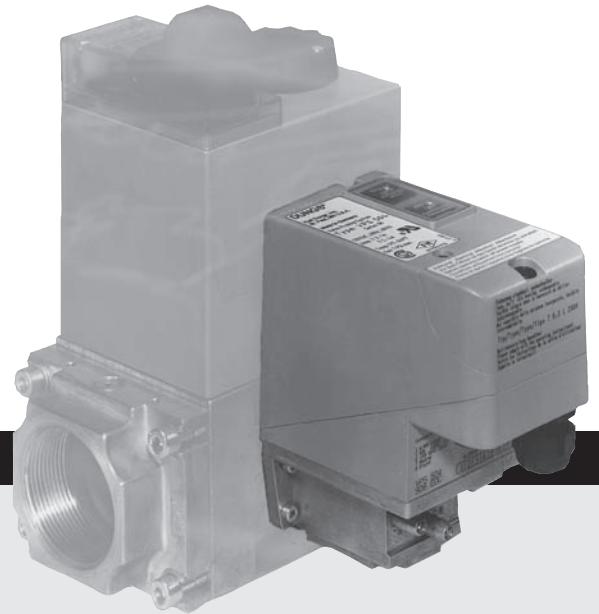




Table of Contents

Table of Contents	Page 1
Approvals	Page 1
Attention	Page 1
Specification	Page 2
Mounting Positions	Page 3
Mounting VPS 504 to DMV Shutoff Valve	Page 4
Wiring	Page 4
Operation	Page 5
Leak Detection Limit for each Valve	Page 6
Maintenance & Testing	Page 6
Accessories & Replacement	Page 7



Approvals



UL Recognized
File # MN 17004 (S06 only)



CSA Certified
File # 1637485 (series S05, S06 & S02)



FM Approved
File # J.I. 3004006 (7411) (S06 only)

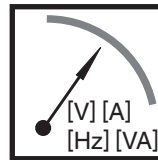
New York City: File # MEA 51-05-E (S06 only)

Commonwealth of Massachusetts Approved Product Approval code G1-1107-35

Attention



The installation and maintenance of this product must be done under the supervision of an experienced and trained specialist. Never perform work if gas pressure or power is applied, or in the presence of an open flame.



Check the ratings in the specifications to verify that they are suitable for your application.



Please read the instruction before installing or operating. Keep the instruction in a safe place. You find the instruction also at www.dungs.com. If these instructions are not heeded, the result may be personal injury or damage to property.



On completion of work on the valve proving system, perform a leakage and function test.



Any adjustment and application-specific adjustment values must be made in accordance with the equipment manufacturers instructions.



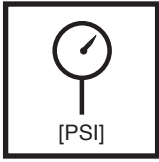
This product is intended for installations covered by, but not limited to, the following codes and standards: NFPA 86, NFPA 85, Swiss Re (formerly IRI) or CSA B149.3.

Explanation of symbols

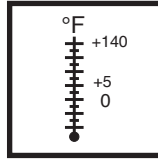
- 1, 2, 3 ... = Action
- = Instruction

Specification

VPS The Valve Proving System VPS 504 checks that both safety shutoff valves in a Dual Modular Valve (DMV) are closed before either a system start-up or after shutdown when wired and interlocked with a suitable flame monitoring relay. The VPS 504 will halt the start-up sequence to a burner if it detects an open or damaged safety shutoff valve, thus preventing ignition under potentially dangerous conditions.



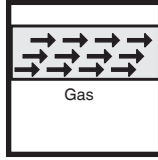
Max. Operating Pressure (MOP)
7 PSI (500 mbar)
Max. Body Pressure
15 PSI (1000 mbar)



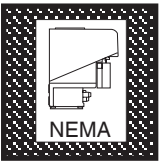
Ambient / Fluid Temperature
+5 °F to +140 °F
(-15 °C to +60 °C)



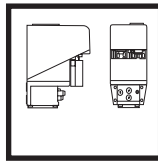
Electrical Input Ratings
120 VAC / 60 Hz for S06 Series and
24 VDC for S05 and S02 Series
Power Rating (consumption)
Valve proving 60 VA
In operation 17 VA
Switch Output Ratings
S06 Series:
RUN (T5) 4 A and ALARM (T3) 1 A
@ 120 VAC
S05 and S02 Series:
RUN (TB) 4 A and ALARM (TS) 1 A
@ 24 VDC



