Innovation in Miniature

PRODUCT DATA SHEET

EXTENDED PERFORMANCE SOLENOID VALVE

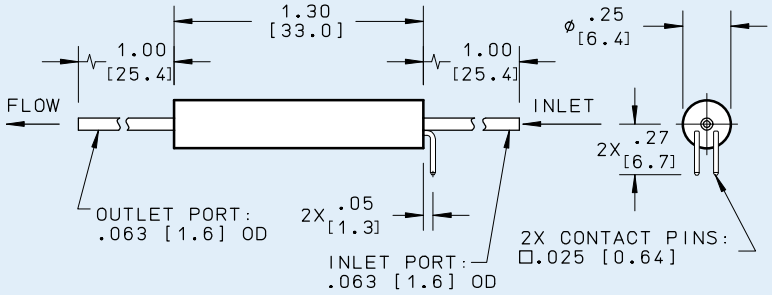
The Lee EP (Extended Performance) Series Solenoid Valve is designed to meet mission critical parameters. This compact, lightweight, 2-way solenoid valve builds on the long performance history of the VHS solenoid valve product line, but extends the operating pressure to 800 psi (55 bar). High temperature models can operate up to 275°F (135°C) under continuous ambient conditions.

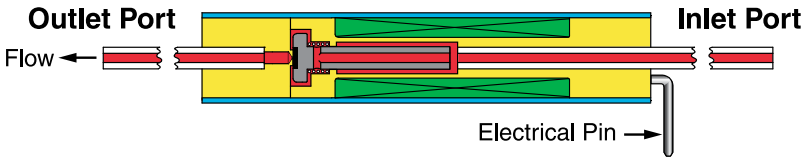
Featuring stainless steel construction and a selection of wetted seal materials, the EP Series valves are leak-tight, and are suitable for controlling both gases and a wide range of liquids including fuel (gasoline, JP and diesel), hydrazine, hydraulic fluid and many solvents.

The EP Valves are available in standard 12 and 24 vdc coil designs, and are used in medical instrumentation, aerospace and satellite thrust control applications.

Special designs and configurations, including threaded ends with MINSTAC® fittings, are available for custom applications. Contact your local Lee Sales Engineer for additional information and technical assistance.

- Light Weight – valves weigh less than 6 grams
- Operating speeds up to 500 Hz
- Compact Size – 1.3" (33.0mm) long x 0.250" (6.4mm) diameter
- Versatile – elastomers for many different fluids including solvents and fuels
- Suitable for small ground based and aerial engine platforms
- Can be used for discrete dispensing or proportional flow (PWM)





Coil
Flow Path
Housing
Seal
Shield
Plunger

PART NUMBER	SEAL MATERIAL	VOLTAGE (vdc)	POWER (watts)	PRESSURE		MAX. AMBIENT TEMPERATURE		FLOW (Lohms)
				(psi)	(bar)	(°F)	(°C)	
IEPA1211141H	FKM	12	0.5	800	55	120	49	4100
IEPA2411141H	FKM	24	0.5	800	55	120	49	4100
IEPA1211541H	FFKM	12	0.5	300	21	120	49	4100
IEPA2411541H	FFKM	24	0.5	300	21	120	49	4100
IEPA1211241H	EPDM	12	0.5	800	55	120	49	4100
IEPA2411241H	EPDM	24	0.5	800	55	120	49	4100
IEPA1221141H	FKM	12	0.5	800	55	275	135	4100
IEPA2421141H	FKM	24	0.5	800	55	275	135	4100
IEPA1221541H	FFKM	12	0.5	300	21	275	135	4100
IEPA2421541H	FFKM	24	0.5	300	21	275	135	4100
IEPA1221241H	EPDM	12	0.5	800	55	275	135	4100
IEPA2421241H	EPDM	24	0.5	800	55	275	135	4100

FKM = Viton®; FFKM = Perfluorelastomer; EPDM = Ethylene Propylene Diene Monomer
Viton is a registered trademark of DuPont Performance Elastomers

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LEE LOHM LAWS

The Lohm Laws are a simple system of defining the fluid resistance of Lee components. Just as the "Ohm" is used in the electrical industry, we can use the "Liquid Ohm" or "Lohm" to quantify the resistance to flow of any fluid control component. When using the Lohm system, you can forget about coefficients of discharge and dimensional tolerances on drilled holes. These factors are automatically compensated for in the Lohm calculations, and confirmed by testing each component to establish flow tolerances.

