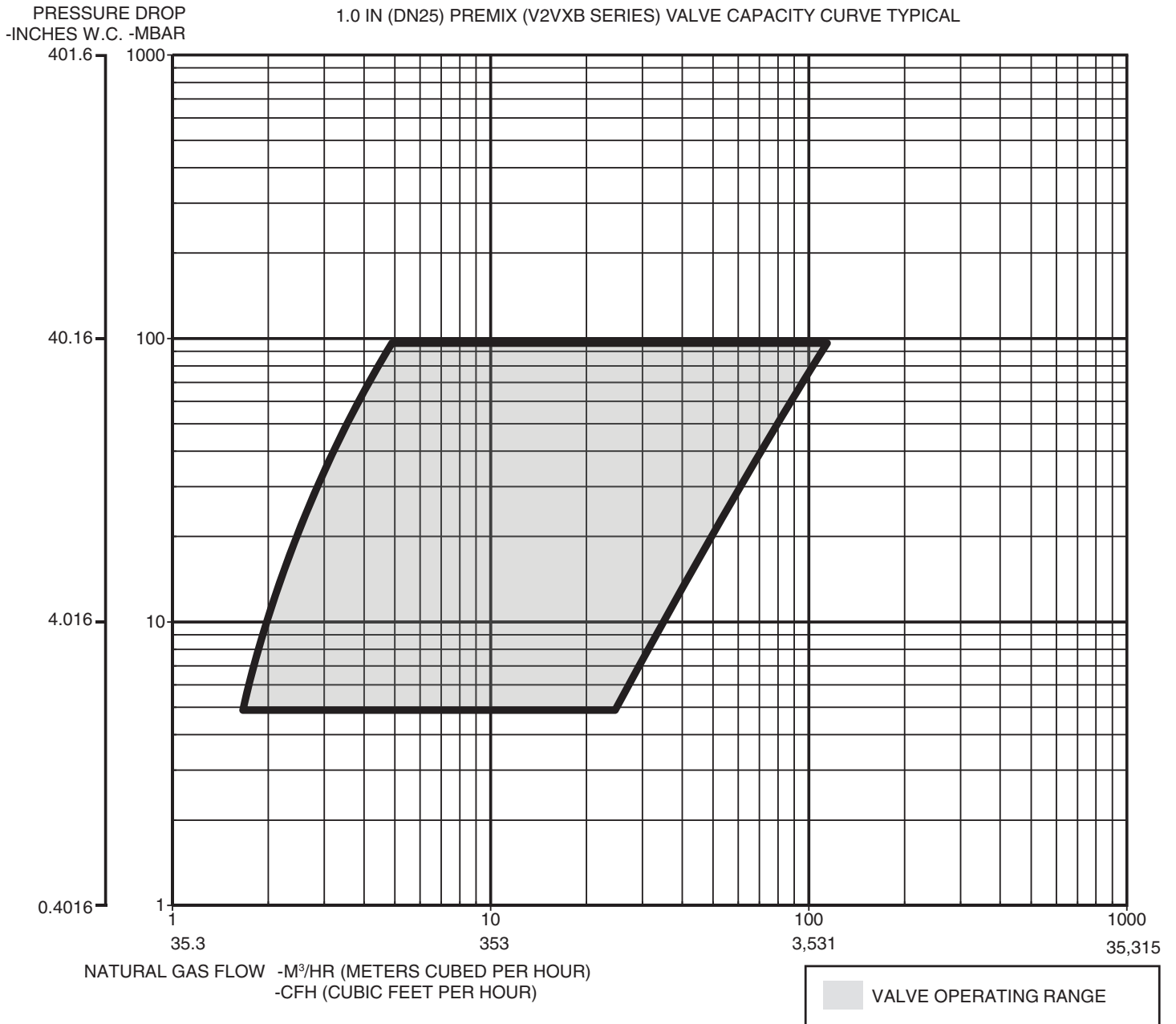
B.) M³/HR AND MBAR

- 1 IN (DN25) = 0.001620 X (FLOW²)
- 1-1/4 IN (DN32) = 0.000900 X (FLOW²)
- 1-1/2 IN (DN40) = 0.000745 X (FLOW²)
- 2 IN (DN50) = 0.000600 X (FLOW²)



MCR37078

Fig. 9: 2.0 in (DN50) On/off valve capacity curves.

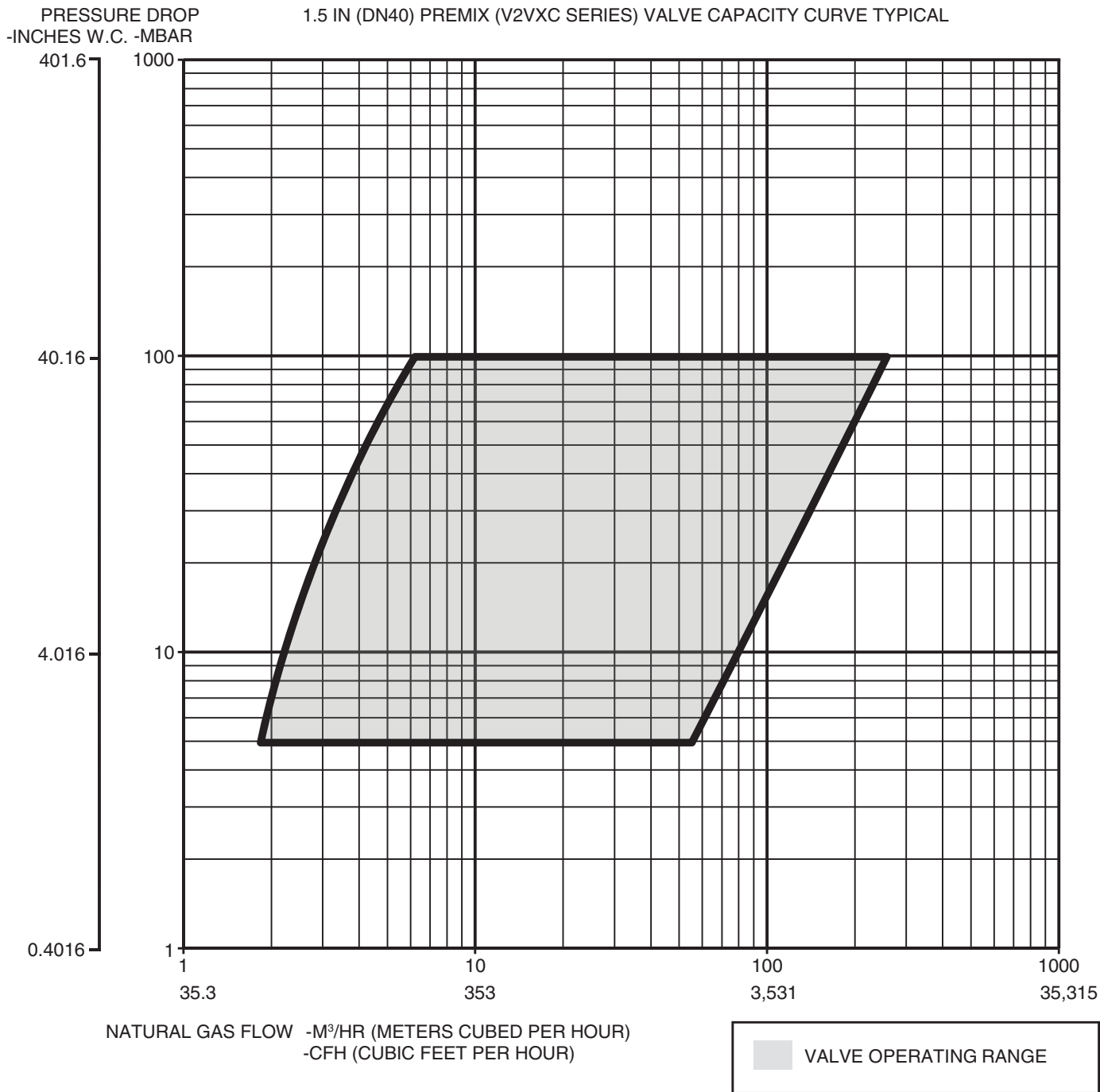


1 VALVE CAPACITY IS MEASURED WITH 1.0 IN / DN25 FLANGES ASSEMBLED. THE VALVE CAPACITY WILL VARY WHEN PAIRED WITH SMALLER FLANGES.

2 CAPACITY CURVE REPRESENTS A VALVE TYPICAL GUARANTEED MAXIMUM AND MINIMUM FLOW (WHEN THE FUEL CONTROL VALVE IS FULLY OPEN AND FULLY CLOSED). THE CAPACITY COVERS A 95% POPULATION CONFIDENCE.

M37241A

Fig. 10: 1.0 inch (DN25) Premix valve capacity curves

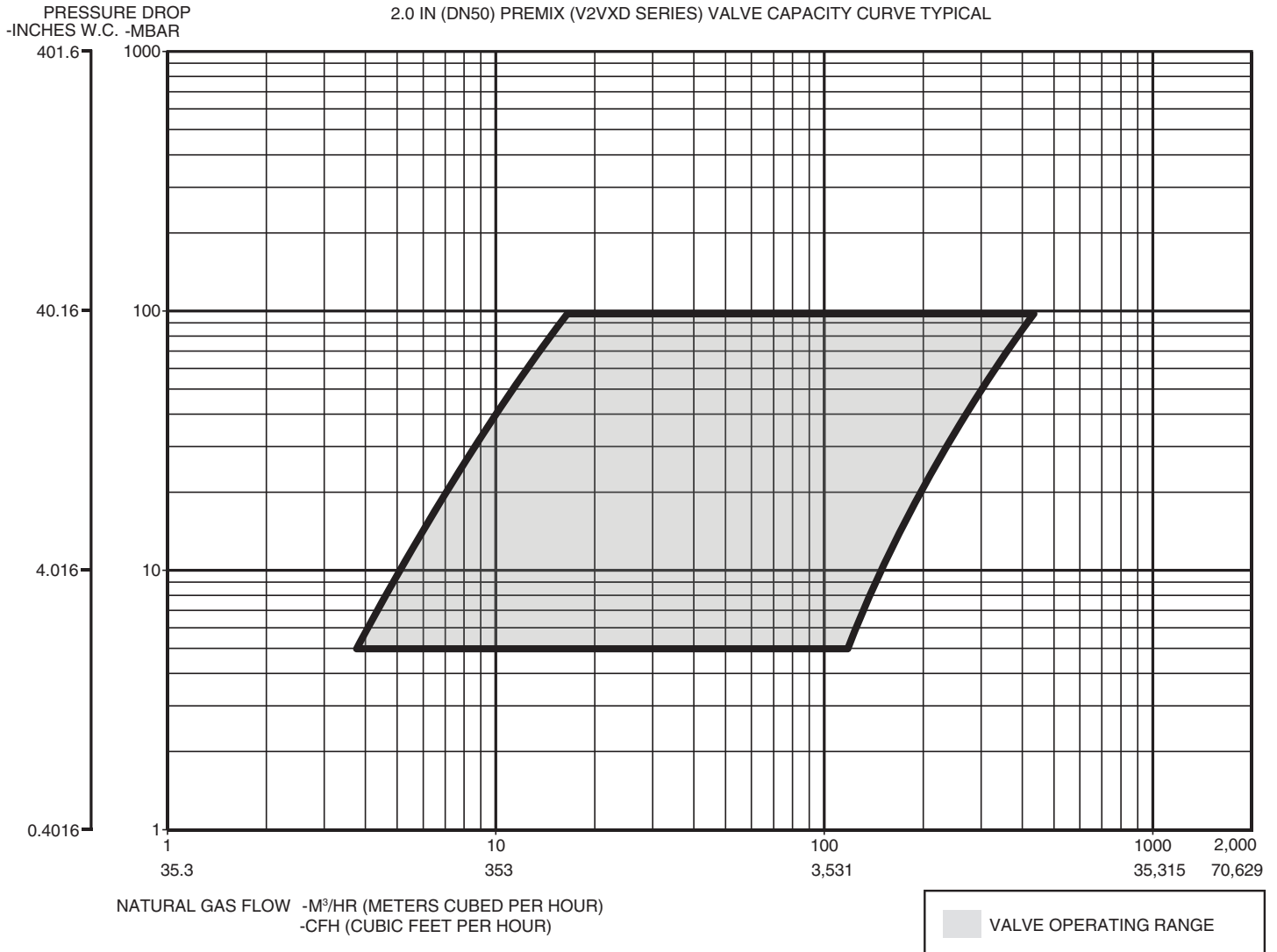


1 VALVE CAPACITY IS MEASURED WITH 1.5 IN / DN40 FLANGES ASSEMBLED. THE VALVE CAPACITY WILL VARY WHEN PAIR WITH SMALLER FLANGES.

2 CAPACITY CURVE REPRESENTS A VALVE TYPICAL GUARANTEED MAXIMUM AND MINIMUM FLOW (WHEN THE FUEL CONTR VALVE IS FULLY OPEN AND FULLY CLOSED). THE CAPACITY COVERS A 95% POPULATION CONFIDENCE.

M37242f

Fig. 11: 1.5 inch (DN40) Premix valve capacity curves



- 1 VALVE CAPACITY IS MEASURED WITH 2.0 IN / DN50 FLANGES ASSEMBLED. THE VALVE CAPACITY WILL VARY WHEN PAIRIED WITH SMALLER FLANGE
- 2 CAPACITY CURVE REPRESENTS A VALVE TYPICAL GUARATEED MAXIMUM AND MINIMUM FLOW (WHEN THE FUEL CONTROL VALVE IS FULLY OPEN AND FULLY CLOSED). THE CAPACITY COVERS A 95% POPULATION CONFIDENCE.

M37243A

Fig. 12: 2.0 inch (DN50) Premix valve capacity curves

GAS VALVE SIZING

The procedure below along with the valve capacity curves shown in [Figs. 7-12](#) will help to identify the correct valve size for your application. Valve selection may also be accomplished via the SV2 Series valve configuration tool, found at <http://www.combustion.honeywell.com/SV2Series>.

Honeywell gas valve capacities are shown in [Figs. 7-12](#) in:

- Cubic feet per hour (CF/H) or cubic meters per hour (M³/H)
- For gas with a specific gravity/relative density of 0.64 (1 CF/H = 0.0283 M³/H).
- Capacities for natural gas are at ANSI Z21.21 or EN437 standard conditions of 15.6°C / 60°F and 1013.3 mbar / 406.9 in w.c. / 29.2 in. HG / 14.7 psi pressure

Sizing procedure:

1. Check the burner nameplate for:
 - a. The type of gas used.
 - b. The gas flow capacity. The capacity will be listed in BTU/H, KW/H or CF/H (cubic feet per hour).
2. Call the gas utility for information on:
 - c. The specific gravity (sp gr)/relative density.
 - d. BTU per cubic foot (BTU/ft³) or KW per cubic meter (KW/M³) for the type of gas used.
3. Find the burner capacity in:
 - e. CF/H. If the capacity is listed in BTU/H, convert to CF/H by the following formula:
 - Capacity in CF/H = BTU/H (from burner nameplate) / BTU/FT³ (from gas utility)
 - f. M³/H. If the capacity is listed in in KW/H, convert to M³/H by the following formula:
 - Capacity in M³/H = KWH (from burner nameplate) / KW/M³ (from gas utility)
4. For gases with specific gravities/relative densities other than 0.64, correct the burner CF/H or M³/H from step 3. by multiplying it by the proper conversion factor found in [Table 3](#).

Table 3. Gas Conversion Factors.

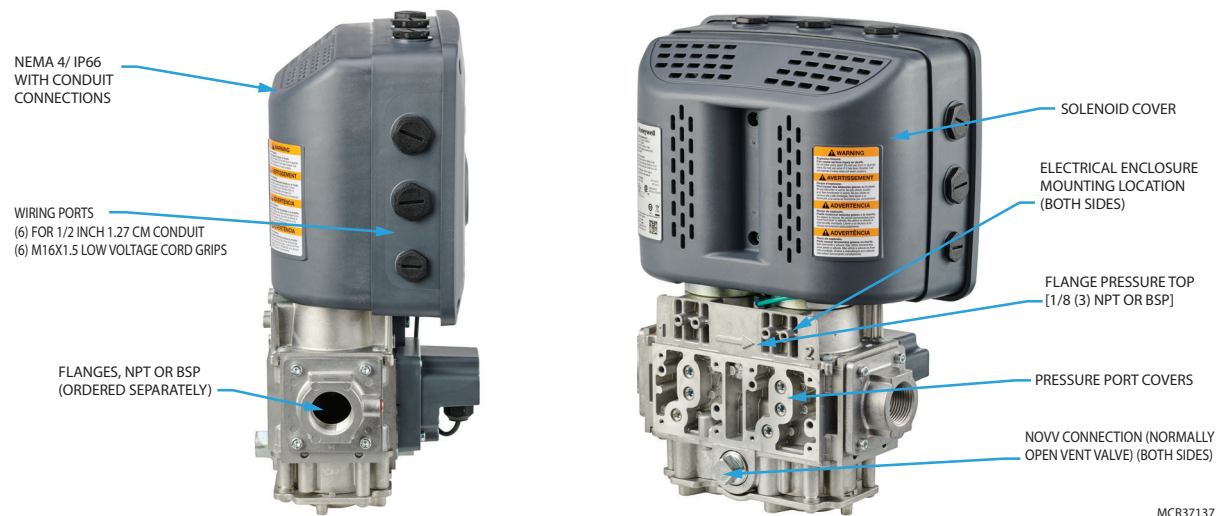
Type of Gas	Specific Gravity/ Relative Density (average)	Multiply CF/H or M ³ /H by:
G20 (100% CH ₄) ¹	0.555	1.00
G25 (86% CH ₄ , 14% N ₂) ¹	0.612	1.05
Natural gas	0.640	1.07
LP gas (Propane)	1.530	1.66
G31 (100% C ₃ H ₈) ¹	1.550	1.67

1. Per EN437.
5. Use the corrected burner capacity in CF/H or M³/H as calculated in step 4 (if applicable) when determining the gas valve size in [Figs. 7-12](#).
6. Determine the available pressure drop across the valve and draw a horizontal line at this pressure in [Figs. 7-12](#).
7. Draw a vertical line in [Figs. 7-12](#) at the capacity (CF/H or M³/H) previously determined, using the corrected capacity for a gas with a specific gravity other than 0.64 as calculated in step 4 above.
8. Use the flange size with the appropriate valve size shown at the intersection of the horizontal and vertical lines in [Figs. 7-12](#). If the intersection of the horizontal and vertical lines is close to the right-hand edge of the chart or not on the chart, you may need to use the next higher valve size. Perform the same procedure for the next higher valve size to ensure the capacity can be obtained with that valve at the required pressure drop.

CHAPTER 2 : VALVE FEATURES

Overview

The SV2 Series valves have two safety shut-off valve seats integrated into a single valve body. They also contain many unique features. Below is an overview of the various valve features.



NOTE: NEMA 4 / IP66 solenoid covers contain vents to dissipate heat build-up created by the solenoids when powered. Vent sizing meets the requirements for preventing finger intrusion into the space. The solenoid casings themselves, housed inside the solenoid cover, meet NEMA 4 / IP66 requirements.



Fig. 13: Valve features.

Power Saving Feature

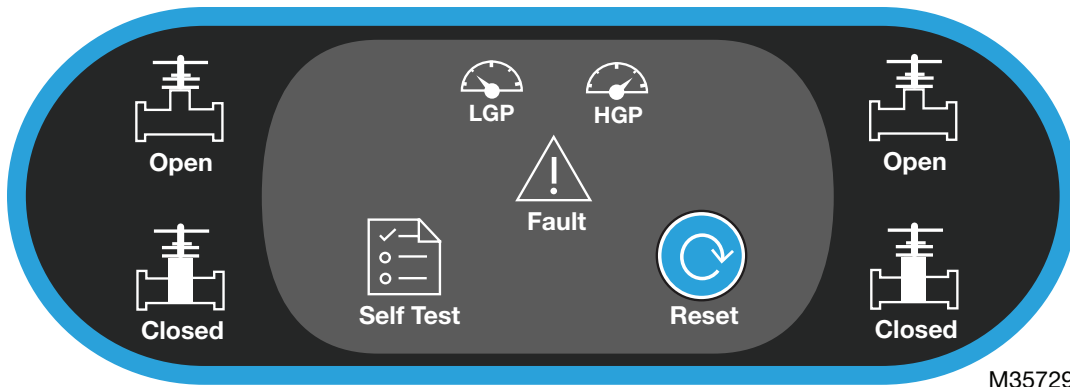
A power saving feature implemented into the SV2 Series valves allows the usage of physically smaller solenoids with less heat generation while saving electrical energy. Run current is reduced via duty-cycling of the voltage applied across the solenoids. The power saving circuitry is designed as Class C fail-safe to avoid full power application and thus over-heating of the solenoids per EN13611 / 6.6.4 class C to fulfill the requirements in EN161 / 8.11.120.4.1.

Valve Interface

The valve interface contains 8 back lit LEDs, which are used to indicate the following conditions; valve seat open / closed or powered / not powered status, the presence of a general fault condition, low gas pressure or high gas pressure fault condition or if a self-test is in process.

The valve seat Open / Closed LEDs indicate the status of the valve seat over which they are situated ¹.







The valve interface also has a push Reset button, which is used to reset the valve in the event it is in lockout status, to verify safety parameters after setup and to reverse the Open / Closed LEDs when the valve electronics orientation is changed in the field (refer to Note 1 below).



M35729

Fig. 14: Valve interface.

Table 4. Valve Interface LED Descriptions.

LED	Purpose	Applicable Models
 Open	If a POC (proof of closure switch) is present on the valve, this LED indicates that the valve seat is open. This gives visual position indication per FM (Factory Mutual) 7400 and ANSI Z21.21 / CSA 6.5. LED gives status indication of the valve seat over which the LED is situated. ¹ If a POC (proof of closure switch) is NOT present, this LED indicates the solenoid is powered.	All valve models
 Closed	If a POC (proof of closure switch) is present on the valve, this LED indicates that the valve seat is closed. This gives visual position indication per FM (Factory Mutual) 7400 and ANSI Z21.21 / CSA 6.5. LED gives status indication of the valve seat over which the LED is situated. ¹ If a POC (proof of closure switch) is NOT present, this LED indicates the solenoid is not powered.	
 Self Test	The Self Test LED indicates a valve test is being performed. Self Tests include circuit check during initial power-up, external and internal VPS, leak detection test, manual low gas or high gas pressure tests. NOTE: On BASIC (5) intelligence valves, this only indicates a circuit check.	
 Fault	Indicates a fault condition exists. Refer to the VALVE FAULT CODES section of this manual for detailed fault descriptions.	
 LGP	Indicates a Low Gas Pressure fault condition exists when a SV2 Series Pressure Module is used on the valve and programmed. NOTE: The Fault LED will also be lit while this fault is active.	All models with Intelligent Features of 6
 HGP	Indicates a High Gas Pressure fault condition exists when a SV2 Series Pressure Module is used on the valve and programmed. NOTE: The Fault LED will also be lit while this fault is active.	

1. Valve electronics orientation is ordered as left-hand or right-hand mounted from the factory (defined as being viewed from the valve gas outlet / burner end). If the electronics orientation is changed in the field (as illustrated in CHAPTER 10: [CHANGING VALVE / ELECTRONIC ORIENTATION](#) in this manual), the LED orientation procedure must be completed to ensure the LED annunciation continues to indicate status of the valve seat over which it is situated. This procedure is part of the instructions in Chapter 10.

Valve Body

The valve body is symmetrical on both sides; there are markings molded into the casting including a gas flow directional arrow, valve seat 1 and 2 markings, pressure port access markings (A, B, C, D) and guide posts for mounting to the pressure access ports. Also, each body has threaded holes to affix the electrical enclosure and modules in place. Valve bodies that are ordered from the factory with NPT port threads have an appropriately sized NOV (normally open vent valve) connection on each side. Valve bodies ordered with BSP port threads do not have NOV connections.

Additionally, each side of the valve body has a ground connection to which the chassis ground wire is connected.

The valve body symmetry lends itself to flexible valve orientation and installation. From the factory, each valve must be ordered as either right-hand or left-hand valve/electronics orientation as viewed from the gas outlet end (refer to digit #10 from [Fig. 1](#) Valve nomenclature). Accordingly, the valve electronics enclosure is mounted per the order specification along with side-specific chassis ground wiring, solenoid 1/2 wiring, valve seat 1/2 open/closed LED association and proof of closure 1/2 wiring. As required in the factory or field, these items may be re-oriented to the opposite side of the valve. Refer to CHAPTER 10: CHANGING VALVE / ELECTRONICS ORIENTATION in this document for detailed instructions on performing this procedure in the field.

Pressure Access Locations

Each side of the valve body has two (2) pressure access locations, with a total of four (4). The pressure access locations are labeled as A, B, C and D. Locations A and B reside on one side of the valve body under valve seats V1 and V2, respectively. Locations C and D reside on the other side of the valve body under valve seats V1 and V2, respectively. Since the valve body is symmetrical, locations A and C under valve seat V1 and are identical to each other and locations B and D under valve Seat 2 are identical to each other.

Pressure access locations A, B C and D each contain three (3) pressure access ports with plugs, which access pressure measurement locations at various points in the valve anatomy and are used for various purposes. The pressure access ports on locations A and C under valve seat V1 are identical. The same is true for pressure access ports on locations B and D under valve seat V2. Refer to [Table 5](#) and [Fig. 15](#) and [Fig. 18](#).

For shipment from the factory, covers are added to the four pressure access locations (A, B, C and D) to prevent damage or entry of foreign objects. Refer to [Fig. 15](#). Before mounting a Pressure Module in the field or using a port for pressure measurement, the appropriate cover will need to be removed. Follow the detailed directions provided in the associated accessory installation instructions.

Note that pressure measurements may also be taken via the pressure access ports on the inlet and/or outlet flanges.

[Table 5](#) shows all of the possible pressure access/tap locations on each side of the valve and usages for each. Also refer to [Fig. 16](#) and [Fig. 18](#). Each pressure access/tap location on the valve body is either 1/8 in (3mm) NPT or BSP, depending on which port thread is ordered from the factory. Refer to [Fig. 1](#) Valve nomenclature for further information. Digit # 6 in the valve model identifies the port thread type.

The flange pressure taps are 1/8-27 in (3mm) if an NPT flange is ordered or 1/8-28 in (3mm) if a BSP flange is ordered from the factory.

Table 5. Valve Pressure Access Ports.

Location	Valve Pressure Access Locations ¹	Pressure Port Label	Pressure Measurement	Usage ²
Inlet Flange	-	-	Inlet	Inlet pressure measurement C6097 NPT or Rp mount pressure switch for low gas limit
Valve Seat ¹	A C	I	Inlet	Inlet pressure measurement C6097 NPT or Rp mount pressure switch for low gas limit NOTE: Cannot be used with Pressure Module
		M	Mid	Mid-valve seat pressure measurement (between V1 and V2) C6097 flange mount pressure switch for external VPS Pressure Module for low + high gas limits, VPS, leak detection
		R	Regulator Servo	Future usage
Valve Seat ²	B D	M	Mid	Mid-valve seat pressure measurement (between V1 and V2)
		O	Outlet	Outlet pressure measurement C6097 flange mount pressure switch for high gas limit Pressure Module for low + high gas limits
		R	Regulator Servo	Future usage
Outlet Flange	-	-	Outlet	Outlet pressure measurement C6097 flange mount pressure switch for high gas limit

- Locations A, B, C and D have embedded guide posts for Pressure Module and C6097 keyed mounting orientation.
- Usage is valve model dependent due to available open ports. For detailed C6097 and Pressure Module usage and installation instructions, refer to the SV2 Series safety shut-off valves installation instructions and the Pressure Module installation instructions, documents 32-00018 and 32-00017, respectively.

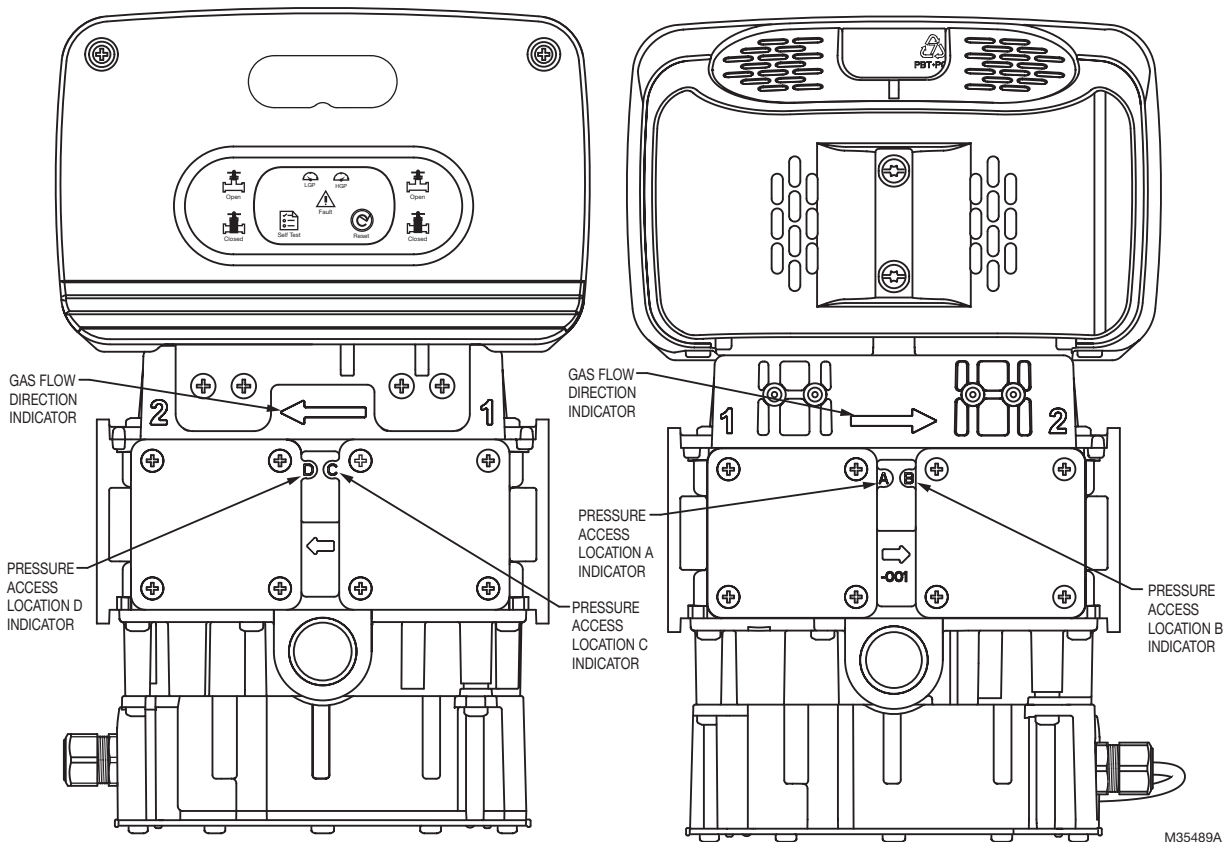


Fig. 15: Valve body and pressure port covers.

NOTE: If you need to replace a pressure access location cover, the tightening torque should be between 1.36 to 1.82 Nm (12 to 16 in-lbf).

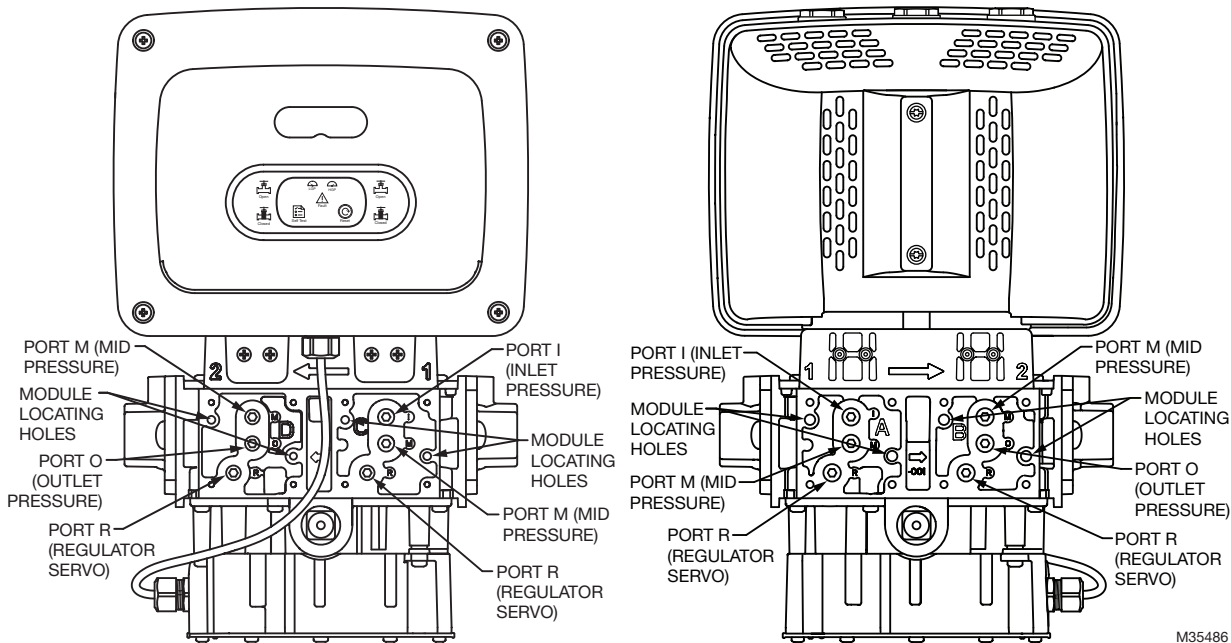


Fig. 16: Valve body and pressure ports.

NOTE: If you need to replace the NOVV plug, the tightening torque should be between 72 to 88 Nm (53 to 65 ft-lbf).

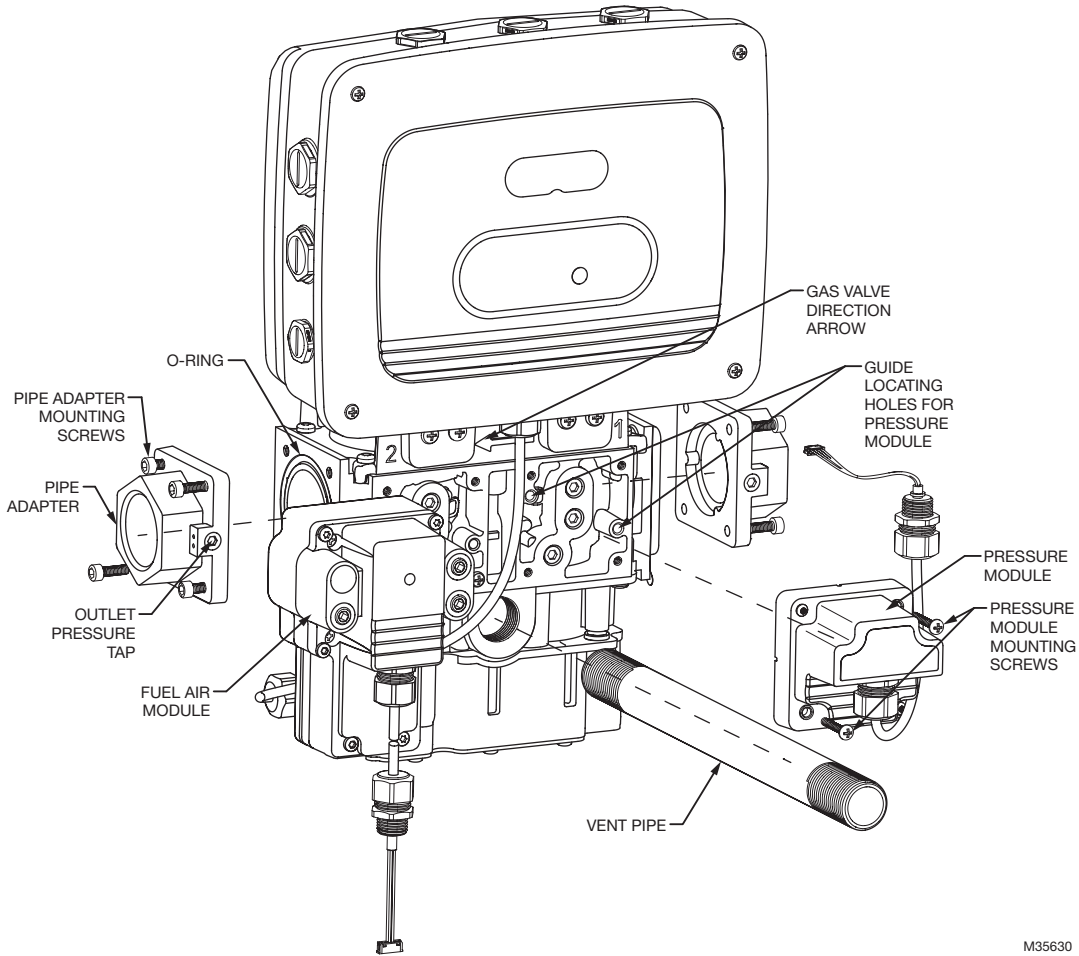
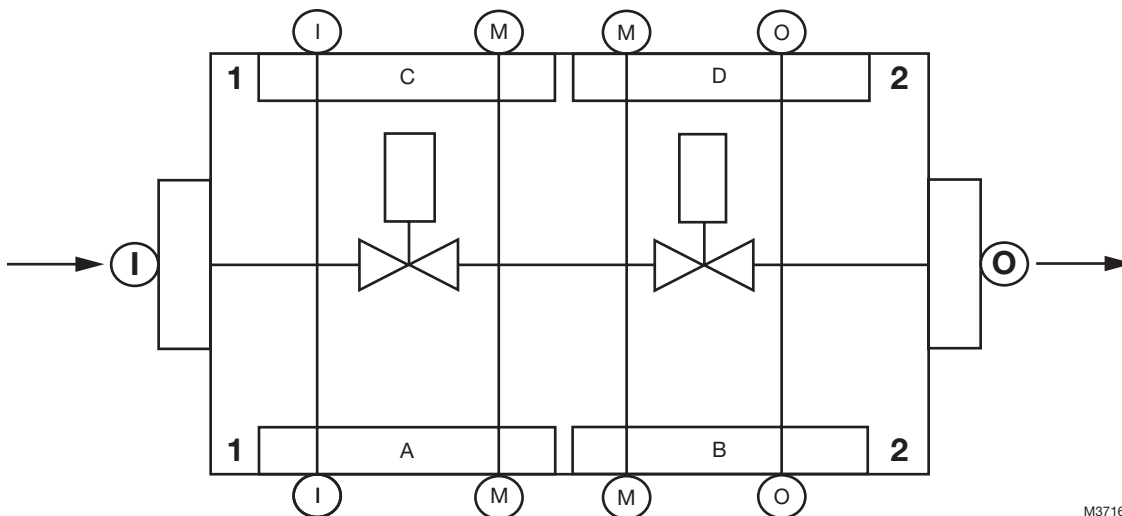


Fig. 17: Valve exploded view.

The diagram below shows all of the possible pressure access/tap locations on each side of the valve. These locations may be used for the functions listed in [Table 5](#) or general pressure measurement. Each pressure access/tap location on the valve body is either 1/8 in (3mm) NPT or BSP, depending on what is ordered from the factory. Typically, for 24VAC or 100-120VAC, taps are NPT and for 200-240VAC, taps are BSP. Refer to [Fig. 1](#) Valve nomenclature for further information. Digit # 6 in the valve model identifies the port thread type.

The flange pressure taps are 1/8-27 in (3mm) if an NPT flange is ordered or 1/8-28 in (3mm) if a BSP flange is ordered from the factory.

NOTES: When replacing pressure access port plugs in the field, the tightening torque should be 6-8 Nm (53-71 in-lbf).



M37160

I=Inlet pressure

M=Middle valve seat pressure

O=Outlet pressure

Fig. 18: Valve Pressure Access Port Locations.

INSTALLATION OVERVIEW

When Installing This Product...

1. Read installation instructions and the appropriate product literature carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Installer must be a trained, experienced combustion service technician.
3. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application. Do not exceed the valve ratings.
4. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage.
5. All wiring must comply with the National Electric Code (NEC) and any applicable local electrical codes, ordinances and regulations.
6. After installation is complete, carry out a thorough checkout of product operation as laid out in the valve installation instructions document

! WARNING!

Explosion Hazard and Electrical Shock Hazard.

Can cause explosion, serious injury or death.

- Turn off gas supply before starting installation.
- Disconnect power supplies before beginning installation.
- More than one disconnect can be involved

IMPORTANT

- The valve must be installed so that the arrow on the valve body points in the direction of the gas flow (gas pressure helps to close the valve).
- Make sure the O-ring seals (provided) are properly positioned and seated at the inlet and outlet flange connections.
- Do not remove the dust seal over the valve inlet and outlet until ready to connect piping.

WARNING!

Explosion Hazard and Electrical Shock Hazard.
Can cause explosion, serious injury or death.

- Do not take valve apart.
- Do not use tools to operate valve.
- Do not use valve if it has been flooded.
- Call serviceman if valve does not work properly.

IMPORTANT

- Disassembly of the valve in the field may cause permanent damage to the valve and void the factory warranty.
- Fasteners containing lacquer paint indicate non-field accessible areas.
- Accessory modules may be removed or replaced as necessary in the field.

CAUTION

If valve has been dropped, do not use it.

- Dropping the valve may cause permanent damage to the valve.
- Replace entire valve and associated modules before use

Installation Quick Start Guide

The SV2 Series valve installation steps are illustrated below in the Quick Start Guide.

NOTE: Elaboration of each step is detailed in the SV2 Series Safety Shut-Off Valves Installation Instructions, document 32-00018, which is shipped with each valve and available online.

CAUTION


The SV2 Series valve should be used with clean gas free of particles bigger than 50 micrometers. To ensure this requirement is met, an external filter element, such as the Honeywell Kromschroeder GFK or similar, can be added to the gas supply line.

INSTALLATION QUICK START GUIDE


The SV2 Series valve installation steps are illustrated below in the Quick Start Guide.

NOTE: This section is an installation overview ONLY. Elaboration of each step is detailed in the SV2 Series Safety Shut-Off Valves Installation Instructions, document 32-00018, which is shipped with each valve and available online.





What's in the box



A. Valve



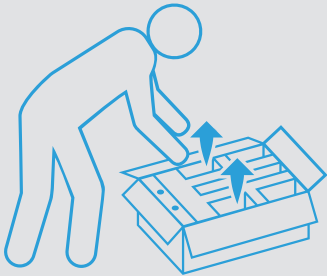
B. Accessory Box:

- Connectors (not EU) 
- Cord grips (NEMA 4/IP66 versions only)
- Mounting Hardware (for C6097 Pressure Switch)  
- Installation Instructions 
- Premix pre-filter (V2V models)

C. Accessories Ordered Separately:

- Flanges
- Pressure Module
- HMI or PC Tool
- Mixing unit
- Pulse lines
- Pulse line fittings
- Heat Exchanger

1 Remove from box



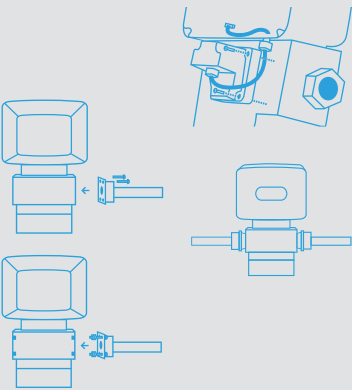
2 Installation and Mounting

A. Orientation planning

B. Mounting flanges

C. Mount valve to flanges and piping

- 3/4, 1 inch (DN20/25) valve bodies have drilled and tapped holes
- 1 1/2 inch (DN40) and larger valve bodies with embedded slots for flange retaining nuts



D. Vent valve connection

E. Premix mixing unit, pulse lines, air pre-filter and outdoor air installations planning

F. Pressure Module or C6097 planning

- Investigate correct mounting location and pressure access port

G. Mount Pressure Module or C6097

NOTE: The 1in/DN25 valve flange pressure port must be installed facing sideways (refer to Figs. 2-3) due to the mounting hole orientations.

NOTE: The 1.5-2.0 inch/DN40-50 valve flange pressure port must be installed either facing up or down (refer to Figs. 4-6) due to the mounting hole orientations.

3 Wiring

A. Wiring and conduit recommendations.

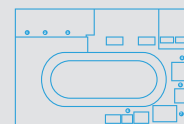
- Use only flexible conduit on NEMA 4/IP66 enclosures.
- Wiring must comply with all applicable electrical codes, ordinances and regulations.
- All line voltage wiring must be NEC Class 1.
- Use lead wire, which can withstand 90°C (194°F) ambient temperatures.
- Power supply voltage and frequency must agree with those marked on the device.
- Load connected to the device must not exceed the ratings given in this document.
- Separate line and low voltage wiring to avoid signal interference. If using conduit, run line voltage and low voltage wiring in separate conduit.

B. Remove valve front electrical enclosure cover



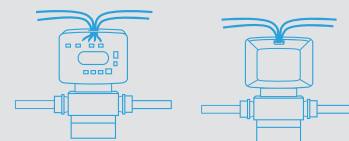
C. Estimate wiring:

- Observe unique line voltage, limits & interlock wiring required for the SV2 Series valves.
- More wires may be required than typical valves.



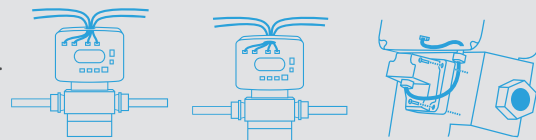
D. String wires:

- String wires through conduit, NEMA 4/IP66 enclosure entry points, cord grips and nuts before wiring to connectors.
- String wires through NEMA 1 / IP20 enclosure rear opening or bottom slot before wiring to connectors.



E. Connect wires:

- Observe terminal labeling and proper electrical connector placement.
- Connect wires to the wire connectors.
- Plug electrical connectors into their proper sockets.
- Pressure Module must be field connected in electrical enclosure.



F. In connecting more than 1 valve to HMI / PC Tool or a building automation network, be sure to setup bias + termination resistors.

G. Install plugs and nuts in unused NEMA 4/IP66 electronic enclosure wire entry locations.

- Low voltage, M16 x 1.5
- Line voltage, 1/2 in. NPT

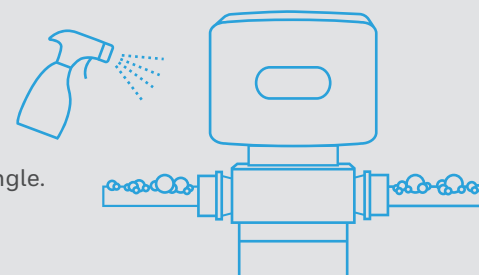
4 Checkout and Operation - Leak Check

You will need:

- Rich soap and water solution.
- Jar or glass filled with water.
- 1/4 in (6mm) flexible tubing.
- 1/4 in (6mm) aluminum or copper pilot tubing with 1 end cut at 45 angle.
- Manual test petcock

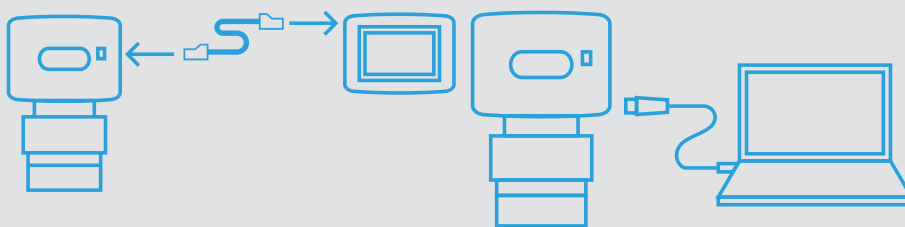
A. Valve connection and accessory leak test.

B. Valve seat leak test.



5 Programming & Setup

Any intelligent features requiring setup must be completed before the valve will be operational. The HMI or PC Tools are used for this purpose.



This includes:

- Valve modbus address + communication speed
- Low gas pressure
- High gas pressure
- External VPS (using Pressure Module)
- Fuel/air firing curve (Premix/V2V models)

A. Connect Modbus wiring per HMI Tool or PC Tool Installation Instructions.

B. Power SV2 Series valve and HMI or PC Tool.

C. Complete setup as required and run on-board test procedures as required.

6 Wiring Checkout

A. Test:

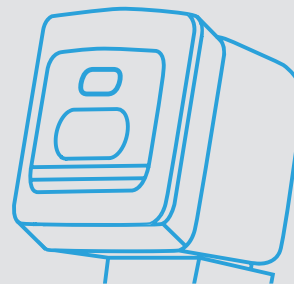
- Cycle the valve several times to verify proper function.
- Each limit and interlock.
- Following burner management system checkout guidelines.
- Any other recommended or required tests.

7 Finish

A. Replace the electrical enclosure cover.

B. Replace solenoid cover (if removed).

C. Your valve is ready to use.



2. MOUNTING OVERVIEW

A. Introduction and Orientation Planning

The gas valve can be mounted plus or minus 90 degrees from the vertical. Refer to Fig. 19. Pay attention to the gas flow direction arrows on the valve body when planning the mounting orientation (refer to Fig. 15 and Fig. 16). The electronics and LEDs should be accessible when the valve is installed in the valve train for programming purposes and visual indication purposes.

NOTE: If the valve electronics needs to be moved to the opposite side of the valve for better access, refer to the CHANGING VALVE / ELECTRONICS ORIENTATION procedure in this manual.

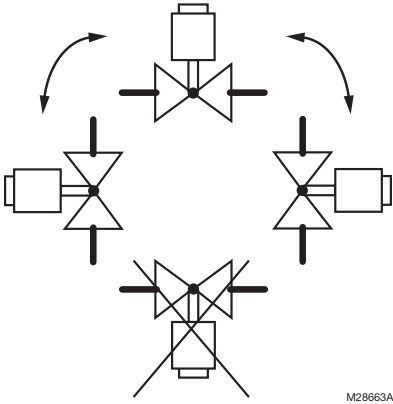


Fig. 19: Valve mounting position.

! NOTICE

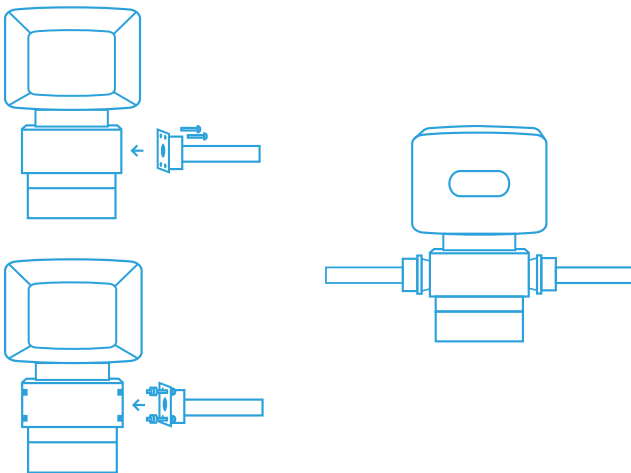
Do not attempt to change valve electronics orientation without consulting the CHANGING VALVE / ELECTRONICS ORIENTATION section of this manual.

B. - D. Flanges, Valve and NOVV Mounting

After planning for the valve orientation, the flanges should be mounted to the gas connection, following the pipe preparation guidelines set forth in the SV2 Series Valves Installation Instructions (document 32-00018).

NOTE: Ensure the gap left between the flanges when installed on the pipes does not exceed the valve body width otherwise the valve piping may be over stressed.

Next the valve is mounted to the flange(s) and piping. Depending on the valve size, there are different mounting techniques. Refer to the SV2 Series Valves Installation Instructions, the installation instructions packed with each flange and/or Flanges section of this document. If a NOVV (normally open vent valve) is required, it should be mounted next.



NOTE: The 1in/DN25 valve flange pressure port must be installed facing sideways (refer to Figs 2-3) due to the mounting hole orientations.

NOTE: The 1.5-2.0 inch/DN40-50 valve flange pressure port must be installed either facing up or down (refer to Figs 4-6) due to the mounting hole orientations.

E. Premix Mixing Unit, Pulse Lines, Air Pre-Filter and Outdoor Air Installations Planning

This section is an overview ONLY. For elaboration on all elements, refer to the SV2 Series Installation Instructions (32-00018), which is packed with each valve or Chapter 5: Premix Technology in this manual.

Premix Mixing Unit Extension Piping

For optimal fuel/air ratio performance, it is recommended to assemble an extension pipe between the V2V gas valve and V2MU Mixing Unit as indicated in [Table 19](#). Alternatively, a 90-degree elbow with an inner diameter as specified in the table can be used.

Premix Pulse Lines

The Fuel/Air Module contains three pulse line connections for connection of air pressure, gas pressure and reference pressure of a gas/air mixing unit. The connections are indicated by A (gas), B (reference) and C (air) on both the Fuel/Air Module and the SV2 Series mixing units. Refer to [Fig. 43](#).

Honeywell offers several fittings and tubing kits to facilitate myriad system configurations as shown in [Table 17](#).

IMPORTANT:

- Refer to the Pulse Line Connections and Pulse Line Assembly to FARMOD, Heat Exchanger, Air Pre-Filter and V2MU sections in Chapter 5: Premix Technology for detailed information regarding pulse lines.
- The fittings selected by Honeywell from specific brands and types assure free sample flow to and from the SV2 Series fuel/air ratio premix valve.
- If any other fittings are used, the sample flow to and from the valve can easily get obstructed and affect the combustion quality.
- For this reason it is strongly recommended to use the fittings listed in [Table 17](#).

Attach the pulse lines to the pulse line fittings to Port A, B and C of the FARMOD as indicated in [Fig. 43](#), following the instructions of the burner or boiler manufacturer. Attach each pulse line to its corresponding fitting on the mixing unit or burner.

Premix Air Pre-Filter

The air pre-filter is included with every premix valve. The air pre-filter MUST be installed in every premix system.

The filter must be mounted between the V2MU mixing unit and the valve FARMOD in the air pulse line. When the Heat Exchanger is used, it must also be mounted between the V2MU mixing unit and the valve FARMOD, with the Heat Exchanger first and the filter second. Refer to [Fig. 45](#).

IMPORTANT

- The filter should be mounted as close to the valve FARMOD as possible.
- Replacement of the filter shall be included in the annual appliance maintenance procedures.

Premix Outdoor Air Installations

WARNING

Direct water ingress (e.g. from mist, rain or pressure wash) into the pulse lines should be avoided or prevented

IMPORTANT:

- Refer to the Outdoor Air Installations section in Chapter 5: Premix Technology for detailed information regarding the necessary components and installation details.
- When using the Honeywell HEATEXCHANGER-000 kit, the valve + FARMOD may be installed above or below the mixing unit + Heat Exchanger, but above is preferred.
- To prevent condensation formation due to back draft, it is recommended to purge the application after each burner operation.

The heat exchanger can be directly mounted to the V2MU mixing unit as shown in [Fig. 49](#) and [Fig. 50](#) and can be mounted in either a vertical or horizontal position, depending on the appliance configuration and available space. For remote mounting the heat exchanger, the customer must provide the appropriate bracket and/or install and connect as part of their appliance offering. Pulse line tubing and fitting between the mixer and heat exchanger is then required.

The inner diameter of the connection between the heat exchanger and the mixer shall not be smaller than 9mm at any point.

NOTES:

- **The Heat Exchanger must always be mounted in a position that allows condensate to drain to the mixing unit. Accordingly, ensure that the mixer connection on the heat exchanger is the lowest point in regards to the heat exchanger mounting, otherwise water will be trapped inside the heat exchanger and will not drain appropriately.**
- **Excessive moisture can partially or fully clog the pulse lines between the mixing unit and the FARMOD and damage the FARMOD. In this case, the system will fail safely by causing a flame out, a valve lockout and/or may render the FARMOD unusable. Note that the FARMOD is field replaceable should this last instance occur.**
- **The Heat Exchanger and the filter must be mounted between the V2MU mixing unit and the FARMOD, with the Heat Exchanger first and the filter mounted as close to the FARMOD as possible. Refer to [Fig. 45](#).**

Installation Sequence

The sequence of installation for the premix accessories is as follows; FARMOD insulation shoe (part of heat exchanger kit), heat exchanger, air pre-filter with pulse line tubing in between as required.

For detailed installation, refer to the Premix Accessories installation instructions, document, 32-00180, which is packed with the air pre-filter, heat exchanger, tubing and fitting kits.

Premix Start-Up

The FARMOD (Fuel/Air Ratio Module) is standard equipped with a heating device. The heater will be powered whenever the valve electronics are powered. The FARMOD will feel warm after 1 hour of being powered. This is normal.

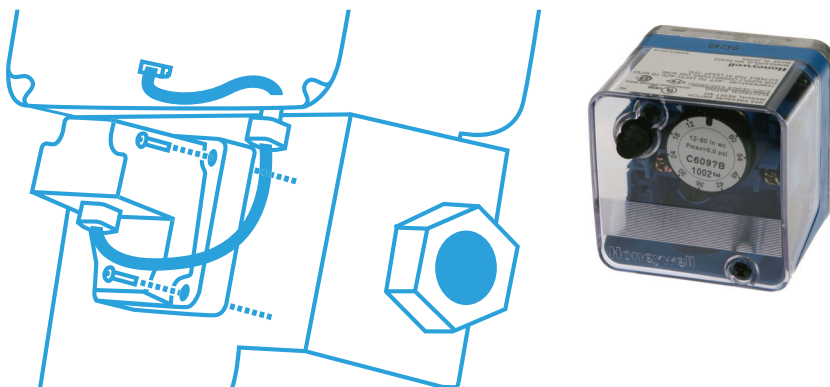
As part of the appliance adjustments during commissioning, the site-specific calibration of the SV2 Series valve/appliance should be performed when the valve/appliance has reached a typical operating temperature for its installation/application in order to minimize the impact of component temperature changes on the fuel/air ratio.

F. - G. Pressure Module or C6097 Planning and Mounting

Refer to the [C6097 Pressure Switches](#) and [Pressure Module](#) sections of this document for information on model selection, placement, connection and features. The SV2 Series Valves Installation Instructions provides for detailed installation instructions for the C6097 pressure switches and the Pressure Module Installation Instructions, which is packed with each Pressure Module, provides detailed installation instructions.

NOTES:

- Accessing the Inlet (I) port of pressure access mounting locations A and C on V1 is not allowed for the Pressure Module. Refer to [Fig. 16](#) and [Fig. 18](#).
- The Pressure Module cannot be used at this time with premix (V2V) valves for low gas pressure, high gas pressure or VPS. It is suggested to use the C6907 pressure switches for those functions instead. Refer to [Table 12](#).
- The M4x25 screws shipped with the SV2 valve **MUST** be used to secure the flange mount C6097 to the valve body. **DO NOT** use the 8-32 screws provided with the flange mount C6097 pressure switch.



3. WIRING OVERVIEW

Introduction

Up to 5 connectors are required for customer field wiring (model dependent). Customers may purchase the Honeywell SV2 Series valves with or without the required customer wiring connectors (continent dependent).

If the valve is purchased with customer electrical connectors, they may be found in a bag assembly, housed in the accessory box that contains the literature and spare screws for mounting the Pressure Module or C6097 pressure switches.

If the valve is not purchased with the required customer wiring connectors, all 5 may be purchased from Honeywell as a bag assembly under part number CONNECTORKIT-000 or purchased externally. For purchasing externally, the appropriate connector information is shown in [Table 6](#).

Table 6. SV2 Valve Electrical Connectors Identification.

Vendor	Description	Vendor Part Number	SV2 Series Valves Purpose	Required Quantity
Lumberg	RAST 5, 2 Pole	3611 02 K02M08	Mains supply	1
Lumberg	RAST 5, 3 Pole	3611 03 K04M08	RS-485 Modbus ¹	1
Lumberg	RAST 5, 4 Pole	3611 04 K120M08	Analog Fire Rate + Analog O2 Sensor (future use) ¹	2
Lumberg	RAST 5, 6 Pole	3611 06 K01M08	Control Wiring	1

1. Does not apply to BASIC (5) electronics, designated by the 9th digit in the valve model number. Refer to [Fig. 1](#). Valve nomenclature.

A. Wiring and Conduit Recommendations

! WARNING!

Explosion Hazard and Electrical Shock Hazard.

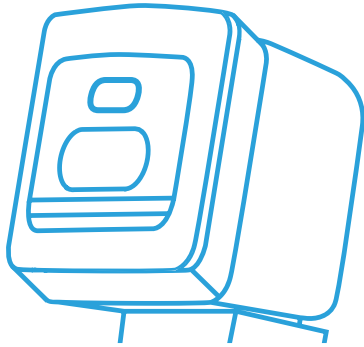
Can cause explosion, serious injury or death.

- Disconnect the power supply making wiring connections to prevent electrical shock and equipment damage.
- More than one power supply disconnect can be involved.

IMPORTANT

- Use only flexible conduit with the SV2 Series valve NEMA 4 / IP66 enclosures.
- Wiring must comply with all applicable electrical codes, ordinances and regulations.
- Wiring must comply with NEC Class 1 (line voltage) wiring.
- Use lead wire which can withstand 90°C (194°F) ambient temperatures.
- Voltage and frequency of the power supply connected to this control must agree with those marked on the device.
- Loads connected to the VPS (valve proving system) Switch and/or POC (proof of closure) Switch, if used, must not exceed the ratings given in [Table 8](#).
- Separate line and low voltage to avoid signal interference. If using conduit, run line voltage and low voltage in separate conduit.

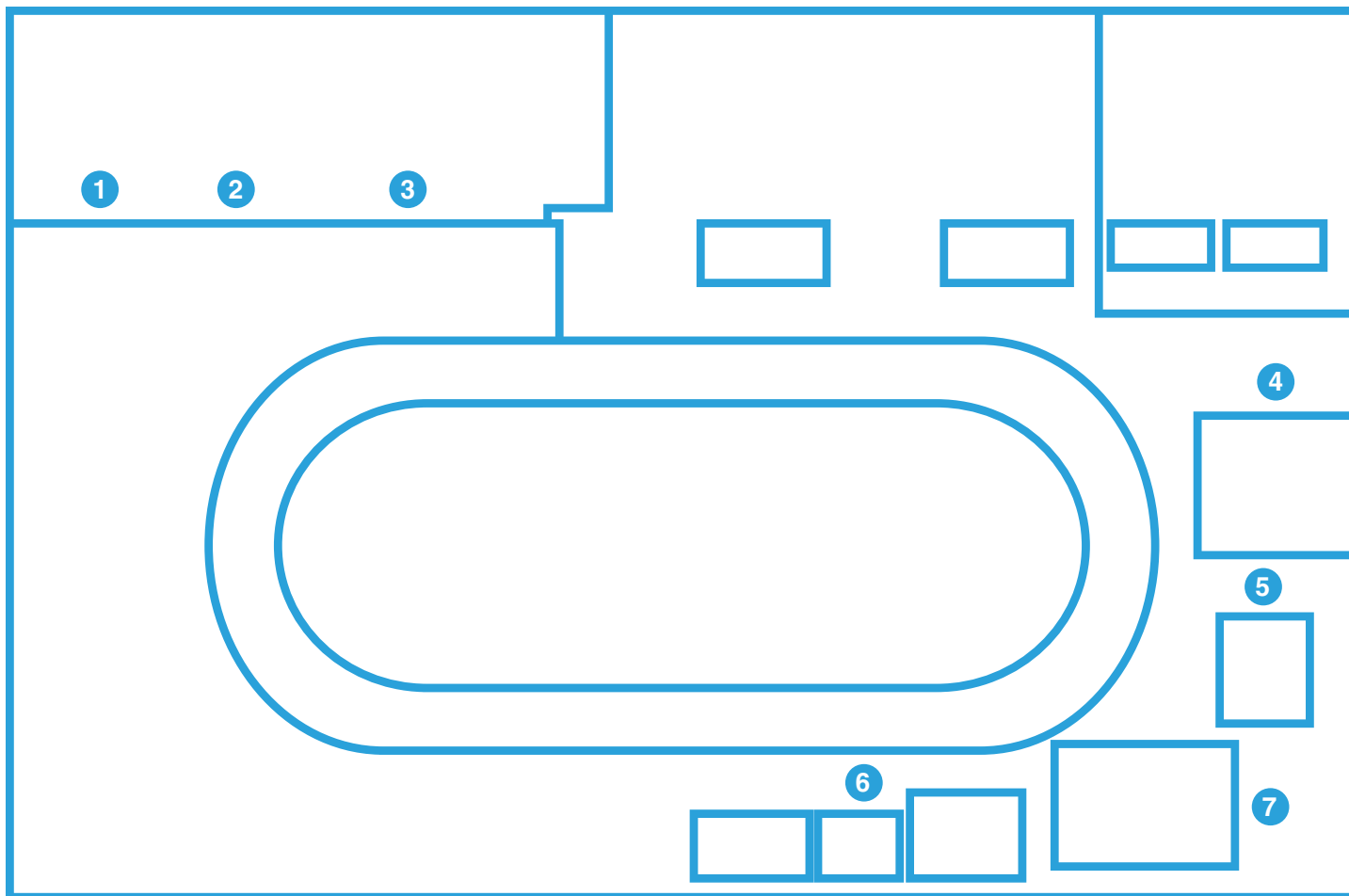
B. - C. Remove Electrical Enclosure Cover and Estimate Wiring



To access the customer wiring terminals, remove the valve front electrical enclosure retaining screws with the appropriate tool. Set the cover aside.

Note that the SV2 Series valves have unique line voltage, limit, interlock and VPS (valve proving sequence) wire routing. SV2 Series valves require line voltage power input at all times to the internal electronics. This is true of all SV2 Series valve models. Interlock wiring is run through all valve models for the solenoid power saving feature. Interlock dry contact input / output terminals are also used for the flame safeguard control ILK string with the Pressure Module for low gas pressure and high gas pressure functions. A VPS switch contact output is present on applicable models for when the Pressure Module is used for VPS that is externally triggered by a separate device. Refer to [Fig. 147](#) to [Fig. 157](#) for proper valve wiring.

NOTE: Even when external C6097 pressure switch(es) are used, the ILK wiring must be run through the valve.



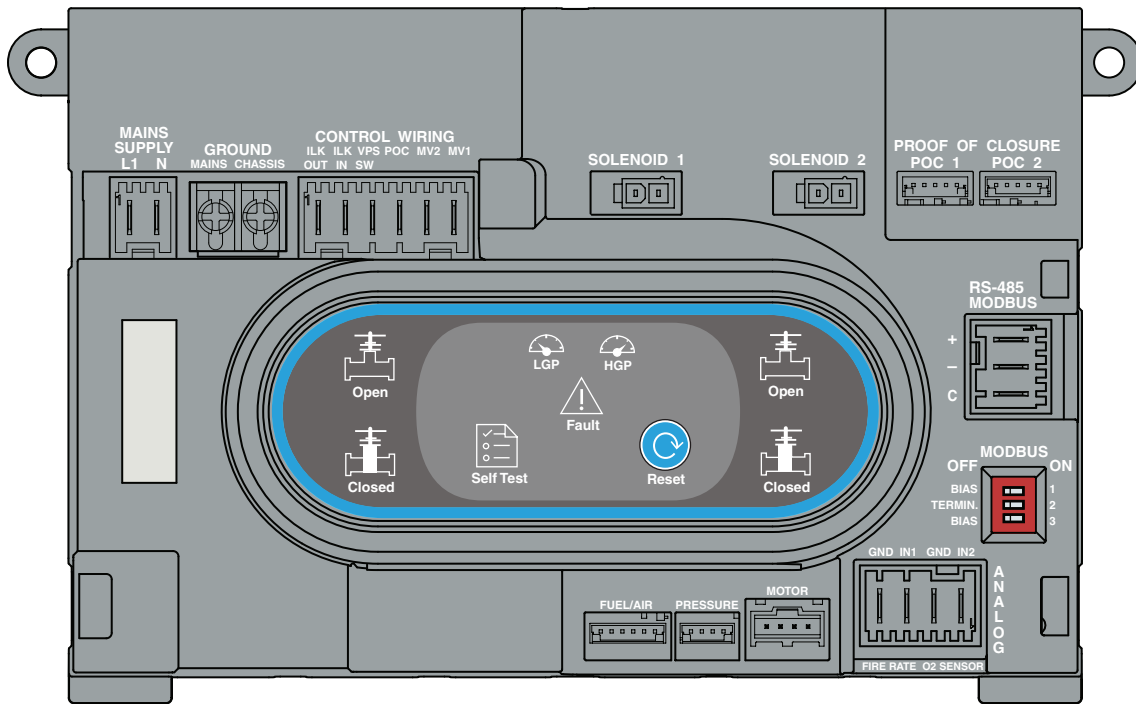
Certain models of the SV2 Series valves also have Modbus interface wiring as well as termination and bias resistor selections. The Modbus interface is used for programming intelligent features and connection to a building automation system.

Fig. 20 and Fig. 21 show all of the wiring terminals inside the valve electronics enclosure. The factory wiring terminals can be found in Table 7 while the field wiring terminals and designations can be found in Table 8. A summary of the possible field wiring connections is shown below, relative to the callouts in the illustration above.

1. Mains Supply L1 and N
2. Ground Mains and Chassis
3. ILK Out/In, VPS Switch output, POC output, Main Valve 1/2
4. RS-485 Modbus (not present on BASIC Intelligence models)
5. Modbus termination and bias resistors (not present on BASIC Intelligence models)
6. Pressure connection for Pressure Module
7. Analog GND/IN for Fire Rate and O2 Sensor (used for future enhancements)

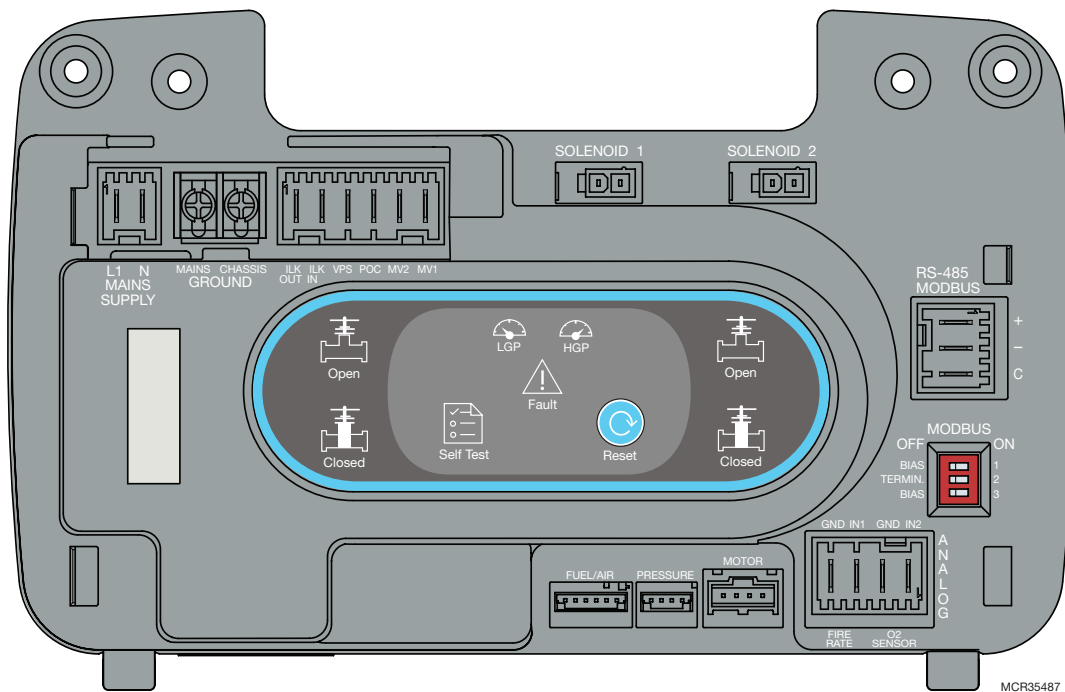
External – C6097/C437 pressure switches

NOTE: Use of certain terminals and items such as VPS Switch output, POC output, Modbus, and groupings is model dependent. Refer to Table 8 for details.



MCR35488A

Fig. 20: NEMA 4 / IP66 STANDARD (6) valve electronics interface.



MCR35487

Fig. 21: NEMA 1 / IP20 STANDARD (6) valve electronics interface.

NOTES:

- **Electrical connections are the same for NEMA 1 / IP20 electrical assembly with the omission of POC 1 and POC 2.**
- **BASIC (5) electronics do not have any Modbus, Fuel/Air, Pressure, Motor or Analog connections**

From the factory, several items will be fully wired internally via connectors inside the electrical enclosure. The factory wiring terminals can be found in [Table 7](#).

Table 7. Factory Wiring Information.

Description	Purpose	Applicable Model(s)
SOLENOID 1	Connection from Solenoid 1 to main electronics. Enables powering of solenoid.	All
SOLENOID 2	Connection from Solenoid 2 to main electronics. Enables powering of solenoid.	
PROOF OF CLOSURE		
POC 1	Connection from Solenoid 1 POC to main electronics. Tied to the valve interface Open and Closed LEDs. Refer to Fig. 14 and Fig. 21.	All (optional)
POC 2	Connection from Solenoid 2 POC to main electronics. Tied to the valve interface Open and Closed LEDs. Refer to Fig. 14 and Fig. 21.	
FUEL/AIR	Module that measures gas, air and gas/air mix inputs from fuel/air system to control the fuel/air premix valves. Works with stepper MOTOR.	V2V
MOTOR	Stepper motor performs valve modulation in response to changing conditions from the fuel/air module and burner system	V2V

Table 8. Field Wiring and Terminal Designation⁴.

Description	Terminal	Purpose	Rating ⁶	Applicable Model(s) ⁵
MAINS SUPPLY ¹	L1	Valve incoming voltage supply L1 connection	24, 100-240VAC, 15W	All
	N	Valve incoming voltage supply neutral connection		
GROUND (PROTECTIVE EARTH PE)	MAINS	Valve external ground connection	-	All
	CHASSIS	Valve chassis ground, connected to valve body grounding terminal		
CONTROL WIRING ²	ILK OUT	Interlock wiring run through all valve models for solenoid power saving feature. Dry contact output / input also used for flame safeguard control ILK string with Pressure Module for low gas pressure and high gas pressure functions.	24, 100-240VAC, 8A	All
	ILK IN			
	VPS SW	Line voltage output for Valve Proving System switch, using the Pressure Module, for external VPS conducted by a separate device	24, 100-240VAC, 0.1A	All models with Intelligent Features of 6 or 7
	POC	Line voltage output for Proof of Closure switch	24, 100-240VAC, 0.1A	All valves with POC
	MV2 ³ MV1 ³	Main valve 2 and 1 incoming voltage from burner control. May be jumpered if external VPS is NOT performed or if valve is an internal VPS model (models with Intelligent Features of 8 or 9)	1 inch / DN25 Valves: 24VAC, 1.6A/35W 120VAC, 0.5A/55W 240VAC, 0.3A/55W 1.5/2.0 inch / DN40-50 Valves: 120VAC, 1.0A/110W 240VAC, 0.6A/110W Per coil pull-in (2 sec) at 20°C/68°F	All
RS-485 MODBUS ²	+	Modbus Data + connection	For HMI or PC Tools or building automation system connection	All models with Intelligent Features of 6, 7, 8 or 9
	-	Modbus Data - connection		
	C	Modbus common connection		
MODBUS BIAS RESISTORS	BIAS	Bias resistor for differential resistance	Refer to section F, entitled Valve Modbus Bias Setup	All models with Intelligent Features of 6, 7, 8 or 9
	TERM.	Termination resistor		
	BIAS	Bias resistor for differential resistance		
PRESSURE	-	Field connection for Pressure Module, which can be used for Low gas pressure, High gas pressure, VPS (external and internal), Leak detection or pressure monitoring	-	All models with Intelligent Features of 6, 7, 8 or 9

Description	Terminal	Purpose	Rating ⁶	Applicable Model(s) ⁵
FIRE RATE ²	GND	Ground connection for firing rate analog input	-	For future enhancements
	IN1	Firing rate 4-20mA / 2-10VDC analog input for metering function		
O2 SENSOR ²	GND	Ground connection for oxygen sensor analog input	-	
	IN2	O2 sensor 4-20mA / 2-10VDC analog input for fuel/air adaptive		

- Run line voltage wires in separate conduit.
- Run low voltage wires in separate conduit. For the best Modbus communication performance, use shielded wire with two twisted pairs (Belden 9842 or equivalent). Connect + and - to one twisted pair, and C to both wires of the other twisted pair. Connect the shield to Earth Ground at the end of the connected external device (i.e. HMI or building automation system). Do not connect C to the shield. Route any noise producing wires in conduit separate from the HMI and as far away from the HMI as possible. For further Modbus wiring information, refer to HMI installation instructions, document 32-00030.
- MV2 and MV1 may be jumpered if there is no need to individually power them. MV2 and MV1 should NOT be jumpered if an external VPS control is used, which requires MV2 and MV1 to be powered individually. On valve models with internal VPS functionality, MV2 and MV1 may be jumpered as the VPS sequence is directed by the valve itself, rather than an external control.
- Installation, operation and maintenance shall conform with National Fire Protection Association standards, national and local codes and authorities having jurisdiction.
- Use of the Pressure Module is only applicable to valve versions with embedded intelligence;
- Rating may be valve supply voltage dependent.
 - 5 = BASIC. No Modbus or Pressure Module capability.
 - 6 = STANDARD. Includes Modbus, Pressure Module, external VPS using Pressure Module.

D. Stringing Wires

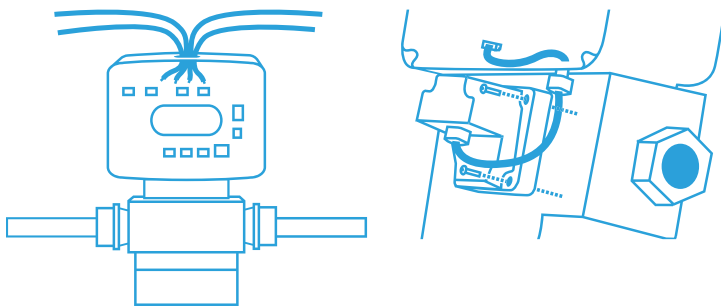
If purchased with the valve, the electrical connectors will be included in the valve accessory box. NEMA 4/IP66 valve models will also have line voltage and low voltage nuts, plugs and cord grips in the accessory box.

Depending on the NEMA / IP rating of the valve, there are different steps for stringing and connecting the wires to the proper terminals. The wires should always be strung through the proper openings and fitting before wiring to the connectors. Refer to the SV2 Series Installation Instructions for detailed instructions.

NEMA 4/IP66 Enclosures:

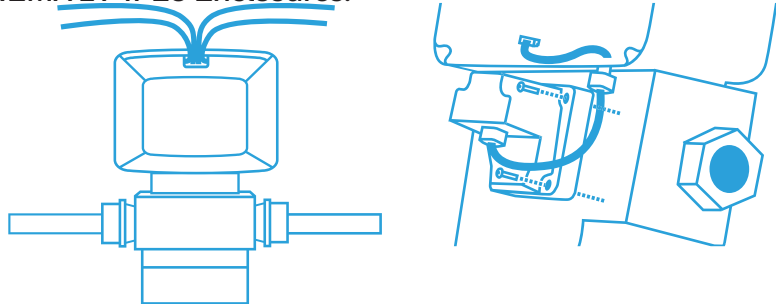
NOTES:

- Use only flexible conduit with the SV2 Series valve NEMA 4/IP66 enclosures.
- There are 6 low voltage entry points using M16 x 1.5 cord grips and retaining nuts.
- There are 6 entry points with 0.875 in (2.223 cm) holes for use with:
 - 1/2 in (1.27 cm) conduit
 - The provided 1/2 in NPT cord grip (for the RS-485 Modbus cable due to the recommended cable size).
- To maintain the NEMA 4/IP66 enclosure rating when using the cord grips, the recommended wire ODs are as follows:
 - M16 x 1.5 cord grip: Cable OD 1.7-5.8 mm (0.07-0.23 in)
 - 1/2 in NPT cord grip: Cable OD 4.3-11.4 mm (0.17-0.45 in)



- Cord grips may be used for low voltage wiring with the included retaining nuts. Before wiring to the connectors, string the wires through the cord grips, low voltage entry points and retaining nuts.
- Flexible conduit may be used for low and line voltage wiring. Before wiring to the electrical connectors, string the wires through the external conduit, the valve electrical enclosure entry points and conduit retaining fittings.
- For the Pressure Module, use the cable entry point just above its mounting location or in the center of the electrical enclosure. Be sure to place a retaining nut in the selected electrical enclosure entry location before threading the connector end through the hole and nut.

