High Vacuum Products for Sciance & Industry

3200 Dwight Road, Suite 100, Elk Grove, CA 95758
(916) 395-3003 (916) 395-3363

Maintenance Manual

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ATTENTION

LIFTING:

LIFT ONLY FROM DESIGNATED LIFTING POINTS (NOT FROM BONNET PLATE). ONLY EXPERIENCED RIGGERS SHOULD ATTEMPT TO LIFT VALVE

INSTALLATION:

THE VALVE SHOULD BE IN THE CLOSED AND LOCKED POSITION DURING INSTALLATION. KEEP BODY PARTS AWAY FROM THE EXPOSED GATE OR POPPET ACTUATOR MECHANISM WHILE CONNECTING UTILITIES.

OPERATION:

THE VALVE IS DESIGNED TO OPERATE WITH SPEED CONTROLS SET TO MANUFACTURER'S SPECIFICATION. DO NOT CYCLE WITHOUT PROPERLY SET SPEED CONTROLS IN PLACE. DOING SO WILL VOID THE WARRANTY.

MAINTENANCE:

IF TOXIC, COMBUSTIBLE OR REACTIVE GASSES HAVE BEEN USED IN THE SYSTEM DURING NORMAL PROCESS OPERATION, ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO PROTECT THE MAINTENANCE PERSONNEL FROM POSSIBLE INJURY. REQUIRED STEPS MAY CONSIST OF SYSTEM GAS PURGING. WEARING OF PROTECTIVE CLOTHING AND BREATHING APPARATUS AS WELL AS DECONTAMINATION OF THE COMPONENTS REMOVED FROM THE SYSTEM. DISPOSE OF ALL USED / CONTAMINATED MATERIALS IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL ORDINANCES.

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INSTALLATION, OPERATION AND MAINTENANCE GUIDE

1.0 The purpose of this document is to assist the installer / user of the GNB valve with the correct installation, operation and maintenance procedures required for meeting all warranty conditions expressed or implied in the Terms and Conditions of Sale.

1.1 It is understood that installation of the product implies acceptance of the product with the exception of leakage experienced across a gate seal (see storage recommendation), weld or other non-compliance with order specifications.

1.1.0 Unacceptable leakage is defined as weld leaks larger than 1x10-9 std cc sec helium or static seal leaks larger than 7x10-9 std cc sec-1 helium.

2.0 INSTALLATION

2.1 Locate the appropriate seal interface medium (o-ring, copper seal or specially designed seal) between the valve flange and the mating flange, if required. In the case of an o-ring seal the o-ring should be located in the o-ring groove on the valve flange face or the mating flange face. The o-ring may be lightly coated with an acceptable vacuum compatible grease or oil to facilitate movement of the ring during the joining process and to aid in filling extremely small surface irregularities. Copper or wire seals demand extreme cleanliness and should be handled with gloved hands and good UHV technique.

2.2 Orient the valve appropriately to the installation requirements. Be sure that bolt holes if present, are in alignment between the two flanges.

2.2 Secure the mating flanges with the appropriate media (bolts, claw clamps, quick clamps or weld) to the appropriate torque or until the flanges are "face-to face".

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2.4 UTILITY CONNECTION (All valves except manual actuation)

2.4.0 Connect the appropriate utilities to the valve for actuation. Typical utilities will be electrical (for electric motor, solenoid or hydraulic pump actuation) and if required, shop air or other gas source with nominal operating supply pressure of 80 - 100 psig.

WARNING

THE VALVE SHOULD BE IN THE CLOSED AND LOCKED POSITION DURING INSTALLATION. KEEP BODY PARTS AWAY FROM THE EXPOSED GATE OR POPPET ACTUATOR MECHANISM WHILE CONNECTING THE UTILITIES.

2.5 ACTUATION TEST

2.5.0 Cycle the valve several times checking for smooth actuation during both the opening and closing.

2.5.1 Close the valve.

ATTENTION:

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2.6 INTERFACE LEAK TEST

NOTE:
If any valve weld leaks are found, notify the GNB factory immediately.