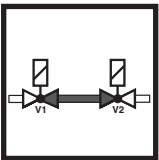
Gases
Dry, natural gas, air and other inert gases. NOT suitable for butane or any gas mixture containing 60 % or more of butane. A "dry" gas has a dew point lower than +15 °F and its relative humidity is less than 60 %.
Materials in Contact with Gas
Housing: Aluminum
Seals: NBR-based rubber



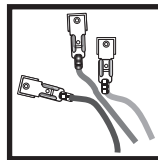
Enclosure Rating
NEMA Type 12
IEC 529 / NEMA 250



Operating Time
100 % duty cycle; Maximum 20 test cycles per hour
Release Period (time to get a RUN or ALARM)
~10 sec. for test volume < 0.05 ft³
>10 sec. (max. 26 s) for test volume > 0.05 ft³
Detection Limits of Natural Gas (each valve)
Less than 1.76 ft³/h (0.2 - 1.0 ft³/h through both valves)



Test Volume
Less than 0.14 ft³

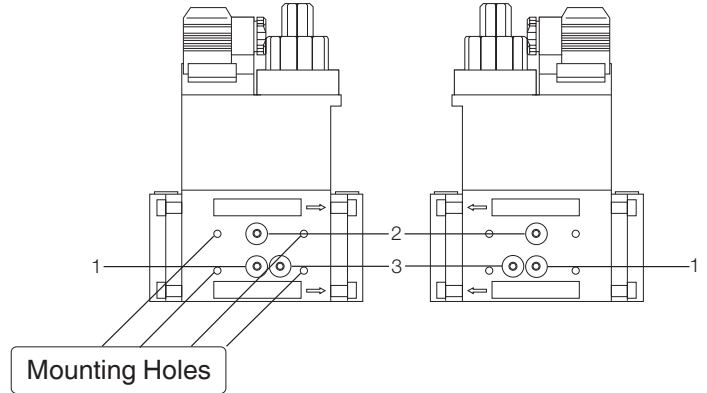


Electrical Connection
Screw terminals with 1/2" NPT conduit connection

Mounting Positions

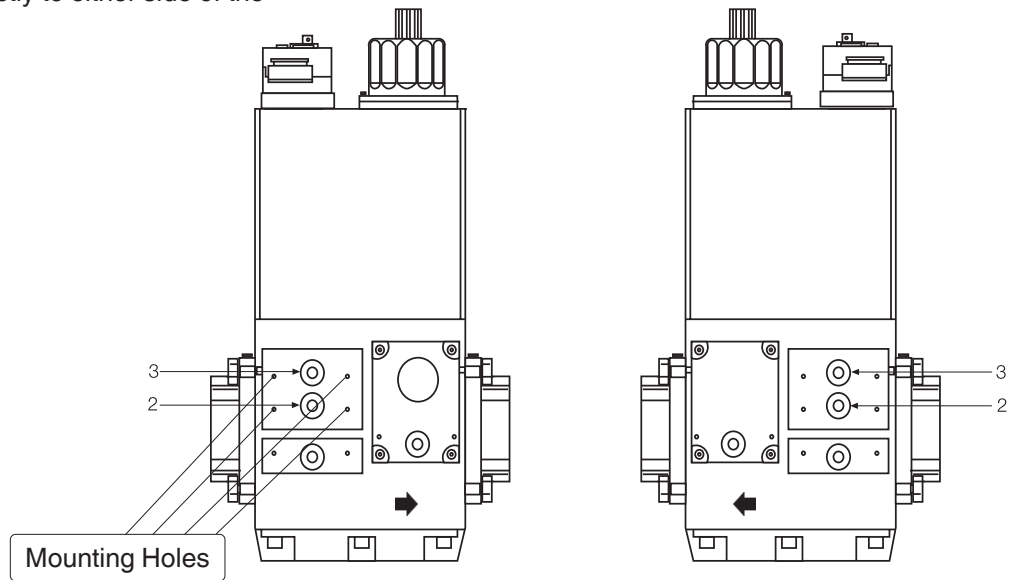
Location for DMV 7xx series

The VPS 504 is to be mounted directly to either side of the DMV to ports 1 and 2.