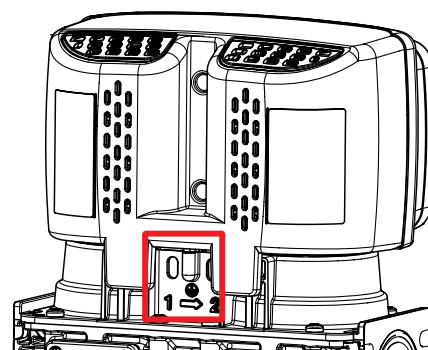
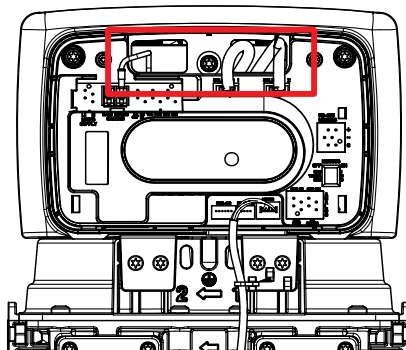
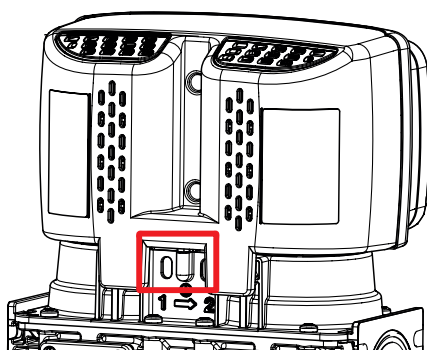
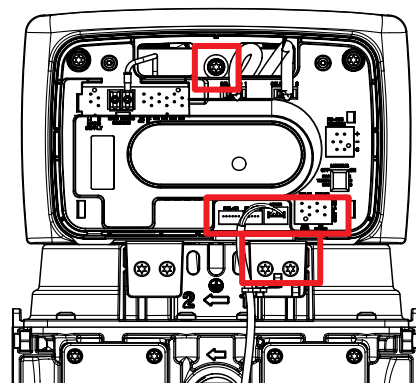
NOTE: A NEMA 4/IP66 Pressure Module (PRESSMOD4x-000) must be used with the NEMA 4/IP66 valve electrical enclosure to retain the enclosure rating.

NEMA 1 / IP20 Enclosures:**1 Inch / DN25 Valves**

- Before wiring to connectors, string low and line voltages wires through electrical enclosure rear opening or bottom slot.
- Separate the low and line voltage entry points.
- For the Pressure Module, thread the connector end through the slot in the bottom center of the electrical enclosure.

1.5-2.0 Inch / DN40-50 Valves

- The rear enclosure covering the solenoid coils must first be removed to access the line voltage mains and control wire routing area.
 - With the valve front electrical enclosure cover off, the back cover can be removed with one screw which is located above the valve interface on the front side of the valve.
- Before wiring to connectors, string wires through appropriate openings:
 - Low voltage wiring entry is at the bottom of the front electrical enclosure.
 - o Strain relief is via a loop on the electrical enclosure fixation tab.
 - Line voltage wiring entry is at the bottom of the rear electrical enclosure. Route wires between the solenoids and through two rectangular openings at the top of the front electrical enclosure.
 - o Wires may be secured to hooks embedded into the plastic on the rear exterior of the front electrical enclosure, just below the rectangular openings.
 - o Strain relief is via eyes in the top part of the valve bonnet assembly, above the gas flow directional arrow.



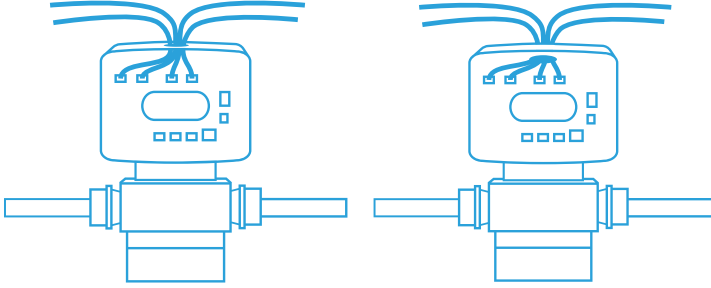
- For the Pressure Module, thread the connector end through the slot in the bottom of the front electrical enclosure.

NOTE: A NEMA 1 / IP20 Pressure Module (PRESSMOD1x-000) must be used with the NEMA 1 / IP20 valve electrical enclosure.

E. Connecting Wires

Match up the proper connector with the proper location/function per [Fig. 20](#) and [Fig. 21](#). Connect the wires to the proper terminal on the proper connector. Refer to [Table 8](#) and the BURNER CONTROL INTERFACE WIRING [Fig. 147](#) to [Fig. 157](#). Once

wiring is complete, the electrical connectors can then be plugged into their proper sockets and the Pressure Module (if used) connector can be plugged into the socket labeled 'PRESSURE'.



F. Valve Modbus Bias Setup

The SV2 Series valve can communicate via Modbus RTU communication with any compatible device. Only RTU communications with **1 start bit, 8 data bits, 1 stop bit and no parity** is supported.

Refer to the SV2 Series Valves Installation Instructions (32-00018) and [CHAPTER 3 : COMMUNICATION / CONNECTIVITY](#) in this manual for details on Modbus setup.

G. Install Plugs

Install the low and line voltage plugs in any unused wire entry locations for the NEMA 4 / IP66 valves to maintain the enclosure rating.

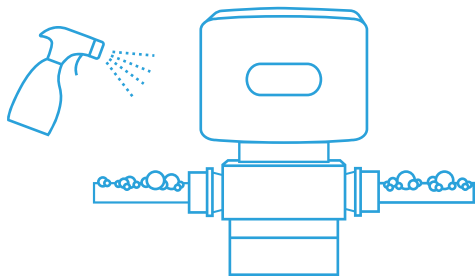
4. CHECKOUT AND OPERATION OVERVIEW

! WARNING!

Explosion Hazard and Electrical Shock Hazard.
Can cause explosion, serious injury or death.

- Do not allow fuel to accumulate in the combustion chamber for longer than a few seconds without lighting. An explosive mixture can result.
- Do not put the system into service until you have satisfactorily completed the Valve Seat Leak Test as detailed in the SV2 Series installation instructions (32-00018), all applicable tests described in the Checkout section of the flame safeguard control manual, and any other tests required by the burner manufacturer.
- All tests must be performed by a trained, experienced combustion service technician.
- Close all manual fuel shut-off valves as soon as trouble occurs. After the installation is complete, perform the Valve Seat Leak Test before putting the valve into service.

A. Valve Connection and Accessory Leak Test



The leak test should be performed during the initial startup of the burner system, or whenever the valve is replaced. It is recommended that this test also be included in the scheduled inspection and maintenance procedure.

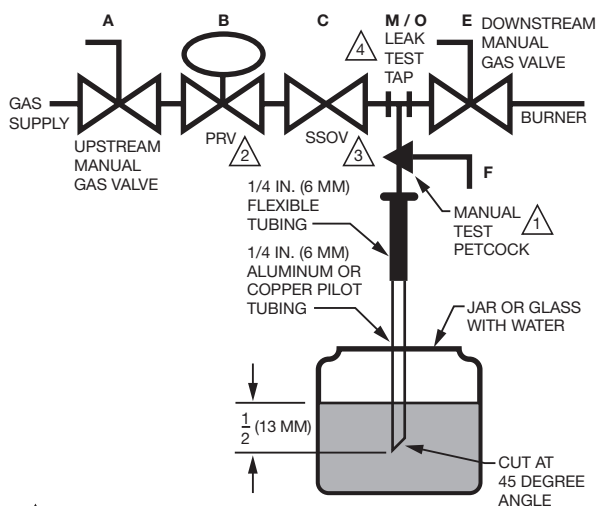
Per the installation instructions, the test requires a rich soap and water solution used with a series of manual safety shut-off valve closures and valve seats being powered to check for possible leaks.

B. Valve Seat Leak Test

! WARNING!

Electrical Shock and Explosion Hazard.
Can cause explosion, serious injury or death.

Remove the power from the system before beginning the valve leak test to prevent electrical shock. More than one disconnect may be involved. Power the system only when requested in the test procedure.



1 CAN ALSO BE A PERMANENT PETCOCK.

2 PRV = PRESSURE REGULATING VALVE.

3 SSOV = SAFETY SHUTOFF VALVE.

4 USE ONLY ONE OF THE DOWNSTREAM TAPS ON THE SSOV.

M9547H

Before putting the valve into service, the closure tightness of the gas shut-off valves must be checked. It should be performed only by trained, experienced combustion service technicians during the initial startup or the burner system or whenever the valve is replaced. It is recommended that this test should also be included in the scheduled inspection and maintenance procedures.

Follow the detailed step-by-step instructions laid out in the SV2 Series Installation Instructions, which is packed with each valve.

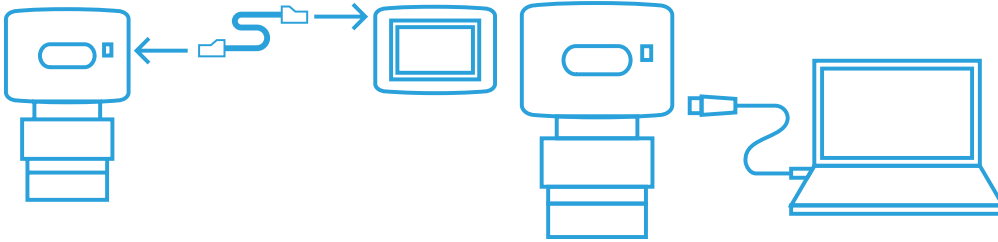
NOTE: In order to complete the leak test procedure outlined in the valve installation instructions, it is necessary to energize the valve seats. Valves with intelligent features can be readily energized if the Installer + OEM passwords have already been assigned, thereby removing faults associated with un-assigned passwords. For an un-programmed valve, the user must log in with the default OEM password and/or assign Installer + OEM passwords in order to bypass the fault conditions associated with un-assigned passwords in order to energize the valve seats. Default passwords are automatically pre-filled in the appropriate field during the initial user login.

NOTE: The use of a gas “sniffer” is not recommended as an alternative to this procedure as it can only sense gas leaks through the outer wall.

The procedure outlined in the SV2 Series Valves Installation Instructions is designed to locate and quantify a gas leak.

5. PROGRAMMING AND SETUP OVERVIEW

A. Connect Wiring



Connect the Modbus wiring per the HMI Tool or PC Tool installation instructions (whichever is used).

B. - C. Power Valve and Programming Tool and Complete Setup

Power the valve and the HMI Tool or PC Tool. The welcome screen should appear.

Follow the embedded wizards in the HMI or PC Tool to complete the setup of all applicable intelligent items as required. You may reference the HMI/ PC Tool User manual, 32-00031.



6. FINAL WIRING AND STATIC CHECKOUT OVERVIEW

A. Test

CAUTION

- Cycle the valve several times with the manual fuel shut-off valve closed. Verify that the valve, accessory modules and control system function properly
- Test each limit and interlock to ensure system operates correctly as defined in the applicable flame safeguard control manual instructions.
- Follow burner management system checkout guidelines. For 7800 SERIES, refer to the “Checkout and Test” document 65-0229.
- Perform any other recommended manufacturer or other required tests.

Troubleshooting

WARNING!

Electrical Shock Hazard.

Can cause severe injury, death or property damage.
Use extreme caution when troubleshooting: line voltage is present.

IMPORTANT

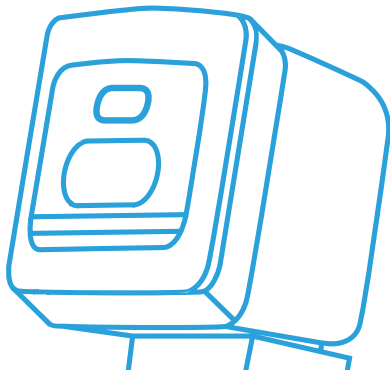
Do not replace the valve until all other sources of trouble have been eliminated.

Service Information**! WARNING!**

Explosion Hazard and Electrical Shock Hazard.

Can cause severe injury, death or property damage.

- Turn off gas supply and disconnect all electrical power to the valve before servicing.
- Only trained, experienced combustion service technician should attempt to service or repair flame safeguard controls, burner assemblies or valve trains.
- Refer to the ACCESSORIES, FIELD REPLACEMENTS AND INTELLIGENT FEATURES section of this manual for advice on component field replacements.

7. FINISH

- Replace the valve electrical enclosure cover, tightening each fastener between 1.26 and 1.54 Nm (11 and 13.63 in-lbf).
- Replace the solenoid cover, if removed during installation, tightening each fastener between 2.2 to 2.35 Nm (19.5 to 20.8 in-lbf).
- Your SV2 Series valve is now ready to use!

CHAPTER 3 : COMMUNICATION / CONNECTIVITY

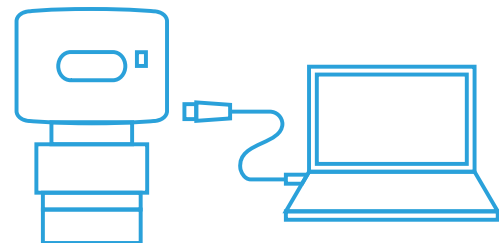
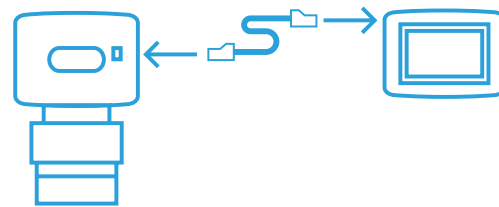
Introduction

SV2 Series valve models with intelligence levels of 6 have embedded Modbus RTU communications. SV2 valves can communicate via Modbus RTU open protocol with any compatible device. The SV2 Series valves and HMI / PC Tools support RS-485 Modbus RTU communications with:

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

The SV2 Series valves can communicate with:

- The SV2 Series HMI programming tool directly
- The SV2 Series PC programming tool via a USB to RS-485 converter (included in the PCTOOLKIT-000)
- 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. With this communication option, the HMI Tool would likely be permanently installed.



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 Valve Modbus Bias Setup section of this document for more information as well as the reference documents listed at the end of this section for proper SV2 Series valve and Programming Tools Modbus wiring and setup.

The HMI or PC Tools automatically communicate with the valve once properly connected. Either of these tools is required for initial setup of any intelligent features. After initial valve setup is complete, the HMI or PC Tools may be left in place, removed or replaced with a building automation system connection. If any of the Modbus master configurations shown above are used, it can monitor and/or control the connected valve(s). Certain writable features may be dependent on the connected Modbus master device. Note that the HMI and PC Tools have built-in monitoring, troubleshooting, diagnostics and trending capabilities as well.

When connected to a building automation system Modbus master either directly or through a secondary port on the HMI Tool, the Modbus master control must be programmed to recognize the various SV2 Series valve Modbus registers since communication is not automatic. Refer to the Modbus Addressing section of this manual for the Modbus addressing information.

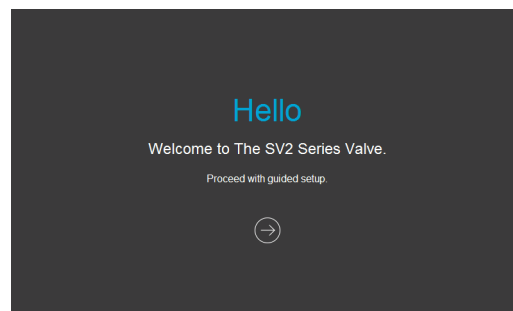
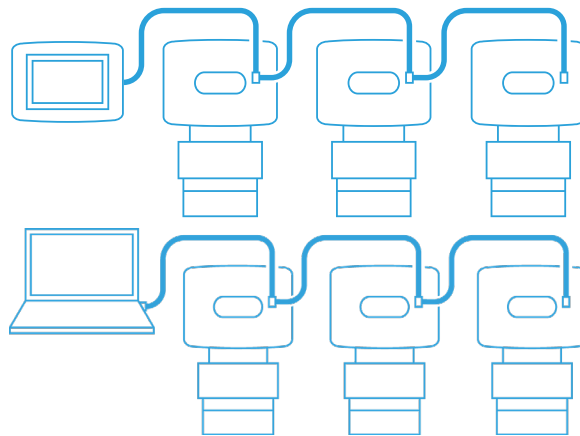
Programming Tools

There are two available models of programming tools for use with the SV2 Series valves with intelligent features. There is an HMI (human machine interface) version and a PC (personal computer) version available.

Either tool is required to complete initial setup of any intelligent valve features before the valve will be operational.

For further details on the use of the HMI and PC Tools and specifications, refer to the [APPENDIX of this manual for the detailed Modbus addressing information and CHAPTER 4 : ACCESSORIES, FIELD REPLACEMENTS AND INTELLIGENT FEATURES](#) section of this document as well as the reference documents.

Up to 8 valves may be wired to a single HMI or PC Tool in daisy chain fashion. Refer to the Connectivity Notes section that follows for important information



Connectivity Notes

From the factory, the default Modbus address for all valves is 1. If the intent is to connect more than 1 valve to the programming tool or external Modbus master, make sure each connected valve is given a unique Modbus address. Once The HMI or PC Tool is connected to the valve and communicating, the Modbus address may be changed. Modbus addresses can be from 1 to 247.

This manual provides an overview of connectivity to the valve, HMI Tool, PC Tool and an external Modbus master. Detailed wiring, setup and connectivity information is provided in the reference documents listed below. When attempting connectivity and valve programming activities, referencing these documents is imperative.

IMPORTANT

- When intending to connect more than 1 valve to the HMI or PC Tool or an external Modbus master, each valve must be individually connected and programmed first with each valve given a unique Modbus address. Once this is complete, all valves may be wired in a daisy chain fashion to a single HMI Tool port, PC Tool USB to RS485 converter or a Modbus master single port.
- From the factory, the default baud rate for all valves and the HMI or PC Tools is 38400 bps. Both baud rates may be changed AFTER CONFIGURATION IS COMPLETE FOR THE PROGRAMMING TOOL AND ALL VALVES. The baud rate selections are 9600, 19200, 38400 or 57600 bps. 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. For detailed information, refer to the HMI / PC Tool User Manual listed below.
- For best HMI communication performance, use shielded cable with two twisted pairs (Belden 9842 or equivalent). Connect the + and – to one twisted pair and C to both wires of the other twisted pair. Connect the shield to earth ground at the end of the connected external device. Do not connect C to the shield. Refer to the HMI or PC Tools Installation Instructions listed below for detailed wiring information.
- Use the provided clamp filters with the HMI Tool to protect against conducted and radiated transient noise for the 24VAC and COM connections.
- Separate line and low voltage wiring to avoid signal interference. If using conduit, run line voltage and low voltage wiring in separate conduit. Route any noise producing wires as far away from the HMI as possible.

Reference documents:

- 32-00018, SV2 Series Valves Installation Instructions
- 32-00030, HMI Tool Installation Instructions
- 32-00031, HMI / PC Tool User Manual
- 32-00037, PC Tool Installation Instructions

Valve Modbus Bias Setup

The SV2 Series valve can communicate via Modbus RTU communication with any compatible device. Only RTU communications with 1 start bit, 8 data bits, 1 stop bit and no parity is supported.

When more than one SV2 Series valve is connected to the HMI or PC Tools or directly connected to a building automation system, the Modbus termination and bias resistors should be adjusted appropriately. The resistors can be found inside the electrical enclosure on the right-hand side. Refer to [Table 9](#) below. Termination and bias resistors are present in all intelligent valves models; valves where the 9th digit in the part number string are 6. Reference [Fig. 1](#) for valve nomenclature details.

The TERMIN. (termination) resistor in the ON position helps to improve signal integrity for the best performance in regards to EMC (electromagnetic compatibility). The termination resistor may be especially helpful to improve communication when the SV2 Series connected valve is at the end of the communication BUS.

The BIAS resistors in the ON position provide differential resistance for some older communication systems where communication can be lost with zero voltage present on the BUS. Resistors 1 and 3 should always be in the OFF or ON positions together. Refer to [Table 9](#) below.

NOTES:

- If communication is problematic with all daisy-chained valves connected to the master control, adjusting the two BIAS resistors may solve the issue.
- When replacing the valve front electrical enclosure, the tightening torque for each fastener should be between 1.26 and 1.54 Nm (11 to 13.63 in-lbf).

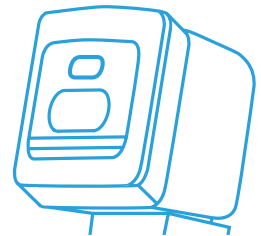
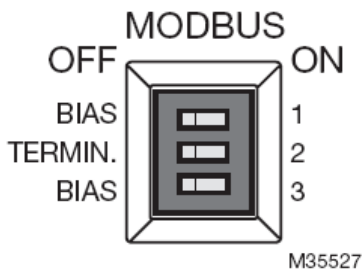


Table 9. Modbus bias resistor setup.



SV2 Series Valve		Differential Biasing					
Not at BUS end	At BUS end	Not required	Required		OFF	ON	
X		X		BIAS	X		1
				TERMIN.	X		2
				BIAS	X		3
X			X	BIAS		X	1
				TERMIN.	X		2
				BIAS		X	3
	X	X		BIAS	X		1
				TERMIN.		X	2
				BIAS	X		3
	X		X	BIAS		X	1
				TERMIN.		X	2
				BIAS		X	3

Modbus Addressing

The SV2 Series valve models with intelligence levels of 6 with embedded Modbus RTU open protocol communications can communicate with an external Modbus master device either directly or through a secondary port of the HMI with the 'Gateway-Connect to External Systems' selection as explained in the Introduction portion of the [CHAPTER 3 : COMMUNICATION / CONNECTIVITY](#) section.

Before attempting external Modbus master connection, each connected valve must be fully individually setup and programmed including any intelligent features, Modbus addressing, bias resistor setup and baud rates.

This manual provides an overview of connectivity to the valve and an external Modbus master. Detailed wiring, setup and programming information is provided in the reference documents listed in the previous Connectivity Notes section.

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

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

Refer to the [APPENDIX](#) of this manual for the detailed Modbus addressing information.

CHAPTER 4 : ACCESSORIES, FIELD REPLACEMENTS AND INTELLIGENT FEATURES

The SV2 Series valves are built on a flexible modular platform, including modular components that could be added and/or replaced in the field plus several accessories. Additionally, there are intelligent features which can be utilized when certain accessories are used with the SV2 Series valves. Accessories and field replacement parts include C6097 pressure switches, HMI or PC programming tools for any intelligent features, Pressure Modules, flanges, replacement electronics and replacement solenoids. All of these items are detailed in this section of the manual. For further information and/or detailed installation instructions, refer to the documents noted in each section.



C6097 Pressure Switches

Specifications

Models:

- For detailed specifications, refer to documents 65-0237 and EN1R-9172 9907R1-NE.
- C6097A models break control circuit at setpoint on pressure fall
- C6097B models break control circuit at setpoint on pressure rise
- Auto or manual reset
- Available pressure ranges

in. wc	psi	kPa	mbar	Notes
0.4-4	-	0.10-1.00	1-10	250VAC version
0.4-5	-	0.10-1.25	1-12.4	-
1-20	-	0.25-5	2.5-50	250VAC version
3-21	-	0.75-5.23	7.5-52.3	-
12-60	-	3-15	30-150	-
12-60	-	3-15	30-150	250VAC version
41.4-193	1.5-7	10.3-48	103-480	-
40.2-201	1.5-7.3	10-50	100-500	250VAC version

Mounting:

¼-18 NPT or Rp models

Flange models:

Two (2) M4x25 Phillips head drive screws (included with SV2 Series valves)

Maximum tightening torque 2 ± 0.2 Nm (18 ± 2 in-lbf)

WARNING!

Explosion Hazard.

Can cause explosion, serious injury or death.

- The M4x25 screws (bag assembly 32305434-001) shipped with the SV2 Series valve **MUST** be used to secure the flange mount C6097 to the valve body.
- **DO NOT** use the 8-32 screws provided with the flange mount C6097 pressure switch.
- Failure to follow this advice can result in gas leakage and explosion.

Environmental Ratings:

IP54

Operating Temperature Range:

-40°F to 140°F / -40°C to 60°C

Contact Ratings:

C6097A/B, 120/240Vac, 50/60Hz or C6097A 250VAC, 50Hz

Resistive load 5.0A

Inductive load 3.0A full load / 18.0A locked rotor

Documentation:

65-0237, C6097A,B Pressure Switch Product Data

EN1R-9172 9907R1-NE, C6097A Gas Pressure Switches Instruction Sheet (European Union)

32-00018, SV2 Series valves Installation Instructions (installation of C6097 for use with the SV2 Series valves)

Introduction

C6097 pressure switches may be used on all SV2 Series valve models for single-function operation including low gas pressure limit, high gas pressure limit and VPS (valve proving sequence) switch operation. Available functions and mounting locations may differ by valve model and pressure switch mounting type. Refer to [Table 10](#), [Fig. 15](#), and [Fig. 17](#). The flange mount C6097s cannot be used for low gas pressure on the SV2 Series valves. C6097 NPT versions may be used for low gas pressure mounted via piping and reducing means.

C6097 Pressure Switch Selection

C6097A models break a control circuit at setpoint on pressure fall and are used for low gas pressure and VPS switches. C6097B models break a control circuit at setpoint on pressure rise and are used for high gas pressure switches. C6097 pressure switches are available in several pressure ranges, flange, NPT or Rp/BSPP (British Standard Pipe Parallel) mount and auto or manual reset. Be aware that certain models may only be available in certain parts of the world.

Refer to documents 65-0237 and EN1R-9172 9907R1-NE for details on available C6097 pressure switch part numbers, versions, pressure ranges and specifications.

Depending on the main valve functionality, the mounting location of the C6097 and the pressure port used, the available pressure functions will vary. The flange mount C6097 can only access the center port of each pressure access location and its seals will only cover that access port. Refer to [Fig. 16](#) for the pressure access locations.

The available pressure port locations for V1 and V2 seats for both sides of the valve are shown in [Fig. 16](#). V1 mounting locations A and C access the Middle (M) and Inlet (I) pressure ports while V2 mounting locations B and D access the Outlet (O) and Middle (M) pressure ports. As a result, only certain pressure functions are available when using the flange, NPT or Rp mount C6097 pressure switches. Pressure Module type, placement and associated functionality information can be found in [Table 10](#).

Table 10. C6097 Pressure Switch Placement.

Valve Model	Description	C6097 Functions	C6097 Model	C6097 Mounting Style	Pressure Access Location	Pressure Port to Open
V2F	On/off	VPS	C6097A	Flange	A/C on V1	Middle (M)
		High gas pressure	C6097B		B/D on V2	Outlet (O)
		VPS	C6097A	NPT or Rp (1/4 in)	B/D on V2	Middle (M)
		High gas pressure	C6097B		Pressure tap on outlet flange	
		Low gas pressure	C6097A		A/C on V1	Inlet (I)
V2V	Premix	Low gas pressure	C6097A	NPT or Rp (1/4in)	Pressure tap on inlet flange	
		High gas pressure	C6097B		A/C on V1	Inlet (I)
					Pressure tap on outlet flange Pressure tap on V2MU Any suitable location downstream of valve	
				Flange	B/D on V2 (other side of valve)	Outlet (O)

NOTES:

- **Flange mount C6097s:**
 - **CANNOT** be used for low gas pressure on the SV2 Series valves.
 - Can be used for high gas pressure and/or VPS as specified above.
 - The two (2) M4x25 Phillips head drive screws (included with SV2 Series valves) **MUST** be used to secure the flange mount C6097 pressure switches to the SV2 Series valves.
- **NPT or Rp mount C6097s (1/4 inch):**
 - May be used for VPS, high gas pressure and/or low gas pressure mounted via piping and reducing means as specified above.
 - Pressure taps on the SV2 Series valves are 1/8 in (3mm) NPT or BSP, depending on which port thread is ordered from the factory. Refer to [Fig. 1 Valve nomenclature](#) for further information. Digit # 6 in the valve model identifies the port thread type.
 - Flange pressure taps are 1/8-27 in (3mm) if an NPT flange is ordered or 1/8-28 in (3mm) if a BSP flange is ordered from the factory.
- **C6097 pressure switches cannot be used for VPS on valve models with external VPS functionality, when this feature is enabled (valves with intelligent feature designation of 6 as identified by the 9th digit in the valve model number in [Fig. 1 Valve nomenclature](#); the SV2 Series Pressure Module must be used for these functions when they are enabled.**

Mounting

The flange mount C6097s may be directly mounted on the SV2 Series valves in any of the four (4) positions on the valve body and are keyed for specific mounting orientation. The seal of the flange mount C6097s are designed to cover the center pressure access ports only of each mounting location. If using the flange mount versions, the two (2) M4x25 Phillips head drive screws, shipped with all SV2 Series valves, must be used instead of the 8-32 screws shipped with the flange mount C6097 pressure switches.

NPT or Rp mount C6097s may be connected to various valve or flange pressure taps as specified in [Table 10](#) and [Fig. 16](#). Note that available mounting locations and functions are valve model dependent.

Wiring to the C6097 pressure switch must be completed as well. Refer to the applicable C6097 document for wiring instructions.

NOTES:

- For detailed C6097 installation instructions when used with the SV2 Series valves, refer to the SV2 Series valves installation instructions, document 32-00018.
- You may want to mount the C6097 on the same side as the valve electrical enclosure for easy access when the valve is mounted in the valve train.
- If you need to replace a pressure access location cover, the tightening torque should be between 1.36 to 1.81 Nm (12 to 16 in-lbf).
- If you need to replace a pressure access port plug, the tightening torque should be 6-8 Nm (53-71 in-lbf).

WARNING!

Explosion Hazard and Electrical Shock Hazard.

Can cause explosion, serious injury or death.

- Turn off gas supply before starting installation
- Disconnect power supplies before beginning installation
- More than one disconnect can be involved

Programming Tools

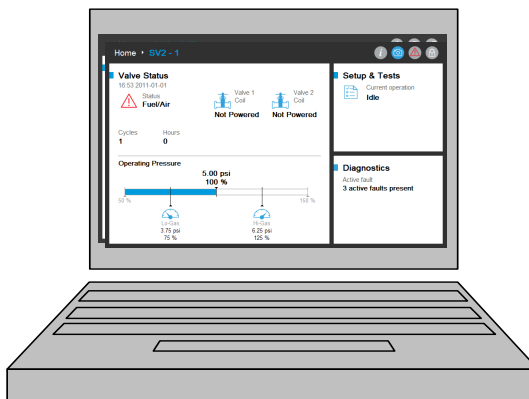


Fig. 22: Programming Tools.

Specifications

Models:

HMITOOL-000

PCTOOL-000 (comes with PCTOOLKIT-000)

Number of Connected Valves:

Up to 8 valves wired in daisy chain fashion to a single port

HMI Dimensions:

Refer to [Fig. 23](#).

HMI Electrical Ratings:

Input Voltage: 18-30VAC (24VAC nominal), 50/60Hz

Input Current: 500mA max

Power Consumption: 12W max

HMI Operating Temperature Range:

-4 to +158°F (-20 to +70°C)

HMI Storage/Shipping Temperatures:

-22 to +176°F (-30 to +80°C)

HMI Humidity:

Max 90% relative humidity continuous, non-condensing

HMI Environmental Ratings:

NEMA 1 / IP20

HMI Approvals:

FCC Part 15, Class A Digital Device

Underwriter's Laboratories, Inc. (UL) (cUL) Component Recognized (for non-continuous operation): File Number MH17367 (MJAT2.MJAT8)

Canada: ICES-003

HMI Ports:

(2) RS-485 ports (COM 1 and COM 2)

HMI Mounting:

Flush front or behind mounted into a panel cutout.

PC Tool Compatible Operation Systems:

Microsoft® Windows 7
 Microsoft Windows 8
 Microsoft Windows 8.1
 Microsoft Windows 10
 32 and 64 bit modes

NOTE: An opto-isolated USB to RS-485 converter is recommended for use with the SV2 Series PC Tool to break ground loops.

Documentation:

32-00030, HMI Tool Installation Instructions
 32-00037, PC Tool Installation Instructions
 32-00031, HMI / PC Tool User Manual

Connectivity

As detailed in CHAPTER 3 : COMMUNICATION / CONNECTIVITY of this manual, the SV2 Series programming tools can communicate with any SV2 Series valve models with an intelligence level of 6, which have embedded Modbus RTU open protocol communications. Communication modes with the HMI / PC Tools include:

- HMI Tool direct communication with valve(s)
- PC Tool communication with valve(s) through an RS-485 to USB converter (included in the PCTOOLKIT-000)
- External Modbus master device communication with valve(s) via the HMI Tool second port with 'Gateway – Connect to External Systems' selection. With this communication option, the HMI Tool would likely be permanently installed.

The HMI or PC Tools automatically read all appropriate connected valve Modbus registers. 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.

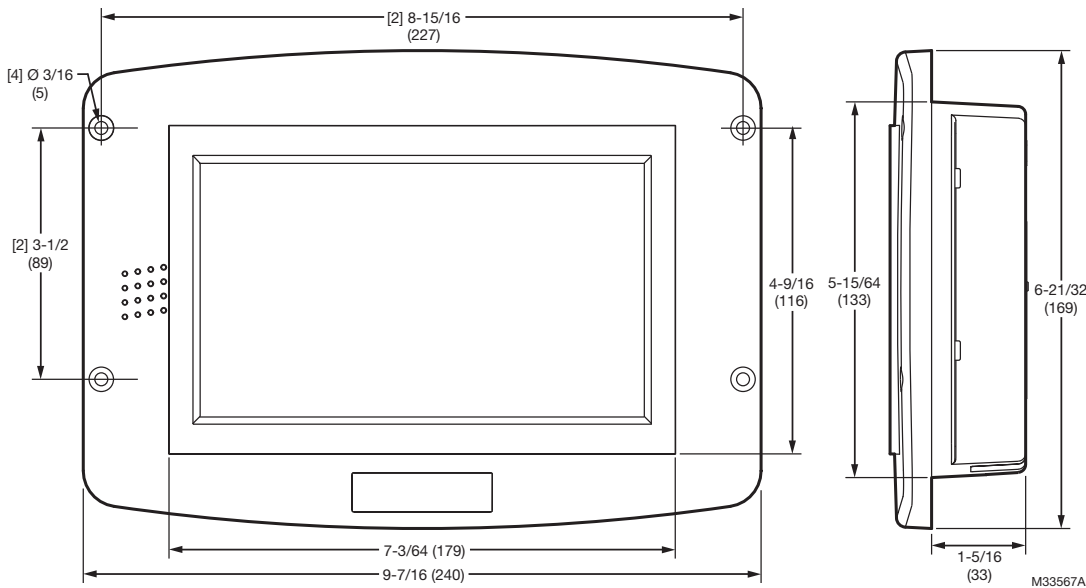


Fig. 23: HMITOOL dimensions in inches (mm).

NOTE: Not to scale. Refer to Fig. 11 and Fig. 12 in the HMITOOL installation instructions for mounting templates.

Safety Features

The SV2 Series valves programming tools 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.

Programming and Setup

The SV2 Series valve's intelligent features are programmed via the use of the HMI (human machine interface) or PC Tools. The programmable features, which are model dependent, include:

- Valve Modbus address + communication speed
- Low gas pressure limit setting and reset type
- High gas pressure limit setting and reset type
- VPS (valve proving sequence) operation (using Pressure Module)
- Fuel/air firing curve Premix/V2V valves

The HMI or PC Tools can also be used for SV2 Series valve monitoring, trending, diagnostics and troubleshooting for up to 8 connected valves. Troubleshooting is facilitated by on-board fault messaging with remediation steps. For detailed information on these features, refer to the documents listed under the Specifications section.

IMPORTANT

- You DO NOT have to enable and utilize the intelligent valve features (if applicable to your selected model).
- 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. Also, the OEM must assign user access levels to the various parameter groupings and assign OEM main + reset passwords.
- When using the Pressure Module, you MUST use both the low gas pressure and high gas pressure limit functions.

When Programming With These Products...

1. The programming tools have embedded guided setup features to guide you safety through the setup and commissioning process. Safety, however, is your responsibility.
2. Read all documentation carefully and respond appropriately to all fault and warning messages.
3. Refer to document 32-00031 (SV2 Series HMI/PC Tool User Manual) for detailed valve programming instructions.
4. If using the HMI Tool, make sure its 8-pin connector is properly aligned and pressed firmly into place.
5. Make sure the wires between the HMI or PC Tool connector and the SV2 valve(s) are properly wired and secured.
6. Make sure the HMI power supply is connected securely to the power source.

NOTES:

- **The HMI and PC Tools will timeout from the commissioning mode after 30 minutes of inactivity. A 5 minute timeout warning is given to the user along with a selection to stay in commissioning mode. 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 30 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.**

WARNING!

Electrical Shock Hazard.

Can cause severe injury, death, or equipment damage.

Line voltage is present at the 120VAC or 240VAC power supply

WARNING!

Explosion Hazard.

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

Improper user operation may result in PROPERLY LOSS, PHYSICAL INJURY OR DEATH.

Installing and using the programming tools to setup or change parameters must be attempted only by trained and experienced combustion service technicians.

These devices must be setup according to all applicable national and local codes, ordinances and regulations.

Pressure Module

Specifications



Fig. 24: Pressure Module.

Dimensions:

Refer to [Fig. 25](#).

Models:

For detailed specifications, refer to [Table 11](#).

PRESSMOD11-000
 PRESSMOD12-000
 PRESSMOD13-000
 PRESSMOD14-000
 PRESSMOD41-000
 PRESSMOD42-000
 PRESSMOD43-000
 PRESSMOD44-000

Mounting:

Two (2) M4x25 Phillips head screws
 Maximum tightening torque 2 ± 0.2 Nm (18 ± 2 in-lbf)

Environmental Ratings:

NEMA 1/IP20 or NEMA 4/IP66

Operating Temperature Range:

NEMA 1/IP20 versions: $+5^{\circ}\text{F}$ to 150°F / -15°C to 65°C
 NEMA 4/IP66 with conduit connections versions: -40°F to 150°F / -40°C to 65°C

Approvals

The Pressure Module is not a stand-alone product and must be used with a SV2 Series valve and thus is specified as part of the valve approvals.

Contact Ratings:

Contact wiring connections for the flame safeguard control interlock string are contained within the valve main electrical enclosure. Refer to VALVE SPECIFICATIONS section of this manual for contact ratings and the BURNER CONTROL INTERFACE WIRING section of this manual for proper wiring. The same information may be found in the SV2 Series safety shut-off valve installation instructions, document 32-00018.

Maximum Inlet Pressure:

Valve inlet pressure must not exceed Pressure Module maximum pressure rating. Refer to [Table 11](#).

Maximum Withstand Pressure:

Equals 150% of Pressure Module model maximum pressure rating.

Documentation:

32-00017, Pressure Modules Installation Instructions
 32-00031, HMI/PC Tool User Manual (detailed programming instructions)

Introduction

The Pressure Module may be used on most SV2 Series valves for multi-function operation. It contains embedded pressure sensors to cover the designated range of the Pressure Module model and can be used for functions including low gas pressure, high gas pressure, VPS (valve proving sequence), leak detection sequence operation and/or pressure monitoring via Modbus. The available functions may be model and mounting location dependent. Refer to [Table 12](#) for details.

Pressure Modules may only be used on valves with embedded intelligent features; those valves that have an Intelligent Feature designation of 6 as found in the 9th digit of the valve model number.

- 6 = STANDARD

For an explanation of the above intelligence levels, refer to [Fig. 1](#) Valve nomenclature.

Pressure Module Selection

There are four (4) different available pressure ranges for the Pressure Modules and two (2) different versions to match with the SV2 Series valves NEMA 1/IP20 and NEMA 4/IP66 electrical enclosures. The NEMA 4/IP66 Pressure Module versions have a cord grip to mate with the valve NEMA 4/IP66 electrical enclosure to maintain the enclosure rating.

Due to the different NEMA/IP ratings and associated temperature range when paired with SV2 Series valves, the applicable pressure measuring range varies between the NEMA 1/IP20 and NEMA 4/IP66 Pressure Module versions as shown in [Table 11](#).

Table 11. Available Pressure Modules.

Pressure Module	Enclosure Rating	Pressure Module Rating Range			High Pressure Accuracy	Low Pressure Accuracy	Usable Temperature Range	Valve Models
		mBar	in w.c.	psi				
PRESSMOD11-000	NEMA 1 / IP20	0.8 - 40	0.3 - 16	0.011 - 0.58	± 1.6 mbar ± 0.6 in w.c. ± 0.02 psi	± 0.03 mbar ± 0.01 in w.c. ± 0.0004 psi	+5°F to +150°F (-15°C to +65°C)	All
PRESSMOD12-000		2.6 - 160	1.1 - 64	0.038 - 2.32	± 6.4 mbar ± 2.6 in w.c. ± 0.09 psi	± 0.11 mbar ± 0.04 in w.c. ± 0.0015 psi		
PRESSMOD13-000		8.4 - 600	3.4 - 241	0.122 - 8.70	± 24 mbar ± 9.6 in w.c. ± 0.35 psi	± 0.34 mbar ± 0.14 in w.c. ± 0.0049 psi		
PRESSMOD14-000		16.8 - 1000	6.7 - 401	0.244 - 14.50	± 40 mbar ± 16 in w.c. ± 0.58 psi	± 0.67 mbar ± 0.27 in w.c. ± 0.0098 psi		
PRESSMOD41-000	NEMA 4/IP66	1.3 - 40	0.5 - 16	0.018 - 0.58	± 1.6 mbar ± 0.6 in w.c. ± 0.02 psi	± 0.05 mbar ± 0.02 in w.c. ± 0.007 psi	-40°F to +150°F (-40°C to +65°C)	All
PRESSMOD42-000		3.9 - 160	1.6 - 64	0.057 - 2.32	± 6.4 mbar ± 2.6 in w.c. ± 0.09 psi	± 0.16 mbar ± 0.06 in w.c. ± 0.0023 psi		
PRESSMOD43-000		10.5 - 600	4.2 - 241	0.153 - 8.70	± 24 mbar ± 9.6 in w.c. ± 0.35 psi	± 0.42 mbar ± 0.17 in w.c. ± 0.0061 psi		
PRESSMOD44-000		21.1 - 1000	8.5 - 401	0.305 - 14.50	± 40 mbar ± 16 in w.c. ± 0.58 psi	± 0.84 mbar ± 0.34 in w.c. ± 0.0122 psi		

Mounting

The Pressure Module can be mounted in any of the four (4) positions on the valve body and is keyed for specific mounting orientation. The seals of the Pressure Module are designed to cover the center and upper pressure access ports of each mounting location.

Cord length of each Pressure Module is long enough to fit all applicable valve sizes when mounted on the same side as the valve electronics enclosure. On smaller valve sizes, the extra cord length may be placed inside the electronics enclosure or dressed to one of the provided wire clips on the NEMA 1 / IP20 valve electrical enclosure.

Available pressure port locations for V1 and V2 valve seats on both sides of the valve are shown in [Fig. 16](#) and [Fig. 18](#). Pressure Module placement and associated functionality can be found in [Table 12](#). Note that available mounting locations and functions are valve model and intelligence level dependent.

NOTES:

- Accessing the Inlet (I) port of mounting locations A and C on V1 for Pressure Module use is not allowed.
- For detailed installation instructions, refer to the Pressure Modules Installation Instructions, document 32-00017.
- If you need to replace a pressure access location cover, the tightening torque should be between 1.36 to 1.81 Nm (12 to 16 in-lbf).
- If you need to replace a pressure access port plug, the tightening torque should be 6 to 8 Nm (53 to 71 in-lbf).

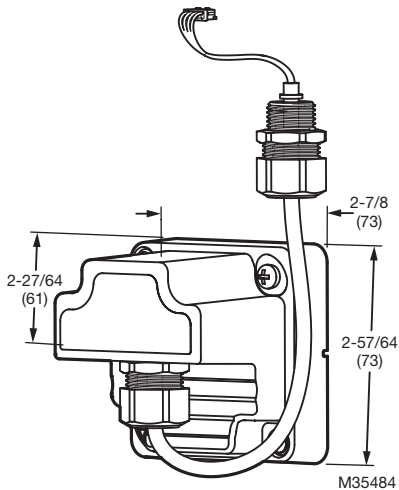


Fig. 25: Pressure Module.

Table 12. Pressure Module Placement.

Valve Model	Description	Functions ^{1, 2}	Pressure Access Location ³	Pressure Port to Open ³
V2F	On/off	Low gas pressure, High gas pressure, VPS, Leak detection	A/C on V1	Middle (M)
		Low gas pressure, High gas pressure	B/D on V2	Middle (M)
V2V ⁴	Fuel/air Premix with mixing unit	-	-	-

1. Pressure module must be mounted on the same side as the electronics enclosure.
2. During initial valve setup using the HMI or PC Tools, any functions using the Pressure Module must be setup before the valve will be operational.
3. Refer to [Fig. 16](#) and [Fig. 18](#) for pressure access locations and pressure ports.
4. The Pressure Module cannot be used at this time for low gas pressure, high gas pressure or VPS. It is suggested to use the C6907 pressure switches for those functions instead. Refer to Table 12.

WARNING!

Explosion or Fire Hazard

Can cause severe injury, death, or property damage.

- Turn off gas supply before starting installation
- Disconnect power supplies before beginning installation
- More than one disconnect can be involved

WARNING!

Electric Shock Hazard

Can cause serious personal injury or death.

- Disconnect power supply before beginning installation
- More than one disconnection can be involved

Theory of Operation

Pressure measurement with the Pressure Module is accomplished via 3 embedded sensors, which cover the associated range for low gas and high gas pressure. There are two high and one low pressure sensor in each Pressure Module to both extend the pressure range and maintain accuracy over the required pressure and temperature range. Refer to [Table 11](#) for applicable Pressure Module models and pressure ranges. At low pressures, the low pressure sensor reading is used while at high pressures, only the high pressure sensor readings are used. In the middle all three pressure sensor readings are used for a smooth transition.

Depending on the valve model and Pressure Module mounting location, both low gas and high gas pressure measurements can be made with the Pressure Module when mounted to a single location. Pressure is only actively measured when both valve seats are powered and non-zero flow is established, which is accomplished via embedded software algorithms. As a result, any low gas pressure condition that occurs while the valve is de-energized is ignored and allows the low gas pressure limit to be located in the intermediate position between the two valve seats or after the two valve seats. The high gas pressure limit is measured from the same location when both valve seats are powered with non-zero flow. As a result, there is no potential for a high gas pressure limit fault if there is a leaking upstream pressure regulator in the off-cycle.

Since the SV2 Series Pressure Module pressure measurement is performance based, pressure measurements can be taken via the valve middle (M) or outlet (O) ports. Previous pressure switch technology dictated that the low gas pressure switch shall be located upstream of the first safety shut-off seat, a prescriptive based approach. The prescriptive based approach for the high gas pressure switch indicated it shall be located downstream of the service gas pressure regulator or may be located downstream of all main burner gas supply controls.

In addition to low gas pressure and high gas pressure measurements, the Pressure Module can be used for VPS (valve proving sequence) pressure measurements when mounted to a (M) Middle / mid-valve seat pressure access port. Refer to [Table 12](#) for applicable pressure sensing functions and mounting locations.

Software algorithms are embedded in the SV2 Series valves to identify not only low and high gas pressure limit faults and VPS test failures, but also when a Pressure Module is un-configured, if there is a reading fault with the Pressure Module, if a pressure limit setting is unusable based on the pressure range of the selected Pressure Module and if the selected Pressure Module is incompatible with the applied valve pressure.

For premix valves, those that start with the V2V prefix, at this time the Pressure Module cannot be used for the low gas pressure limit, high gas pressure limit, VPS or leak detection due to the low pressures present at the mid-point between the two valve seats and at the valve outlet while the combustion fan is running. Instead, the C6907 pressure switches can be used for those functions. The C6097 pressure switches can be used for single-function operation including low gas pressure limit, high gas limit function and VPS. Refer to the [C6097 Pressure Switches](#) section of this document for available functions, mounting styles and mounting locations and [Table 10](#).

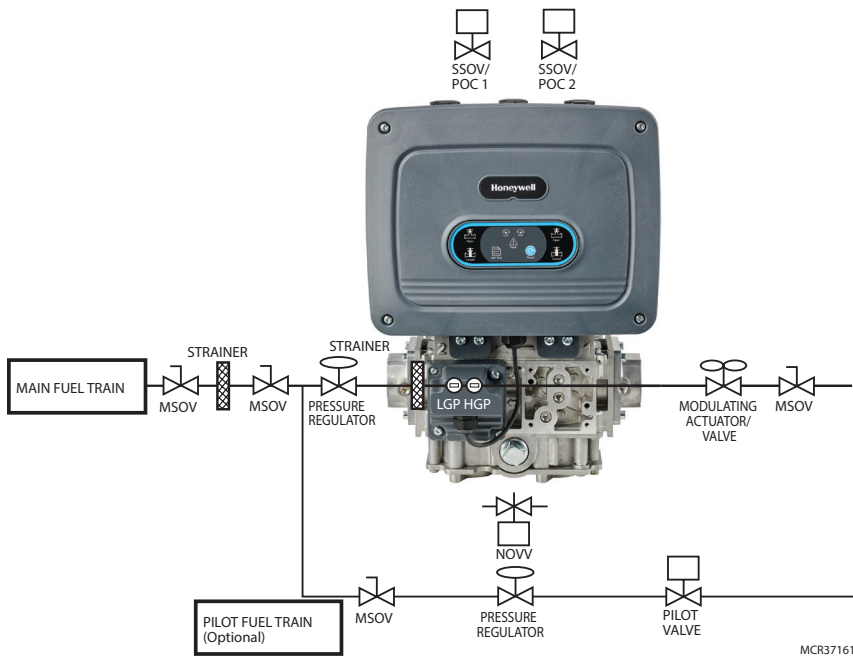


Fig. 26: Pressure Module Operational Diagram.

The statements below are relative to EN1854 2010: Pressure sensing devices for gas burners and gas burning appliances. EN1854 also refers to EN60730-2-6.

For high gas pressure and low gas pressure, the DUT (device under test) combines pressure reading with the knowledge of the valve status (ON or OFF) and therefore only evaluates HGP/LGP when the sensors are exposed to the relevant pressure; i.e. when both valves are open and non-zero flow is established. Pressure events can only be detected after valves are open; in other words, LGP cannot prevent the start of the ignition sequence as in a traditional system. However, the reaction time of LGP detection is less than 3 seconds, causing the DUT to enter non-volatile lockout. Moreover, if a LGP event appears during the burner cycle, the operation of the SV2 Series valve and Pressure Module is analogous to today's mechanical pressure switch based systems.

When the Pressure Module is used with the SV2 Series valves, VPS and HGP/LGP provides Class B control according to EN1854.

When the Pressure Module is used with the SV2 Series valves, the response time to a HGP/LGP event is 2.7 seconds maximum.

When the Pressure Module is used with the SV2 Series valves, the internal fault reaction time for HGP/LGP is 2 seconds.

The HMI or PC Tool is used to program all available functions using the Pressure Module via an embedded set-up wizard. Programming includes the low and high gas pressure lockout type, limit settings, VPS leakage limit along with any associated connected pipe volume and VPS contact action. Additionally, the HMI and PC Tools have built-in testing mechanisms for the limit settings so they can be verified for installation purposes. For detailed step-by-step programming setup instructions, consult the HMI / PC Tool user manual, 32-00031.

Low Gas Pressure and High Gas Pressure Operation

When using the Pressure Module for the gas pressure limit functions, both the low and high gas functions **MUST** be used together.

Note that the SV2 Series valves have unique interlock wiring requirements in that the Interlock wiring is run through all valve models for the solenoid power saving feature. Additionally, since the low gas limit and high gas limit functions are contained in the Pressure Module and are part of the Interlock string, if activated, there is an Interlock dry contact input / output in the valve electronics for the flame safeguard control ILK string. Refer to the SV2 Series Wiring paragraph in the WIRING OVERVIEW section of this manual for details as well as [Fig. 147](#) to [Fig. 157](#) for proper valve wiring.

Since the SV2 Series valves cannot sense a low gas pressure condition prior to opening, it will actively sense and react to the condition once both valve seats are opened. The response time upon sensing the condition is 2.7 seconds after which the valve seats will be closed and the valve will annunciate the fault condition both on the valve face via the LGP LED and the HMI / PC Tool, if connected.

In order to properly program the high and low gas limit settings, the burner must be run so that the embedded pressure sensors can measure the actual pressure that should occur during low fire and high fire conditions, respectively. While the burner is running after stabilization has occurred, the user must select a % over or under the measured operating pressure for the high and low gas limit settings. The value can then be locked in. The high gas pressure limit can be set between 125% and 150% of the highest measured operating pressure at low fire while the burner is running. Conversely, the low gas pressure limit can be set between 50% and 75% of the lowest measured operating pressure at high fire. Refer to [Fig. 27](#) for the high/low gas pressure user interface setup summary screen.

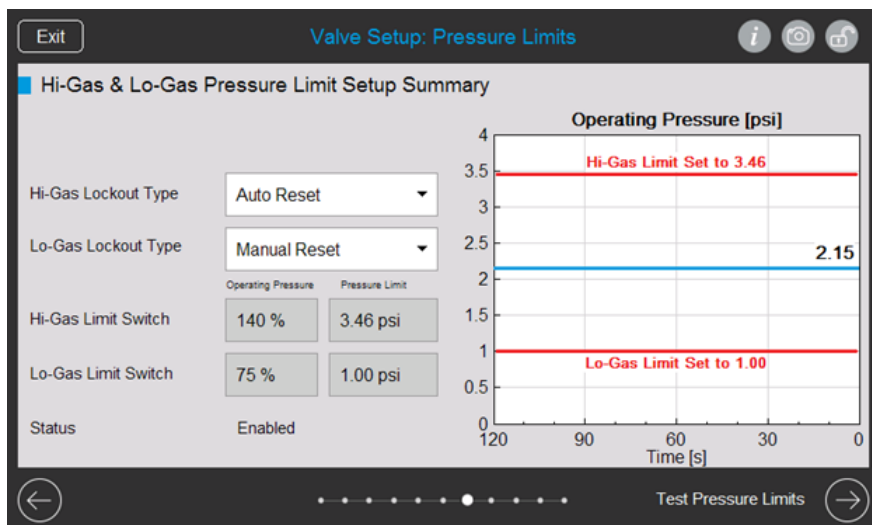


Fig. 27: Hi-Gas/Low-Gas Limit Setup Summary Screen.

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.**
- **YOU MUST KEEP 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 DISABLED, 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.**

After successful setup of both the high and low gas pressure limits, the installer may test both limit trip points via an embedded testing routine. Refer to [Fig. 28](#) for the high/low gas pressure user interface limit test screen.

To test the lockout for each setting, the installer must slide the appropriate limit gauge icon to the right or left, approaching the current operating pressure as shown on the top of the bar. The slider bar color changes to red when the limit reaches the current setting at which point the valve will lockout, opening the interlock relay contact and illuminating the appropriate LED on the valve face.

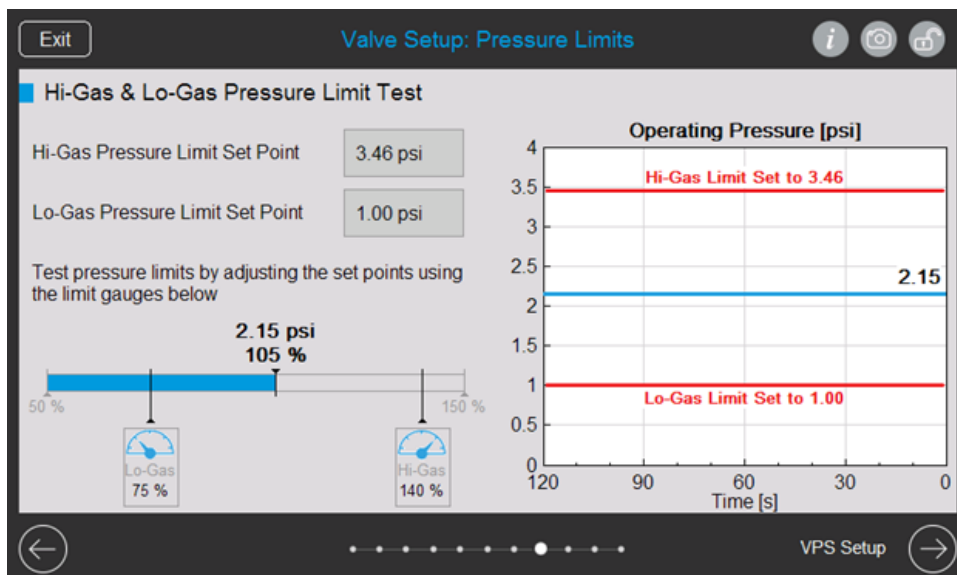


Fig. 28: Hi-Gas / Low-Gas Limit Test Screen.

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. The valve will wait for 7 seconds before allowing the burner management system to power it after a reset, even if there is a call for heat, due to various flame failure response timings.
- When the valve is reset, the Limit Set Points will automatically be reset back to their original settings.

Valve Proving Sequence (VPS) Operation

If programming the valve for VPS functionality via the HMI or PC Tool, whether directed external or internal to the valve, the Pressure Module must be used.

External VPS is defined as being initiated and operated by an external control, such as a burner management system. SV2 Series valves with Intelligent Feature designations of 6 and 7 can be used with external VPS systems and have a VPS SW contact closure output for interface with the external control. The VPS SW action is programmed during setup; Pressure to Close or Pressure to Open. Refer to Fig. 147 to Fig. 157 for proper valve wiring.

When a VPS sequence is initiated by the external control, the SV2 Series valve intelligent models will automatically determine a VPS sequence is being performed since one valve seat at a time is selectively powered. Accordingly, the valve will initiate its internal leak detection routine, using the attached Pressure Module to measure the 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 and based on that comparison will toggle the VPS SW output as selected during setup (pressure to close or open). The contact output action is the same as in a traditional VPS system using a separate pressure switch. Based on the VPS contact output, the external device performing VPS will determine if the VPS test passed or failed. The valve leakage test results along with the current valve cycles and hours are stored in the valve memory and can be accessed via the HMI or PC Tools or via Modbus. If the allowed leakage rate is exceeded, a valve lockout will occur, requiring a valve manual reset.

When using the 7800 SERIES as the burner management system, the VPS function may be performed at any time; before, after, split or both relative to the call for heat.

For valve models with internal VPS operation the Pressure Module is also used, however, there is no VPS SW contact closure output since the VPS operation is performed entirely internal to the valve. SV2 Series valves with Intelligent Feature designations of 8 and 9 include internal VPS functionality and have DMD IN and DMD OUT terminals instead of the VPS SW terminal. The demand signal is run through the valve so that it knows when there is a call for heat or loss of the demand signal, which is used to perform the internal VPS before and/or after the demand cycle.

External and internal VPS functionality is programmed via the HMI Tool or PC Tool. During programming, several selections must be made including the allowed leakage limit, the VPS contact action upon VPS completion (external VPS only), the connected pipe size and whether or not there is external piping connected between V1 and V2 (such as a pilot take-off). Once these selections are complete, recommended timing for valve power and test time will be provided for the burner management

system or VPS control performing the external valve proving sequence. Refer to Fig. 29 for the VPS setup screen and Fig. 30 for the VPS test screen.

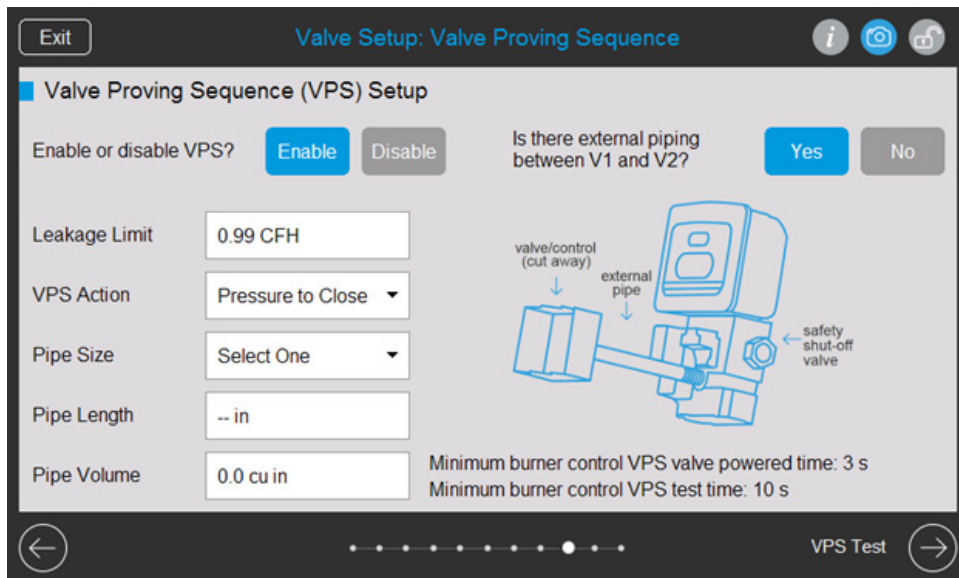


Fig. 29: VPS Setup Screen.

The lowest possible leakage limit is set as the default, depending on the valve body size. This rate may be changed by the user as applicable to the appliance type and size and the applicable codes. The following information can be found via the 'i' button on the HMI or PC Tools for quick reference when on-site.

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 1 in (DN25) valves
- 142 l/h for 1.5 / 2 in (DN40/50) valves
- 283 l/h for 2.5 / 3 in (DN65/80) valves

NOTES:

- **YOU MUST KEEP THE EXTERNAL VPS CONTROL DISABLED 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.
- When utilizing the VPS functionality with the Pressure Module, 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.
- The maximum allowed size per valve for external piping connected between V1 and V2 (such as for pilot take-off) is:
 - ¾ in (DN20) for 1 in (DN25) valves
 - 1 in (DN25) for 1.5 or 2 in (DN40/50) valves
- In order for the valve to be operational after setup is complete, the Verification of Safety Parameters procedure must be completed.

During or after a VPS test, the VPS Test screen can be accessed, which shows the resulting leakage rates for each valve seat, the valves cycles and run hours at which each test occurred and the status of the test. This information can also be accessed via Modbus. Refer to [Fig. 30](#).

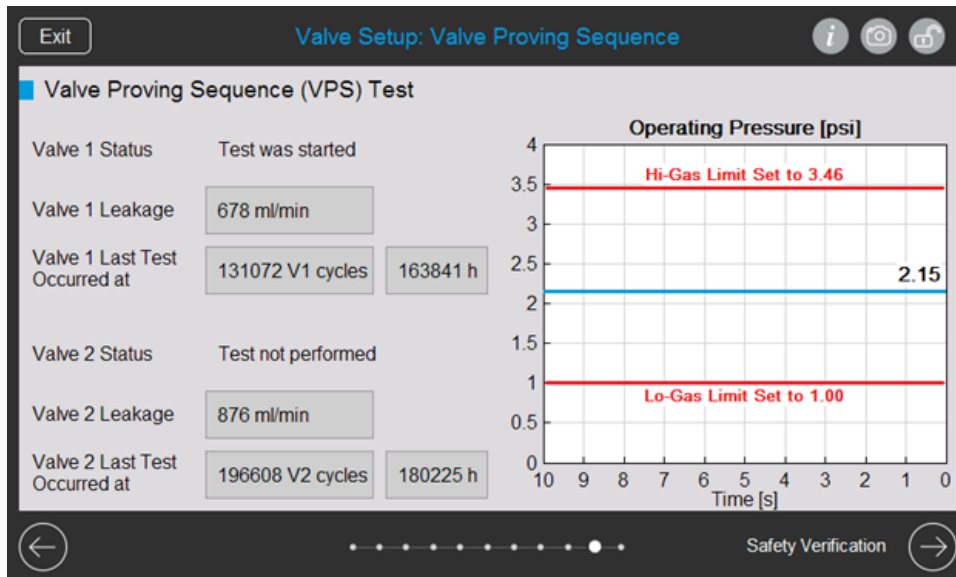


Fig. 30: VPS Test Screen.

NOTES:

- The first time VPS is run, V1 test results may be inaccurate until operating pressure has been learned.
- 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 not included in trending data.

Field Replacement

Should field replacement of the Pressure Module be necessary, ensure that the correct model is ordered. Refer to [Table 11](#), Available Pressure Modules and/or the model information on the Pressure Module installed on the valve.

For the mechanical installation, follow the SV2 Series Valve Pressure Modules installation instruction document, 32-00017, which is packed with the Pressure Module. For step-by-step programming setup instructions, consult the HMI / PC Tool user manual, 32-00031.

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.
 - o 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.
 - o 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 avoid the 2 lockout conditions mentioned above when replacing a Pressure Module:
 - BEFORE installing the replacement Pressure Module, disable the Hi-Gas and Lo-Gas Lockout Types and the Valve Proving Sequence (VPS)
 - Perform the Verify Safety Parameters procedure to confirm the changes.
 - Replace the Pressure Module and plug in the electrical connector.

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.
 - o 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.

Flanges**Specifications****Models:**

Valve size: 1 inch (DN25)

Flange sizes: 1/2, 3/4, 1 and 1 1/4 in NPT or BSPP
DN15, 20, 25, 32

Valve sizes: 1 1/2 and 2 in (DN40 and DN50)

Flange sizes: 1, 1 1/4, 1 1/2, 2 in NPT or BSPP
DN25, 32, 40, 50

Flange pressure tap sizes & threads:

NPT flanges: 1/8-27" (3mm) NPT. Torque 7±1 Nm (62±9 in-lbf).

BSP flanges: 1/8-28" (3mm) BSP. Torque 1.5±0.15 Nm (13.3±1.3 in-lbf).

Mounting:

1 inch (DN25) valves: Four (4) M5x16 Hex head screws

1 1/2, 2 inch (DN40/50) valves: Four (4) M8x20 Hex head screws

Maximum tightening torque

1 inch (DN25) valves: 3.4 Nm (30 in-lbf)

1 1/2, 2 inch (DN40/50) valves: 13.5-14.5 Nm (120-128 in-lbf)

Documentation:

32-00028, AB Valve Flange Kits Installation Instructions

32-00036, CD Valve Flange Kits Installation Instructions

Introduction and Flange Selection

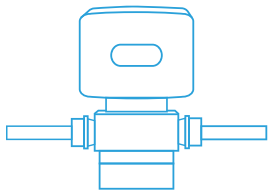
Flanges are required to mount each valve and provide connection to standard NPT or BSP gas pipes. There are several available flanges per valve body size. Flange kits designated as AB are for the 1 inch (DN25) valves while flange kits designated as CD are for the 1 ½ and 2 inch (DN40 and DN50) valves. Each flange kit consists of 1 flange with sealing plug and 4 screws. Sealing O-rings are shipped with each valve from the factory.

Table 13. Available Flange Kits.

Valve Sizes	Thread Type	Size Inches / DN	Flange Kit	Valve Models
B 1 inch (DN25) 1.0 MMBTu (300 kW) at 4 in w.c. pressure drop	NPT	0.50 / DN15	FLANGEABNPT050	All
		0.75 / DN20	FLANGEABNPT075	
		1.00 / DN25	FLANGEABNPT100	
		1.25 / DN32	FLANGEABNPT125	
	BSP	0.50 / DN15	FLANGEABBSP050	
		0.75 / DN20	FLANGEABBSP075	
		1.00 / DN25	FLANGEABBSP100	
		1.25 / DN32	FLANGEABBSP125	
C / D 1 ½ and 2 inch (DN40 and DN50) 2.6-4.6 MMBTu (750-1348 kW) at 4 in w.c. pressure drop	NPT	1.00 / DN25	FLANGECDNPT100	All
		1.25 / DN32	FLANGECDNPT125	
		1.50 / DN40	FLANGECDNPT150	
		2.00 / DN50	FLANGECDNPT200	
	BSP	1.00 / DN25	FLANGECDBSP100	
		1.25 / DN32	FLANGECDBSP125	
		1.50 / DN40	FLANGECDBSP150	
		2.00 / DN50	FLANGECDBSP200	

Mounting Valve to Flange(s) and Piping

When initially installing the valve, the installer must first determine the overall mounting orientation, then mount the flanges to the main gas connection pipe and finally mount the valve to the flanges and piping.

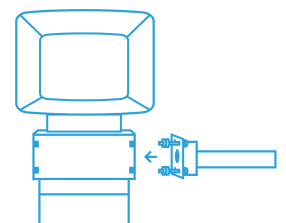
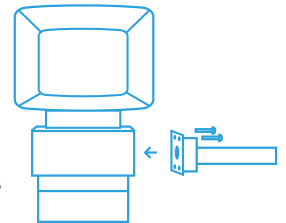


NOTES:

- **Flange Installation Instructions are packed with the flanges. Reference documents 32-00028 for 1 in (DN25) valve bodies and 32-00036 for 1 ½ and 2 in (DN40 and DN50) valve bodies.**
- **The entire mounting and installation process is covered in detail in the valve installation instructions, 32-00018 (packed with each valve).**

The process for mounting the 1 inch (DN25) valves/flanges differs from the process for mounting the 1 ½ and 2 inch (DN40 and DN50) valves/flanges.

- 1 inch (DN25) valve bodies have drilled and tapped holes
 - The flange pressure port must be installed facing sideways (refer to Figs. 2-3) due to the mounting hole orientations.
 - To prevent rotation, it is important to support the valve while installing it into the pipe train. The screws may then be inserted into the flanges and tightened. The recommended tightening torque is 3.4 Nm (30 in-lbf).
- 1 ½, 2 inch (DN40/50) valve bodies have embedded slots for flange retaining nuts
 - The flange pressure port must be installed facing either up or down (refer to Figs. 4-6) due to the mounting hold orientations.
 - The installer must first place 4 flange retaining nuts on one side only of the valve (front or back), from inlet to outlet, such as side A/B only referenced in Fig. 16 or side C/D only. Then, on each flange, they must partially install the screws and retaining nuts onto the **opposite side relative to the nut placement in the previous step**. The installer would then slide the valve into the pipe train, ensuring that the partially installed retaining nuts on the flange slide into their respective slots on the valve body. The valve must be supported as necessary to ensure that it does not rotate. The installer would then tighten the partially installed flange screws per the recommended torque of



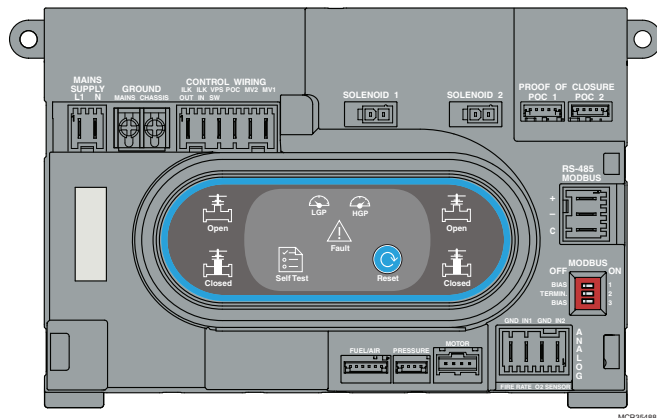
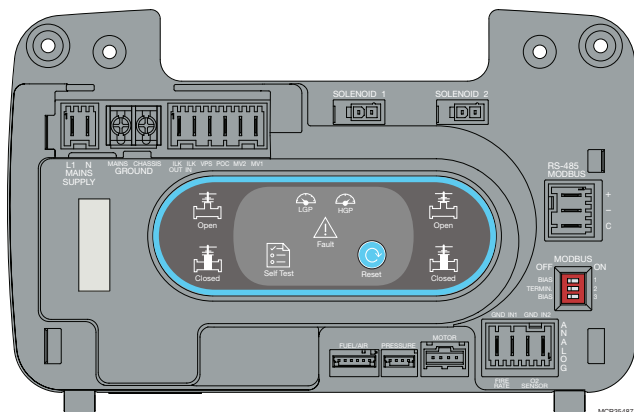
13.5-14.5 Nm (120-128 in-lbf). The last step is to install and tighten the remaining screws, first on the top remaining slots then second on the bottom remaining slots, tightening to the recommended torque.

NOTES:

- Ensure the gap left between the flanges when installed on the pipes does not exceed the valve body width otherwise the valve piping may be over-stressed.
- Follow the flange and valve install instructions as outlined in the SV2 Series Valves Installation Instructions, 32-00018 or the applicable flange kit installation instruction. The methodology is different for each valve body size.
- 1 ½ and 2 inch (DN40 and DN50) valves may require extra bracing due to their weight, depending on the application.

Replacement Electronics

Specifications



Models:

NEMA 1 / IP20 and NEMA 4 / IP66

Voltages: 24, 100-240VAC

Mounting:

Two (2) #6 x ¾ in Plastite® slotted Torx™ screws

Retaining tabs embedded into valve electrical enclosure

Documentation:

32-00039, Replacement Electronics Installation Instructions

Introduction and Replacement Assembly Selection

The SV2 Series valves were designed for application flexibility, including modular components that could be replaced in the field, should the necessity occur, without replacing the entire valve. The internal valve electronics assembly can be field replaced. Acting as the master control center, the electronics assembly contains customer line voltage inputs, wiring terminals to and from the burner management system, Modbus connection and bias resistors as well as factory connections for the solenoids, proof of closure switches, fuel/air module, pressure module and fuel/air modulating motor. Any intelligent features utilized are programmed via the Modbus connection to the SV2 Series HMI or PC Tools. Intelligent features include valve Modbus address + communication speed, low gas pressure, high gas pressure, VPS (valve proving sequence), fuel/air ratio, leak detection sequence and metering. Once programmed and verified, the electronics and internal software operate the valve as required.

Replacement electronics assembly part numbers are identified by 'REL', followed by the NEMA rating, the maximum voltage and the valve intelligence (IQ) level. Each applicable replacement electronics assembly will work on all valve sizes and models as indicated in [Table 14](#).

As the various valve intelligence levels are released, the associated replacement electronics assemblies will also be released.

Table 14. Available Replacement Electronics.

Valve Sizes	Valve Models	Enclosure Rating	Voltage / Phase	Valve Intelligence Level ¹	Replacement Assembly
All	All: V2F V2V	NEMA 4/IP66	100-120VAC 200-240VAC 50/60Hz	5	REL4N230V5Q
				6	REL4N230V6Q
					5
				6	REL4N024V6Q
		NEMA 1/IP20	100-120VAC 200-240VAC 50/60Hz	6	REL1N230V6Q
			6	REL1N024V6Q	

1. Valve Intelligence Levels are defined as:

5 = BASIC. No Modbus or Pressure Module compatibility.

6 = STANDARD. Includes Modbus, Pressure Module compatible, external VPS using Pressure Module

Field Replacement

WARNING!

Explosion or Fire Hazard

Can cause severe injury, death, or property damage.

- Turn off gas supply before starting installation
- Disconnect power supplies before beginning installation
- More than one disconnect can be involved

WARNING!

Electric Shock Hazard

Can cause serious personal injury or death.

- Disconnect power supply before beginning installation
- More than one disconnection can be involved

WARNING!

Explosion Hazard and Electrical Shock Hazard.

Can cause explosion, serious injury or death.

- Disconnect the power supply making wiring connection to prevent electrical shock and equipment damage.
- More than one power supply disconnect can be involved.

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.

IMPORTANT

- Ensure the exact same electronics assembly model is being replaced. Verify the assembly part numbers are identical before beginning installation. Refer to [Table 14](#) and/or the model information on the electronics assembly installed on the valve.
- For valve the mechanical and electrical installation, follow the SV2 Series Valve Replacement Electronics installation instruction document, 32-00039, which is packed with the replacement assembly.
- For step-by-step programming setup instructions, consult the HMI / PC Tool user manual, 32-00031.
- Ensure that the SOLENOID 1 and SOLENOID 2 internal wiring is properly re-connected per the original arrangement. Failure to do so may cause unnecessary fault conditions.
- The maximum tightening torque to fasten the electronics assembly to the electrical enclosure is 1.26-1.54 Nm (11-13.63 in-lbf).

When replacing the electronics assembly in the field, retainment of the most of the Pressure Module and Fuel Air Ratio Module programmed settings should occur, unless those accessories are replaced at the same time as the main valve electronics assembly. It is recommended, however, to perform/verify the valve programming as was done during the original installation. The HMI / PC Tools have embedded guided setup wizards for easy commissioning. Detailed step-by-step programming instructions are provided in the HMI / PC Tool user manual, 32-00031.

Replacement Solenoids

Specifications

Models:

Valve size AB: 1 inch (DN25)

Voltages: 24, 100-120, 200-240VAC

Valve size CD: 1 ½ and 2 in (DN40 and DN50)

Voltages: 100-120, 200-240VAC

Documentation:

32-00038, Replacement Solenoid Installation Instructions

Introduction and Replacement Solenoid Selection

The SV2 Series individual solenoids can be replaced in the field without replacing the entire valve, should the need arise. Replacement solenoid part numbers are identified by 'COIL', followed by the valve body size identifier and applicable voltage. Each replacement solenoid will work on all valve intelligence levels and models as indicated in [Table 15](#).

As the various valve sizes and voltages are released, the associated replacement solenoid kits will also be released.

Replacement solenoids are sold and shipped one (1) per box.

Table 15. Available Replacement Solenoids.

Valve Models	Valve Intelligence Level ¹	Enclosure Rating	Valve Sizes	Voltage / Phase	Solenoid	
All	All: 5 6	All: NEMA 4/IP66 NEMA 1 / IP20	B 1 inch (DN25) 1.0 MMBTu (300 kW) at 4 in w.c. pressure drop	24VAC 50/50Hz	COILAB024V-000	
				100-120VAC 50/50Hz	COILAB120V-000	
				200-240VAC 50/50Hz	COILAB240V-000	
			C / D 1 ½ and 2 inch (DN40 and DN50) 2.6-4.6 MMBTu (750-1348 kW) at 4 in w.c. pressure drop	100-120VAC 50/50Hz	COILCD120V-000	
				200-240VAC 50/50Hz	COILCD240V-000	

1. Valve Intelligence Levels are defined as:

5 = BASIC. No Modbus or Pressure Module compatibility.

6 = STANDARD. Includes Modbus, Pressure Module compatible, external VPS using Pressure Module

Field Replacement

WARNING!

Explosion or Fire Hazard

Can cause severe injury, death, or property damage.

- Turn off gas supply before starting installation
- Disconnect power supplies before beginning installation
- More than one disconnect can be involved

WARNING!

Electric Shock Hazard

Can cause serious personal injury or death.

- Disconnect power supply before beginning installation
- More than one disconnection can be involved

WARNING!

Explosion Hazard and Electrical Shock Hazard.

Can cause explosion, serious injury or death.

- Disconnect the power supply making wiring connection to prevent electrical shock and equipment damage.
- More than one power supply disconnect can be involved.

IMPORTANT

- Ensure the exact same solenoid size and voltage is being replaced. Verify the assembly part numbers are identical before beginning installation. Refer to [Table 15](#) and/or the model information on the solenoid assembly installed on the valve.
- For valve the mechanical and electrical installation, follow the SV2 Series Valve Replacement Electronics installation instruction document, 32-00039, which is packed with the replacement assembly.
- Ensure that the SOLENOID 1 and SOLENOID 2 internal wiring is properly re-connected per the original arrangement. Failure to do so may cause unnecessary fault conditions.

CHAPTER 5 : SV2 SERIES PREMIX TECHNOLOGY

Fuel/Air Module

Specifications

Dimensions

Refer to Figures 31 and 32.

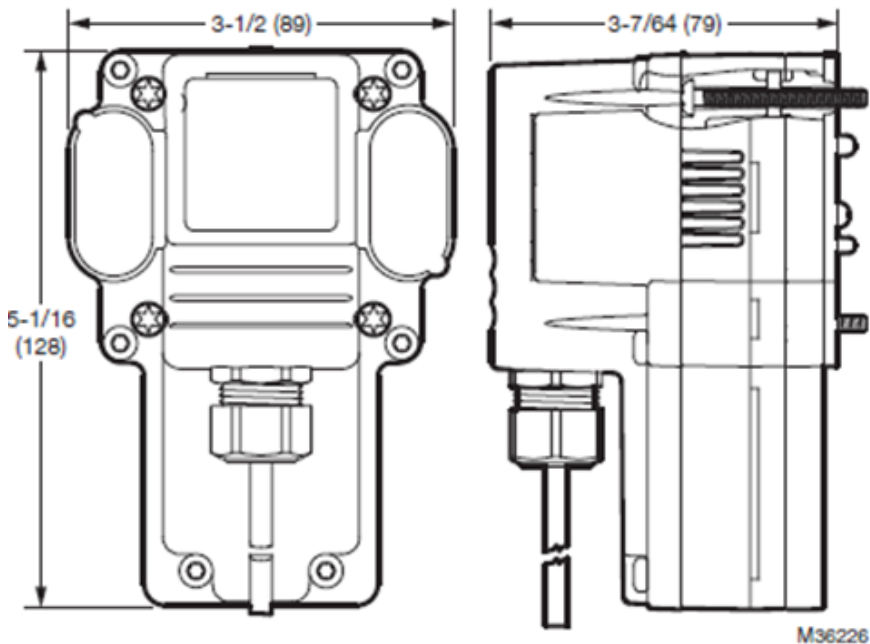


Fig. 31: FARMODxx-000 without insulation.

NOTE: FARMOD standoff is approximately 2.5mm from valve body.