2.6.0 Pump down the chamber or component to which the valve is attached and leak check the gate or poppet seal. Also check the flange seal for integrity.

NOTE:
Leak checking can be done by employing a helium mass spectrometer leak detector, RGA or other acceptable device. Though GNB valves are rigorously tested at the factory, torquing the valve flanges onto uneven mating surfaces may distort the valve body enough to affect the seal integrity of the gate or poppet seal. Therefore, it is prudent to leak check the gate after installation to reduce potential system dismantling time required to fix the problem later.

2.6.1 Note any leaks found.

2.6.2 Vent the chamber or component.

2.6.3 Repair any leaks found.

NOTE:
Flange o-ring seal leaks may be due to uneven or excessive torque, small pieces of debris across the sealing surface, a twisted o-ring (where the flash line on the ring crosses the sealing surface) or a damaged o-ring. See the section on gate adjustment if a leak is found across the gate seal. Leakage across a poppet seal may be due to mating the valve to an extremely uneven surface. This can be corrected by resurfacing or replacing the uneven flange.

2.6.4 Repeat Section 2.6 until leak integrity is achieved.

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2.7 MATE NEXT COMPONENT TO VALVE

2.7.1 Repeat the process noted in Sections 2.1, 2.2, and 2.3 for the mating component. Leak check the flange seal as soon as it is convenient.

3.0 OPERATION

3.1 MANUAL VALVES

3.1.0 The valve will be opened or closed by turning the handweel in either clockwise or counter-clockwise direction. Unless otherwise noted, turning the handweel clockwise will close the valve, counter-clockwise will open the valve. The handwheel should be turned to the end of travel and then backed off 1/8 to 1/4 turn to take the mechanical stress off of the actuator seals.

3.1.1 Lever or Toggle actuated valves are opened or closed by moving the operating handle from one end of its travel to the other.

3.2 ELECTRO PNEUMATIC, ELECTRIC MOTOR AND HYDRAULIC VALVES

3.2.0 Make sure that the valve utilities have been properly installed (see Section 2.4).

3.2.1 The valve will be actuated by sending or removing the required electrical signal to the valve operator (solenoid switch or motor / pump). If the valve is equipped with position indicators an electrical signal from on of the switches will indicate whether the gate or poppet is in the open or closed position.

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4.0 MAINTENANCE

4.1 Seal replacement - gate / poppet / bonnet

NOTE:
GNB valves do not have to be removed from the vacuum system manifold in order to perform this operation. However, sufficient space must be available around the valve to allow for the removal of the bonnet flange and bonnet / actuator assembly from the valve body. If space is not available to perform this task in place, the valve must be removed from the system.

4.1.0 Vent the system to atmospheric pressure on both sides of the valve.

WARNING

IF TOXIC, COMBUSTIBLE OR REACTIVE GASSES HAVE BEEN USED IN THE SYSTEM DURING NORMAL PROCESS OPERATION, ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO PROTECT THE MAINTENANCE PERSONNEL FROM POSSIBLE INJURY. REQUIRED STEPS MAY CONSIST OF SYSTEM GAS PURGING. WEARING OF PROTECTIVE CLOTHING AND BREATHING APPARATUS AS WELL AS DECONTAMINATION OF THE COMPONENTS REMOVED FROM THE SYSTEM. DISPOSE OF ALL USED / CONTAMINATED MATERIALS IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL ORDINANCES.

4.1.1 Remove all utilities from the valve.

4.1.2 Remove the bonnet and actuator assembly from the valve body.

4.1.3 Remove the suspect o-ring from the o-ring groove.

NOTE:
Take extreme care to not scratch the sealing surfaces of the o-ring groove or mating surface during the removal / installation procedures.

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4.1.4 Clean the o-ring groove and mating surface with an acceptable, vacuum compatible solvent and lint-free towel.

