

SUPERPRESSURE

LITTLE RICHARD PNEUMATICALLY OPERATED VALVE

| | |
|--------------|-------------------------------------|
| 44-19730 | 20K NORMALLY CLOSED |
| 44-19730LS | 20K NORMALLY CLOSED & LIMIT SWITCH |
| 44-19730OX | 20K NORMALLY CLOSED OXYGEN SERVICE |
| 44-19731 | 60K NORMALLY CLOSED |
| 44-19731LS | 60K NORMALLY CLOSED & LIMIT SWITCH |
| 44-19749-1 | 100K NORMALLY CLOSED |
| 44-19749-1LS | 100K NORMALLY CLOSED & LIMIT SWITCH |
| 44-19790 | 20K NORMALLY OPEN |
| 44-19790LS | 20K NORMALLY OPEN & LIMIT SWITCH |
| 44-19790OX | 20K NORMALLY OPEN OXYGEN SERVICE |
| 44-19791 | 60K NORMALLY OPEN |
| 44-19791LS | 60K NORMALLY OPEN & LIMIT SWITCH |
| 44-19799-1 | 100K NORMALLY OPEN |
| 44-19799-1LS | 100K NORMALLY OPEN & LIMIT SWITCH |

This Manual is for:

Part No. : _____
Sales Order No. : _____
Serial No. : _____
Date Manufactured : _____

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44-19730

Little Richard 20K PSI Normally Closed

52076005700
52076006000
56046001200

Air Drive 6"
Operator Assembly
Valve Body Assembly

44-19730LS

Little Richard 20K PSI Normally Closed & Limit Switch

44-19730
52076005700
52076006000
56046001200
63017000300

Little Richard 20K PSI Normally Closed
Air Drive 6"
Operator Assembly
Valve Body Assembly
Limited Switch Assembly

44-19730OX

Little Richard 20K PSI Normally Closed-Oxygen Service

52076005700
52076006000
56046002900

Air Drive 6"
Operator Assembly
Valve Body Assembly

44-19790OX

Little Richard 20K PSI Normally Open-Oxygen Service

52076005700
52076005900
56046002900

Air Drive 6"
Operator Assembly
Valve Body Assembly

44-19791

Little Richard 60K PSI Normally Open

52076005700
52076006000
52085012400

Air Drive 6"
Operator Assembly
Valve Body Assembly

I DESCRIPTION

The Newport Scientific, Inc. Little Richard Valve, is a solenoid operated pneumatic piston type pressure valve. The valve is composed of four major components.

- a valve body assembled for the pressure rating of the Little Richard Valve
- a spring-return assembly, one for normally closed mode, another for normally open mode
- a pneumatic actuator cylinder and piston 6 inches in diameter
- a normally closed three-way solenoid valve

The pneumatic piston actuator uses a low pressure (90 psi) air supply controlled by the normally closed, explosion proof, Class 1, Group D solenoid valve.

When electrically energized, the solenoid valve opens to allow air to enter the actuator piston. The piston is connected to the pressure valve stem by an extension shaft, and a spring keeps the actuator shaft in the normally open (NO) or normally closed (NC) position. When air enters the cylinders, spring tension on the piston is overcome and the valve stem is moved to the fully open or fully closed position. When the solenoid valve is de-energized, the air pressure is vented from the actuator cylinder through the exhaust port of the solenoid, (see assembly drawing), and the spring tension returns the valve stem to its normal position.

APPLICATION

Solenoid valve control of the pneumatic actuator permits the use of the Little Richard Valve for remotely controlled on-off operation, or as a pressure sensitive, contact-type gage in the line. The valve may also be furnished with limit switches for remote indication if the fully open or fully closed positions.