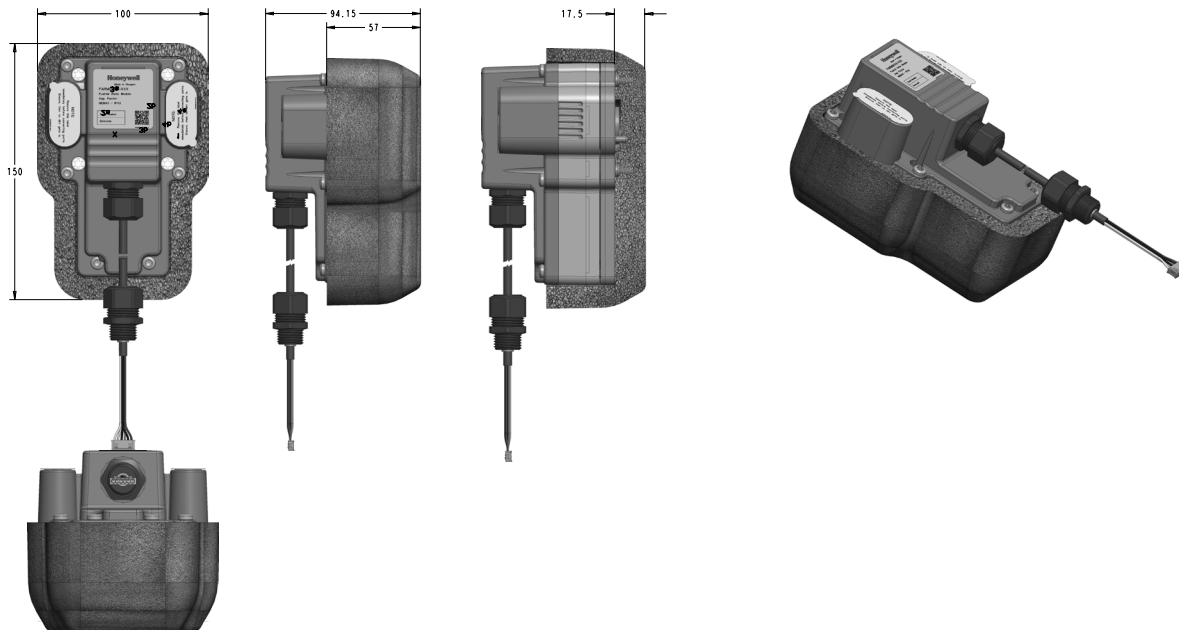


Fig. 32: FARMODxx-000 with insulation.

NOTE: FARMOD standoff is approximately 17.5mm from valve body.

Models

For detailed specifications, refer to Table 16.

FARMOD14-000

FARMOD44-000

NOTE: Premix valves come with assembled and tested FARMODs from the factory. The above part numbers are for field replacement purposes only.

Mounting

The Fuel/Air modules are factory assembled to the V2V valve models and tested. It is not allowed to assemble the valve with the Fuel/Air Module pointing downwards.

Four (4) M4x40, T-20 torx screws

Maximum tightening torque 2 ± 0.2 Nm (18 ± 2 in-lbf)

IMPORTANT

The FARMOD is designed and tested to be directly mounted to the valve.

Honeywell has tested and confirmed the FARMOD performance with the FARMOD mounted directly to the valve on the same side as the electronics with the factory provided length of cable against EMC standard FCC 15 Part B Class A, EN/UL 60730-1 and EN 13611 at industrial levels.

Environmental Ratings

NEMA 1/IP20 or NEMA 4/IP66 with sealing cord grip

Operating Temperature Range

All versions: +5°F to 145°F (-15°C to 63°C)

Air Pressure Differential

15 Pa to 3200 Pa / 0.059 to 12.6 in w.c..

Delta P across FARMOD air inlet to the Pref outlet

Gas Pressure Differential

FARMOD14/44 types: 3.75 to 2560 Pa / 0.015 to 10 in w.c.

Delta P across FARMOD gas inlet to the Pref outlet

Approvals

The Fuel/Air Module is not a stand-alone product and must be used with a SV2 Series valve and thus is specified as part of the valve approvals.

Amplification Factor Accuracy

The achievable accuracy or repeatability of the amplification factor depends on the adjusted value.

The figure below shows the typical achievable amplification factor accuracy of a commissioned fuel /air control system.

Documentation

32-00040, Fuel/Air Module Installation Instructions

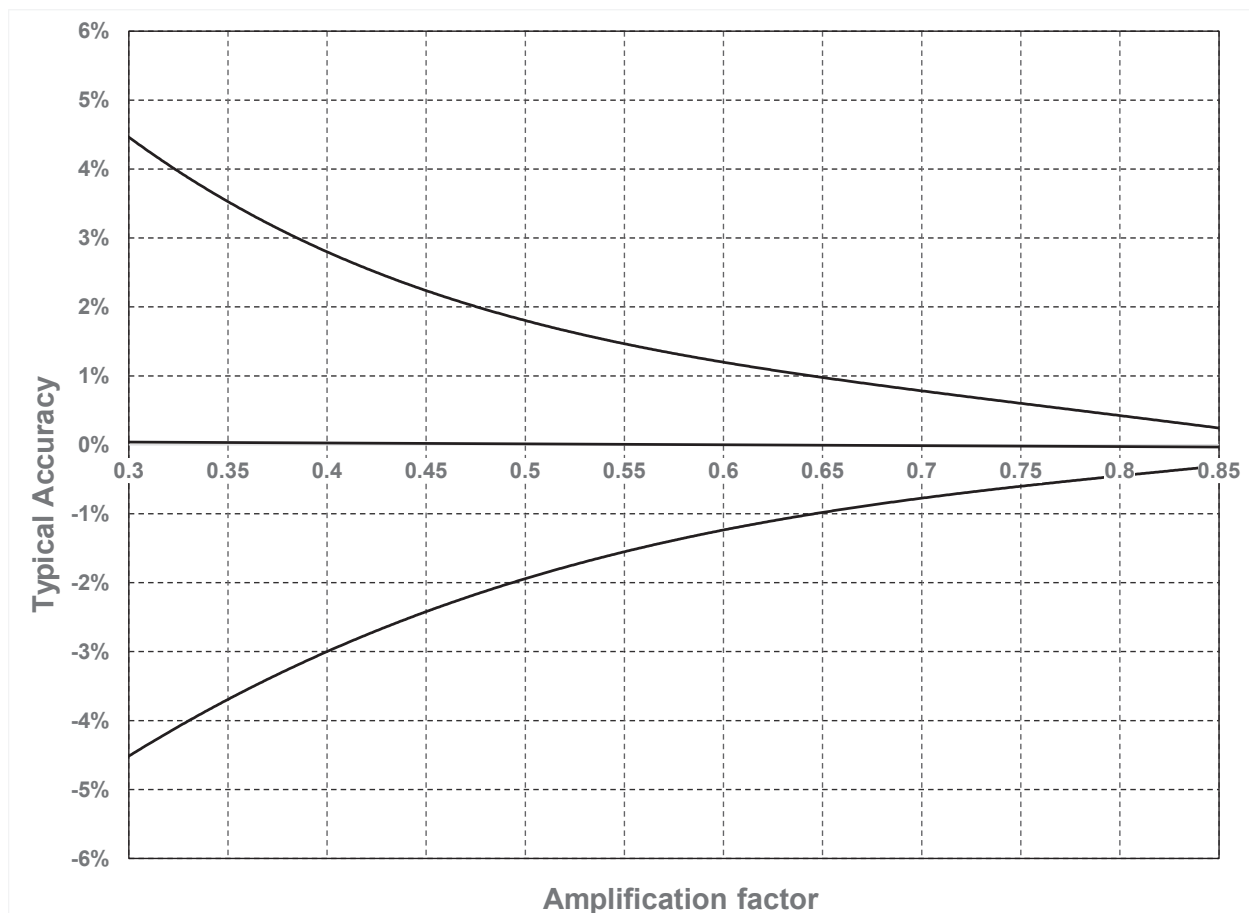


Fig. 33: FARMODx4-000 Typical Premix Amplification Factor Accuracy.

ACCURACY INCLUDES:

- Sensor drift / offset¹ and gain shift² after commissioning.
 - Ambient temperature (-15°C to +63°C / +5°F to +145°F).
 - Typical 95% of the population.
1. ±3 counts.
 2. ±1.5% of actual sensor reading

Fuel/Air Module Introduction

The Fuel/Air Module is installed on SV2 Series premix valves for fuel/air regulation (valve model numbers starting with V2V). Each FARMOD contains multiple sensors for accurate measurement of the differential air and gas pressures. Dedicated control electronics and software accurately regulate the fuel/air ratio based on the Fuel/Air Module signals.

Dedicated Fuel/Air Modules are available to meet the specific requirements of Premix. Refer to [Table 16](#) for details. From the factory, each valve will come with the appropriate tested, calibrated and mounted FARMOD.

Note that factory stepper motor full stroke calibration is stored in the main electronics board and the FARMOD. At each shutdown, the valve will check the actual full stroke against the stored value. If the stored value is bad or out of tolerance, the valve cannot be used and the valve will lockout.

Field Replacement of FARMOD or Valve Main Electronics

Applies to valve firmware version 12.01 or later. HMI/PC Tool software version 12.01.002 or later.

FARMOD Field Replacement

Should field replacement of the Fuel/Air Module be necessary, ensure that the correct model is ordered. Refer to [Table 16](#) and/or the model information on the FARMOD installed on the valve. For the mechanical/electrical installation, follow the SV2 Series Valve Fuel Air Ratio Modules installation instruction document, 32-00040, which is packed with the Fuel/Air Module. For step-by-step FARMOD change-out instructions, refer to [CHAPTER 8](#) of this manual.

During normal operation, certain FARMOD fuel/air parameters are automatically backed up in the valve main electronics. However, replacement of the FARMOD does result in partial loss of the commissioning data, which requires partial re-commissioning of the application. This is because parameters specific to a particular FARMOD, including the Correction Curve and the recorded pre-ignition air value (Record Ign. Air Level), are not stored in the main board.

After connecting the new or previously configured / used FARMOD, lockout condition(s) will result. The user needs to confirm acceptance of new FARMOD on the FARMOD tab in the Setup & Tests menu, or they can use the guided setup routine to complete all setup functions.

When the FARMOD is replaced:

- The FARMOD back-up data stored on the valve main electronics is automatically loaded onto the replacement FARMOD once the valve is powered. Normal operation of the valve will be locked until the Ign. Air Level is recorded and a minimum of 4 points are re-commissioned on the Correction Curve (minimum, maximum and two intermediate loads). Refer to Fig. 53 and Fig. 57.
- The user can choose to modify the existing setup (if allowed by the OEM) by logging in with the proper access level credentials. The OEM Base curve can be modified by deleting single points or deleting all points and re-creating the curve. Refer to Fig. 56.

Part Number ^{1,2}	Description	Compatibility
FARMOD14-000	For NEMA 1 / IP20 enclosure, amplification factor range 0.3-0.85	All fuel/air premix valve models
FARMOD44-000	For NEMA 4 / IP66 enclosure with cord grip connections, amplification factor range 0.3-0.8	

Table 16. Field Replacement Fuel/Air Module Selection.

1. The part numbers shown in Table 16 are for field replacement purposes only.
2. It is not allowed to assemble the valve with the Fuel/Air Module pointing downwards.

NOTE: In order for the Installer to replace the FARMOD in the field, the OEM must grant them access to the FARMOD and FAR Correction Curve Access Levels groups. Refer to Fig. 87 and Table 23.

IMPORTANT

- Using a previously configured / used FARMOD is allowed, however, the user should exercise caution when doing so as it could result in reliability issues if the usage/history of the FARMOD is unknown.
- The SV2 Series valves have internal algorithms that prevent the accidental or intentional removing of the Fuel Air Ratio Module once the valve has been fully setup and is in use. If the FARMOD cable is disconnected, the valve will lockout.
- The fuel/air valves (V2V) FARMOD and main electronics CANNOT be replaced at the same time or all Honeywell and OEM factory + field data will be lost, including the valve-specific stepper motor full stroke calibration. If both components must be replaced, the installer must replace 1 at a time. Follow the Fuel/Air Ratio Module Change-Out Procedure outlined in chapter 8, restoring power after to preserve the configuration. Then follow the Valve Main Electronics Change-Out Procedure in chapter 9. This will preserve the most setup parameters.

Valve Main Electronics Field Replacement

Should field replacement of the valve main electronics be necessary, ensure that the correct model is ordered. Refer to Table 14 and/or the model information on the main electronics assembly installed on the valve. During normal operation, all on/off valve parameters and certain FARMOD fuel/air parameters are automatically backed up in the valve main electronics board. Some specific premix fuel/air parameters are automatically stored in the FARMOD (fuel/air ratio module) and are automatically loaded to the replacement main electronics from the FARMOD after power is reapplied.

Replacing the valve main electronics does not require extensive re-commissioning **if the proper procedure is followed as outlined in CHAPTER 9 of this manual:**

- Perform the Valve Production Cloning procedure, cloning all parameters **EXCEPT THE BASE CURVE**
- Remove power and replace the valve main electronics board. Refer to the SV2 Series replacement electronics installation instructions, 32-00039, which is packed with the replacement electronics part.
- Once power is restored, certain fuel/air configuration elements, which are specific to a valve + FARMOD, are automatically copied from the FARMOD into the new electronics. These include the Base Curve, Correction Curve, motor full stroke and Pre Ign. Air Level.
- Copy the cloned configuration into the new valve main board.
- Perform the Safety Parameter Verification procedure.

IMPORTANT

- If the Valve Production Cloning procedure is not performed **BEFORE replacing the valve main electronics**, parameters will be lost including the valve body size. Additionally, the premix fuel/air OEM Setup + Ignition Setup parameters will be set to their default values, causing non-optimized ignition and requiring re-programming of lost values.
- **DO NOT clone the fuel/air Base Curve** during the Valve Production Cloning procedure. If the Base Curve is cloned, the Base + Correction Curves that were stored in the FARMOD cannot be uploaded to the new main electronics board.
- The fuel/air valves (V2V) FARMOD and main electronics **CANNOT** be replaced at the same time or all Honeywell and OEM factory + field data will be lost, including the valve-specific stepper motor full stroke calibration. If both components must be replaced, the installer must replace 1 at a time. Follow the Fuel/Air Ratio Module Change-Out Procedure outlined in [CHAPTER 8](#), restoring power after to preserve the configuration. Then follow the Valve Main Electronics Change-Out Procedure in [CHAPTER 9](#). This will preserve the most setup parameters.
- The valve main electronics **SHALL NOT** be replaced with a previously configured main electronics assembly. Using a previously configured electronics assembly will result in possible data mis-matches, causing random faults or inoperability of the valve.

Fuel/Air Accessories**Pulse Line Connections**

The Fuel/Air Module contains three Pulse Line Connections for connection of air pressure, gas pressure and reference pressure of a gas/air mixing unit. The connections are indicated by A (gas), B (reference) and C (air) on both the Fuel/Air Module and the SV2 Series mixing units. Refer to [Fig. 43](#). Pulse line tubing and fittings are required between the valve fuel/air ratio module (FARMOD), the mixing unit, air filter and heat exchanger (if used). Refer to [Fig. 45](#).

The pulse line tubing can be plastic or metal, depending on the connection point and approval body requirement. The Honeywell preferred pulse line connection for the air and reference pressure is aluminum or stainless steel. Refer to the specifications that follow.

Honeywell offers several fittings and tubing kits to facilitate myriad system configurations as shown in [Table 17](#).

IMPORTANT:

- The fittings selected by Honeywell from specific brands and types assure free sample flow to and from the SV2 Series fuel/air ratio premix valve.
- If any other fittings are used, the sample flow to and from the valve can easily get obstructed and affect the combustion quality.
- For this reason it is strongly recommended to use the fittings listed in [Table 17](#).

Part Number	Description	Compatibility
V2MUTUBEPL-000B	Plastic feedback tubing kit. Contains (3) 50 meter (164 foot) polyethylene plastic tubing coils (5.9mm ID, 8mm OD).	All fuel/air premix valve models
V2MUFITPLSTR-000B	Plastic feedback tubing fittings kit, straight. Contains 300 push-in fittings.	
V2MUFITPL90D-000B	Plastic feedback tubing fittings kit, 90 degree. Contains 300 swivel push-in fittings.	
V2MUFITPLTEE-000B	Plastic feedback tubing fittings kit, tee. Contains 100 push-in fittings.	
V2MUTUBEAL-000B	Metal feedback tubing kit. Contains 200 aluminum tubes (7mm ID, 8mm OD, 1000mm long).	
V2MUFITMESTR-000B	Metal feedback tubing fittings kit, straight. Contains 300 compression fittings.	
V2MUFITME90D-000B	Metal feedback tubing fittings kit, 90 degree. Contains 300 swivel compression fittings.	

Table 17. Pulse Line Kits Selection.

For installation instructions of the pulse lines see the Pulse Line Assembly section contained within the SV2 Series Fuel/Air Valve Theory of Operation section of this document. You may also refer to the FARMOD installation instructions (32-00040) or the V2MU mixing unit installation instructions (32-00044).

NOTE: Aluminum pulse line kits come with straight tubing that can be formed to specific application needs by the customer.

Preferred Pulse Line Materials and Dimensions

Air pressure line: Aluminum or Stainless steel, 8 mm OD x 1 mm thick

Gas pressure line: Polyethylene¹, 8 mm OD x 1.25 mm thick

Reference pressure line: Aluminum or Stainless steel, 8 mm OD x 1 mm thick

Fittings should not restrict the inner preferred pulse line diameter

1. Alternatively, other tubing materials such as PUN can be used, noting that the maximum temperature of 140F/60C shall not be exceeded.

NOTE: Aluminum tubing shall preferably fulfill the following requirements to mate with the recommended fittings:

- **Diameter and wall thickness: 8 x 1 mm.**
- **Dimensions and tolerances according DIN EN754-7/8.**
- **Material AW6063 according DIN EN573.**
- **Tempering T832 according DIN EN515.**
- **Mechanical properties according DIN EN754-2.**

Mixing Units

Dedicated SV2 Series premix valve mixing units have been designed to work with and mate to the FARMOD and pulse lines as well as to provide the optimum fuel-air mixing to ensure smooth appliance operation, efficiency and reliability. Refer to [Table 18](#) and [Fig. 37-Fig. 39](#) for overall dimensional information, bolt patterns and orifice sizes. For mechanical installation details, refer to the mixing unit installation instructions (32-00044), which is shipped with each mixing unit.

Mixing Unit Part Number	Reference Net Load ¹	Minimum Net Load
V2MU0300-000	300kW / 1.0 MMBTU	30kW / 0.10 MMBTU
V2MU0500-000	500kW / 1.7 MMBTU	50kW / 0.17 MMBTU
V2MU0800-000	800kW / 2.7 MMBTU	80kW / 0.27 MMBTU
V2MU1000-000	1000kW / 3.4 MMBTU	100kW / 0.34 MMBTU
V2MU2000-000	2000kW / 6.8 MMBTU	200kW / 0.68 MMBTU

Table 18. V2MU mixing unit models.

- The reference load is defined as the achieved capacity at an air pressure drop of 15 mbar / 5.9 in w.c. and lambda of 1.250. Values for natural gas / G20.

IMPORTANT

For optimal fuel/air ratio performance, it is recommended to assemble an extension pipe between the V2V gas valve and V2MU Mixing Unit as indicated in [Table 19](#) and [Fig. 34, Fig. 35 and Fig. 36](#). Alternatively, a 90-degree elbow with an inner diameter as specified in [Table 19](#) can be used.

NOTES:

- If a manual safety shut-off valve is assembled between the gas valve and the Mixing Unit, the MSOV length can be subtracted from the minimum recommended lengths in [Table 19](#).
- If the V2MU2000 is assembled directly to the valve, remove the valve's factory supplied outlet O-ring and mount the V2MU2000 using its factory supplied O-ring in the flange of the V2MU2000 for sealing purposes.
- Shorter pipe lengths may be possible but must be tested to ensure acceptable performance.

Mixing Unit Part Number	Gas Extension Pipe Minimum Length (mm / in)	Gas Elbow Inner Diameter (mm / in)
V2MU0300	222 / 8.7	44.3 / 1.74
V2MU0500, V2MU0800, V2MU1000	330 / 13.0	66.0 / 2.60
V2MU2000	425 / 16.7	84.9 / 3.34

Table 19. Minimum piping length between V2MU mixing units and SV2 Series valve.

The Honeywell recommended tubing configurations between the valves and the V2MU mixing units are shown in [Fig. 34-36](#).

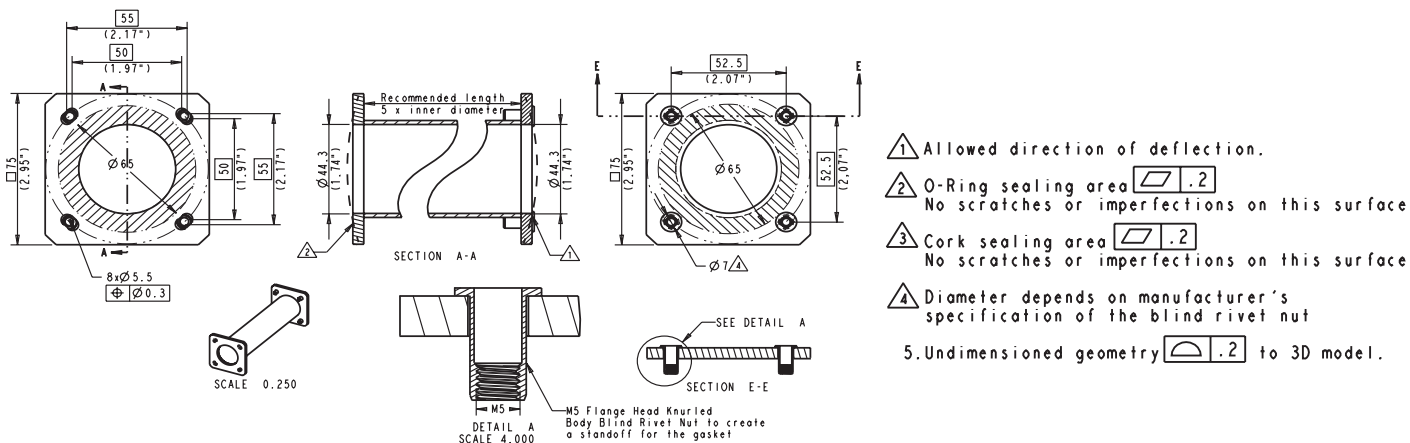


Fig. 34: 1in/DN25 valve to V2MU0300/0500

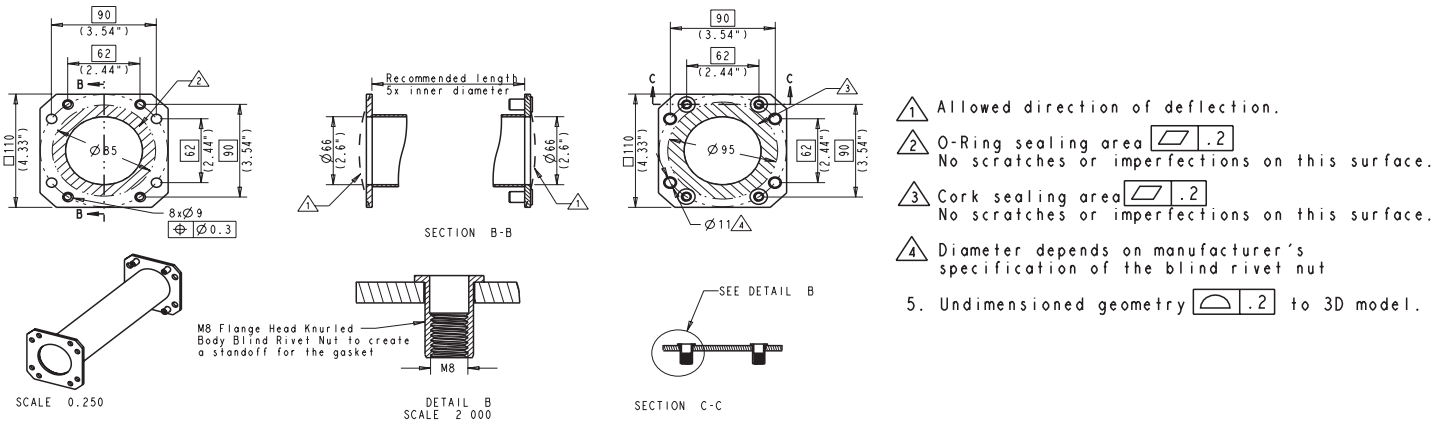


Fig. 35: 1.5-2in/DN40-50 valve to V2MU0500/0800/1000

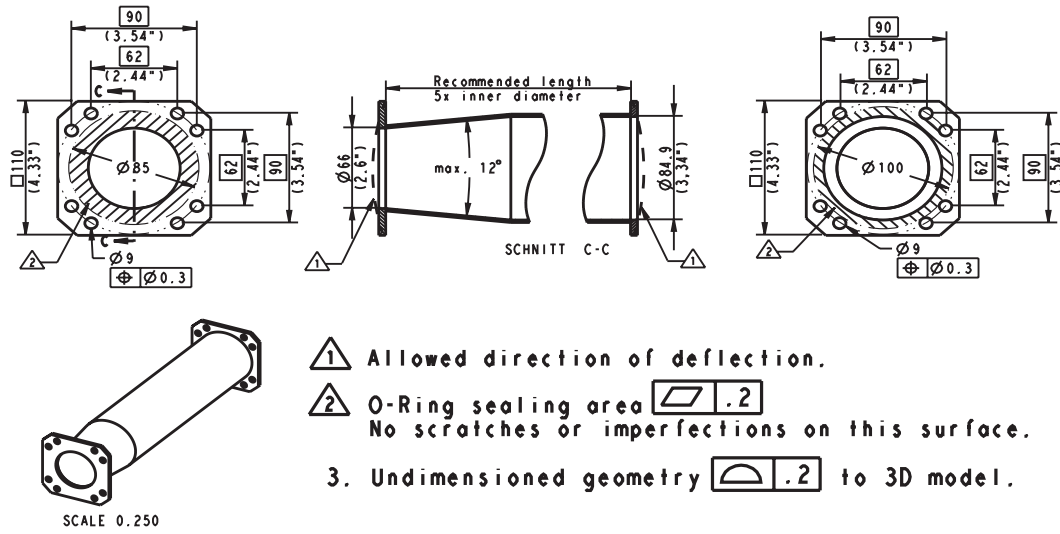


Fig. 36: 1.5-2in/DN40-50 valve to V2MU2000

Mixing Unit Part Number	M5 x 16 mm	M8 x 16 mm	M8 x 20 mm	Nut (M8)	Washer
V2MU0300	4	--	--	--	
V2MU0500, V2MU0800, V2MU1000	--	4	--	4	4
V2MU2000	--	--	4	4	

Table 20. Provided fastening materials.

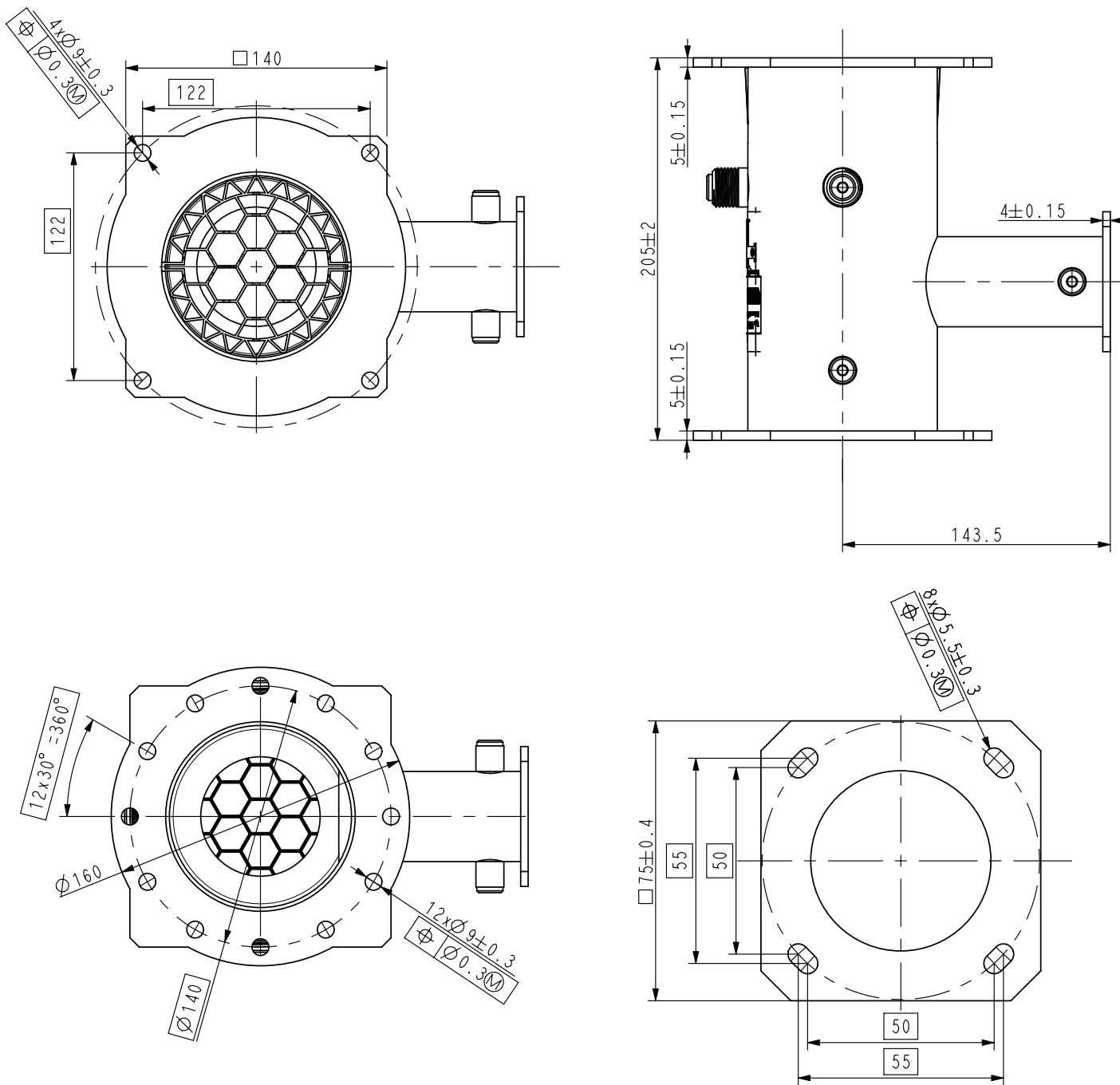


Fig. 37: V2MU0300, Dimensional information

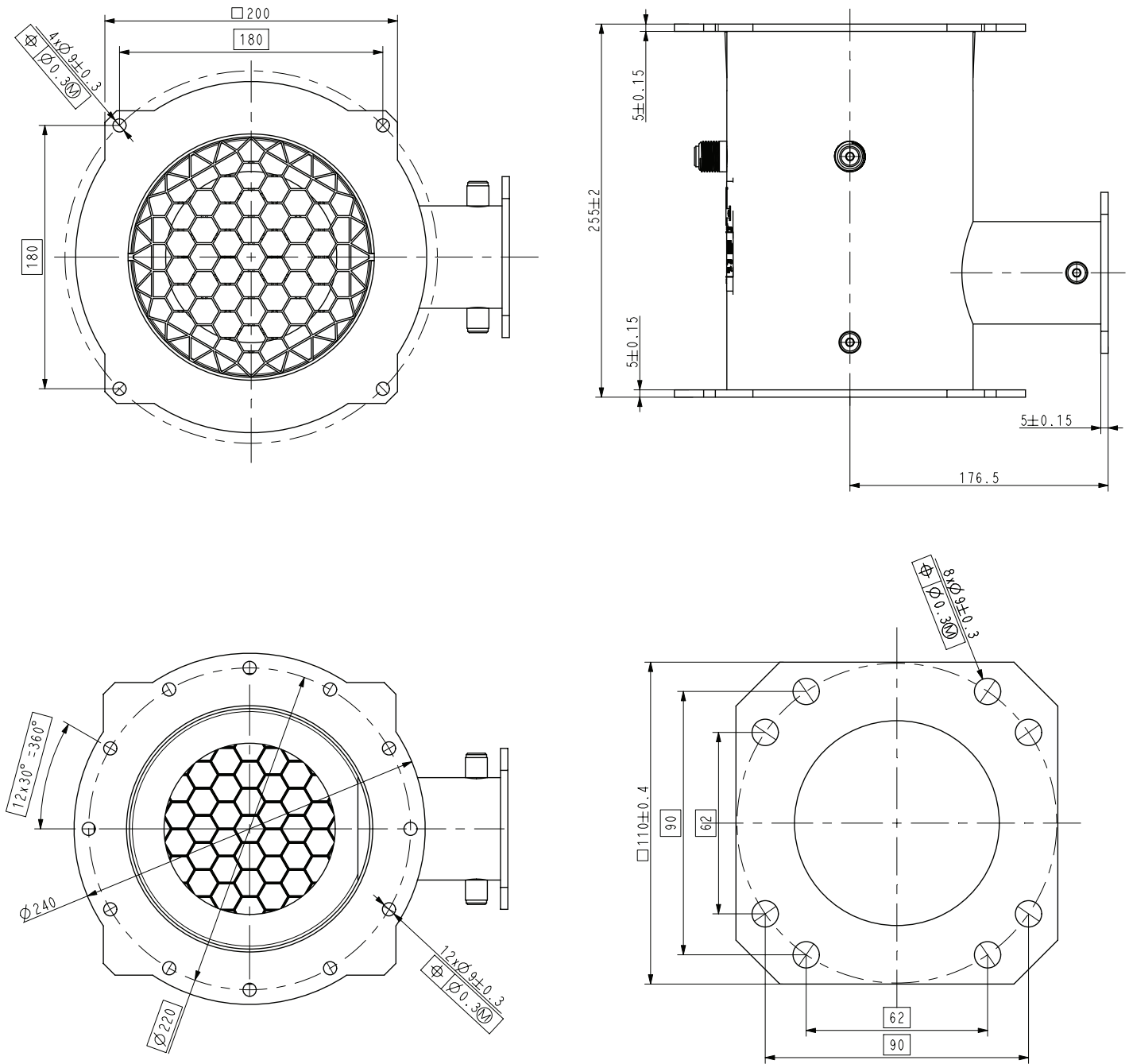


Fig. 38: V2MU0500, V2MU0800, V2MU1000 Dimensional information

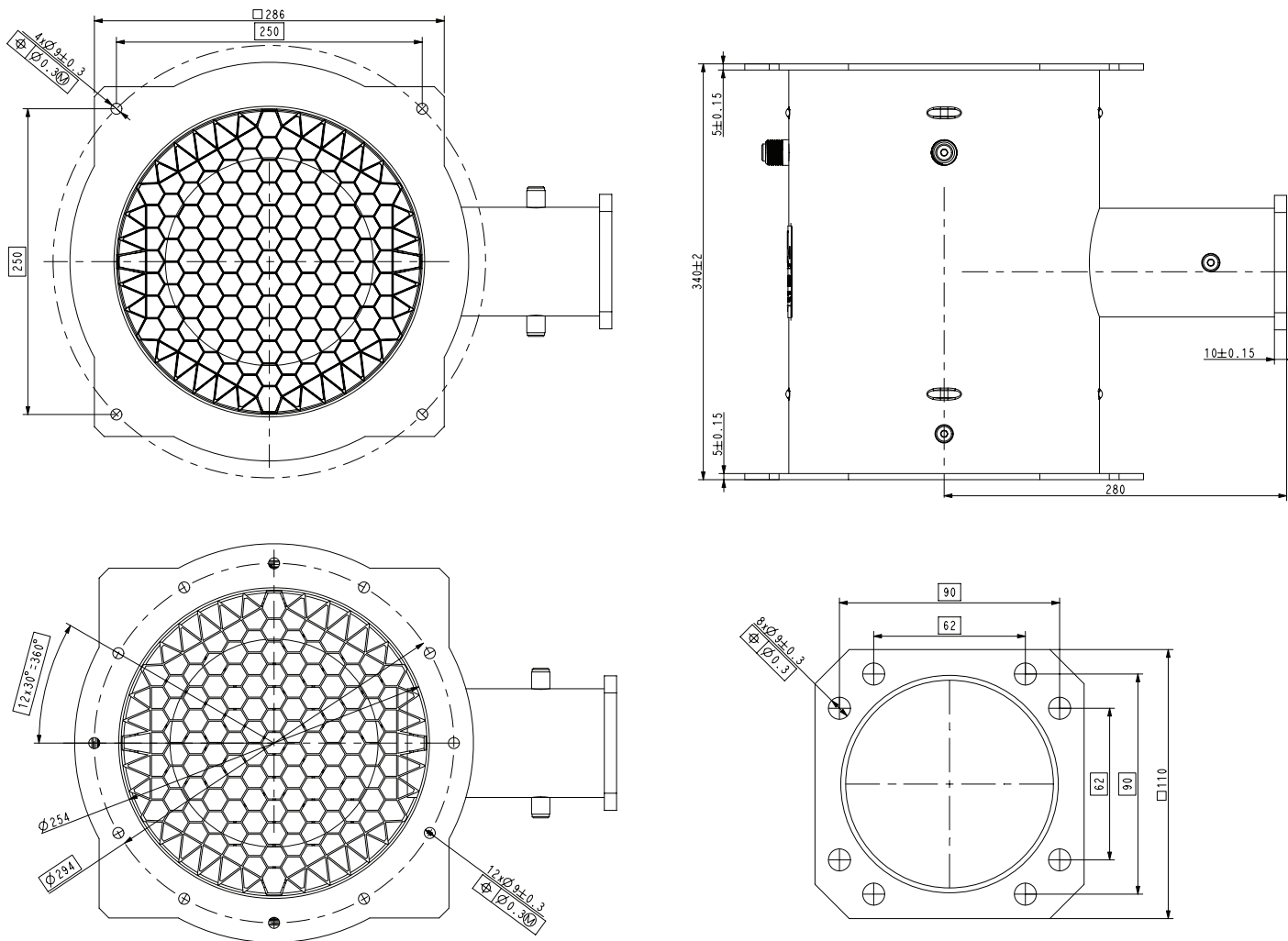


Fig. 39: V2MU2000 Dimensional information

IMPORTANT:

- The SV2 Series premix valve and its accessories have been developed to provide an optimum fuel-air ratio performance.
- Honeywell cannot guarantee the valve or mixer performance, operation, efficiency or reliability if any non-Honeywell accessories are used with the SV2 Series premix platform.

Heat Exchanger Kit

When the premix (V2V) valve is installed in an area with a temperature “continuously” lower than the combustion air intake temperature, a risk of condensate formation in the air pulse line and FARMOD is present, which can affect the fuel/air ratio control, depending on the appliance. In this case, the FARMOD would sense less airflow and adjust the gas flow to create a leaner mixture, which eventually could result in flame loss or lockout due to permanent FARMOD damage. Such a condition would also be identified at the next call for heat.

The Heat Exchanger Kit, in addition to the heater embedded within the FARMOD, work together to prevent condensate from entering the FARMOD for conditions as indicated above.

If the potential of condensate formation exists, it is strongly recommended to install the SV2 Series Heat Exchanger kit, which is available from Honeywell. Refer to [Table 21](#). When the Heat Exchanger is paired with the heater embedded within the FARMOD (see the Outdoor Air Installations section of this manual under SV2 Series Fuel/Air Valve Theory of Operation), a complete condensation/dehumidification solution is provided. If the potential for condensate formation exists and the complete condensation/dehumidification is not used, any condensation that enters the FARMOD is likely to permanently damage the system.

If there is never a risk of condensation, meaning the ambient room temperature is above the combustion air dew point at all times, the complete dehumidification system is not needed. This means adding the additional SV2 Series Heat Exchanger kit is then not needed.

For detailed mounting and application information for the heat exchanger, refer to the [Outdoor Air Installations](#) section of this manual and [Fig. 40](#), [Fig. 43](#), [Fig. 44](#), [Fig. 45](#), [Fig. 47](#), [Fig. 49](#), and [Fig. 50](#).

Part Number	Description
HEATEXCHANGER-000	Heat exchanger kit for premix applications. Includes heat exchanger, 3 pulse line insulation sleeves (1 m/39.4 in each), sealing nut + washer for mounting to V2MU mixing unit, (4) M4X54 screws, FARMOD insulating shoe and (4) 4.3x8x11 spacers.

Table 21. Heat exchanger Information.

NOTE: The fittings and tubing to connect the Heat Exchanger to the FARMOD are sold separately in kits. Tubing is available in aluminum or plastic. Fittings are available for connection to the aluminum or plastic tubing in straight, tee and 90 degree configurations. Refer to [Table 17](#) for information.

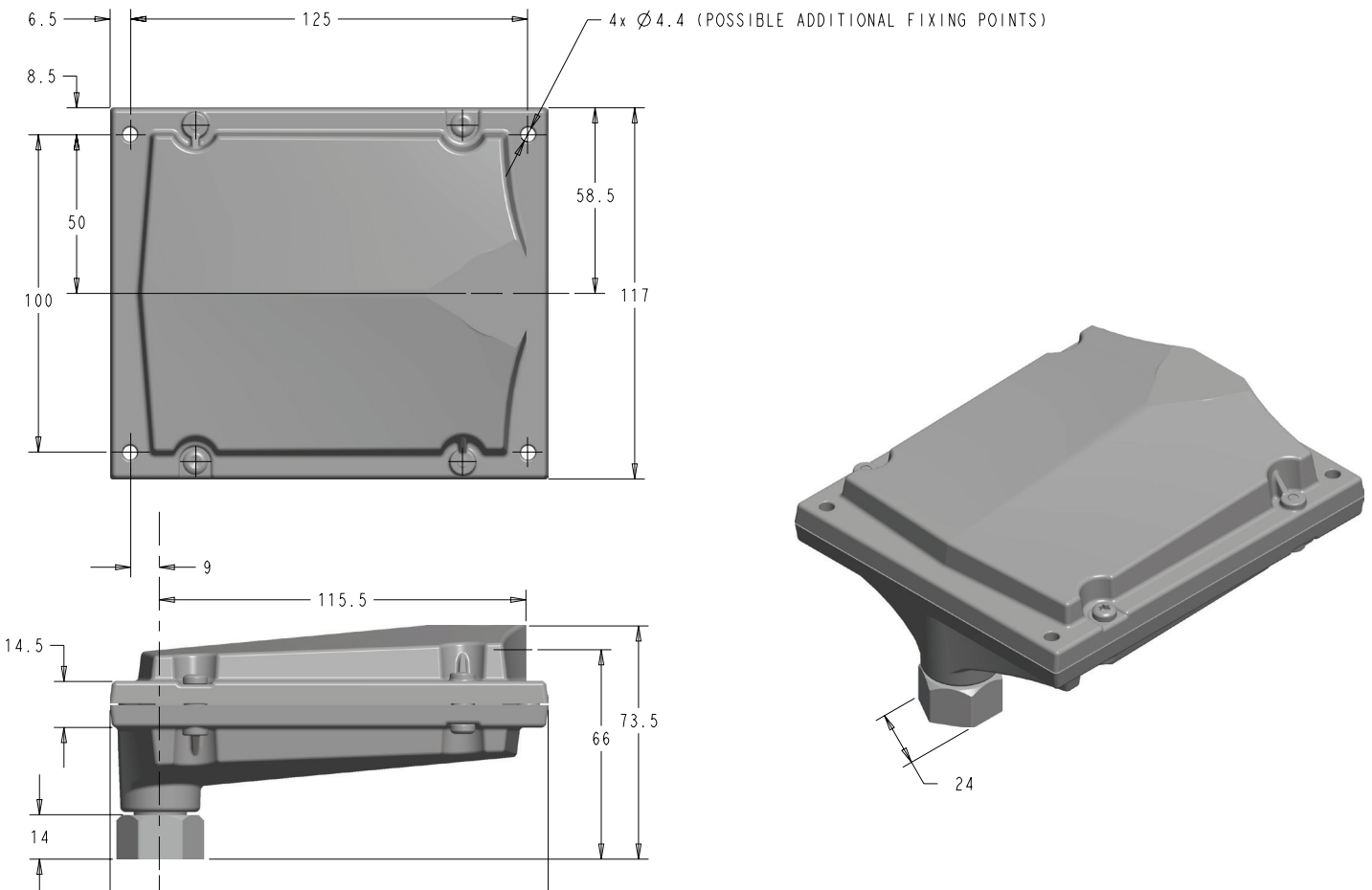


Fig. 40: Heat Exchanger dimensional information.

Air Pre-Filter

The air pre-filter is included with every premix valve and is available as a field replacement part as well. The air pre-filter MUST be installed in every premix system, regardless of whether the Heat Exchanger is used. The filter is designed to remove fine dust particles from the air stream to the valve FARMOD, which can affect the flow resistance to the internal sensors and eventually cause nuisance lockouts.

The filter must be mounted between the V2MU mixing unit and the valve FARMOD in the air pulse line. If the Heat Exchanger is used, it must also be mounted between the V2MU mixing unit and the valve FARMOD, with the Heat Exchanger first and the filter second. Refer to [Fig. 45](#), [Fig. 46](#) and [Fig. 47](#) for mounting orientations.

Part Number	Description
FARMODFILTER-000B	Field replacement pre-filter assembly for premix valves fuel/air ratio module. Bulk pack of 12.

Table 22. Air pre-filter replacement part information.

NOTES:

- Due to the variety of possible appliance configurations, the fittings and tubing must be ordered separately. Refer to [Table 17](#) for information.
- The customer must furnish an appropriate filter mounting bracket for their chosen location.

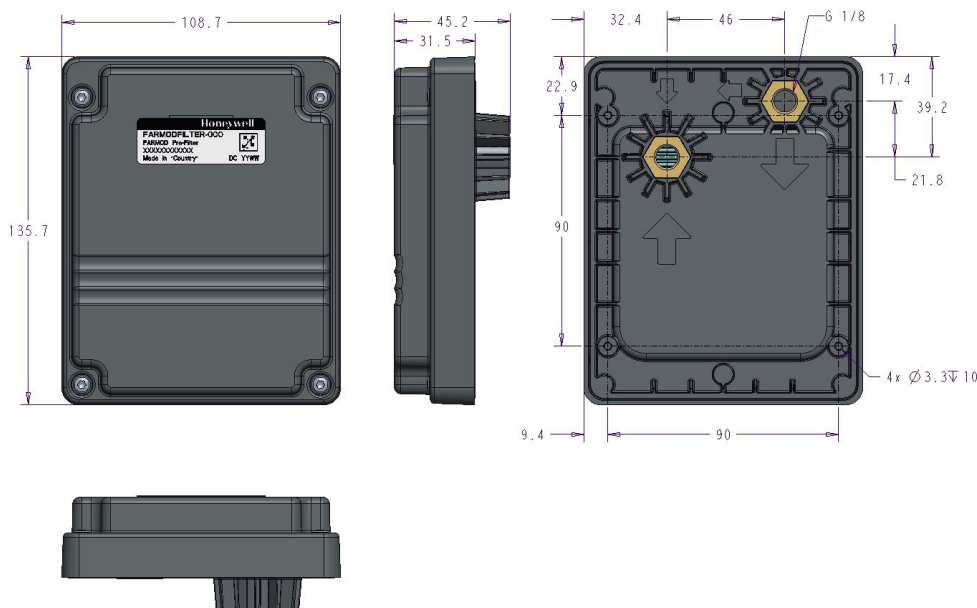


Fig. 41: Pre-Filter dimensional and mounting information.

SV2 Series Fuel/Air Valve Theory of Operation

Introduction

Fuel/air ratio control within the SV2 Series Premix valves is accomplished with a Fuel/Air Ratio Module and a stepper motor driven Fuel Control Valve (throttle) embedded in the main valve body.

The Fuel/Air Ratio Module (FARMOD) is equipped with 3 embedded mass flow sensors, which provide accurate differential air and gas pressure measurement data to the SV2 Series main control. During commissioning of the appliance / burner, amplification values (the ratio between dPgas and dPair) are set at various burner loads to meet specific lambda / O₂ (CO₂) requirements of the appliance

After commissioning is complete and the appliance is running, the Fuel Control Valve is controlled/modulated by a comparison of the actual sensor readings against the setpoint which is derived from the stored amplification settings to accurately control the lambda / O₂ (CO₂) behavior against the burner load. The ability of the SV2 Series Fuel/Air Ratio control system to store up to 24 burner load-dependable amplification values allows for maximal flexibility in the optimization of the appliance/burner combustion process.

During the burner start-up sequence (pre-purge) and burner operation, the SV2 Series Fuel/Air Ratio control system ensures the presence of sufficient air to assure a safe combustion process. Software algorithms are embedded in the SV2 Series main control to detect an un-configured Fuel/Air control system to prevent the appliance from operation. Further, the SV2 Series Fuel/Air Ratio control system is equipped with safeguards to assure reliable operation of the burner.

The SV2 Series Fuel/Air control system fulfills the requirements of all applicable European and North American standards. Refer to the Valve Specifications section of this document for an overview of the applicable standards.

The SV2 Series Fuel/Air Ratio control system is suitable for Premix appliance applications.

FARMOD Measuring Principle

[Fig. 42](#) shows the FARMOD sensor orientations and pulse line connections to a Premix burner with a mixing unit.

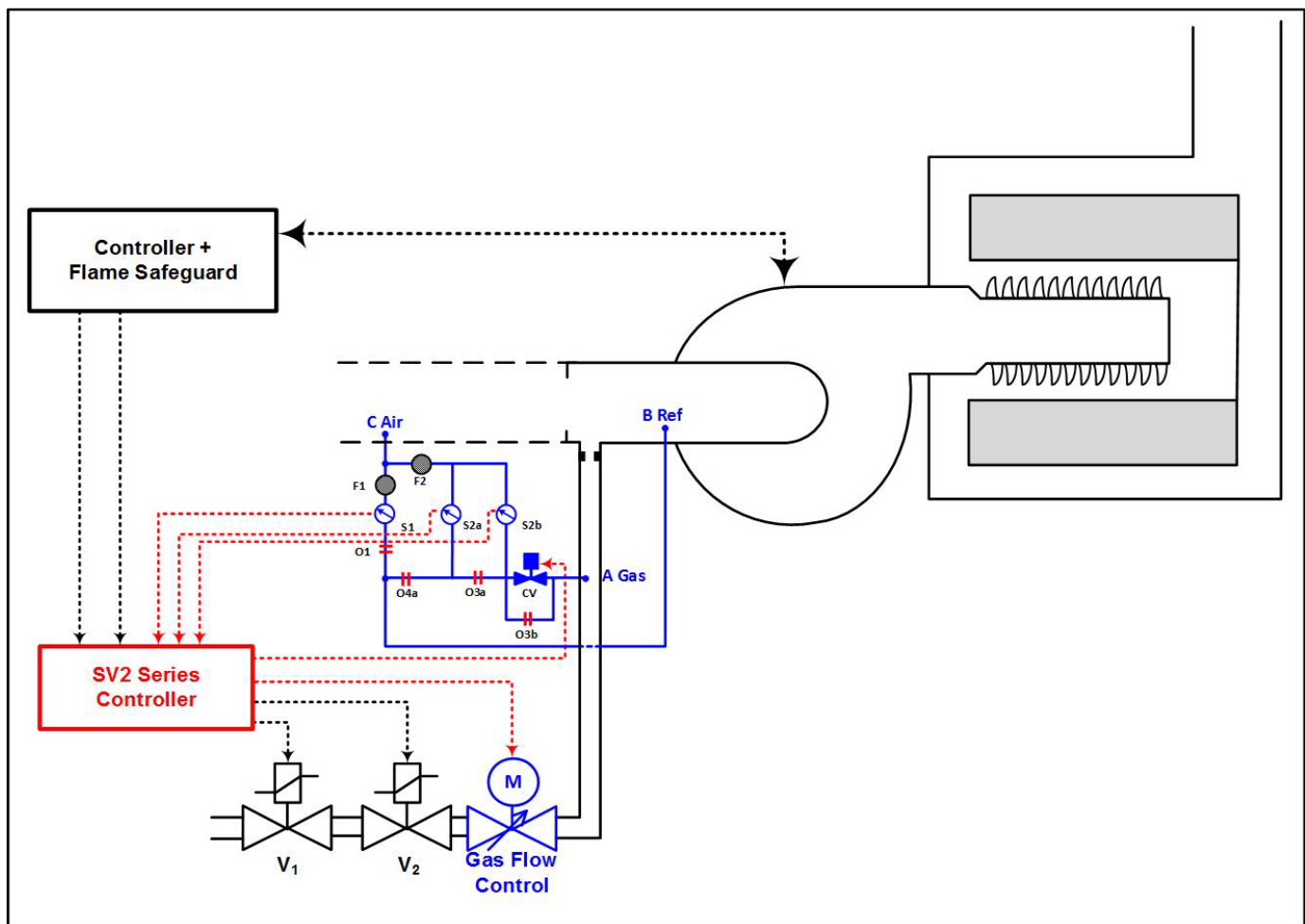


Fig. 42: FARMOD orientation and pulse line connections.

The flow restrictors (O1 ... O4) are chosen such that the system will operate with airflow through the sensors (S1, S2a and S2b) only. The sensor signals represent an airflow depending on the sensor pressure differentials.

Filters (F1 and F2) protect the sensors and flow restrictors against pollution. The S1 sensor signal depends on the differential of the air and reference pressure, which in turn depend on the actual combustion airflow, and thus represents the actual airflow.

The S2b sensor signal depends on the differential of the air and gas pressure, which in turn depends on the actual combustion air and gas pressure, and thus represents the gas pressure.

Note that the S1 and S2b signals do not represent the actual combustion air or gas flow values, but a derivative of the flows.

The SV2 Series Fuel/Air Ratio control depends on the ratios of the S1 and S2b signals, which are derived from the stored amplification values at different burner loads during the commissioning of the appliance. The FARMOD sensor S2a and the valve (CV) are part of the built-in safeguards to assure the plausibility of the sensor signals.

All sensor signals are fed to the SV2 Series electronics, which actuates the stepper motor controlled gas Flow Control Valve (FCV) to the required gas flow to meet the required S2b value.

For ease of commissioning, the interface between the set-up tool (see the Accessories chapter of this manual for available set-up tools), requires entry of the amplification factor $[(P_{gas} - P_{ref}) / (P_{air} - P_{ref})]$. The SV2 Series electronics then translates the entered amplification factor into the required S2b to S1 ratio.

Pressure Pick-up Point Requirements

Due to the flexibility of setting up the fuel/air ratio per specific burner load, some attention should be paid to the design of the pressure pickup locations:

- To avoid a dynamic pressure behavior, the pressure pick-up should be perpendicular to the air, the fuel and, for the premix reference pressure, the (fuel/air) mixture/flow.

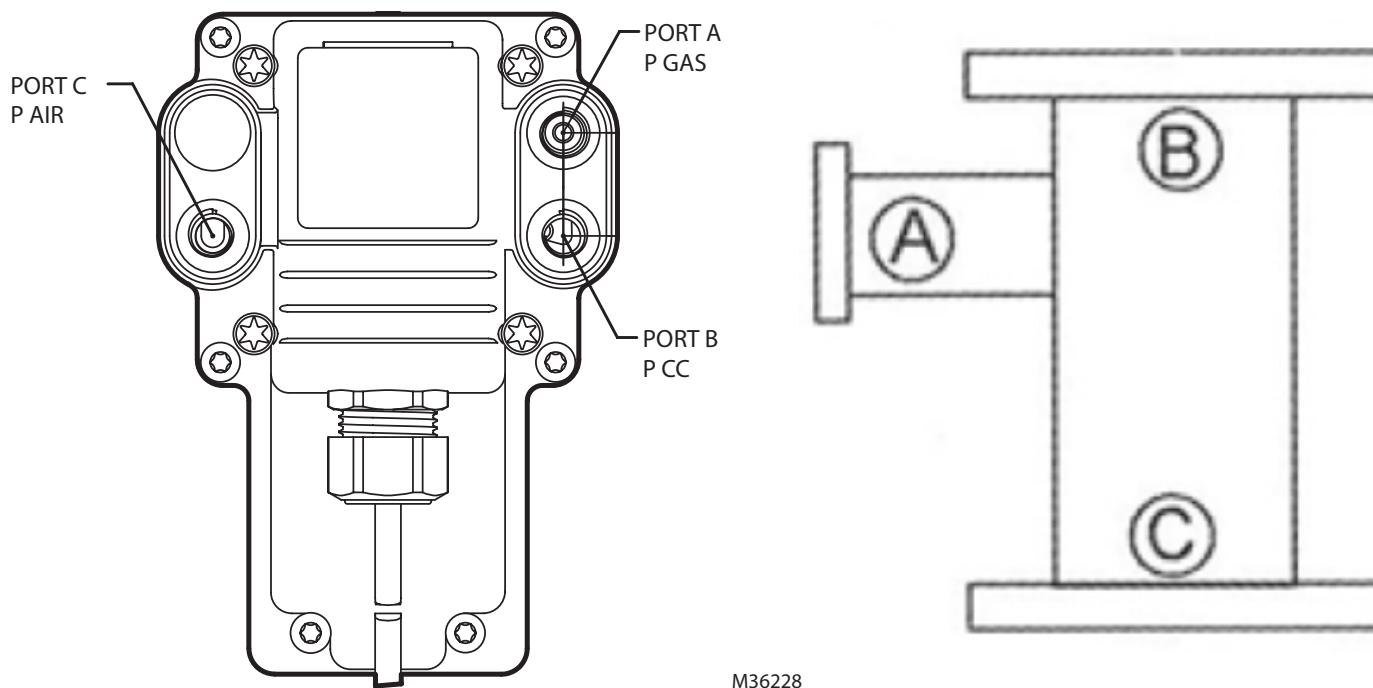
- The pressure pick-up must allow for pulse lines with a minimum inner diameter of 6 mm / 0.236 inch.
- Excessive turbulence at the pressure pick-up locations should be avoided.
- For proper Premix application operation, it is recommended to use the dedicated Honeywell V2MU Mixing Units. Refer to the Valve Accessories and Replacement Parts section of this manual for specifications and ordering details.

Pulse Line Assembly to FARMOD, Heat Exchanger, Air Pre-Filter and V2MU

The Fuel Air Ratio Module and Honeywell Mixing Units are equipped with 3 pulse line connections for Gas pressure (Port A), Reference pressure (port B) and Air pressure (Port C). Refer to Fig. 43.

All pulse line connections are equipped with 1/8 in. BSP PL threading. Follow the instructions of the fitting manufacturer for maximum tightening torques, but do not exceed 9 Nm (80 in-lbf).

The minimum required inner diameter of the pulse lines is 6 mm / 0.236 inch. The pulse line tubing can be plastic or metal, depending on the connection point and approval body requirement. The Honeywell preferred pulse line connection for the reference pressure is aluminum or stainless steel. Honeywell offers several pulse line kits with separate tubing and fitting selections to facilitate myriad system configurations. Refer to Table 17 in the Fuel/Air Accessories section of this document.



M36228

Fig. 43: Fuel Air Ratio Module and Mixing Unit pulse line connections.

IMPORTANT

- The Fuel/Air Ratio Module operates properly only if the pulse line fittings are properly tightened and the flow through the pulse lines is un-obstructed. During connection of the pulse lines, ensure that the pulse lines are not twisted or kinked to avoid obstructed flows.
 - Recommended tightening torque for all fittings is 6 ± 1.2 Nm (53.1 ± 10.6 in-lbf)
 - To assemble the aluminum tube and fitting, first tap the reinforcing sleeve into the tube (with the smooth side of the sleeve ahead). Then fit the tube into the fitting and tighten the nut until you can feel a contact. Finally tighten with 1.5 turns of the nut.
 - Proper measures shall be taken to ensure the pulse lines are not twisted or kinked during connection or that they can be unintentionally kinked after the installation has been taken into operation.
 - Protect pulse lines against damage and keep the lines free from any contact to potential vibrating surfaces
- In all cases, avoid creating a siphon-like shape.
- A wide variety of pulse line slopes and shapes may be needed to fit into a particular appliance; best engineering practice would be '1/2 bubble' on a level (1/4 inch of drop per 1 foot of run or about 6mm per 0.31m of run). However, practical limitations may require some deviation from it. Please consult Honeywell Thermal Solutions with your particular geometrical arrangement if at doubt.
- Refer to the Outdoor Air Installations section for further details regarding pulse lines.

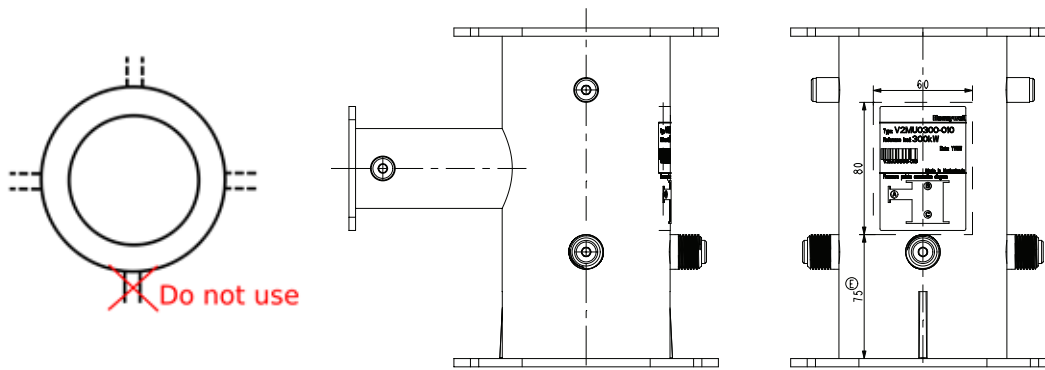


Fig. 44: V2MU mixing unit pulse line connections.

IMPORTANT (Refer to Fig. 44)

- To avoid condensate from back draft entering any pulse line of the Fuel/Air Ratio Module, downwards pointing pressure ports on the V2MU mixing unit or any other device shall not be used.
- Partial blockage of the air intake of the V2MU mixing unit can potentially influence the air pressure signal to the valve.
 - Proper measures shall be taken to avoid the (partial) air intake blockage of the V2MU mixing unit. Inspection of the V2MU air intake shall be part of the annual maintenance of the appliance.
- Refer to the Outdoor Air Installations section for further details regarding pulse lines.

NOTE: If the appliance is equipped with a sealed air chamber and the SV2 Series valve with FARMOD is contained in the sealed chamber, it is allowed to not use the air pressure pulse line.

The air pre-filter is included with every premix valve and is available as a field replacement part as well. The air pre-filter **MUST** be installed in every premix system, regardless of whether the Heat Exchanger is used. The air pre-filter filter must be mounted between the V2MU mixing unit and the valve FARMOD in the air pulse line. If the Heat Exchanger is used, it must also be mounted between the V2MU mixing unit and the valve FARMOD, with the Heat Exchanger first and the filter second. Refer to Fig. 45.

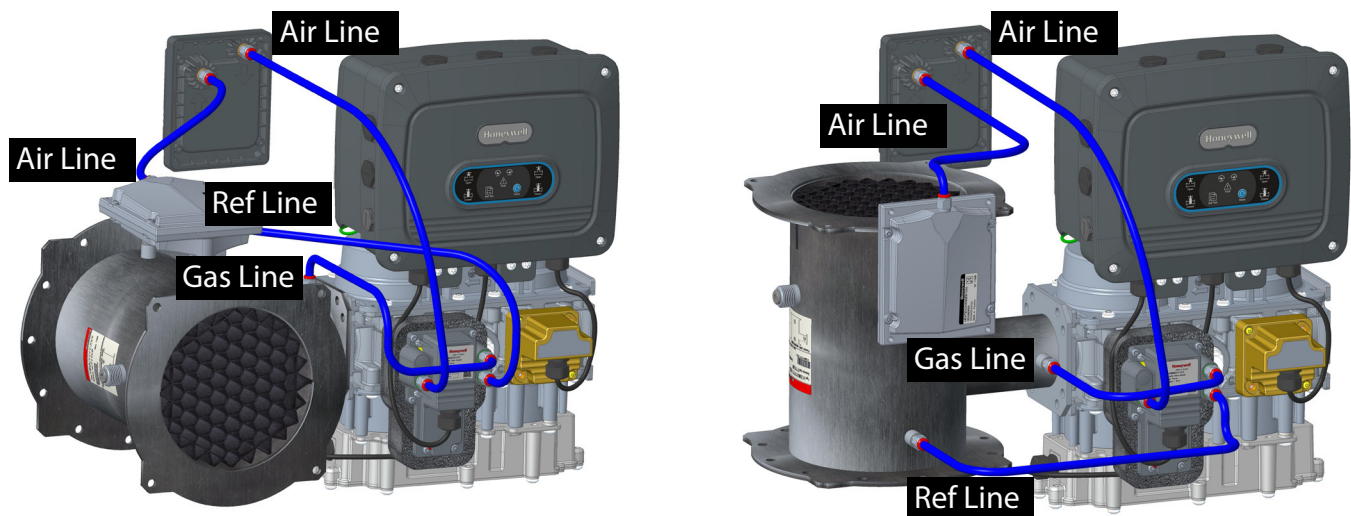


Fig. 45: Pre-Filter installation.

IMPORTANT

- The filter should be mounted as close to the valve FARMOD as possible.
- The customer must furnish an appropriate filter mounting bracket for their chosen location.
 - Maximum screw length is bracket thickness plus 9mm.
 - Preferably use the Honeywell provided screws.
 - Recommended torque 0.8 +/- 0.05 Nm (7.1 +/- 0.44 in-lbf).

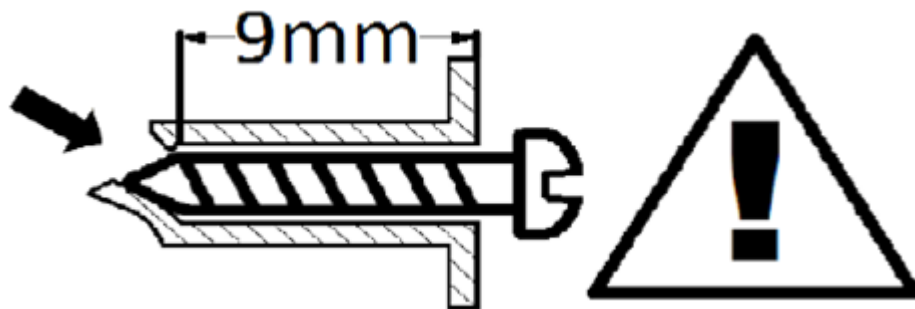


Fig. 46: FARMOD Filter Maximum screw length

- Due to the variety of possible appliance configurations, pulse line tubing and fittings are sold separately. Refer to [Table 17](#).
- Replacement of the filter shall be included in the annual appliance maintenance procedures.

Outdoor Air Installations

If air from outside the installation building / room is directly supplied to the fuel-air mixing unit, there is a risk that moisture content in the sample airflow (air pulse line) will condense. Condensation of water in the air pulse line or the Fuel/Air Ratio Module shall be avoided to assure proper operation of the appliance.

WARNING!

Direct water ingress (e.g. from mist, rain or pressure wash) into the pulse lines should be avoided or prevented

A dehumidification solution was created by Honeywell to discourage potential condensation from entering the pulse lines and the FARMOD due to moisture-laden air. It is comprised of a FARMOD embedded heater with an available insulation shoe and an available external heat exchanger as well as appropriate insulation for the pulse lines. All components must be used together as necessary in applications where there is a potential for moisture content or condensation in the combustion air.

If the potential of condensate formation exists, it is strongly recommended to install the SV2 Series Heat Exchanger kit, which is available from Honeywell. Refer to [Table 21](#). When the Heat Exchanger is paired with the heater embedded within the FARMOD a complete condensation/dehumidification solution is provided. If the potential for condensate formation exists and the complete condensation/dehumidification is not used, any condensation that enters the FARMOD is likely to permanently damage the system.

If there is never a risk of condensation, meaning the ambient room temperature is above the combustion air dew point at all times, the complete dehumidification system is not needed. This means adding the additional SV2 Series Heat Exchanger kit is then not needed.

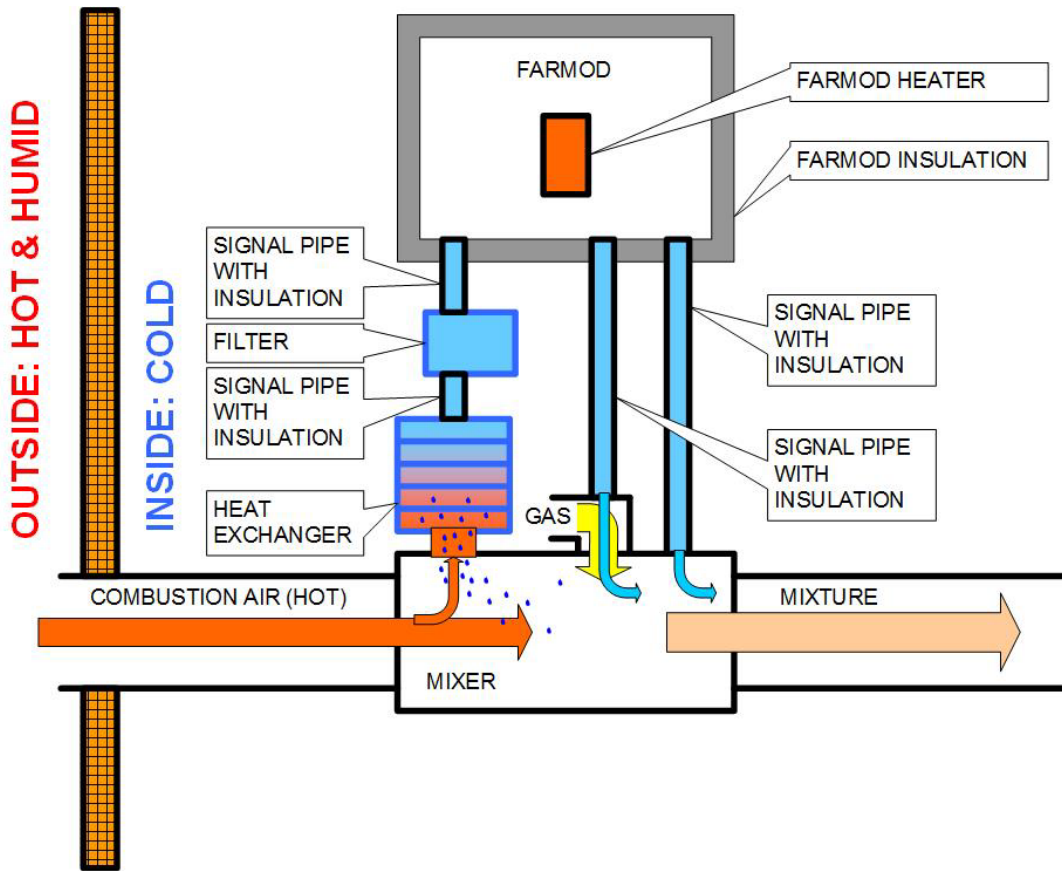


Fig. 47: Dehumidification solution working principle.

FARMOD Heater

The heater is built into the FARMOD design. The Heat Exchanger kit includes a FARMOD insulation shoe, which encases the metal surfaces of the FARMOD. Along with the Heat Exchanger, these items provide a complete dehumidification solution. Refer to [Fig. 32](#) and [Fig. 47-Fig. 48](#).

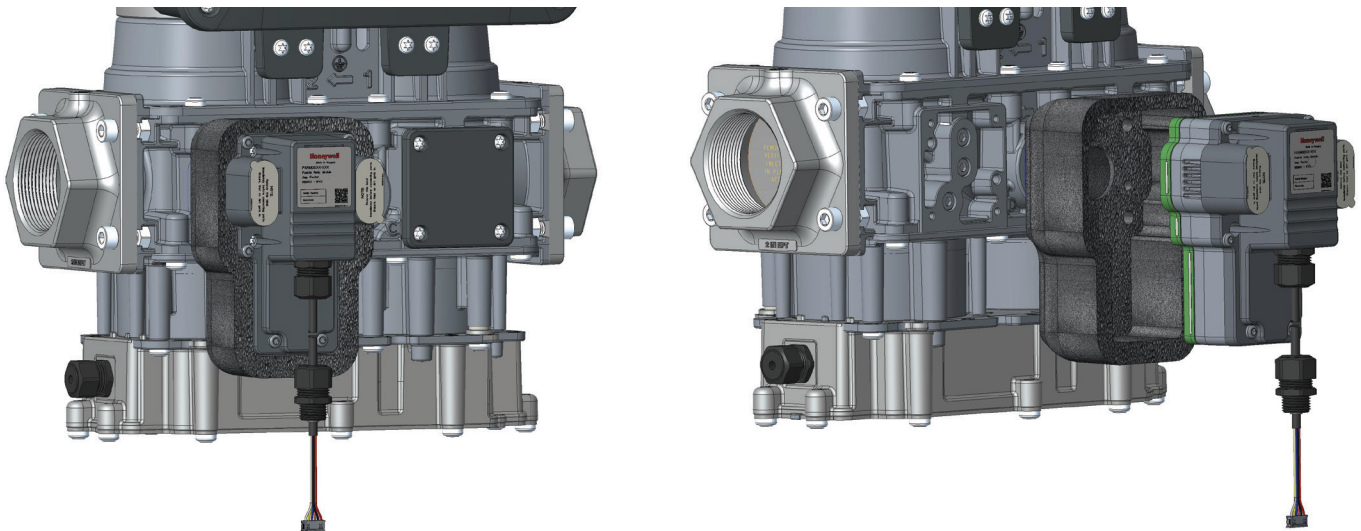


Fig. 48: FARMOD with insulation shoe.

IMPORTANT

- The FARMOD is standard equipped with a heating device to help protect it from condensation as part of the full dehumidification solution. The heater will be powered whenever the valve electronics are powered. The FARMOD will feel warm after one hour of power-up. This is normal.
- As part of the appliance adjustments during commissioning, the site-specific calibration of the SV2 Series valve/appliance should be performed when the valve/appliance has reached a typical operating temperature for its installation/application in order to minimize the impact of component temperature changes on the fuel/air ratio.

Heat Exchanger Kit

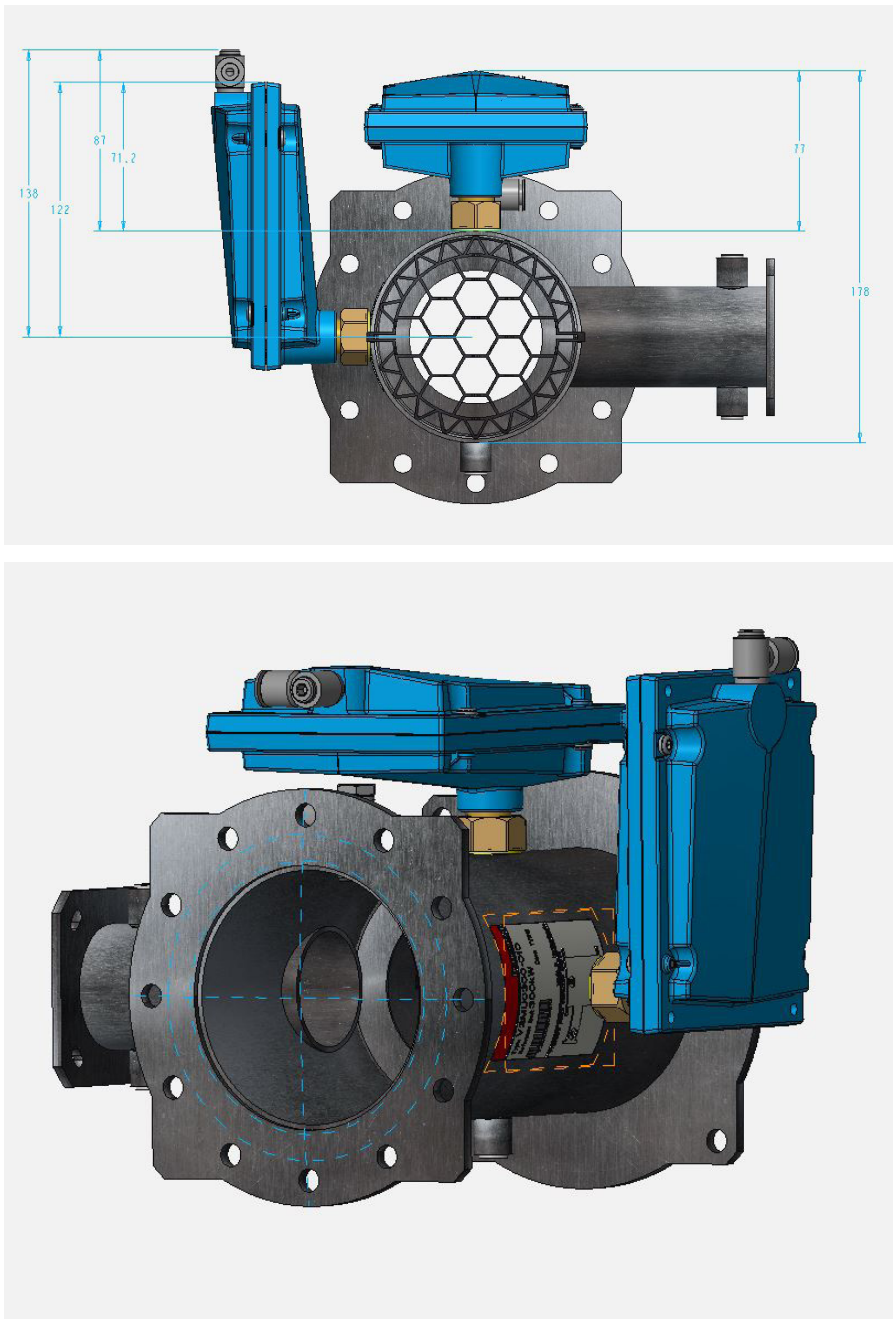
The Honeywell heat exchanger can be assembled directly to the V2MU mixing unit. The heat exchanger, in conjunction with the FARMOD embedded heater and insulation shoe, works to reduce the moisture content in the combustion air in hot and humid conditions by cooling the air and condensing moisture out before it enters the pulse line. The collected moisture / condensate drains into the mixer via which it is transported towards the fan, burner and combustion room.

IMPORTANT:

- When the valve is installed in an area with a temperature continuously lower than the combustion air intake temperature, a risk of condensate formation in the air pulse line is present, which can affect the fuel/air ratio control, depending on the appliance and permanently damage the FARMOD and the system.
- In this case it is strongly recommended to install the Honeywell SV2 Series HEATEXCHANGER-000 kit for a complete condensation/dehumidification solution to avoid permanent damage to the FARMOD and the system.
- When using the Honeywell HEATEXCHANGER-000 kit, the valve + FARMOD may be installed above or below the mixing unit + Heat Exchanger, but above is preferred.
- If the potential for condensation exists and the full Honeywell dehumidification system is not used, Honeywell cannot provide any guidance regarding the valve/FARMOD position versus the mixing unit as this configuration as not been designed or tested.
- To prevent condensation formation due to back draft, it is recommended to purge the application after each burner operation.
- If there is never a risk of condensation, meaning the ambient room temperature is above the combustion air dew point at all times, the complete dehumidification system is not needed. This means adding the additional SV2 Series Heat Exchanger kit is then not needed. In this case the valve + FARMOD can be mounted above or below the mixing unit.

NOTE: The Heat Exchanger and the filter must be mounted between the V2MU mixing unit and the FARMOD, with the Heat Exchanger first and the filter mounted as close to the FARMOD as possible. Refer to Fig. 45 and Fig. 47.

The optional heat exchanger can be directly mounted to the V2MU mixing unit as shown in Fig. 45, Fig. 49 and Fig. 50 and can be mounted in either a vertical or horizontal position, depending on the appliance configuration and available space. When assembling the heat exchanger, care shall be taken that condensate can drain to the mixing unit. Accordingly, ensure that the mixer connection on the heat exchanger is the lowest point in regards to the heat exchanger mounting, otherwise water will be trapped inside the heat exchanger and will not drain appropriately.



NOTES:

- V2MU0300-010: If mount the Heat Exchanger directly to the V2MU, rotated inwards and aligned with the V2MU body, there is not enough room to assemble the recommended metal reference pulse line tubing + fitting on the same side of the mixing unit, unless the Heat Exchanger is slightly rotated out of the way. With the plastic tubing + fittings, all orientations are possible.
- V2MU0500-010, V2MU0800-010 and V2MU1000-010: Can mount the Heat Exchanger in this location/orientation if a 90 degree metal fitting is used and rotated slightly sway from the Heat Exchanger. With the plastic tubing + fittings, all orientations are possible.

Fig. 49: Heat exchanger mounting examples with horizontal mixing unit orientation (shown with 300kW Mixing Unit).



Fig. 50: Heat exchanger mounting examples with vertical mixing unit orientation (shown with 300kW Mixing Unit).

NOTE: The Heat Exchanger may be remote mounted instead of direct V2MU mounted. To do so, Honeywell suggests using the following components to ensure system integrity. The selected fittings, thread lengths and seals ensure proper sealing.

- Aluminum tubing, 14 mm OD x 1 mm thick
- Straight male adapter (parallel) from Aignep, ordering number 10485 00 010
 - Remove the flat seal provided with the fitting. There is already a seal inside the nut of the Heat Exchanger, which needs to be present while fixing this fitting inside the Heat Exchanger.
- Straight female adapter from Aignep, ordering number 10500 00 015
 - To avoid leakage between the fitting and the V2MU, add a 18.6 mm OD, 11 mm ID x 1.5 mm thick flat seal constructed of Klingertit, fiber or equivalent material suitable in water applications (rubber is NOT allowed).
- For the assembly of the fittings and aluminum tubing, follow the recommended procedure of the fitting manufacturer.
- The shape of the aluminum tubing **MUST** allow for continuous drainage of the condensate over the entire length from the Heat Exchanger to the V2MU.

