

# OPERATING AND MAINTENANCE MANUAL

## Series 2023A No-Freeze Valve



Series 2023A

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### 1.0 INTRODUCTION

#### CAUTION!

The instruction provided in this manual should be reviewed thoroughly and understood prior to installing, operating or repairing this equipment. All **CAUTION** and **WARNING** notes must be strictly observed to prevent personal injury or equipment damage.

#### 1.1 Scope

This instruction manual includes installation, operation and maintenance information for the Norriseal Series 2023 No-Freeze Valves.

All Norriseal valves come with spring-diaphragm pneumatic actuators that are either reverse-acting (fail-closed) or direct-acting (fail-open). Both are available in No. 9 (35 sq. in.) and No. 12 (70 sq. in.).

#### 1.2 Application

The Series 2023A No-Freeze Valve is specially designed as a high-pressure reverse seated liquid level control valve for separators and other process valve applications. The body screws directly into the vessel connection. This places the inner valve inside the vessel which allows any warm fluid present to slow the freezing process inside the valve body.

The series 2023A is equipped standard with a No. 9 Non-Adjustable spring diaphragm pneumatic actuator.

#### WARNING!

*Before disassembly or maintenance, all pressures in this device must be relieved. Failure to relieve pressures may result in personal injury or device damage. The resulting uncontrolled venting or spilling of line fluids may also cause personal injury, loss of process control or environmental contamination.*

#### 1.3 Valve Identification

The nameplate attached to the upper diaphragm housing of each valve contains information specific to each valve assembly.

When servicing your valves always use genuine Norriseal replacement parts. Refer to the serial and model numbers on the nameplate when ordering those parts.

#### WARNING!

*Maximum allowable pressures for the valve and actuator, and the maximum allowable pressure at the maximum temperature for the valve are shown on the nameplate fastened to the actuator. If supply pressure to the valve is capable of exceeding these limits, install relief valves or other over-pressure protection devices in the pressure lines.*

#### CAUTION!

*When ordered, the valve configuration and construction materials were selected to meet specific pressure, temperature, pressure drop and fluid conditions. Since some body/ trim material combinations are limited to their pressure drop and temperature ranges, do not subject the valve to any other conditions without first contacting the Norriseal sales office or your sales representative.*

### 2.0 Valve Installation and Start-Up

1. Before installing the valve, inspect it for shipment damage and for anything that may have collected during packing and shipment. Remove protectors from body end connections.
2. Blow out all pipelines to remove pipe scale, chips, welding, slag and other foreign materials. Threaded and gasketed surfaces should also be free of any foreign materials.
3. Install the valve using good piping practice. Use PTFE tape or pipe thread sealant on external pipe threads.
4. The valve body is rated ANSI 900 class. Keep the system at a working pressure that cannot exceed those marked on the nameplate.
5. Where piping is insulated, **DO NOT** insulate the valve actuator housing.
6. Connect the supply pressure to the actuator. Refer to the nameplate for the maximum supply pressure. Check for proper valve operation by cycling the actuator several times and observing stem movement.

#### WARNING!

*Do not exceed the maximum supply pressure specified on the valve nameplate. Under no circumstances should the actuator supply pressure ever exceed 55 psig.*

**TABLE 1 MAINTENANCE SCHEDULE \***

ITEM	INSPECTION SCHEDULE
Valve Trim (Seat, Plug)	Inspect every 6 months, under normal service conditions (low-pressure drop and no sand or abrasives in fluid). Or inspect every 2 months, under service conditions, such as high-pressure drop, corrosion, or fluid with sand.
Stem Packing	Inspect Packing at least once a year.
Actuator	Inspect Diaphragm, Spring and Stem once a year.
Body	The body should last many years under normal conditions. However, under severe conditions of corrosion or erosion from sand in the flowing fluid, high-pressure drops, or high-fluid velocity, body life may be greatly reduced. Inspect the body each time the bonnet is removed.
Bonnet	Inspect Bonnet once a year or whenever trim inspection is performed.
Seals	Inspect O-rings each time valve is disassembled.

\*Under certain operating conditions, this suggested maintenance schedule will not be adequate and shorter time intervals may be required.

### 3.0 Valve Maintenance

#### **WARNING!**

Before making any repairs to your valve follow the following four steps:

1. Isolate the valve from the process/ system.
2. Shut off all supply lines to the actuator.
3. Release the process pressure (both upstream and downstream).
4. Vent the actuator supply pressure.

