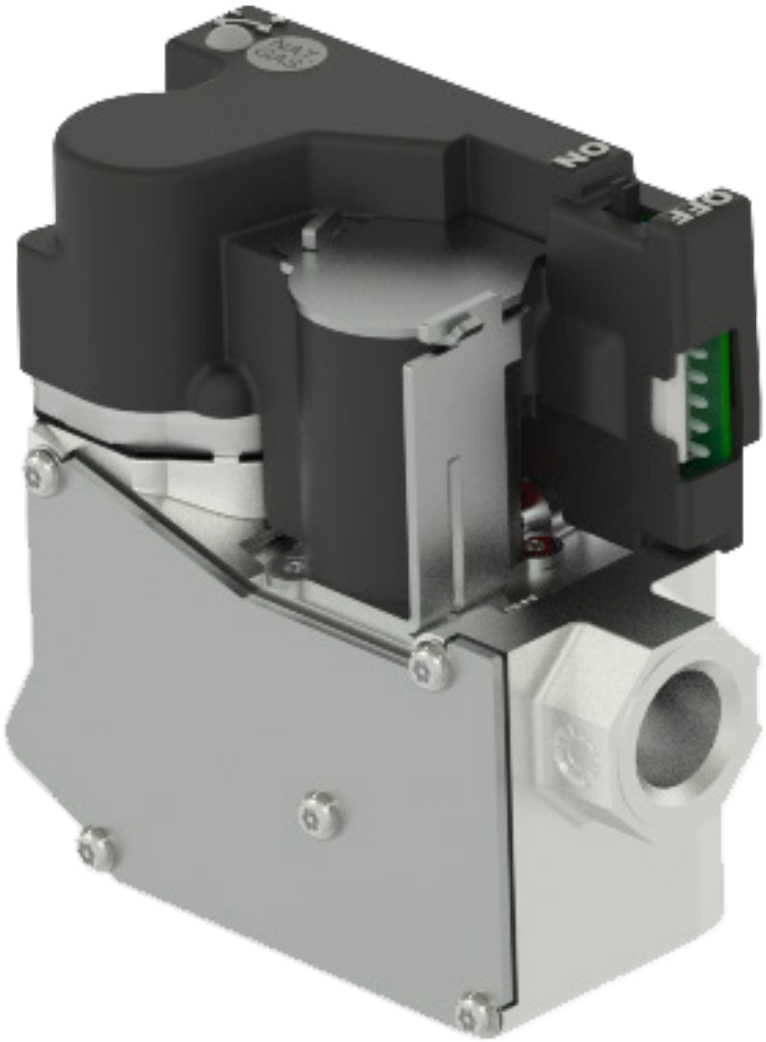
36J Stepper gas control

Product information



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Product description

The 36J Stepper Gas Valve is a modulating combination gas valve and regulator for use on a wide range of gas fired appliances. Included in the design is an electronic board that interprets the appropriate pulse width modulation (PWM), 0-10VDC, 2-10VDC, or serial ClimateTalk Light Weight Protocol (CT-LWP) signal from the IFC to drive a stepper motor that controls outlet pressure. The 36J Stepper valve is designed specifically for direct burner/direct spark ignition markets.

Features include:

- Inlet and outlet screens help protect internal parts from debris.
- Electronic control for gas pressure modulation
- Rotary dip switch for pressure regulation adjustments
- Easy LP conversion (use optional conversion kit)
- 1/2" x 1x2" NPT, straight through or right angle outlet
- 1/8" NPT or European towers for pressure taps
- Electrical on/off gas valve switch

Information in this manual is provided to qualified HVAC Professionals Only for the installation and replacement of gas valves. Homeowners must contact their local HVAC Contractor for gas valve replacement. Any gas valve suspected of damage or if it has been flooded with water must be replaced immediately. **There are no replaceable parts on a gas valve.**