LOHM LAWS (liquids)

The Lohm has been selected so that a 1 Lohm restriction will permit a flow of 100 gallons per minute of water with a pressure drop of 25 psi at a temperature of 80°F.

The following formulas are presented to extend the use of the Lohm laws to many different liquids, operating over a wide range of pressure conditions.

These formulas introduce compensation factors for liquid density and viscosity. They are applicable to any liquid of known properties, with minimum restrictions on pressure levels or temperature.

The units constant (K) eliminates the need to convert pressure and flow parameters to special units.

Volumetric Flow Units $L = \frac{KV}{I}\sqrt{\frac{H}{S}}$

Gravimetric Flow Units $L = \frac{KV}{w}\sqrt{HS}$

LIQUID FLOW – UNITS CONSTANT K

VOLUMETRIC FLOW UNITS			
	Pressure Units		
Flow Units	psi	bar	kPa
GPM	20	76.2	7.62
L/min	75.7	288	28.8
ml/min	75 700	288 000	28 800
in^3/min	4 620	17 600	1 760

GRAVIMETRIC FLOW UNITS			
	Pressure Units		
Flow Units	psi	bar	kPa
PPH	10 000	38 100	3 810
gm/min	75 700	288 000	28 800

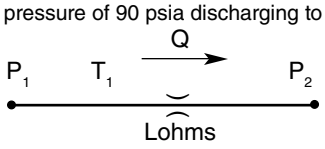
NOMENCLATURE, Liquids

- L = Lohms
- S = Specific gravity*
- H = Differential pressure
- V = Viscosity compensation factor**
- I = Liquid flow rate: Volumetric
- w = Liquid flow rate: Gravimetric
- K = Units Constant – Liquid (see chart left)
- *S = 1.0 for water at 80°F.
- **V = 1.0 for water at 80°F.

(For other fluids and temperatures, contact your Lee Sales Engineer or visit us at www.TheLeeCo.com)

LOHM LAWS (gases)

The Lohm has been selected so that a 100 Lohm restriction will permit a flow of 250 standard liters per minute of nitrogen at a temperature of 59°F, and an upsteam pressure of 90 psia discharging to atmosphere.



$$L = \frac{K f_T P_1}{Q}$$ (Sonic region) i.e. $P_1/P_2 \geq 1.9$

$$L = \frac{2 K f_T \sqrt{\Delta P P_2}}{Q}$$ (Subsonic region) i.e. $P_1/P_2 < 1.9$

GAS FLOW – UNITS CONSTANT K

To eliminate the need to convert pressure and flow parameters into specific units such as "psia" and "std L/min.", the table below lists values of the Units Constant "K", which is used in the Gas Flow Lohm Formulas:

VOLUMETRIC FLOW UNITS							
Abs. Pres	psia			bar		kPa	mm.Hg
Flow	SLPM	SCFM	in^3/min	SLPM	SCFM	SLPM	mL/min
He	771	27.2	47 100	11 200	395	112	14 900
N_2	276	9.73	16 800	4 000	141	40.0	5 330
Air	271	9.56	16 500	3 930	139	39.3	5 230
O_2	257	9.08	15 700	3 730	132	37.3	4 970
CO_2	213	7.52	13 000	3 090	109	30.9	4 110

For more information on Lohms, visit us at www.TheLeeCo.com or contact your Lee Sales Engineer.

NOMENCLATURE, Gases

- L = Lohms
- K = Units Constant – Gas (see chart left)
- f_T = Temperature correction factor
- P_1 = Upstream absolute pressure
- P_2 = Downstream absolute pressure
- Q = Gas flow rate
- $\Delta P = P_1 - P_2$

1. Compute the P_1/P_2 pressure ratio.
2. Select the correct formula for the flow region.
3. Look up the value of "K" for the gas.
4. Determine the temperature correction factor, " f_T".
   f_T = 1.0 @ room temperature (70°F)
   $$f_T = \sqrt{\frac{530}{T\,(°F) + 460}}$$
5. Use the formula to solve for the unknown.

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