Valve parts are subject to normal wear and must be inspected and replaced as necessary with the frequency of inspection and maintenance depending upon the severity of service conditions. The following section describes the procedures for disassembling and reassembling the valve for normal maintenance and troubleshooting. All maintenance operations may be performed while

the valve body remains in line *as long as the line is not in service and is isolated from active process by block valves*. Table 2 provides assistance in troubleshooting valve body port orientation. Refer to the parts list drawing for valve configuration.

### 3.1 Actuator Disassembly

1. Vent and disconnect the supply pressure from the actuator.
2. Remove the nuts and screws, except the two extra-long nuts and screws, from around the diaphragm housing flange.

#### **WARNING!**

*There is spring tension pressure on the upper diaphragm housing.*

Slowly loosen the nuts on the extra-long screws equally to relieve the spring tension. Remove the upper diaphragm housing and springs.

3. Remove the nuts from the top of the stem.
4. Remove the lock washer, spring retainer, bearing washers, O-ring, diaphragm plate and diaphragm.
5. Remove the spring.
6. Unthread the retainer from the body.

### 3.2 Trim Replacement

1. Remove the nut from the stem.
2. Remove the plug from the stem.
3. Remove the retaining ring at the end of the body.
4. Remove the seat from the body.

### 3.3 Inspection and Replacement

1. Visually inspect the valve plug and seat for signs of erosion, pitting, scratches and damage from corrosion. A magnifying glass can be helpful in determining the type and severity of damage that may be present.
2. Fit the plug and the seat together. While looking into the orifice from the bottom of the seat, hold the trim set in front of a bright light. If any light can be seen between the plug and seat contact surfaces than this is an indication of poor fit condition.
3. Determine the magnitude of any wear or corrosion damage. Many times the plug and seat contact surfaces can be fully restored by re-lapping. Replace any parts that are beyond restoration.

**TABLE 2 — TROUBLE DIAGNOSIS**

<b>Symptom</b>	<b>Probable Cause</b>	<b>How to Verify</b>
The valve leaks when it is in the closed position.	Something is under the plug or the valve plug and seat are worn.	Remove the valve from the vessel, open the valve with air pressure, and inspect the seat and plug. By visual inspection you can see whether the plug and seat are worn.
The diaphragm housing leaks air from the breather plug.	The diaphragm has worn out or its plates are loose and need tightening.	Remove the pressure from the diaphragm housing and disassemble the top. Replace the diaphragm. If the nuts holding the diaphragm plates are loose, tighten them.
The valve, which is typically closed, leaks but the seat and plug, and the spring are OK. Nothing is under the plug.	The pressure drop is too great across the valve.	Check the valve pressure drop table for limits on the pressure drop.
The valve will not open.	The pressure drop across the valve seat is too great.	Increase the actuating air pressure to a maximum of 55 psi. If this does not open the valve, then the valve orifice is too big. A smaller size plug is needed. Consult the pressure drop table.

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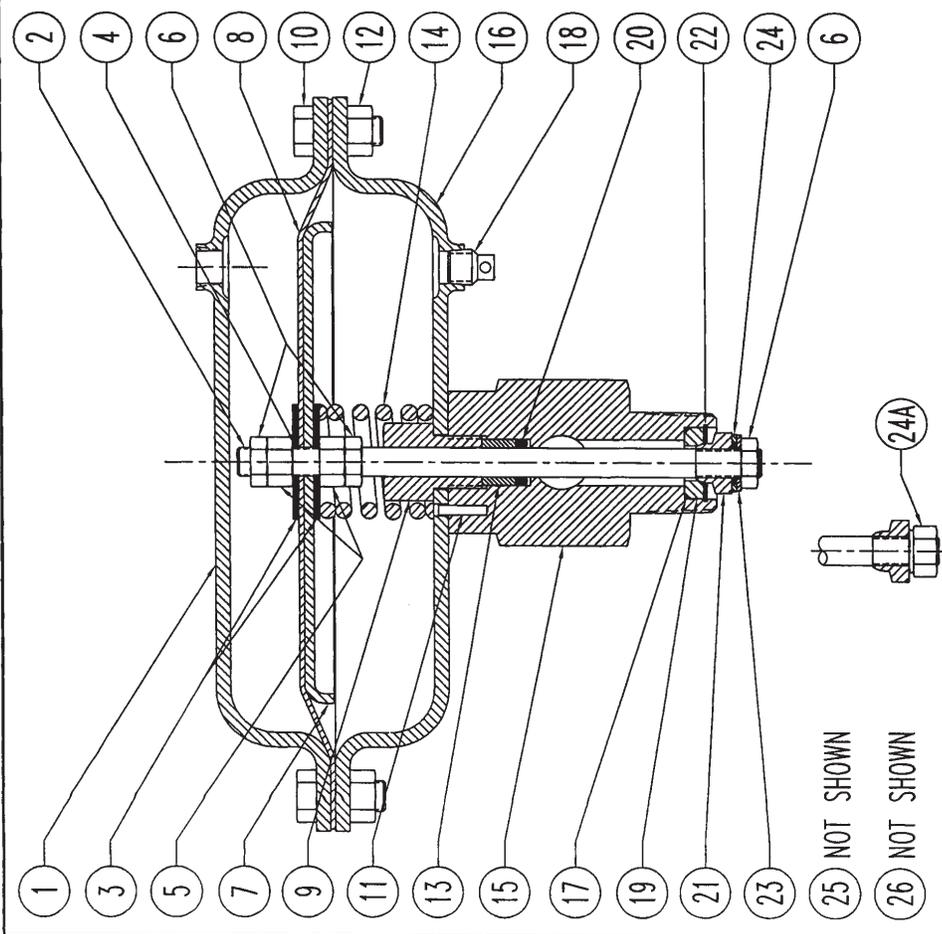
## Series 2023A No-Freeze Valve