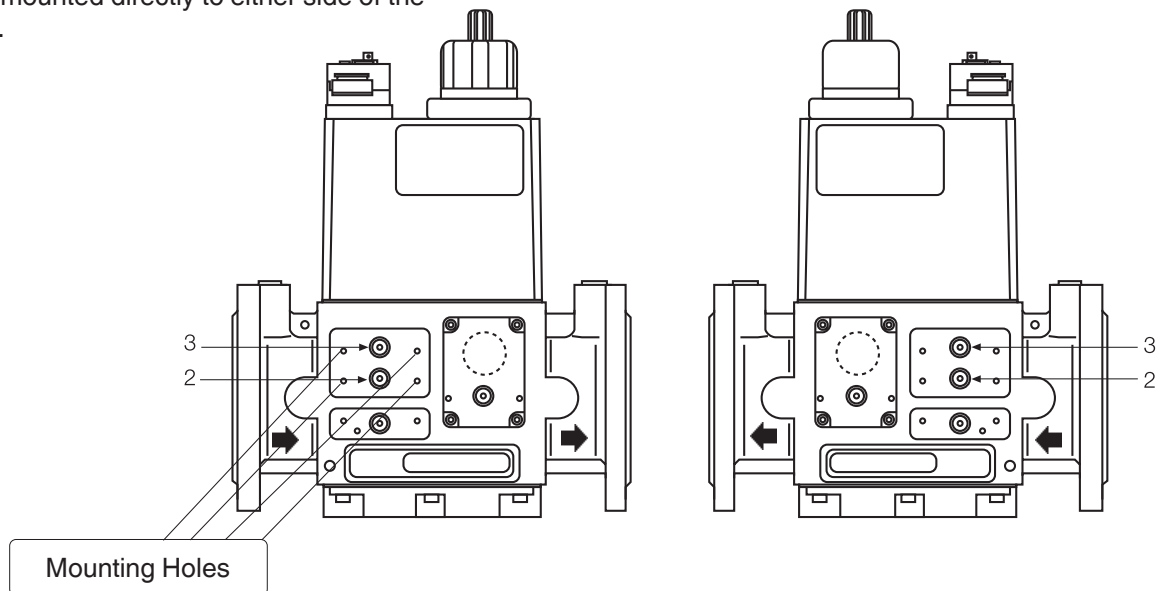
Location for DMV 525 Series

The VPS 504 is to be mounted directly to either side of the DMV to ports 2 and 3.



Location for DMV 5xxx Flanged Series

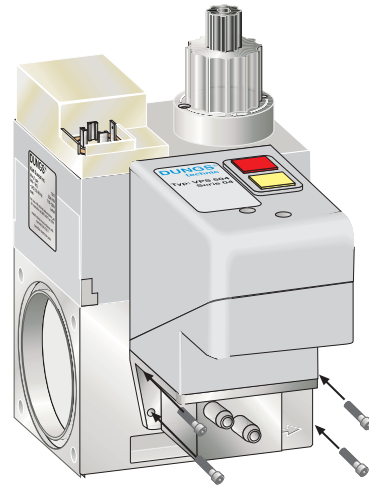
The VPS 504 is to be mounted directly to either side of the DMV to ports 2 and 3.



Mounting VPS 504 to DMV Shutoff Valve

Recommended Mounting Procedure

1. Shut off the gas supply and disconnect all power to the DMV and the VPS 504 to prevent shock and equipment damage.
2. Verify the 10.5 x 2.25 mm O-rings are fitted into the grooves on the back of the VPS 504.
3. Verify that the O-rings are clean and in good condition.
4. Remove the G 1/8 plugs from port 1 and port 2 of the valve with a 3 mm hex key wrench.
5. Verify that the surface is clean and in good condition. Clean if necessary.
6. Use the M 4 x 15 mm self tapping hex head screws supplied to mount the VPS 504 to the DMV valve body. **DO NOT** Exceed 22 lb-in of Torque.
7. Verify that the O-rings are located in the grooves form a complete leak test to verify that no leakage occurs around the O-rings.



! Do not adjust or remove any screws or bolts which are sealed with a Red or Blue colored compound. Doing so will void all approvals and warranties.