IMPORTANT:

- The SV2 series premix valve and its accessories have been developed to provide an optimum fuel-air ratio performance.
- Honeywell cannot guarantee the valve or mixer performance, operation, efficiency or reliability if any non-Honeywell accessories are used with the SV2 Series premix platform.
- When mounting the heat exchanger vertically, orient its FARMOD port C connection facing upwards so that the condensate from the FARMOD drains through the heat exchanger and into the mixing unit. Refer to [Fig. 49-Fig. 50](#).

Excessive moisture can partially or fully clog the pulse lines between the mixing unit and the FARMOD and damage the FARMOD. In this case, the system will fail safely by causing a flame out, a valve lockout and/or may render the FARMOD unusable. Note that the FARMOD is field replaceable should this last instance occur.

! WARNING!

Direct water ingress (e.g. from mist, rain or pressure wash) into the pulse lines should be avoided or prevented

Control Possibilities Via Parameter Settings

The fuel/air ratio valve control offers many settings to tune your appliance to your requirements. Following is an overview of the available settings. The Screen shots were taken from the dedicated SV2 Series HMI/PC Tool user interfaces and are shown in the sequence in which they appear in the Guided Valve Setup. Refer to [Fig. 51](#).

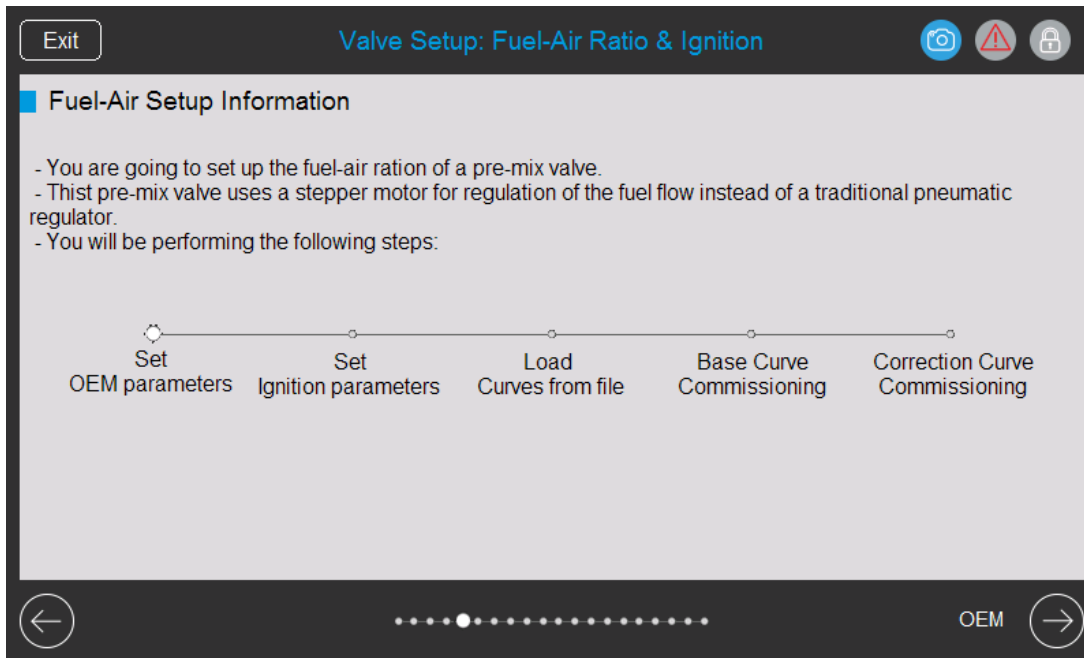


Fig. 51: Fuel-Air Setup sequence.

OEM Setup

The parameters that define the threshold for the S1 (air) signal can be set via the OEM Setup page or OEM tab of the HMI/PC Tool. The following settings are available, as shown in [Fig. 52](#).

Air Proving During Pre-Purge or Burner Ignition

With both safety valves closed during pre-purge or the burner ignition sequence, the FARMOD sensor signals provide information about the actual air flow through the appliance. The SV2 Series control offers settings in the OEM Setup to store the expected airflow level during burner pre-ignition with user-specified thresholds. If the measured airflow signal is outside of the specified limits, the SV2 Series control will lockout.

The air proving ignition values are set via the OEM parameters of S1 pre-ignition lower threshold and S1 pre-ignition upper threshold.

Air Proving During Burner Operation

During the commissioning of the appliance, the S1 (air) signal at minimum burner load and maximum burner load including thresholds is stored. Via OEM Setup parameters, thresholds can be set for the minimum and maximum S1 (air) signal. If one of the S1 signals including thresholds is exceeded (at minimum or maximum burner load), the SSOVs will be closed, but no lockout will occur.

The air proving values during burner operation are set via the OEM parameters of S1 minimum threshold and S1 maximum threshold.

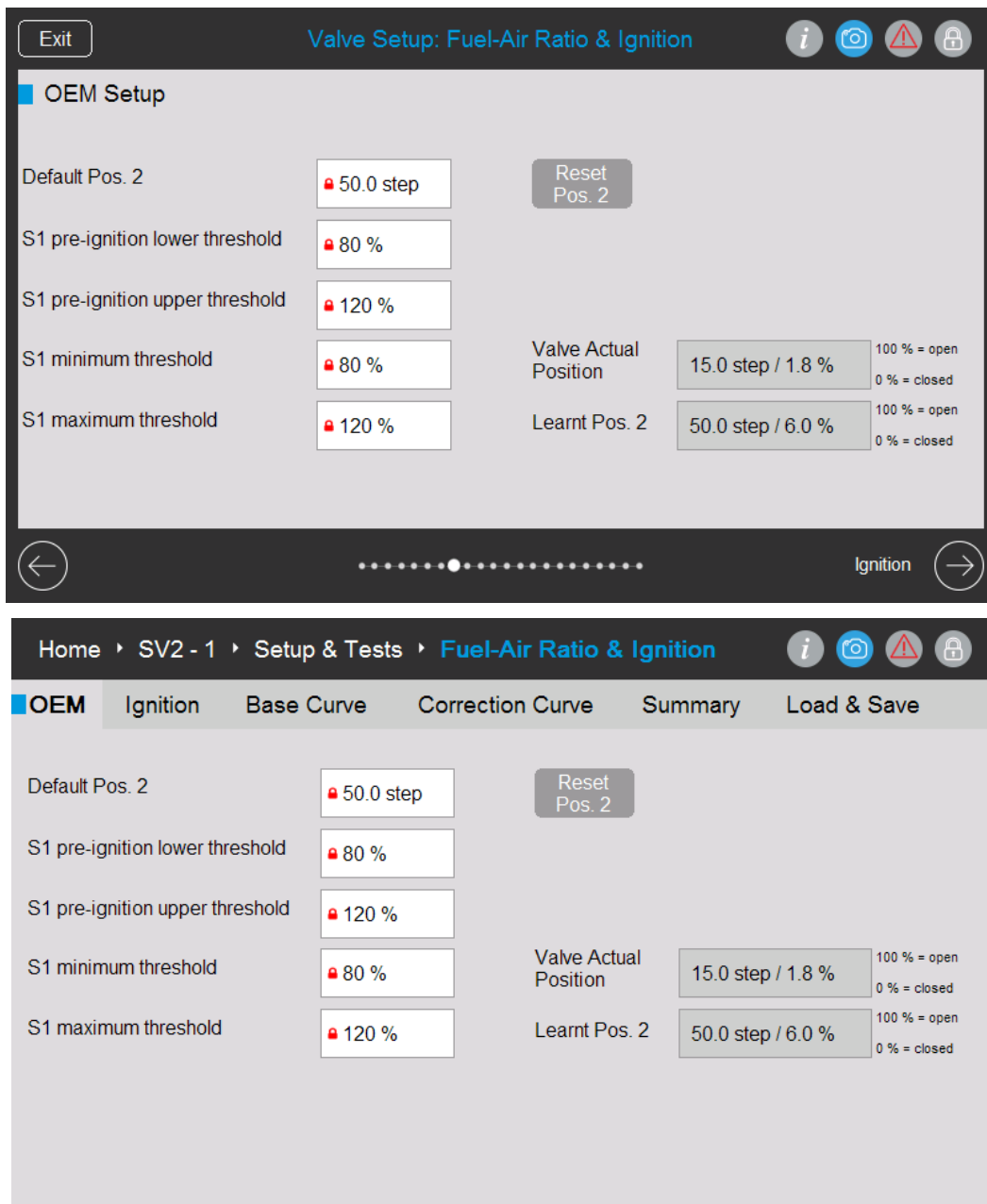


Fig. 52: OEM Setup Parameters.

Default Pos. 2 (steps)

Refer to Fig. 52. The stepper motor driven Fuel Control Valve (FCV) is set to a start position after each heat demand and reset of the SV2 Series valve. The first/initial stepper motor start position 2 of the ignition sequence is set with this parameter.

Based on the ignition amplification and available inlet pressure, the SV2 Series system will learn the right stepper motor position for starting the appliance, which is recorded as the Learnt Pos. 2 (refer to Fig. 53). The Learnt Pos. 2 stepper motor start position value or adjustment is limited by the user-entered value for Default Pos. 2 in that it can vary up to $\pm 20\%$ of the entered Default Pos. 2 value or a maximum of ± 10 full steps.

In practice the value that needs to be entered for Default Pos. 2 depends on the start capacity and the available inlet pressure to the valve. The best way to find a value for the Default Pos. 2 is to have the appliance running at ignition load (normal operation) at the right CO₂ level and normal inlet pressure and record the motor position and use this value for setting the value of Default Pos. 2 in the OEM Setup screen. Practice values can be somewhere between 100 and 250 steps for the 1.5 in and 2.0 in (DN40 and DN50) valves.

Reset Pos. 2 Button

Allows the user to overwrite the current Learnt Pos. 2 by the current Default Pos. 2 parameter when fine-tuning the ignition settings. This is only needed if the Learnt Pos. 2 has drifted due to variation of the ignition load, inlet pressure or amplification setting and needs to be set back. In doing so, the assumption is that the Default Pos. 2 which was entered fits to nominal situations of inlet pressure, ignition load and amplification setting that have just been restored. Entering a new value for Default Pos. 2 also sets the Learnt Pos. 2 to the entered value until successive appliance firings.

IMPORTANT

If the appliance is allowed to fire without fuel, you will likely need to invoke the Reset Pos. 2 button. This is because the Learnt Pos. 2 is overwritten with every ignition sequence and firing without gas will save ineffective values.

S1 pre-ignition lower threshold (%)

Sets the percentage that the air S1 signal can be below the recorded / commissioned air signal during ignition. This is the air signal that is recorded during the first (supervised) ignition during commissioning. If the actual air signal drops below the value specified by the combination of this parameter and the recorded Ign. Air Level, the valve will lockout and require manual reset. Refer to Fig. 49 for information regarding the Ign. Air Level.

S1 pre-ignition upper threshold (%)

Sets the percentage that the air S1 signal can be over the recorded / commissioned air signal during ignition. This is the air signal that is recorded during the first (supervised) ignition during commissioning. If the actual air signal raises above the value specified by the combination of this parameter and the commissioned Ign. Air Level, the valve will lockout and require manual reset. Refer to Fig. 53 for information regarding the Ign. Air Level.

S1 minimum threshold (%)

Sets the percentage that the air S1 signal can be below the recorded / commissioned minimum air signal during normal RUN mode. The commissioned minimum air signal during normal RUN mode = the air signal recorded during the commissioning of the Correction Curve (usually at the installed site) at minimum load.

If the S1 signal drops below this value, the valve is cycled off and waits for S1 to rise above this value. The valve does not lockout

S1 maximum threshold (%)

Sets the percentage that the air S1 signal can be over the recorded / commissioned maximum air signal during normal RUN mode. The commissioned maximum air signal during normal RUN mode = the air signal recorded during the commissioning of the Correction Curve (usually at the installed site) at maximum load.

If the S1 signal rises above this value, the valve is cycled off and waits for S1 to drop below this value. The valve does not lockout

IMPORTANT

The S1 minimum threshold (%) should be set lower than the S1 pre-ignition lower threshold (%) to avoid situations where the boiler switches off at minimum load and restarts at an ignition load that is higher than minimum load. Such settings would cause an endless cycle of stopping and restarting if the burner control allows endless restarts. Note that this will not cause the SV2 Series valve to lockout.

Learnt Pos. 2 Value

Refer to the next section, Ignition Setup, for an explanation of this learned value. The first time ignition is performed, this value will be equal to the Default Pos. 2 value.

Advanced Stepper Motor Settings

There are 3 stepper motor settings contained in the FAR OEM access level configuration grouping which are not accessible on the OEM Setup page. They are Slow Gear Band, Slow Gear Band Max and Slow Gear Stone. They can only be accessed via the advanced user Modbus Editor page in the user interface while logged in with the OEM user access level. The inclusion of these items allows for fine tuning of certain appliance configurations as needed to optimize appliance performance. If any fine-tuning is performed, the 3 values will be included in the cloning files of valves with 12.01 firmware or later when using HMI/PC Tools with 12.01.002 software or later. Refer to [CHAPTER 6 ACCESS LEVELS](#) and [Table 24](#) for further details on access levels and assignments. Contact Honeywell for advice on how to access these settings via the Modbus Editor in the SV2 Series valves user interface tools.

Ignition Setup

Refer to [Fig. 53](#). The SV2 Series control offers many possibilities to adjust the ignition behavior to your appliance needs. The following settings and schemes are available. All settings can be adjusted independently. The Base Curve Setup and Correction Curve Setup sections later in this document detail the OEM and Installer amplification factor setup. Refer to [Fig. 56-Fig. 57](#) for the Base and Correction Curves.



Fig. 53: Ignition Setup Parameters.

First Time Ignition Operation

First time ignition operation is typically only performed in the laboratory during development. By selecting a short Ramp Period (and an extra startup delay of 0 = Ignition Period) the control is started almost directly after opening of the two safety valves.

During the first ignition trials the ignition amplification setting (Ignition Setpoint parameter) is best set to 100% to prevent flame loss when jumping to a leaner mixture after the ignition period.

Ramp Offset and Ramp Period Parameters

Refer to [Fig. 53](#) and [Fig. 62–Fig. 63](#). In order to smooth out the start-up behavior of the burner and avoid ignition back-pulse, the SV2 Series valve allows ramp-up adjustment of the gas volume (# steps and timing) during the ignition period.

The Ramp Offset (in steps) determines how lean the mixture is when the two safety shut-off valve seats open. This sets the number of steps that the Learnt Pos. 2 is reduced or offset during ignition. Once the valve seats are powered, the stepper motor moves from this position to the Learnt Pos. 2 position. Note that Learnt Pos. 2 is re-learned with every burner start.

The Ramp Period (in seconds) governs the speed with which the stepper motor opens from the (offset) idle / start position to the Learnt Pos. 2 during the ignition sequence. While the burner igniter is on, the air and gas mixture enriches until a mix occurs for light-off.

NOTES:

- o **The default values for Ramp Offset and Ramp Period are 35.0 steps and 1 seconds, respectively.**
- o **If the FARMOD mass flow sensor measured values reach their saved/Learnt Pos. 2 ignition settings before the end of the programmed Ramp Period, the stepper motor will not open further.**

During the Ramp Period, the motor position will change without the fuel/air control being active to prevent the fuel/air control from reacting on the pressure pulls in the air signals caused by the ignition of the burner.

The slowest allowed Ramp Period is limited by the setting of the Ignition Period; the Ignition period needs to be at least 1 second longer than the Ramp Period.

Hold On Period

In addition to the startup delay of the fuel/air control as a result of the Ramp Period, the startup can be further delayed up to 1 second before the end of the Ignition Period by entering a value greater than 0 for the Hold On Period parameter.

The Hold On Period sets the time that the control ignores the fuel/air control feedback following the Ramp Period. The Fuel Control Valve is held at the controlled valve position for the specified time before it starts to modulate.

As with the Ramp Offset and Ramp Period, this control startup delay helps to make the system less sensitive to pressure pulses caused by ignition of the burner. During the Hold On Period, the control loop is not active so that fluctuations in the measured air signal are not translated into position variation of the Fuel Control Valve. Gas flow to the burner during this period is determined by the pressure drop over the stepper motor-controlled Fuel Control Valve and the gas restriction in the mixing unit.

Ignition Period and Ignition Setpoint Parameters

The SV2 Series valve allows the user to make the fuel/air mixture rich or lean during the Ignition Period relative to the amplification setting for the appliance RUN mode or the start load. This occurs AFTER the Ramp Period and Hold On Period timers have expired, when the valve control loop starts to modulate.

The Ignition Period parameter (in seconds) sets the time that the SV2 Series valve control uses the ignition settings. It encompasses the Ramp Period, the Hold On Period and the remaining period in which the controlled amplification setting can be changed relative to the normal amplification setting (based on the control curves) at the start load / RUN (as governed by the Ignition Setpoint % parameter).

The Ignition Setpoint % defines whether the mixture during the ignition phase is the same, leaner or richer relative to normal operation at ignition load.

If the Ignition Setpoint % is at 100%, there is no change compared to normal operation at ignition load.

If the Ignition Setpoint % is above 100%, it causes an enriched fuel/air mixture during ignition with an increased amplification factor. This occurs after the Ramp and Hold On Periods have expired. Refer to [Fig. 58](#).

If the Ignition Setpoint % is below 100%, it causes a leaner fuel-air mixture during ignition with a decreased amplification factor. This occurs after the Ramp and Hold On Periods have expired. Refer to [Fig. 59](#).

Note that $\pm 20\%$ gives approximately $\pm 10\%$ change in excess air level.

Record Ign. Air Level parameter

The SV2 Series valve will check the combustion air level during the ignition phase. To do so, the ignition air level needs to be recorded under normal conditions by checking this box. After modifying the ignition settings that influence the air volume during ignition, like fan speed and flue length / air filters, the ignition air level needs to be recorded / corrected for this new situation. This prevents the system from checking the ignition airflow against an incorrect value.

During the first burner start when the air level is recorded, this check box is automatically unchecked.

NOTE: Checking and unchecking the Record Ign. Air Level check box will erase the recorded ignition air levels and causes a lockout of the SV2 Series valve when installer mode is exited.

NOTE: This parameter is included within the FARMOD access level grouping to facilitate field FARMOD replacement by the Installer, without the OEM providing Installer access to the FAR Ignition parameter grouping. Refer to Chapter 6: Access Levels (Fig. 87 and Table 23) and Chapter 8: Fuel/Air Module Change-Out Procedure (Fig. 123) of this manual for details regarding access level assignments and parameters groupings.

Learnt Pos. 2 Value

After every successful ignition sequence, the SV2 Series fuel/air valve re-learns and records the stepper motor position that fits to the available inlet pressure and ignition amplification setting, which is recorded as Learnt Pos. 2. This self adjusting value has a limited range of no more than $\pm 20\%$ of the user-entered Default Pos. 2 value or a maximum of ± 10 full steps. Refer to the OEM Setup section and Fig. 53.

The flexibility of this self-adjustment behavior helps to accommodate the valve and appliance for gas pressure changes.

NOTE: The correction of the Learnt Pos. 2 is limited to 10 steps per start. This means that it can take a few starts until the value of the Learnt Pos. 2 has stabilized.

Position 3 Value

Illustrates the stepper motor position for normal burner operation (RUN mode) relative to the current ignition load. Position 3 is graphically influenced by the user-entered value for Ignition Setpoint %.

Load Saved Curves

Refer to Fig. 54-Fig. 55. If there are saved fuel/air curve(s) on the connected HMI/PC Tool, the user may load one of them to use for the factory Base Curve initial settings.

The curve(s) would have been recorded in the lab and saved to the hard disk/memory using the HMI or PC Tools for reuse on other valves on identical appliances (i.e. same valve type, mixer, heat exchanger and combustion air supply circuit).

Note that the Load & Save feature was designed mostly for adjusting the Base and Correction Curves as needed in the factory or field. This feature saves the Base Curve, Correction Curve and the extra commissioning data (if applicable). No other valve for fuel/air data is saved with this feature. To clone a valve configuration for use on a similar appliance, refer to the Valve Production Cloning section of this manual and Fig. 54.

NOTES:

- Naming and saving a fuel/air curve configuration file is not possible on this page in the Guided Setup mode; it is only possible while accessing the Load & Save page via the Setup & Tests --> Fuel-Air Ratio & Ignition menus.
- To load a saved curve, select Open next to the desired curve and follow the instructions on the screen (refer to Fig. 54).
- Saved Base Curves can be loaded to any valve.
- Saved Correction Curves can only be loaded to the valve from which the curves were created and read from.
- You can copy any saved fuel/air configuration to a USB flash drive via the file manager located at Home --> File Settings --> A/F Curves.

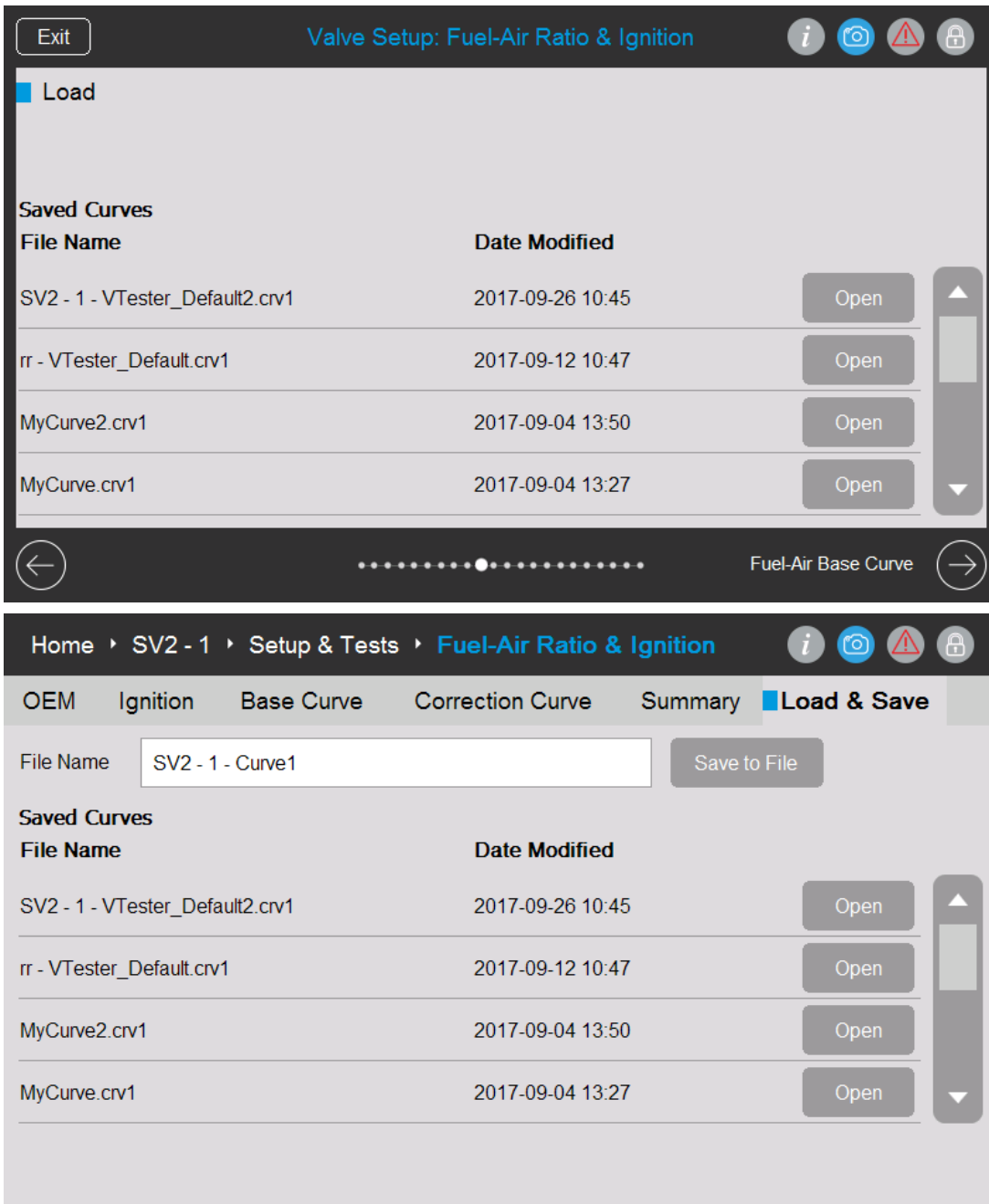


Fig. 54: Load Saved Curves.

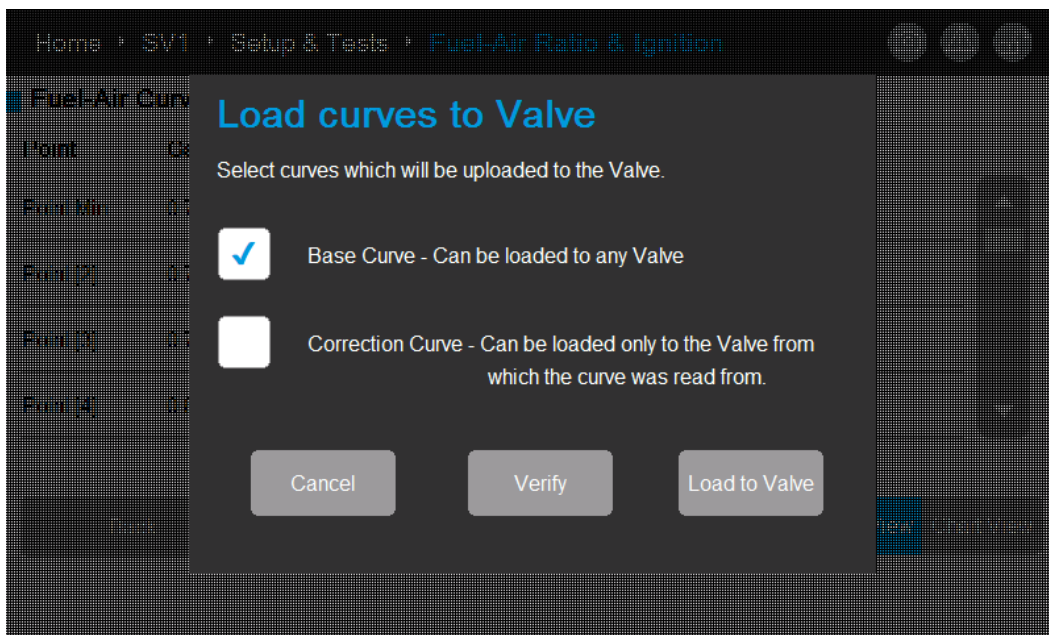


Fig. 55: Load Saved Curves.

Base Curve Setup

In case no Base Curve has been loaded to the SV2 Series valve, a Base Curve needs to be created, which sets the amplification as a function of the appliance load. Refer to [Fig. 56](#).

The Base Curve is usually defined in the OEM laboratory for a specific appliance type and capacity. The Base Curve defines the amplification setting as a function of the measured combustion airflow (excess air levels) over the modulation range of the system.

NOTE: The valve must be powered for 1 hour in order for the embedded FARMOD heater to effectively warm up the device. If the full hour is not provided, the programmed lambda and the excess air values might vary from the desired values.

Fine-tuning of the system for a specific valve, application/burner and location is done via the Correction Curve (refer to the next section).

The Base Curve can have up to 25 load points distributed over the modulation range of the appliance and be shaped to give the desired CO₂/O₂ content in the combustion products over the modulation range (via individual amplification settings). The curve should be recorded in the laboratory and can be saved to the hard HMI or PC Tools disk/memory for reuse on other valves on identical appliances (i.e. same valve type, size, mixer, heat exchanger and combustion air supply circuit).

The amount of required setpoints depends on appliance-specific requirements.

The Base Curve makes it possible to have a versatile amplification setting over the modulation range of the appliance without the need of commissioning more than four points in the field or during production. The shape of the Base Curve is corrected by the correction values set in the Correction Curve (refer to [Fig. 57](#)); the correction values for modulation levels between the defined correction points is found through linear interpolation.



Fig. 56: Base Curve Setup.

Initial Amplification Factor Set-Up (Set Initial button)

To enable the first appliance start, the SV2 Series valve requires an initial amplification value before the first ignition attempt. To do so, set the value by pressing the Lean or Rich up and down arrow buttons and selecting the Set Initial button. The value only becomes effective after pressing the Set Initial button.

It is recommended to determine the initial amplification factor during the development of the appliance and list the initial amplification factors per gas type in the appliance installation manual.

Alternately, a Base Curve which was defined on a similar appliance can be uploaded to the system using the Load & Save feature of the HMI or PC Tools. Refer to the Load Saved Curves section of this manual or [Fig. 54-Fig. 55](#).

NOTE: If this factor is not entered, the SV2 Series valve will not allow a start-up of the burner.

Once the burner is fired, the initial amplification factor can be fine-tuned by pressing the up and down arrow and Set Initial buttons as shown in Fig. 56 to meet the desired lambda (CO₂) and O₂ settings.

NOTE: A change of 0.01 in amplification factor corresponds roughly to 0.1% in CO₂.

Adding Points to Create the Base Curve (Addition button)

The Base Curve must contain a minimum of 4 points; a point for minimum and maximum load and two intermediate points. It is, however, advisable to use as many points needed, up to a quantity of 25, to obtain the desired excess air level over the modulation range of the system.

NOTE: The Base Curve needs to be built starting with the Minimum point.

To set the Minimum load point, run the appliance at minimum load and set the amplification factor for this load by selecting Start Point Commissioning and changing the amplification factor with the arrow keys until the excess air level has stabilized at the right level. Select the Set Min button to store the amplification factor for this point.

Increase the appliance load and repeat this process for maximum and intermediate loads. The Set Max button records the maximum load point while the Add Generic button records any intermediate load points.

The commissioning of any point can be interrupted by selecting the Stop Point Commissioning button.

Deleting Points on the Base Curve (Deletion button)

Single points can be deleted by picking the desired point in the selection box and pushing the Delete single button. The selected point will turn red in the graph and is identified by the X-axis value and the point number counting from left to right.

After deleting the minimum or maximum point, the system will generate a warning. A new value for the minimum and or maximum needs to be defined to be able to run the system in normal operation mode (Not Installer or OEM mode).

All points of the curve can be deleted at once by selecting Delete all button. The amplification setting will default back to the earlier entered initial amplification curve. To be able to run the system in normal operation mode, a minimum of 4 points need to be defined (Minimum, Maximum and two intermediate points).

Correction Curve Setup

Refer to Fig. 57. The Correction Curve is used to correct/calibrate the amplification settings (excess air levels) of the Base Curve for variations in the valve measuring module (FARMOD) and mixing unit's measuring points for use with a specific valve, application/burner, installation and even the location. Before being able to commission the Correction Curve, the Base Curve needs to be fully commissioned or uploaded to the system.

The Correction Curve might typically be created and/or adjusted in the field.

NOTE: The valve must be powered for 1 hour in order for the embedded FARMOD heater to effectively warm up the device. If the full hour is not provided, the programmed lambda and the excess air values might vary from the desired values.

The Correction Curve can have up to 25 burner load-specific points, with an enforced minimum of 4 points. The 4 minimal points would consist of a point at minimum load, maximum load and 2 points equally distributed between minimum and maximum load. It is strongly recommended to have a minimum of 8-10 Correction Curve points for best performance. The Correction Curve is FARMOD/installation-specific and can be saved using the HMI or PC Tools. The amount of required setpoints depends on appliance-specific requirements.

NOTES:

- Saved Correction Curves can only be loaded to the valve from which the curves were created and read from.
- For valves where the Base Curve is set for each appliance, the Correction Curve needs to be defined for a minimum of 4 points; minimum, 2 intermediate and maximum points.
- For best performance, it is STRONGLY recommended to have a minimum of 8-10 Correction Curve points.

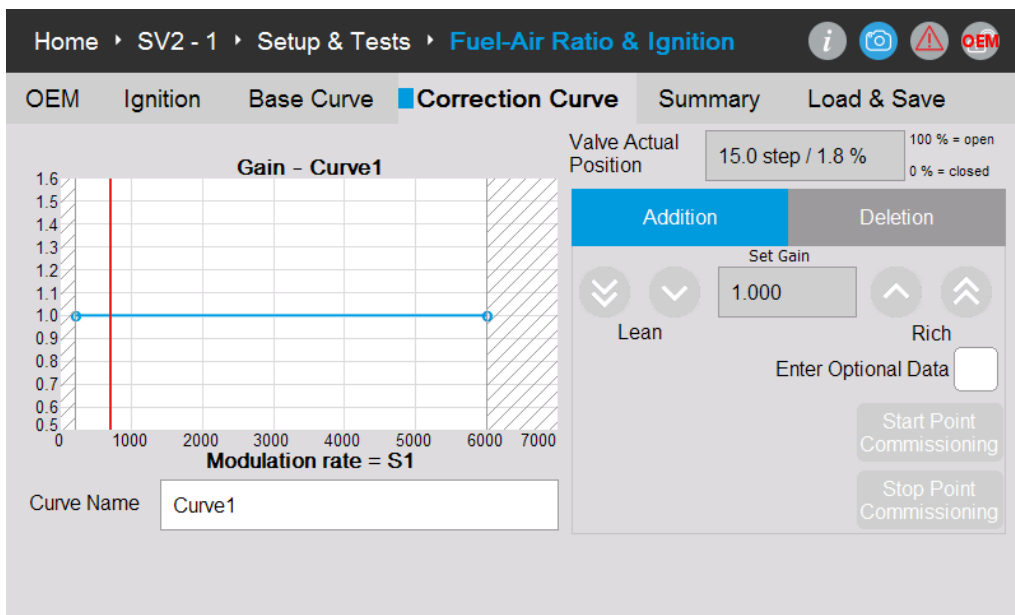
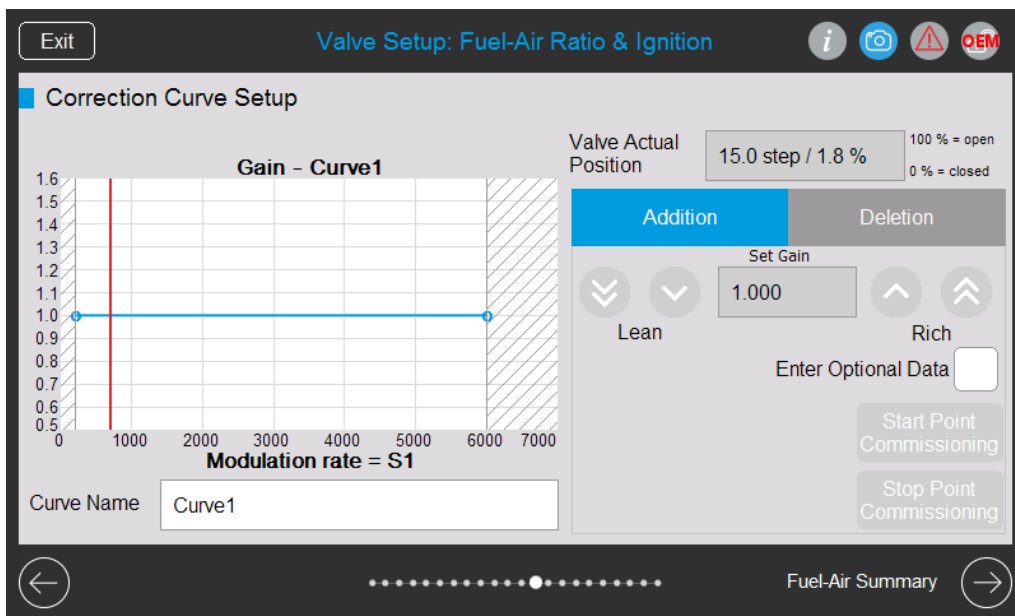


Fig. 57: Correction Curve setup.

Adding Points to Create the Correction Curve (Addition button)

The Correction Curve needs to be built starting with the Minimum point. To set the Minimum load point, run the appliance at minimum load and set the gain factor for this load by selecting Start Point Commissioning and changing the gain factor with the arrow keys until the excess air level has stabilized at the right level. Select the Set Min button to store the gain factor for this point.

Increase the appliance load and repeat this process for maximum and intermediate loads. The Set Max button records the maximum load point while the Add Generic button records any intermediate load points.

While defining the gain setting for various loads, additional commissioning data can be entered. To enable this function select Enter Optional Data.

The commissioning of any point can be interrupted by selecting the Stop Point Commissioning button.

Deleting Points on the Correction Curve (Deletion button)

Single points can be deleted by picking the desired point in the selection box and pushing the Delete single button. The selected point will turn red in the graph and is identified by the X-axis value and the point number counting from left to right.

After deleting the minimum or maximum point, the system will generate a warning. A new value for the minimum and or maximum needs to be defined to be able to run the system in normal operation mode (Not Installer or OEM mode).

All points of the curve can be deleted at once by selecting Delete all button. The gain setting will default to 1. To be able to run the system in normal operation mode, a minimum of 4 points need to be defined (Minimum, Maximum and two intermediate points).

Fuel-Air Curves Summary

Refer to Fig. 58. After completing setup of the Base and Correction Curves, both curves may be viewed on the summary page or tab. The values can be viewed in chart or table formats.

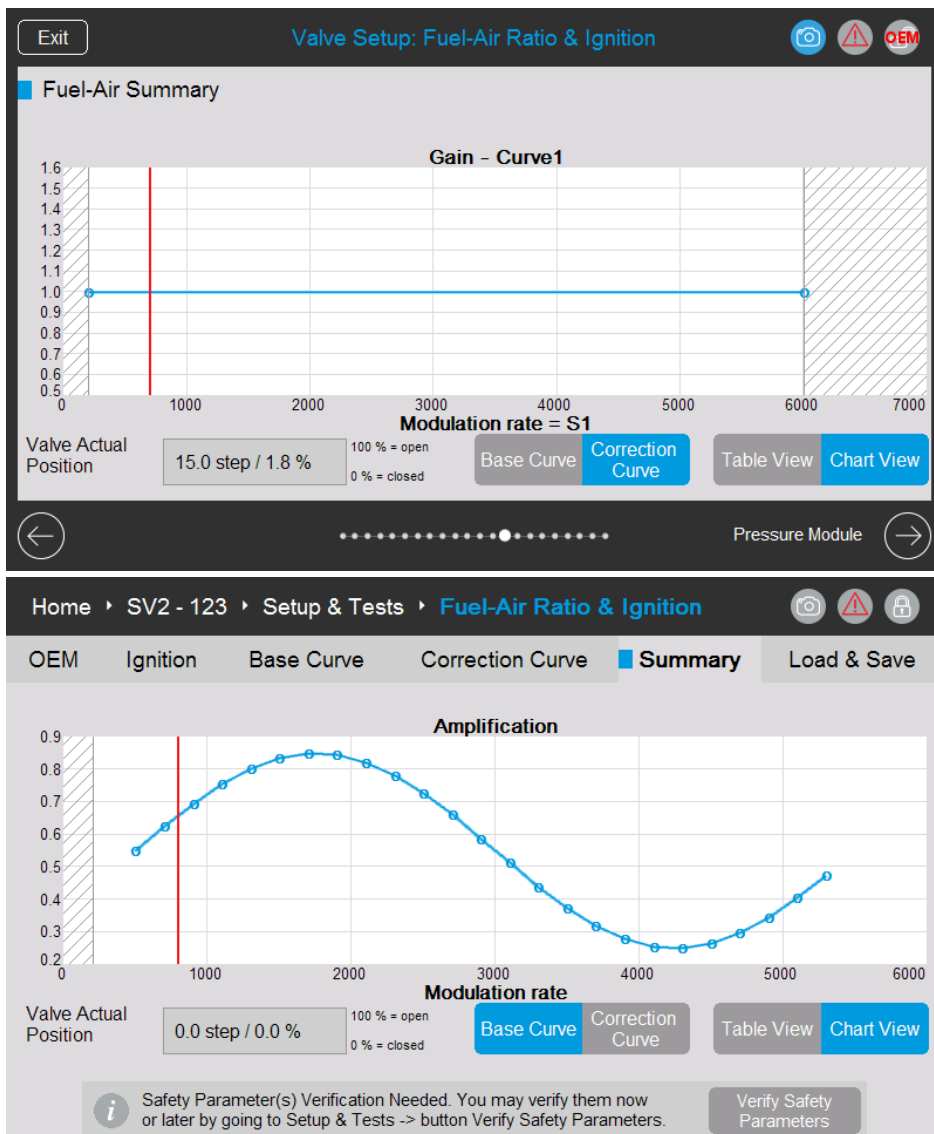


Fig. 58: Fuel-Air Curves Summary.

Combining All of the Parameter Concepts for Ignition Setup

Together, all the parameters from the OEM Setup, Ignition Setup, Base Curve and Correction Curve can be used for initial ignition setup and subsequent ignition optimization.

Ignition Optimization (OEM Setup + Ignition Setup + Base Curve Setup)

After establishing the first time ignition operation and curve entry, the ignition may be optimized as a function of a particular burner modulation point (ignition load).

In the Ignition Setup screen/tab (refer to Fig. 53), adjust the input values accordingly. For further details on the parameters required for ignition optimization, refer to the following sections and Fig. 59-Fig. 63.

Control Startup Delay (Ramp Period + Hold On Period + Ignition Period parameters)

Refer to Fig. 59. The Ignition Period and Ramp Period (Ignition Setup page) start as soon as both solenoids are powered by the burner management control. During the Ramp Period, the SV2 Series control is not active and the motor is driven from the start position of the FCV to the Learnt Pos. 2. During the movement from the start position to Learnt Pos. 2, the SV2 Series control monitors the FARMOD sensor signals to ensure that the amount of gas supplied for ignition does not exceed the amount of gas set by the Ignition amplification (Ignition Setpoint parameter).

In addition to the startup delay of the Ramp Period, the startup of the fuel/air control (i.e. mass flow sensors being active) can be delayed further up to 1 second before the end of the Ignition Period by entering a value greater than 0 for the Hold On Period parameter. The Fuel Control Valve is held at the controlled valve position during ignition for the time specified for the Hold On Period.

The control startup delay allows for an ignition of the burner without the control reacting on the pressure pulls in the air signals caused by the ignition of the burner.

By setting the Ignition Period to a longer duration than the safety time of the burner manager control, the SV2 Series control will keep controlling to the ignition-specific amplification factor after the safety time has elapsed until the time of Ignition Period has elapsed.

For example, these settings can be used to stabilize the flame before the SV2 Series valve control controls the amplification factor to the value required during normal burner operation (RUN mode).

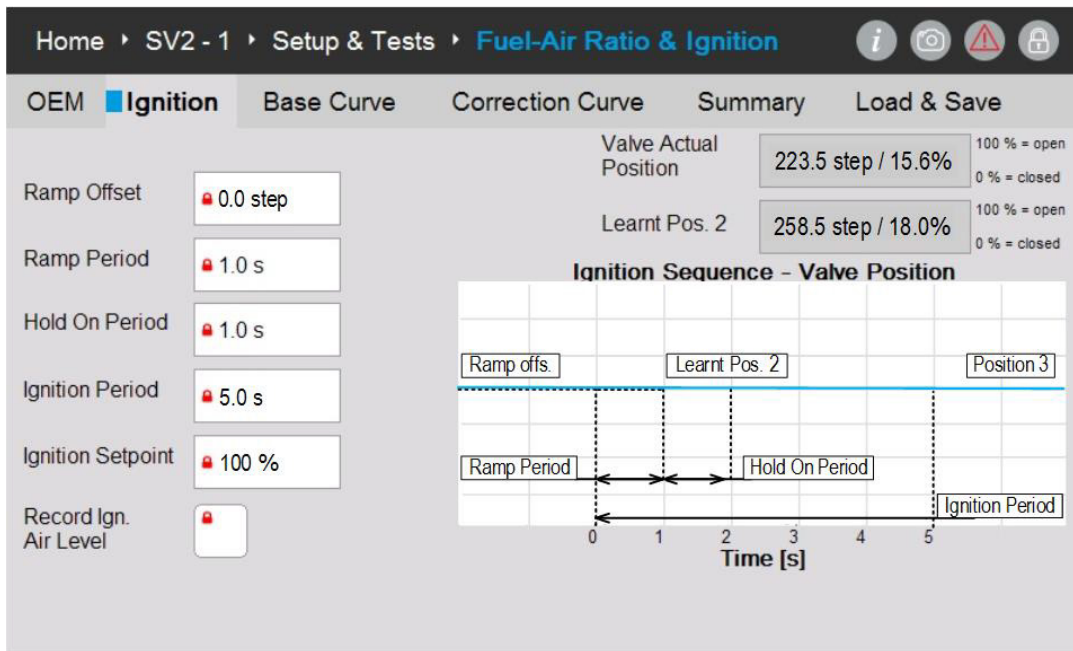


Fig. 59: Control startup delay.

Control Startup Delay and Enriched Mixture (Ramp Period + Hold On Period + Ignition Period + Ignition Setpoint parameters)

The SV2 Series control offers the possibility to enrich the fuel/air mixture during the Ignition Period. The mixture can be made rich during the Ignition Period relative to the amplification setting for the appliance RUN mode or the start load.

By entering a percentage larger than 100% in the Ignition Setpoint field (Refer to Fig. 60), the amplification factor will be increased during the Ignition Period. This occurs after the Ramp and Hold On Periods have expired.

After the Ignition Period has elapsed, the SV2 Series controller will control the amplification factor to the value required during normal burner operation (RUN mode).

For example, this setting can be used to assure a successful burner ignition during extreme start-up conditions.

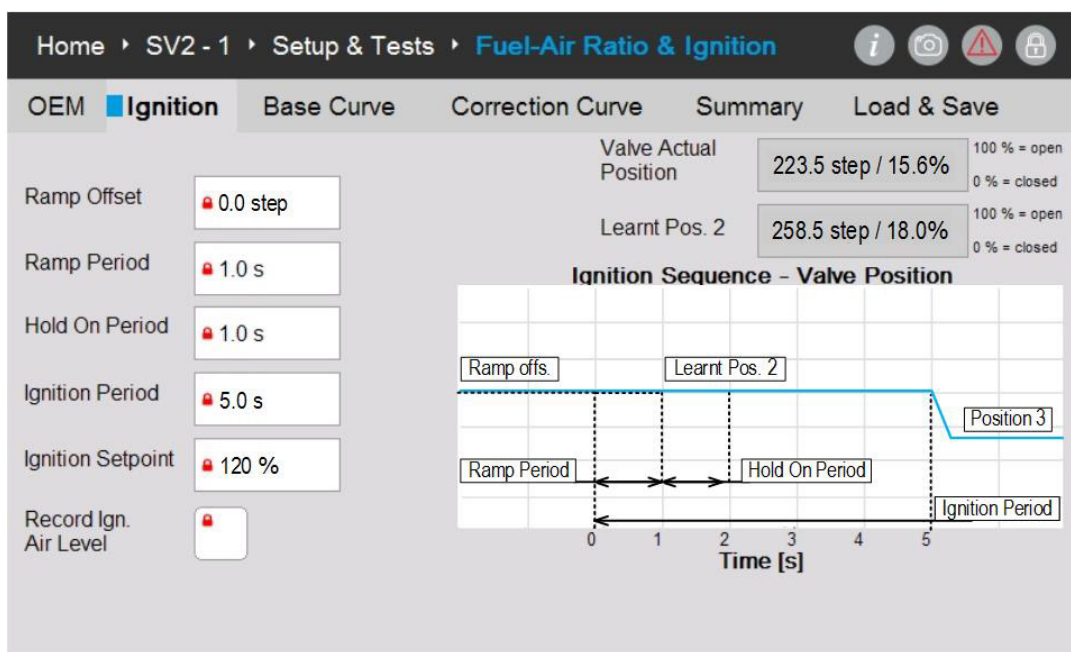


Fig. 60: Control startup delay with enriched mixture (increased amplification factor).

Control Startup Delay and Leaner Mixture (Ramp Period + Hold On Period + Ignition Period + Ignition Setpoint parameters)

The SV2 Series control also offers the possibility to set the fuel/air mixture leaner during the Ignition Period. The mixture can be made lean during the Ignition Period relative to the amplification setting for the appliance RUN mode or the start load.

By entering a percentage lower than 100% in the Ignition Setpoint field (Refer to Fig. 61), the amplification factor will be decreased during the Ignition Period. This occurs after the Ramp and Hold On Periods have expired.

After the Ignition Period has elapsed, the SV2 Series controller will control the amplification factor to the value required during normal burner operation (RUN mode).

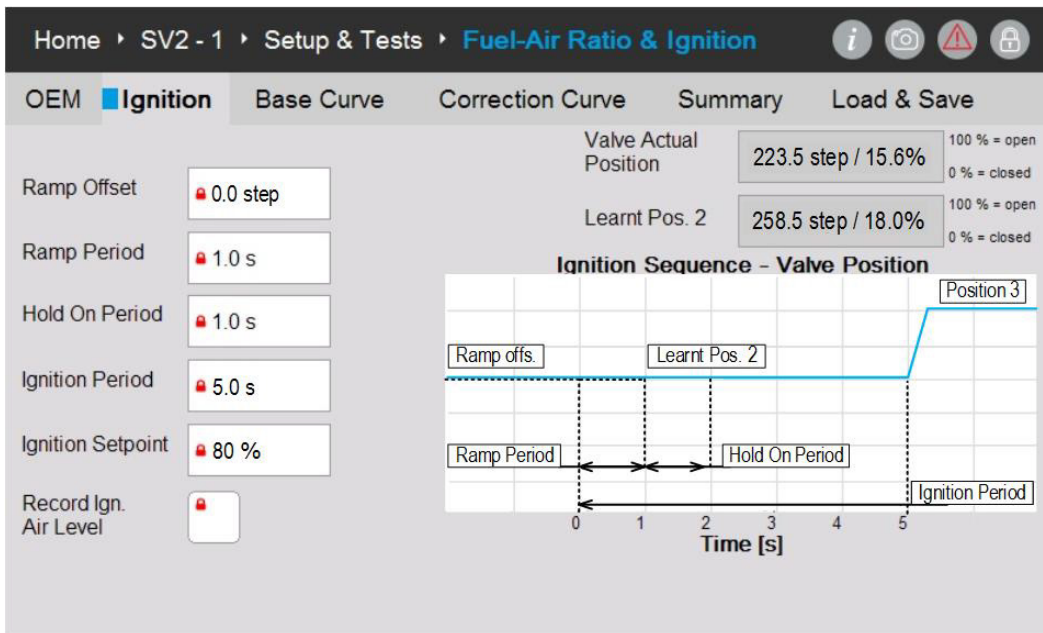


Fig. 61: Control startup delay with Leaner mixture (decreased amplification factor).

Ramped Startup with Control Startup Delay and Enriched or Leaner Mixture (Ramp Offset + Ramp Period + Hold On Period + Ignition Period + Ignition Setpoint parameters)

In addition to the Control Startup Delay + Enriched/Leaner Mixture concepts previously discussed, ramp-up of the amplification factor during the ignition period can be adjusted. This helps to smooth out the start-up behavior of the burner.

By entering a Ramp Offset value, a Ramp Period value and a Hold On Period value in the appropriate fields as shown in Figs 58–59 (Ignition Setup page), the SV2 Series control controls the gas volume to a lower value at the start of the Ignition Period and drives it within the Ramp Period timing to the gas volume required by the Ignition Setpoint. Following the Ramp Period, the Hold On Period begins, in which the gas volume is kept at a fixed level while feedback ignition back-pulse is ignored. This occurs before the Ignition Period timing expires.

The Ramp Offset (in steps) determines how lean the mixture is when the two safety shut-off valve seats open. This sets the number of steps that the Learnt Pos. 2 is reduced or offset during ignition. Once the valve seats are powered, the stepper motor moves from this position to the Learnt Pos. 2 position. Note that Learnt Pos. 2 is re-learned with every burner start.

The Ramp Period (in seconds) governs the speed with which the stepper motor opens from the (offset) idle / start position to the Learnt Pos. 2 during the ignition sequence. While the burner igniter is on, the air and gas mixture enriches until a mix occurs for light-off.

The Hold On Period sets the time that the control ignores the fuel/air control feedback following the Ramp Period. The Fuel Control Valve is held at the controlled valve position for the specified time.

For the Ramp Period + Hold On Period timing, the control loop is not active so that fluctuations in the measured air signal are not translated into position variation of the fuel control valve. Gas flow to the burner during this period is determined by the pressure drop over the stepper motor-controlled fuel control valve and the gas restriction in the mixing unit.

The Ramp Offset has a minimum value of 35.0 steps such that the fuel/air mixture at the moment the two safety shut off valves open will always be lean. Directly after opening the SSOVs, the stepper motor will ramp from the offset position to the Learnt Pos. 2 within the Ramp Period timing. After the Hold On Period time expires, the mixture moves from a lean mixture to a mixture setting specified by the Ignition Setpoint %.

The Ignition Period parameter (in seconds) sets the time that the SV2 Series valve control uses the ignition settings. It encompasses the Ramp Period, the Hold On Period and the remaining period in which the

controlled amplification setting can be changed relative to the normal amplification setting (based on the control curves) at the start load (RUN) (as governed by the Ignition Setpoint % parameter)

The Ignition Setpoint % defines whether the mixture during the ignition phase is the same, leaner or richer relative to normal operation at ignition load. This occurs AFTER the Ramp Period and Hold On Period timers have expired, when the valve control loop starts to modulate.

If the Ignition Setpoint % is at 100%, there is no change compared to normal operation at ignition load.

If the Ignition Setpoint % is above 100%, it causes an enriched fuel/air mixture during ignition with an increased amplification factor. This occurs after the Ramp and Hold On Periods have expired. Refer to Fig. 62.

If the Ignition Setpoint % is below 100%, it causes a leaner fuel-air mixture during ignition with a decreased amplification factor. This occurs after the Ramp and Hold On Periods have expired. Refer to Fig. 63.

NOTES:

- If the Ramp Period is set to a relative long time, the ignition of the burner will occur during the ramp up, causing lean ignition.
- If the Ramp Period is set to a short time, the ignition of the burner will occur at a mixture setting governed by the Ignition Setpoint % value. The actual setting of the mixture during the ignition phase depends on the mixture setting at ignition load as defined by the control curves (Base and Correction Curves) and the Ignition Setpoint % setting.
 - o The Ignition Setpoint % defines whether the mixture during the ignition phase is leaner or richer than during normal operation at ignition load

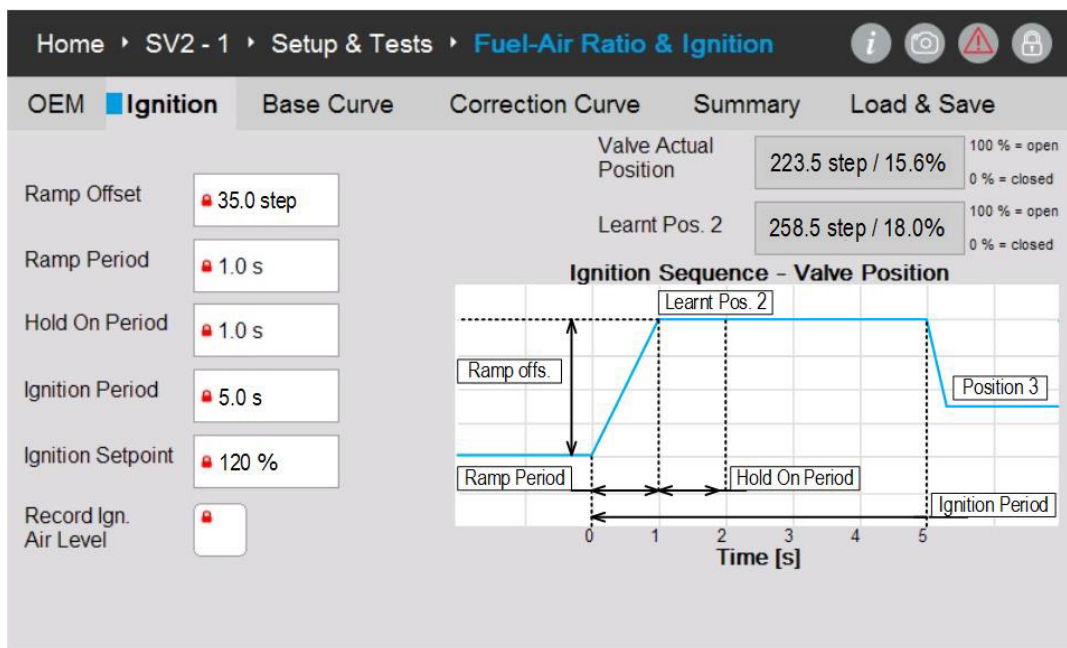


Fig. 62: Ramped startup with control startup delay and enriched mixture.

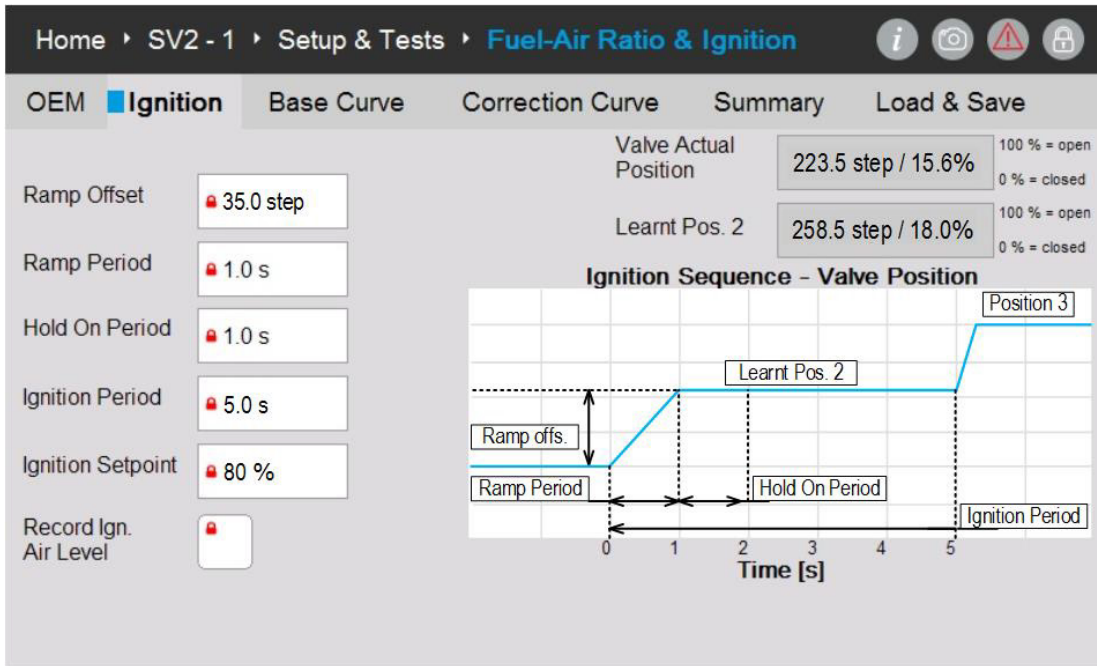
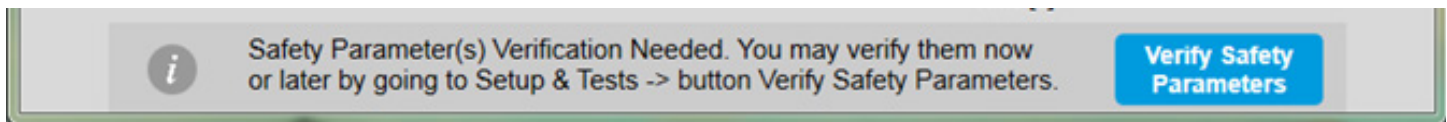


Fig. 63: Ramped startup with control startup delay and leaner mixture.

NOTE: Changes to the ignition behavior need to be verified by selecting Verify Safety Parameters at the bottom of the screen before burner operation.

Select begin, check the modified parameters, press Yes on the screen and press the valve Reset button, following instructions on the HMI/PC Tool screen.



Record Ign. Air Level parameter

The SV2 Series valve will check the combustion air level during the ignition phase. To do so, the ignition air level needs to be recorded under normal conditions by checking this box. After modifying the ignition settings that influence the air volume during ignition, like fan speed and flue length / air filters, the ignition air level needs to be recorded / corrected for this new situation. This prevents the system from checking the ignition airflow against an incorrect value.

During the first burner start when the air level is recorded, this check box is automatically unchecked.

NOTE: Checking and unchecking the Record Ign. Air Level check box will erase the recorded ignition air levels and causes a lockout of the SV2 Series valve when installer mode is exited.

Stepper Motor / Fuel Control Valve Full Stroke Check

Every time the two SSOVs close, the full stroke of the fuel valve is checked; the stepper motor is driven to its maximum open position then to its fully closed position while the number of steps in between are counted. Afterwards it is driven to its ignition position (represented by the Learnt Pos. 2 and the Ramp Offset parameter setting). During this time, the first SSOV seat is closed. The test takes approximately 30 seconds to complete. A call for heat before the full stroke check is completed could cause valve or burner management control lockouts and/or poor ignitions until the settings are stabilized (refer to the Learnt Pos. 2 for details).

NOTE: If there is a loss of main flame, some controls may try to re-light immediately. In this case, program the burner management control to perform a combined post-purge and pre-purge timing to equal a minimum of 30 seconds to give the SV2 Series valve time to reset itself to the proper ignition position and prevent unnecessary faults or ignition issues.

Burner Load Specific Amplification Factor Adjustment

After setting the ignition parameters and successfully firing the burner, the amplification factor control characteristic should be adjusted to meet the lambda (CO₂) and O₂ requirements at specific burner loads.

The SV2 Series valves offer the possibility to upload a pre-defined application/burner type specific Base Curve that contains the amplification settings for up to 25 load points over the modulation range of the appliance/burner. The Base Curve is usually defined in the OEM laboratory for a specific appliance type and capacity. To save and upload saved Base Curves, refer to the Load Saved Curves and Valve Production Cloning sections of this manual.

After uploading the Base Curve to the valve, the amplification setting of the system needs to be calibrated/corrected for use with the specific valve and application/burner. The calibration/correction is done using the Correction Curve, which offers a minimum of four (at minimum and maximum burner load and two in between load points) and a maximum of 25 burner load-specific calibration/correction factor settings. The amount of required setpoints depends on appliance-specific requirements. The Correction Curve might typically be created and/or adjusted in the field.

NOTE: The valve must be powered for 1 hour in order for the embedded FARMOD heater to effectively warm up the device. If the full hour is not provided, the programmed lambda and the excess air values might vary from the desired values.

While in the Base/Correction Curve setup screen, to add more points, select the Start Point Commissioning button.

The burner must first be run to its minimum power and the amplification adjusted so that it runs at the desired CO₂/O₂ levels. To lock the values, select the Set Min button.

Add the desired number of burner load-specific points as required by using the Add Generic (point) button.

The burner must then be run to its maximum power and the amplification adjusted accordingly. To lock the values, select the Set Max (point) button.

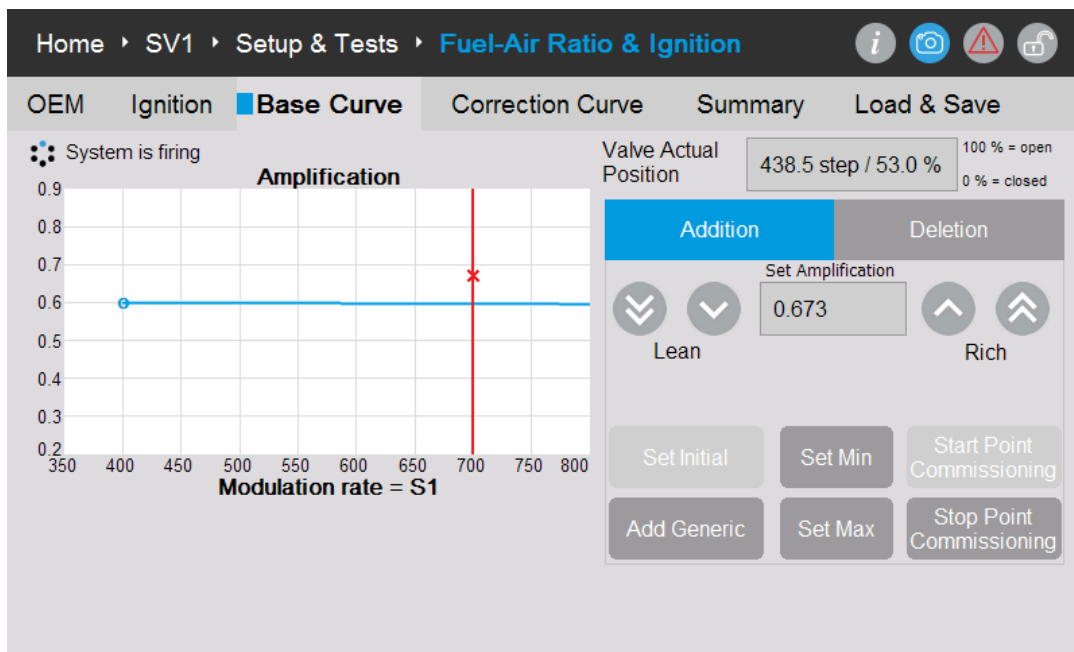


Fig. 64: Base Curve Amplification Settings.

NOTES:

- The amplification factor adjustments made during normal burner operation (RUN mode) affect the amplification factor as adjusted during the ignition setup.
- If the minimum and maximum loads are not set, the SV2 Series control will not allow a next startup of the burner if the system is not in commissioning mode. Refer to the Set Min and Set Max buttons in [Fig. 64](#).
- After the Base Curve setup is completed, the Correction Curve needs to be set for at least 4 points. Minimum load, maximum load and two points in between. If the Correction Curve is not defined, the system will not run without being in Installer or OEM mode.

- Fig. 65 and Fig. 66 show examples of an amplification factor control characteristic Base Curve and Correction Curve with 6 setpoints in the Base Curve and 4 points in the Correction Curve after finishing the setup procedure.
- Modifying the Base Curve leads to erasing the Correction Curve. Therefore, it is better to make small modifications to the Correction Curve instead of making adjustments to the Base Curve.

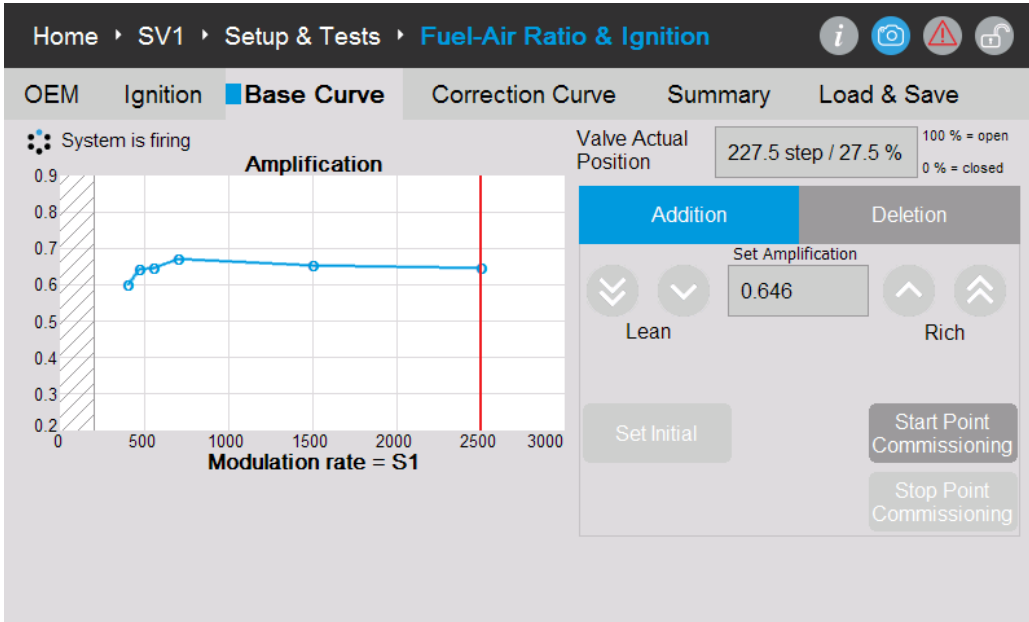


Fig. 65: Amplification factor control Base Curve.

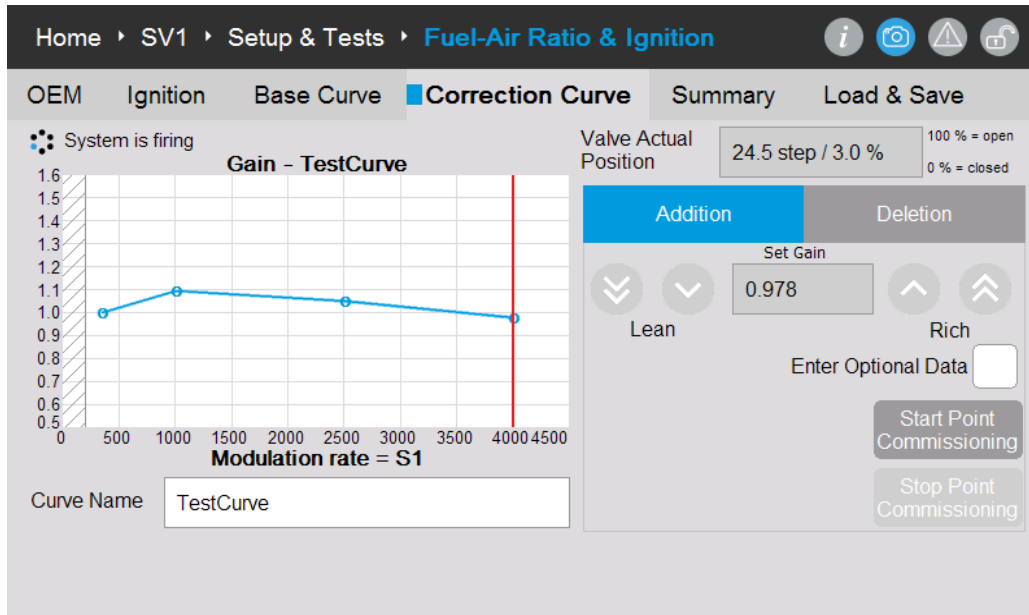


Fig. 66: Gain factor Correction Curve after Set Max Completed.

NOTE: If the Enter Optional Data box is checked, you will be asked to enter the measured O2 level and fan speed values before storing the individual amplification factors.

Valve Production Cloning

Provisions for customer production cloning of established valve parameters have been added to the HMI and PC Tools. The Valve Production Cloning page provides a shortcut for factory production and cloning of established valve configurations as well as cloning for certain field situations. For detailed step-by-step production cloning procedures, refer to CHAPTER 7, of this manual.

The cloning screens may be accessed one of two ways (refer to Fig. 67):

- Selecting the icon of a connected valve and selecting the 'Valve Production Cloning' button from the pop-up screen
- Selecting the 'Valve Production Cloning' button in the Setup & Tests menu for a connected valve

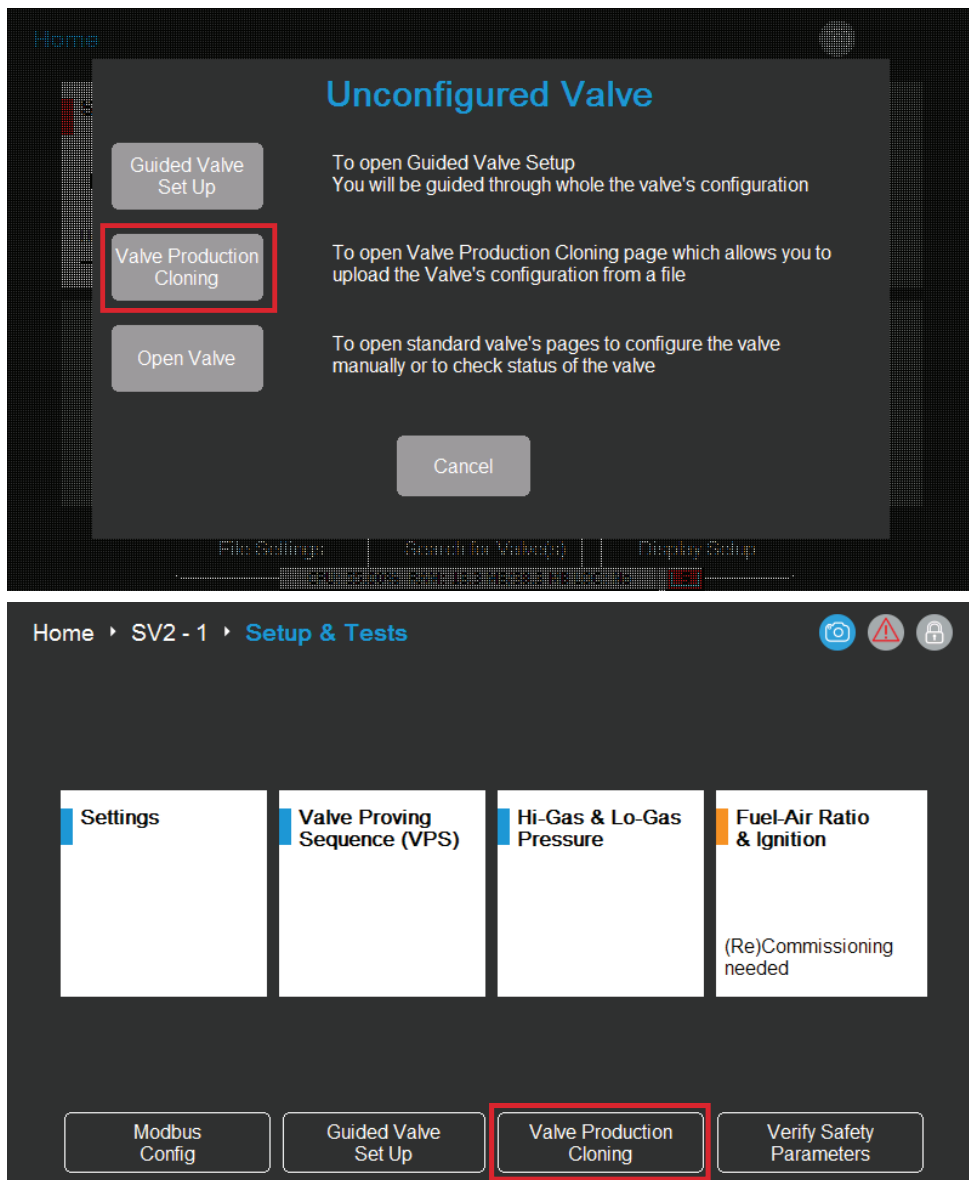


Fig. 67: Valve Production cloning selection.

The cloning feature allows the Installer or OEM user to load a previously saved fuel/air valve configuration to use for another application or as a basis for making another configuration. Note that there are few a limitations to the cloning procedure:

- The cloned fuel/air valve configuration only contains the OEM Setup and Ignition Setup parameters and Base Curve.
- The fuel/air Correction Curve and the recorded pre-ignition air values as well as the LGP/HGP and POC settings are not part of the cloned configuration because they are related to the valve with which they were created.

After the configuration is uploaded to the valve, the safety parameter verification procedure will need to be completed.

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.

After cloning is complete, start the valve in the Installer or OEM mode and set the new fuel/air Correction Curve and record the Ign. Air Level to make the valve fully operational.

CHAPTER 6 : ACCESS LEVELS

Applies to valve firmware version 12.01 or later. HMI/PC Tool software version 12.01.002 or later

User Access Levels

Three access levels exist for the SV2 Series valves via the HMI or PC Tools:

- OEM
 - Read/write rights with the ability to assign read/write parameter groups for the OEM and Installer levels.
 - OEM is defined at the original provider/programmer of the valve.
- Installer
 - Read/write rights as assigned by the OEM.
- User
 - Read only rights via HMI/PC Tool and the ability to reset fault codes via valve display.

Default Passwords

A new SV2 Series valve does not have configured OEM or Installer passwords and must be first accessed via the OEM or Installer default passwords. Default passwords are the same for all valves shipped from Honeywell.

- OEM default password = 'SV2OemKey2017'
- Installer default password = 'SV2InstallerKey2017'

NOTE: Default passwords are automatically pre-filled in the appropriate field during the initial user login.

Initial Login

When the valve is first powered and connected to the user interface, the user must proceed through the user interface About page as well as the license agreement, safety warning and the display setup pages. Once that is complete, the Home page is shown and the user must select the appropriate connected valve and choose between accessing the Guided Valve Set Up, the Valve Production Cloning or just Open Valve to view the status page.

- If the Guided Valve Set Up is chosen, you will be forced to change the default OEM or Installer password immediately after logging in with it. The user will need to enter the new main password for their access level. Additionally, the OEM will need to enter their reset password (if enabled) in order to advance through the valve setup sequence.
- If either the Valve Production Cloning for Open Valve is chosen, the OEM may login using the default OEM password and change any settings they wish, but the valve will not run without being logged in as the OEM or Installer. It is therefore advisable to assign an OEM Main and Reset password (if enabled) as soon as possible.
- For information about password configuration plus requirements as well as logging in and user-specific password requirements, refer to the Password Configuration, OEM Password Configuration and the Installer Password Configuration sections of this document.

Password Configuration

Below are definitions of the 3 passwords that must be configured:

- OEM Main Password
 - Allows access to all OEM and Installer read/write parameter groups.
 - Allows OEM to assign OEM/Installer/Read Only access to read/write parameter groups. Refer to [Fig. 86](#).
 - Allows OEM to enable/disable the OEM and Installer Password Reset features. Refer to [Fig. 70](#).
 - OEM can choose to create the Installer main password or allow the Installer to assign it at the initial login.
- OEM Reset Password
 - Allows OEM to reset their main password back to the Honeywell factory default if their main password is lost. OEM must then re-assign a new OEM Main password. The OEM assigned Reset password remains unchanged by the reset action.
 - OEM chooses whether to enable/disable this action on the Security page. Refer to [Fig. 70](#).
- Installer Main Password
 - Allows access to setup valve in the field and/or read values.

- OEM selects to which parameter groups the Installer will have access to read/write.
 - o Installer can assign/change password if the OEM has granted Installer access to the Installer Security grouping on the Access Level page. Refer to [Fig. 86](#).
- OEM can assign the Installer main password or allow the Installer to choose it at the initial login.

NOTES:

- If the default passwords are not set to new non-default values, the valve will be in lockout status and will not be operational unless the appropriate user is logged in. The warning message as shown in [Fig. 68](#) will be displayed. All applicable passwords must be configured in order to clear the individual fault codes. Refer to [Fig. 69](#) for the active faults.
 - OEM main password not changed fault code 97. Valve will not be operational unless the user is logged in using the default OEM password.
 - OEM reset password feature is enabled and password not change fault code 102. Valve will not be operational unless the user is logged in using the default OEM password.
 - Installer main password not changed fault code 96. Valve will not be operational unless the user is logged in using either the default Installer or OEM password.
 - o The OEM can choose to assign the Installer password or allow the Installer to assign it in the field.
 - The password assignments can be accessed via the Security page during the guided setup sequence or via the Setup & Tests --> Settings --> Security menus. Refer to [Fig. 70](#).

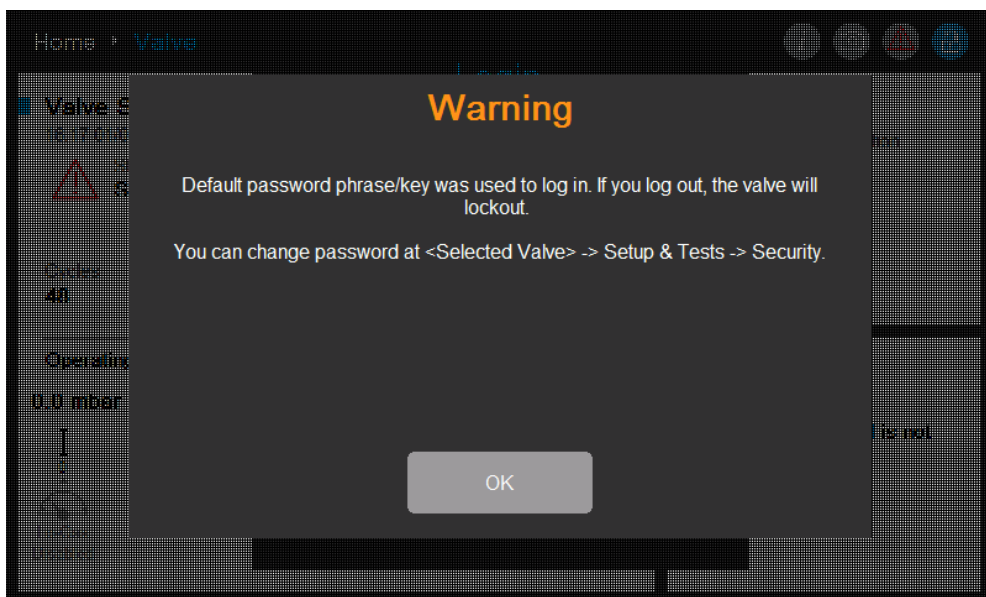


Fig. 68: Warning message when logged in with default password.