TABLE OF CONTENTS

General specifications

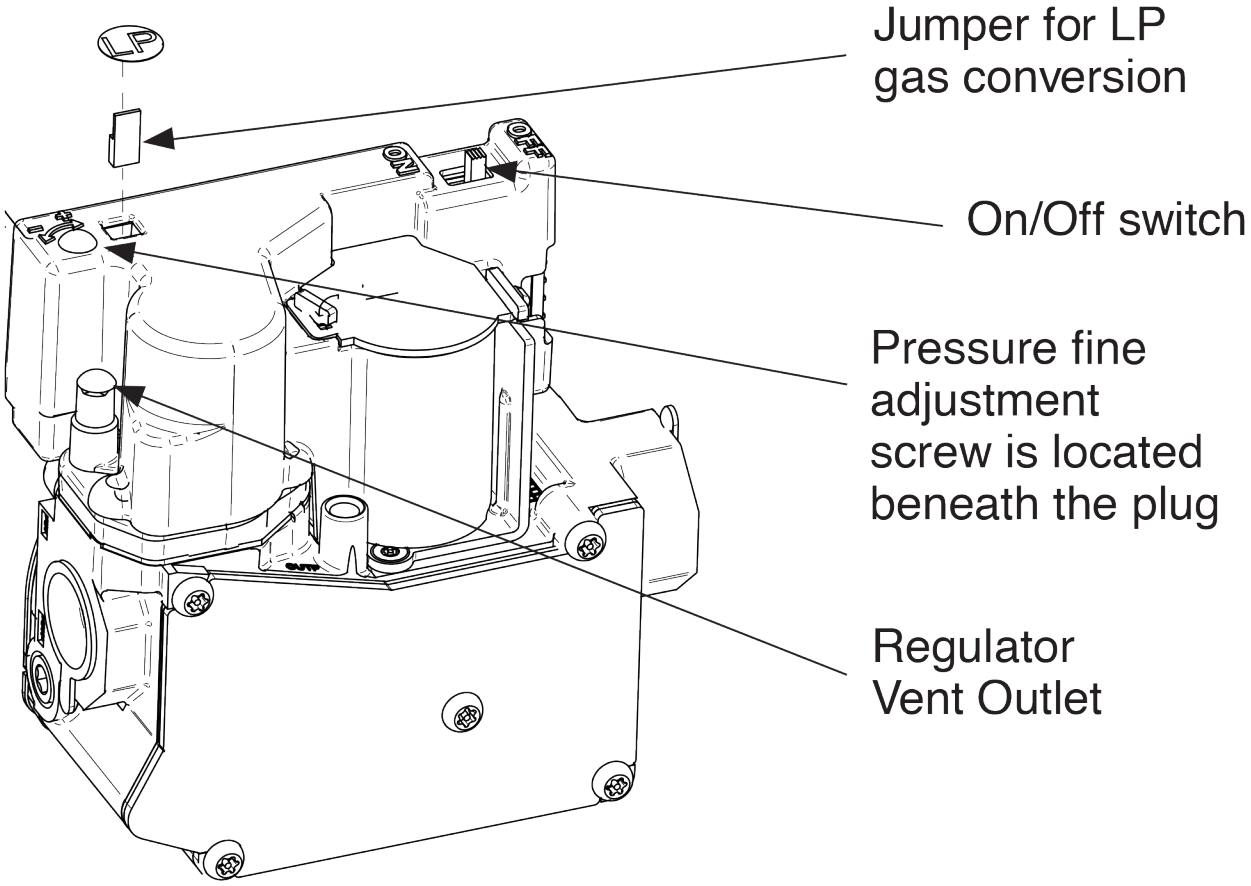
Standard features

- Inlet/Outlet screen
- Ambient temperature for –40˚F to 175˚F
- Limited horizontal mounting
- Quiet redundant valve
- Electrical shut-off
- Outlet pressure tap (1/8" N.P.T.)
- Inlet pressure tap (1/8" N.P.T.)
- 5 pin electrical connector
- Maximum pressure (1/2 PSI)
- CSA approved
- PWM signal: Low level : 0 to 0.3 Volts,
  High level: 3 to 5.5 Volts
- Modulation: 35% to 100% gas
  opening with 1% increments
- Regulator vent outlet: accepts 5/16 inch I.D. hose
- Rotary dip switch for pressure regulation adjustment
- Precalibrated for LP - simplifies conversion

Current Requirements	
Voltage Frequency	**Total Current**
24V, 60 HZ	0.56A

Optional features

- Ground terminal
- Natural / LP field conversion kit
  (White-Rodgers PN: F92-1021)
- Vent tap (Hose barb fitting)
- Top pressure taps (European)
- Temperature compensation