Wiring

Wiring Procedure

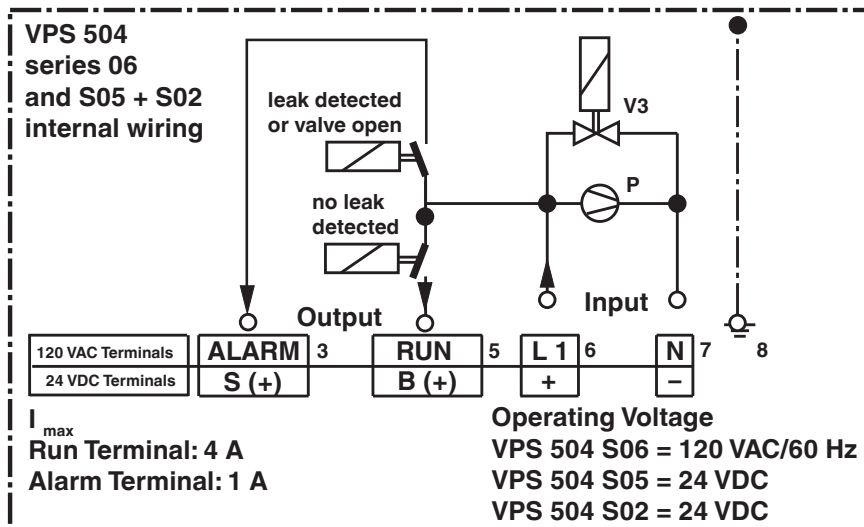
1. Use 14 or 16 gauge wire rated for 95°C (200°F).
2. Disconnect all power to the VPS 504 before beginning the wiring to prevent electrical shock and equipment damage.
3. Remove the black cap on top of the VPS 504.
4. Loosen the screw which secures the gray cover and remove.
5. Attach 1/2" NPT conduit to the black conduit adapter.
6. Route the wires through the conduit connector.
7. Install a conduit plug at some point in the conduit run between the VPS and closest panel that contains switching contacts or other sparking devices (see NFPA 86 requirements about potential risks of gas leaking down conduit).
8. Connect the wiring to the appropriate screw terminals on the terminal strip.
9. Replace the gray cover, the screw, and the black cap.
10. A typical wiring diagram for operating the VPS 504 on burner start-up only is shown below.

! Do not wire the VDK RUN terminal to directly power the safety shutoff valves. The safety shutoff valves should always be under direct command to the flame safeguard.

! Frequency converters or frequency drive motors with insufficient shielding can cause faults in the VPS 504 as the result of transients. Verify that the equipment is provided with sufficient shielding.

! Operating voltage for the S06 series is 120 VAC 60 Hz. NOT suitable for 50 Hz.

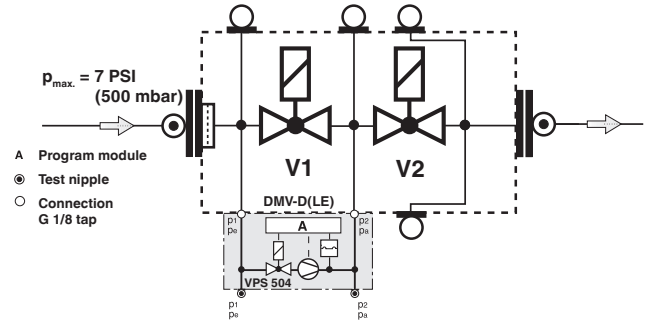
! All wiring must comply with local electrical codes, ordinances and regulations.