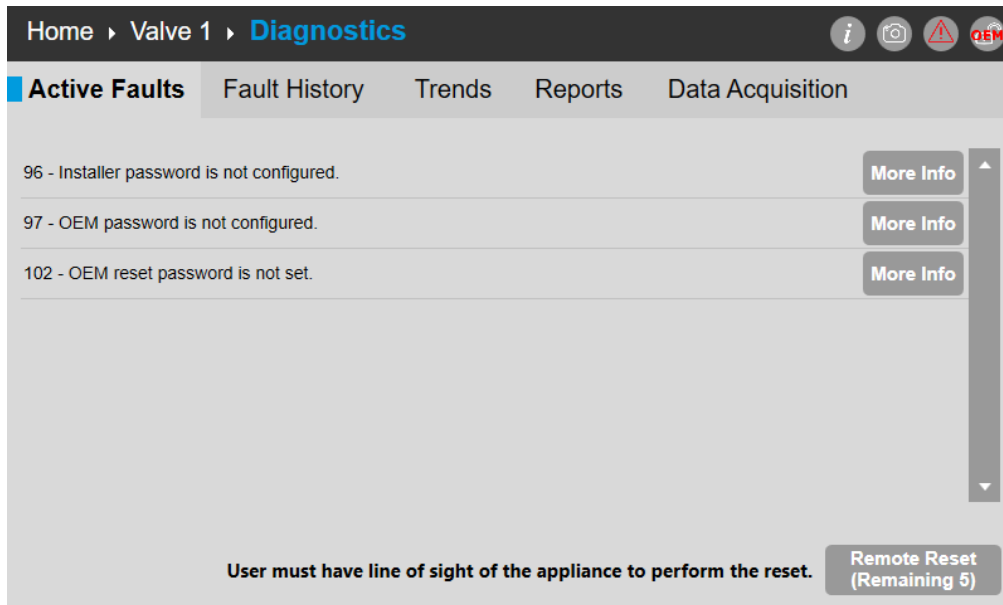


Fig. 69: Fault codes when passwords are un-configured.

The following rules must be observed for all passwords:

- Minimum twelve characters long
- Use a combination of numbers, lower case letters and upper case letters
- At least one upper case and one lower case letter
- At least one number
- No special characters
 - Special characters such as !, @, #, \$, %, ^, &, *, (,), +, =, ?, < and > have been disabled and are not allowed to be used in passwords

A passphrase is recommended since it is easier to remember. An example would be “HelloWorld2017”.

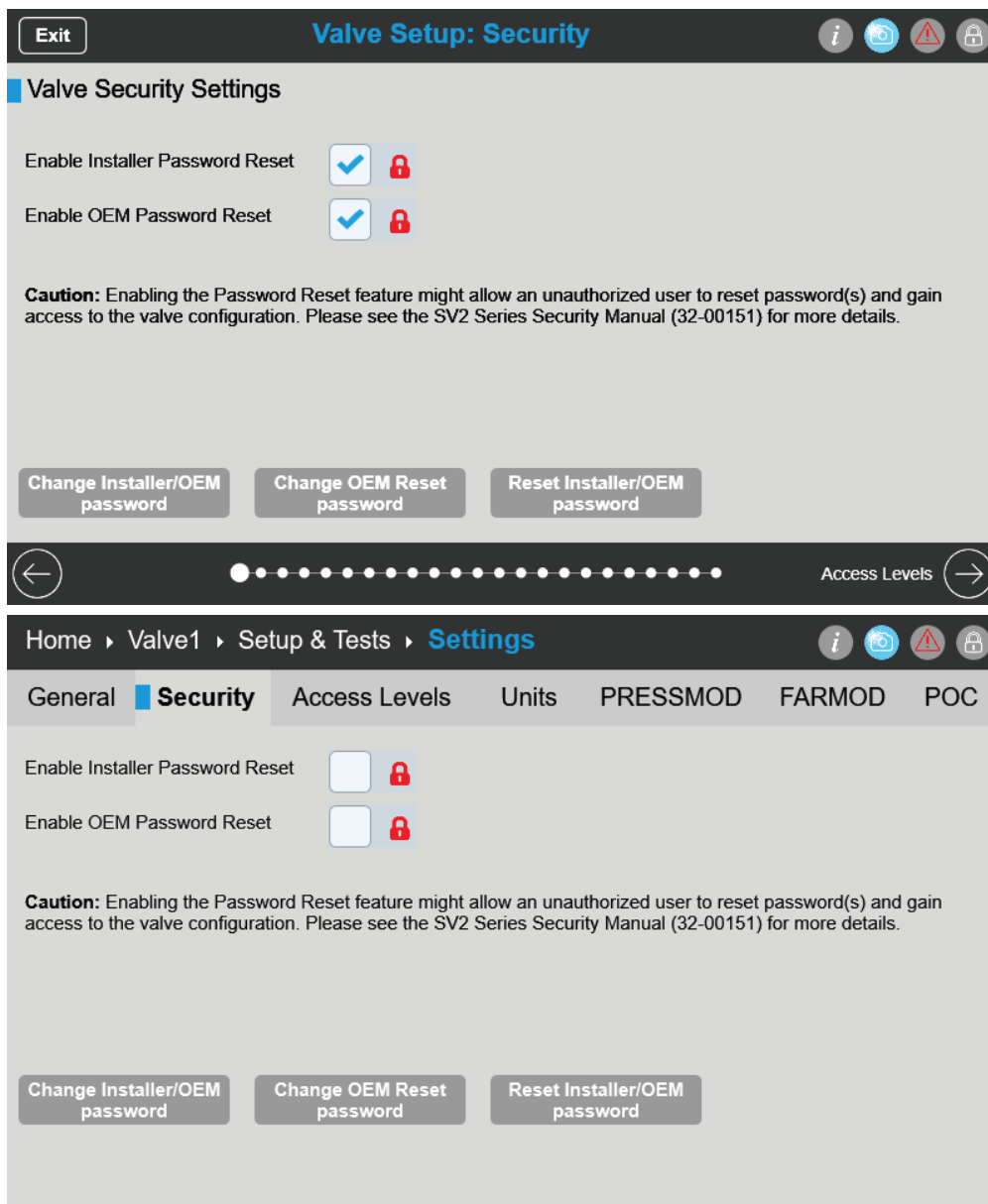


Fig. 70: Security page for passwords enable/disable, entry, change or reset.

The OEM can choose to enable or disable the OEM and Installer password reset functions on the Security page. Refer to [Fig. 70](#).

- If it is enabled, the user can follow the reset instructions in the Installer and OEM Password Reset section of this document.
- If it is disabled and the main OEM password is lost, the OEM will not be able to reset the password and will effectively be locked out of editing the valve at the OEM level.
 - If the Installer level main password is known, the OEM can access the valve using it and edit the parameters to which they have granted the Installer access.
 - In order to make OEM level editing possible again, the valve main electronics would have to be replaced and the valve completely re-programmed at both the OEM and Installer levels.

The OEM and Installer passwords can be set from a dialog box which opens when the user clicks on the Change Installer/OEM password button or the Change OEM Reset password button. Refer to [Fig. 71](#).

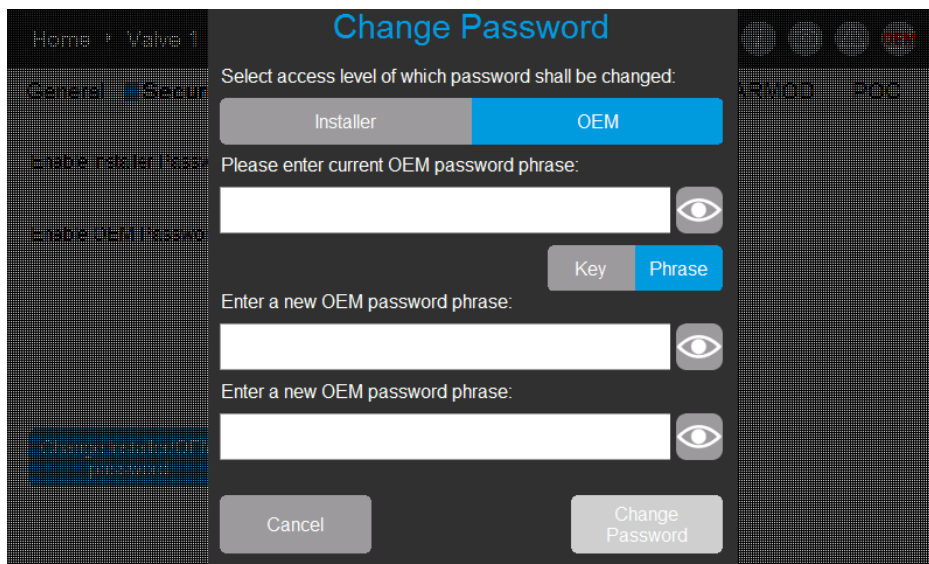


Fig. 71: Change Installer/OEM password dialog box.



By selecting the button with the eye symbol, the obscured passwords will be visible. The Key button will not be used.

OEM Password Configuration

The OEM will need to configure their main password and their reset password if the 'Enable OEM Password Reset' box is checked on the Security page (refer to [Fig. 70](#)). Both passwords should be kept in a secure, but accessible location.

NOTES:

- **The OEM MAIN password should NOT be the same for all OEM valves/appliances in accordance with best practices.**
- **The OEM RESET password CAN be the same for all OEM valves/appliances. For security reasons, the OEM Reset password should be more robust and longer than the OEM Main password.**
- **The OEM main and reset passwords CANNOT be the same.**
- **Do not print passwords in manuals for cyber security reasons.**

The procedure to configure the OEM main password is as follows:

1. Select 'OEM' in the Change Installer/OEM password dialog box. Refer to [Fig. 71](#).
2. Type in the current OEM password (if it exists). When the OEM password is not configured, the default OEM password is automatically filled in ("SV2OemKey2017").
3. Enter the new OEM Password by selecting the blank field. When the keyboard pops up, enter the new OEM password and select Save. Refer to [Fig. 72](#).

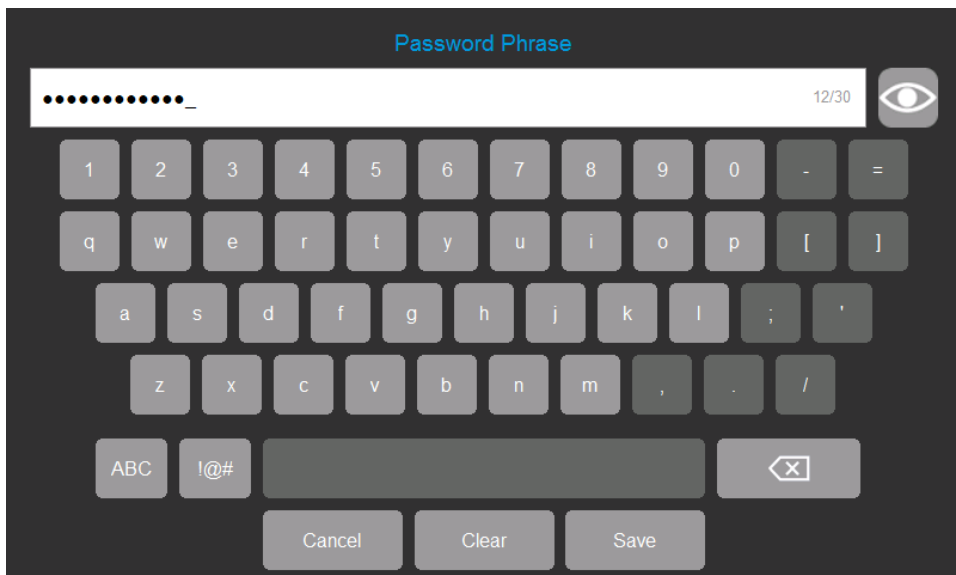


Fig. 72: Password entry screen.

4. Confirm the new password by selecting the second blank field, entering the password and selecting save again.
5. When the Change Password dialog box reappears (refer to [Fig. 73](#)), select Change Password.

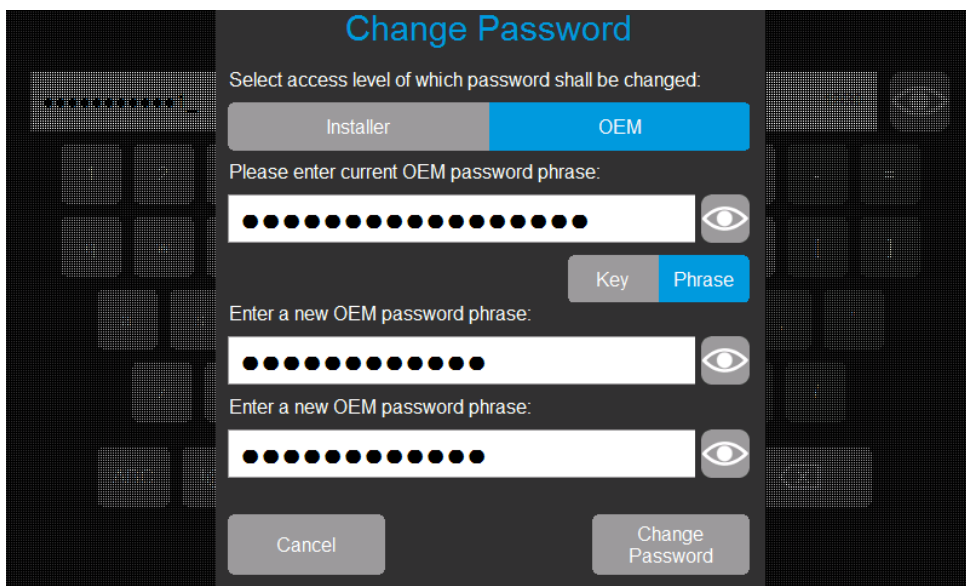


Fig. 73: Change OEM password dialog box with entered password.

6. When the OEM password is changed, the Password Changed dialog box opens. Refer to [Fig. 74](#).

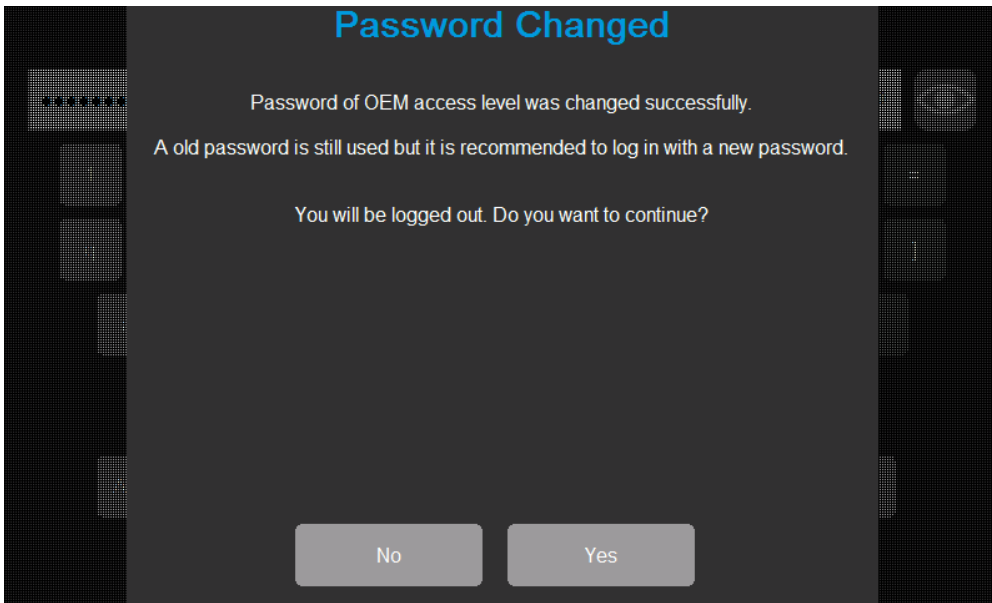



Fig. 74: OEM Password Changed confirmation dialog box.

7. It is recommended to select Yes on the Password Changed dialog box, which will bring the user back to the Security page (refer to [Fig. 70](#)).
 - a. The user can then log in with the newly created OEM password (see next step).
 - b. If No is selected, the Password Changed confirmation dialog box will close and the user will stay logged in with the old password, with the Change Password dialog box open (refer to [Fig. 73](#)).
8. Log in using the newly created OEM password by selecting the padlock symbol  in the upper right hand corner of the Security page. Refer to [Fig. 70](#).
 - a. Enter the new password by selecting the blank field and entering it when the keyboard pops up. Refer to [Fig. 75](#).
 - b. Select Login to log in with the new password.

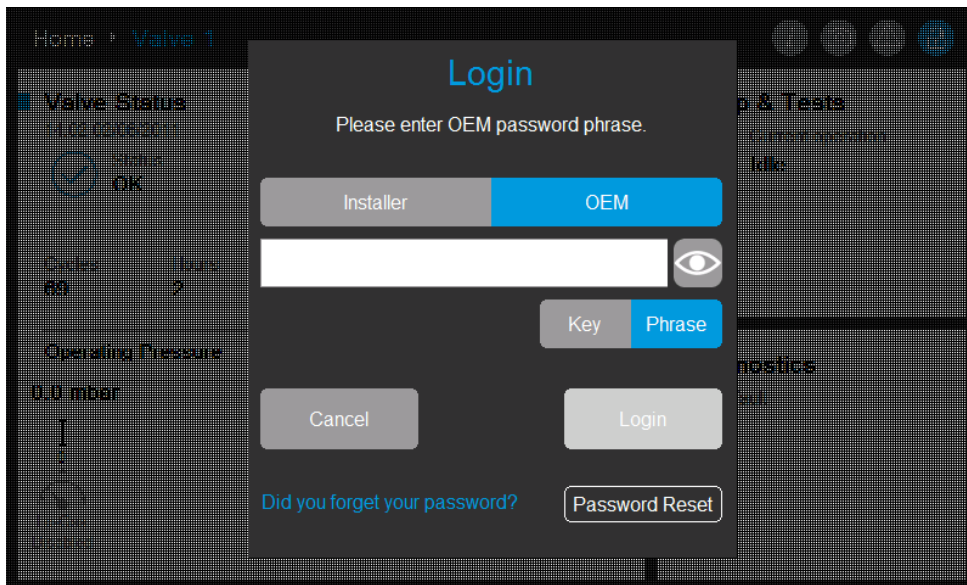



Fig. 75: Login dialog box.

Installer Password Configuration

When configuring the Installer main password, there some differences between when the user is logged in as the OEM or as the Installer as detailed below.

Installer Password Configuration by the OEM

1. Log in using the OEM password. The OEM can login by selecting the padlock symbol  in the upper right corner on the Security page. Refer to [Fig. 70](#).
2. Select Change Installer/OEM password button. Refer to [Fig. 70](#). This will open the Change Password dialog box. Refer to [Fig. 76](#).
3. Select 'Installer' in the dialog box.

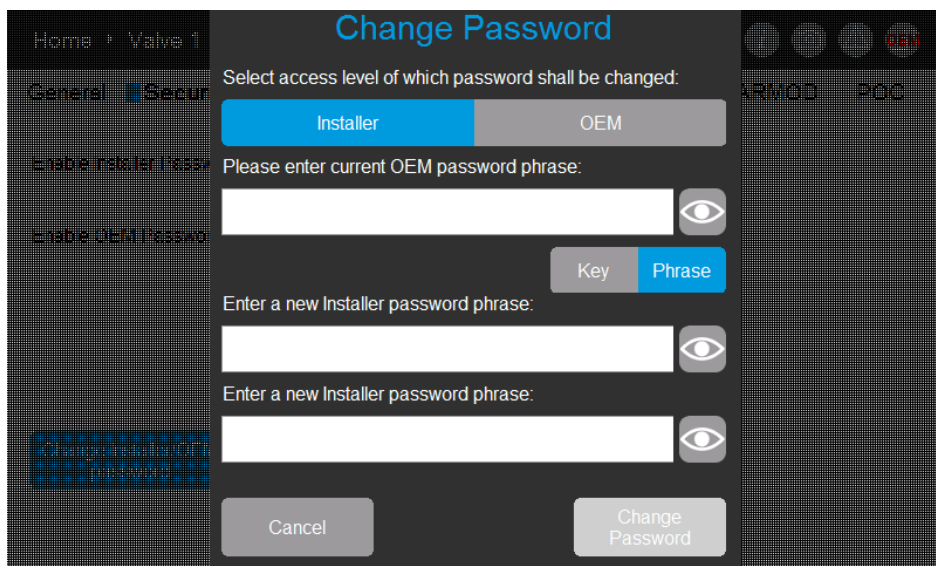


Fig. 76: Change Installer password as OEM dialog box.

4. Type in the current OEM Password (if it exists). When the OEM password is not configured, the default OEM password is automatically filled in ("SV2OemKey2017").
5. Enter the new Installer Password by selecting the blank field. When the keyboard pops up, enter the new Installer password and select Save. Refer to [Fig. 72](#).
6. Confirm the new password by selecting the second blank field, entering the password and selecting save again.
7. When the Change Password dialog box reappears (refer to [Fig. 77](#)), select Change Password.

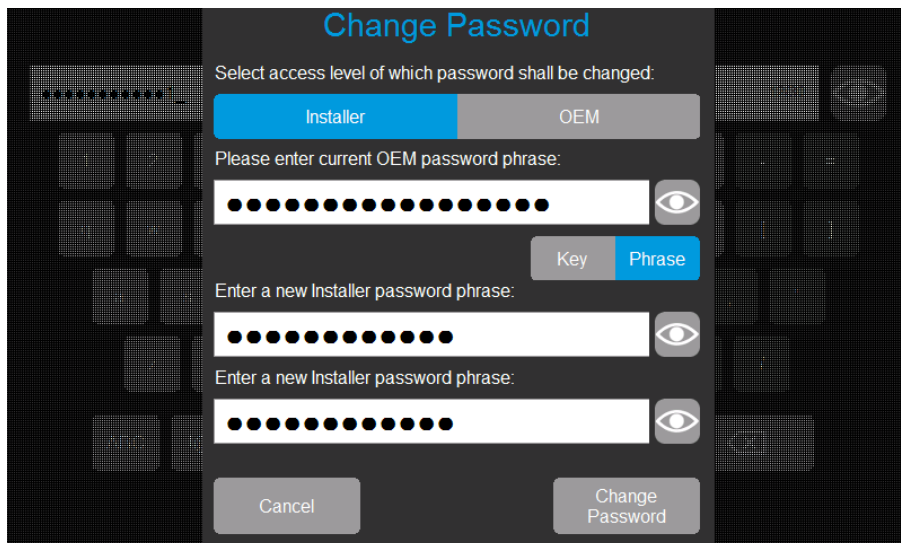


Fig. 77: Change Installer password as OEM dialog box with entered password.

8. When the Installer password is changed, the Password Changed dialog box opens. Select the OK button to proceed. Refer to [Fig. 78](#).

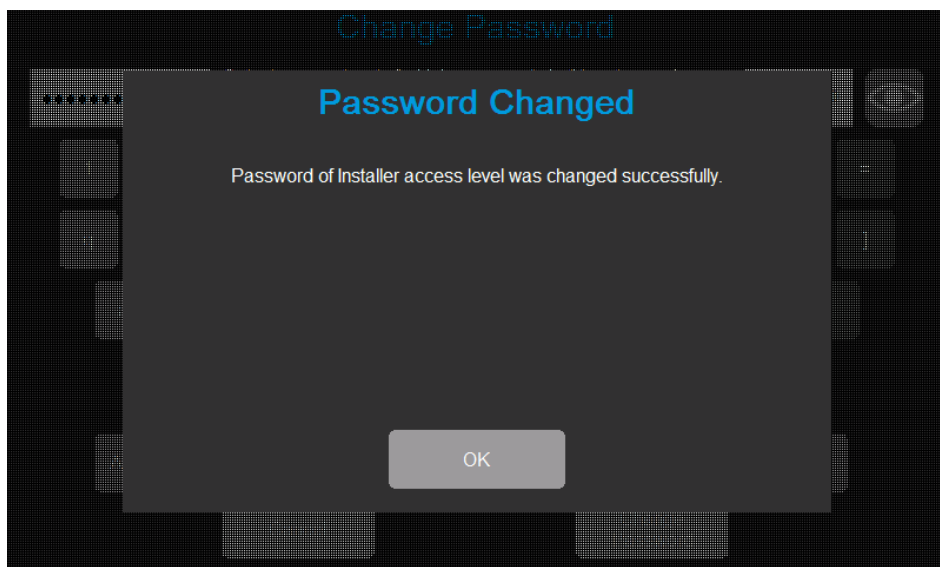



Fig. 78: Installer Password Changed confirmation dialog box.

Installer Password Configuration by the Installer

1. Log in using the Installer password. The Installer can login by selecting the padlock symbol  in the upper right corner on the Security page. Refer to [Fig. 70](#).
2. Select Change Installer/OEM password button. Refer to [Fig. 71](#). This will open the Change Password dialog box.

NOTE: When logged in as the Installer, the user can only change the Installer password, therefore the access selection at the top of the Change Password dialog box is pre-selected as Installer.

3. Type in the current Installer Password (if it exists). Refer to [Fig. 79](#). When the Installer password is not configured, the default Installer password is automatically filled in ('SV2InstallerKey2017').

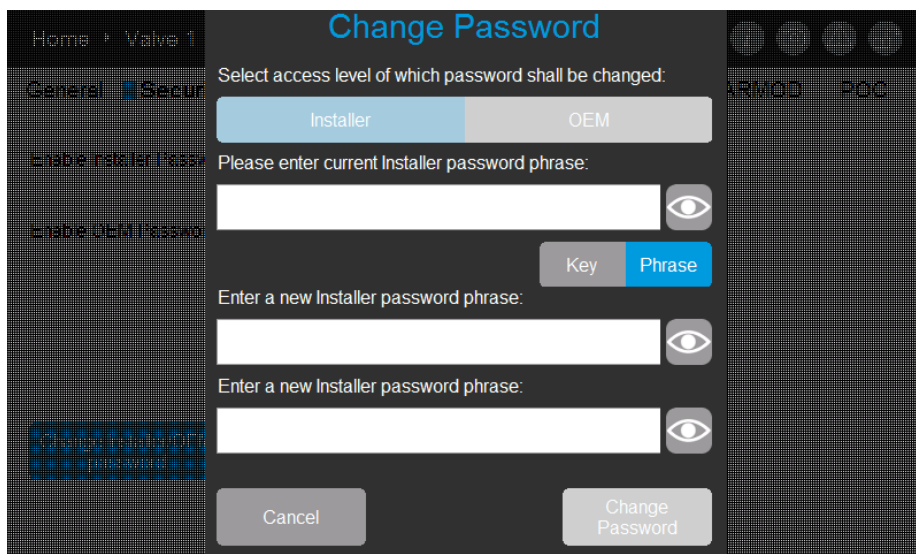


Fig. 79: Change Installer as Installer password dialog box.

4. Enter the new Installer Password by selecting the blank field. When the keyboard pops up, enter the new Installer password and select Save. Refer to [Fig. 72](#).
5. Confirm the new password by selecting the second blank field, entering the password and selecting save again.
6. When the Change Password dialog box reappears (refer to [Fig. 80](#)), select Change Password.

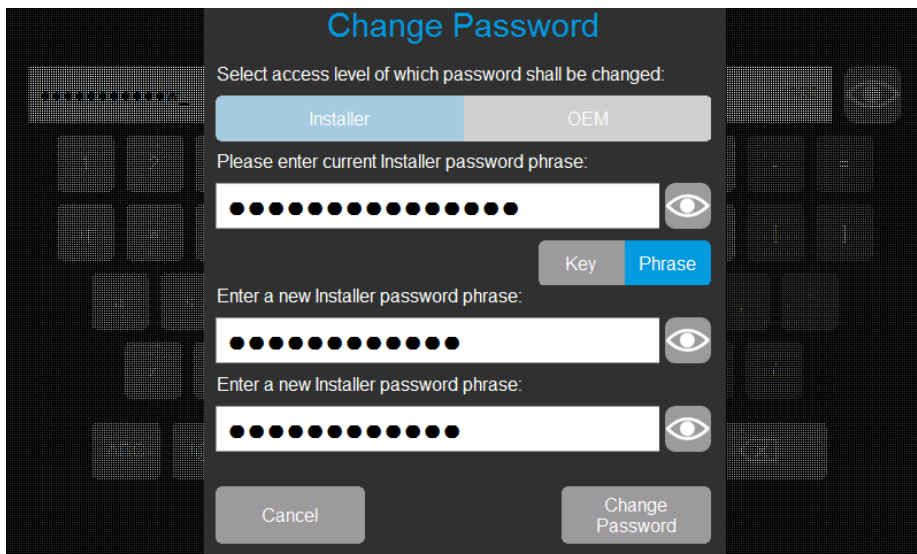


Fig. 80: Change Installer password as Installer dialog box with entered password.

7. When the Installer password is changed, the Password Changed dialog box opens. Refer to [Fig. 81](#).

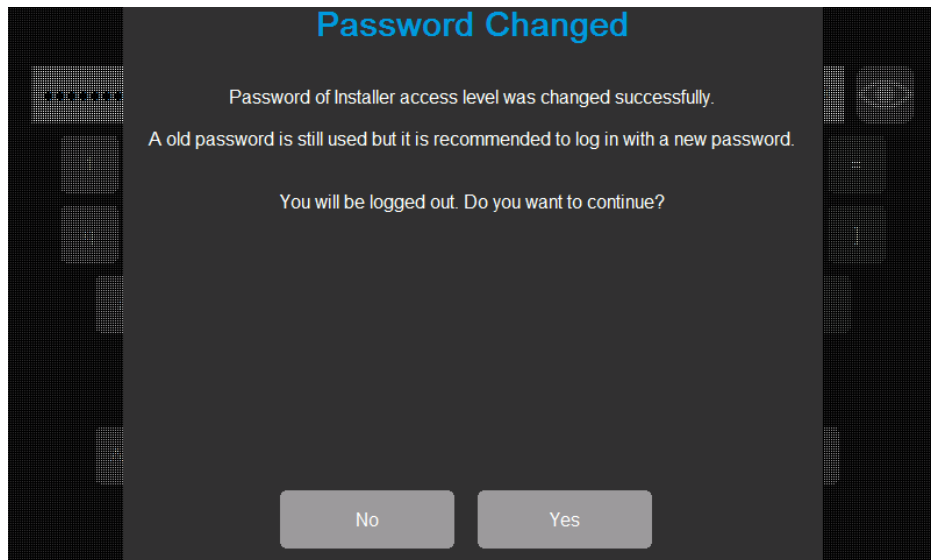



Fig. 81: Installer Password Changed confirmation dialog box.

8. It is recommended to select Yes on the Password Changed dialog box, which will bring the user back to the Security page (refer to [Fig. 70](#)).
- The user can then log in with the newly created Installer password (see next step).
 - If No is selected, the Password Changed confirmation dialog box will close and the user will stay logged in with the old password, with the Change Password dialog box open (refer to [Fig. 80](#)).
9. Log in using the newly created Installer password by selecting the padlock symbol  in the upper right hand corner of the Security page. Refer to [Fig. 70](#).
- Enter the new password by selecting the blank field and entering it when the keyboard pops up. Refer to [Fig. 82](#).
 - Select Login to log in with the new password.

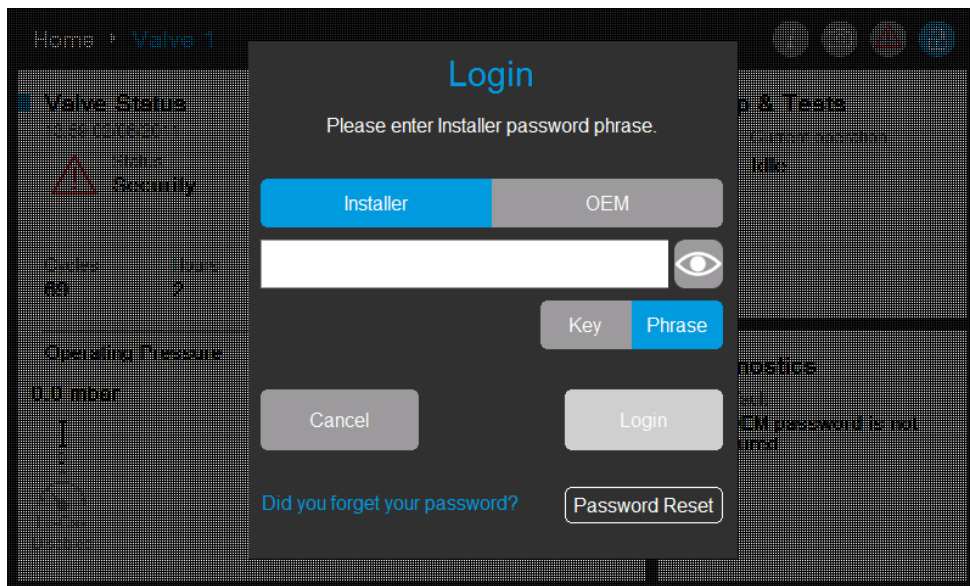


Fig. 82: Login dialog box.

OEM Reset Password Configuration


If enabled, the reset password allows the OEM to reset the current OEM main password back to the Honeywell factory default value. Typically, this would only be performed when the current OEM main password is lost. Once the password is reset, the OEM can then log in and assign a new main password. The OEM assigned reset password remains unchanged, but the OEM can choose to change it at any time on the Security page as desired by selecting the 'Change OEM Reset Password' button. Refer to Fig. 70.

Note that the Installer main password is not reset to the Honeywell factory default by the OEM password reset action. However, at this point the OEM user could choose to change the previously assigned Installer main password without knowing what the previous Installer password is.

NOTES

- **The OEM main and reset passwords CANNOT be the same.**
- **The OEM reset password CAN be the same for all OEM valves/appliances. For security reasons, the OEM Reset password should be more robust and longer than the OEM Main password.**
- **Do not print passwords in manuals for cyber security reasons.**
- **The OEM can choose to enable or disable the OEM (and Installer) password reset functions. Refer to Fig. 70.**
 - **If it is enabled, the user can follow the reset instructions in the Installer and OEM Password Reset section that follows.**
 - **It is disabled and the main OEM password is lost, the OEM will not be able to reset the password and will effectively be lockout out of editing the valve at the OEM level.**
 - **If the Installer level main password is known, the OEM can access the valve using it and edit the parameters to which they have granted the Installer access.**
 - **In order to make OEM level editing possible again, the valve main electronics would have to be replaced and the valve completely re-programmed at both the OEM and Installer levels.**

The procedure to configure the OEM reset password is as follows:

1. Log in as the OEM using the main password. Select the padlock symbol  in the upper right corner on the Security page. Refer to Fig. 70.
2. Click on Change OEM Reset password on the Security page. Refer to Fig. 70. This will open the Change OEM Reset Password dialog box. Refer to Fig. 83.

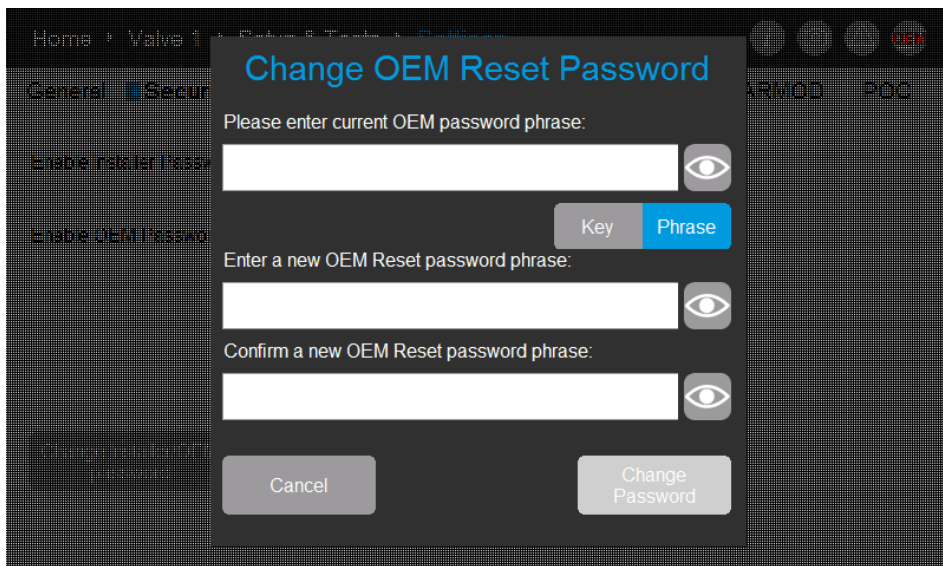


Fig. 83: Change OEM Reset Password dialog box.

3. Type in the current OEM main password in the top box. When OEM password is not configured, the default OEM password is automatically filled in ('SV2OemKey2017').
4. Enter the new OEM Reset Password by selecting the blank field. When the keyboard pops up, enter the new password and select Save. Refer to [Fig. 72](#).
5. Confirm the new password by selecting the second blank field, entering the password and selecting Save again.
6. When the Change OEM Reset Password dialog box reappears (refer to [Fig. 84](#)), select Change Password.

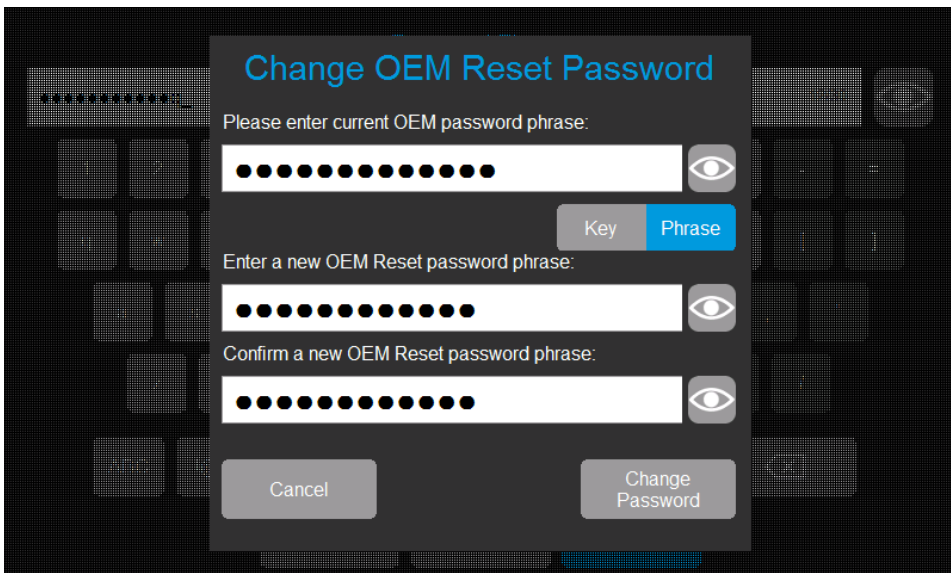


Fig. 84: Change OEM Reset Password dialog box with entered password.

7. When the OEM Reset Password has been changed, the acknowledgement dialog box will appear. Refer to [Fig. 85](#). Select OK to exit this mode.

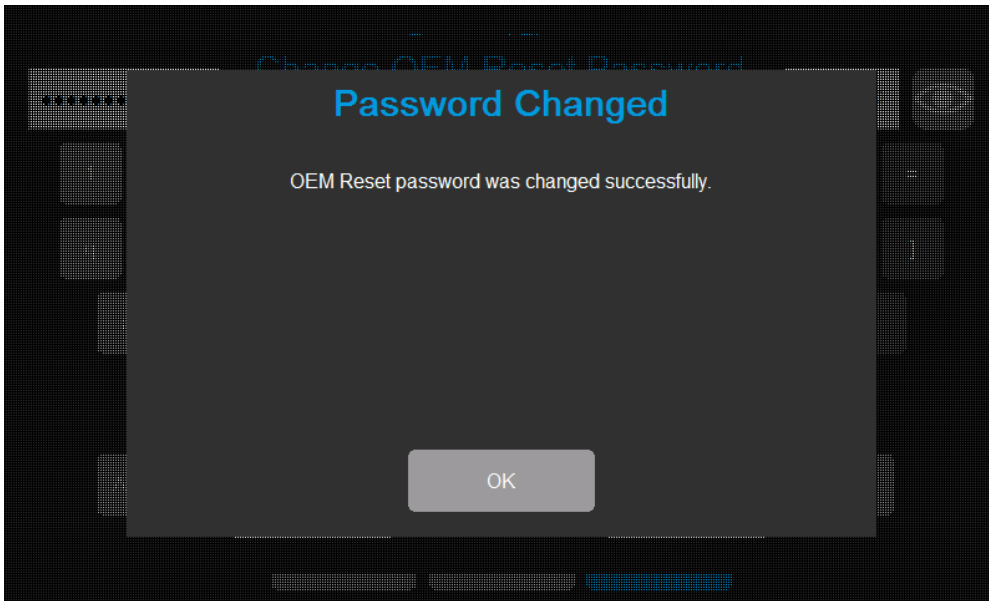


Fig. 85: OEM Reset Password Changed confirmation dialog box.

Access Levels Assignment

After the password assignments are complete, the next step in the guided setup sequence is the Access Levels assignment. This page can also be reached via the Setup & Tests --> Settings --> Access Levels menus. Refer to [Fig. 86](#).

The user must be logged in as the OEM in order to assign applicable user access to each of the parameter groupings. For the items included in each group, refer to [Table 25](#). Applicable access level choices from the drop down menus are OEM, Installer and Read Only. The default for all parameter groups is Installer. Refer to [Fig. 86](#).

- o If OEM is chosen, only the OEM may make changes to the associated parameters within that grouping when logged in as the OEM.
- o If Installer is chosen, both the Installer and the OEM may make changes to the associated parameters within that grouping when logged in as the Installer or the OEM.
- o If Read-Only is chosen, neither the Installer nor the OEM can make changes to the associated parameters. In order to make changes possible, the OEM would have to change the Access Level to the OEM or Installer levels.
- o For the Remote Reset parameter group only, there is also an Anonymous selection, which allows anyone to remotely reset the valve via the user interface. Therefore the access level can be Anonymous, Installer, OEM or Read-only.

NOTE: The Installer automatically has access to the Safety Parameter Verification function for any parameter groups regardless of access level configuration.

In order for the Installer to perform a FARMOD replacement in the field, the OEM must grant them access to the following Valve Access Levels (refer to [Fig. 87](#)):

- **FARMOD**
- **FAR Correction Curve**

The Set Access Levels to Default button can only be used when logged in as the OEM to reset all of the settings to the Honeywell default settings as shown in [Fig. 86](#).

NOTE: The Access Level parameter grouping assignments are included in the OEM cloning procedure and thus will be copied to new valves with the same access level assignments as the original valve setup being cloned.

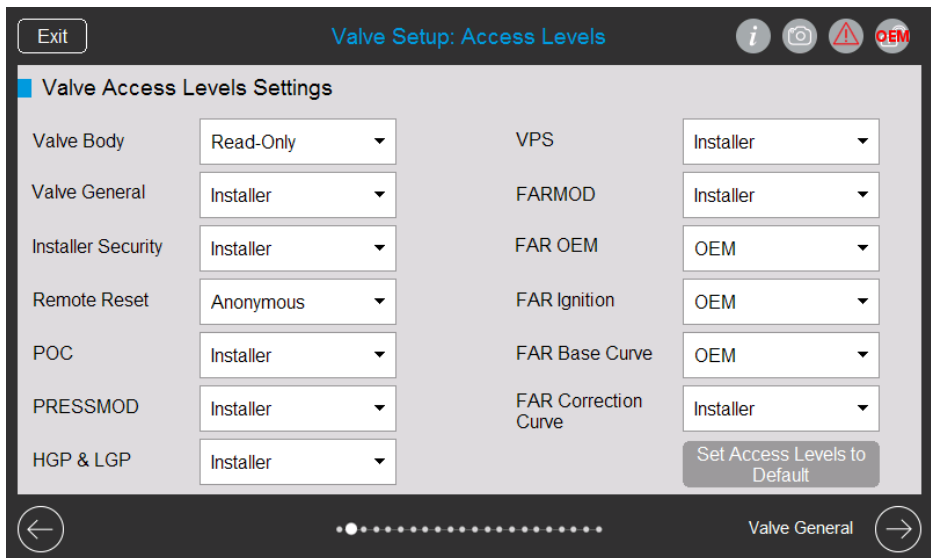


Fig. 86: Access Levels assignment screen with default values.

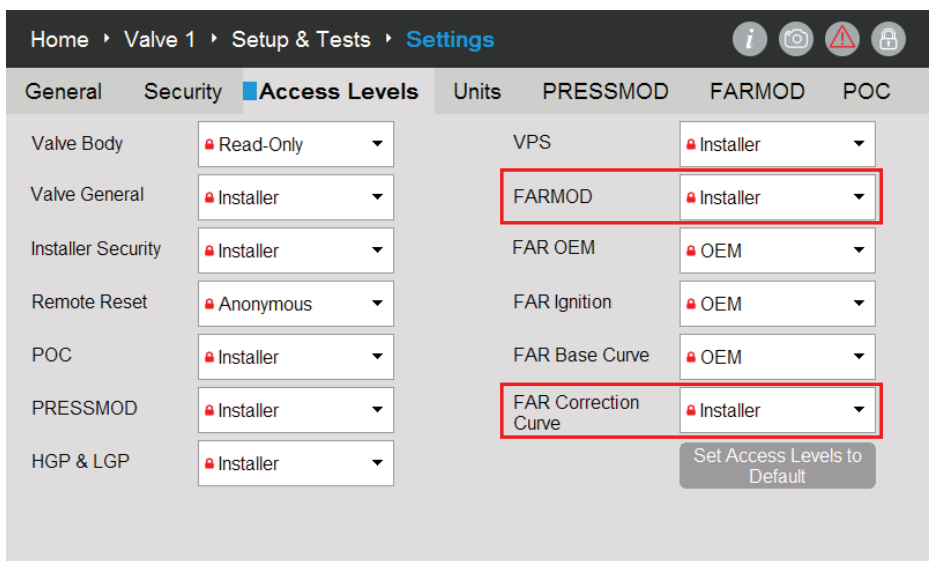


Fig. 87: Access Levels configuration to allow field FARMOD replacement by Installer

Table 23. Access Level Groups

Category	Contents
Valve Body	<ul style="list-style-type: none"> Valve body size
Valve General	<ul style="list-style-type: none"> Valve Name Modbus Address Baud Rate LED Indication (for electronics side change)
Installer Security	<ul style="list-style-type: none"> Installer password configuration (whom is allowed to assign this password)
Remote Reset	<ul style="list-style-type: none"> Remote reset function via user interface
POC	<ul style="list-style-type: none"> Setup of POC 1 and POC 2 (configuration acceptance)
PRESSMOD	<ul style="list-style-type: none"> Pressure Module replacement (whom is allowed to perform)

Category	Contents
HGP & LGP	<ul style="list-style-type: none"> • Pressure units • Lockout Type selection • Limit setup • Limit % (of operating pressure) selection • HGP/LGP Limit Test
VPS	<ul style="list-style-type: none"> • Volume/Leakage Rate units • Enable/Disable VPS • Leakage Limit (vol/time) • VPS Action (pressure to open/close) • Pipe Size and Length entry • External piping entry
FARMOD	<ul style="list-style-type: none"> • FARMOD replacement / re-commissioning (whom is allowed to perform) • Record Ign. Air Level
FAR OEM	<ul style="list-style-type: none"> • Default Pos. 2 • Reset Pos. 2 • S1 pre-ignition lower threshold • S1 pre-ignition upper threshold • S1 minimum threshold • S1 maximum threshold
FAR Ignition	<ul style="list-style-type: none"> • Ramp Offset • Ramp Period • Hold On Period • Ignition Period • Ignition Setpoint
FAR Base Curve	<ul style="list-style-type: none"> • Curve commissioning • Curve uploading to the valve
FAR Correction Curve	<ul style="list-style-type: none"> • Curve commissioning • Curve Name • Curve uploading to the valve

Installer and OEM Password Reset Procedures

Should the Installer and/or OEM main access level passwords be lost, password reset is possible, if the reset mechanisms were enabled by the OEM on the Security page. Refer to [Fig. 70](#). The reset mechanism will vary between the Installer and OEM levels as indicated below. Note that cycling of the valve or user interface power will not defeat this methodology.

NOTES:

- **The password reset mechanism simply allows the appropriate user to reset the current password(s) back to the Honeywell factory default value(s). Once the password(s) are reset, the user can then log in and assign new password(s).**
- **After reset to the default values, if the passwords are not set to new non-default values, the valve will be in lockout status and will not be operational unless the appropriate user is logged in. The applicable password(s) must be configured in order to clear the individual fault code(s). Refer to [Fig. 88](#).**
 - **OEM main password not changed fault code 97. Valve will not be operational unless the user is logged in using the default OEM password.**
 - **OEM reset password feature is enabled and password not changed fault code 102. Valve will not be operational unless the user is logged in using the default OEM password.**
 - **Installer main password not changed fault code 96. Valve will not be operational unless the user is logged in using either the default Installer or OEM password.**
 - **The OEM can choose to assign the Installer password or allow the Installer to assign it in the field.**

- The password assignment can be accessed via the Security page during the guided setup sequence or via the Setup & Tests --> Settings --> Security menus. Refer to Fig. 70.
- Follow the password configuration sequence as illustrated in Fig. 76-Fig. 82.

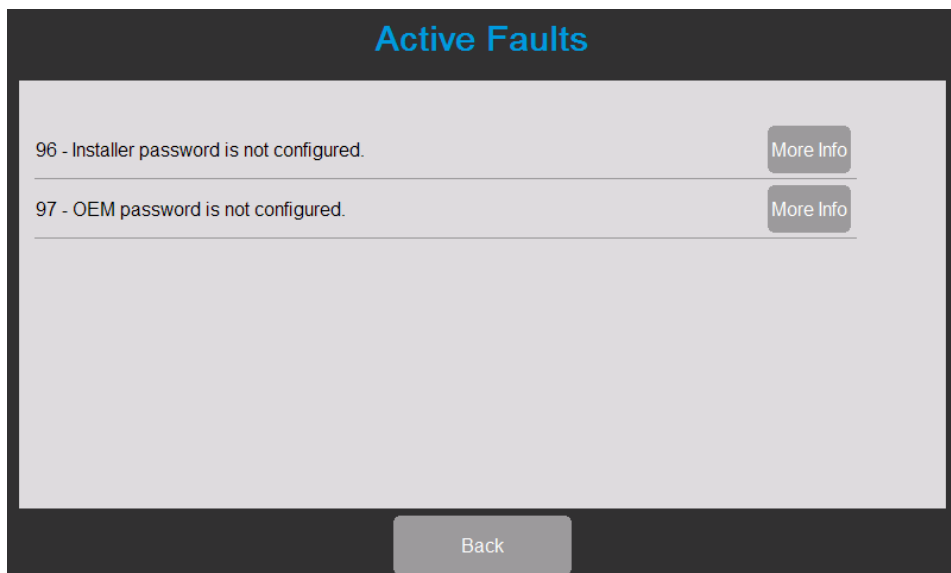


Fig. 88: Fault codes after password reset.

Installer Password Reset Procedure

An installer level 12-character random code is generated at the Honeywell factory, which is only applicable to a particular electronics assembly serial number. That code is placed on a card which is shipped with the valve in the accessory box. It is also shipped with replacement electronics assemblies. If the card should be lost, the code is also placed on the back of the valve main electronics assembly.

NOTES:

- The OEM can choose to enable or disable the Installer password reset function.
 - If it is enabled, the Installer can follow the reset instructions below.
 - If it is disabled and the main Installer password is lost, the Installer will not be able to reset the main password and will effectively be locked out of editing the valve.
 - In order to make editing possible, the OEM would have to login and enable the Installer password reset function or set a new Installer password.
- To access the Installer reset code on back of the valve main electronics assembly:
 - First remove power to the valve.
 - Then remove the electronics front cover and loosen the electronics assembly retaining screws. The electrical connectors may need to be removed in order to access the code on the back side of the electronics assembly.
 - The tamper evident seal on the electronics assembly must be broken. Write the applicable code for reference after re-powering the valve.

Procedure:

1. To reset the Installer password, access the valve using either the HMI Tool touchscreen display or the PC Tool.
2. Navigate to the Security page either using the guided setup sequence or via the Setup & Tests --> Settings --> Security menus. Refer to Fig. 89.

NOTE: User must be logged out in order to be able to perform the password reset function.

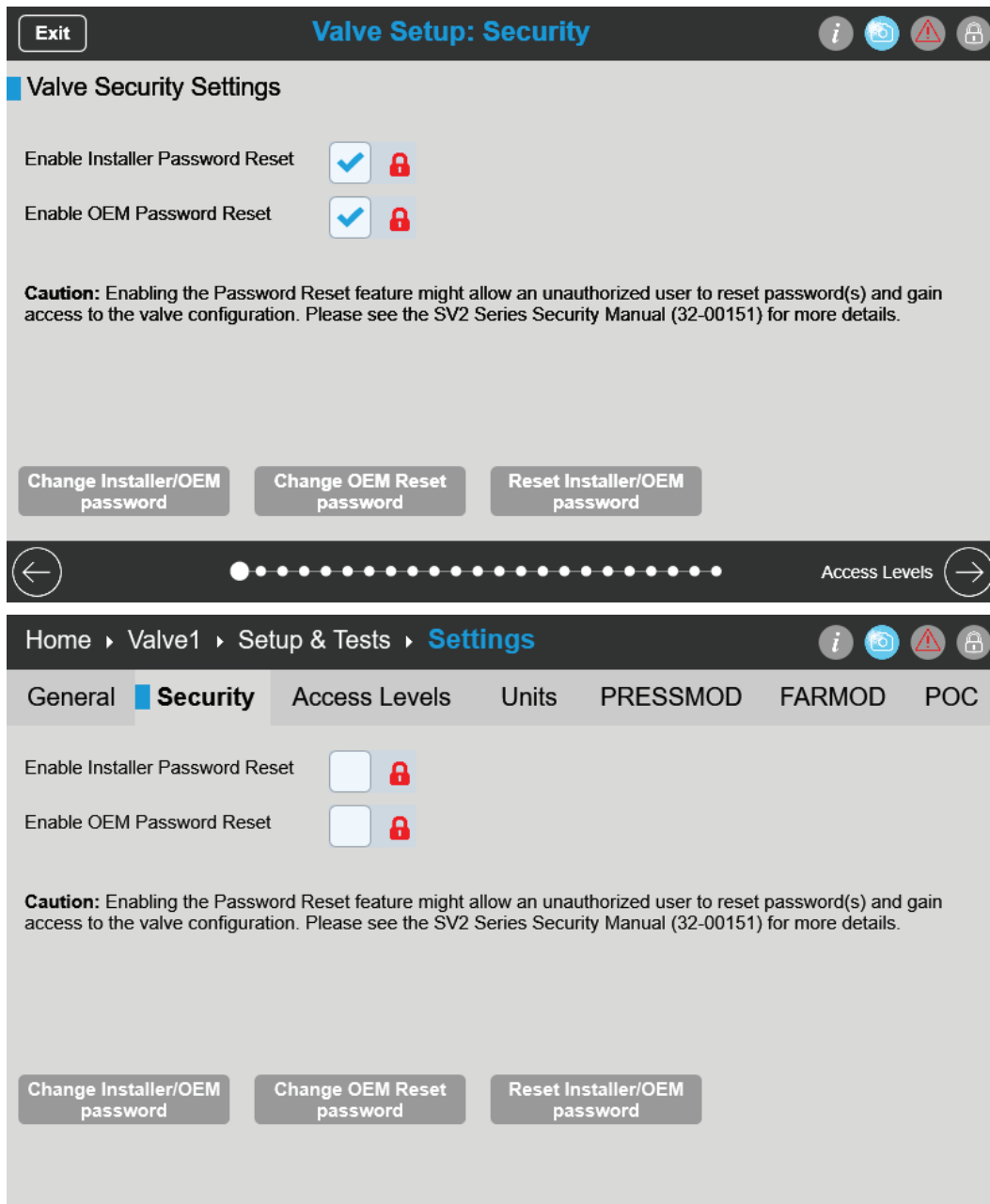


Fig. 89: Security page for passwords entry, change or reset.

3. On the Security page, select the Reset Installer/OEM password button.
 - a. If the user is logged in when this button is selected, the dialog box shown in Fig. 90 will appear. In this case, select No, log out and perform the above steps again.

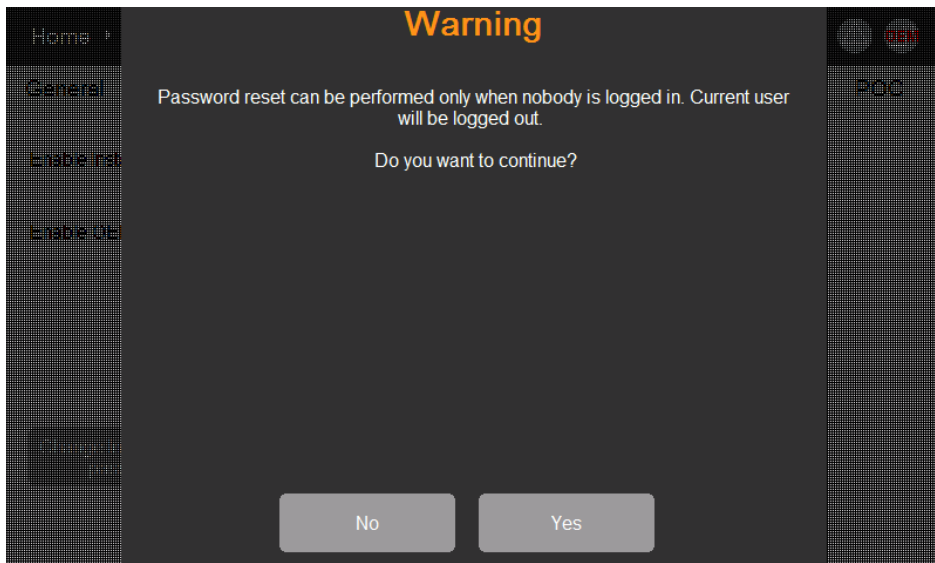


Fig. 90: Password reset warning dialog box.

- b. If the user is logged out, the Password Reset dialog box is opened. Refer to [Fig. 91](#).

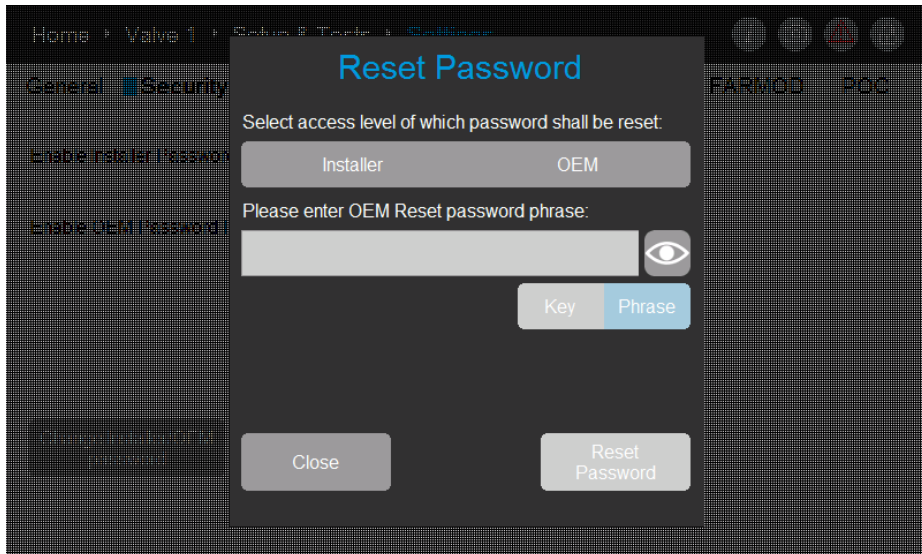


Fig. 91: Reset Password dialog box.

4. Select 'Installer' in the dialog box.
5. In the blank field, type in the 12-character random code from the card that shipped with the valve and/or the label on back of the electronics assembly.
6. Select the Reset Password button. Refer to [Fig. 92](#).

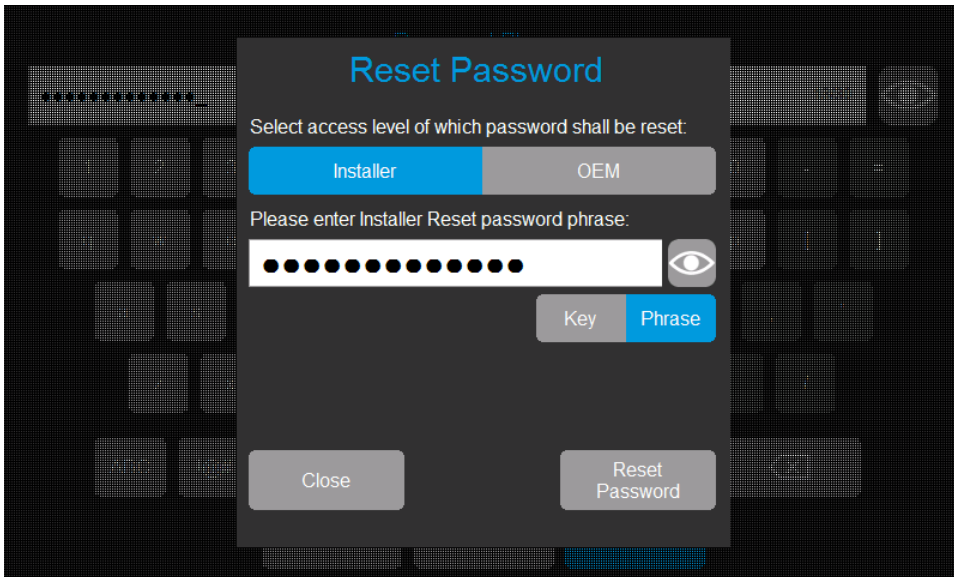


Fig. 92: Reset Password dialog box with entered password.

- When the Installer password has been successfully reset, the acknowledgement dialog box will appear. Refer to [Fig. 93](#). Select OK to exit this mode.

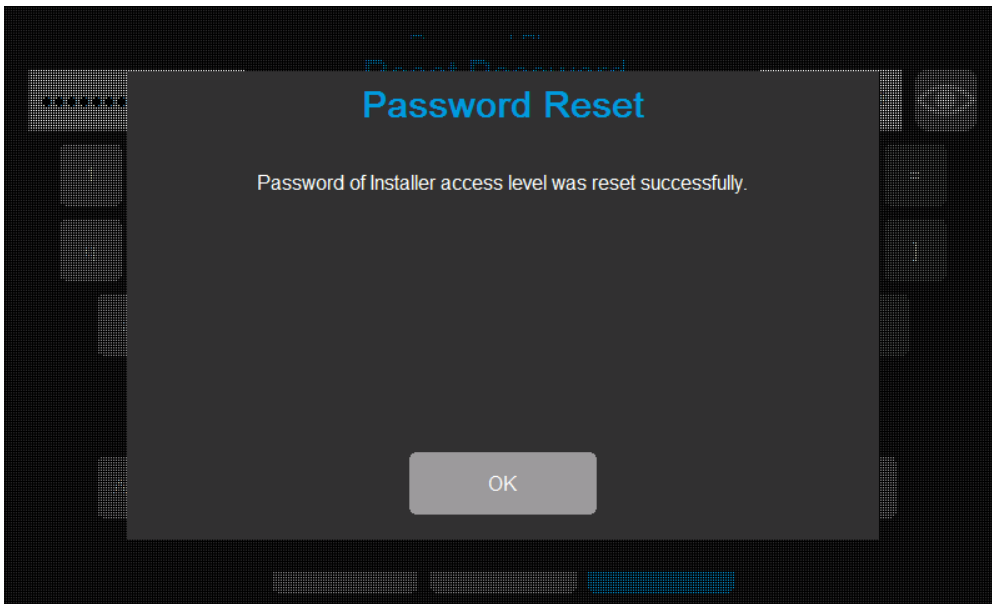


Fig. 93: Password Reset acknowledgement dialog box.

- After successful password reset back to the Installer default, the valve will be in lockout status. The user must login using the applicable Honeywell default password level and assign a new Installer password. Refer to the Default Passwords section and the Installer Password Configuration section of this manual for details.

OEM Password Reset Procedure

During initial valve commissioning, the OEM will be required to assign a main password and a reset password for the valve (if enabled). These 2 passwords CANNOT be the same. However, the reset password CAN be the same for all individual OEM valves/appliances.

If enabled, the reset password allows the OEM to reset the current OEM main password back to the Honeywell factory default value. Typically, this would only be performed when the current OEM main password is lost. Once the password is reset, the OEM can then log in and assign a new main password. The OEM assigned reset password remains unchanged, but the OEM can choose to change it at any time on the Security page as desired by selecting the 'Change OEM Reset Password' button. Refer to [Fig. 70](#).

Note that the Installer main password is not reset to the Honeywell factory default by the OEM password reset action. However, at this point the OEM user could choose to change the previously assigned Installer main password without knowing what the previous Installer password is.

NOTES:

- **The OEM can choose to enable or disable the OEM password reset function. Refer to [Fig. 70](#).**
 - **If it is enabled, the OEM can follow the reset instructions below.**
 - **If it is disabled and the main OEM password is lost, the OEM will not be able to reset the password and will effectively be locked out of editing the valve at the OEM level.**
 - **If the Installer level main password is known, the OEM can access the valve using it and edit the parameters to which they have granted the Installer access.**
 - **In order to make OEM level editing possible again, the valve main electronics would have to be replaced and the valve completely re-programmed at both the OEM and Installer levels.**

Procedure:

1. To reset the OEM password, access the valve using either the HMI Tool touchscreen display or the PC Tool.
2. Navigate to the Security page either using the guided setup sequence or via the Setup & Tests --> Settings --> Security menus. Refer to [Fig. 89](#).

NOTE: User must be logged out in order to be able to perform the password reset function.

3. On the Security page, select the Reset Installer/OEM password button.
 - a. If the user is logged in when this button is selected, the dialog box shown in [Fig. 94](#) will appear. In this case, select No, log out and perform the above steps again.

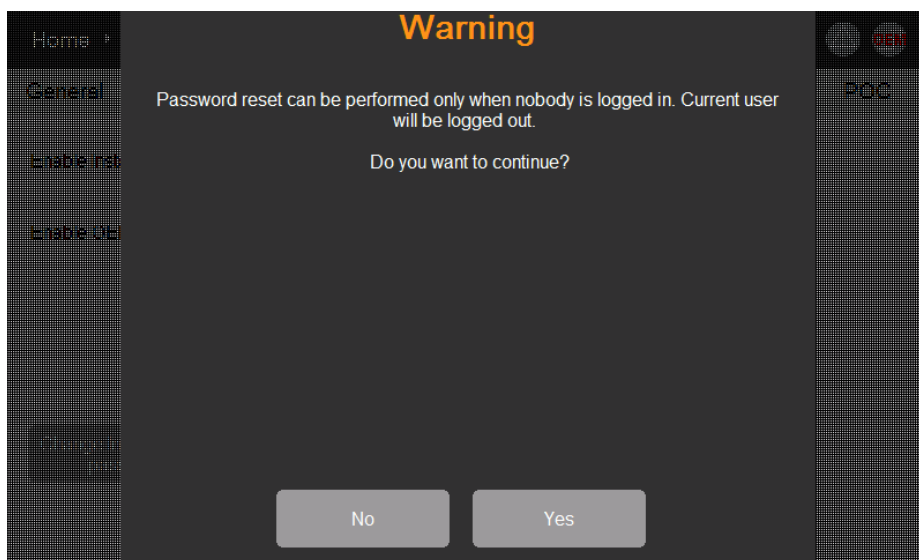


Fig. 94: Password reset warning dialog box.

- b. If the user is logged out, the Password Reset dialog box is opened. Refer to [Fig. 95](#).

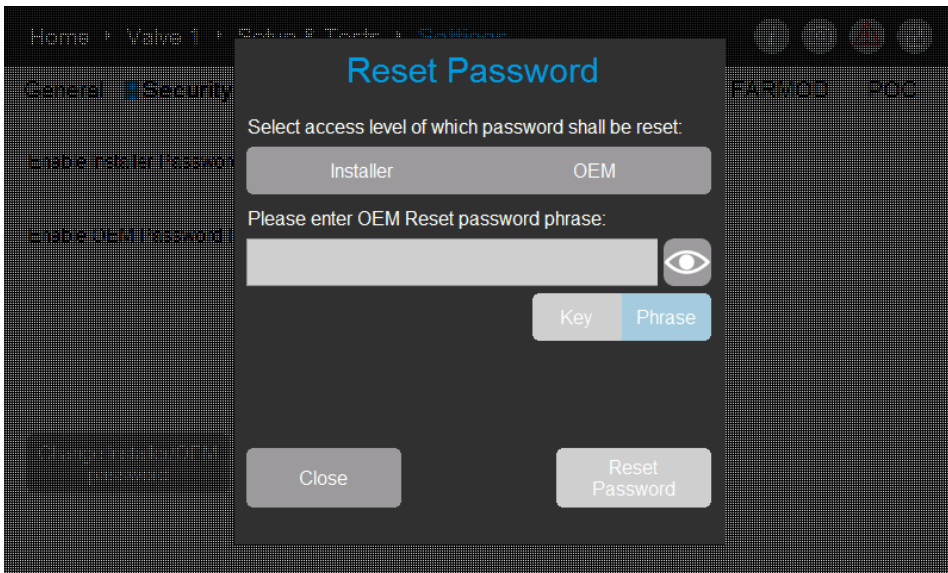


Fig. 95: Reset Password dialog box.

4. Select 'OEM' in the dialog box.
5. In the blank field, type in the established OEM Reset password.
6. Select the Reset Password button. Refer to [Fig. 96](#).

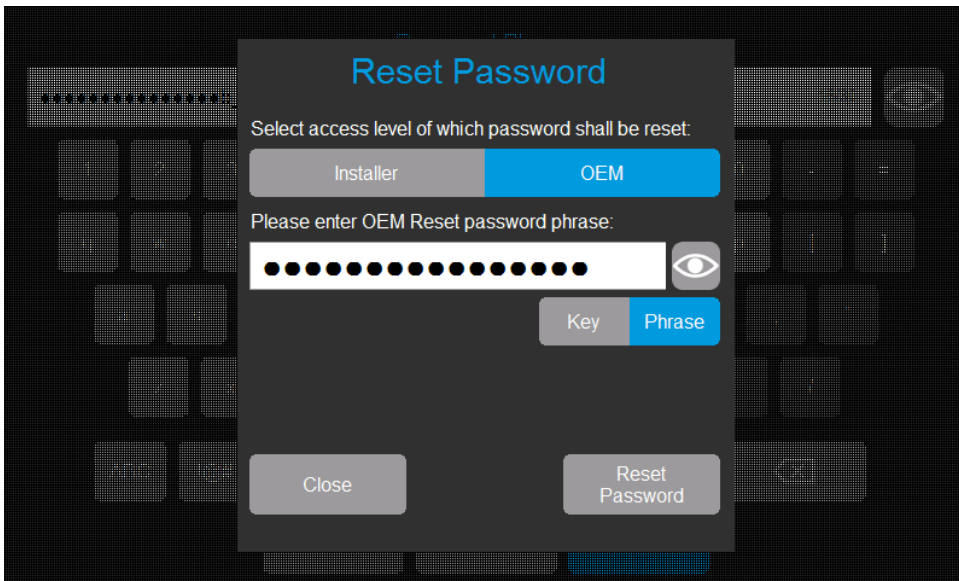


Fig. 96: Reset Password dialog box with entered password.

7. When the OEM Reset password has been successfully reset, the acknowledgement dialog box will appear. Refer to [Fig. 97](#). Select OK to exit this mode.

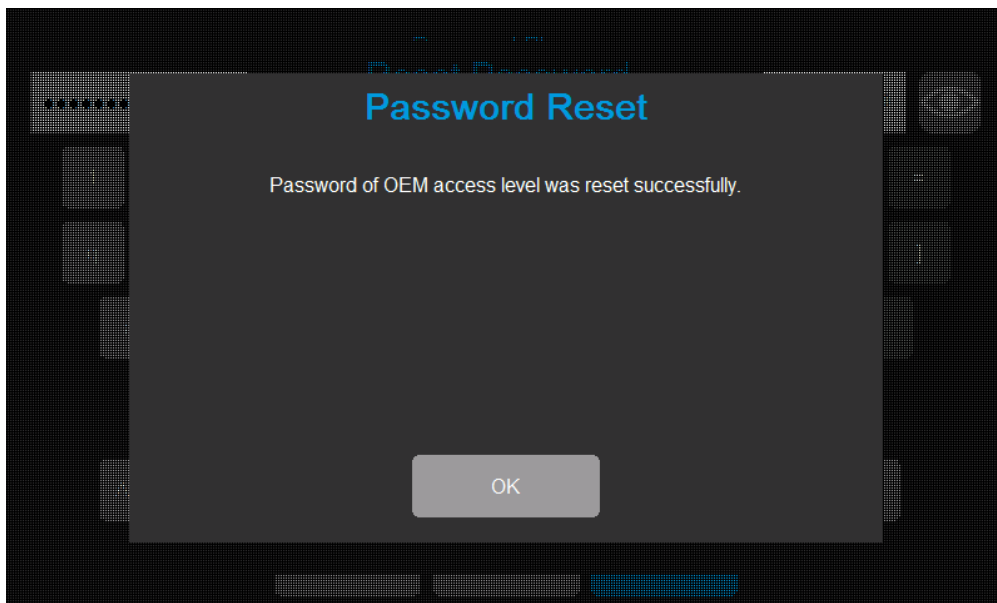


Fig. 97: Password Reset acknowledgement dialog box.

8. After successful password reset back to the Honeywell OEM default, the valve will be in lockout status. The user must login using the applicable Honeywell default password level and assign a new OEM main password. Refer to the Default Passwords section and the OEM Password Configuration section of this manual for details.

CHAPTER 7 : VAVLE PRODUCTION CLONING

Applies to valve firmware version 12.01 or later. HMI/PC Tool software version 12.01.002 or later

Provisions for customer production cloning of established valve parameters have been added to the HMI and PC Tools. The Valve Production Cloning page provides a shortcut for factory production and cloning of established valve configurations as well as cloning for certain field situations. The cloning screens may be accessed one of two ways;

- Selecting the icon of a connected valve and selecting the 'Valve Production Cloning' button from the pop-up screen. Refer to [Fig. 100](#).
- Selecting the 'Valve Production Cloning' button in the Setup & Tests menu for a connected valve. Refer to [Fig. 113](#).

The cloning feature allows the Installer or OEM user to load a previously saved fuel/air valve configuration to use for another application or as a basis for making another configuration. Naming and saving a newly created valve configuration is also possible. Refer to [Fig. 101](#).

Note that there are few a limitations to the cloning procedure:

- The cloned fuel/air valve configuration only contains the OEM Setup and Ignition Setup parameters and Base Curve.
- The fuel/air Correction Curve and the recorded pre-ignition air values as well as the LGP/HGP and POC settings are not part of the cloned configuration because they are related to the valve with which they were created.

The valve configuration file contains the following configuration groups as shown in [Fig. 98](#) and [Table 24](#), from which the OEM can choose to clone.

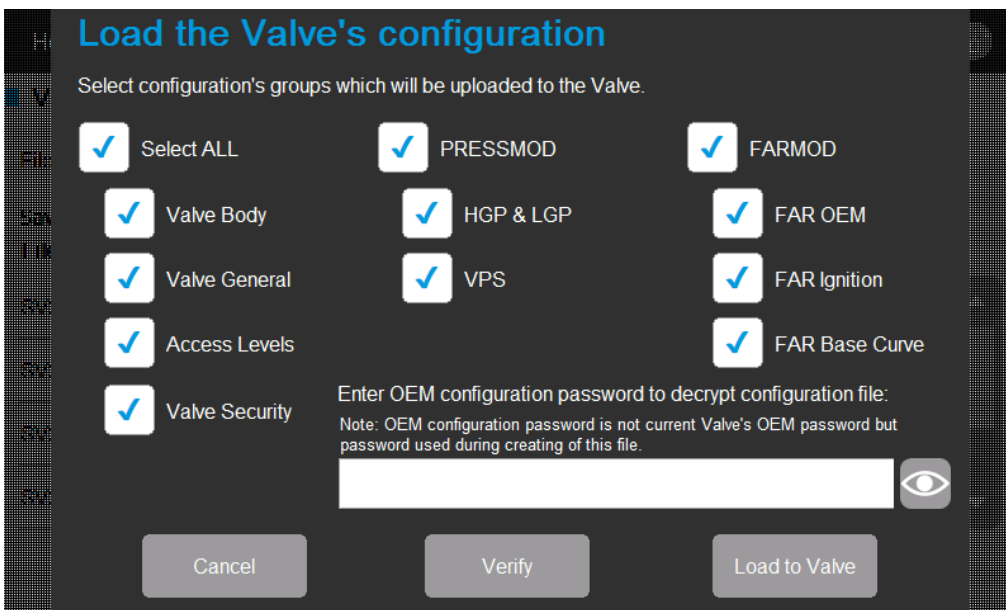


Fig. 98: Valve Production cloning configuration groups selection.

Table 24. Valve configuration groups.

Category	Contents	Description
General	Valve Body	<ul style="list-style-type: none"> Valve body size + Access Level
	Valve General	<ul style="list-style-type: none"> Valve Name + Access Level Modbus Address + Access Level Baud Rate + Access Level LED Indication (for electronics side change) + Access Level
	Access Levels	<ul style="list-style-type: none"> Applicable Access Levels noted in each section of this table
	Valve Security	<ul style="list-style-type: none"> Installer Security: <ul style="list-style-type: none"> Access Level of Installer password configuration (whom is allowed to assign this password) Enable/Disable password reset functionality: <ul style="list-style-type: none"> Installer (Access Level is set to OEM and cannot be changed) OEM (Access Level is set to OEM and cannot be changed) Main passwords: <ul style="list-style-type: none"> OEM (optional) Installer (optional) OEM Reset password (optional) (can only be configured and cloned when OEM Password Reset functionality is Enabled)
	Remote Reset	<ul style="list-style-type: none"> Access Level for Remote Reset via user interface
	POC (Proof of Closure)	<ul style="list-style-type: none"> Access Level of POC 1 and POC 2 Setup (configuration acceptance) <ul style="list-style-type: none"> A new valve or newly re-connected POC sensor(s) have to be accepted manually on the Setup & Tests / Settings / POC page
	PRESSMOD (Pressure Module)	PRESSMOD General

Category	Contents	Description
PRESSMOD (Pressure Module)	HGP & LGP (High Gas Pressure & Low Gas Pressure)	<ul style="list-style-type: none"> • Pressure units + Access Level • Temperature units + Access Level • Lockout Type selection + Access Level • Limit % (of operating pressure) selection + Access Level • Access Level of Limit setup <ul style="list-style-type: none"> – HGP / LGP Limit Setup has to be performed manually on the Setup & Tests / Hi-Gas & Lo-Gas Pressure / Setup page
	VPS (Valve Proving Sequence)	<ul style="list-style-type: none"> • Volume/Leakage Rate units+ Access Level • Enable/Disable VPS + Access Level • Leakage Limit (vol/time) + Access Level • VPS Action selection (pressure to open/close) + Access Level • Access Level of Pipe Size and Length entry • Pipe Volume + Access Level
FARMOD (Fuel/Air Ratio Module)	FARMOD General	<ul style="list-style-type: none"> • Access Level of FARMOD field replacement / re-commissioning (whom is allowed to perform) <ul style="list-style-type: none"> – A new connected FARMOD has to be accepted manually on the Setup & Tests / Settings / FARMOD page • Access Level of Record Ign. Air Level
	FAR OEM	<ul style="list-style-type: none"> • Default Pos. 2 + Access Level • Reset Pos. 2 + Access Level • S1 pre-ignition lower threshold + Access Level • S1 pre-ignition upper threshold + Access Level • S1 minimum threshold + Access Level • S1 maximum threshold + Access Level • Slow Gear Band • Slow Gear Band Max • Slow Gear Stone <p>NOTE: 3 Slow Gear parameters are not on the FAR OEM Setup page and are accessible via the Modbus Editor page only.</p>
	FAR Ignition	<ul style="list-style-type: none"> • Ramp Offset + Access Level • Ramp Period + Access Level • Hold On Period + Access Level • Ignition Period + Access Level • Ignition Setpoint + Access Level
	FAR Base Curve	<ul style="list-style-type: none"> • Base Curve + Access Level
	FAR Correction Curve	<ul style="list-style-type: none"> • Access Level of Curve commissioning • Access Level of Curve Name • Access Level of Curve uploading to the valve

Note that the 3 premix valve stepper motor settings under the FAR OEM configuration group can only be accessed via the advanced user Modbus Editor page in the user interface while logged in with the appropriate user access level. The inclusion of these items allows for fine tuning of certain appliance configurations as needed to optimize appliance performance. If any fine-tuning is performed, the 3 values will be included in the cloning files of valves with 12.01 firmware or later when using HMI/PC Tools with 12.01.002 software or later. Contact Honeywell for advice on how to access these settings via the Modbus Editor in the SV2 Series valves user interface tools.

After the configuration is uploaded to the valve, the safety parameter verification procedure will need to be completed. 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.

Depending on whether the attached valve is un-configured or configured and whether the configuration has or does not have passwords, there are slightly different cloning procedures to be followed as detailed next.

Unconfigured Valve Procedure

1. With the valve connected to the user interface (HMI Tool or PC Tool), navigate to the Home page. The attached unconfigured valve(s) are identified via the text 'Unconfigured' at the bottom of the valve tile(s). Refer to [Fig. 99](#).