4.1.5 Rinse the cleaned surfaces with 2 propanol or other vacuum compatible alcohol.

4.1.6 Inspect the sealing surfaces for any scratches or debris that may be present.

NOTE:
Remove debris or scratches fro the sealing surfaces, if present. Remember, never polish or abrade across the sealing surface. Always polish in a direction parallel with the sealing surface of the o-ring. Repeat steps 4.1.4 through 4.1.6 until the surfaces are clean and free from scratches across the sealing surfaces.

4.1.7 Verify that the replacement o-ring is clean, free from cracks, gouges, dings, manufacturing anomalies, of the correct material and the correct size for the o-ring groove.

4.1.8 Apply a thin film of vacuum grease to the o-ring surface.

NOTE:
Only a microfilm of grease is required. General vacuum practice usually specifies that the excess grease be wiped from the o-ring with a lint-free towel. The grease remaining on the o-ring should be sufficient for good sealing.

4.1.9 Install the o-ring into the groove. Take care not to twist, stretch or damage the o-ring during installation.

4.1.10 Repeat steps 4.1.3 through 4.1.9 for each o-ring to be replaced.

4.1.11 Locate the valve bonnet / actuator in the valve body.

4.1.12 Install the bonnet retention bolts or clip as required.

4.1.13 Leak check the valve seals prior to resuming system operation.

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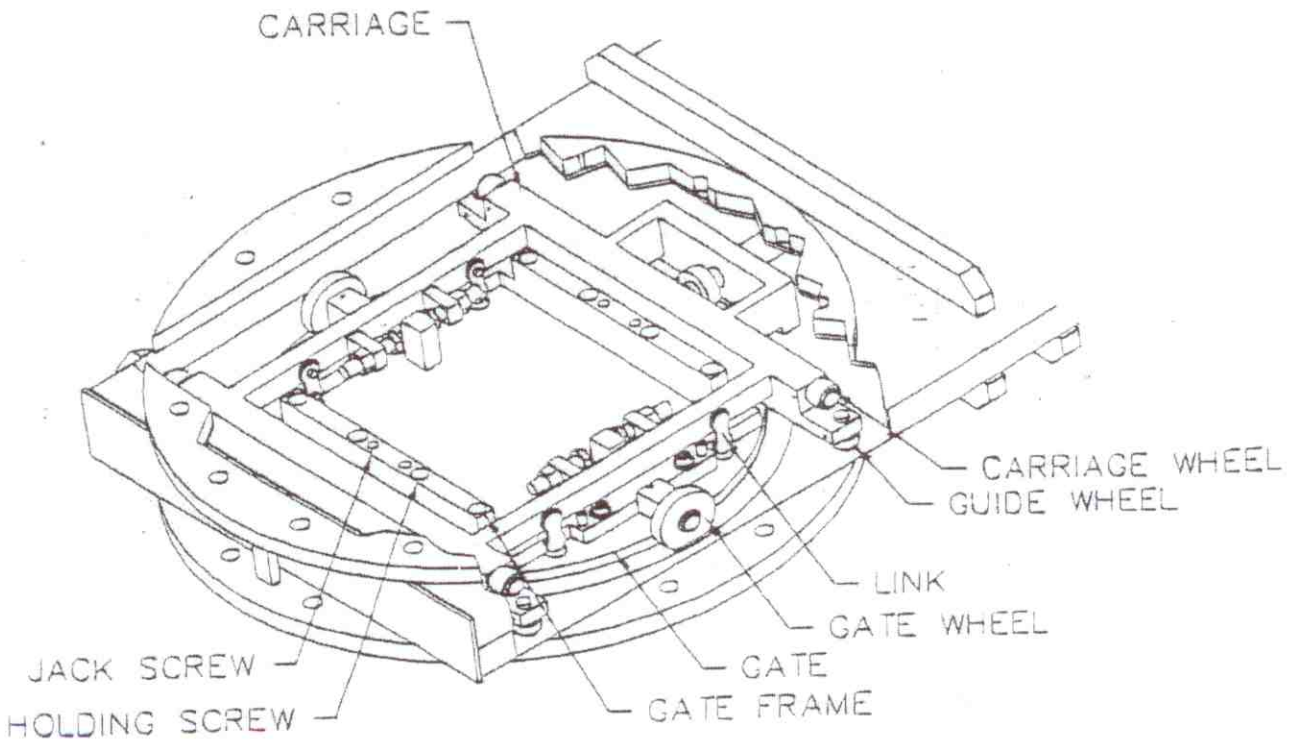
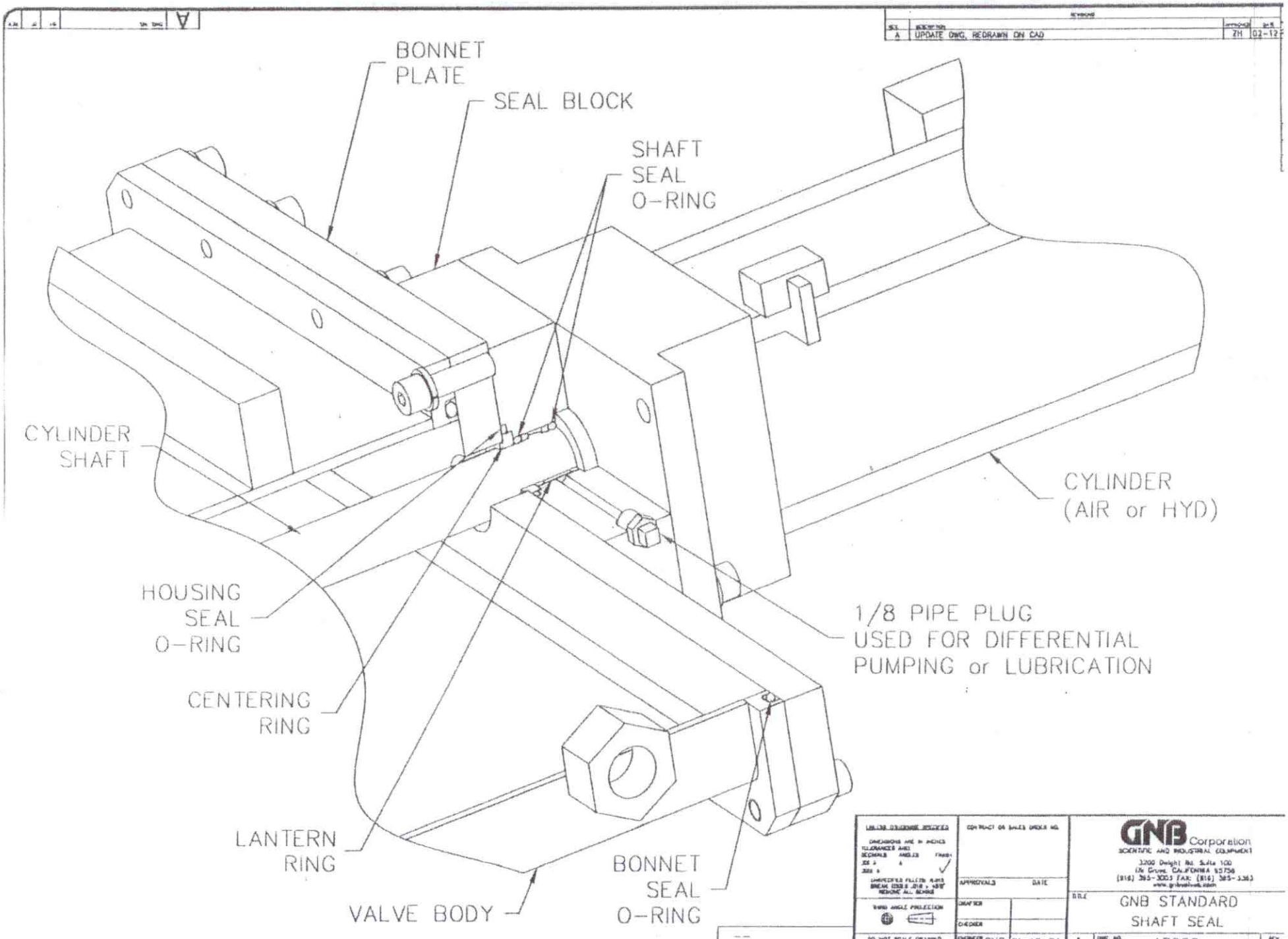
GATE ADJUSTMENT PROCEDURE