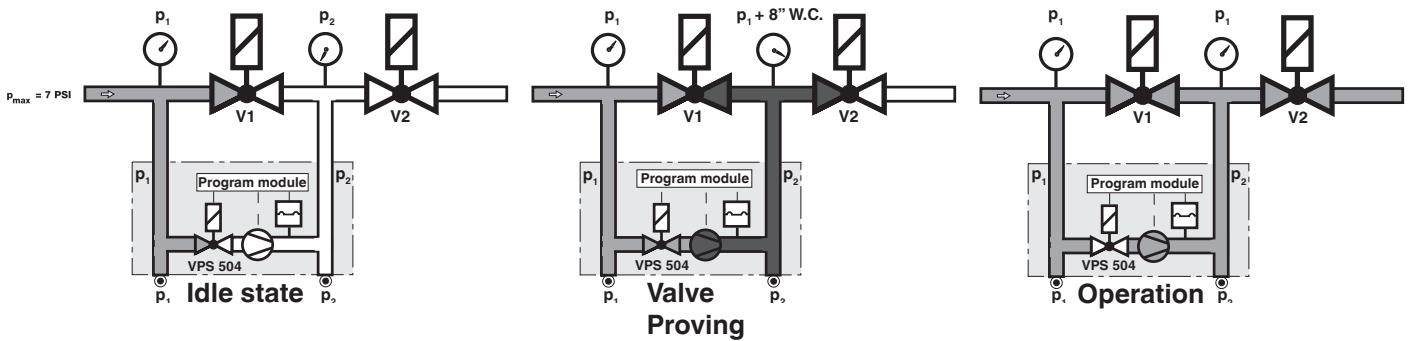
Operation

Functional description

The VPS 504 proves the integrity and the effective closure of the valve seats by pumping gas from upstream of the main safety valve to the volume between the two safety shutoff valves and detecting leakage. The VPS 504 proves the valves as soon as power is applied. Valve proving should be wired to prove on each start-up.



Program sequence



Idle state: Valves 1 and 2 are closed.

Valve proving: The internal pump pumps gas pressure from upstream the first safety valve, p_1 , to the volume between the two safety shut-off valves, p_2 , increases approx. 8 in. W.C. above p_1 .

During the test period, the internal differential pressure switch monitors the pressure between the two safety valves.

If p_2 increases approx. 8 in. W.C. above p_1 , the motor pump is switched off (end of test period) indicating no leak is detected. The contact "RUN" (T5) is energized after 26 s max. and the yellow signal lamp lights continuously. (For 24Vdc models, the B terminal is energized)

If p_2 does not increase approx. 8 in. W.C. above p_1 , the motor pump is switched off (end of test period) as a leak is detected. The contact "ALARM" (T3) is then energized after about 26 s, and the red signal

lamp lights continuously. (For 24VDC models, the S terminal is energized)

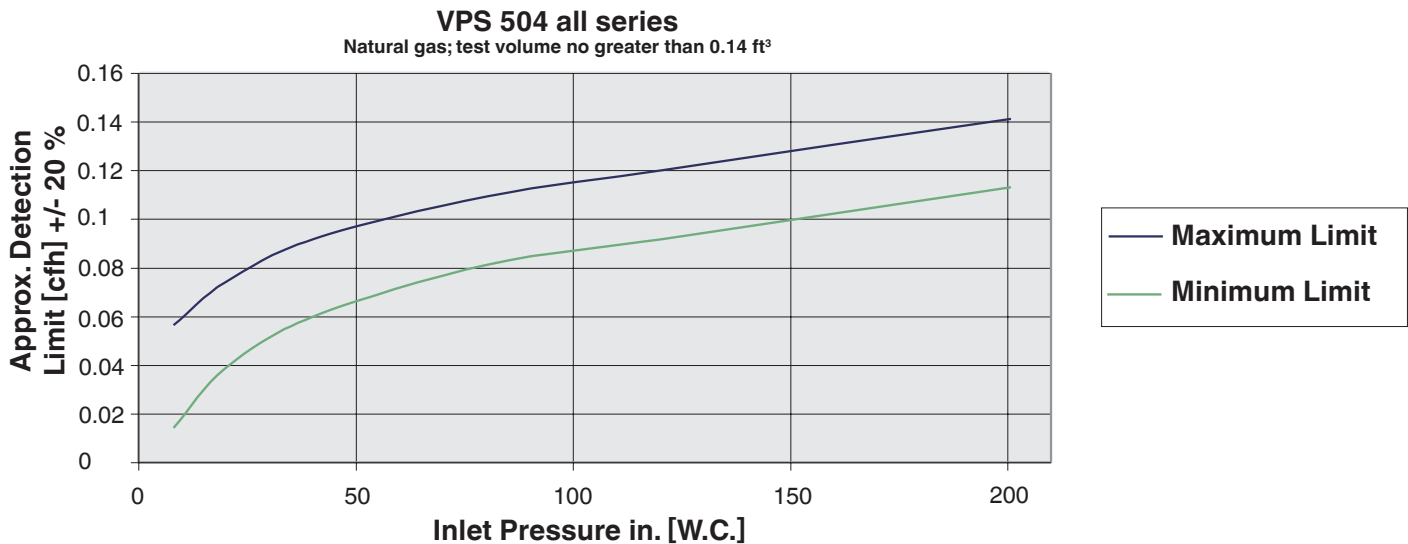
The release time (10 - 20 s) depends on the test volume (max. 0.14 ft³) and input pressure (max. 200 in. W.C.)

In the case of short-term voltage failure during test or burner operation, an automatic restart is performed.