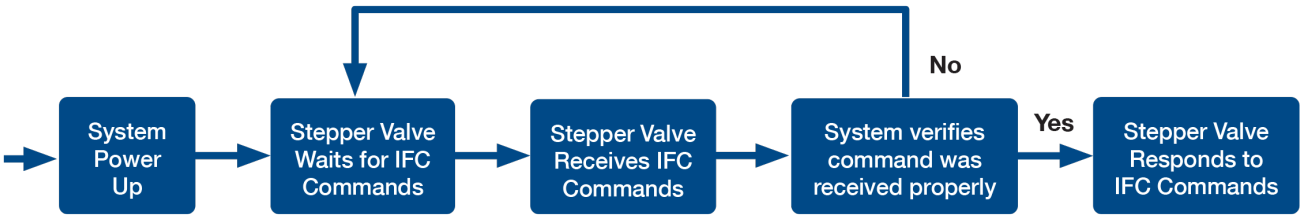


Capacity & regulator adjustment range *

Pipe sizes	Capacity NAT gas (BTU/hr.)*	Capacity LP Gas (BTU/hr.)†	Adjustment range (NAT., IN. W.C.)	Adjustment range (LP., IN. W.C.)
1/2" x 1/2" NPT	40,000 - 210,000	64,800 - 340,200	0.4 - 5.0	0.8 - 11.5

* for both Natural (.64 Sp. Gr.) and LP (1.53 Sp. Gr.) Gases
† can regulate down to 20% of capacity

General operation overview



Stepper valve operation sequence and IFC command types

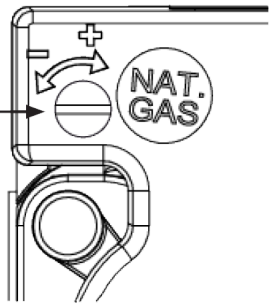
Contact your White-Rodgers representative for further information on the definition of IFC commands and 36J Stepper Valve responses.

Outlet pressure fine adjustment - Rotary dip switch

The gas valve outlet pressure was pre-adjusted for both Nat. and LP at the factory, but fine adjustment is possible by removing the access plug (ref Figure 1) and turning the fine-adjustment screw with a 1/8" flat blade screw driver. Adjustment must only be done while monitoring outlet pressure with a suitable manometer attached to the outlet pressure tap. The outlet pressure tap must be checked after resealing. Refer to Installation Instructions, 37-7004A, for further information on the adjustment procedure.

Turn screw to increase/ decrease outlet pressure

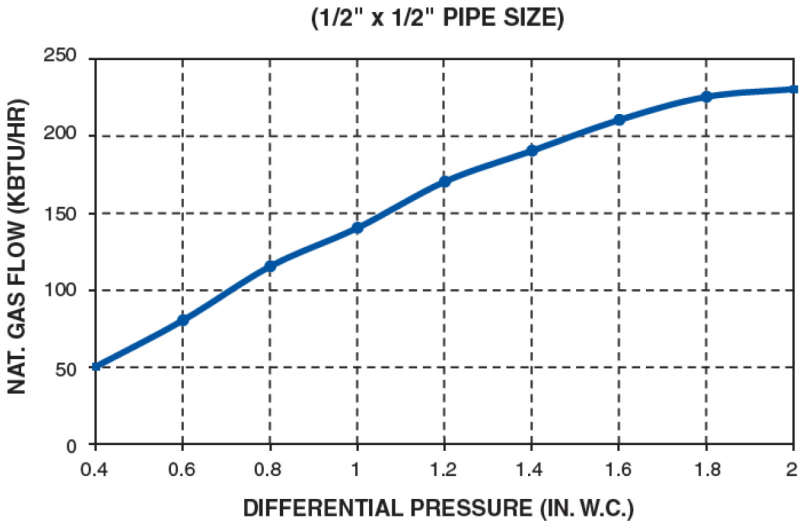
Pressure fine Adjustment Screw is located beneath Access plug.