1. Actuate the valve into the closed and locked position.
2. Remove the air and electrical supplies to the valve.
3. Loosen the holding screws.
4. Tighten or loosen the jack set screws as needed to achieve a uniform distance between the flange and gate. Use a feeler gauge to measure between the flange and gate. Distance is usually between .015" - .025" for a good seal. The distance may be less if the o-ring is well used.
5. Tighten the holding screws to maintain gate adjustment setting.
6. A gate map is included in every valve manual as a reference for adjustment. The gate map is valve specific and the measurements are the original factory settings.
7. Re-attach the air and electrical supplies.
8. It is recommended that a helium leak test be performed to assure proper seal and that no further adjustment is needed before system start up.

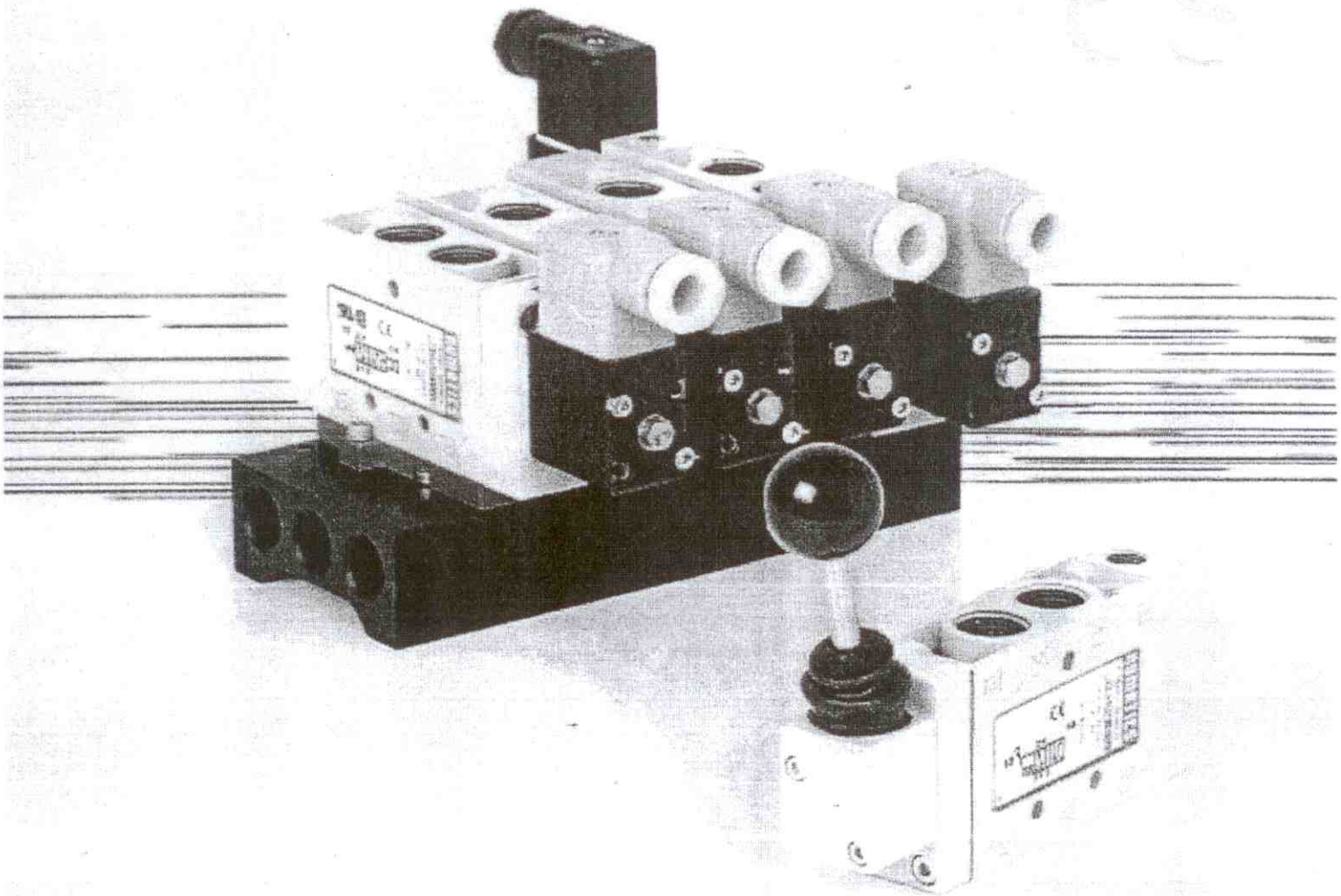




REVISIONS			
REV.	DESCRIPTION	APPROVED	DATE
A	UPDATE DWG. REDRAWN ON CAD	ZH	02-12

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES. TOLERANCES ARE: DECIMALS ANGLES FINISH: XX ± ° ✓ XXX ± UNSPECIFIED FILLETS AND BREAK EDGES .010 x 45° REMOVE ALL BURRS. THIRD ANGLE PROJECTION. DO NOT SCALE DRAWING.	CONTRACT OR SALES ORDER NO.	GNB Corporation SCIENTIFIC AND INDUSTRIAL EQUIPMENT 3200 Dwight Rd. Suite 100 Elk Grove, CALIFORNIA 95758 (916) 393-3003 FAX: (916) 393-3383 www.gnbvalves.com	
	APPROVALS DATE		
	DRAFTER	TITLE: GNB STANDARD SHAFT SEAL	