Operation

VPS pump remains off. "RUN" contact remains energized.

Leak Detection Limit for each Valve



NOTE: Leak detection limit depends on inlet pressure and gas density. To obtain detectable leakage through both valves, divide values in graph by 1.6.

Maintenance & Testing

⚠ Verify that both safety shutoff valves are deenergized and closed prior testing the VPS 504.

⚠ The VPS 504 is a protective device. Check it at least annually for proper operation.

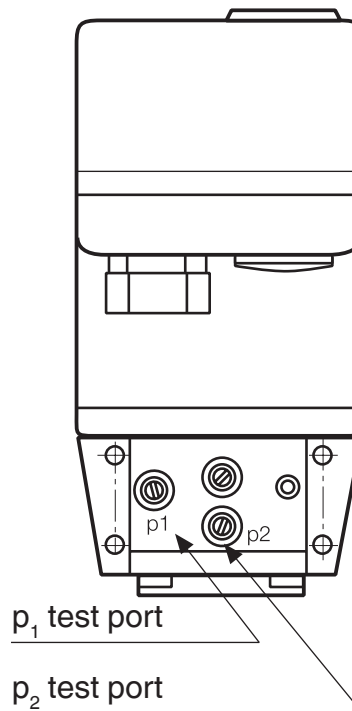
⚠ All test ports must be properly tightened before any gas is reapplied to the system.

⚠ If the VPS 504 is defective, do not try to repair the unit. Doing so might interfere with its normal operation and cause a fire or explosion. If disassembled, approvals, warranty and exchange policies will be void.

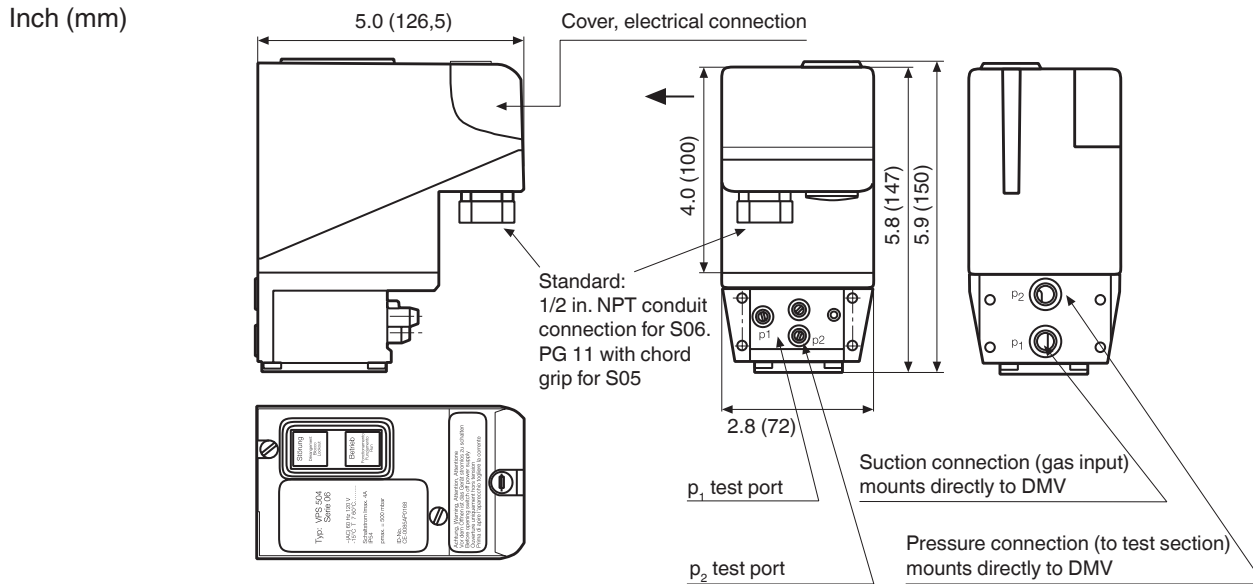
Test Procedure

1. Loosen test nipple p_2 . Confirm that gas is not continuously leaking from p_2 by applying soapy water to the p_2 test port. If bubble continue, perform a leakage test on the valve seats.
2. Close test nipple p_2 , and then simulate a leak by removing test tap at port #2 from the DMV safety shutoff valve on the opposite side of the VPS. With power to the VPS 504, and the upstream ball valve opened, reset the VPS 504 by pressing the red lockout button. Confirm that after the VPS 504 stops pumping, the red light illuminates, and the VPS 504 locks out. (Terminal T3 on S06 series or terminal S on S05 series is energized.)
3. If test procedure 1 or 2 fails, immediately shut down the system, remove, and replace the VPS 504.