1" Pressure drop capacity

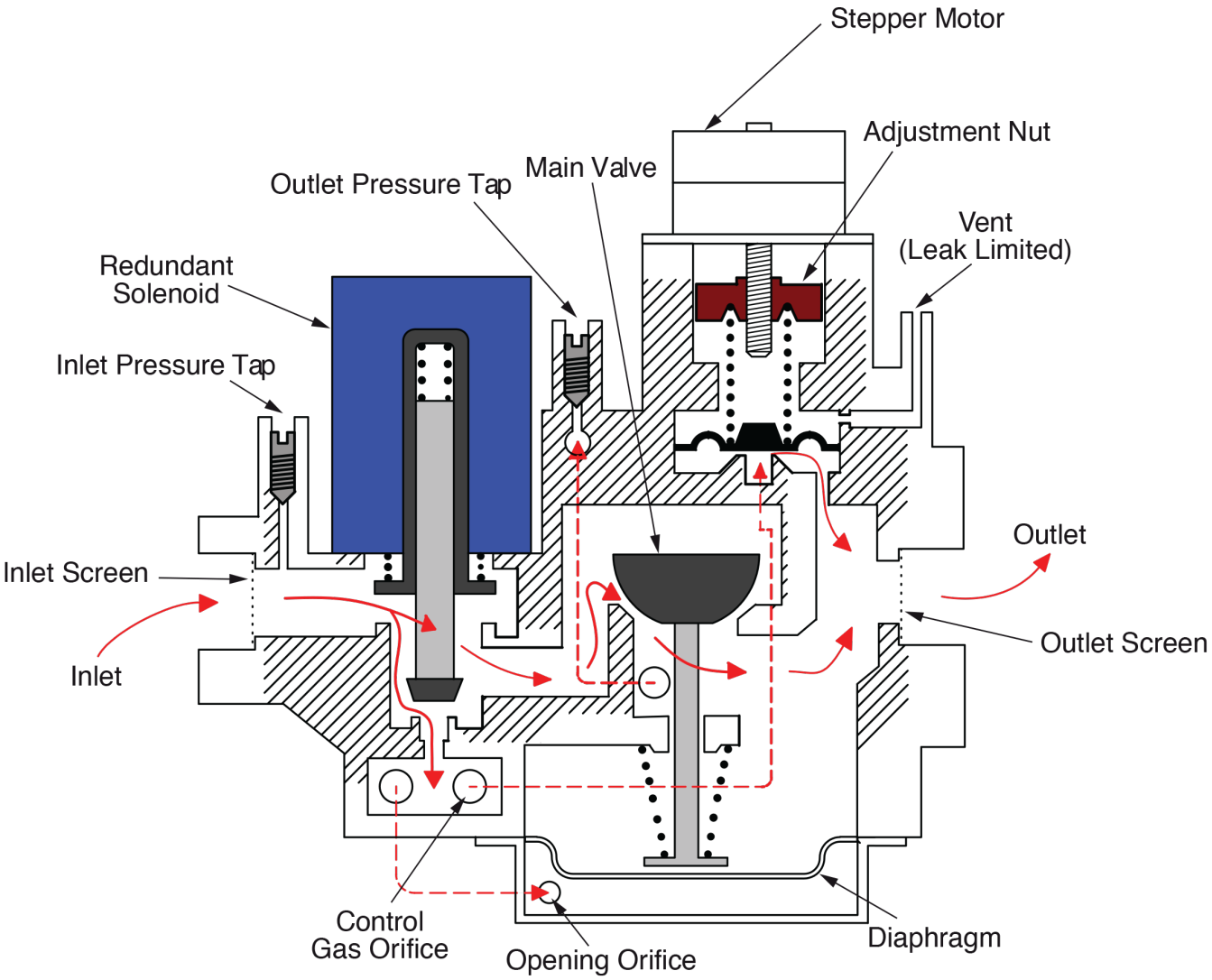
Pipe sizes	CSA Std. Gas, .64 Sp, Gr. (1,000 BTU/CU. Ft.)	LP Gas, 1.53 Sp, Gr. (2,500 BTU/CU. Ft.)
1/2" x 1/2" NPT	140,000 BTU/HR	226,800 BTU/HR

1" Pressure drop capacity (Upright Orientation)