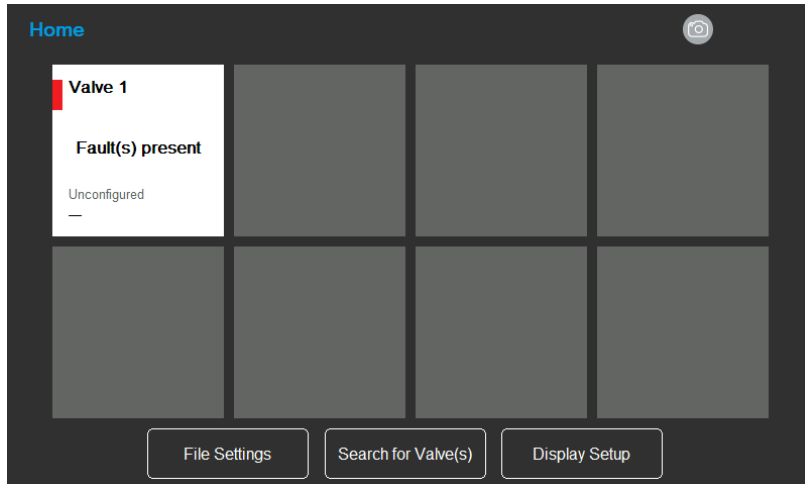


Fig. 99: Unconfigured valve tile on user interface.

2. Select the appropriate connected valve tile. The unconfigured valve selection screen will pop up. Select the 'Valve Production Cloning' button. Refer to [Fig. 100](#).

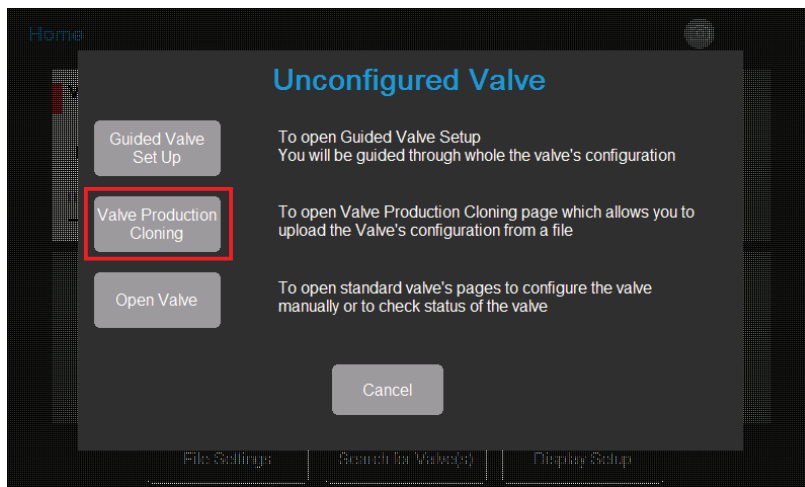


Fig. 100: Unconfigured valve selection screen.

3. On the 'Valve Production Cloning' screen that appears, log in under the OEM access level by selecting the padlock symbol  in the upper right corner of the page. Refer to [Fig. 101](#).

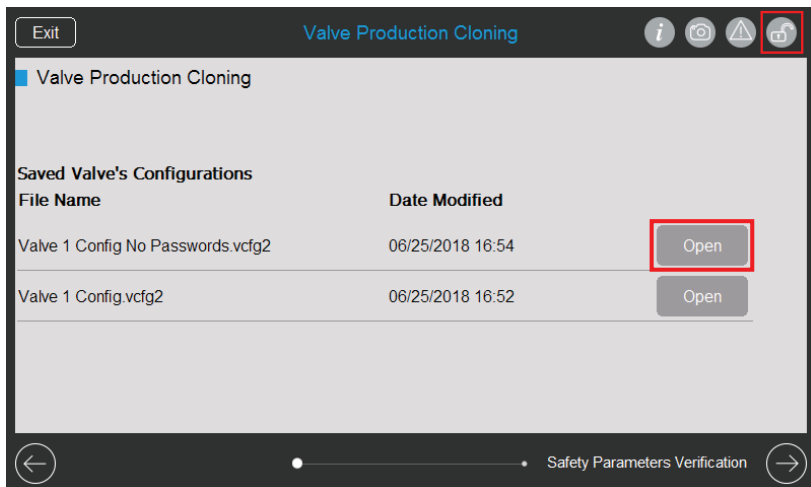


Fig. 101: Valve Production Cloning screen.

4. Select the appropriate valve configuration to load to the valve by pressing the 'Open' button beside it (Refer to [Fig. 101](#)). The configuration cloning groups page will pop up.
 - a. The page look and next steps will depend on whether passwords have not been assigned (Refer to [Fig. 102](#)) or have been assigned (Refer to [Fig. 103](#)).

Valve Configuration Without Passwords

The steps for selecting and uploading the valve configuration groups without and with passwords is the same with one exception; the user does not need to fill in the OEM password if passwords have not been assigned. Refer to [Fig. 102](#).

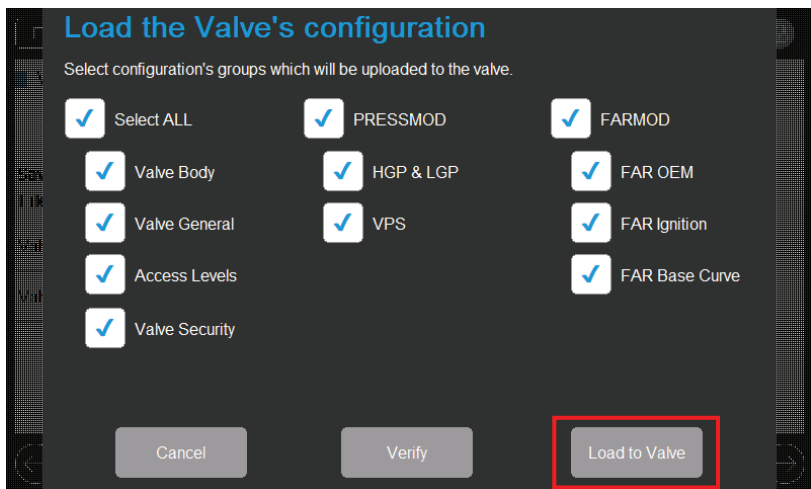


Fig. 102: Valve Production Cloning configuration groups selection, without passwords.

Valve Configuration With Passwords

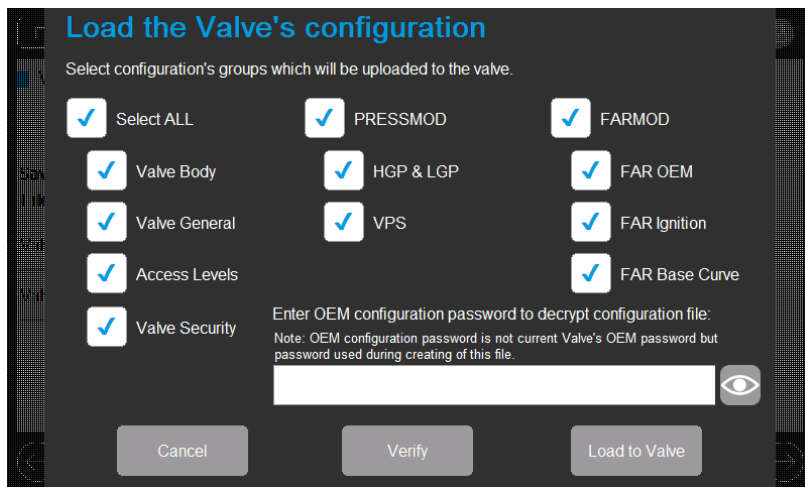


Fig. 103: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group selected.

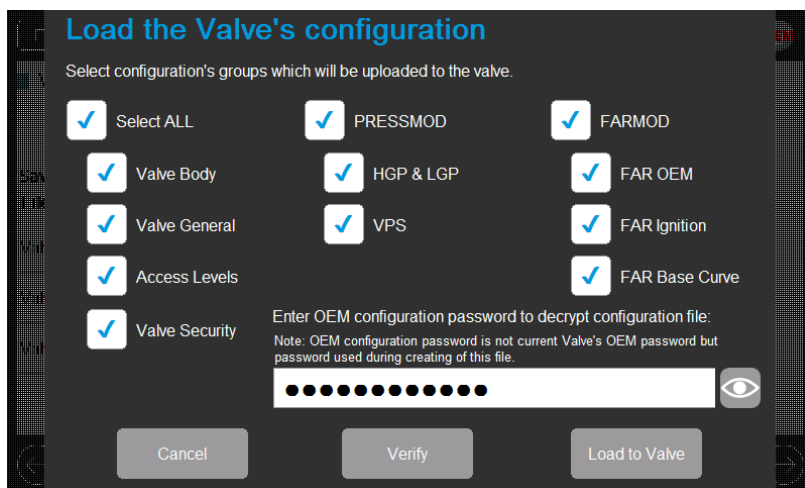


Fig. 104: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group selected and OEM configuration password automatically pre-filled.

5. Select the required valve configuration groups. Refer to [Table 24](#) and [Fig. 104](#).
 - a. If the 'Valve Security' group is checked, the OEM main password must be entered on this page. The OEM main password provided must be the password that was entered when the selected configuration was created. Typically, this password would be specific to a particular valve/appliance configuration and would be the same for valves/appliances of that configuration from an OEM manufacturer in accordance with best practices. For further information on password access levels and best practices, refer to CHAPTER 6 ACCESS LEVELS.

NOTE: The last entered and valid OEM main password is temporarily stored for the selected valve configuration. If the same valve configuration is opened again, the OEM main password is automatically pre-filled (refer to [Fig. 104](#)). If a different valve configuration is selected, the OEM main password must be entered again.

- b. If the 'Valve Security' group is unchecked, the OEM main password does not need to be entered on this page. Refer to [Fig. 105](#).

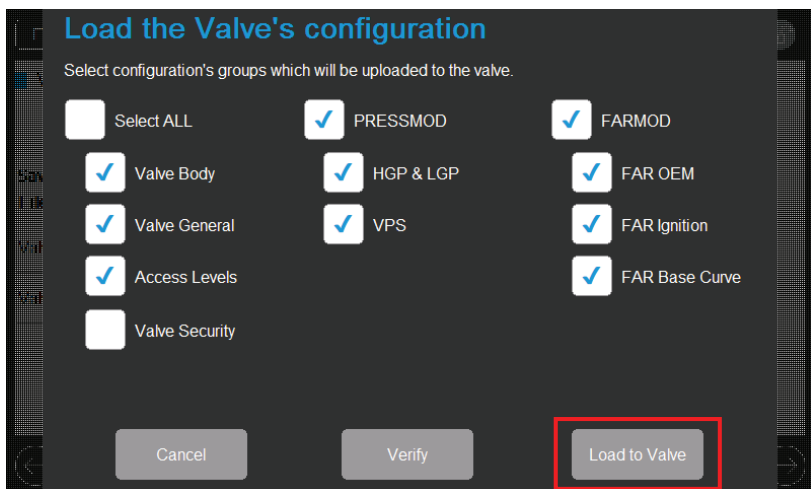


Fig. 105: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group not selected.

6. Select the 'Load to Valve' button. As the user interface is sending the selected configuration to the valve, the progress bar pops up to show download progress. Refer to [Fig. 106](#).

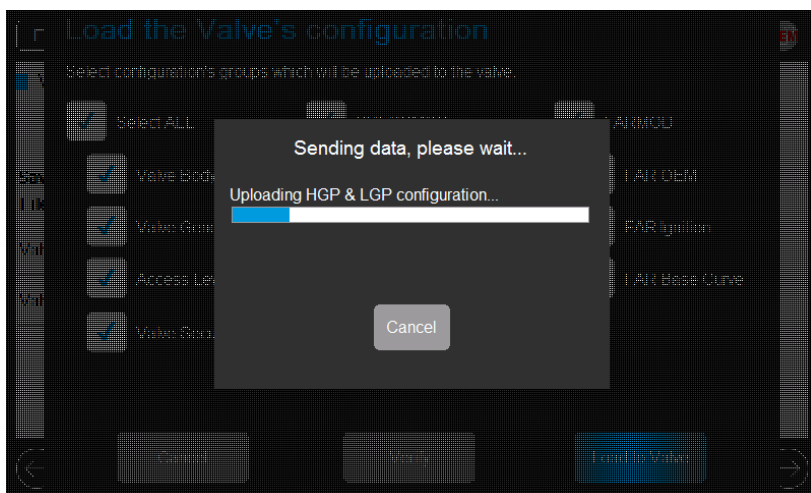


Fig. 106: Load valve configuration progress bar.

7. Once the data is successfully sent and verified, the text 'Data sent successfully' is displayed at the top of the progress bar. Refer to [Fig. 107](#).

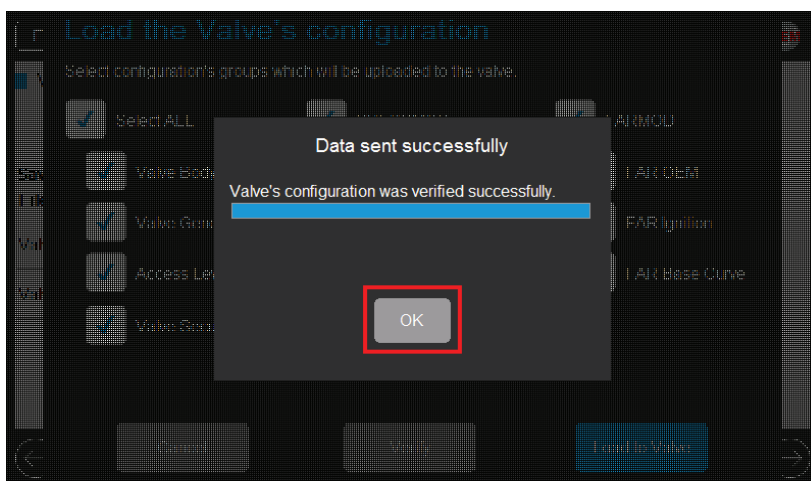


Fig. 107: Load valve configuration successful completion.

8. Select the 'OK' button ([Fig. 107](#)) to proceed to the 'Safety Parameters Verification' step (refer to [Fig. 108](#) and [Fig. 109](#)).

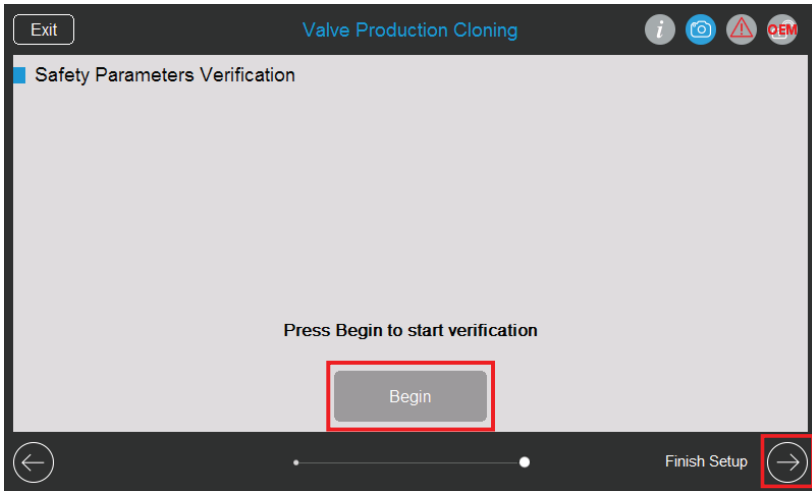


Fig. 108: Safety Parameters Verification page.

9. Perform the Safety Parameters Verification by selecting the 'Begin' button.

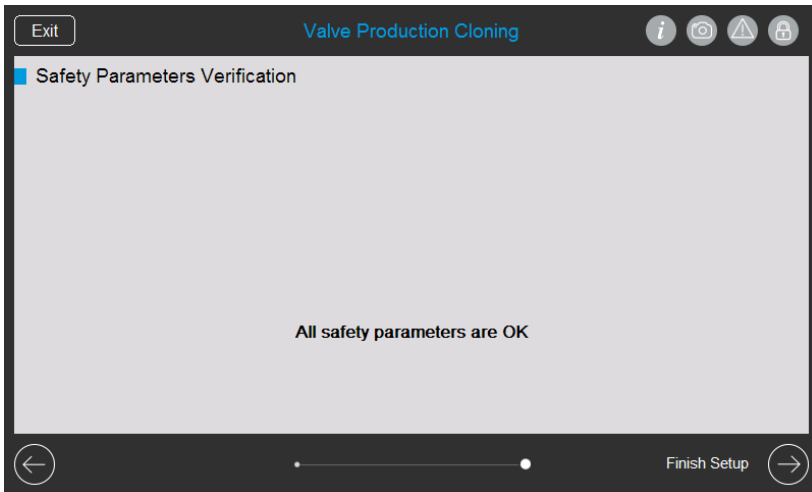


Fig. 109: Safety Parameters Verification completed.

10. Select the 'Finish Setup' button to complete the valve cloning procedure.

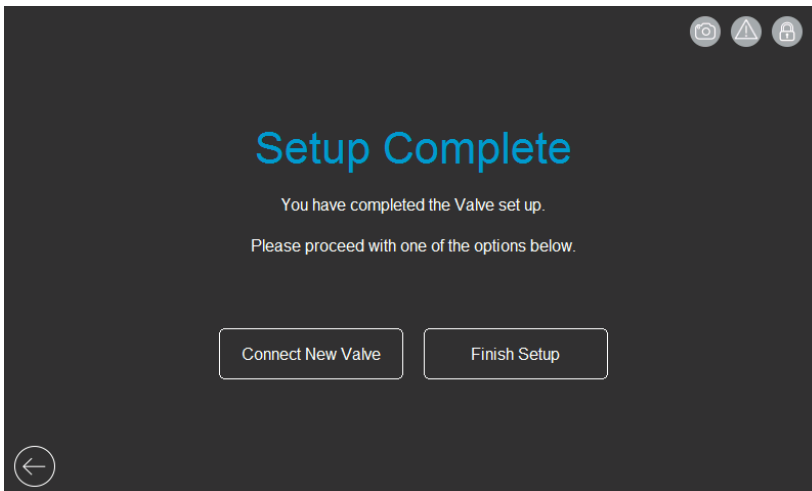


Fig. 110: Setup Complete page.

11. There are two options on the Setup Complete page:

- a. Select the 'Connect New Valve' button to connect another valve and/or clone another valve. The user is redirected to the Home page where another valve can be selected for cloning or any connected valve can be selected for viewing status.
- b. Select the 'Finish Setup' button to finalize the valve cloning procedure and return to the Valve Status page (refer to [Fig. 111](#)).

12. After cloning is complete, start the valve in the Installer or OEM mode and set the new fuel/air Correction Curve and record the Ign. Air Level to make the valve fully operational.

Configured Valve Procedure

1. With the valve connected to the user interface (HMI Tool or PC Tool), navigate to the Home page. The attached configured valve(s) are identified via a date stamp at the bottom of the valve tile(s). Refer to [Fig. 111](#).

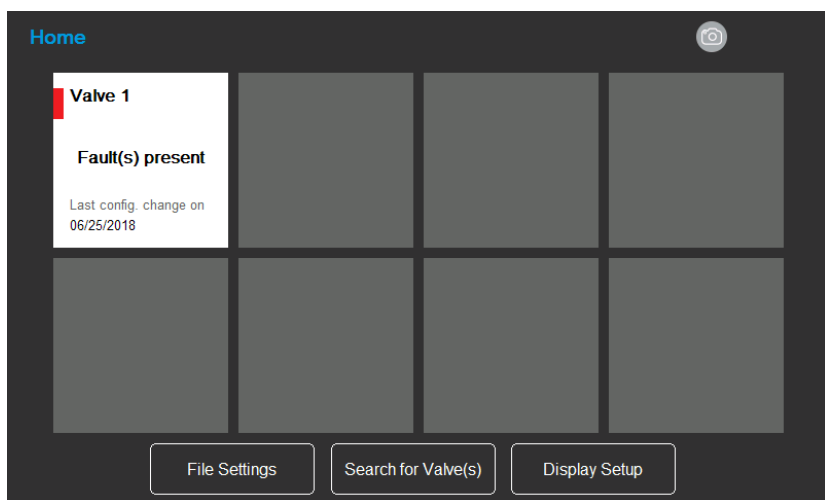


Fig. 111: Configured valve tile on user interface.

2. Select the appropriate connected valve tile. The valve status page will be displayed. Refer to [Fig. 112](#).

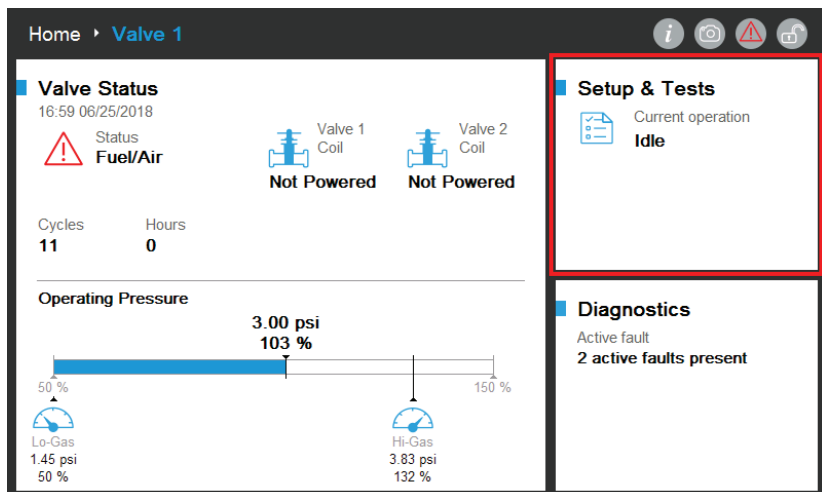


Fig. 112: Valve status page.

3. Select the 'Setup & Tests' tile on the valve status page. This will open the 'Setup & Tests' page. Refer to [Fig. 113](#).

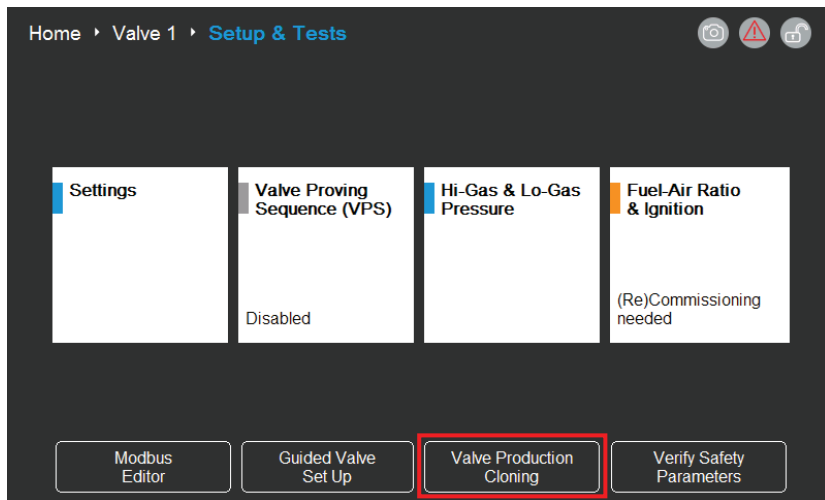


Fig. 113: Valve Production cloning selection for configured valve.

4. Select the 'Valve Production Cloning' button.

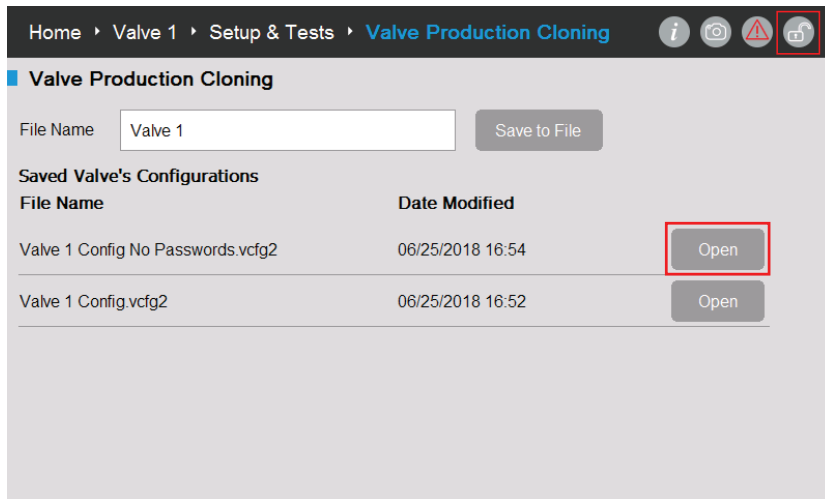



Fig. 114: Valve Production Cloning screen.

5. On the 'Valve Production Cloning' screen that appears, log in under the OEM access level by selecting the padlock symbol  in the upper right hand corner of the page. Refer to [Fig. 114](#).
6. Select the appropriate valve configuration to load to the valve by pressing the 'Open' button beside it (Refer to [Fig. 114](#)). The configuration cloning groups page will pop up.
 - a. The page look and next steps will depend on whether passwords have not been assigned (Refer to [Fig. 116](#)) or have been assigned (Refer to [Fig. 117](#)).

Valve Configuration Without Passwords

The steps for selecting and uploading the valve configuration groups without and with passwords is the same with one exception; the user does not need to fill in the OEM password if passwords have not been assigned. Refer to [Fig. 115](#).

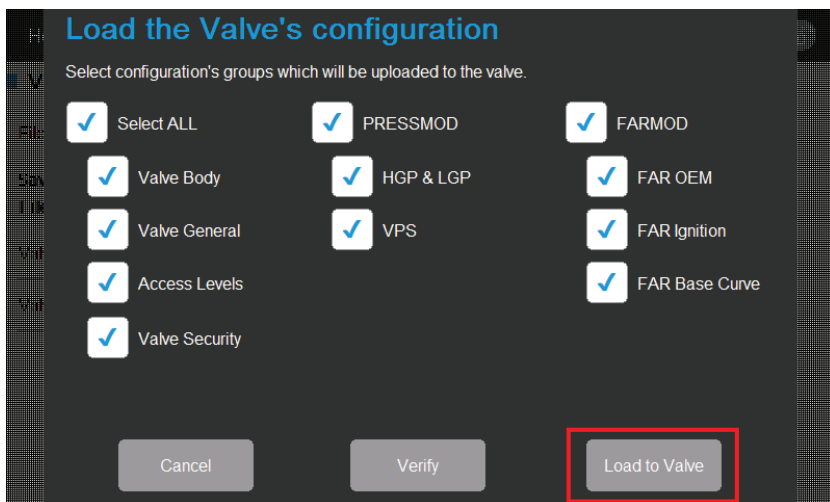


Fig. 115: Valve Production Cloning configuration groups selection, without passwords.

Valve Configuration With Passwords

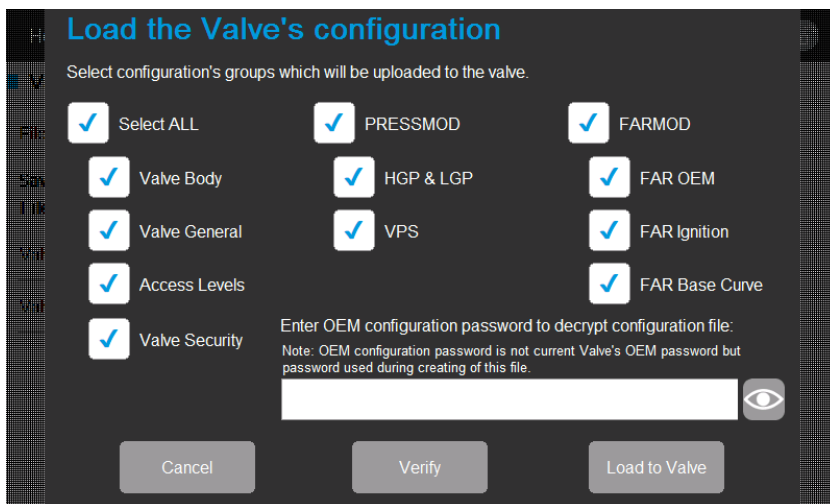


Fig. 116: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group selected.

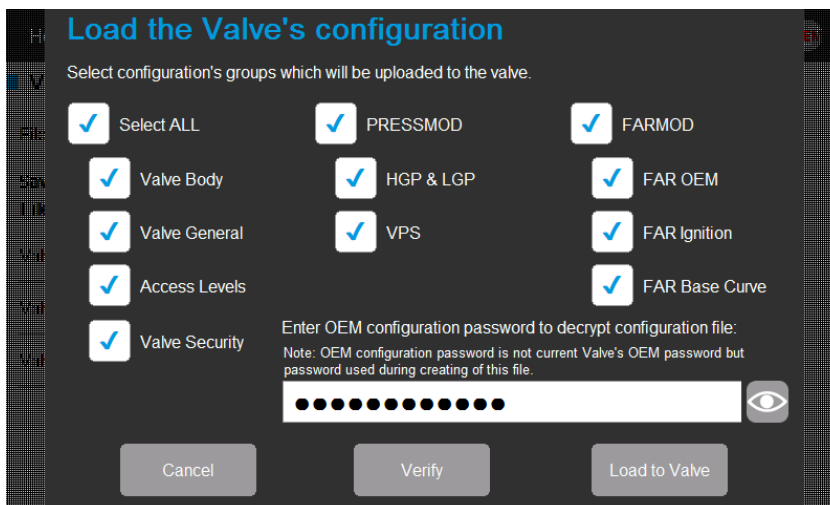


Fig. 117: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group selected and OEM configuration password automatically pre-filled.

7. Select the required valve configuration groups. Refer to [Table 24](#) and [Fig. 117](#).
 - a. If the 'Valve Security' group is checked, the OEM main password must be entered on this page. The OEM main password provided must be the password that was entered when the selected configuration was created. Typically, this password would be specific to a particular valve/appliance configuration and would be the same for valves/appliances of that configuration from an OEM manufacturer in accordance with best practices. For further information on password access levels and best practices, refer to [CHAPTER 6](#).

NOTE: The last entered and valid OEM main password is temporarily stored for the selected valve configuration. If the same valve configuration is opened again, the OEM main password is automatically prefilled (refer to [Fig. 117](#)). If a different valve configuration is selected, the OEM main password must be entered again.

- b. If the 'Valve Security' group is unchecked, the OEM main password does not need to be entered on this page. Refer to [Fig. 118](#).

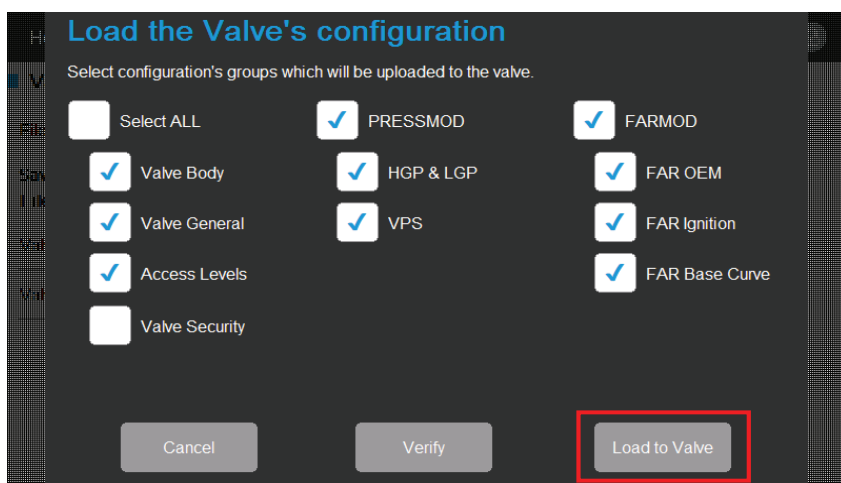


Fig. 118: Valve Production Cloning configuration groups selection, with passwords, 'Valve Security' group not selected.

8. Select the 'Load to Valve' button. As the user interface is sending the selected configuration to the valve, the progress bar pops up to show download progress. Refer to [Fig. 119](#).

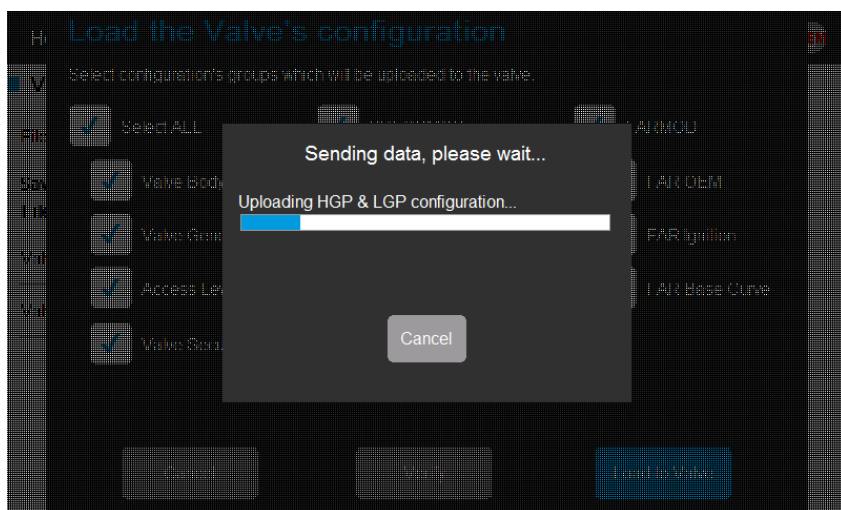


Fig. 119: Load valve configuration progress bar.

9. Once the data is successfully sent and verified, the text 'Data send successfully' is displayed at the top of the progress bar. Refer to [Fig. 120](#).

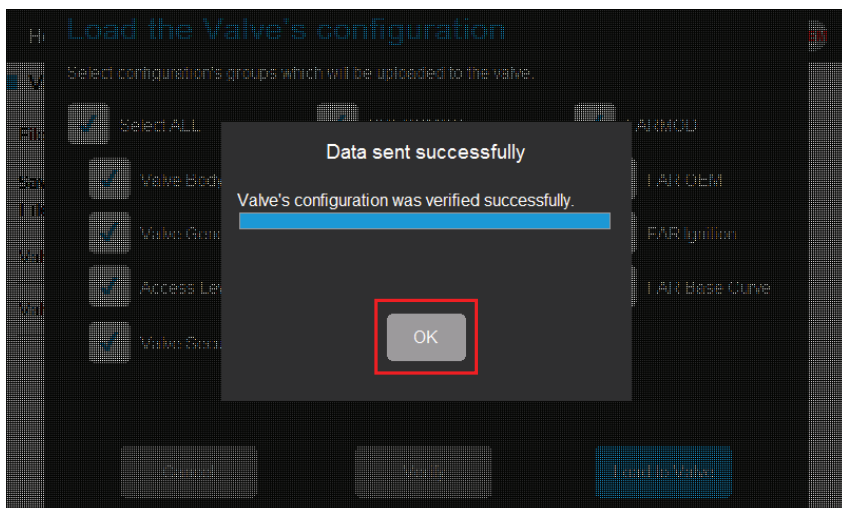


Fig. 120: Load valve configuration successful completion.

10. Select the 'OK' button to proceed to the 'Safety Parameters Verification' step. Refer to [Fig. 121](#) and [Fig. 122](#).

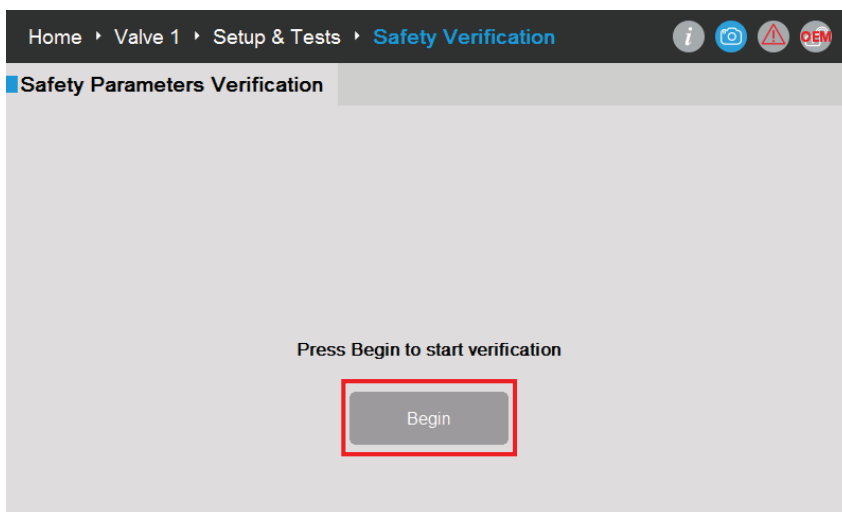


Fig. 121: Safety Parameters Verification page.

11. Perform the Safety Parameter Verification by selecting the 'Begin' button.

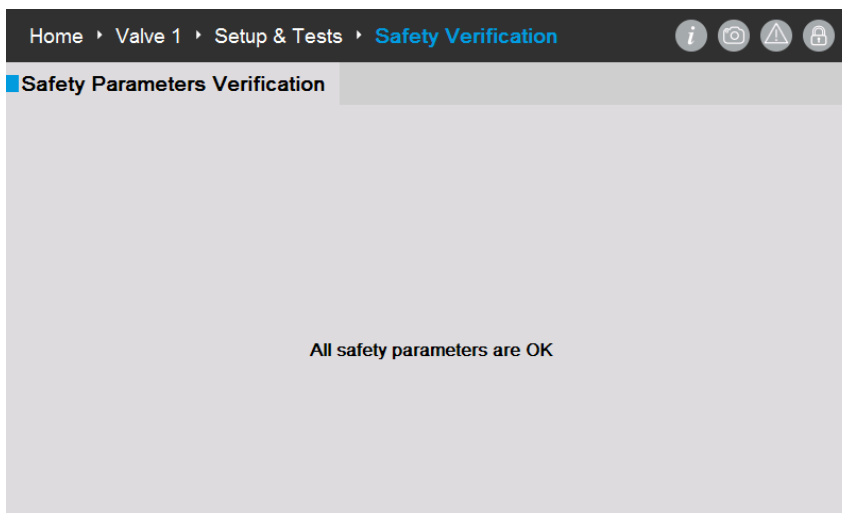


Fig. 122: Safety Parameters Verification completed.

12. Select the 'Home' wording at the top to go to the Home page (refer to [Fig. 99](#) and [Fig. 111](#)) or the valve name wording to go to the valve status page (refer to [Fig. 112](#)).
13. After cloning is complete, start the valve in the Installer or OEM mode and set the new fuel/air Correction Curve and record the Ign. Air Level to make the valve fully operational.

CHAPTER 8 : FUEL/AIR RATIO MODULE CHANGE-OUT PROCEDURE

FARMOD Replacement Background

Applies to valve firmware version 12.01 or later. HMI/PC Tool software version 12.01.002 or later

Should field replacement of the Fuel/Air Module be necessary, ensure that the correct model is ordered. Refer to [Table 16](#) and/or the model information on the FARMOD installed on the valve.

During normal operation, certain FARMOD fuel/air parameters are automatically backed up in the valve main electronics. However, replacement of the FARMOD does result in partial loss of the commissioning data, which requires partial re-commissioning of the application. This is because parameters specific to a particular FARMOD, including the Correction Curve and the recorded pre-ignition air value (Record Ign. Air Level), are not stored in the valve main electronics board.

After connecting a new or previously configured / used FARMOD, lockout condition(s) will result. The user needs to confirm acceptance of the replaced FARMOD on the FARMOD tab in the Setup & Tests menu, or they can use the guided setup routine to complete all setup functions.

When the FARMOD is replaced:

- The FARMOD back-up data stored on the valve main electronics board is automatically loaded onto the replacement FARMOD once the valve is powered. Normal operation of the valve will be locked until the Ign. Air Level is recorded (refer to [Fig. 128](#) and [Fig. 134](#)) and a minimum of 4 points are re-commissioned on the Correction Curve (minimum, maximum and two intermediate loads) (refer to [Fig. 129](#) and [Fig. 135](#)).
- The user can choose to modify the existing setup (if allowed by the OEM) by logging in with the proper access level credentials. The OEM Base curve can be modified by deleting single points or deleting all points and re-creating the curve. Refer to [Fig. 56](#).

NOTES:

- **In order for the Installer to perform the FARMOD replacement in the field, the OEM must grant them access to the following Valve Access Levels Settings. Refer to [Fig. 123](#) and [Table 24](#).**
 - **FARMOD. The replacement FARMOD must be Accepted. Refer to [Fig. 126](#) and [Fig. 132](#).**
 - o **The Record Ign. Air Level box must be checked when replacing the FARMOD in the field. Refer to [Fig. 128](#) and [Fig. 134](#).**
 - o **The Record Ign. Air Level check box access is included with the FARMOD access level. Note that the Record Ign. Air Level check box resides on the FAR Ignition page.**
 - **FAR Corrective Curve. The Correction Curve must be re-commissioned. Refer to [Fig. 129](#) and [Fig. 135](#).**

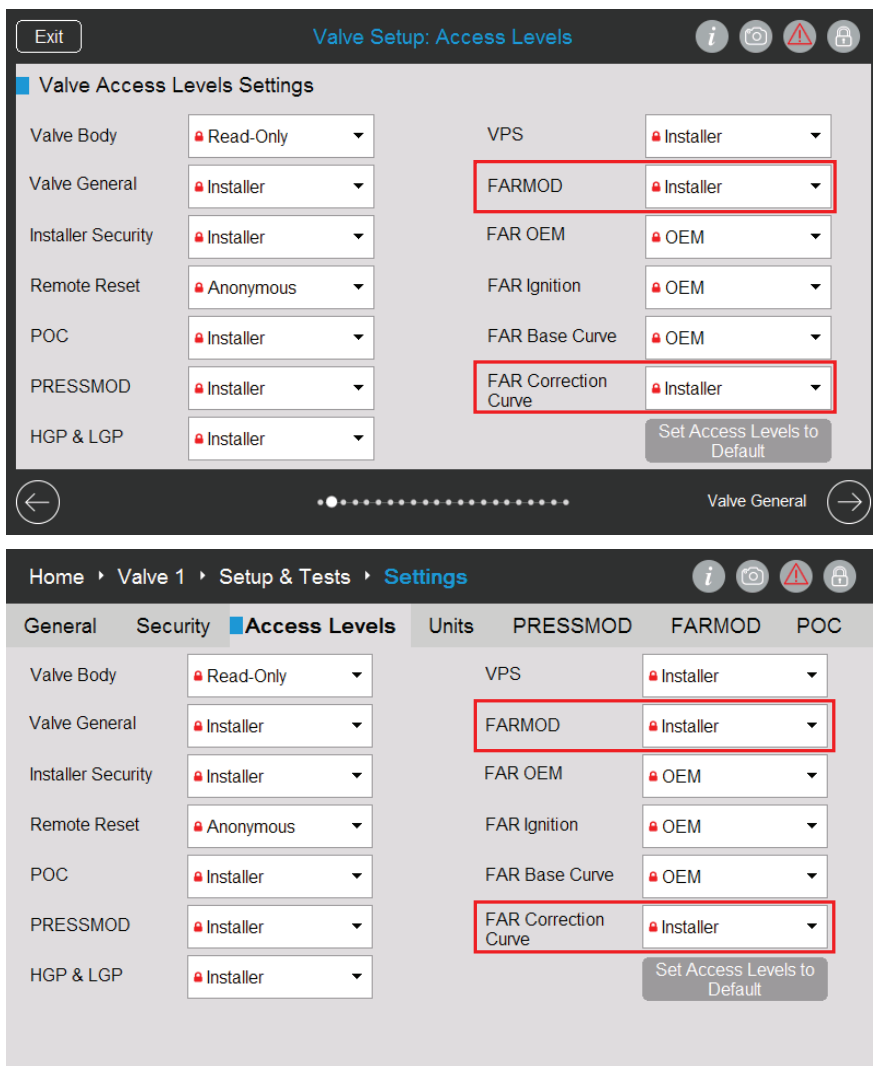


Fig. 123: Access Levels assignment screen.

IMPORTANT

- Using a previously configured / used FARMOD is allowed, however, the user should exercise caution when doing so as it could result in reliability issues if the usage/history of the FARMOD is unknown.
- The SV2 Series valves have internal algorithms that prevent the accidental or intentional removing of the Fuel Air Ratio Module once the valve has been fully setup and is in use. If the FARMOD cable is disconnected, the valve will lockout.
- The fuel/air valves (V2V) FARMOD and main electronics CANNOT be replaced at the same time or all Honeywell and OEM factory + field data will be lost, including the valve-specific stepper motor full stroke calibration. If both components must be replaced, the installer must replace 1 at a time. Follow the Fuel/Air Ratio Module Change-Out Procedure outlined in this chapter, restoring power after to preserve the configuration. Then follow the Valve Main Electronics Change-Out Procedure in Chapter 9. This will preserve the most setup parameters.

New FARMOD Procedure

1. Replace module on valve per instructions in the SV2 Series Valve Fuel Air Ratio Modules installation instruction document, 32-00040, which is packed with the replacement Fuel/Air Module.
2. Once the valve is repowered, there will be 2 active faults present. Refer to [Fig. 124](#).

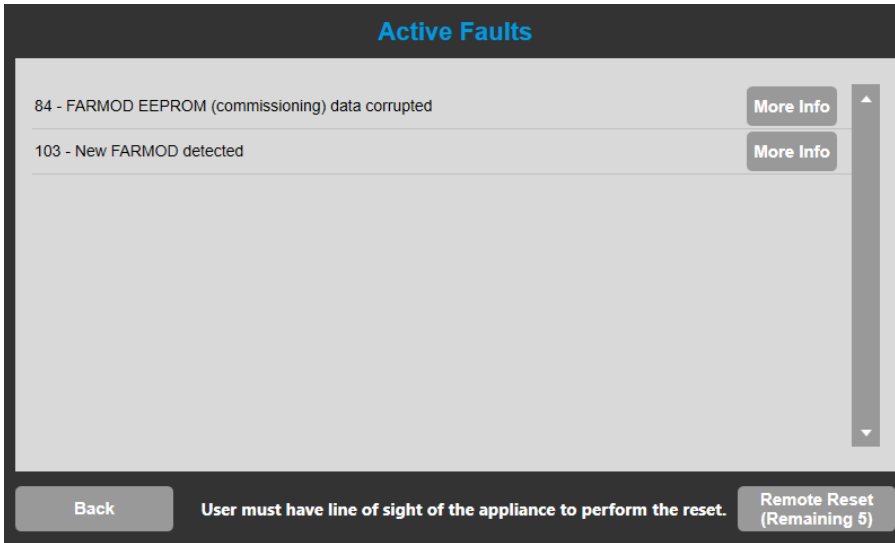


Fig. 124: Active faults with new FARMOD.

3. Navigate to the Setup & Tests menu and select the Settings tile. See [Fig. 125](#).

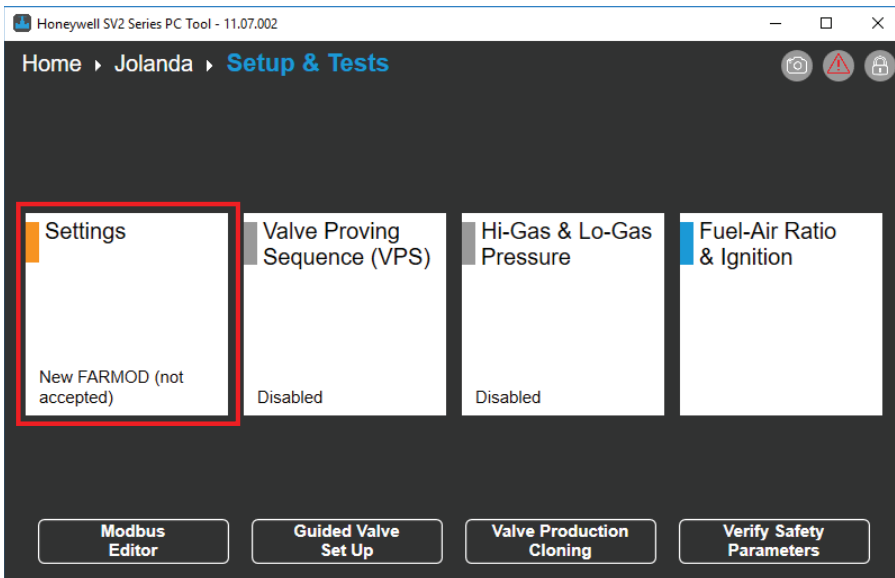


Fig. 125: Setup & Tests menu.

4. Go to the FARMOD tab and Accept the newly attached FARMOD by pressing the Accept button. Refer to [Fig. 126-Fig. 127](#).

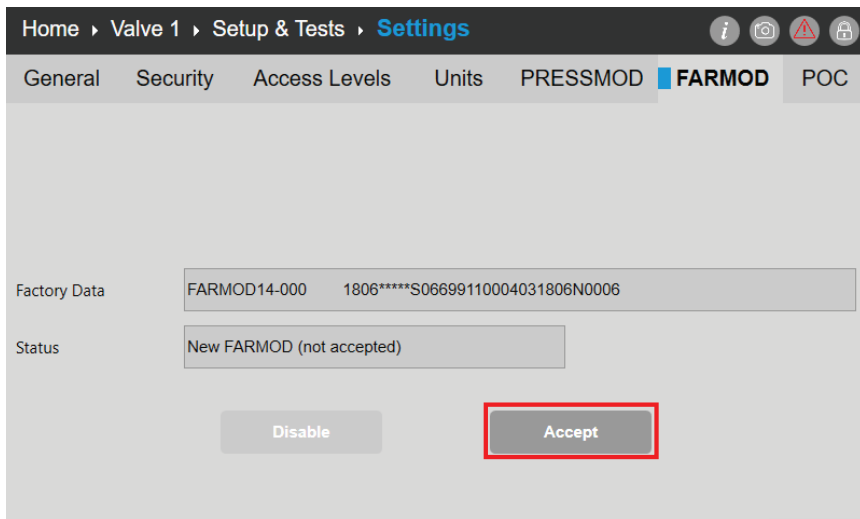


Fig. 126: FARMOD tab, FARMOD not accepted.

NOTE: The Disable button should only be used if a FARMOD has been added to an on/off valve by mistake. If it has been added to an on/off valve by mistake, it must be disconnected within 2 hours and the Disable button selected otherwise the main electronics must be replaced to make the valve usable again.

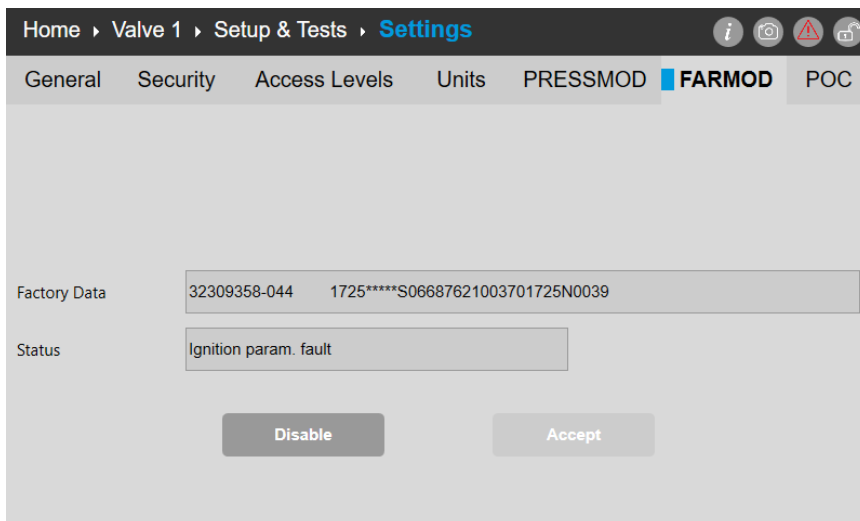


Fig. 127: FARMOD tab, FARMOD accepted.

5. By accepting the new FARMOD, the partial FARMOD data is automatically loaded into the new FARMOD from the valve main electronics where it is backed up. The data includes the Base Curve and valve-specific modulation motor full stroke data. The OEM Setup and Ignition Setup parameters are always stored in the main board.
6. There will be an Ignition parameter fault since the recorded pre-ignition air value (Record Ign. Air Level) will need to be recommissioned as it is linked to a specific FARMOD serial number. To fix this, navigate to the Setup & Tests menu and select the Fuel-Air Ratio & Ignition tile (see [Fig. 125](#)). Check the Record Ign. Air Level box (refer to [Fig. 128](#)).

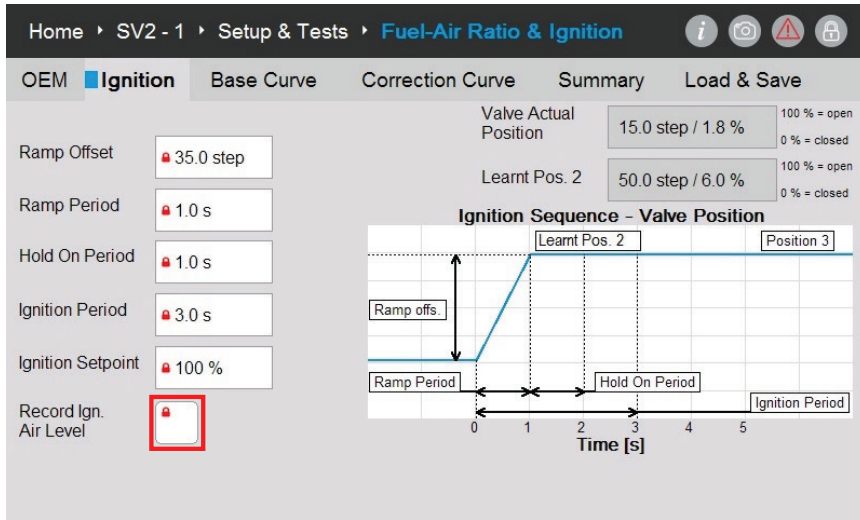


Fig. 128: Ignition Setup Parameters.

7. The Correction Curve will need to be recommissioned because it is also linked to a specific FARMOD serial number. Select the Correction Curve tab as shown in Fig. 129.
 - a. The Correction Curve needs to be built starting with the Minimum point. To set the Minimum load point, run the appliance at minimum load and set the gain factor for this load by selecting Start Point Commissioning and changing the gain factor with the arrow keys until the excess air level has stabilized at the right level. Select the Set Min button to store the gain factor for this point.
 - b. Increase the appliance load and repeat this process for any intermediate load points. The maximum load point should be commissioned last.
 - c. While defining the gain setting for various loads, additional commissioning data can be entered. To enable this function select Enter Optional Data.
 - d. The commissioning of any point can be interrupted by selecting the Stop Point Commissioning button.

NOTE: The user can choose to modify the existing setup (if allowed by the OEM) by logging in with the proper access level credentials. The OEM Base curve can be modified by deleting single points or deleting all points and re-creating the curve. Refer to Fig. 65.

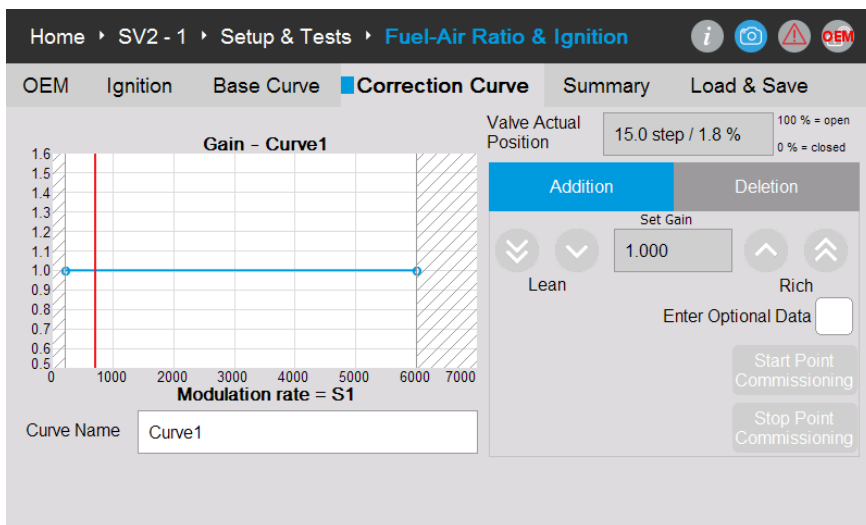


Fig. 129: Correction Curve setup.

Previously Configured / Used FARMOD Procedure

1. Replace module on valve per instructions in the SV2 Series Valve Fuel Air Ratio Modules installation instruction document, 32-00040, which is packed with the replacement Fuel/Air Module.

2. Once the valve is repowered, there will be a FARMOD mismatch active fault present. Refer to [Fig. 130](#).

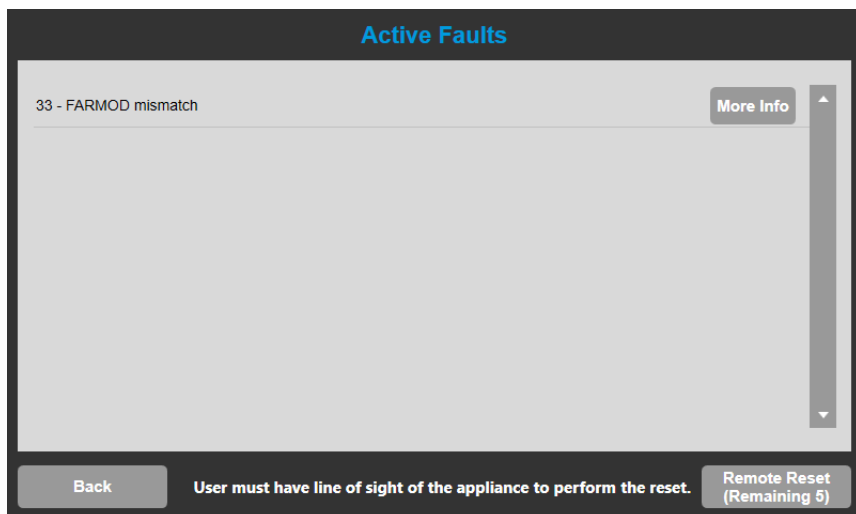


Fig. 130: Active faults with previously configured / used FARMOD.

3. Navigate to the Setup & Tests menu and select the Settings tile. See [Fig. 131](#).

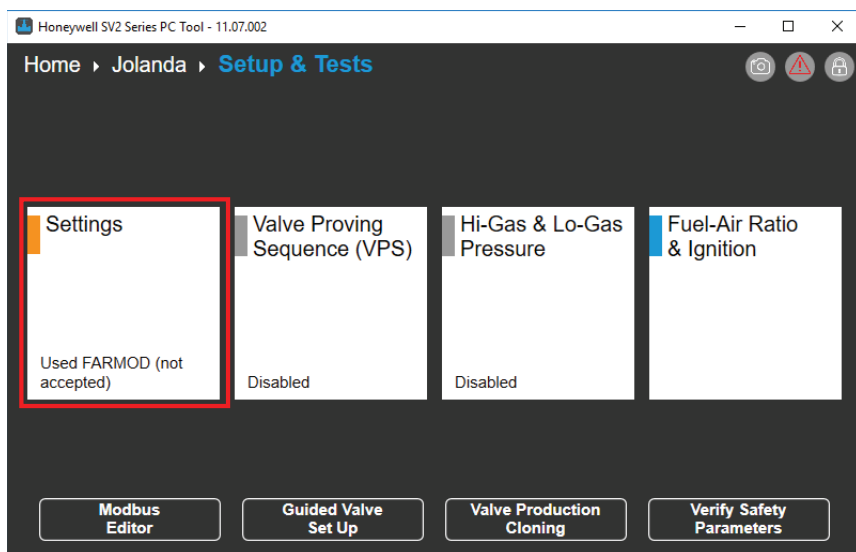


Fig. 131: Setup & Tests menu.

4. Go to the FARMOD tab and Accept the attached used FARMOD by pressing the Accept button. Refer to [Fig. 128-Fig. 129](#).

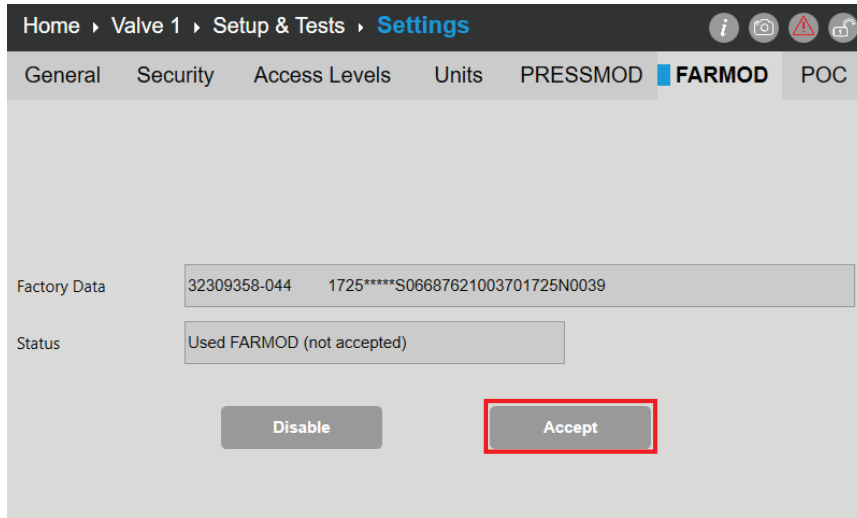


Fig. 132: FARMOD tab, FARMOD not accepted.

NOTE: The Disable button should only be used if a FARMOD has been added to an on/off valve by mistake. If it has been added to an on/off valve by mistake, it must be disconnected within 2 hours and the Disable button selected otherwise the main electronics must be replaced to make the valve usable again.

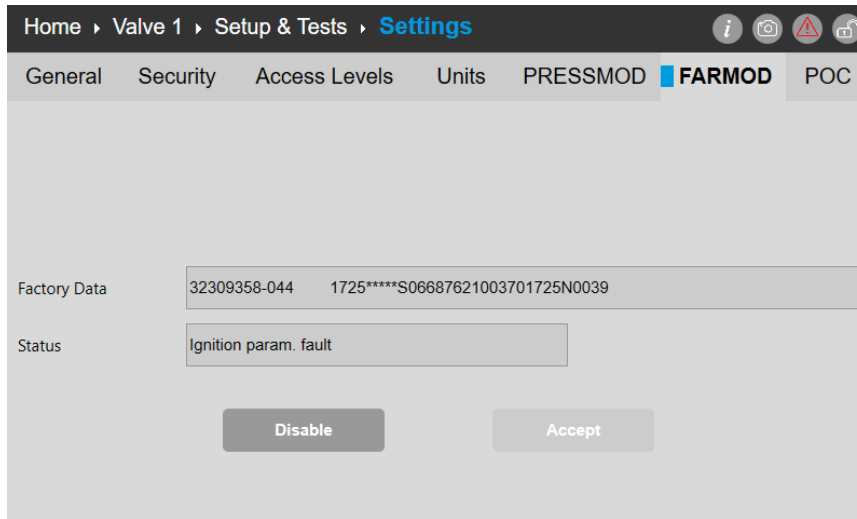


Fig. 133: FARMOD tab, FARMOD accepted.

5. By accepting the new FARMOD, the partial FARMOD data is automatically loaded into the new FARMOD from the valve main electronics where it is backed up. The data includes the Base Curve and valve-specific modulation motor full stroke data. The OEM Setup and Ignition Setup parameters are always stored in the main board.
6. There will be an Ignition parameter fault as shown in [Fig. 133](#), since the recorded pre-ignition air value (Record Ign. Air Level) will need to be recommissioned as it is linked to a specific FARMOD serial number. To fix this, navigate to the Setup & Tests menu and select the Fuel-Air Ratio & Ignition tile. See [Fig. 131](#). Check the Record Ign. Air Level box. Refer to [Fig. 134](#).

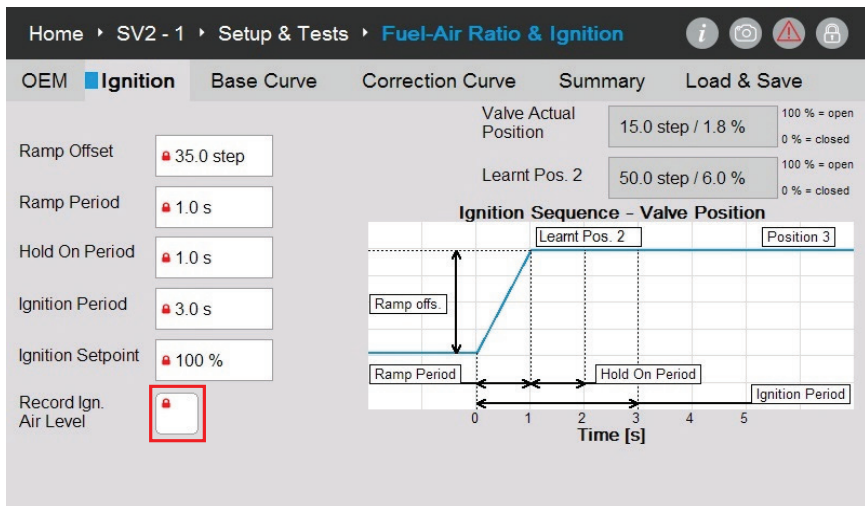


Fig. 134: Ignition Setup Parameters.

7. The Correction Curve will need to be recommissioned because it is also linked to a specific FARMOD serial number. Select the Correction Curve tab as shown in Fig. 135.
 - a. The Correction Curve needs to be built starting with the Minimum point. To set the Minimum load point, run the appliance at minimum load and set the gain factor for this load by selecting Start Point Commissioning and changing the gain factor with the arrow keys until the excess air level has stabilized at the right level. Select the Set Min button to store the gain factor for this point.
 - b. Increase the appliance load and repeat this process for any intermediate load points. The maximum load point should be commissioned last.
 - c. While defining the gain setting for various loads, additional commissioning data can be entered. To enable this function select Enter Optional Data.
 - d. The commissioning of any point can be interrupted by selecting the Stop Point Commissioning button.

NOTE: The user can choose to modify the existing setup (if allowed by the OEM) by logging in with the proper access level credentials. The OEM Base curve can be modified by deleting single points or deleting all points and re-creating the curve. Refer to Fig. 65.

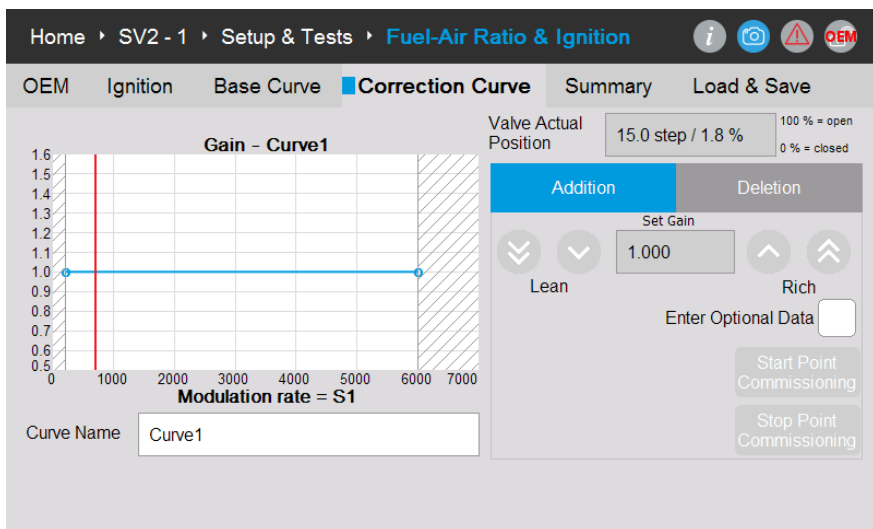


Fig. 135: Correction Curve setup.

CHAPTER 9 : VALVE MAIN ELECTRONICS CHANGE-OUT PROCEDURE

Valve Main Electronics Replacement Background

Applies to valve firmware version 12.01 or later. HMI/PC Tool software version 12.01.002 or later

Should field replacement of the valve main electronics be necessary, ensure that the correct model is ordered. Refer to [Table 1](#) and [Table 14](#) and/or the model information on the main electronics assembly installed on the valve.

During normal operation, all on/off valve parameters and certain FARMOD fuel/air parameters are automatically backed up in the valve main electronics board. Some specific premix fuel/air parameters are automatically stored in the FARMOD (fuel/air ratio module) and are automatically loaded to the replacement main electronics from the FARMOD after power is reapplied.

Replacing the valve main electronics does not require extensive re-commissioning **if the proper procedure is followed as outlined in this chapter and the user is able to save and copy the configuration**. The procedure involves first using the Valve Production Cloning feature in the HMI / PC Tool to store the existing valve setup parameters, if possible, then physically replacing the electronics assembly, copying the stored setup parameters into the new electronics and performing the safety parameter verification procedure.

NOTE: When using the Pressure Module that the low gas pressure and high gas pressure settings must be re-commissioned, if used.

After replacing the valve main electronics assembly and performing the Valve Production Cloning procedure, one or more lockout condition(s) will result. Normal operation of the valve will be locked until the user performs the Safety Parameter Verification Procedure. Any of the following faults can be active after replacing the valve main electronics, depending on the valve configuration:

- 22: Lo-/Hi-Gas pressure not configured
- 47: Safety parameter verification
- 77: POC (proof of closure) of MV1 not verified
- 78: POC (proof of closure) of MV2 not verified

IMPORTANT

- **If the Valve Production Cloning procedure is not performed BEFORE replacing the valve main electronics, parameters will be lost including the valve body size. Additionally, the premix fuel/air OEM Setup + Ignition Setup parameters will be set to their default values, causing non-optimized ignition and requiring re-programming of lost values.**
- **If the Valve Production Cloning procedure cannot be performed due to damaged components, the user will need to manually enter parameters, including the valve body size and the premix fuel/air OEM Setup + Ignition Setup parameters.**
- **DO NOT clone the premix fuel/air Base Curve during the Valve Production Cloning procedure. If the Base Curve is cloned, the Base + Correction Curves that were stored in the FARMOD cannot be uploaded to the new main electronics board.**
- **The fuel/air valves (V2V) FARMOD and main electronics CANNOT be replaced at the same time or all Honeywell and OEM factory + field data will be lost, including the valve-specific stepper motor full stroke calibration. If both components must be replaced, the installer must replace 1 at a time. Follow the Valve Main Electronics Change-Out Procedure outlined in this chapter, restoring power after to preserve the configuration. Then follow the Fuel/Air Ratio Module Change-Out Procedure in Chapter 8. This will preserve the most setup parameters.**
- **The valve main electronics SHALL NOT be replaced with a previously configured main electronics assembly. Using a previously configured electronics assembly will result in possible data mis-matches, causing random faults or inoperability of the valve.**

New Valve Main Electronics Procedure

1. Save the valve's configuration, using the valve production cloning procedure for a configured valve. Refer to the [Configured Valve Procedure](#) in [CHAPTER 7](#) for detailed cloning steps. [Fig. 136](#) shows the valve production cloning save/load screen.

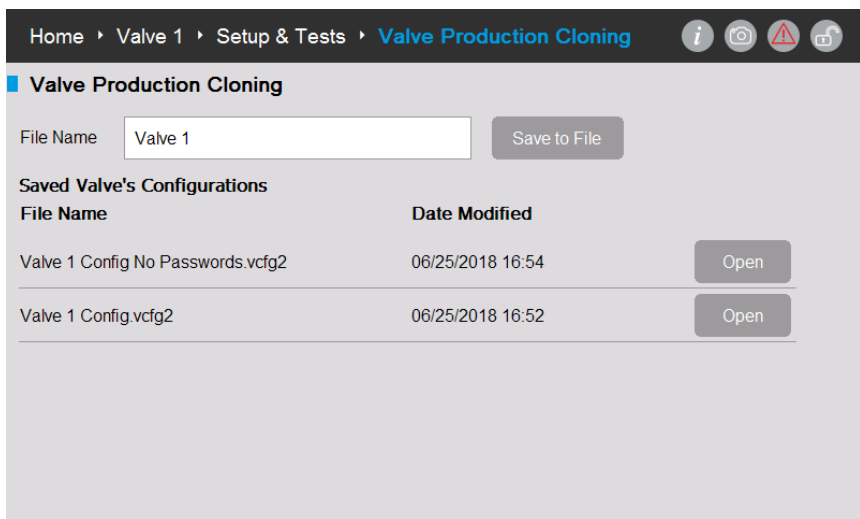


Fig. 136: Valve Production Cloning screen.

- Remove power to the valve and replace electronics assembly per instructions in the SV2 Series Replacement Electronics installation instruction document, 32-00039, which is packed with the replacement electronics assembly.

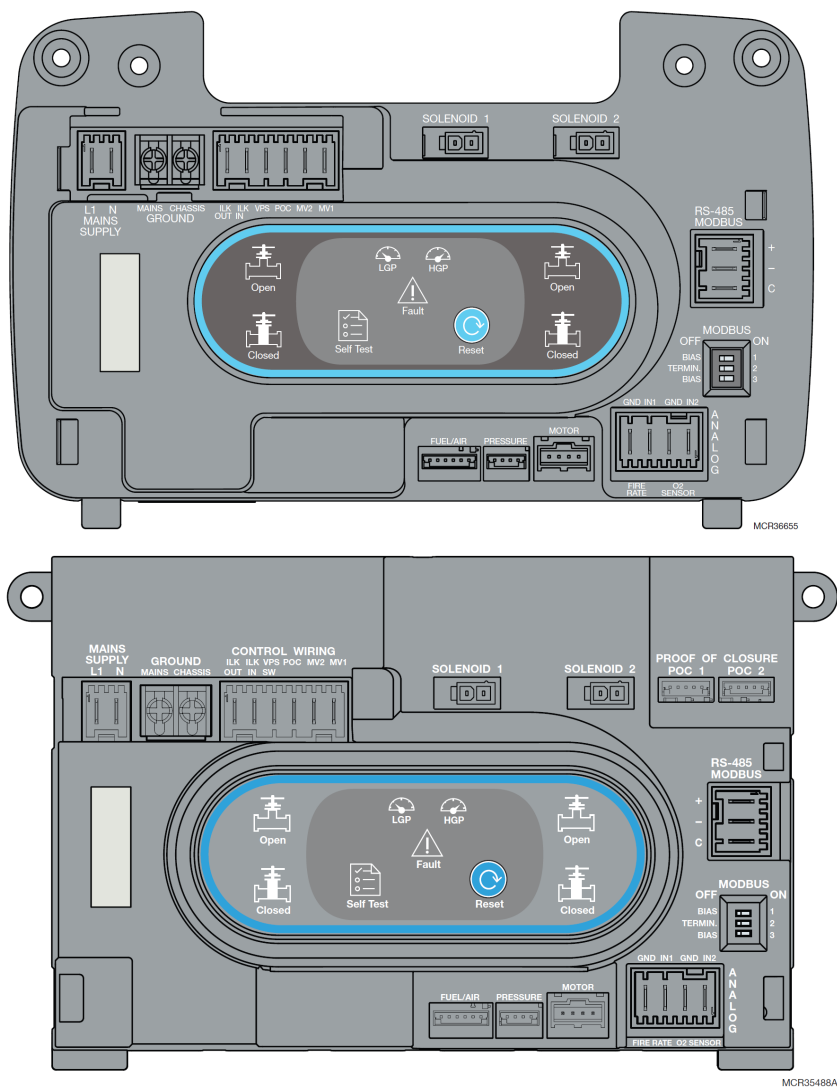


Fig. 137: NEMA 1/IP20 and NEMA 4/IP66 replacement electronics assemblies

3. Once the valve is re-powered, certain premix fuel/air configuration elements, which are specific to a valve + FARMOD are automatically copied from the FARMOD into the new electronics. These include the Base Curve, Correction Curve, motor full stroke and Pre Ign. Air Level.
4. Navigate to the Valve Production Cloning menu. Upload the saved valve configuration to the new electronics, following the [Configured Valve Procedure](#) in [CHAPTER 7](#), cloning all parameters **EXCEPT THE BASE CURVE (if valve is a premix / V2V model)**. Refer to [Fig. 138](#) and the [Configured Valve Procedure](#) in [CHAPTER 7](#) for detailed cloning steps.
 - a. If all of the items shown in [Fig. 138](#) are checked, the following items are cloned; Valve name + Modbus address + baud rate, Valve General Settings, Units, Access Levels Settings, Valve Security Settings, Proof of Closure setup, Pressure Module Lockout Types and VPS Setup, Fuel/Air OEM Setup + Ignition Setup.
 - b. Note that the user will need to re-commission the Pressure Module Hi-Gas and Lo-Gas limit settings by running the burner.

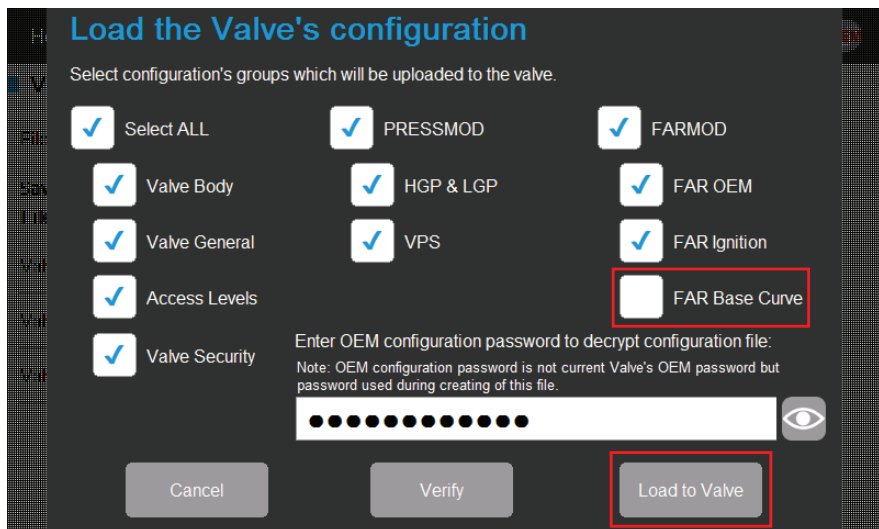


Fig. 138: Valve Production cloning configuration groups selection.

5. If a Pressure Module is used, navigate to the PRESSMOD tab by selecting the following: Attached valve -> Setup & Tests -> Settings -> PRESSMOD. Refer to [Fig. 139](#).
 - a. Accept the Pressure Module (PRESSMOD).

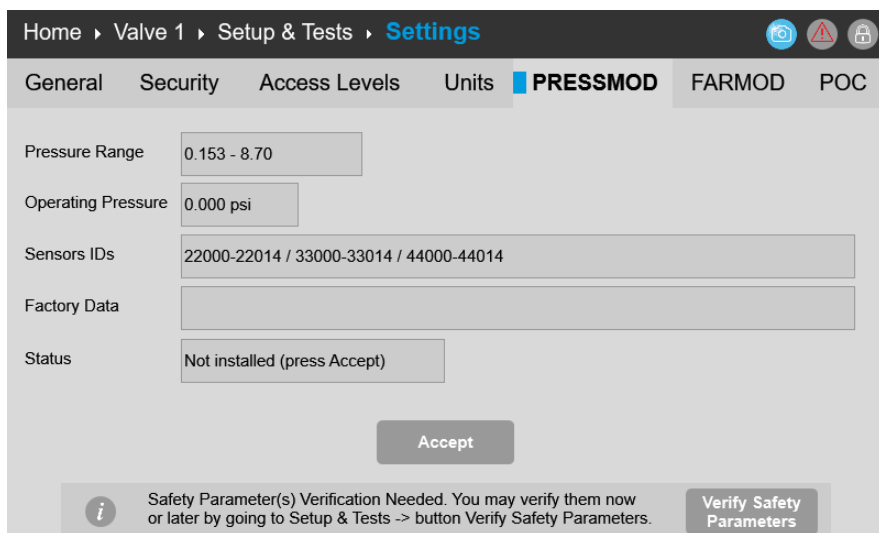


Fig. 139: Pressure Module Tab.

6. Select the POC tab.
 - a. Accept the Proof of Closure Switch(es) (POCs) configuration. Refer to [Fig. 140](#).

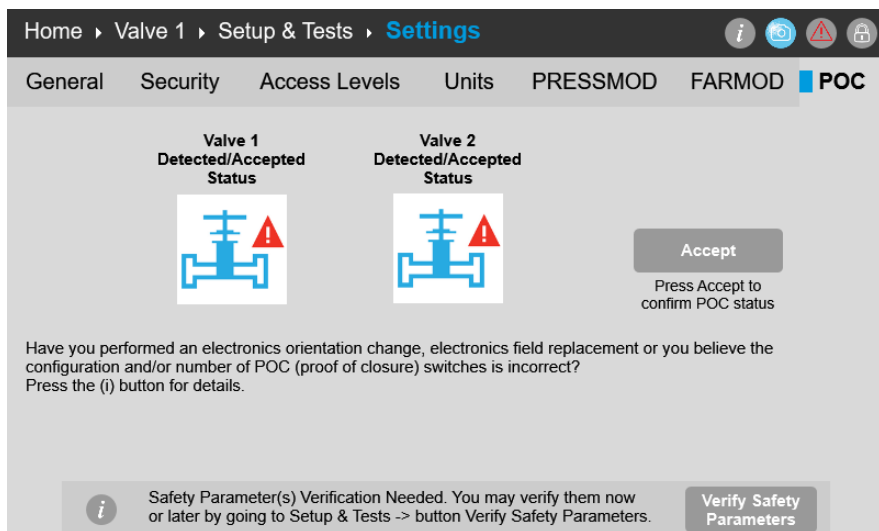


Fig. 140: Proof of Closure Switch tab.