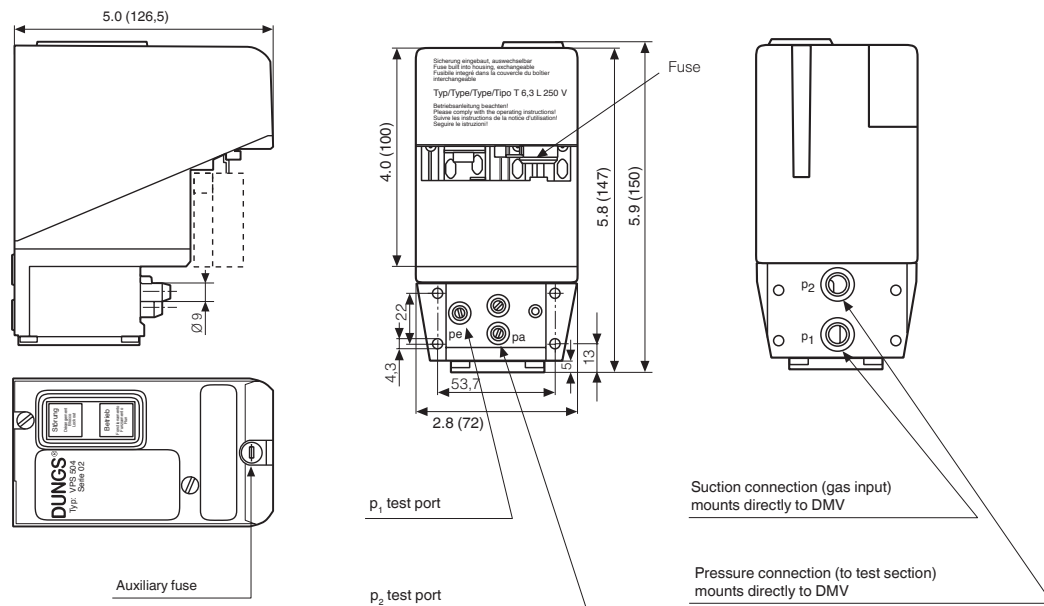
⚠ When the internal pump in the VPS 504 is running, a small amount of gas will flow from port #2 of the DMV.



Accessories & Replacement



Version	Order No.	
VPS 504 S06 (120 VAC 60 Hz)	221-073	
VPS 504 S05 (24 VDC)	224-983	PG13, only CSA certified
VPS 504 S02 (24 VDC)	225-481	Plug, 7 pin, only CSA certified
Accessory	Order No.	
Mounting kit NPT 1/2 (4 mounting screws)	164-760	
Mounting kit (4 x M4 x 16,2, 2 x O-Ring, 2 x filter insert)	221-503	





It is necessary to replace safety-relevant components after they have reached the end of their useful life.

DUNGS recommends replacing such components according to the following table:

Es besteht die Notwendigkeit sicherheitsrelevante Komponenten nach Erreichen ihrer Nutzungsdauer auszutauschen.

DUNGS empfiehlt den Austausch gemäß folgender Tabelle:

Valid only for domestic, residential and industrial* heating applications.			
*Not valid for high performance industrial heat process applications. See page 2			
Gültig nur für häusliche Heizungsanlagen			
Nicht gültig für Thermprozessanwendungen mit Taktbetrieb			
Valve Type Safety relevant component	Recommended replacement after years/cycles: → Depends on the value which will be achieved first		Max. Cycle Rate
Ventil Typ Sicherheitsrelevante Komponente	Empfohlener Austausch nach Jahren/Schaltspielen: → Je nachdem welcher Wert zuerst erreicht wird		Max. Schalthäufigkeit
	USEFUL LIFE [Years] DUNGS recommends replacement after:	USEFUL LIFE [Rated Cycle Life (cycles)] DUNGS recommends replacement after:	
	NUTZUNGSDAUER [Jahre] DUNGS empfiehlt den Austausch nach:	NUTZUNGSDAUER [Schaltspiele (auf/zu)] DUNGS empfiehlt den Austausch nach:	
DMV-(D)	10 Years 10 Jahre	1,000,000 cycles	500 /h
SV-(D)			
MV(D)/602			
DMV/MV/SV: LE-Ausführungen (mit Hydraulikbremse) DMV/MV/SV: LE-Versionen (with hydraulic brake)		500,000 cycles	20 /h
Gasventil mit DUNGS-Ventilprüfsystem Gas valve with DUNGS valve proving system	Austausch nach erkanntem Fehler Replacement after error detection		
VPS 504*	10 Years 10 Jahre	250,000 cycles	20 /h
VDK 200*			15 /h
CPI 400		1,000,000 cycles @ 1 A and 120 VAC 100,000 cycles @ 10 A and 120 VAC	1,000 /h
CPI 401			