Stepper valve model

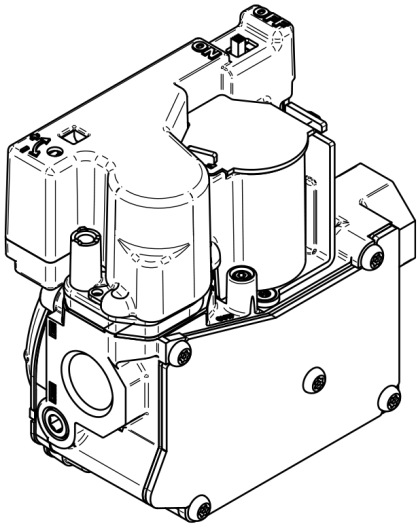
Schematic gas flow diagram

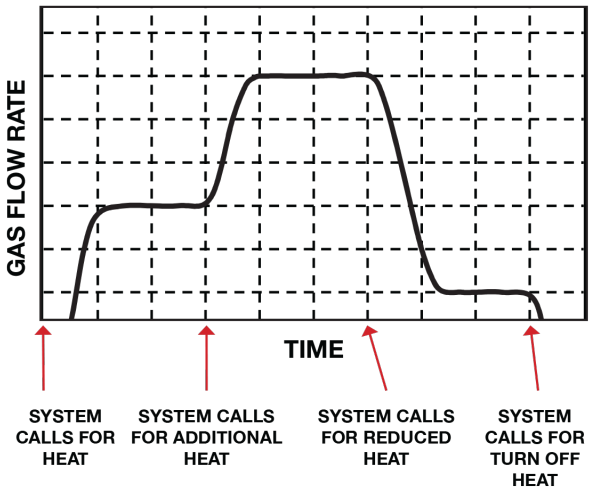


Application information

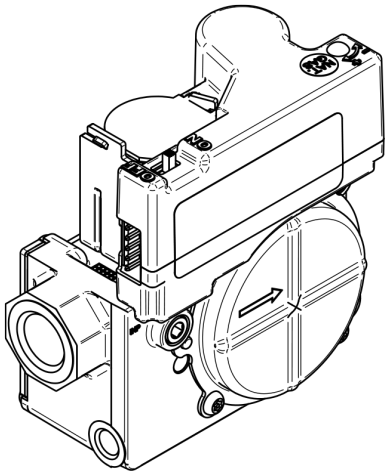
Typical heating cycle

A typical example of how the 36J Stepper valve will modulate in response to a call for heat. The onboard electronics interpret the system signal and drives the stepper motor to the correct position to adjust the outlet pressure.





Electrical connections



Harness Interface: JST 5-pin connector S5P – VH or equivalent with the following pin out configuration (mating connector VHR-5N). Use PIN SVH-21TP1122-18AWG, or PIN SVH-41T-P1120-16AWG

Pin 1: TH – Board 24V AC (bottom pin, with the cover pointing up)

Pin 2: RX – Communications to Stepper

Pin 3: TX – Communications to IFC

Pin 4: TR ground

Pin 5: TH – Main Valve 24 VAC (top pin, with the cover pointing up)

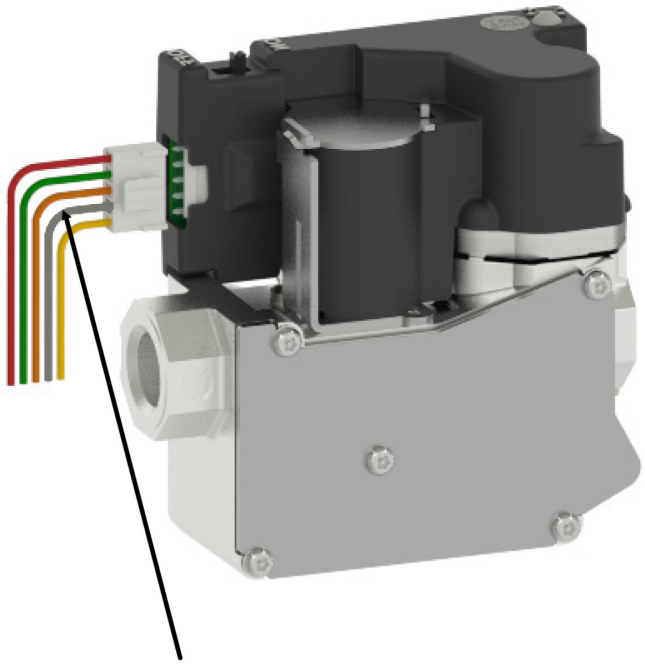
Voltage Input	Main Valve Input
24VAC +10%/-15% @60Hz; 0.56Amp	At 24 VAC @ 60 Hz; 0.28 Amp. At 24 VDC; 0.34 Amp

Signal input options

1. Pulse-width Modulation (30%-95% PWM) *
2. 0-10 VDC
3. 2-10 VDC *
4. Serial (ClimateTalk Light Weight Protocol)

All models include Echo Feedback (Pin 3) to send information back to the furnace control to confirm signal received, to notify when move is complete, and to communicate any errors that may occur. ***(See Echo Feedback section 8 of this document for details.)***

* These models can receive diagnostic command signals to send the motor to the home position, to move the motor towards and away from home in 1% increments, to query the last requested motor position, and to query if the valve is configured for NAT or LP gas (i.e. if the jumper is in place or not). ***(See Diagnostic Command Signals section 8 of this document for details.)***



PMC & VDC
Inputs use Pin 2

Control scheme notes

1. It is recommended to utilize the echo feedback output to ensure that the valve and controller are in agreement.

   a. See the "Echo Feedback" section 8 of this document

2. The maximum typical move from minimum flow to maximum flow takes approximately 4.5 seconds.

3. The motor can be sent to the home position by sending it one the following three signals, depending on the model type: 5% PWM | 0.198-0.365VDC

4. Sending the valve to the home position does not fully shut off the valve. To completely close off the valve to gas flow, power shall be turned off at the main/redundant solenoid valve.