CONSTRUCTION FEATURES

- The structure containing the pneumatic piston actuator and connecting shaft is constructed of heavy-duty aluminum.
- Valve bodies available:
 - 20,000 psi body with 5/16 inch orifice opening
 - 60,000 psi body with 1/8 inch orifice opening
 - 100,000 psi body with 1/16 inch orifice opening
- Valve body material:
 - for 20,000 and 60,000 psi service, 316 stainless steel
 - for 100,000 psi service, 410 stainless steel, heat treated
 - for oxygen service, Monel 400
- All parts exposed to the flowing medium are made of stainless steel, for oxygen service, Monel, and stellite.
- Stems (replaceable) are made of 440C stainless steel, heat treated
 - for oxygen service, stellite #6B
- Valve seat (replaceable):
 - For 20,000 and 60,000 psi service: 410 stainless steel, heat treated
 - For 100,000 psi service: 17-4PH
 - For oxygen service: stellite #25
- All valves are furnished with 416 stainless steel glands, nuts and sleeves

SPECIFICATIONS

COMMON CHARACTERISTICS

OPERATED AIR PRESSURE: 90 psi nominal
AIR CONNECTIONS: 1/4 inch NPT
VALVE STEM TRAVEL: 5/16 inch maximum
VALVE STEM CLOSURE ANGLE: 60 degrees
SOLENOID VALE: Normally closed
ELECTRICAL POWER: 115V, 60Hz, 1-phase
SOLENOID ENCLOSURE: Explosion proof

CHARACTERS THAT VARY BY MODEL

| MODELS: | 20,000 PSI | 60,000 PSI | 100,000 PSI |
|------------------------------|-----------------|-----------------|----------------|
| MAXIMUM OPERATING PRESSURE: | 20,000 PSI | 60,000 PSI | 100,000 PSI |
| OPERATING TEMPERATURE*: | -100°F TO 450°F | -100°F TO 450°F | -20°F TO 300°F |
| VALVE ORIFICE DIAMETER: | 5/16 INCH | 1/8 INCH | 1/16 INCH |
| INTAKE TUBING CONNECTION: | 9/16 INCH HP** | 9/16 INCH | 1/4" |
| DISCHARGE TUBING CONNECTION: | 9/16" HP** | 9/16" HP** | 1/4" HP*** |

* For 20,000 and 60,000 PSI models, special aluminum foil packing can be used to increase the operating temperature to 1000°F.
 ** Adapters for 1/4 HP or 3/8 HP are supplied when specified.
 *** Inlet/Outlet openings for 9/16 inch OD AMINCO high-flow tubing can be furnished on special order.

II INSTALLATION

IF EQUIPMENT IS RECEIVED IN DAMAGED CONDITION:

Forward an immediate request to the delivering carrier to perform an inspection and prepare a concealed-damage report. Do not destroy container or packing material until contents have been verified. Concurrently report the nature and extent of damage incurred to Newport Scientific, Inc. giving instrument serial and catalog numbers, so that action may be initiated to repair or replace damaged parts or instructions issued for the return of the instrument. Do not return damaged goods to Newport Scientific, Inc. without first securing proper authorization from the Company. The responsibility of Newport Scientific, Inc. ends with delivery to the first carrier; all claims for loss, damage, or non-delivery must be made against the delivering carrier within 10 days of receipt of shipment.

MOUNTING

Mounting dimensions are shown in assembly drawing. Facilities for mounting are provided as follows:
 Two 3/8-16 UNC-2 B tapped side mounting holes 3/4 inch deep at the edge of the cylinder flanges on 2-7/8 inch centers.
 Four 11/32 inch flange mounting holes on 5-7/8 inch centers at the corners of the cylinder flange base.

The Little Richard Valve may be mounted in any practical position. Position does not affect operation.

CONNECTIONS

Valves are packed and shipped with gland nuts finger-tight only and must be tightened before being put into service,

Connect appropriate high pressure tubing to be the inlet and discharge ports of the valve body. Tubing gland nuts should be tightened with a torque wrench as follows:

9/16 inch HP connections, tighten nut to 45 ft-lbs, approximately
3/8 inch HP connections, tighten nut to 28 ft-lbs, approximately
1/4 inch HP connections, tighten nut to 15 ft-lbs, approximately

2. Connect 90 psi air supply to the solenoid valve air inlet port.
3. Connect 115V, 60Hz power line to the solenoid valve either through a control switch, or in series with a contact type pressure gage. Use 1/2 inch NPT threaded conduit or electrical connections to solenoid valve when Little Richard Valve is used in hazardous atmosphere or to handle flammable gases or liquids.