### 4.0 Parts List

ITEM	DESCRIPTION	MATERIAL	STOCK NUMBER	QTY.
1	HOUSING UPPER LEFT IS	CARBON STEEL PAINTED	41324 1-200-040	1
2	STEM WAVE .375	303 SSI	41323 1-200-004	1
3	WASHER 1.500 X .375	316 SSI	41699 1-200-146	1
4	O RING OMPARON/WASHER	BRUNN	42508 1-202-016	2
5	NUT HEX REGULAR 3/8-24	WTRN	41504-011	1
6	NUT HEX ANL 3/8-24	CARBON STEEL PLATED	41582-011	2
7	FLATE OMPARON .38 X 1.625	CARBON STEEL PLATED	41582	3
8	OMPARON ACTUATOR FLAT 1/8	CARBON STEEL PLATED	41670 1-222-013	1
9	BEARING O RING/LOWER HOUSING 7/325 STEM	BRUNN/ALUMIN	41618 1-200-037	1
10	SCREEN CAP HEX 3/8-18 X .28	303 SSI	42624 1-202-004	1
11	PN BALL .125 X .625	420 SSI	41610	12
12	NUT HEX REGULAR 3/8-16	CARBON STEEL PLATED	41583	1
13	HOUSING UPPER 7/24 O RING	BRUNN NITRON	41500	1
14	SPRING ACTUATOR BR 1.3 X 1.86 LC	CARBON STEEL K2B	41178 1-225-010	1
15	BODY 2023A ANGLE NPT 220 RP	CARBON STEEL PAINTED	41676 1-222-015	1
16	HOUSING OMPARON LOWER IS	CARBON STEEL PAINTED	42612 1-202-003	1
17	O RING SSI/BODY	BRUNN	42615 1-202-027	1
18	FLUX BREAKER 250 NPT 1-1/2 NPT	CARBON STEEL PLATED	42623 1-202-025	1
19	SEA WAVE	303 SSI	42626-019	1
20	O RING SSI/ROOT	303 SSI	42626-019	1
21	FLUX WAVE	316 SSI	41689 1-200-067	1
22	RING RETURNING	316 SSI	41376 1-202-002	1
23	WASHER FLAT .38	303 SSI	41376 1-202-006	1
24	RING THEORETICAL	17-4 SSI	41376 1-202-019	1
25	NUT HEX SEALING 3/8-24	440C SSI	41364 1-202-011	1
26	FLUX CAPWELL	303 SSI	41363 1-202-004	1
		316 SSI	41369 1-202-008	
		17-4 SSI	41364 1-202-000	
		440C SSI	41365 1-202-013	
		KNWR	41371 1-202-010	
		303 SSI	42593	
		303 SSI	42593	
		CARBON STEEL/NIHRE	42535	
		CARBON STEEL/ALUM	42611	
		CARBON STEEL/ALUM	42608	
		CARBON STEEL PLATED	41327	
		316 SSI	41626 1-200-004	

PARTS LIST 2023A (.50 OR .75) X 1.00 NPT  
W/ NO. 98A REV. ACT.

DATE: 12-01-00  
CHK RELEASE NO: 17470  
DRAWING NO: 1-202-26  
SHEET 1 OF 1



25 NOT SHOWN  
26 NOT SHOWN



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