	CHECKER		
	ENGINEER GNB 01-10-74	A DWG. NO. 17259	REV. A
CADD FILE NAME: C:\..\B_COMMON\GATE CARR\GNB ABE\17259.DWG		SCALE: 1=1 SHEET 1 OF 1	
NEXT ASSEMBLY			

numatics®



L2 Series

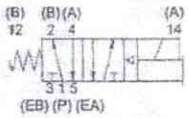
Solenoid-Pilot, Air-Pilot or Hand Lever Actuated Valves

We're everywhere you need us to be!

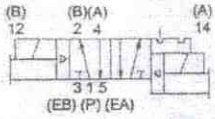
5 Ported, 2 and 3 position, 4-way, Spool & Sleeve
Cv: 1.7

- Solenoid pilot or air pilot actuated
- Hand-lever valves available
- DIN plug-in solenoid and plug connector with indicator light
- Unlubricated or lubricated service
- In-line or manifold mounted
- Integral speed control available

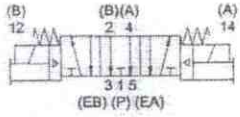
single solenoid
2 position 4-way



double solenoid pilot
2 position 4-way



double solenoid pilot
3 position 4-way
open center



double solenoid pilot
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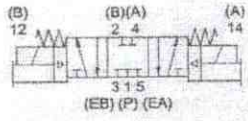
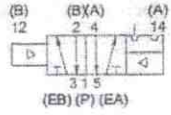
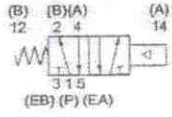
closed center



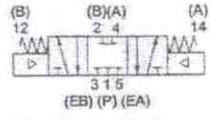
single air pilot
2 position 4-way
no override



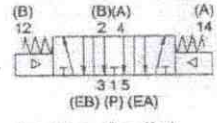
single air pilot
2 position 4-way
no override



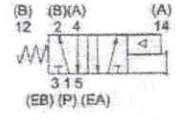
double air pilot
3 position 4-way
closed center
no override



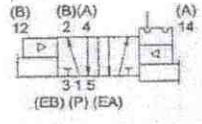
double air pilot
3 position 4-way
open center
no override