5. A "go home command" may be sent after certain control faults such as flame rollout, temperature limit trips, and lockouts.

   a. If a "go home command" is necessary, it should be limited to **once every 1,000 cycle** to reduce stress on the mechanical components.

   b. After a power outage and when power is restored to Pin #1 on the 5-pin connector on the motor circuit, the valve will automatically be sent to the home position upon the first call for heat, followed by a move to the requested position. If the valve was at maximum flow prior to the power reset, the travel time could be as high as 14 seconds if after the reset the control is requesting a near maximum flow.

6. The valve should not be left in the "home" position for extended periods. All home commands should be followed by a move command.

7. The valve is shipped from the factory with the regulation, or motor position, set at the maximum flow for Natural Gas and shall be shipped to the field in this position.

Echo feedback (TXD Pin 3)

1. Available on all signal types

2. Signal is sent back to controller as a PWM signal for PWM, 0-10V, 2-10V input types

   a. PWM Signal is 5VDC @ 13.1Hz to17.0 Hz for 1.0 to 1.1 seconds

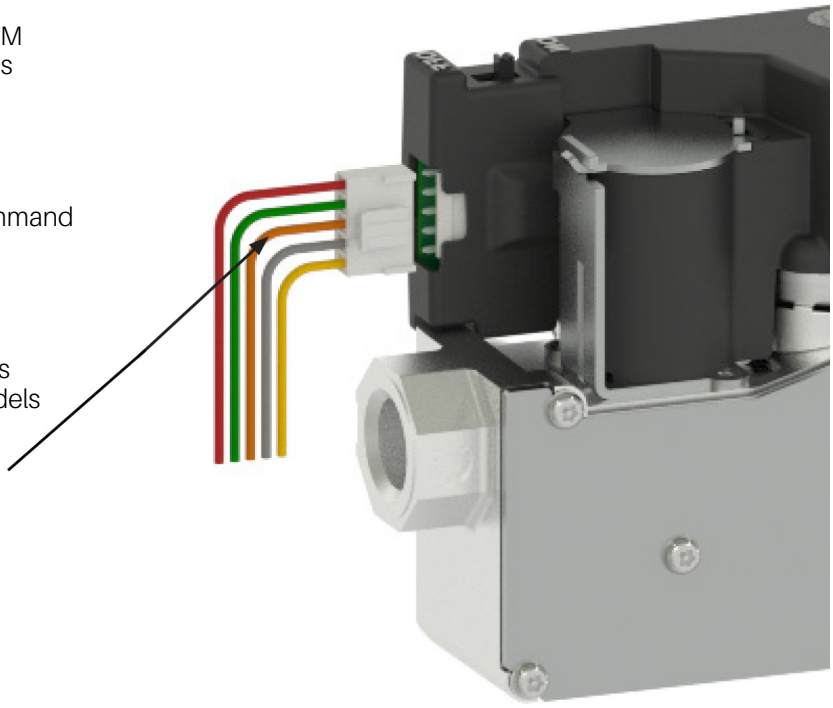
   b. Will echo back requested move command

   c. Will echo back a done command when move is complete (25%)

   d. Can echo back motor position or gas type queries for PWM, 2-10VDC models

3. Serial CT-LWP echoes are sent in serial CT-LWP format

   a. Move commands are ACK'd



Diagnostic command signals (- PWM and 2-10VDC)

PWM Input Signal	2-10 VDC Input Signal	Description	Corresponding PWM% Echo Command
4% to 6%	.198 - .365	Go to home position	5%
7% to 9%	.366 - .534	LP/NAT Query	30% for NAT 70% for LP
10% to 12%	.535 - .702	Go 1% toward home	Move Command
14% to 16%	.760 - .927	Query current valve position with 1% resolution	30% to 95%
19% to 21%	1.040 – 1.208	Go 1% away from home	Move Command

Serial ClimateTalk Light Weight CT-LWP

CT-LWP enabled valves may be queried for various information including:

» Motor position, ambient temperature, NAT/LP jumper status, call for heat status, motor status, target pressure, etc. *

» Lifetime counts including call for heat count, home count, etc.*

* Full ClimateTalk Light Weight Protocol feature set to be furnished upon request.