7. Perform the Safety Parameter Verification procedure by selecting the Verify Safety Parameters button at the bottom of the POC tab.

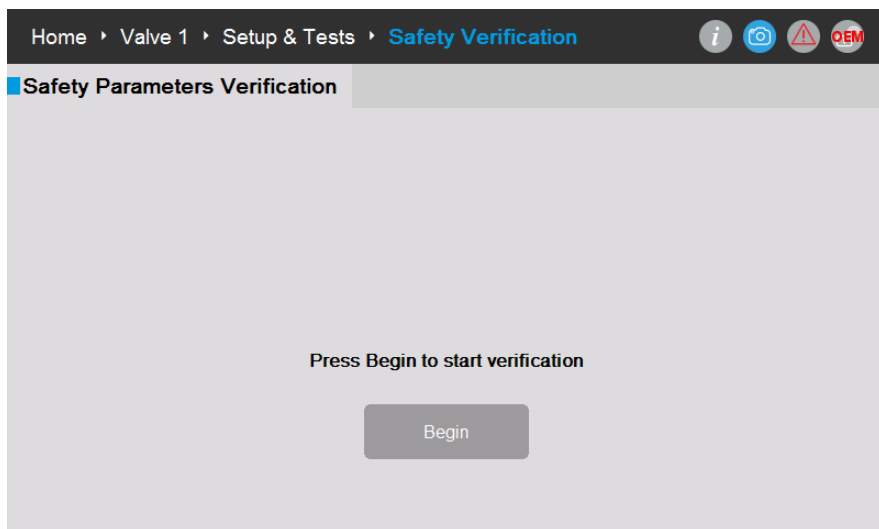


Fig. 141: Safety Parameters Verification page.

8. After cloning and the above steps are complete, start the valve in the Installer or OEM mode and commission the Pressure Module Lo-Gas and Hi-Gas settings, if used, to make the valve fully operational:
 - a. Note that the Fuel/Air valve (V2V models) Base Curve, Correction Curve and Pre-Ignition calibration settings are restored from the connected FARMOD upon valve power-up.
 - b. Pressure Module Lo-Gas and Hi-Gas limit settings. Refer to [Fig. 142](#).
 - Navigate to the Setup & Tests menu.
 - Select the Hi-Gas & Lo-Gas Pressure tile.
 - Accept the warning statement.
 - Choose the Hi-Gas or Lo-Gas tab.
 - Run the burner as specified, allowing the pressure to stabilize. Select the Set Limit button to set the applicable pressure limit. Repeat with the remaining limit setting.

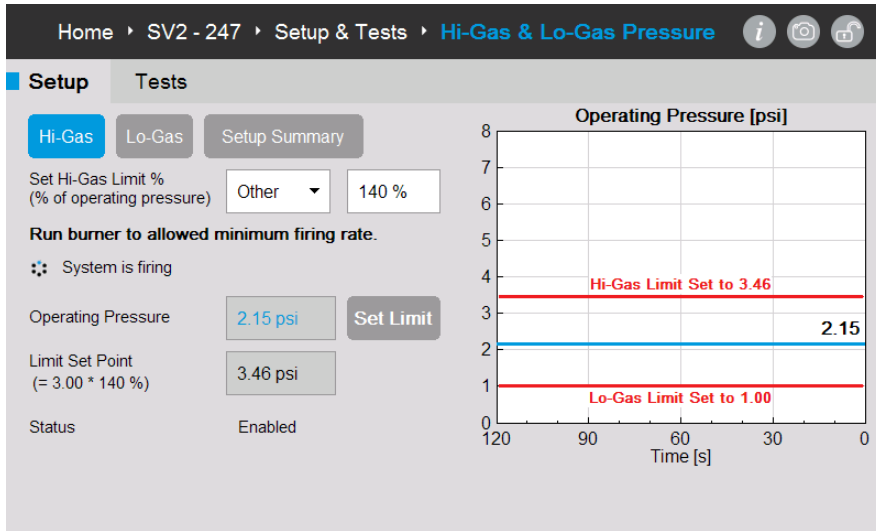


Fig. 142: Hi-Gas & Lo-Gas Pressure setup. Hi-Gas & Lo-Gas Pressure setup.

CHAPTER 10 : CHANGING VALVE / ELECTRONICS ORIENTATION

Introduction

From the factory, each SV2 Series valve must be ordered as either right-hand or left-hand valve/electronics orientation as viewed from the gas outlet end. Refer to digit #10 from Fig. 1 Valve nomenclature. Accordingly, the valve electronics enclosure is mounted per the order specification along with side-specific chassis ground wiring, solenoid 1/2 wiring, valve seat 1/2 Open/Closed LED association and proof of closure 1/2 wiring.

The SV2 Series valve electronics and modules are side flexible, regardless of what orientation was ordered from the factory. As explained in the Valve Body section in Chapter 2, the SV2 Series valve bodies are symmetrical on both sides; there are markings molded into the casting including a gas flow directional arrow, valve seat 1 and 2 markings, pressure port access markings (A, B, C, D) and guide posts for mounting the Pressure Module and C6097 pressure switches to the pressure access ports. Also, each body has a valve chassis ground connection as well as tapped and threaded holes to affix the electrical enclosure in place. Each body ordered with NPT port threads has an appropriately sized NOVV (normally open vent valve) connection.

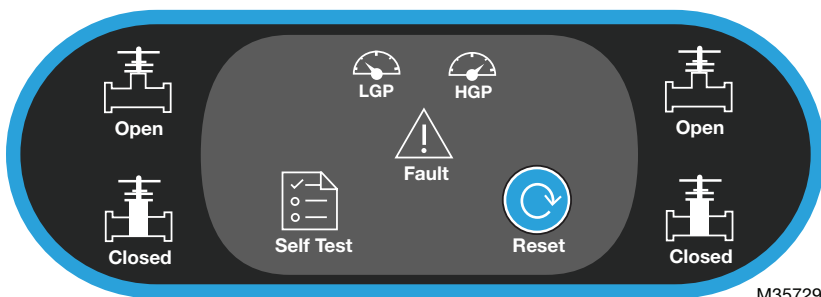
If the valve mounting in the field is such that the electronics and any associated modules must be re-oriented to the other side of the valve to ensure access to the electronics, follow the procedure outlined below.

NOTICE

DO NOT attempt to change the valve electronics side orientation without following these instructions.

IMPORTANT

- Ensure that the SOLENOID 1, SOLENOID 2, POC 1 and POC 2 internal wiring is properly connected per this procedure. Failure to do so may cause unnecessary fault conditions.
- If the electronics orientation is changed in the field, the **LED ORIENTATION CHANGE PROCEDURE MUST ALSO BE COMPLETED** to ensure the LED annunciation continues to indicate status of the valve seat over which it is situated.



M35729

Fig. 143: Valve interface with LEDs.

Electronics Orientation Change Process

If wiring has already been completed, the task will be more involved. The directions below include any necessary considerations for completed wiring.

! WARNING!

Explosion or Fire Hazard

Can cause severe injury, death, or property damage.

- Turn off gas supply before starting installation
- Disconnect power supplies before beginning installation
- More than one disconnect can be involved

! WARNING!

Electric Shock Hazard

Can cause serious personal injury or death.

- Disconnect power supply before beginning installation
- More than one disconnection can be involved

! WARNING!

Explosion Hazard and Electrical Shock Hazard.

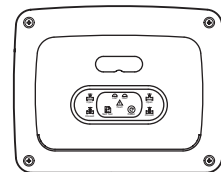
Can cause explosion, serious injury or death.

- Disconnect the power supply making wiring connection to prevent electrical shock and equipment damage.
- More than one power supply disconnect can be involved.

IMPORTANT

- Use only flexible conduit with the SV2 Series valve NEMA 4/IP66 enclosures
- Wiring must comply with all applicable electrical codes, ordinances and regulations.
- Wiring must comply with NEC Class 1 (line voltage) wiring.
- Use lead wire which can withstand 90°C (194°F) ambient temperatures.
- Voltage and frequency of the power supply connected to this control must agree with those marked on the device.
- Loads connected to the VPS (valve proving sequence) Switch and/or POC (proof of closure) contacts, if used, must not exceed the ratings given in [Table 8](#), Field Wiring and Terminal Designation.
- Separate line and low voltage to avoid signal interference. If using conduit, run line voltage and low voltage wiring in separate conduit.

1. Ensure that:
 - a. The line voltage has been removed from the valve.
 - b. The gas supply is turned off and that the manual safety shut-off valve(s) are closed.
 - c. The valve is stabilized and will not tip over or fall.
2. Remove the valve front electrical enclosure retaining screws with the appropriate tool to access the customer wiring terminals.
3. Disconnect all applicable connectors from their sockets inside the main valve electrical enclosure. Refer to [Fig. 144](#).
 - a. Leave the CHASSIS GROUND connection in place.
 - b. Leave the FUEL/AIR, and PRESSURE connectors in place (if applicable).



MCR37165

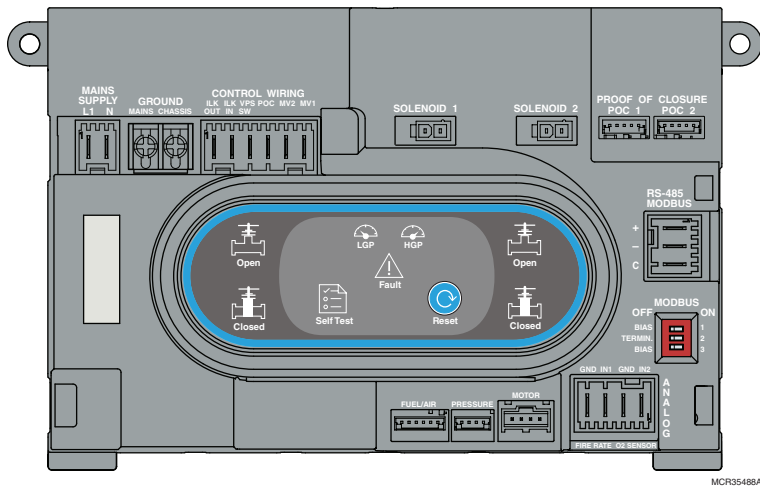


Fig. 144: NEMA 4 / IP66 STANDARD (6) electronics interface.

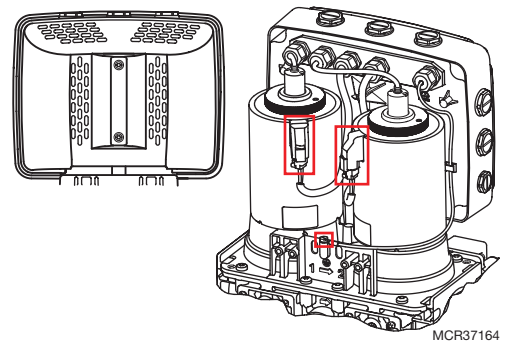
4. On the back side of the valve:
 - a. Remove the solenoid cover retaining screw(s) with the appropriate tool to access the SOLENOID 1/2 and CHASSIS GROUND wiring.
 - b. Between the solenoids remove the green chassis ground screw.
 - c. Remove the black solenoid connectors by pressing the tab & pulling down.

5. If customer wiring is already in place, loosen any flex conduit connections and/or lock nuts and mating cord grips.
 - a. You may need to remove wires from their connectors for the MAINS SUPPLY, MAINS GROUND, CONTROL WIRING, RS-485 MODBUS and ANALOG.
 - b. Loosen the MOTOR cord grip and remove the connector from the electrical enclosure. It will need to be relocated to the other side of the valve.
 - c. Make note of wire connections for each connector. Also reference the as-built electrical drawings and/or the electrical drawings in the BURNER CONTROL INTERFACE WIRING section of this manual.

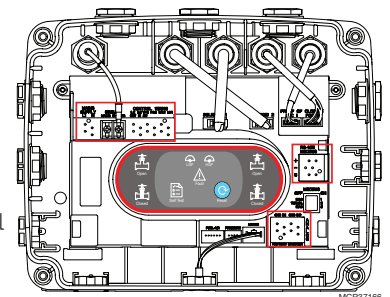
6. Loosen factory lock nuts and their mating cord grips (if applicable) for POC 1/2 factory wiring. Remove cord grips, nuts and factory connectors from electrical enclosure.

NOTE: Leave the factory lock nuts and cord grips in place for the CHASSIS GROUND, SOLENOID 1/2 and PRESSURE connections.

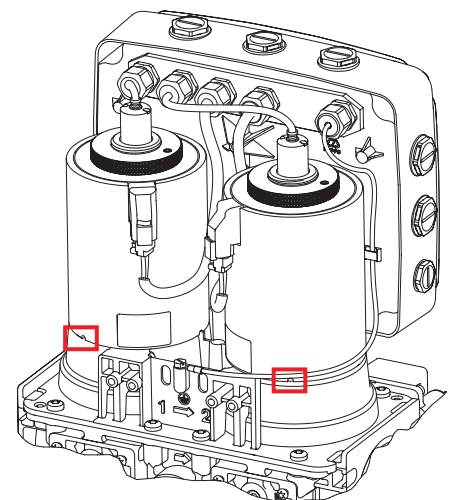
7. Solenoids rotation procedure:
 - a. Loosen and remove the solenoid set screw, then remove the nut, retaining both.
 - b. Lift and rotate each solenoid outward towards the other side of the valve (approximately 90 degrees).
 - c. Lower solenoid, making sure the notches line up and the solenoid is flush with the valve bonnet.
 - d. Replace the nut on top of the solenoid post, hand tightening.
 - e. Replace the set screws, tightening to 4-5 Nm (35-45 in-lbf).



MCR37164

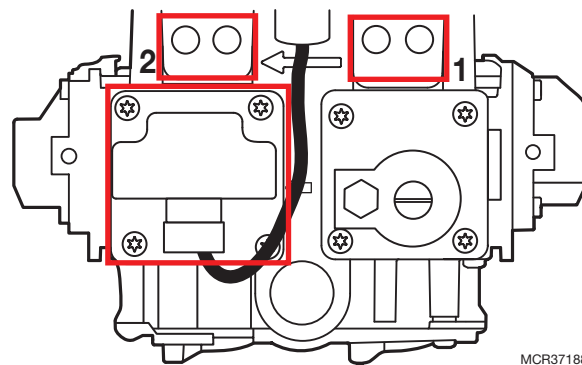


MCR37166



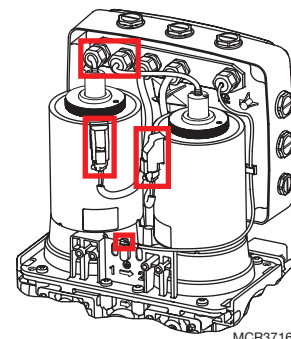
8. Side-mounted components:
 - a. Remove retaining screws for any side-mounted components including the Pressure Module, Fuel/Air Module and C6097 pressure switch(es).
 - b. Make note of mounting location (1 or 2) and access port(s) used (M or O).
 - c. Plug MOTOR and accessory access port(s) as required with spare plugs and nuts that shipped with the valve. Recommended tightening torque is 6-8 Nm (53-71 in-lbf).

NOTE: If the access port plug(s) have been misplaced, use the access port plug(s) removed on opposite side of valve in steps 8.b. and 8.c.



MCR37188

9. Prepping opposite side for side-mounted components:
 - a. For the same mounting location(s) (1 or 2), remove pressure access cover(s), if present.
 - b. For the same pressure access port(s) (M or O), remove the access plug(s).
 - c. For NEMA 1/IP20 enclosures with conduit connections, remove a plug closest to the MOTOR wire connection point.
10. Remove retaining screws for electrical enclosure tabs, supporting the enclosure.
11. Move electrical enclosure and connected side-mounted components to opposite side of valve.
 - a. Fasten electrical enclosure tab retaining screws to valve bonnet. Recommended tightening torque is 4-5 Nm (35-44 in-lbf).
 - b. Fasten side-mounted components to appropriate location(s) (1 or 2). Recommended tightening torque is 1.8-2.2 Nm (16-20 in-lbf).
 - c. (Optional) Fasten the pressure access cover to the un-used side of the valve. Recommended tightening torque is 1.8-2.2 Nm (16-20 in-lbf).
12. Tighten chassis ground wire on opposite side of valve. Recommended tightening torque is 4-5 Nm (35-44 in-lbf).
13. Thread MOTOR connector through the closest entry point and insert connector into its socket. If the MOTOR wire contains a cord grip, tighten to the following specifications to maintain the enclosure tightness:
 - a. Lock nut to the cord grip: 4.5-5.1 Nm (40-45 in-lbf).
 - b. Cord grip sealing nut around the cord: 5.6-6.2 Nm (50-55 in-lbf).
14. Thread factory cord grips for POC 1/2 through rear of electrical enclosure, ensuring the mating lock nut is in place on the inside of the enclosure. Tighten the cord grips and lock nuts to 3.7-4.3 Nm (33-38 in-lbf).
15. Connect black solenoid connectors into the adjacent socket until the tab clicks in place.
16. Connect factory SOLENOID 1/2 and POC 1/2 connectors to their new mating sockets.

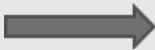


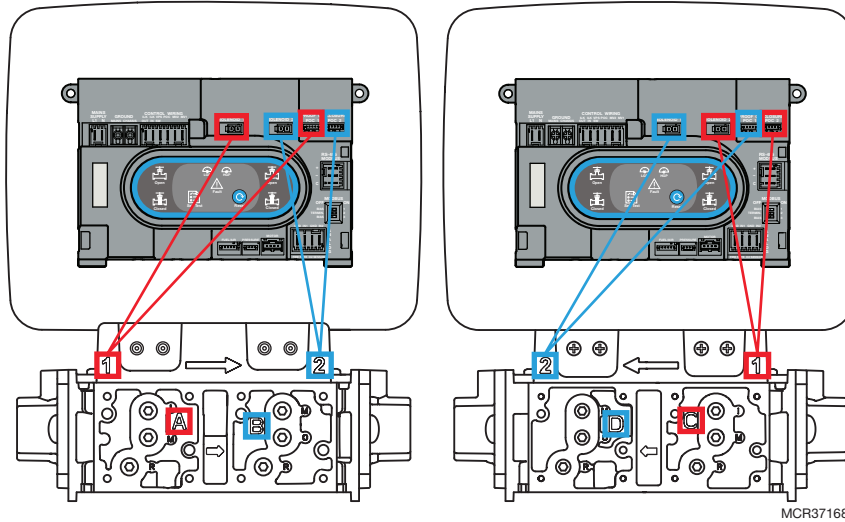
MCR37167

NOTE: Always insert the connectors for the SOLENOIDS / POCs:

- a. Seated above valve seat **1 / A / C** markings as indicated on valve casting to **SOLENOID 1** on the electronics assembly.
- b. Seated above valve seat **2 / B / D** markings as indicated on valve casting to **SOLENOID 2** on the electronics assembly.
- c. Refer to [Table 25](#), [Fig. 144](#) and [Fig. 145](#).

Table 25. Proper SOLENOID / POC connection association relative to valve body casting markings.

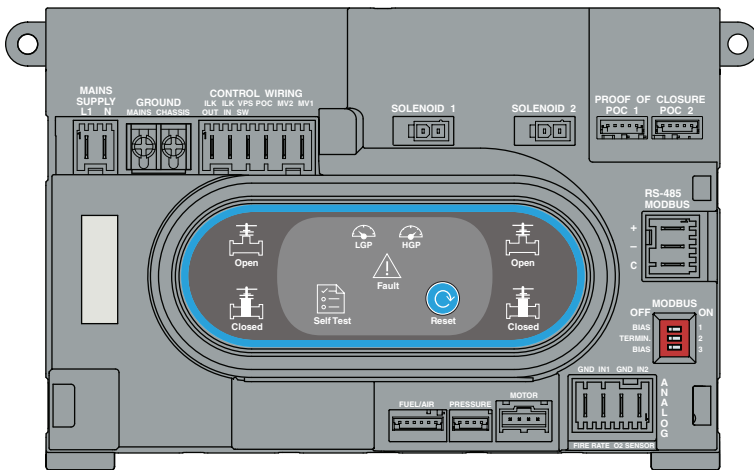
Valve Seat 1	Valve Seat 2	Description
SOLENOID 1	SOLENOID 2	Solenoid connector labeling on electronics assembly
POC 1	POC 2	POC connector labeling on electronics assembly
1	2	Valve seat marking on valve body casting
		Gas flow directional arrow marking on valve body casting
A	B	Left-Hand side pressure access locations marked on valve body casting
C	D	Right-Hand side pressure access locations marked on valve body casting



MCR37168

Fig. 145: Proper SOLENOID / POC connection association relative to valve body casting markings.

17. Re-install the flex conduits, threading wires into electrical enclosure as required and tighten conduit to manufacturer’s recommendations.



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18. Re-wire customer wiring to connectors, if removed, for the MAINS SUPPLY, MAINS GROUND, CONTROL WIRING, RS-485 MODBUS and ANALOG.

a. Follow your connection notes from Step 6. a. and/or the as-built electrical drawings and the electrical drawings in the BURNER CONTROL INTERFACE WIRING section of this manual.

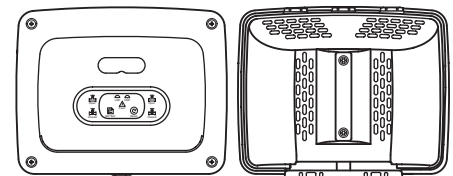
19. Connect customer wiring connectors to their mating sockets.

20. Re-install the solenoid cover, tightening the two (2) retaining screws to 2.2-2.35 Nm (19.5-20.8 In-lbf).

21. Re-install the valve front electrical enclosure cover, tightening the retaining screws to 1.26-1.54 Nm (11-13.63 in-lbf).

22. Re-supply power to the valve.

23. Perform the LED Orientation Change Process below.



M37169

24. Perform a wiring check and static checkout as defined below.
 - a. Cycle the valve several times with the manual fuel shut-off valve(s) closed. Verify that the valve, accessory module(s) and control system function properly
 - b. Perform any necessary tests as outlined in the SV2 Series Safety Shut-Off Valve Installation Instructions (document 32-00018) and the manufacturer.
25. Turn on the gas supply to the valve and open any manual safety shut-off valve(s).

LED Orientation Change Process

Once the electronics orientation process is complete, the LED ORIENTATION CHANGE PROCESS MUST BE COMPLETED in order for the valve seat Open/Closed LEDs to accurately annunciate status of the valve seat over which they are situated.

Note that if a POC (proof of closure) switch is present on the valve, the Open/Closed LEDs will indicate that the valve seat is open. This gives visual position indication per FM (Factory Mutual) 7400 and ANSI Z21.21 / CSA 6.5. If a POC (proof of closure) switch is NOT present, the LEDs will indicate if the solenoids are powered or not powered.

NOTE: Valve must be in a standby sequence (no call for heat, no lockouts) in order to perform this procedure.

NOTE: For valves with an intelligence level of 6 where an HMI or PC Tool is available, this procedure may be performed using the applicable user interface. After communication is established between the valve and user interface, select the connected valve icon → Setup & Tests → Settings → General tab. Select the drop down menu for the LED Indication parameter to change the selection. In order to change this selection, the user must be logged in with the appropriate user access level as assigned by the OEM; the OEM can select the access level for the Valve General settings as OEM or Installer. Refer to Fig. 86 in CHAPTER 6: ACCESS LEVELS.

1. Press and hold the valve Reset button for 10 seconds until all four (4) Open/Closed icon LEDs start to flash in sequence.
 - a. The Open/Closed LEDs for the current V1 and V2 seats will flash in sequence.
 - b. Once this starts, release the valve Reset button.

NOTE: You must release the button within 5 seconds after the start of the flashing or before the sequence has completed flashing 4 times, otherwise the LED orientation change will not occur.

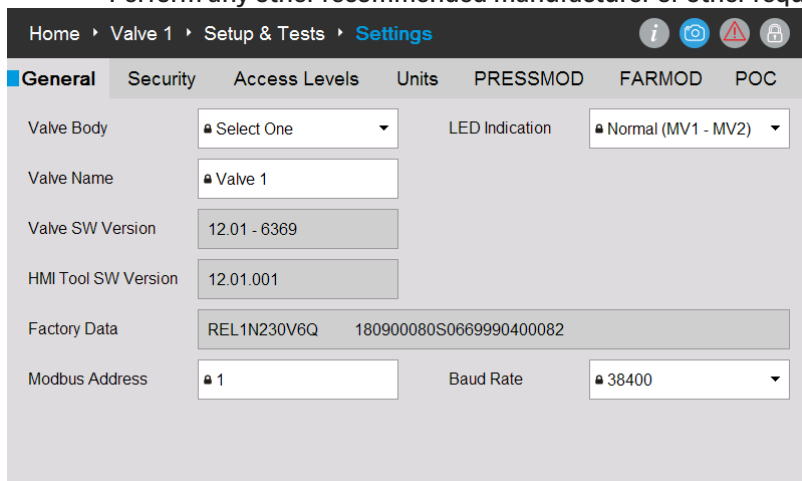
- a. Next the Open/Closed LEDs for the new V1 and V2 seats will flash 4 times in sequence to indicate the orientation change.
- b. Once the LED orientation change has been accepted, all valve LEDs will flash briefly together for clarification.

NOTE: If this simultaneous flashing of all valve LEDs DOES NOT OCCUR, the orientation change procedure was not successful and must be performed again.

Final Wiring Check and Static Checkout

CAUTION

- Cycle the valve several times with the manual fuel shut-off valve(s) closed. Verify that the SV2 Series valve, accessory modules and control system function properly
- Test each limit and interlock to ensure system operates correctly as defined in the applicable flame safeguard control manual instructions.
- Follow burner management system checkout guidelines. For 7800 SERIES, refer to the “Checkout and Test” document, form #65-0229.
- Perform any other recommended manufacturer or other required tests.



Parameter	Value
Valve Body	Select One
LED Indication	Normal (MV1 - MV2)
Valve Name	Valve 1
Valve SW Version	12.01 - 6369
HMI Tool SW Version	12.01.001
Factory Data	REL1N230V6Q 180900080S0669990400082
Modbus Address	1
Baud Rate	38400

Fig. 146: Valve General Settings Tab

APPENDIX

Burner Control Interface Wiring

IMPORTANT: If the burner management control does not have a running or lockout interlock input, consult the factory. The valve ILKIN terminal must be powered before MV1 and MV2 valve seats can be opened or a lockout will occur. The valve INKIN terminal must be tied to a burner management control in some manner and not simply jumpered to L1 power

For the best Modbus communication performance, use shielded wire with two twisted pairs (Belden 9842 or equivalent). Connect + and - to one twisted pair, and C to both wires of the other twisted pair. Connect the shield to earth ground at the end of the connected external device (i.e. HMI, PC or building automation system). Do not connect C to the shield. Run any noise producing wires in conduit separate from the HMI Tool and as far away from the HMI as possible. For further Modbus wiring information, refer to the HMI installation instructions, document 32-00030.

Valve Operational Notes

After valve terminals MV1 and MV2 are powered, the valve will run internal self-diagnostics on its MV1 contact for 200–300 milliseconds and then close the contact to power the valve seats.

All SV2 Series valves have a power save feature built in. The ILKIN / ILKOUT circuit is used as a back-up to shut off the valve through the burner control ILK circuit. If for any reason the power save feature fails, the valve internal ILK contact is opened and a fault annunciated.

The valve internal ILK contact is closed at all times when the valve electronics are powered, unless there is a general fault condition, a Lo-Gas / Hi-Gas pressure lockout condition from the Pressure Module, or just after power-up before internal relay diagnostics are complete.

The valve POC (Proof of Closure) output terminal is energized when both valve seats are sensed closed and open if one or both valve seats are sensed as not closed. On BASIC and STANDARD electronics versions, the valve POC output will remain energized, even during a valve lockout condition.

When using the Pressure Module for the Lo-Gas / Hi-Gas limits, the software is only active after both MV1 and MV2 valve seats are powered.

North American Standards 7800 SERIES Operational Notes

The North American Standard EC/RM78xx controls ILK (Interlock) input must close by 10 seconds into pre-purge otherwise a recycle to the beginning of pre-purge will occur or a safety shutdown, depending on the model. The ILK input is ignored during post-purge.

The pre-ignition input terminal (via the valve POC output) must remain closed during standby through pre-purge otherwise the control returns to the standby state and hold for 30 seconds or a safety shutdown occurs, depending on the model.

The pre-ignition input terminal (via the valve POC output) must be closed within the first 5 seconds of post-purge or the burner control will lockout.

If the SV2 Series Pressure Module Lo-Gas / Hi-Gas limits are set to auto reset and one of them are tripped during the burner control Run cycle on a burner control with lockout interlocks, the burner control will lockout on ILK lockout and need to be manually reset. This occurs since the Pressure Module is located in the ILK circuit of the valve and burner control instead of the Limits circuit.

European Standards 7800 SERIES Operational Notes

The European Standards EC/RM78xx controls LOS (Lockout) input is monitored at all times for closure and will lockout if the input opens, but will continue post-purge if it opens during that sequence.

The pre-ignition input terminal (via the valve POC output) must:

- not be open an accumulative time of 30 seconds during standby

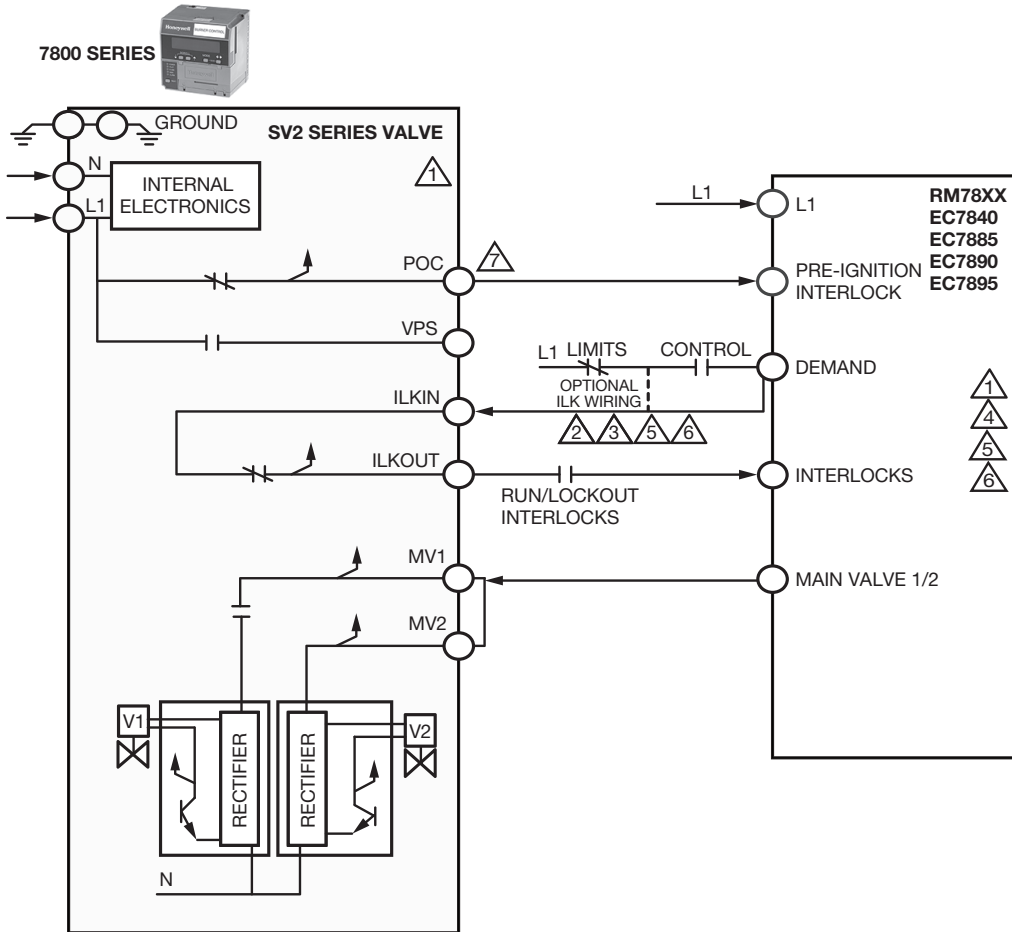
- remain closed during pre-purge through pre-ignition otherwise a safety shutdown occurs.

At this time, the Pressure Module cannot be used for Lo-Gas / Hi-Gas limit operation on European 7800 SERIES models.

No External VPS (Valve Proving System) used; electronics configuration BASIC (5) or STANDARD (6)

Wiring between the SV2 Series valve and Honeywell 7800 SERIES, SOLA, 7800 SERIES and ControLinks and SLATE is shown in this section.

7800 SERIES North American Standards (UL, CSA, FM, etc.)

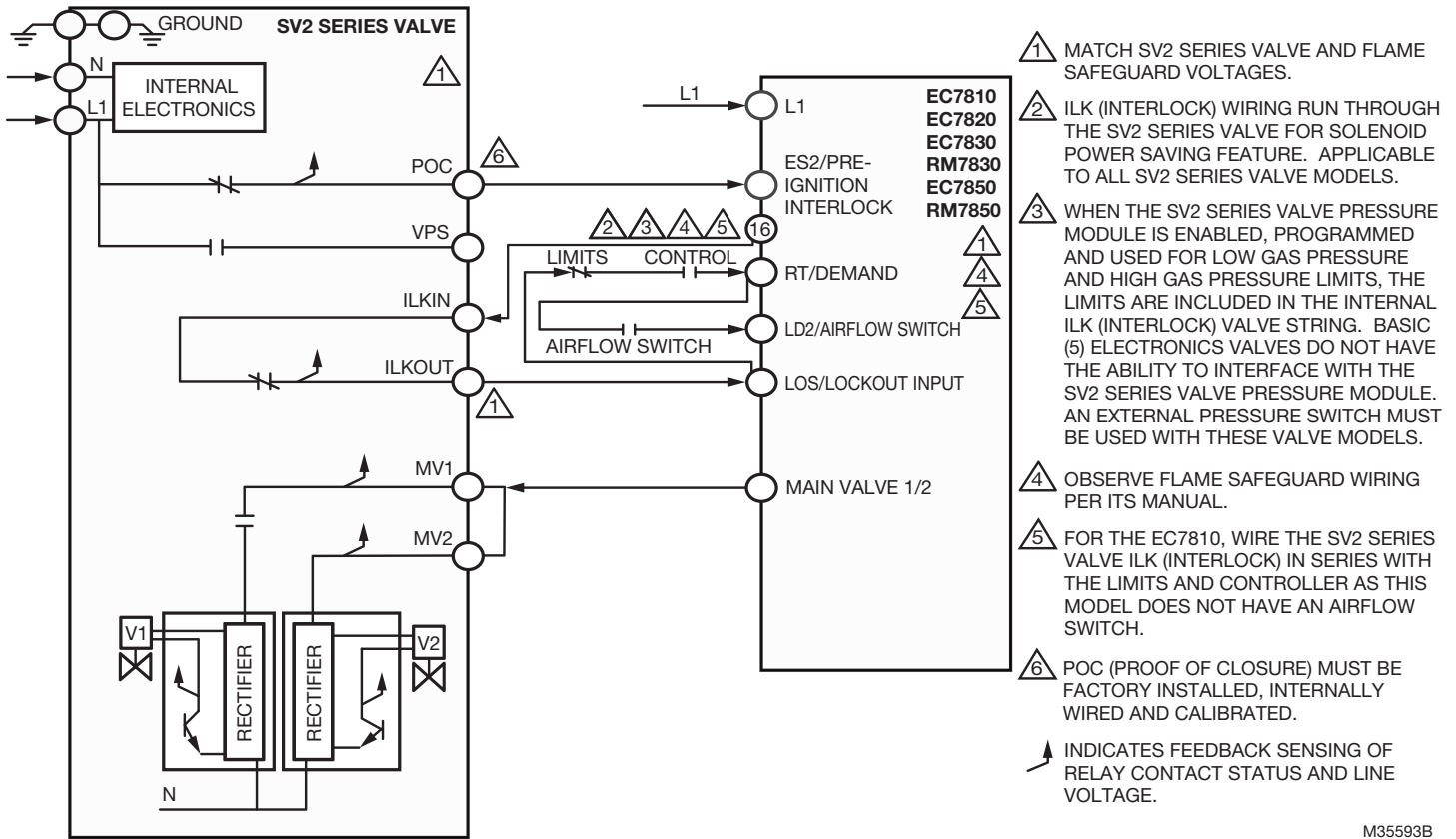


- ⚠️ 1 MATCH SV2 SERIES VALVE AND FLAME SAFEGUARD VOLTAGES.
- ⚠️ 2 ILK (INTERLOCK) WIRING RUN THROUGH THE SV2 SERIES VALVE FOR SOLENOID POWER SAVING FEATURE. APPLICABLE TO ALL SV2 SERIES VALVE MODELS.
- ⚠️ 3 WHEN THE SV2 SERIES VALVE PRESSURE MODULE IS ENABLED, PROGRAMMED AND USED FOR LOW GAS PRESSURE AND HIGH GAS PRESSURE LIMITS, THE LIMITS ARE INCLUDED IN THE INTERNAL ILK (INTERLOCK) VALVE STRING. BASIC (5) ELECTRONICS VALVES DO NOT HAVE THE ABILITY TO INTERFACE WITH THE SV2 SERIES VALVE PRESSURE MODULE. AN EXTERNAL PRESSURE SWITCH MUST BE USED WITH THESE VALVE MODELS.
- ⚠️ 4 OBSERVE FLAME SAFEGUARD WIRING PER ITS MANUAL.
- ⚠️ 5 FOR RM7838 CONTROLS, WIRE THE SV2 SERIES VALVE ILK (INTERLOCK) AHEAD OF THE LOCKOUT INTERLOCKS AND COMBUSTION AIR BLOWER SWITCHES.
- ⚠️ 6 FOR RM7890/EC7890 AND EM/EC7885 CONTROLS, WIRE THE SV2 SERIES VALVE ILK (INTERLOCK) IN SERIES WITH THE LIMITS AND CONTROLLER AS THESE MODELS DO NOT HAVE AN AIRFLOW SWITCH.
- ⚠️ 7 POC (PROOF OF CLOSURE) MUST BE FACTORY INSTALLED, INTERNALLY WIRED AND CALIBRATED.
- ➔ INDICATES FEEDBACK SENSING OF RELAY CONTACT STATUS AND LINE VOLTAGE.

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Fig. 147: 7800 SERIES with BASIC or STANDARD Electronics, No External VPS.

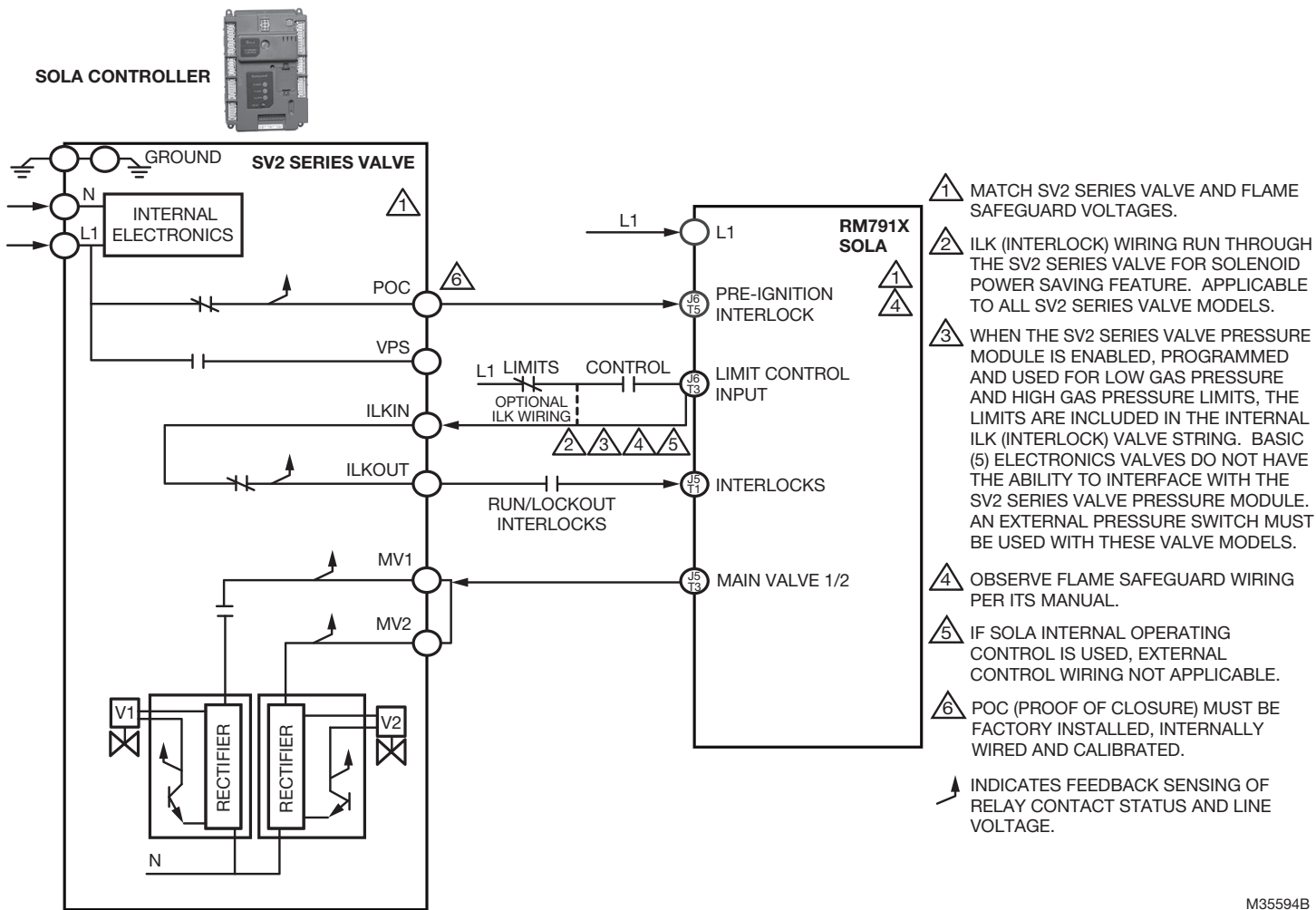
7800 Series European Standards (CE, EN, etc.)



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Fig. 148: 7800 SERIES with BASIC or STANDARD Electronics, No External VPS.

SOLA Controller

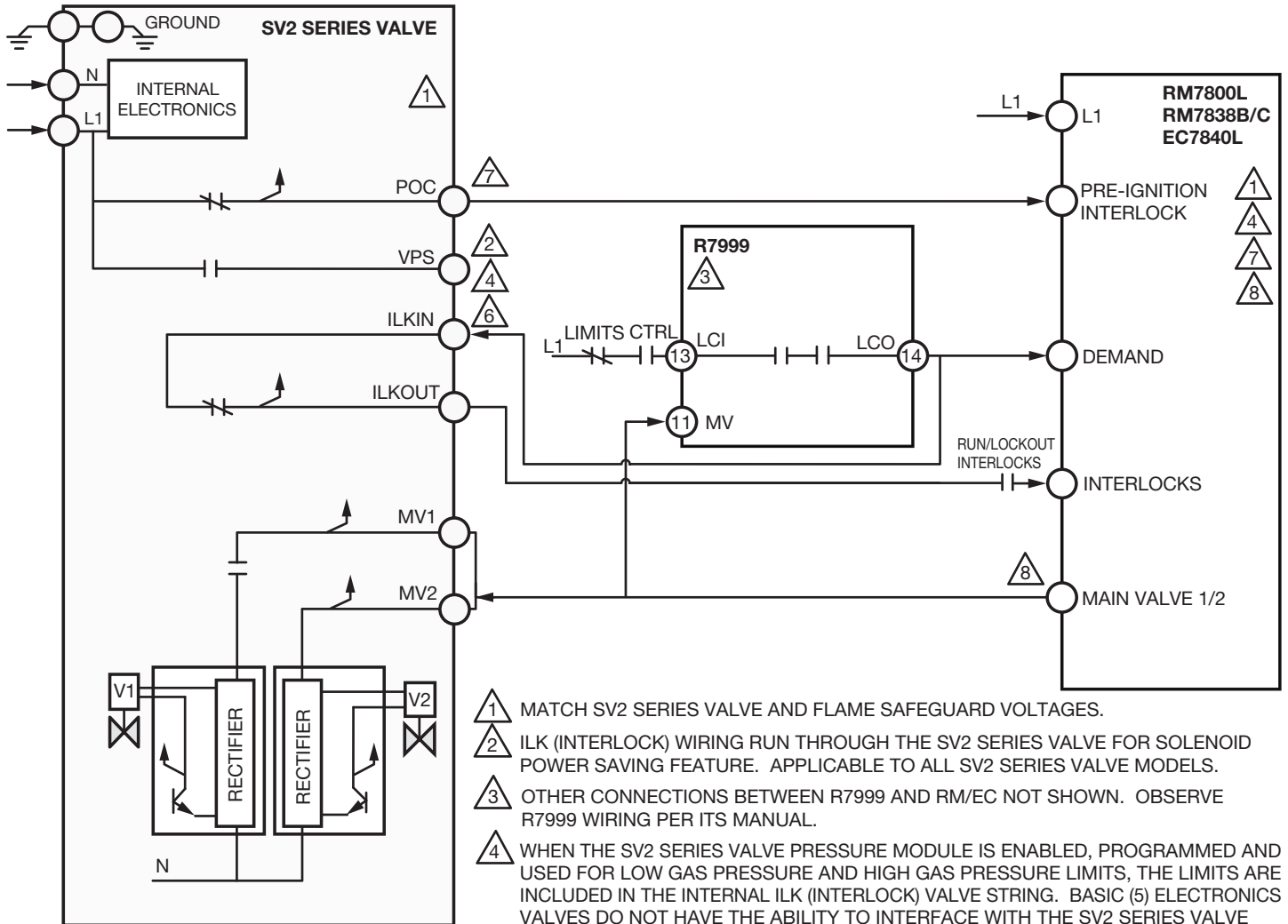


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Fig. 149: SOLA with STANDARD Electronics, No External VPS.

7800 SERIES and ControlLinks

7800 SERIES AND ControlLinks

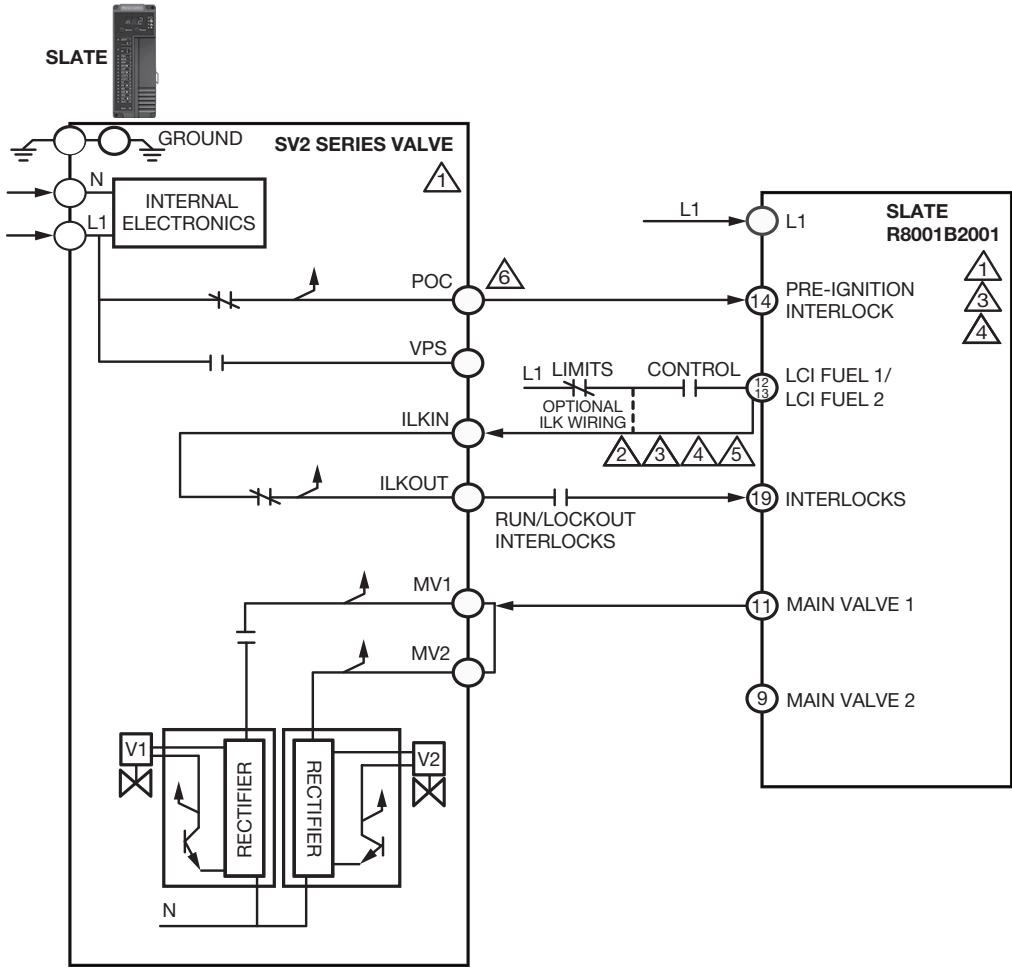


- 1 MATCH SV2 SERIES VALVE AND FLAME SAFEGUARD VOLTAGES.
 - 2 ILK (INTERLOCK) WIRING RUN THROUGH THE SV2 SERIES VALVE FOR SOLENOID POWER SAVING FEATURE. APPLICABLE TO ALL SV2 SERIES VALVE MODELS.
 - 3 OTHER CONNECTIONS BETWEEN R7999 AND RM/EC NOT SHOWN. OBSERVE R7999 WIRING PER ITS MANUAL.
 - 4 WHEN THE SV2 SERIES VALVE PRESSURE MODULE IS ENABLED, PROGRAMMED AND USED FOR LOW GAS PRESSURE AND HIGH GAS PRESSURE LIMITS, THE LIMITS ARE INCLUDED IN THE INTERNAL ILK (INTERLOCK) VALVE STRING. BASIC (5) ELECTRONICS VALVES DO NOT HAVE THE ABILITY TO INTERFACE WITH THE SV2 SERIES VALVE PRESSURE MODULE. AN EXTERNAL PRESSURE SWITCH MUST BE USED WITH THESE VALVE MODELS.
 - 5 OBSERVE FLAME SAFEGUARD WIRING PER ITS MANUAL.
 - 6 FOR RM7838 CONTROLS, WIRE THE SV2 SERIES VALVE ILK (INTERLOCK) AHEAD OF THE LOCKOUT INTERLOCKS AND COMBUSTION AIR BLOWER SWITCHES.
 - 7 POC (PROOF OF CLOSURE) MUST BE FACTORY INSTALLED, INTERNALLY WIRED AND CALIBRATED.
 - 8 FOR DUAL FUEL APPLICATIONS, AN APPROVED CENTER-OFF POSITION FUEL SELECTION SWITCH IS REQUIRED. REFER TO R7999 MANUAL FOR FURTHER DETAILS.
- ↑ INDICATES FEEDBACK SENSING OF RELAY CONTACT STATUS AND LINE VOLTAGE.

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Fig. 150: 7800 SERIES and ControlLinks with BASIC or STANDARD Electronics, No External VPS.

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- ① MATCH SV2 SERIES VALVE AND FLAME SAFEGUARD VOLTAGES.
- ② ILK (INTERLOCK) WIRING RUN THROUGH THE SV2 SERIES VALVE FOR SOLENOID POWER SAVING FEATURE. APPLICABLE TO ALL SV2 SERIES VALVE MODELS.
- ③ WHEN THE SV2 SERIES VALVE PRESSURE MODULE IS ENABLED, PROGRAMMED AND USED FOR LOW GAS PRESSURE AND HIGH GAS PRESSURE LIMITS, THE LIMITS ARE INCLUDED IN THE INTERNAL ILK (INTERLOCK) VALVE STRING. BASIC (5) ELECTRONICS VALVES DO NOT HAVE THE ABILITY TO INTERFACE WITH THE SV2 SERIES VALVE PRESSURE MODULE. AN EXTERNAL PRESSURE SWITCH MUST BE USED WITH THESE VALVE MODELS.
- ④ OBSERVE FLAME SAFEGUARD WIRING PER ITS MANUAL.
- ⑤ IF SLATE INTERNAL OPERATING CONTROL IS USED, EXTERNAL CONTROL WIRING NOT APPLICABLE.
- ⑥ POC (PROOF OF CLOSURE) MUST BE FACTORY INSTALLED, INTERNALLY WIRED AND CALIBRATED.
- ↗ INDICATES FEEDBACK SENSING OF RELAY CONTACT STATUS AND LINE VOLTAGE.

Fig. 151: SLATE with BASIC or STANDARD Electronics, No External VPS.

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European Burner Controls

European Standards (CE, EN, etc.)

Certain European burner controls do not have separate interlock circuits. The SV2 Series valves require that the ILKIN terminal be tied to the burner management control in some manner and not simply jumpered to L1 power.

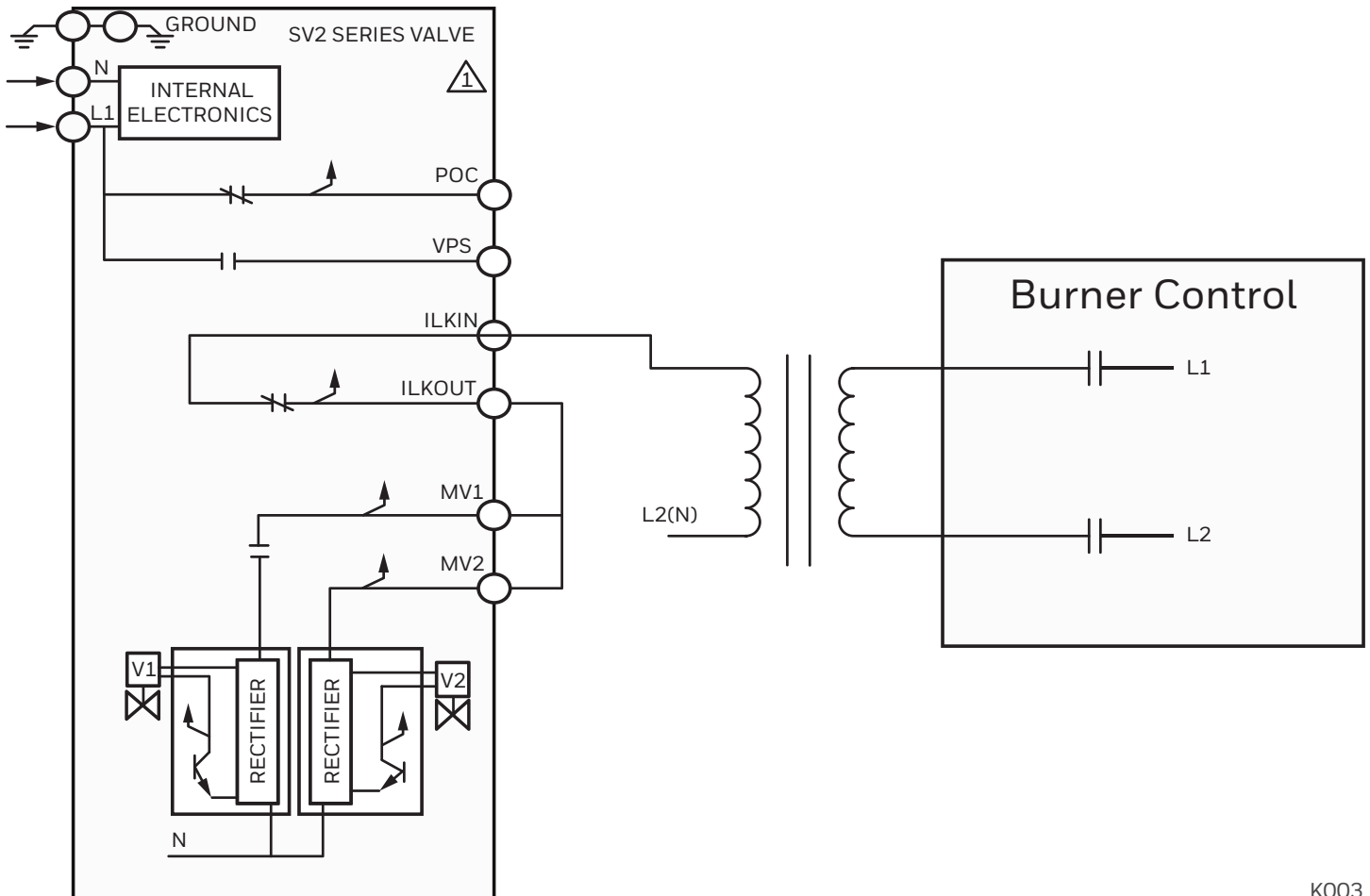
Burner controls with independently switched line and neutral voltages will not work as is with the SV2 Series valves and require extra components plus wiring to make them work effectively with the SV2 Series valves.

As well, per European standards, the burner management control used shall have two line voltage switching elements in series that switch power to the valve coils. If the burner control does not have two switching elements in series, the following alternatives may be used in the European Union, per KIWA.

For systems where VPS is not used, MV1 and MV2 may be jumpered and powered together.

Option 1

Add an external safety relay to ensure that both the switched L1 and L2 (Neutral) of the burner control are used.



K003

Fig. 152: European Burner Control with BASIC or STANDARD Electronics, No External VPS.

Option 2

Alternately, a transformer may be used. The transformer must be a double- or reinforced-isolated separation transformer, so that a short between the primary and secondary is excluded. EN298:2012 Annex E requires the use of either an EN61558-2-6 or EN61558-2-16 approved transformer, however, the actual meaningful requirement is the isolation strength of the transformer and not the fact that the secondary is an accessible voltage.

- Use a 240/240VAC transformer
- ILKIN is only energized if both relays are ON
- Transformer may also be used to convert 240/120/24VAC as desired. Match to appropriate SV2 Series valve model (24/120/240VAC).

NOTE: EN61558-2-6 specifically requires that the “secondary does not exceed 50 VAC or 120 V ripple-free VDC”, whereas EN61558-2-16 does NOT have such a requirement. In this case, ONLY the reinforced isolation is relevant.

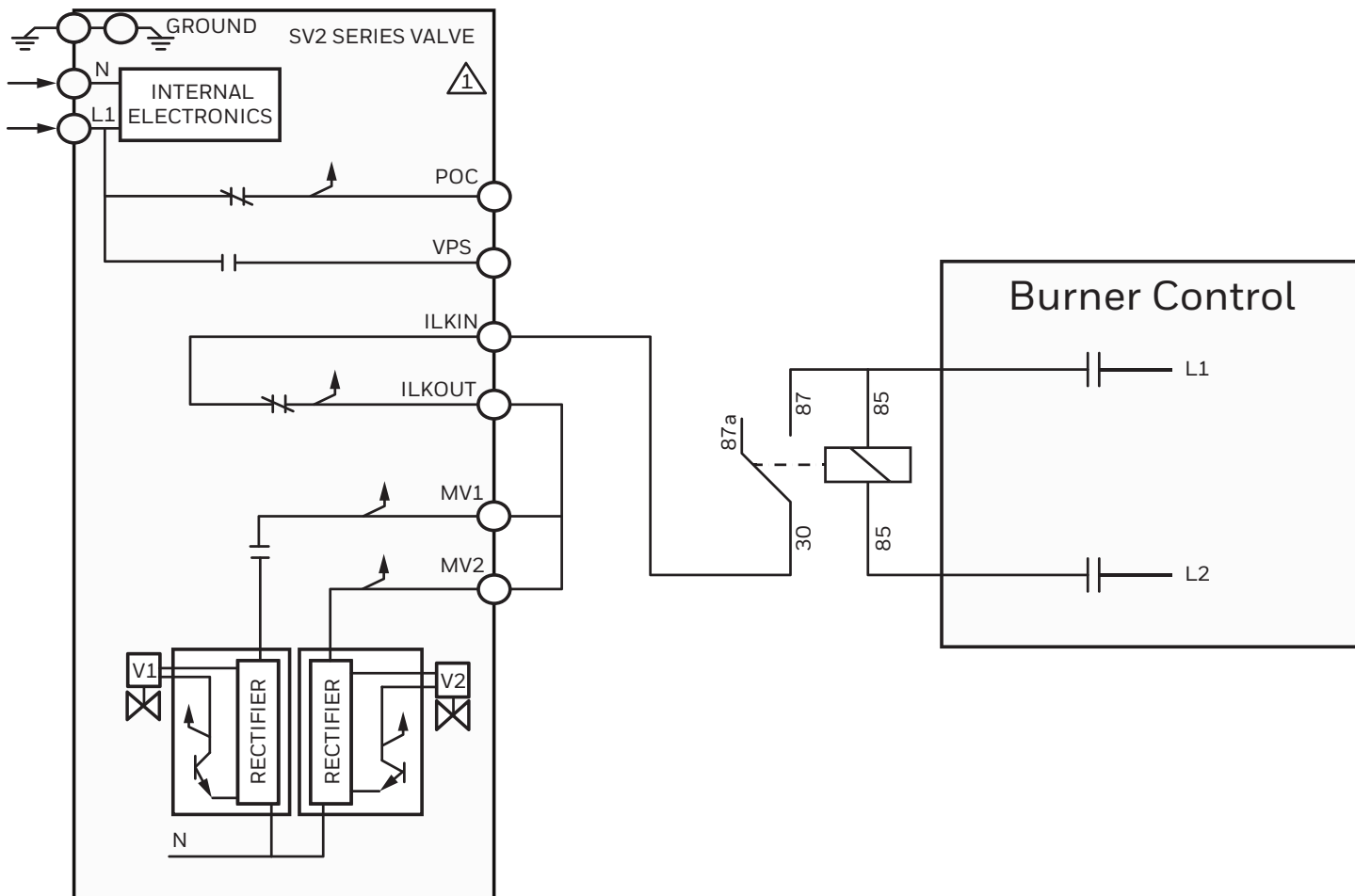


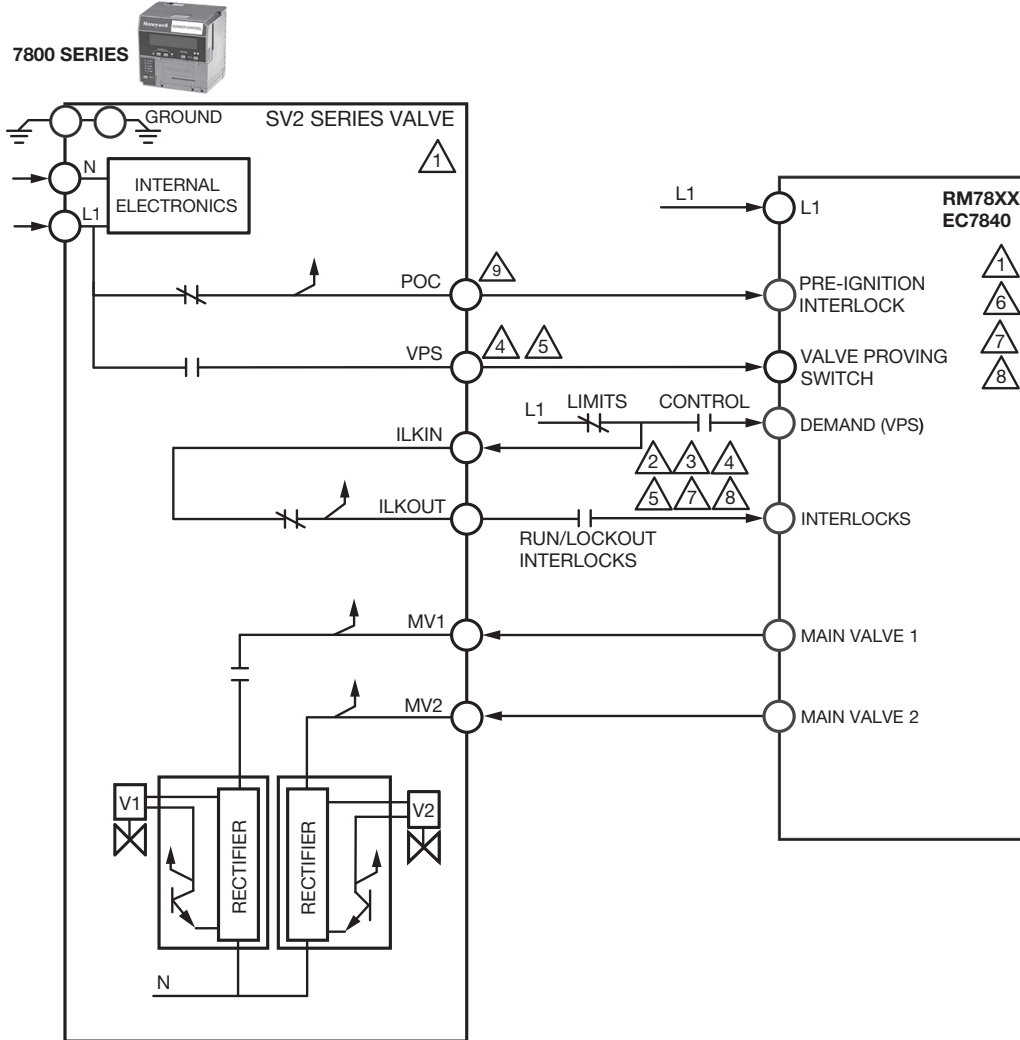
Fig. 153: European Burner Control with BASIC or STANDARD Electronics, No External VPS.

External VPS (Valve Proving System) Used; Electronics configuration BASIC (5) with external pressure switch or STANDARD (6) with Pressure Module

The SV2 Series valve Pressure Module is used with this scenario with the VPS switch output coming from the SV2 Series electronics. Wiring between the SV2 Series valve and Honeywell 7800 SERIES, 7800 SERIES and ControlLinks and SLATE is shown in this section.

7800 SERIES

North American Standards (UL, CSA, FM, etc.)



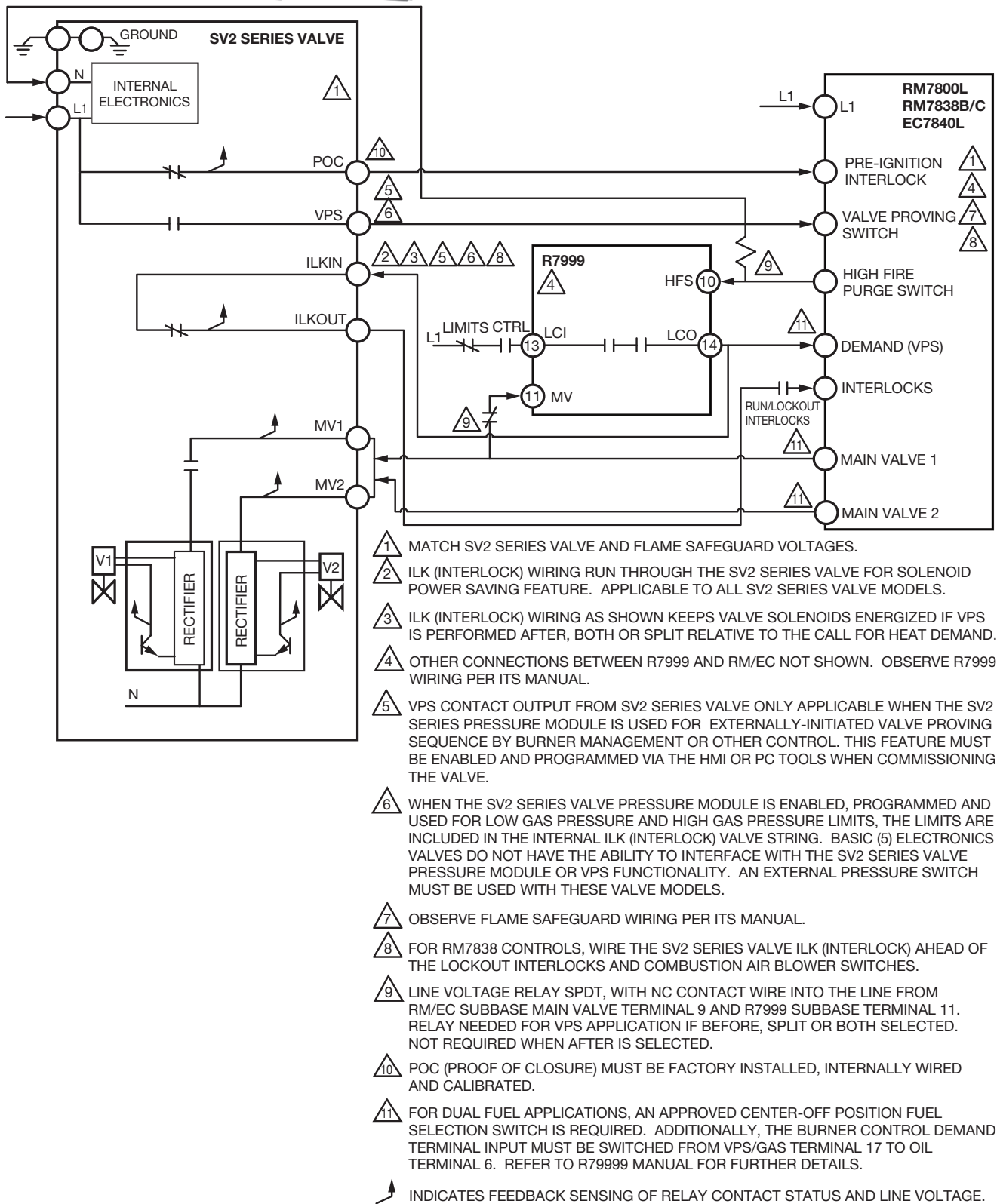
- 1 MATCH SV2 SERIES VALVE AND FLAME SAFEGUARD VOLTAGES.
 - 2 ILK (INTERLOCK) WIRING RUN THROUGH THE SV2 SERIES VALVE FOR SOLENOID POWER SAVING FEATURE. APPLICABLE TO ALL SC2 SERIES VALVE MODELS.
 - 3 ILK (INTERLOCK) WIRING AS SHOWN KEEPS VALVE SOLENOIDS ENERGIZED IF VPS IS PERFORMED AFTER, BOTH OR SPLIT RELATIVE TO THE CALL FOR HEAT DEMAND.
 - 4 VPS CONTACT OUTPUT FROM SV2 SERIES VALVE ONLY APPLICABLE WHEN THE SV2 SERIES PRESSURE MODULE IS USED FOR EXTERNALLY-INITIATED VALVE PROVING SEQUENCE BY BURNER MANAGEMENT OR OTHER CONTROL. THIS FEATURE MUST BE ENABLED AND PROGRAMMED VIA THE HMI OR PC TOOLS WHEN COMMISSIONING THE VALVE.
 - 5 WHEN THE SV2 SERIES VALVE PRESSURE MODULE IS ENABLED, PROGRAMMED AND USED FOR LOW GAS PRESSURE AND HIGH GAS PRESSURE LIMITS, THE LIMITS ARE INCLUDED IN THE INTERNAL ILK (INTERLOCK) VALVE STRING. BASIC (5) ELECTRONICS VALVES DO NOT HAVE THE ABILITY TO INTERFACE WITH THE SV2 SERIES VALVE PRESSURE MODULE OR VPS FUNCTIONALITY. AN EXTERNAL PRESSURE SWITCH MUST BE USED WITH THESE VALVE MODELS.
 - 6 OBSERVE FLAME SAFEGUARD WIRING PER ITS MANUAL.
 - 7 FOR RM7838 CONTROLS, WIRE THE SV2 SERIES VALVE ILK (INTERLOCK) AHEAD OF THE LOCKOUT INTERLOCKS AND COMBUSTION AIR BLOWER SWITCHES.
 - 8 FOR RM7890/EC7890 CONTROLS, WIRE THE SV2 SERIES VALVE ILK (INTERLOCK) IN SERIES WITH THE LIMITS AND CONTROLLER AS THESE MODELS DO NOT HAVE AN AIRFLOW SWITCH.
 - 9 POC (PROOF OF CLOSURE) MUST BE FACTORY INSTALLED, INTERNALLY WIRED AND CALIBRATED.
- ↑ INDICATES FEEDBACK SENSING OF RELAY CONTACT STATUS AND LINE VOLTAGE

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Fig. 154: 7800 SERIES with BASIC or STANDARD Electronics, External VPS Used.

7800 SERIES and ControlLinks

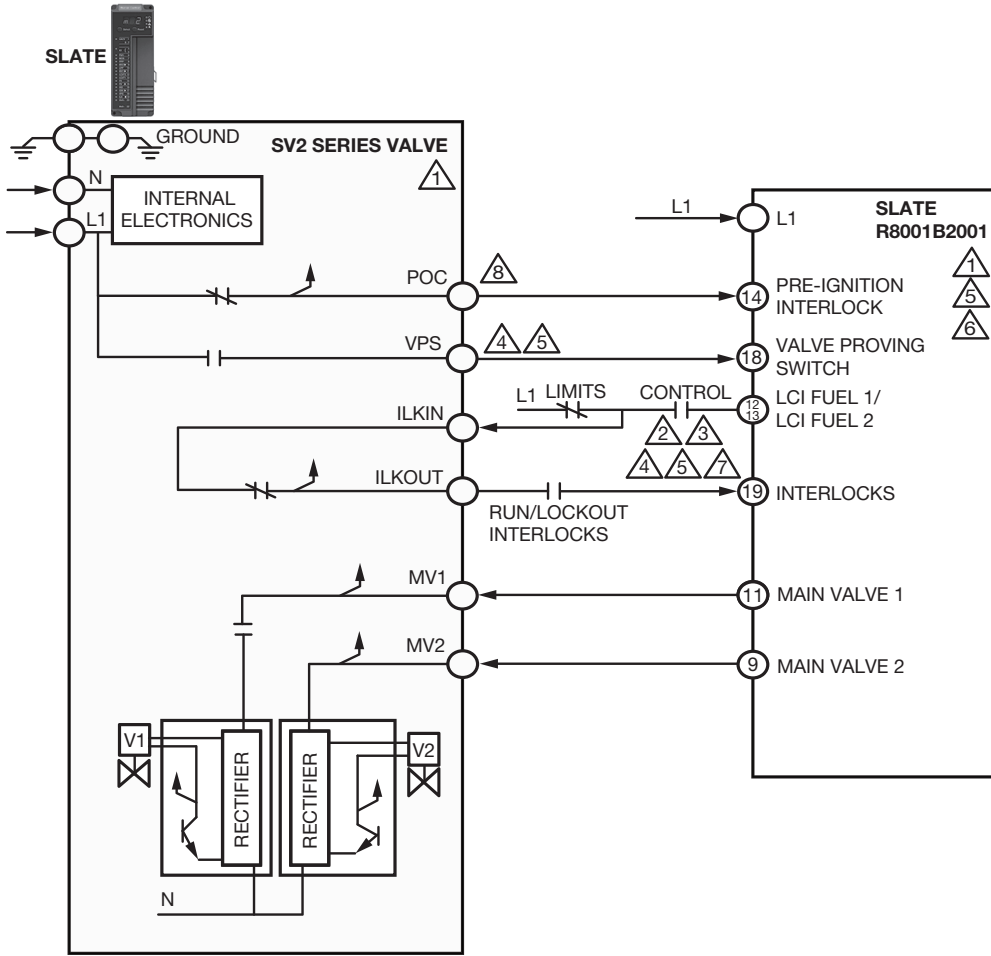
7800 SERIES AND ControlLinks



M35597B

Fig. 155: 7800 SERIES and ControlLinks with BASIC or STANDARD Electronics, External VPS Used.

SLATE™



- 1 MATCH SV2 SERIES VALVE AND FLAME SAFEGUARD VOLTAGES.
 - 2 ILK (INTERLOCK) WIRING RUN THROUGH THE SV2 SERIES VALVE FOR SOLENOID POWER SAVING FEATURE. APPLICABLE TO ALL SV2 SERIES VALVE MODELS.
 - 3 ILK (INTERLOCK) WIRING AS SHOWN KEEPS VALVE SOLENOIDS ENERGIZED IF VPS IS PERFORMED AFTER, BOTH OR SPLIT RELATIVE TO THE CALL FOR HEAT DEMAND.
 - 4 VPS CONTACT OUTPUT FROM SV2 SERIES VALVE ONLY APPLICABLE WHEN THE SV2 SERIES PRESSURE MODULE IS USED FOR EXTERNALLY-INITIATED VALVE PROVING SEQUENCE BY BURNER MANAGEMENT OR OTHER CONTROL. THIS FEATURE MUST BE ENABLED AND PROGRAMMED VIA THE HMI OR PC TOOLS WHEN COMMISSIONING THE VALVE.
 - 5 WHEN THE SV2 SERIES VALVE PRESSURE MODULE IS ENABLED, PROGRAMMED AND USED FOR LOW GAS PRESSURE AND HIGH GAS PRESSURE LIMITS, THE LIMITS ARE INCLUDED IN THE INTERNAL ILK (INTERLOCK) VALVE STRING. BASIC (5) ELECTRONICS VALVES DO NOT HAVE THE ABILITY TO INTERFACE WITH THE SV2 SERIES VALVE PRESSURE MODULE OR VPS FUNCTIONALITY. AN EXTERNAL PRESSURE SWITCH MUST BE USED WITH THESE VALVE MODELS.
 - 6 OBSERVE FLAME SAFEGUARD WIRING PER ITS MANUAL.
 - 7 IF SLATE INTERNAL OPERATING CONTROL IS USED, EXTERNAL CONTROL WIRING NOT APPLICABLE.
 - 8 POC (PROOF OF CLOSURE) MUST BE FACTORY INSTALLED, INTERNALLY WIRED AND CALIBRATED.
- ↑ INDICATES FEEDBACK SENSING OF RELAY CONTACT STATUS AND LINE VOLTAGE.

M35598B

Fig. 156: SLATE with BASIC or STANDARD Electronics, External VPS Used.

European Burner Controls

European Standards (CE, EN, etc.)

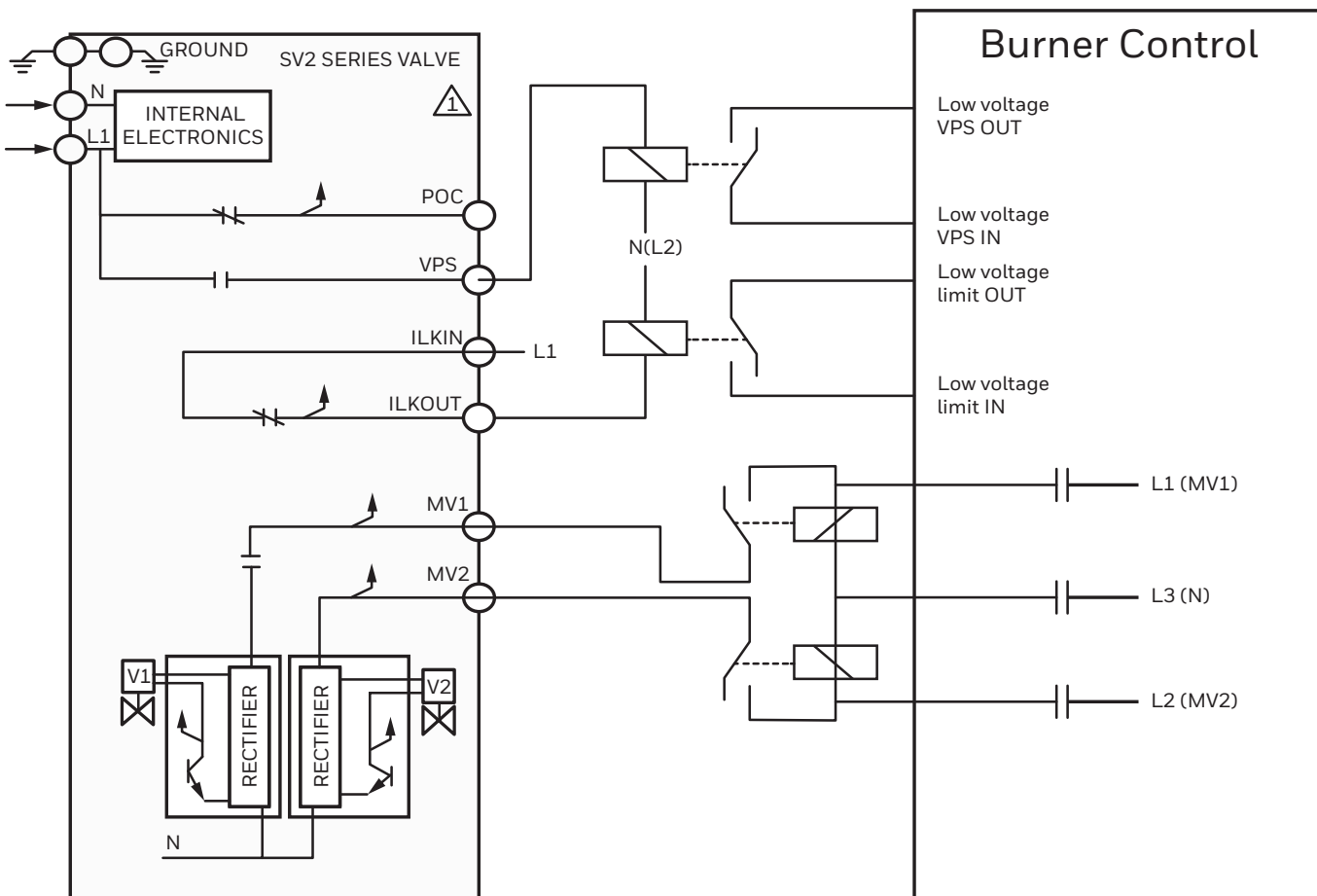
Some European burner controls have low voltage limit and/or VPS terminals, which differs from the line voltage load terminals. The wiring diagram below addresses wiring of such controls with the SV2 Series valves.