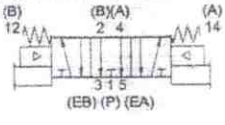
single air pilot
2 position 4-way
w/override



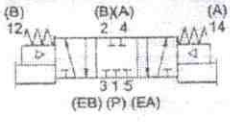
double air pilot
2 position 4-way
w/override



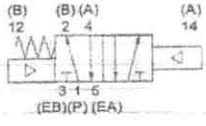
double air pilot
3 position 4-way
open center w/override



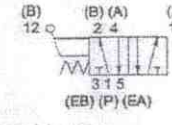
double air pilot
3 postition 4-way
closed center w/override



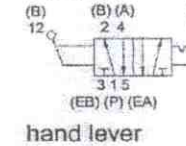
double air pilot
2 position 4-way
spring offset
no override



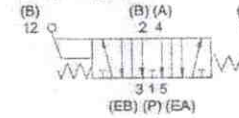
hand lever
2 postion 4-way
w/spring return



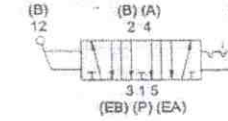
hand lever
2 position 4-way
w/detent



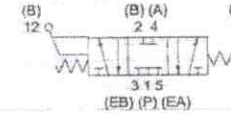
hand lever
3 position 4-way
open center
w/spring center



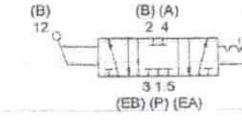
hand lever
3 position 4-way
open center
w/detent



hand lever
3 position 4-way
closed center
w/spring center



hand lever
3 position 4-way
closed center
w/detent



Technical Data

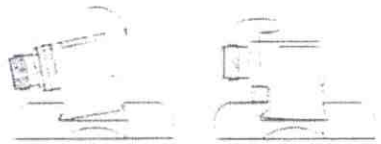
VALVE DATA	ENGLISH		METRIC	
Cv	1/4 = 1.7	3/8 = 1.7	1/4 = 1.7	3/8 = 1.7
Flow capacity	79 SCFM @ 80 PSIG upstream pressure to atmosphere		1674 Nl/m @ 6 bar upstream/5 bar downstream	
Main Valve Operating Pressure Range	28" HG. Vacuum to 150 PSIG		Vacuum to 10 bar	
Pilot Pressure Range: Internal and External	14.5 to 150 PSIG		1 to 10 bar	
Temperature range: Solenoid Pilot (ambient)	-10°F to +115°F		-23°C to +46°C	
Temperature Range: Air Pilot (ambient)	-10°F to +150°F		-23°C to +66°C	

Operating Data

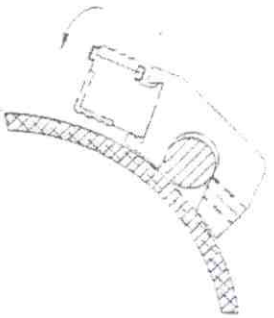
ALL SOLENOIDS ARE CONTINUOUS DUTY RATED		12 VDC	24 VDC	24 VAC 50 Hz.	24 VAC 60 Hz.	115 VAC 50 Hz.	120 VAC 60 Hz.	230 VAC 50 Hz.	240 VAC 60 Hz.
Power (Watts)*		3.5	3.5	4.8	3.3	4.8	4.0	5.0	3.5
Holding Current (Amps.)		0.30	0.15	0.380	0.260	0.064	0.054	0.030	0.023
Inrush Current (Amps.)		N/A	N/A	0.500	0.420	0.087	0.082	0.042	0.036
Energize in seconds	2-Position, Single, Spring Return	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
	2-Position, Double, Detented	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
	3-Position, Spring Centered	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
De-energize in seconds	2-Position, Single, Spring Return	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
	2-Position, Double, Detented	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3-Position, Spring Centered	0.030	0.035	0.035	0.035	0.035	0.035	0.035	0.035

*A 1.4 Watt DC solenoid is available. Add **"17G"** to the model number. **EXAMPLE:** L22BA452B017G61. Maximum pilot pressure is reduced to 116 PSIG (8 bar).