CHECKOUT AND ADJUSTMENT

STEM-SEAT SEAL CHECK

Valves are tested by Newport Scientific, Inc. for effective pressure seal. However, in some cases, service conditions require that the stem seat be tighter (i.e., the stem be adjusted slightly longer so that a more positive and effective seal is made to stop the flow of gas or liquid).

To determine the effectiveness of the seat:

1. Operate the valve in the system several times while using low pressure to purge any dirt particles that could cause a faulty seal.
2. Close the valve by energizing the solenoid of a NO valve or de-energize the solenoid of a NC valve. Slowly apply pressure to the system. If leakage occurs, shut off pressure.
3. Open valve by de-energize the solenoid for NO valve or energize solenoid for NC valve.
4. Loosen valve stem lock nut and packing gland nut, and shorten the squared stem by turning it clockwise with a wrench toward the actuator shaft, approximately one full turn.
5. Close valve. Check that stem is free from its valve seat; it will move easily when turned. If stem is not free, open valve and readjust until stem is free and then close valve.
6. Lengthen stem by turning it counterclockwise until it just touches the valve seat. This is the initial position for stem adjustments for both normally open and normally closed valves.
7. Perform procedures in either "To Set Normally Open Valves Only" or "To Set Normally Closed Valves Only" paragraph.

TO SET NORMALLY OPEN VALVES ONLY

1. De-energize solenoid to open valve. Loosen lock nut and lengthen stem counterclockwise out of the piston shaft to a full turn. Tighten stem lock nut and packing gland nut to torque specified in "Connections" paragraph.
2. Test valve for leaks. If leakage occurs, disassemble the valve and inspect stem and seat for damage. Refer to Maintenance section for disassembly procedures.

TO SET NORMALLY CLOSED VALVES ONLY

1. Energize solenoid to open valve and lengthen stem as follows:
 - A. When valve is being used to one half of its maximum pressure rating. Open valve, loosen lock nut and gland nut and lengthen stem by turning stem counterclockwise out of the piston shaft from one half to a full turn.
 - B. When used at maximum pressure rating, more spring force is required to keep valve from leaking. Set valve as follows:

Loosen stem lock nut and packing nut. Because spring force is essentially linear with spring compression, 20,000 psi or 60,000 psi NC valves operating between one half of maximum pressure rating and full pressure rating should have the stem extended TWO full turns (counterclockwise) for each additional 10% increase in working pressure over 50%. For example: at 60% use 2 turns; at 70% use 4 turns, etc.

For 100,000 psi NC valves, the stem should be extended 1½ turns for each 10% over the 50% maximum working pressure (i.e., at 60% use 1½ turns; for 70% use 3 turns, etc). This setting will result in lower spring fatigue rate. Typical settings at maximum rated pressure are:

- **For 20,000 psi NC Valves at maximum pressure rating** – from point of initial valve seat contact, open the valve and extend the stem out of the piston shaft by turning counterclockwise 9½ full turns.

- **For 60,000 psi NC Valves at maximum pressure rating** – from point of initial valve seat contact, open the valve and extend the stem out of the piston shaft by turning the valve stem counterclockwise 10 full turns.

- **For 100,000 psi NC Valves at maximum pressure rating** - from point of initial valve seat contact, open the valve and extend the stem out of the piston shaft by turning counterclockwise 7½ turns.

2. Tighten stem lock nut and packing gland nut to torque specified in paragraph before testing or operating.

NOTE

Even though the stem travel between the open and closed positions may seem inadequate by using the actuator piston only, the added thrust due to line pressure on the stem will provide a full port area opening.

3. Test valve for leaks. If leakage is encountered, disassemble the valve and inspect the valve seat and stem for damage. Refer to Maintenance section for disassembly procedures.