Fine-tune adjustment (Rotary Dip Switch)

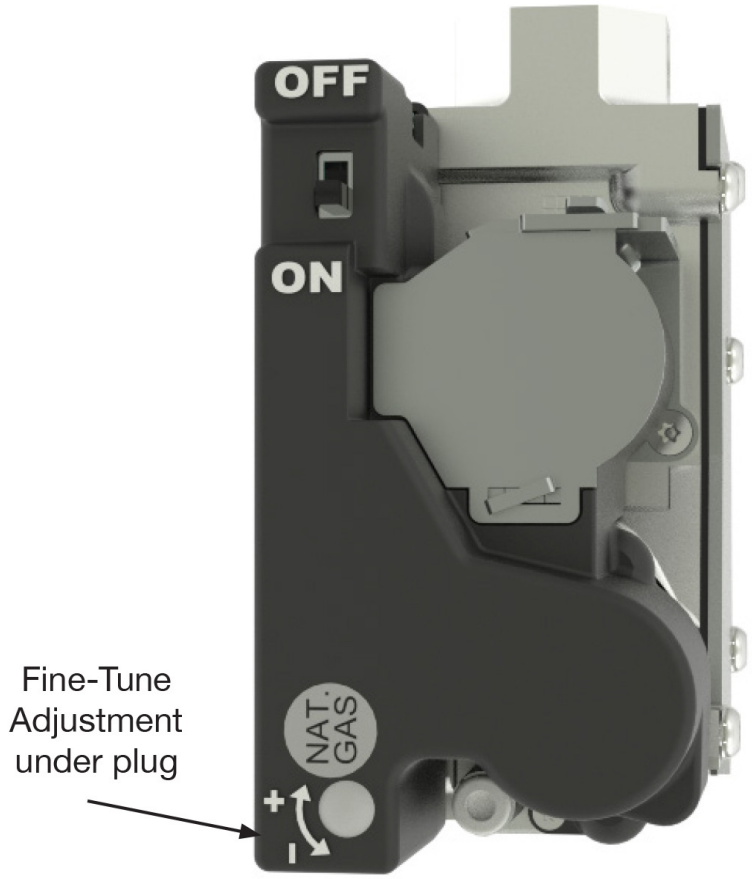
1. The Rotary Dip Switch is used to fine-tune the outlet pressure at both the minimum and maximum outlet settings.

2. Rotary Dip Switch adjustment will only be accepted while the valve is not receiving a command from the control and while the motor position is 35% to 100% flow.

3. If the motor position is 35% to 67%, the clockwise or counterclockwiserotary adjustment is defining the lower (35%) offset setpoint. **Maximum of 64 clicks.**

4. If the motor position is 68% to 100%, the clockwise or counterclockwiserotary adjustment is defining the upper (100%)offset setpoint. **Maximum of 64 clicks.**