SWITCH MOUNTING



- Clip switch into cylinder groove or bracket and tighten screw.
- The switches can be clipped into the groove at any point.
- Metric allen wrench included with each switch.



- Mount switch on bracket and tighten screw.
- Fit bracket on tie rod.
- Tighten bracket with screw.

See below for tie rod bracket part numbers.

CORDS - FOR PLUG-IN SWITCHES

Cable and Plug Assembly	Part Number
Straight Plug assembly with (3 m) 10' Cable	SC6-001
90 degree Plug assembly with (3 m) 10' Cable	SC6-002

Application Recommendation

1. Always use a load in conjunction with the switch. Failure to use a load will ruin the switch. For DC voltage always observe polarity.

2. Testing switches with a filament light bulb creates severe inrush currents that will adversely effect switch life.

3. Limit wire runs to a minimum. Long wire runs create capacitive loading that may effect switch life.

4. When circuit designs call for the switch to actuate a solenoid, external surge suppression may be required.

5. Always keep the area around the switch clean and free of potentially magnetic debris.

TIE ROD BRACKETS

INCH SIZE TIE ROD BRACKETS

BORE	SERIES	TIE ROD DIAMETER	BRACKET PART NUMBER	NICKEL PLATED BRACKET PART NUMBER
1 1/2	A	1/4"	SB6-K01	NB6-K01
1 1/4, 2	E			
2, 2 1/2	A	5/16"	SB6-L01	NB6-L01
1 3/4, 2 1/2, 3	E			
3	C			
3 1/4, 4	A	3/8"	SB6-P01	NB6-P01
3 1/2, 4, 4 1/2	E			
4	C			
3 1/4, 4	F			
5, 6	A	1/2"	SB6-T01	NB6-T01
5, 6	E			
8	A	5/8"	SB6-W01	NB6-W01
8	E			

VDMA TIE ROD BRACKETS

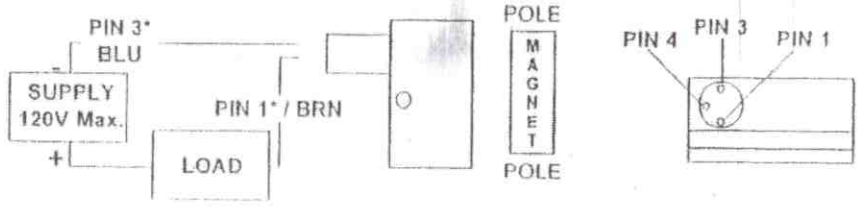
BORE (mm)	BRACKET PART NUMBER
32/40	219-251
50/63	219-252
80/100	219-253
125	219-254
160/200	219-255

Using the cylinder bore and series, select the tie rod bracket required.

use this diagram if box is checked ☐

Reed Switch - Normally Open
Type SR6

-Warning-
Do not exceed Ratings.
Permanent damage to sensor may occur.



Power Supply Polarity MUST be observed for proper operation on DC application. The LED will not light if polarity is reversed.

* Pin out for 8mm connector version

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SR6-002	3m Wire Version	Reed Switch, LED	Normally Open	5 - 120 VAC/VDC	0.3 Amps Max. 0.001 Amp Min.	4 watts max.	2 Volts
SR6-004	3m Wire Version	Reed Switch, LED & MOV	Normally Open	5 - 120 VAC/VDC	0.5 Amps Max. 0.005 Amp Min.	10 VA	3.5 Volts
SR6-012	8mm Connector	Reed Switch, LED	Normally Open	5 - 120 VAC/VDC	0.3 Amps Max. 0.001 Amp Min.	4 watts max.	2 Volts
SR6-014	8mm Connector	Reed Switch, LED & MOV	Normally Open	5 - 120 VAC/VDC	0.5 Amps Max. 0.005 Amp Min.	10 VA	3.5 Volts