Certain European burner controls do not have separate interlock circuits. The SV2 Series valves require that the ILKIN terminal be tied to the burner management control in some manner and not simply jumpered to L1 power.

Burner controls with independently switched line and neutral voltages will not work as is with the SV2 Series valves and require extra components plus wiring to make them work effectively with the SV2 Series valves.

As well, per European standards, the burner management control used shall have two line voltage switching elements in series that switch power to the valve coils. If the burner control does not two switching elements in series, the following alternatives may be used in the European Union, per KIWA.

For systems using VPS, MV1 and MV2 must be powered separately.



K001

Fig. 157: European Burner Control with BASIC or STANDARD Electronics, External VPS Used.

VALVE 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 26. SV2 Series Fault Conditions.

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
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.		23
	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.		24
	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.		48
Fuel/Air	Air flow sensor (S1) out of range	The airflow sensor signal is/was outside the sensor measuring range (-8000 to 8000).	1.) Reset valve and burner management system. 2.) If fault persists, replace Fuel/Air Module. 3.) Reset valve and burner management system. 4.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 5.) Recommission partially or fully as desired.		18

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD communication fault	The bus communication between the Fuel/Air Ratio Module and the valves electronics was/is interrupted.	<p>Remove power and shut-off gas supply.</p> <ol style="list-style-type: none"> 1.) Remove valve front electrical enclosure and inspect Fuel/Air module wiring connections for wire engagement, seating, pin engagement and cleanliness. 2.) Replace cover and reset valve and burner management system when corrected. 3.) Check for a nearby source of strong electro-magnetic interference. Reset valve and burner management system when corrected. 4.) If fault persists, replace Fuel/Air module. 5.) Reset valve and burner management system. 6.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 7.) Recommission partially or fully as desired. 		25
	Air flow sensor (S1) frozen	The air flow sensor returns a fixed value to the valve electronics. During normal operation the signal is fluctuating. The missing fluctuation of the signal indicates a fault in the sensor.	<ol style="list-style-type: none"> 1.) Replace Fuel/Air Module. 2.) Reset valve and burner management system. 3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 4.) Recommission partially or fully as desired. 		26
	FARMOD flow sensor (S2a) frozen	The Fuel/Air flow sensor returns a fixed value to the valve electronics. During normal operation the signal is fluctuating. The missing fluctuation of the signal indicates a fault in the sensor.	<ol style="list-style-type: none"> 1.) Replace Fuel/Air Module. 2.) Reset valve and burner management system. 3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 4.) Recommission partially or fully as desired. 		27

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD flow sensor (S2a) out of range	The S2a airflow sensor signal is/was outside the sensor measuring range (-8000 to 8000).	<ol style="list-style-type: none"> 1.) Reset valve and burner management system. 2.) If fault persists, replace Fuel/Air Module 3.) Reset valve and burner management system. 4.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 5.) Recommission partially or fully as desired. 		28
	FARMOD control valve has reached its lower limit	<p>The stepper motor position has reached zero position during run mode. This can happen if the inlet pressure is relatively high for the requested minimum gas volume.</p> <p>Lower the gas inlet pressure to SV2 Series valve or increase minimum capacity. Practically, the stepper motor position should be above 80 steps for the 1.5in and 2in valves and above 50 steps for the 1in valve. Below these values the gas flow will change very little with changing motor position.</p>	<p>Fault indicates gas supply pressure is too high and minimum load is too low.</p> <ol style="list-style-type: none"> 1.) Check gas supply pressure to appliance. 2.) Check Fuel/Air Module signal connections for proper engagement. 3.) Reset valve and burner management system, monitoring for proper operation. 4.) If fault persists, replace Fuel/Air Module. 5.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 6.) Recommission partially or fully as desired. 7.) Reset valve and burner management system, monitoring for proper operation. 8.) If fault persists, replace valve and re-commission. 		30

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD control valve has reached its upper limit	<p>The Fuel/Air Ratio stepper motor position has reached maximum open position during run mode. This can happen if the inlet pressure is relatively low for the requested maximum gas volume.</p> <p>Increase the gas inlet pressure to SV2 Series valve or decrease maximum capacity. Practically, the stepper motor position should be below 1100 steps for the 1.5in and 2in (DN40-50) valves and below 550 steps for the 1in (DN25) valve. Above these values the gas flow will change very little with changing motor position.</p>	<p>If this occurs with fault 34 (FARMOD target (S2b) not reached), it's an indication the gas supply pressure is too low and the maximum load is too high.</p> <ol style="list-style-type: none"> 1.) Check gas supply pressure to appliance. 2.) Check Fuel/Air Module signal connections for proper engagement. 3.) Reset valve and burner management system, monitoring for proper operation. 4.) If fault persists, replace Fuel/Air Ratio Module. 5.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 6.) Recommission partially or fully as desired. 7.) Reset valve and burner management system, monitoring for proper operation. 8.) If fault persists, replace valve and re-commission. 	Warning indication for SV2 Series valve. This condition will likely cause a burner controller lockout.	31
	FARMOD sensor - drift of flow sensors	<p>The safety check on the Fuel/Air Ratio Module sensor signals has failed. If this fault occurs shortly after commissioning adding points to the correction curve of 4 points or recommissioning the 4 points can help to improve the performance of the safety check.</p>	<ol style="list-style-type: none"> 1.) Check Fuel/Air Module reference signal connection for proper engagement. 2.) Reset valve and burner management system, monitoring for proper operation. 3.) If fault persists, replace Fuel/Air Module. 4.) Reset valve and burner management system. 5.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 6.) Recommission partially or fully as desired. 7.) Reset valve and burner management system, monitoring for proper operation. 	Warning indication for SV2 Series valve. This condition will likely cause a burner controller lockout.	32

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
	FARMOD mismatch	<p>The Fuel/Air Ratio Module has been replaced by a used Fuel/Air Ratio Module that already contains commissioning data.</p> <p>NOTE: If this FARMOD is Accepted and used, any existing data in it will be over-written with the Base Curve and stepper motor full stroke data from valve. The Correction Curve and Ign. Air Level will be erased and must be re-commissioned.</p>	<p>1.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. Any data in the attached FARMOD will be over-written by data from the valve main electronics.</p> <p>2.) Recommission partially or fully as desired.</p>		33
Fuel/Air	FARMOD target (S2b) not reached	<p>The Fuel/Air Ratio controlled gas pressure was not within the control setpoint window within the specified time of 30 seconds. Lower the modulation speed of the appliance/burner to avoid this fault.</p> <p>This fault can occur independently or in combination with fault 38.</p>	<p>If this occurs with fault 38 (FARMOD target (S2a) not reached), it is an indication the gas supply pressure is too low.</p> <p>1.) Check gas supply pressure to appliance.</p> <p>2.) Check Fuel/Air Module signal connections for proper engagement.</p> <p>3.) Reset valve and burner management system, monitoring for proper operation.</p> <p>4.) Check/lower appliance/burner modulation speed (by decreasing fan control P factor or limiting its RPM change per time unit)</p> <p>5.) If fault persists, replace Fuel/Air Ratio Module</p> <p>6) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>7.) Recommission partially or fully as desired.</p> <p>8.) Reset valve and burner management system, monitoring for proper operation.</p> <p>8.) If fault persists, replace valve and re-commission.</p>		34

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD rough target (S2b) not reached	<p>The Fuel/Air Ratio controlled gas pressure was not within the control setpoint rough window within the specified time of 10 seconds. Lower the modulation speed of the appliance/burner to avoid this fault.</p> <p>This fault can occur independently or in combination with fault 70.</p>	<p>If this fault occurs with fault 70 (FARMOD rough target (S2a) not reached), it is an indication the modulation speed is too high.</p> <ol style="list-style-type: none"> 1.) Check gas supply pressure to appliance. 2.) Check Fuel/Air Module signal connections for proper engagement. 3.) Reset valve and burner management system, monitoring for proper operation. 4.) Check/lower appliance/burner modulation speed (by decreasing fan control P factor or limiting its RPM change per time unit) 5.) If fault persists, replace Fuel/Air Module. 6.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 7.) Recommission partially or fully as desired. 8.) Reset valve and burner management system, monitoring for proper operation. 9.) If fault persists, replace valve and re-commission. 		35

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD target (S2a) not reached	<p>The Fuel/Air Ratio redundant gas pressure signal was not within the control setpoint window within the specified time of 30 seconds.</p> <p>This fault can occur independently or in combination with fault 34</p>	<p>If this fault occurs directly after commissioning:</p> <ol style="list-style-type: none"> 1.) Recommission the 4 points of the correction curve and/or add additional points to the correction curve. <p>If the fault persists or if it occurs in combination with fault 34 (FARMOD target (S2b) not reached), it indicates low gas supply pressure for the asked capacity.</p> <ol style="list-style-type: none"> 1.) Check gas supply pressure to appliance. 2.) Check Fuel/Air Module signal connections for proper engagement. 3.) Reset valve and burner management system, monitoring for proper operation. 4.) If fault persists, replace Fuel/Air Module. 5.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 6.) Recommission partially or fully as desired. 7.) Reset valve and burner management system, monitoring for proper operation. <p>If this fault occurs independently, the Fuel/Air Module is corrupt:</p> <ol style="list-style-type: none"> 1.) Replace Fuel/Air Module. 2.) Accept new Fuel/Air Module on the FARMOD tab in the Setup & Tests menu. 3.) Recommission partially or fully as desired. 4.) Reset valve and burner management system, monitoring for proper operation. <p>If fault persists, replace valve and re-commission.</p>	Warning indication for SV2 Series valve. This condition will likely cause a burner controller lockout.	38
	FARMOD EEPROM communication	Fuel/Air Module has separate storage which is does not respond to read request. Storage contains module-specific calibration data essential for correct device operation. This can be caused by incorrect wiring or Fuel/Air Module damage.	<ol style="list-style-type: none"> 1.) Check the electrical connection of main and Fuel/Air modules. 2.) Reset the valve and the burner management system. 3.) If fault persists replace Fuel/Air Ratio module. 4.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 5.) Recommission partially or fully as desired. 		39

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD S1 pre-ignition air level	<p>The S1 pre-ignition air level is below or above the Recorded Ign. Air Level by the threshold values.</p> <p>The S1 pre-ignition threshold values are programmed as X% below and Y% above the Recorded Ign. Air Level on the OEM Setup screen.</p> <p>X%=S1 pre-ignition lower threshold. Default=80%.</p> <p>Y%=S1 pre-ignition upper threshold. Default=120%.</p> <p>This can be caused by a change in ignition load, change in ignition fan speed, wind attack or blockage of the appliance air supply.</p>	<p>If ignition load has changed:</p> <ol style="list-style-type: none"> 1.) Recommission light off sequence. 2.) If fault persists, perform steps below. <p>If ignition fan speed change is known/suspected:</p> <ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check Fuel/Air Module signal connections for proper engagement. 4.) Reset valve and burner management system. 5.) If fault persists, recommission light off sequence. Record new pre-ignition air proving values by checking the Record Ign. Air Level box on the Ignition Setup page once system is stabilized. 6.) If fault persists, replace Fuel/Air Ratio Module. 7.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 8.) Recommission partially or fully as desired. 9.) If fault persists, replace valve and re-commission. 		42

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD light-off S2a/S1 ratio	<p>The Fuel/Air Ratio Module S2a/S1 ratio was outside the commissioned window.</p> <p>This can potentially be caused by a change in ignition load or ignition fan speed.</p>	<p>When combined with fault 42 and/or 44 it's an indication the fan speed is wrong or there are flue system issues.</p> <ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check Fuel/Air Module signal connections for proper engagement. 4.) Reset valve and burner management system. 5.) If fault persists, recommission light off sequence. Record new pre-ignition air proving values by checking the Record Ign. Air Level box on the Ignition Setup page once system is stabilized. 6.) Check combustion by measuring O2 and CO2 levels. 7.) If fault persists, replace Fuel/Air Module. 8.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 9.) Recommission partially or fully as desired. <p>If fault appears independently, the likely cause is a corrupt S2a sensor inside the FARMOD.</p> <ol style="list-style-type: none"> 1.) Reset valve and burner management system. 2.) If fault persists, replace Fuel/Air Ratio Module. 3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 4.) Recommission partially or fully as desired. 		43

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD light-off S2b/S1 ratio	<p>The Fuel/Air Ratio Module S2b/S1 ratio was outside the commissioned window.</p> <p>This can potentially be caused by a change in ignition load or ignition fan speed.</p>	<p>When combined with fault 42 and/or 44 it's an indication the fan speed is wrong or there are flue system issues.</p> <ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check Fuel/Air Module signal connections for proper engagement. 4.) Reset valve and burner management system. 5.) If fault persists, recommission light off sequence. Record new pre-ignition air proving values by checking the Record Ign. Air Level box on the Ignition Setup page once system is stabilized. 6.) Check combustion by measuring O2 and CO2 levels. 7.) If fault persists, replace Fuel/Air Ratio Module. 8.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 9.) Recommission partially or fully as desired. <p>If fault appears independently, the likely cause is a corrupt S2b sensor inside the FARMOD.</p> <ol style="list-style-type: none"> 1.) Reset valve and burner management system. 2.) If fault persists, replace Fuel/Air Module. 3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 4.) Recommission partially or fully as desired. 		44

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD EEPROM factory data corrupted	The factory stored data inside the Fuel/Air Module is corrupted, contact your OEM for advice.	<p>1.) Replace Fuel/Air Ratio Module.</p> <p>2.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>3.) Recommission partially or fully as desired.</p> <p>4.) Reset valve and burner management system.</p>		45
	Fuel/Air Correction Curve Max not defined	<p>This fault is ignored when the Installer or OEM are logged into the valve.</p> <p>If the curve maximum was not defined during commissioning and commissioning mode is exited, the valve will lockout on this fault.</p>	Commission the Fuel/Air curve, ensuring the maximum firing rate is entered.		50
	Fuel/Air Correction Curve Min not defined	<p>This fault is ignored when the Installer or OEM are logged into the valve.</p> <p>If the curve minimum was not defined during commissioning and commissioning mode is exited, the valve will lockout on this fault.</p>	Commission the Fuel/Air curve, ensuring the minimum firing rate is entered.		52
	Fuel/Air motor driver	Fuel/Air stepper motor fault signal is active due to possible overheat or electrical short.	<p>1.) Remove power from valve and allow fuel/air stepper motor to cool down for a minimum of 5 minutes in case of an overheat situation.</p> <p>2.) Reset valve and burner management system, observing valve / burner operation.</p> <p>Remove power and shut-off gas supply as necessary.</p> <p>3.) Remove valve front electrical enclosure and verify the stepper motor terminating connector is fully inserted in the socket labeled 'MOTOR' in the electrical enclosure. Replace electrical enclosure.</p> <p>5.) Reset valve and burner management system, observing valve / burner operation.</p> <p>6.) If fault persists, replace valve main electronics.</p> <p>7.) If fault persists, replace valve and re-commission.</p>		54

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	Fuel/Air Control Valve	Fuel/Air Control valve is stuck. This means that gas regulation does not work correctly.	<p>Remove power and shut-off gas supply.</p> <p>1.) Remove valve front electrical enclosure and inspect Motor connection for wire engagement, seating, pin engagement and cleanliness. Correct any errors. Replace electrical enclosure.</p> <p>2.) Verify ambient temperature meets valve specifications.</p> <p>3.) Restore power and gas supply. Reset valve and burner management system, monitoring for proper operation.</p> <p>4.) If fault persists, replace valve and re-commission.</p> <p>5.) If fault persists, replace valve electronics.</p>		55
	FARMOD fuel sensor is stuck	The Fuel/Air Ratio Module flow sensor returns a fixed value to the valve electronics. During normal operation the signal is fluctuating. The missing fluctuation of the signal indicates a fault in the sensor.	<p>1.) Replace Fuel/Air Module.</p> <p>2.) Reset valve and burner management system.</p> <p>3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>4.) Recommission partially or fully as desired.</p>		56
	FARMOD light-off not commissioned	<p>No values were recorded for the Fuel/Air Ratio pre-ignition air proving values.</p> <p>This fault is ignored during commissioning if the Record Ign. Air Level box is checked on the Ignition Setup screen.</p>	<p>1.) Commission the light-off sequence by logging in as OEM or Installer. Record new pre-ignition air proving values by checking the Record Ign. Air Level box on the Ignition Setup page once system is stabilized.</p> <p>2.) Reset valve and burner management system.</p>		60

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	Burner load maximum threshold	<p>During curve commissioning, the S1 threshold is hard-coded at 6000. If S1 rises above 6000, this fault occurs, but does not cause a lockout.</p> <p>During normal run mode, the S1 threshold is programmed as Y (or at least 25 counts) above the S1 maximum commissioned Installer Correction Curve value.</p> <p>Y is programmed in the OEM Setup parameters via the S1 maximum threshold (%) parameter. The default is 120%.</p>	<ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check Fuel/Air Module signal connections for proper engagement. 4.) Reset valve and burner management system. 5.) Recommission Fuel/Air curve. 6.) If fault persists, replace Fuel/Air Module. 7.) Reset valve and burner management system. 8.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 9.) Recommission partially or fully as desired. 10.) Reset valve and burner management system, monitoring for proper operation. 		61

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD rough target (S2a) not reached	<p>The Fuel/Air Ratio Module redundant gas pressure signal was not within the control setpoint rough window within the specified time of 10 seconds.</p> <p>This fault can occur independently or in combination with fault 35.</p>	<p>If this fault occurs directly after commissioning:</p> <ol style="list-style-type: none"> 1.) Recommission the 4 points of the correction curve and/or add additional points to the correction curve. <p>If the fault persists or if it occurs with fault 35 (FARMOD rough target (S2a) not reached), it is an indication the modulation speed is too high.</p> <ol style="list-style-type: none"> 1.) Check gas supply pressure to appliance. 2.) Check Fuel/Air Module signal connections for proper engagement. 3.) Reset valve and burner management system. 4.) Check/lower appliance/burner modulation speed (by decreasing fan control P factor or limiting its RPM change per time unit). 5.) If fault persists, replace Fuel/Air Module. 6.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 7.) Recommission partially or fully as desired. 8.) Reset valve and burner management system, monitoring for proper operation. 9.) If fault persists, replace valve and re-commission. 	Warning indication for SV2 Series valve. This condition will likely cause a burner controller lockout.	70
	FARMOD EEPROM image revision	Fuel/Air Ratio Module EEPROM image revision does not match valve firmware.	<ol style="list-style-type: none"> 1.) Replace Fuel/Air Ratio Module with a correct version. 2.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 3.) Recommission partially or fully as desired. 		71
	Motor connection	Stepper motor is not connected, or motor current is outside its specified range.	<ol style="list-style-type: none"> 1.) Check the stepper motor and valve main electronics board connection. 2.) Reset the valve and the burner management system, monitoring for proper operation. 3.) If fault persists, replace valve main electronics board. Perform Valve Production Cloning procedure first, accessed via Setup & Tests menu. 4.) If fault persists replace the valve and re-commission. 		72


Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD EEPROM write	Fuel/Air Ratio Module EEPROM write error has occurred unexpectedly.	<p>1.) Reset the valve, monitoring for proper operation</p> <p>2.) If fault persists replace Fuel/Air Ratio Module.</p> <p>3.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>4.) Recommission partially or fully as desired.</p>		73
	FCV Failure	Fuel Control Valve has failed to calibrate.	<p>Remove power and shut-off gas supply.</p> <p>1.) Remove valve front electrical enclosure and inspect Motor connection for wire engagement, seating, pin engagement and cleanliness. Correct any errors. Replace electrical enclosure.</p> <p>2.) Restore power and gas supply.</p> <p>3.) Reset valve and burner management system, monitoring for proper operation.</p> <p>4.) If fault persists, replace valve and re-commission.</p>		79
	FARMOD flow sensor (S2b) out of range	Fuel/Air Ratio Module flow S2b sensor value out of range	<p>1.) Reset valve and burner management system, monitoring for proper operation.</p> <p>2.) Check system filter for clogging and replace as necessary.</p> <p>3.) If fault persists, replace Fuel/Air Ratio Module.</p> <p>4.) Reset valve and burner management system.</p> <p>5.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>6.) Recommission partially or fully as desired.</p>		83
	FARMOD EEPROM (commissioning) data corrupted	Fuel/Air Ratio Module EEPROM (commissioning) data corrupted	<p>1.) Attempt a complete Fuel/Air valve commissioning.</p> <p>2.) If fault persists, replace Fuel/Air Module.</p> <p>3.) Reset valve and burner management system.</p> <p>4.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface.</p> <p>5.) Recommission partially or fully as desired.</p> <p>6.) Reset valve and burner management system, monitoring for proper operation.</p>		84

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	FARMOD Factory Calibration data invalid	Fuel/Air Ratio Module does not contain valid factory calibration data.	1.) Replace Fuel/Air Ratio Module. 2.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 3.) Recommission partially or fully as desired. 4.) Reset valve and burner management system, monitoring for proper operation.		86
	Control Valve Full Stroke Undefined	The full stroke of the control valve is not defined.	Replace the valve and re-commission.		88
	Control Valve Full Stroke Mismatch	The recorded full stroke of the control valve does not match valve size.	Replace the valve and re-commission.		89
	Fuel/Air Base Curve Min not defined	Fuel/Air Ratio base curve minimum value has not been defined. In installer mode this fault is ignored.	Commission or load the base fuel/air curve, ensuring the minimum firing rate is entered.		91
	Fuel/Air Base Curve Max not defined	Fuel/Air Ratio base curve maximum value has not been defined. In installer mode this fault is ignored.	Commission or load the base fuel/air curve, ensuring the maximum firing rate is entered.		92
	Fuel/Air Base Curve not commissioned	Fuel/Air Ratio base curve initial amplification setting/ value has not been defined. Enter a value for the initial amplification of the base curve and reset the valve in in OEM commissioning mode.	Commission or load the base fuel/air curve.		93

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	Burner load minimum threshold	<p>During curve commissioning, the S1 threshold is hard-coded at 200. If S1 falls below 200, this fault occurs, but does not cause a lockout.</p> <p>During normal run mode, the S1 threshold is programmed as X (or at least 25 counts) below the S1 minimum commissioned Installer Correction Curve value.</p> <p>X is programmed in the OEM Setup parameters via the S1 minimum threshold (%) parameter. The default is 80%.</p> <p>NOTE: During subsequent start attempts, if the pre-purge air level is outside the commissioned window, the valve will lockout on fault 42.</p>	<ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check Fuel/Air Module signal connections for proper engagement. 4.) Reset valve and burner management system. 5.) Recommission Fuel/Air curve. 6.) If fault persists, replace Fuel/Air Module. 7.) Reset valve and burner management system. 8.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 9.) Recommission partially or fully as desired. 10.) Reset valve and burner management system, monitoring for proper operation. 		94
	New FARMOD detected	New Fuel/Air Ratio Module detected, which has to be accepted and programmed before use.	<ol style="list-style-type: none"> 1.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 2.) Recommission partially or fully as desired. 3.) Reset valve and burner management system, monitoring for proper operation. 		103
	S1 raw count low	<p>During valve operation with MV1 and MV2 opened, the S1 value dropped below -100 raw counts for longer than 2 seconds.</p> <p>A soft lockout was caused and both valves were closed. The fault will automatically resolve when the s1 air value is higher than -100.</p>	<ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check air signal tube for kinks or blockages. 4.) Check Fuel/Air Ratio Module signal connections for proper engagement. 5.) Reset valve and burner management system. 6.) If fault persists, replace Fuel/Air Ratio Module. 7.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 8.) Recommission partially or fully as desired. 		106

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Fuel/Air	S1 raw count low	<p>During valve idle mode with MV1 and MV2 closed, the S1 value dropped below -200 raw counts for longer than 6 seconds.</p> <p>A soft lockout was caused and both valves were closed. The fault will automatically resolve when the s1 air value is higher than -200.</p>	<ol style="list-style-type: none"> 1.) Check that air duct is clear free of any foreign bodies and pollution. 2.) Check that blower is running at a proper rate. 3.) Check air signal tube for kinks or blockages. 4.) Check Fuel/Air Ratio Module signal connections for proper engagement. 5.) Reset valve and burner management system. 6.) If fault persists, replace FARMOD. 7.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of user interface. 8.) Recommission partially or fully as desired. 		107
ILK	Valve Interlock Out (ILK OUT) signal fault	Valve ILK OUT terminal signal is not valid. Frequency or duty is out of expected range.	<p>Remove power and shut-off gas supply as necessary.</p> <ol style="list-style-type: none"> 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. 		9

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
ILK	Valve Interlock Out (ILK OUT) signal mis-match	<p>Valve Interlock Out (ILK OUT) terminal energized while valve internal ILK relay is not energized.</p> <p>Possible internal valve fault, mis-wiring, stuck/welded relay or jumper present.</p>	<p>1.) Measure ILK OUT voltage and verify it does not exist during lockout.</p> <p>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.</p> <p>3.) Remove power and shut-off gas supply as necessary.</p> <p>4.) Verify no jumpers exist between L1 and valve ILK OUT terminals or ILK IN and ILK OUT terminals.</p> <p>5.) Verify that ILK IN and ILK OUT are not reversed; check against wiring diagrams in valve installation instructions, 32-00018.</p> <p>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.).</p> <p>6.) If fault persists, replace valve main electronics.</p>		13

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
ILK	Valve Interlock In (ILK IN) not energized	<p>Valve Interlock In (ILK IN) terminal not energized while MV1 and MV2 are energized.</p> <p>Possible improper burner management timing/wiring, jumper or internal valve fault.</p>	<p> WARNING Explosion Hazard. Can cause severe injury, death or property damage</p> <p>1.) Remove power and shut-off gas supply</p> <p>2.) Remove valve front electrical enclosure and</p> <p>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.</p> <p>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.</p> <p>c.) Inspect wiring connections for wire engagement, seating, pin engagement and cleanliness.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>5.) If fault persists, replace burner management system or contact manufacturer for advice.</p> <p>6.) If fault persists, replace valve main electronics.</p> <p>7.) When fault is corrected, restore gas supply.</p>		14
	Valve Interlock Out (ILK OUT) relay fault	Valve Interlock Out (ILK OUT) safety relay internal drive fault detected.	<p>1.) Reset valve and burner management system, observing valve / burner operation.</p> <p>2.) If fault persists, replace valve main electronics.</p>		16

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
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.		36
	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.		40
	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.		46
	PRESSMOD 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 Ratio Module.	Remove power and shut-off gas supply 1.) Remove valve front electrical enclosure and disconnect Pressure Module and Fuel/Air Ratio 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 Ratio Module (if present) to valve main electronics. 8.) If fault persists, replace Fuel/Air Ratio Module. 9.) Accept new Fuel/Air Ratio Module on the FARMOD tab in the Setup & Tests menu of the user interface. 10.) Recommission partially or fully as desired. 11.) Replace electrical enclosure cover, restore power and gas supply and reset valve and burner management system.		49
	K1 internal relay is stuck closed	MV1 internal K1 relay is stuck closed unexpectedly	1.) Reset valve and attempt system restart. 2.) If fault persists, replace valve main electronics board. Perform Valve Production Cloning procedure first, accessed via Setup & Tests menu.		68

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Main Elec- tronics	K2 internal relay is stuck closed	MV2 internal K2 relay is stuck closed unexpectedly	<p>1.) Reset valve and attempt system restart.</p> <p>2.) If fault persists, replace valve main electronics board. Perform Valve Production Cloning procedure first, accessed via Setup & Tests menu.</p>		69
	POC Failure	Proof of Closure output shorted to MV Input.	<p>1.) Check for proper wiring between valve and burner controller. Verify the valve POC output terminal is not shorted to an MV input terminal. Refer to the installation instructions, 32-00018.</p> <p>2.) If problem persists, replace the valve main electronics board. Perform Valve Production Cloning procedure first, accessed via Setup & Tests menu.</p> <p>3.) Reset valve and burner management system, monitoring for proper operation</p>		90
MV1	MV1 signal fault	MV1 (Main Valve 1) terminal signal is not valid. Frequency or duty is out of expected range.	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical enclosure and inspect MV1, L1 and N wiring connections for wire engagement, seating, pin engagement and cleanliness.</p> <p>2.) Ensure MV1 is wired to proper terminals on burner management system.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system.</p> <p>4.) If fault persists, repeat above steps for L1 and N connections on the burner management system.</p> <p>5.) If fault persists, replace valve main electronics.</p>		11
MV2	MV2 signal fault	MV2 (Main Valve 2) terminal signal is not valid. Frequency or duty is out of expected range.	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical enclosure and inspect MV2, L1 and N wiring connections for wire engagement, seating, pin engagement and cleanliness.</p> <p>2.) Ensure MV2 is wired to proper terminals on burner management system.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system.</p> <p>4.) If fault persists, repeat above steps for L1 and N connections on the burner management system.</p> <p>5.) If fault persists, replace valve main electronics.</p>		12

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
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.	<p>1.) Reset valve and burner management system, monitoring for proper operation.</p> <p>2.) Check the valve power supply to make sure that both frequency and voltage meet the specifications.</p> <p>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.</p>	Warning indication for SV2 valve.	15
POC	POC (proof of closure) switch(es) signal fault	Valve POC (proof of closure) switch(es) signal is not valid. Frequency or duty is out of expected range.	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical enclosure and inspect L1, Neutral, and POC wiring connection for proper seating, pin engagement and cleanliness. Correct any errors.</p> <p>2.) Check the valve power supply to make sure that both frequency and voltage meet the specifications.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs.</p> <p>4.) If fault persists, replace valve main electronics.</p>		10
	POC output signal mis-match	<p>Valve POC (proof of closure) output terminal to burner management control energized while internal POC relay is not energized.</p> <p>Or POC output terminal to burner management control not energized while POC relay is energized.</p> <p>Possible internal fault, malfunction of relay or external mis-wiring of valve.</p>	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical enclosure.</p> <p>2.) Inspect external wiring between valve POC terminal and burner management system for proper seating, pin engagement and cleanliness. Ensure the valve POC terminal is not externally powered. Correct any errors.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs.</p> <p>4.) If fault persists, replace valve main electronics.</p>		74

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
POC	POC (proof of closure) fault for MV1	<p>Fault detected in POC 1 switch or its connection to valve circuit board.</p> <p>Possible internal fault in electronics interface to POC 1 switch.</p>	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical and rear solenoid enclosures.</p> <p>2.) Inspect internal wiring between solenoid proof of closure switch 1 and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (1) in the valve casting. Ensure the appropriate solenoid proof of closure connector is placed in the appropriate terminal (POC 1) on the valve electronics assembly and is properly seated and the wires are not loose.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs.</p> <p>4.) If fault persists, replace valve main electronics.</p> <p>5.) If fault persists, replace entire valve.</p>		75
	POC (proof of closure) fault for MV2	<p>Fault detected in POC 2 switch or its connection to valve circuit board.</p> <p>Possible internal fault in electronics interface to POC 2 switch.</p>	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical and rear solenoid enclosures.</p> <p>2.) Inspect internal wiring between solenoid proof of closure switch 2 and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (2) in the valve casting. Ensure the appropriate solenoid proof of closure connector is placed in the appropriate terminal (POC 2) on the valve electronics assembly and is properly seated and the wires are not loose.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs.</p> <p>4.) If fault persists, replace valve main electronics.</p> <p>5.) If fault persists, replace entire valve.</p>		76

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
POC	POC (proof of closure) of MV1 not verified	Proof of closure verification procedure not completed.	<p>1.) Ensure the Proof of Closure setup/ acceptance procedure has been performed. Go to the Setup & Tests screen, select the Settings menu and the Proof of Closure tab. Follow the prompts and 'i' page information.</p> <p>2.) Perform the Safety Parameters Verification procedure. Go to Setup & Tests screen, press the button labeled Verify Safety Parameters and follow the prompts. If this procedure is not completed while logged in, the valve will lockout when the login times out and the valve will not be operational.</p> <p>NOTE: The Proof of Closure setup/ acceptance and Safety Parameters Verification procedures validate the POC(s) exist and are properly wired to the valve electronics assembly. They also validate proper procedure was followed if the valve electronics orientation was swapped or the valve electronics assembly was replaced in the field.</p>		77
	POC (proof of closure) of MV2 not verified	Proof of closure verification procedure not completed.	<p>1.) Ensure the Proof of Closure setup/ acceptance procedure has been performed. Go to the Setup & Tests screen, select the Settings menu and the Proof of Closure tab. Follow the prompts and 'i' page information.</p> <p>2.) Perform the Safety Parameters Verification procedure. Go to Setup & Tests screen, press the button labeled Verify Safety Parameters and follow the prompts. If this procedure is not completed while logged in, the valve will lockout when the login times out and the valve will not be operational.</p> <p>NOTE: The Proof of Closure setup/ acceptance and Safety Parameters Verification procedures validate the POC(s) exist and are properly wired to the valve electronics assembly. They also validate proper procedure was followed if the valve electronics orientation was swapped or the valve electronics assembly was replaced in the field.</p>		78

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
POC	POC 1 (proof of closure) incorrect position detected	<p>POC 1 switch output does not match valve seat 1 powered/not powered status.</p> <p>Could be due to swapped internal SOLENOID 1/ SOLENOID 2 connections or swapped internal POC 1/POC 2 connections. Can occur if valve electronics orientation is swapped in field or electronics is replaced in field.</p> <p>May also be due to failures of POC switch, solenoid or electronics.</p>	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical and rear solenoid enclosures.</p> <p>2.) Inspect internal wiring between solenoids and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (1) in the valve casting. Ensure the appropriate solenoid connector is placed in the appropriate terminal (SOLENOID 1) on the valve electronics assembly.</p> <p>3.) Inspect internal wiring between solenoid proof of closure switch(es) and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (1) in the valve casting. Ensure the appropriate solenoid proof of closure connector is placed in the appropriate terminal (POC 1) on the valve electronics assembly.</p> <p>4.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs.</p> <p>5.) If fault persists, replace valve main electronics.</p> <p>6.) If fault persists, replace entire valve.</p>		80

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
POC	POC 2 (proof of closure) incorrect position detected	<p>POC 2 switch output does not match valve seat 2 powered/not powered status.</p> <p>Could be due to swapped internal SOLENOID 1/ SOLENOID 2 connections or swapped internal POC 1/POC 2 connections. Can occur if valve electronics orientation is swapped in field or electronics is replaced in field.</p> <p>May also be due to failures of POC switch, solenoid or electronics.</p>	<p>Remove power and shut-off gas supply as necessary.</p> <ol style="list-style-type: none"> 1.) Remove valve front electrical and rear solenoid enclosures. 2.) Inspect internal wiring between solenoids and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (2) in the valve casting. Ensure the appropriate solenoid connector is placed in the appropriate terminal (SOLENOID 2) on the valve electronics assembly. 3.) Inspect internal wiring between solenoid proof of closure switch(es) and valve electronics. The solenoid number is indicated by the direction of flow arrow and number (2) in the valve casting. Ensure the appropriate solenoid proof of closure connector is placed in the appropriate terminal (POC 2) on the valve electronics assembly. 4.) Replace cover and restore power and gas. Reset valve and burner management system, monitoring for proper POC operation in conjunction with valve LEDs and burner management system inputs. 5.) If fault persists, replace valve main electronics. 6.) If fault persists, replace entire valve. 		81

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
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.		20
	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.		21
	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.	Warning indication for SV2 Series valve.	22
	Pressure out of range	Pressure 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.	Warning indication for SV2 Series valve.	53

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Pressure Module	Pressure Module reading fault	Pressure Module communication fault or pressure measurement reading error	<p>Remove power and shut-off gas supply as necessary.</p> <p>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.</p> <p>2.) Check for a nearby source of strong electro-magnetic interference. Reset valve and burner management system when corrected.</p> <p>3.) Remove Pressure Module from valve body.</p> <p>4.) Inspect the O-ring provided on the Pressure Module to ensure that it is clean and fully seated in its oval groove.</p> <p>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.</p> <p>6.) Verify the correct mounting location and pressure port are being used for the valve model - refer to documents 32-00017 and 32-00029.</p> <p>7.) Recommission Low and High gas pressure settings as necessary.</p>		19
Pressure Module	Pressure Module over pressure	System pressure above Pressure Module rating	<p>1.) Verify the Pressure Module rating is correct for the application.</p> <p>2.) If the Pressure Module rating is correct, reset valve and burner management system, observing burner operation for proper pressures.</p> <p>3.) Adjust appliance regulator as necessary.</p> <p>4.) Recommission Low and High gas pressure settings as necessary.</p> <p>5.) Test Low and High gas pressure trip points as necessary.</p> <p>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.</p>		37
Security	Factory keys are corrupt	Factory Key storage is corrupt. Internal micro memory flash corrupted or factory initial key installation missed. Field recovery not possible.	Replace valve main electronics board.		95

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Security	Installer password is not configured.	Installer password is not configured (set to default value).	Configure Installer password to non-default value.		96
	OEM password is not configured.	OEM password is not configured (set to default value).	Configure OEM password to non-default value.		97
	Installer account temporarily disabled	Installer account is temporarily locked down due to too many login attempts with wrong password.	Wait at least 1 minute before new attempt to login. If message is present with no attempts to login, another device on network might be trying to login. Find this device and disable it before trying to login.		98
	OEM account temporarily disabled	OEM account is temporarily locked down due to too many login attempts with wrong password.	Wait at least 1 minute before new attempt to login. If message is present with no attempts to login, another device on network might be trying to login. Find this device and disable it before trying to login.		99
	Installer password reset feature temporarily disabled	Installer password reset feature is temporarily disabled due to too many unsuccessful reset attempts.	Wait at least 1 minute before new attempt to reset password. If message is present with no attempts to reset password, another device on network might be trying to reset password. Find this device and disable it before trying to reset password.		100
	OEM password reset feature temporarily disabled	OEM password reset feature is temporarily disabled due to too many unsuccessful reset attempts.	Wait at least 1 minute before new attempt to reset password. If message is present with no attempts to reset password, another device on network might be trying to reset password. Find this device and disable it before trying to reset password.		101
	OEM reset password is not set.	OEM reset password is not configured although the feature is enabled.	Configure OEM reset password OR disable the OEM password reset feature.		102
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.		0

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Solenoid 1	Solenoid 1 feedback 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.		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.		2
	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.		3
	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.		4
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.		5
	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		6

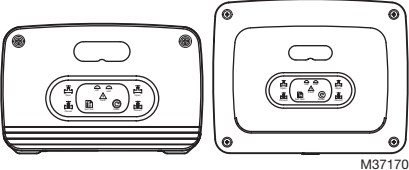
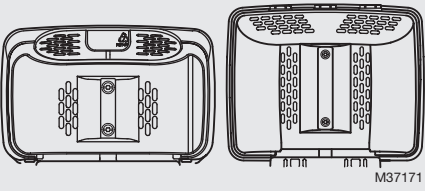
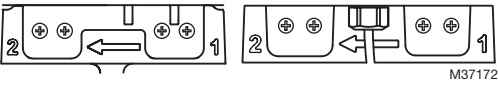
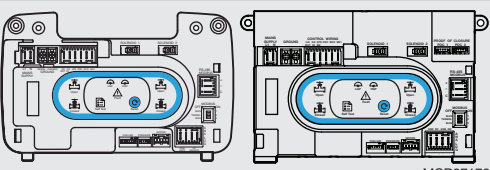
Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
Solenoid 2	Solenoid 2 signal fault	Solenoid 2 terminal signal is not valid. Frequency or duty is out of expected range.	<p>Remove power and shut-off gas supply as necessary.</p> <p>1.) Remove valve front electrical enclosure and inspect SOLENOID 2 and MV2 wiring connections for wire engagement, seating, pin engagement and cleanliness.</p> <p>2.) Ensure MV2 is wired to proper terminals on burner management system.</p> <p>3.) Replace cover and restore power and gas. Reset valve and burner management system.</p> <p>4.) Measure MV2 voltage for proper tolerance per valve nameplate and documentation.</p> <p>5.) If fault persists, repeat above steps for L1 and N connections.</p> <p>6.) If fault persists, replace valve main electronics.</p>		7
	Solenoid 2 mode fault	Solenoid 2 expected and detected mode do not match.	<p>1.) Reset valve and burner management system, observing valve / burner operation.</p> <p>2.) If fault persists, replace valve main electronics</p>		8
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.		47
VPS	VPS Test Failure	Value 1 proving sequence has failed.	<p>1.) Check the piping train (is MSOV closed, piping flanges tight, O-ring leakage), main electronics wiring and Pressure Module connection to it. For wiring, refer to the installation instructions, 32-00018. Reset valve and repeat the VPS test.</p> <p>2.) If fault persists, check system gas pressure and repeat the VPS test.</p> <p>3.) If fault persists, replace Pressure Module.</p> <p>4.) Accept new Pressure Module on the PRESSMOD tab in the Setup & Tests menu.</p> <p>5.) Recommission the Hi-Gas and Lo-Gas pressure limits. Repeat leak detection test.</p> <p>6.) If fault persists, replace valve.</p>	Warning indication for SV2 valve. But this condition will likely cause a burner controller lockout.	62

Fault Category	Fault Description	Detailed Description	Remediation Steps	Comments	Fault #
VPS	VPS Test Failure	Valve 2 proving sequence has failed.	<ol style="list-style-type: none"> 1.) Check the piping train (is MOV closed, piping flanges tight, O-ring leakage), main electronics wiring and Pressure Module connection to it. For wiring, refer to the installation instructions, 32-00018. Reset valve and repeat the VPS test. 2.) If fault persists, check system gas pressure and repeat the VPS test. 3.) If fault persists, replace Pressure Module. 4.) Accept new Pressure Module on the PRESSMOD tab in the Setup & Tests menu. 5.) Recommission the Hi-Gas and Lo-Gas pressure limits. Repeat leak detection test. 6.) If fault persists, replace valve. 	Warning indication for SV2 valve. But this condition will likely cause a burner controller lockout.	63

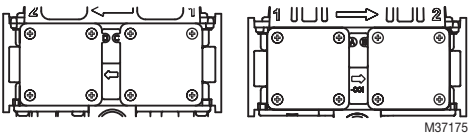
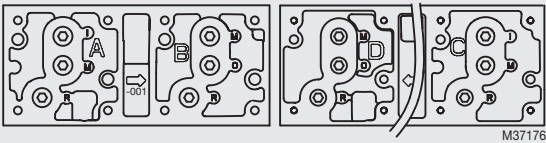
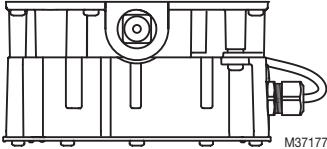
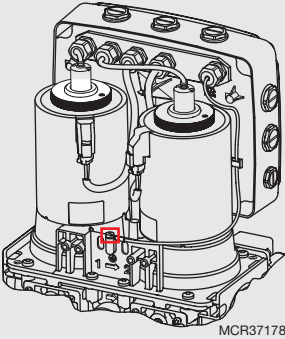
TIGHTENING TORQUES

A summary of all tightening torques for the SV2 Series valves and components can be found in [Table 2927](#).

Table 27. SV2 Series maximum tightening torques.

Category	Item	Picture	Maximum Tightening Torque	
			Nm	In-lbf
Valve enclosure	Front electronics cover (NEMA 1/IP20 and NEMA 4/IP66)	 M37170	1.26-1.54	11-13.63
	Rear solenoids cover (NEMA 1/IP20 and NEMA 4/IP66)	 M37171	2.2-2.35	19.5-20.8
	Electrical enclosure fastener tabs to valve metal bonnet (NEMA 1/IP20 and NEMA 4/IP66)	 M37172	4-5	35-44
	Replacement electronics assembly to the electronics base	 MCR37173	1.69-1.8	15-16

Category	Item	Picture	Maximum Tightening Torque	
			Nm	In-lbf
Valve enclosure (Continued)	(6) NEMA 4/IP66 wiring ports, ½ in (1.27cm) flex conduit		Torque hardware to manufacturer's recommended requirements	
	(6) NEMA 4/IP66 wiring ports, ½ in (1.27cm) NPT low voltage cord grip for RS-485 Modbus wiring, Lock nut to the cord grip or factory provided plugs		4.5-5.1	40-45
	(6) NEMA 4/IP66 wiring ports, ½ in (1.27cm) NPT low voltage cord grip for RS-485 Modbus wiring, Cord grip sealing nut around the cord		5.6-6.2	50-55
	(6) NEMA 4/IP66 wiring ports, M16x1.5 low voltage cord grips or factory provided plugs. Includes field PRESSURE connector, factory SOLENOID 1/2, POC 1/2 and CHASSIS GROUND wire cord grips.		3.7-4.3	33-38
Flange to valve body	¾ and 1 in (DN20 and DN25)		3.4	30
	1 ½ and 2 in (DN40 and DN50)		13.5-14.5	120-128
C6097 pressure switch Pressure Module	Module to valve body		1.8-2.2	16-20
	NEMA 4/IP66 wiring port low voltage M16x1.5 cord grip (Pressure Module only)		3.7-4.3	33-38

Category	Item	Picture	Maximum Tightening Torque	
			Nm	In-lbf
Valve body	Pressure access location cover		1.36-1.81	12-16
	Pressure access port plug, 1/8 in (3mm) NPT or BSP		6-8	53-71
	NOVV plug 3/4 in NPT 1 in (DN25) valves		72-88	637-779 (53-65 ft-lbf)
	Chassis ground wire (underneath solenoid cover)		4-5	35-44

MODBUS COMMUNICATION ADDRESSING

Honeywell SV2 Series valves include a Honeywell specific secure Modbus protocol. Standard Modbus RTU protocol is used, however, safety-related and writable parameters are covered by a secure layer. As a result, they are only writable when accessed using a valid user access level and appropriate user interfaces, which are designed to work with the secure layer. The Modbus addresses shown in this section are readable only.

Table 28.

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 29, 30 and 31)	17

Table 29. 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 30. 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 31. (1 byte)	String terminated by 0 or maximum size 62 characters	Low, High (2 bytes)

Table 31. 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 32](#) for the read and write access function codes.

Table 32. Modbus Function Codes.

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 33](#).

Table 33. 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 34. Holding Register Mapping.

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
73	49	General	All	Standard	Selectable units for temperature	Enum	0=Fahrenheit 1=Celsius	0	1	
74	4A				Selectable units for pressure		0=Mbar 1=PSI 2=inches WC	0	2	
75	4B				Selectable units for volumetric flow		0=Liters per hour (L/h) 1=Milliliters per min (mL/ min) 2=Cubic feet per hour (CFH)	0	2	
78	4E				Selectable volumetric units		0=Milliliter (ml) 1=Cubic inch (cu in)	0	1	
79	4F				Remote reset	U16	Will return number of remote resets remaining. If value 0xAA55 is written and remaining number of resets >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
90	5A				SV2 valve Modbus slave address	U16	Low byte contains address and high byte its negated value, otherwise default address is used.	0	65535	
91	5B				Modbus communication baud rate	U16	9600, 19200, 38400 or 57600 bps Default value 38400	9600	57600	38400
148	94				Valve MV1 / MV2 LED orientation indication change	Bool	0=Factory default; no change 1=MV1/MV2 LEDs swapped	0	1	0
149	95				Body size of attached valve	Enum	Valve body size in inches 0=Unknown Refer to Table 37.	0	3	0
255	FF				User entered Value Name	U16	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	
256	100	U16	0	65535						
257	101	U16	0	65535						
258	102	U16	0	65535						
259	103	U16	0	65535						
285	11D	Date stamp selected by user during setup	U16	Year 7 Month 4 Day 5 Year offset of 2000	0	65535				

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
107	6B	Pressure Module	All	Standard	Pressure Module factory data	62 x Char	String of chars ended by either ASCII-0 or end of register array. Two chars per register.			
108	6C									
109	6D									
110	6E									
111	6F									
112	70									
113	71									
114	72									
115	73									
116	74									
117	75									
118	76									
119	77									
120	78									
121	79									
122	7A									
123	7B									
124	7C									
125	7D									
126	7E									
127	7F									
128	80									
129	81									
130	82									
131	83									
132	84									
133	85									
134	86									
135	87									
136	88									
137	89									

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
156	9C	HGP / LGP	All	Standard	Low gas pressure (LGP) limit lockout type	Enum	0=Disabled 1=Auto reset 2=Manual reset Other value invokes an invalid setup	0	2	
157	9D				High gas pressure (HGP) limit lockout type	Enum	0=Disabled 1=Auto reset 2=Manual reset Other value invokes an invalid setup	0	2	
159	9F				% of measured operating pressure used to set the High gas pressure (HGP) limit during setup.	S16	Value in % % offset = +100%	25	50	
160	A0				% of measured operating pressure used to set the Low gas pressure (LGP) limit during setup.	S16		-50	-25	
161	A1				Low gas pressure (LGP) and High gas pressure (HGP) setup indication	S16	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	-32768	32767	0
162	A2				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 160).	U16	0=Invalid value Pressure in user selected units. See Holding Register 74 for selected units.			
163	A3				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 159).	U16	0=Invalid value Pressure in user selected units. See Holding Register 74 for selected units.			
150	96	VPS	All	Standard	VPS disable / enable status	Bool	0=VPS disabled 1=VPS enabled	0	1	
151	97				Max allowed leakage in user units	U16	Volumetric flow. See Holding Register 75 for selected units.	28 L/h	Refer to Table 37	NV
152	98				Space between valves volume. Units according to selected volumetric units.	U16	Volume. See Holding Register 78 for selected units.	Refer to Table 37	Refer to Table 37	NV
153	99				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 37	NV
154	9A				VPS relay polarity. Selectable action during setup.	Bool	0=Pressure to close 1=Pressure to open	0	1	

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
64	40	Fuel / Air	V2V	Standard	Ignition Setpoint	S16	% of RUN mode target amplification as given by Fuel/Air curve at the ignition load (ignition S1). Determines the target value for fuel/air control during the Ignition Period (holding register 65)	70	150	100
65	41				Ignition Period	U16	Ignition period in seconds. Includes the Ramp Period, the Hold On Period and the remaining period in which the controlled amplification setting can be changed relative to the normal amplification setting at the start load / RUN as governed by the Ignition Setpoint (holding register 64)	Ignition Ramp time (HR341) + Ignition Hold On time (HR340) + 1 sec	5 * 10	3 * 10
66	42				Ignition Ramp Offset	S16	This sets the number of steps that the Learnt Pos. 2 is reduced or offset during ignition. Once the valve seats are powered, the stepper motor moves from this position to the Learnt Pos. 2 position during the Ignition Ramp Period time (HR341) Register content is scaled by 4 (i.e. value of 4 is one full step)	-4 * 50	-4 * 34	-32768
67	43				Ignition Default Position 2	U16	In half steps. Used for the first/initial stepper motor ignition start position 2 by OEM in lab. Note that valve will learn and record the appropriate stepper motor position with each light-off. Saved as the Learnt Pos. 2 (IR125)	0	1.0in / DN25 =821 1.5in / DN40 =1412 2.0in / DN50 =1412	-32768
218	DA				S1 pre-ignition lower threshold	U16	A % that the air S1 signal can be below the recorded / commissioned air signal during ignition. If the air signal drops below this value the valve will lockout	50	95	80
219	DB				S1 pre-ignition upper threshold	U16	A % that the air S1 signal can be over the recorded / commissioned air signal during ignition. If the air signal raises above this value, the valve will lockout.	105	150	120

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
290	122	Fuel/Air	V2V	Standard	Fuel/air module factory data	62 x Char	Fuel/air module factory data string of characters ended by either ASCII-0 or end of register array. Two characters per register Registers are dedicated to store model #, production date etc. into FARMOD EEPROM.	-	-	-
291	123									
292	124									
293	125									
294	126									
295	127									
296	128									
297	129									
298	12A									
299	12B									
300	12C									
301	12D									
302	12E									
303	12F									
304	130									
305	131									
306	132									
307	133									
308	134									
309	135									
310	136									
311	137									
312	138									
313	139									
314	13A									
315	13B									
316	13C									
317	13D									
318	13E									
319	13F									
320	140									
340	154				Ignition Hold On Period	U16	In seconds. Sets the time that the control ignores the fuel/air control feedback following the Ramp Period (HR341). The Fuel Control Valve is held at the controlled valve position for the specified time before it starts to modulate. Register content is scaled by 10 (i.e. 1s corresponds to 10).	0	[Ignition Period (HR65) - Ignition Ramp Time (HR341) - 1s] * 10	1 * 10
341	155				Ignition Ramp Period	U16	In seconds. Governs the speed with which the stepper motor opens from the (offset) idle / start position to the Learnt Pos. 2 during the ignition sequence. While the burner igniter is on, the air and gas mixture enriches until a mix occurs for light-off. Register content is scaled by 10 (i.e. 1s corresponds to 10).	0	[Ignition Period (HR65) - Ignition Hold On Time (HR340) - 1s] * 10	1 x 10
342	156				Fuel Valve Position	S16	Current fuel control valve / stepper motor position Register content is scaled by 4 (i.e. 4 corresponds to 1 full step).	-32768	32767	NA

Address		Type	Valve Model	Intelligence Level	Description	Data Type	Content	Range		Default Value
Dec	Hex							Min	Max	
391	187	Fuel/Air	V2V	Standard	Fuel/air correction curve name entered by user	U16	Fuel/air curve name 0	0	65535	0
392	188					U16	Fuel/air curve name 1	0	65535	0
393	189					U16	Fuel/air curve name 2	0	65535	0
394	18A					U16	Fuel/air curve name 3	0	65535	0
395	18B					U16	Fuel/air curve name 4	0	65535	0
396	18C					U16	Fuel/air curve name 5	0	65535	0
397	18D					U16	Fuel/air curve name 6	0	65535	0
398	18E					U16	Fuel/air curve name 7	0	65535	0
771	303								Base Curve length	S16
779	30B				S1 minimum threshold	U16	A % that the air S1 signal can be below the recorded / commissioned minimum air signal of the Correction Curve during normal RUN mode at minimum load. If the S1 signal drops below this value, the valve is cycled off and waits for S1 to rise above this value. The valve does not lockout.	50	95	80
780	30C				S1 maximum threshold	U16	A % that the air S1 signal can be over the recorded / commissioned maximum air signal of the Correction Curve during normal RUN mode at maximum load. If the S1 signal rises above this value, the valve is cycled off and waits for S1 to drop below this value. The valve does not lockout.	105	150	120
473	1D9	POC	All	Standard	POC (Proof of Closure) Setup indication	Enum	0= There is no POC function activated 1= POC activated on MV1 only 2= POC activated on MV2 only 3= POC activated on both MV1 and MV2	0	0x55	0 (NV)
791	317	Secure Modbus	All	Standard	Active User	U16	Information about current active user mode			
795	31B				Security Flags	U16	Bit 0: Enable Installer password reset Bit 1: Enable OEM password Reset			

Table 35. Input Register Mapping

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
2	2	General	All	Standard	Valve electronic software revision	U8 + U8	High byte major Low byte minor
3	3				Intelligence level identification	U16	Standard=0
5	5				# of currently active alarms with highest priority	S16	-32768=No alarm active alarm
6	6				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
70	46				Fault code number 0	Bit array	Fault code number corresponding to the fault code/time stamp/cycle count in input registers 139-213
71	47				Fault code number 1		
72	48				Fault code number 2		
73	49				Fault code number 3		
74	4A				Fault code number 4		
75	4B				Fault code number 5		
76	4C				Fault code number 6		
77	4D				Fault code number 7		
78	4E				Valve system states	Enum	Refer to Table 31 .
95	5F				Valve VAC signal status	Bit array	Low status word. Refer to Table 36 .
96	60					Bit array	High status word. Refer to Table 36 .
214	D6				Valve accumulated operation time in hours	U16	Upper 2 bytes
215	D7					U16	Lower 2 bytes Resolution 0.25 hr
216	D8				Valve accumulated number of cycles. Either MV1 or MV2, whichever is higher.	U16	Upper 2 bytes
217	D9					U16	Lower 2 bytes
225	E1				Valve factory data	62 x Char	Main electronics factory data string of characters ended by either ASCII-0 or end of register array. Two characters per register
226	E2				Valve factory data	62 x Char	
227	E3				Valve factory data	62 x Char	
228	E4				Valve factory data	62 x Char	
229	E5				Valve factory data	62 x Char	
230	E6				Valve factory data	62 x Char	
231	E7				Valve factory data	62 x Char	
232	E8				Valve factory data	62 x Char	
233	E9				Valve factory data	62 x Char	
234	EA	Valve factory data	62 x Char				
235	EB	Valve factory data	62 x Char				
236	EC	Valve factory data	62 x Char				
237	ED	Valve factory data	62 x Char				
238	EE	Valve factory data	62 x Char				
239	EF	Valve factory data	62 x Char				
240	F0	Valve factory data	62 x Char				
241	F1	Valve factory data	62 x Char				
242	F2	Valve factory data	62 x Char				

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
243	F3	General	All	Standard	Valve factory data	62 x Char	Main electronics factory data string of characters ended by either ASCII-0 or end of register array. Two characters per register
244	F4				Valve factory data	62 x Char	
245	F5				Valve factory data	62 x Char	
246	F6				Valve factory data	62 x Char	Main electronics factory data string of characters ended by either ASCII-0 or end of register array. Two characters per register
247	F7				Valve factory data	62 x Char	
248	F8				Valve factory data	62 x Char	
249	F9				Valve factory data	62 x Char	
250	FA				Valve factory data	62 x Char	
251	FB				Valve factory data	62 x Char	
252	FC				Valve factory data	62 x Char	
253	FD				Valve factory data	62 x Char	
254	FE				Valve factory data	62 x Char	
255	FF				Valve factory data	62 x Char	
24	18				HGP / LGP	All	Standard
25	19	Maximum applicable pressure range for Pressure Module used. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units.			
63	3F	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			
64	40	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			
65	41	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			

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
32	20	Pressure Module	All	Standard	Current Pressure Module pressure reading. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for selected units.
33	21				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
34	22				Pressure Module temperature	S16	Pressure Module measured temperature in selected units
36	24				Pressure Module sensor 1 status	Enum	0=No communication established with sensor
37	25				Pressure Module sensor 2 status	Enum	1=Sensor is operating correctly 2=Sensor is in command mode
38	26				Pressure Module sensor 3 status	Enum	4=Sensor diagnostic error 8=Communication error
39	27				Pressure Module EEPROM status	Enum	0 =There has not been communication with EEPROM 1 =Communication with EEPROM is OK 3 =EEPROM data matches RAM storage 0x81=Communication error 0x82=EEPROM writing failed 0x84=RW data inconsistency 0x88=RO data inconsistency
41	29				Pressure Module sensor 1 serial number	U16	Number
43	2B				Pressure Module sensor 2 serial number	U16	Number
45	2D				Pressure Module sensor 3 serial number	U16	Number
320	140	POC	All	Standard	Proof of Closure 1 (POC 1) status	Enum	0 =POC reading and function disabled 1 =POC detected, but not activated by user 2 =Reading indicates closed valve 3 =Reading indicates open valve
321	141				Proof of Closure 2 (POC 2) status	Enum	0x10=Not calibrated 0x80=Reading error
326	146				Proof of Closure (POC) relay output status	Enum	0 =POC output is off 1 =POC output is on 0x80=Voltage detected on POC output while relay is off
337	151				MV1 closing time	S16	Time in milliseconds as measured using POC (-1=is not measured)
339	153				MV2 closing time	S16	Time in milliseconds as measured using POC (-1=is not measured)
26	1A	VPS	All	Standard	Minimum allowed VPS test pressure. Shown in user selected pressure units.	U16	Pressure. See Holding Register 74 for user selected units.
55	37				VPS minimum calculated valve powered time requirement for burner control	U16	Time in seconds
56	38				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

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
57	39	VPS	All	Standard	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
58	3A				Input pressure measured during VPS	U16	Pressure.
59	3B				Output pressure measured during VPS	U16	See Holding Register 74 for user selected units.
60	3C				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.
61	3D				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.
62	3E				VPS minimum test time requirement for burner control	S16	Time in seconds
270	10E				Valve 1 accumulated hours recorded during last VPS sequence	U16	Upper word
271	10F					U16	Lower word
272	110				Valve 1 accumulated cycles recorded during last VPS sequence	U16	Upper word
273	111					U16	Lower word
274	112				Valve 2 accumulated hours recorded during last VPS sequence	U16	Upper word
275	113					U16	Lower word
276	114				Valve 2 accumulated cycles recorded during last VPS sequence	U16	Upper word
277	115					U16	Lower word
682	2AA				VPS recorded leakage rate for MV1	S16	Expressed in units selected by user during setup
683	2AB				Number of averaged VPS measurements for MV1	U16	Dimensionless number
684	2AC				Recorded valve cycles during MV1 VPS test	U16	Upper word
685	2AD					U16	Lower word
686	2AE				VPS test execution time for MV1	U16	Upper word, resolution 0.25 hours
687	2AF					U16	Lower word, resolution 0.25 hours
689	2B1				VPS recorded leakage rate for MV2	S16	Expressed in units selected by user during setup
690	2B2				Number of averaged VPS measurements for MV2	U16	Dimensionless number
691	2B3				Recorded valve cycles during MV2 VPS test	U16	Upper word
692	2B4					U16	Lower word
693	2B5				VPS test execution time for MV2	U16	Upper word, resolution 0.25 hours
694	2B6					U16	Lower word, resolution 0.25 hours

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
Dec	Hex						
139	8B	Alarms	All	Standard	Fault code of most recent fault	U16	Number
140	8C				Time stamp of most recent fault	U16	Upper 2 bytes
141	8D					U16	Lower 2 bytes
142	8E				Cycle count of most recent fault	U16	Upper 2 bytes
143	8F					U16	Lower 2 bytes
144	90				Fault code of previous fault	U16	Number
145	91				Time stamp of previous fault	U16	Upper 2 bytes
146	92					U16	Lower 2 bytes
147	93				Cycle count of previous fault	U16	Upper 2 bytes
148	94					U16	Lower 2 bytes
149	95				Fault code of 2nd previous fault	U16	Number
150	96				Time stamp of 2nd previous fault	U16	Upper 2 bytes
151	97					U16	Lower 2 bytes
152	98				Cycle count of 2nd previous fault	U16	Upper 2 bytes
153	99					U16	Lower 2 bytes
154	9A				Fault code of 3rd previous fault	U16	Number
155	9B				Time stamp of 3rd previous fault	U16	Upper 2 bytes
156	9C					U16	Lower 2 bytes
157	9D				Cycle count of 3rd previous fault	U16	Upper 2 bytes
158	9E					U16	Lower 2 bytes
159	9F				Fault code of 4th previous fault	U16	Number
160	A0				Time stamp of 4th previous fault	U16	Upper 2 bytes
161	A1					U16	Lower 2 bytes
162	A2				Cycle count of 4th previous fault	U16	Upper 2 bytes
163	A3					U16	Lower 2 bytes
164	A4				Fault code of 5th previous fault	U16	Number
165	A5				Time stamp of 5th previous fault	U16	Upper 2 bytes
166	A6					U16	Lower 2 bytes
167	A7				Cycle count of 5th previous fault	U16	Upper 2 bytes
168	A8					U16	Lower 2 bytes
169	A9				Fault code of 6th previous fault	U16	Number
170	AA				Time stamp of 6th previous fault	U16	Upper 2 bytes
171	AB	U16	Lower 2 bytes				
172	AC	Cycle count of 6th previous fault	U16	Upper 2 bytes			
173	AD		U16	Lower 2 bytes			
174	AE	Fault code of 7th previous fault	U16	Number			
175	AF	Time stamp of 7th previous fault	U16	Upper 2 bytes			
176	B0		U16	Lower 2 bytes			

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
177	B1	Alarms	All	Standard	Cycle count of 7th previous fault	U16	Upper 2 bytes
178	B2					U16	Lower 2 bytes
179	B3				Fault code of 8th previous fault	U16	Number
180	B4					Time stamp of 8th previous fault	U16
181	B5				U16		Lower 2 bytes
182	B6				Cycle count of 8th previous fault	U16	Upper 2 bytes
183	B7					U16	Lower 2 bytes
184	B8				Fault code of 9th previous fault	U16	Number
185	B9					Time stamp of 9th previous fault	U16
186	BA				U16		Lower 2 bytes
187	BB				Cycle count of 9th previous fault	U16	Upper 2 bytes
188	BC					U16	Lower 2 bytes
189	BD				Fault code of 10th previous fault	U16	Number
190	BE					Time stamp of 10th previous fault	U16
191	BF				U16		Lower 2 bytes
192	C0				Cycle count of 10th previous fault	U16	Upper 2 bytes
193	C1					U16	Lower 2 bytes
194	C2				Fault code of 11th previous fault	U16	Number
195	C3					Time stamp of 11th previous fault	U16
196	C4				U16		Lower 2 bytes
197	C5				Cycle count of 11th previous fault	U16	Upper 2 bytes
198	C6					U16	Lower 2 bytes
199	C7				Fault code of 12th previous fault	U16	Number
200	C8					Time stamp of 12th previous fault	U16
201	C9	U16	Lower 2 bytes				
202	CA	Cycle count of 12th previous fault	U16	Upper 2 bytes			
203	CB		U16	Lower 2 bytes			
204	CC	Fault code of 13th previous fault	U16	Number			
205	CD		Time stamp of 13th previous fault	U16	Upper 2 bytes		
206	CE	U16		Lower 2 bytes			
207	CF	Cycle count of 13th previous fault	U16	Upper 2 bytes			
208	D0		U16	Lower 2 bytes			
209	D1	Fault code of 14th previous fault	U16	Number			
210	D2		Time stamp of 14th previous fault	U16	Upper 2 bytes		
211	D3	U16		Lower 2 bytes			
212	D4	Cycle count of 14th previous fault	U16	Upper 2 bytes			
213	D5		U16	Lower 2 bytes Resolution 0.25 hr			
7	7	Fuel / Air	V2V	Standard	Current stepper motor position	S16	Position scaled by 4 (i.e. value of 4 is one full step)

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
9	9	Fuel / Air	V2V	Standard	Filtered S1 sensor signal	S16	Dimensionless - Represents mass flow of air in the appliance. - Can also represent gas flow in the appliance if the Lambda value is held constant. - When linking this value to fan speed, consideration must be given to relative changes in air density.
12	C				Stepper motor maximum number of steps. This value corresponds to the fully opened valve	U16	Position scaled by 4 (i.e. value of 4 is one full step)
13	D				Valve target ignition position 2 in motor steps during ignition ramp time	U16	Position scaled by 4 (i.e. value of 4 is one full step)
49	31				Fuel/Air Module EEPROM status	Ehum	0 =There has not been communication with EEPROM 1 =Communication with EEPROM is OK 3 =EEPROM data matches RAM storage 0x81=Communication error 0x82=EEPROM writing failed 0x84=RW data inconsistency 0x88=RO data inconsistency
52	34				Fuel/Air Module status	Enum	0 =Disabled 1 =Enabled 3 =OK 0xA1=EEPROM data inconsistency 0xC1=Communication error
125	7D				Ignition Learnt Pos. 2	S16	Position scaled by 4 (i.e. value of 4 is one full step)
127	7F				Full valve stroke in motor steps	S16	Position scaled by 4 (i.e. value of 4 is one full step) run between end stops in the last detection cycle.
297	129				Target amplification	S16	Current gain value based on current fuel/air curve and settings. Value scaled by 1x10 ⁴
298	12A				Fuel/air curve informational flags related to curve loading and saving	U16	Bit 0: True = if new curve point is added, it will replace another existing point. 0 = a new point will be added to the curve. Bit 1: True/False = the fuel/air curve commissioning mode is active/inactive. Bit 2: True = a fuel/air curve maximum point already exists. Bit 3: True = point commissioning is currently active. Bit 4: True = a fuel/air curve minimum point already exists. Bit 5: True = an initial fuel/air curve already exists. Bit 6: True = a fuel/air curve point is being sampled. Bit 7: True = the fuel/air curve is locked. Bit 8: True = the loaded fuel/air curve data is OK and can be stored. Updated when the fuel/air curve is unlocked for editing. Bit 9: True = a new fuel/air curve point has been saved.
349	15D				X-coordinate 0	S16	X-coordinate of CORRECTION fuel/air curve, S1 sensor value. S1 value is dimensionless. -32768 indicates an empty cell
350	15E				X-coordinate 1		
351	15F				X-coordinate 2		
352	160	X-coordinate 3					
353	161	X-coordinate 4					
354	162	X-coordinate 5					

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
355	163	Fuel / Air	V2V	Standard	X-coordinate 6	S16	X-coordinate of CORRECTION fuel/air curve, S1 sensor value. S1 value is dimensionless. -32768 indicates an empty cell
356	164				X-coordinate 7		
357	165				X-coordinate 8		
358	166				X-coordinate 9		
359	167				X-coordinate 10		
360	168				X-coordinate 11		
361	169				X-coordinate 12		
362	16A				X-coordinate 13		
363	16A				X-coordinate 14		
364	16C				X-coordinate 15		
365	16D				X-coordinate 16		
366	16E				X-coordinate 17		
367	16F				X-coordinate 18		
368	170				X-coordinate 19		
369	171				X-coordinate 20		
370	172				X-coordinate 21		
371	173				X-coordinate 22		
372	174				X-coordinate 23		
373	175				X-coordinate 24		
381	17D				Fuel / Air		
382	17E	Y-coordinate 1					
383	17F	Y-coordinate 2					
384	180	Y-coordinate 3					
385	181	Y-coordinate 4					
386	182	Y-coordinate 5					
387	183	Y-coordinate 6					
388	184	Y-coordinate 7					
389	185	Y-coordinate 8					
390	186	Y-coordinate 9					
391	187	Y-coordinate 10					
392	188	Y-coordinate 11					
393	189	Y-coordinate 12					
394	18A	Y-coordinate 13					
395	18B	Y-coordinate 14					
396	18C	Y-coordinate 15					
397	18D	Y-coordinate 16					
398	18E	Y-coordinate 17					
399	18F	Y-coordinate 18					
400	190	Y-coordinate 19					
401	191	Y-coordinate 20					
402	192	Y-coordinate 21					
403	193	Y-coordinate 22					
404	194	Y-coordinate 23					
405	195	Y-coordinate 24					
413	19D	Fuel / Air	V2V	Standard	Fuel/Air curve control valve position 0	S16	Control valve position in motor steps recorded during the fuel/air curve the commissioning. Position scaled by 4 (i.e. value of 4 is one full step).
414	19E				Fuel/Air curve control valve position 1		
415	19F				Fuel/Air curve control valve position 2		
416	1A0				Fuel/Air curve control valve position 3		
417	1A1				Fuel/Air curve control valve position 4		

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
418	1A2	Fuel / Air	V2V	Standard	Fuel/Air curve control valve position 5	S16	Control valve position in motor steps recorded during the fuel/air curve the commissioning. Position scaled by 4 (i.e. value of 4 is one full step).
419	1A3				Fuel/Air curve control valve position 6		
420	1A4				Fuel/Air curve control valve position 7		
421	1A5				Fuel/Air curve control valve position 8		
422	1A6				Fuel/Air curve control valve position 9		
423	1A7				Fuel/Air curve control valve position 10		
424	1A8				Fuel/Air curve control valve position 11		
425	1A9				Fuel/Air curve control valve position 12		
426	1AA				Fuel/Air curve control valve position 13		
427	1AB				Fuel/Air curve control valve position 14		
428	1AC				Fuel/Air curve control valve position 15		
429	1AD				Fuel/Air curve control valve position 16		
430	1AE				Fuel/Air curve control valve position 17		
431	1AF				Fuel/Air curve control valve position 18		
432	1B0				Fuel/Air curve control valve position 19		
433	1B1				Fuel/Air curve control valve position 20		
434	1B2				Fuel/Air curve control valve position 21		
435	1B3				Fuel/Air curve control valve position 23		
436	1B4	Fuel/Air curve control valve position 24					
467	1D3	Fuel / Air	V2V	Standard	Fault flag 0	U16	0 = FARMOD fatal data (not recoverable) 1 = Flow sensor related faults 2 = Faults related to FARMOD 3 = Stepper motor related faults 4 = FARMOD control valve faults 5 = Light-off related faults 6 = FARMOD EEPROM or flow sensors communication 7 = Control loop 8 = FARMOD data (recoverable) 9 = FAR commissioning 10= FAR curve 11= FARMOD data soft fault 12= New FARMOD detected
468	1D4				Fault flag 1		
469	1D5				Fault flag 2		
470	1D6				Fault flag 3		
615	267	Fuel / Air	V2V	Standard	Fan RPM data point 0	S16	User entered combustion fan RPM values during commissioning (optional)
616	268				Fan RPM data point 1		
617	269				Fan RPM data point 2		
618	926A				Fan RPM data point 3		
619	26B				Fan RPM data point 4		
620	26C				Fan RPM data point 5		
621	26D				Fan RPM data point 6		
622	26E				Fan RPM data point 7		
623	26F				Fan RPM data point 8		
624	270				Fan RPM data point 9		
625	271				Fan RPM data point 10		
626	272				Fan RPM data point 11		
627	273				Fan RPM data point 12		
628	274				Fan RPM data point 13		
629	275	Fan RPM data point 14					
630	276	Fan RPM data point 15					
631	277	Fan RPM data point 16					
632	278	Fan RPM data point 17					

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
633	279	Fuel / Air	V2V	Standard	Fan RPM data point 18	S16	User entered combustion fan RPM values during commissioning (optional)
634	27A				Fan RPM data point 19		
635	27B				Fan RPM data point 20		
636	27C				Fan RPM data point 21		
637	27D				Fan RPM data point 22		
638	27E				Fan RPM data point 23		
639	27F				Fan RPM data point 24		
647	287				Fuel / Air		
648	288	O2 reading data point 1					
649	289	O2 reading data point 2					
650	28A	O2 reading data point 3					
651	28B	O2 reading data point 4					
652	28C	O2 reading data point 5					
653	28D	O2 reading data point 6					
654	28E	O2 reading data point 7					
655	28F	O2 reading data point 8					
656	290	O2 reading data point 9					
657	291	O2 reading data point 10					
658	292	O2 reading data point 11					
659	293	O2 reading data point 12					
660	294	O2 reading data point 13					
661	295	O2 reading data point 14					
662	296	O2 reading data point 15					
663	297	O2 reading data point 16					
664	298	O2 reading data point 17					
665	299	O2 reading data point 18					
666	29A	O2 reading data point 19					
667	29B	O2 reading data point 20					
668	29C	O2 reading data point 21					
669	29D	O2 reading data point 22					
670	29E	O2 reading data point 23					
671	29F	O2 reading data point 24					
700	2BC	Fuel / Air	V2V	Standard	X-coordinate 0	S16	X-coordinate of BASE fuel/air curve, S1 sensor value. S1 value is dimensionless. -32768 indicates an empty cell.
701	2BD				X-coordinate 1		
702	2BE				X-coordinate 2		
703	2BF				X-coordinate 3		
704	2C0				X-coordinate 4		
705	2C1				X-coordinate 5		
706	2C2				X-coordinate 6		
707	2C3				X-coordinate 7		
708	2C4				X-coordinate 8		
709	2C5				X-coordinate 9		
710	2C6				X-coordinate 10		
711	2C7				X-coordinate 11		
712	2C8				X-coordinate 12		
713	2C9				X-coordinate 13		
714	2CA				X-coordinate 14		
715	2CB				X-coordinate 15		
716	2CC	X-coordinate 16					

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
717	2CD	Fuel / Air	V2V	Standard	X-coordinate 17	S16	X-coordinate of BASE fuel/air curve, S1 sensor value. S1 value is dimensionless. -32768 indicates an empty cell.
718	2CE				X-coordinate 18		
719	2CF				X-coordinate 19		
720	2D0				X-coordinate 20		
721	2D1				X-coordinate 21		
722	2D2				X-coordinate 22		
723	2D3				X-coordinate 23		
724	2D4				X-coordinate 24		
732	2DC	Fuel / Air	V2V	Standard	Y-coordinate 0	U16	Y-coordinate of BASE fuel/air curve, amplification value. Amplification value is dimensionless. -1 indicates an empty cell.
733	2DD				Y-coordinate 1		
734	2DE				Y-coordinate 2		
735	2DF				Y-coordinate 3		
736	2E0				Y-coordinate 4		
737	2E1				Y-coordinate 5		
738	2E2				Y-coordinate 6		
739	2E3				Y-coordinate 7		
740	2E4				Y-coordinate 8		
741	2E5				Y-coordinate 9		
742	2E6				Y-coordinate 10		
743	2E7				Y-coordinate 11		
744	2E8				Y-coordinate 12		
745	2E9				Y-coordinate 13		
746	2EA				Y-coordinate 14		
747	2EB				Y-coordinate 15		
748	2EC				Y-coordinate 16		
749	2ED				Y-coordinate 17		
750	2EE				Y-coordinate 18		
751	2EF				Y-coordinate 19		
752	2F0				Y-coordinate 20		
753	2F1				Y-coordinate 21		
754	2F2				Y-coordinate 22		
755	2F3				Y-coordinate 23		
756	2F4	Y-coordinate 24					

Address		Type	Valve Model	Intelligence Levels	Description	Data Type	Content
Dec	Hex						
765	2FD	Fuel / Air	V2V	Standard	Base fuel/air curve informational flags related to curve loading and saving	U16	Curve related flags. Each bit has its unique meaning: Bit 0 – true indicates that the latest point that has been added to the curve has replaced an existing curve point. Bit 1 – true/false indicates that the base fuel/air curve commissioning mode is active/inactive. Bit 2 – true indicates that a base fuel/air curve custom maximum has already been defined. Bit 3 – true indicates that a point is currently being commissioned. Bit 4 – true indicates that a base fuel/air curve custom minimum has already been defined. Bit 5 – true indicates that the initial curve has already been defined. Bit 6 – true indicates that a curve point is just being sampled. Bit 7 – curve is locked for Modbus editing Bit 8 – the bit is set when a correct curve is uploaded via Modbus. It is cleared as soon as the curve is verified via the safety verification procedure. Bit 9 – true indicates that a new curve point has just been successfully saved (~was accepted by SV2 valve).
766	2FE				Base curve current amplification	S16	Current amplification value based on a current curve and firing rate. Value scaled by 1×10^4
768	300				Fuel/Air curve current gain	S16	Current gain value based on a current curve and firing rate. Value scaled by 1×10^4
288	120	Safety Parameter	All	Standard	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)
31	1F	Safety Relay / Micro	All	Standard	Valve safety relay control state	Enum	0 =Relay in common off state 1 =Relay in on state 0x80=Relay current feedback in off state error 0x81=Relay current feedback in on state error 0x82=Relay current was not interrupted by wrong key value in defined time 0x83=Relay current was not interrupted by steady drive on state in defined time 0x84=The right key has not been built in defined time period

Table 36. VAC Signals Status.

Bit	Vac Signal	Signal State
0	Valve 1 demand	0=Inactive (off) 1=Active (on) 2=Invalid
1		
2	Valve 2 demand	
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 37. 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

PATENTS

The following is a list of granted patents for the SV2 Series valve platform as of January 2018:

Country	Title	Patent Number
United States	Gas valve with electronic proof of closure system	8899264
	Gas valve with electronic valve proving system	9074770
	Gas valve with fuel rate monitor	8905063
	Gas valve with valve leakage test	8947242
	Gas valve with electronic cycle counter	8839815
	Gas valve with communication link	9557059
	A burner control system	9234661
	A burner control system	9657946
	Gas valve with electronic health monitoring	9645584
	Valve control module	D755927
	User interface icons for a valve controller	D771705
	User interface for a valve controller	D763921
	Gas valve with actuator diagnostics	9835265
	Gas valve with overpressure diagnostics	9851103
	Valve controller configured to estimate fuel consumption	9846440
	Gas valve regulating device	9683674
	Gas valve with electronics valve proving system	9841122
	User interface for a valve controller	D763921
	A system for a valve setup	10502340B2
United Kingdom	Gas valve with electronic valve proving system	EP2604923
	Gas valve with fuel rate monitor	EP2604922
	Gas valve with communication link	EP2604924
	A system for a valve setup	EP3133345
Germany	Gas valve with electronic valve proving system	602012015895.6
	Gas valve with fuel rate monitor	602012002894.7
	Gas valve with communication link	602012007123.0
	A system for a valve setup	EP3133345
France	Gas valve with electronic valve proving system	EP2604923
	Gas valve with fuel rate monitor	EP2604922
	Gas valve with communication link	EP2604924
	A system for a valve setup	EP3133345
European Patent Convention	Gas valve with electronic valve proving system	EP2604923
	Gas valve with fuel rate monitor	EP2604922
	Gas valve with communication link	EP2604924
	A system for a valve setup	EP3133345
European Community Design	Valve control module	002619056-0001
	Valve control module	002619056-0002
	User interface for a valve controller	002692939-0001
	User interface for a valve controller	002692939-0002
China P.R.	Valve control module	ZL201530025751.4

For More Information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschröder and Maxon. To learn more about our products, visit [ThermalSolutions.honeywell.com](https://thermalsolutions.honeywell.com) or contact your Honeywell Sales Engineer.

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