* Valve proving system values shown are expected lifetime. NFPA 86 does not require replacing if the expected life has been exceeded.

Änderungen, die dem technischen Fortschritt dienen, vorbehalten

We reserve the right to make modifications in the course of technical development.

Karl Dungs Inc.

3890 Pheasant Ridge Drive NE
Suite 150

Blaine, MN 55449, U.S.A.

Phone 763 582-1700

Fax 763 582-1799

e-mail info@karldungsusa.com

Internet <http://www.dungs.com/usa/>

Karl Dungs GmbH & Co. KG

P.O. Box 12 29

D-73602 Schorndorf, Germany

Phone +49 (0)7181-804-0

Fax +49 (0)7181-804-166

e-mail info@dungs.com

Internet <http://www.dungs.com>



Replacement safety relevant components Austausch sicherheitsrelevanter Komponenten

DUNGS[®]
Combustion Controls



It is necessary to replace safety-relevant components after they have reached the end of their useful life.

DUNGS recommends replacing such components according to the following table:

Es besteht die Notwendigkeit sicherheitsrelevante Komponenten nach Erreichen ihrer Nutzungsdauer auszutauschen.

DUNGS empfiehlt den Austausch gemäss folgender Tabelle:

Valid for high performance industrial heat process applications!			
Valve Type Safety relevant component Ventil Typ Sicherheitsrelevante Komponente	Recommended replacement after years/cycles: → Depends on the value which will be achieved first Empfohlener Austausch nach Jahren/Schaltspielen: → Je nachdem welcher Wert zuerst erreicht wird		Max. Cycle Rate Max. Schalthäufigkeit
	USEFUL LIFE [Years] DUNGS recommends replacement after: NUTZUNGSDAUER [Jahre] DUNGS empfiehlt den Austausch nach:	USEFUL LIFE [Rated Cycle Life (cycles)] DUNGS recommends replacement after: NUTZUNGSDAUER [Schaltspiele (auf/zu)] DUNGS empfiehlt den Austausch nach:	
MV ... /602 NPT 1/2 - NPT 2 (no main flow adjustment)	3 Years 3 Jahre	3,000,000 cycles	1,000 /h
MVD ... /602 NPT 1/2 - NPT 1 (with main flow adjustment)			
MVD ... /602 NPT 1 1/4 - NPT 3 (with main flow adjustment)		1,000,000 cycles	
Conditions	Clean gas (NG, LNG, LPG): maximum 50 micron gas filter required! Dry Gas: <ul style="list-style-type: none"> ■ relative humidity < 60 % ■ dew point of the gas < -14 °F <div style="float: right; border: 1px solid black; border-radius: 15px; padding: 5px; background-color: #0070c0; color: white; font-size: 2em; font-weight: bold; text-align: center; width: 100px; height: 40px; display: flex; align-items: center; justify-content: center;">} "dry"</div>		
→ Not valid for MV(D).../602 valves delivered before 2011/01			

Änderungen, die dem technischen Fortschritt dienen, vorbehalten
We reserve the right to make modifications in the course of technical development.

Karl Dungs Inc.
3890 Pheasant Ridge Drive NE
Suite 150
Blaine, MN 55449, U.S.A.
Phone 763 582-1700
Fax 763 582-1799
e-mail info@karldungsusa.com
Internet <http://www.dungs.com/usa/>

Karl Dungs GmbH & Co. KG
P.O. Box 12 29
D-73602 Schorndorf, Germany
Phone +49 (0)7181-804-0
Fax +49 (0)7181-804-166
e-mail info@dungs.com
Internet <http://www.dungs.com>