III MAINTENANCE

REPLACEMENT OF VALVE STEM, SEAT, OR PACKING

1. Remove pressure tubing inlet and discharge connections from the valve.
2. Loosen valve-stem lock nut and packing gland nut.
3. Remove the four bolts and spacer stilts from valve body.
4. Unscrew valve stem from air operated piston shaft.
5. Remove stem and/or packing from valve as follows:

20,000 PSI VALVES

- (1) Remove packing nut.
- (2) Pull them from the valve. The 20,000 psi valve stem has a button tip which enables packing and picking followers to be removed by pulling the stem from the valve.
- (3) Replace appropriate stem and/or packing.
- (4) As the valve is reassembled, lubricate the following interfaces with appropriate lubrication.
 - Between valve stem and packing nut.
 - Threads between packing nut and valve body.
 - Threads between removable seat nut and valve body.
- (5) Tighten packing nut and tubing nuts to the following torque values.
 - Seat nut to about 200 ft-lbs.
 - Packing nut to about 50 ft-lbs.
 - Tubing gland nut, 9/16 inch, about 45 ft-lbs.
 - Tubing gland nut, 3/8 inch, about 28 ft-lbs.
 - Tubing gland nut, 1/4 inch, about 15 ft-lbs.

60,000 PSI VALVES

- (1) Remove the packing nut.
- (2) Pull stem out from valve. Stems of 60,000 psi valves have needle thread stems that are easily removed.
- (3) Remove seat nut, removable valve seat and thrust washer.
- (4) Tap the packing out (either direction) with a soft 1/4 inch diameter metal bar.
- (5) Replace appropriate stem and/or packing.
- (6) As the valve is reassembled, lubricate the following interfaces with appropriate lubrication.
 - Between valve stem and packing nut.
 - Threads between packing nut and valve body.
 - Threads between removable seat nut and valve body.
- (7) Tighten packing nut and tubing gland nuts to the following torque values:
 - Valve seat nut to about 200 ft-lbs.
 - Packing nut to about 50 ft-lbs.
 - Tubing gland nut, 9/16 inch, about 45 ft-lbs.
 - Tubing gland nut, 3/8 inch, about 28 ft-lbs.
 - Tubing gland nut, 1/4 inch, about 15 ft-lbs.

100,000 PSI VALVES

- (1) Remove the packing nut, thrust washer, and the needle-point stem.
- (2) Remove the seat nut, lens ring, and removable valve seat from the other end of the valve body.
- (3) Tap packing out with a soft metal rod, approximately 7/32 inch in diameter.
- (4) Replace packing and/or stem.
- (5) As the valve is re-assembled, lubricate the following interfaces with appropriate lubrication.
 - Between valve stem and packing nut.
 - Threads between packing nut and valve body.
 - Threads between removable seat nut and valve body.
- (6) Tighten nuts to the following torque values:
 - Seat retainer nut to about 200 ft-lbs.
 - Packing nut to about 50 ft-lbs.
 - Tubing gland nut, 9/16 inch, about 75 ft-lbs.
 - Tubing gland nut, 1/4 inch, about 15 ft-lbs.

SPARE PARTS (REFER TO ASSEMBLY DRAWINGS)

| | | | |
|------------------------------------|----------------------------------|--------------------------------|------------------------------------|
| | 44-19730, -LS 44-19790, -LS | 44-19731, -LS 44-19791, -LS | 44-19749-1, -LS 44-19799-1, -LS |
| Stem | 56047000300 | 52085004400 | P1624000700 |
| Packing, Standard | 44-11471 | 44-13990 | 44-19213 |
| Packing (temp. up to 1000°F) | P1620001700 | P1620027600 | |
| Seat | 56046006200 | 52085012700 | 63171001100 |
| Solenoid Valve Thread Lubricant | P0215090600 (Lubriplate 130A) | | |

OXYGEN SERVICE

| | | | |
|------------------------------------|-------------------------------|--|--|
| | 44-19730OX 44-19790OX | | |
| Stem – Stellite 6B | 56046003000 | | |
| Packing, Standard | 44-11471 | | |
| Seat – Stellite 25 | 56046003300 | | |
| Solenoid Valve Thread Lubricant | P0215090600 Krytox GPL 206 | | |