5. Serial ClimateTalk Light Weight messages may be used on CTLWP enabled valves to set the regulation offsets.

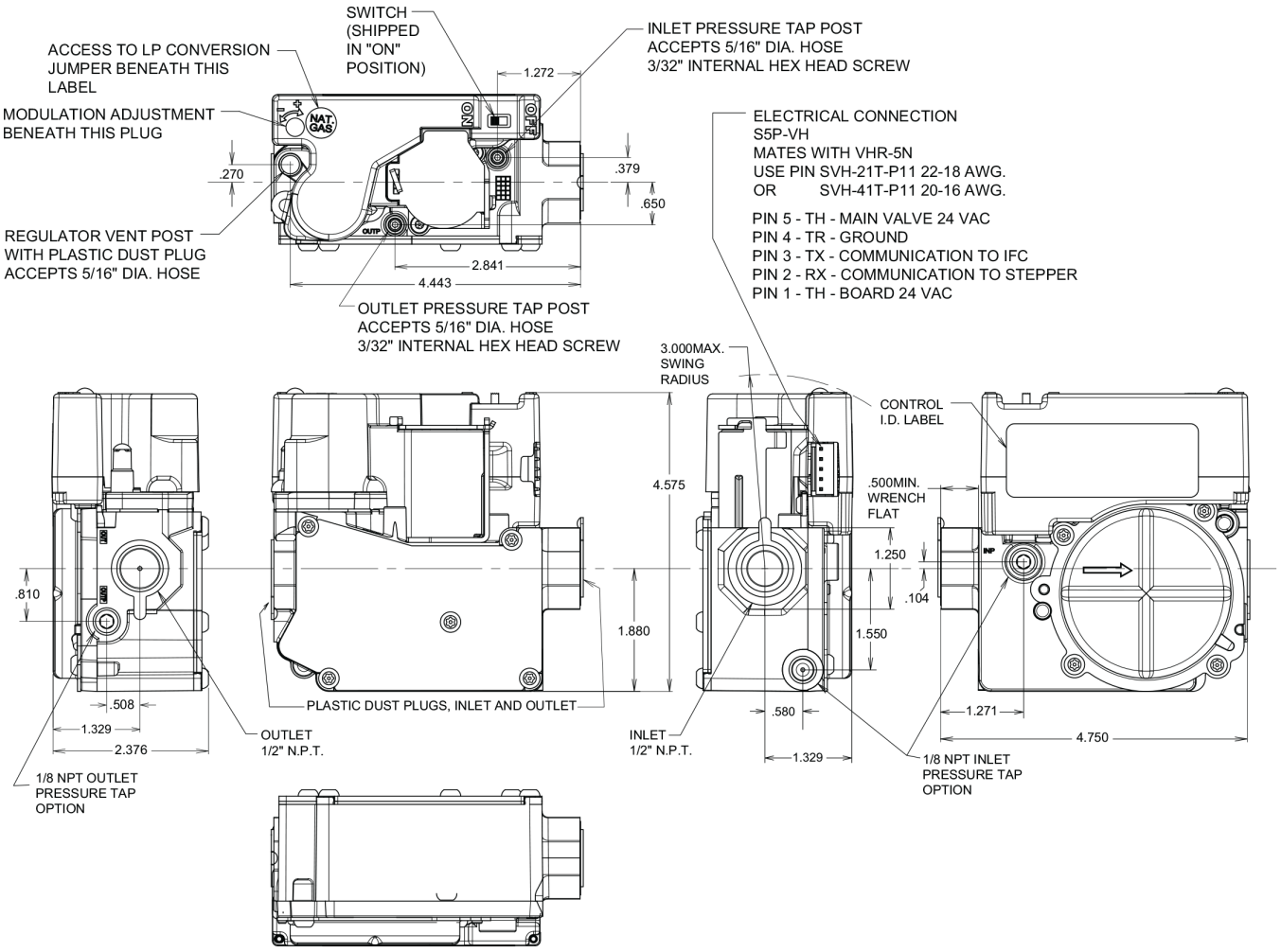


Input signal vs. Percent flow and echo command

PWM Input Signal	0-10 VDC Input Signal	2-10 VDC Input Signal	Percent Flow	PWM Echo Command
30	0	2	35%	30
35	0.769	2.615	40%	35
40	1.538	3.231	45%	40
45	2.308	3.846	50%	45
50	3.077	4.462	55%	50
55	3.846	5.077	60%	55
60	4.615	5.692	65%	60
65	5.385	6.308	70%	65
70	6.154	6.923	75%	70
75	6.923	7.538	80%	75
80	7.692	8.154	85%	80
85	8.462	8.769	90%	85
90	9.231	9.385	95%	90
95	10	10	100%	95

Note: This is a summarized table. Percent flow can be in 1% increments. These signals can be customized for specific customer applications.

Dimensions



Key dimensions

Length	Width	Height	Swing radius
4.75″	2.38″	4.58″	< 3.00″

Stepper model available

36J27-544

36J27 X X TYPE XX

Basic model number series

Pack option	
Pack code	**Description**
Blank	Single pack
B1	Bulk pack
P1	Pallet pack

Voltage / Feature Letter coding	
Alpanumeric	**Voltage**
None	24 VAC 50/60 Hz
X	24 VDC

Type number coding	
Number	**Pipe Size (inlet x outlet)**
2XX	1/2″ NPT x 1/2″ NPT with European pressure taps
5XX	1/2″ NPT x 1/2″ NPT with NPT pressure taps
6XX	1/2″ NPT x 1/2″ NPT (Bottom Outlet) with NPT pressure taps

Signal input	
None	PWN
A	PWM / CT-LWP Auto detect
B	0-10VDC
C	2-10VDC
D	Reserved for future modes
E	Reserved for future modes
F	CT-LWP
G-Z	Reserved for future modes

About Copeland

Copeland is a global leader in sustainable heating, cooling, refrigeration and industrial solutions. We help commercial, industrial, refrigeration and residential customers reduce their carbon emissions and improve energy efficiency. We address issues like climate change, growing populations, electricity demands and complex global supply chains with innovations that advance the energy transition, accelerate the adoption of climate friendly low GWP (Global Warming Potential) and natural refrigerants, and safeguard the world's most critical goods through an efficient and sustainable cold chain. We have over 18,000 employees, with feet on the ground in 50 countries - a global presence that makes it possible to serve customers wherever they are in the world and meet challenges with scale and speed. Our industry-leading brands and diversified portfolio deliver innovation and technology proven in over 200 million installations worldwide. Together, we create sustainable solutions that improve lives and protect the planet today and for future generations.

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