



MAINTENANCE MANUAL

ORBINOX PNEUMATIC CYLINDER

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1. BEFORE YOU BEGIN

The manual describes the recommended procedures for the maintenance of Orbinox double acting pneumatic cylinders.

Please read thoroughly all the instructions in the manual prior to installation, operation and maintenance and contact an Orbinox representative in case of any questions.

 **Orbinox assumes no responsibility or liability if the valve is not installed in strict accordance to the procedures described in this manual.**

2. HEALTH AND SAFETY PRECAUTIONS

All personnel involved should read and understand all applicable sections of this manual before attempting to install, operate, service, or perform maintenance on any operators. Adhere to any tags, warning labels, or instructions present on the operator. These may provide information more specific and significant regarding the operator than this general manual can.

It is the responsibility of the user to ensure proper safety. Always take necessary precautions and utilize proper personal protective equipment when dealing with compressed air, compressed hydraulic fluid, pinch points, and electricity.

It is necessary to rig and lift valve and operator separately. Service personnel need to ensure the lifting capacity of the crane/hoist/rigging is appropriate for the desired load.

Block the power air supply and depressurize the system before attempting to install or service. Isolate the power air from controls if the operator is supplied with control system.

Caustic gases and fluids may be contained in the operators and valves in most applications. Vent all poisonous or flammable gases and store all liquids in a safe location to prevent personnel injury. Discharge at sonic velocity may occur when venting or releasing pressure; service personnel must utilize proper hearing protection.

 **During installation and /or maintenance of Orbinox's valves and actuators always make sure the valve is fully depressurized, and the conduit is completely drained.**

3. EQUIPMENT DESCRIPTION

ORBINOX standard double acting pneumatic cylinders are specifically designed to suit ORBINOX knife gate valves

- Main features:
 - End caps and barrels up to bore Ø12"/300mm are made of aluminum.
 - Sizes Ø14"/350mm and bigger have barrels in composite material.
 - Piston rod in stainless steel.
 - Air supply can vary from 50psi/3,5bar up to maximum 150psi/10 bar.
- Options:
 - Anodized aluminum.
 - Different clevis dimensions.
 - Internal magnetic kit for optional magnetic limit switches.
 - Single acting (Fail Closed or Fail Open) with spring cartridge available for cylinder bore from Ø5"/125mm up to 10"/250mm cylinders
 - Manual override system (two piston rods).
- Cylinder bore sizes (" /mm) : DN 4"/100mm, 5"/125mm, 6,3"/160mm, 8"/200mm, 10"/250mm
12"/300mm, 14"/350mm and 16"/400mm
- Full description of these cylinders and options can be found in their specific datasheets in www.orbinox.com

4. DISASSEMBLING INSTRUCTIONS

 During installation and /or maintenance of Orbinox's valves and actuators always make sure the valve is fully depressurized, and the conduit is completely drained.

Part numbers description can be found in chapter 8 of this manual

4.1 .DOUBLE ACTING CILINDER

1. Disconnect the air supply from the cylinder and remove all supply lines.
2. Remove the gate guards.
3. Remove the cylinder from the valve. Make sure it is well secured by means of straps or lifting lugs on top before attempting to remove it.
 - Remove piston rod (4) to gate bolts (18,19)
 - Remove the cylinder form the yoke. Small cylinders are directly fixed to the yoke by means of 4 bolts, *fig 1*. Larger cylinders use the tie rods to fix the cylinder to the yoke, *fig 2*. In some cases it is required to use an intermediate plate; *fig 3*.

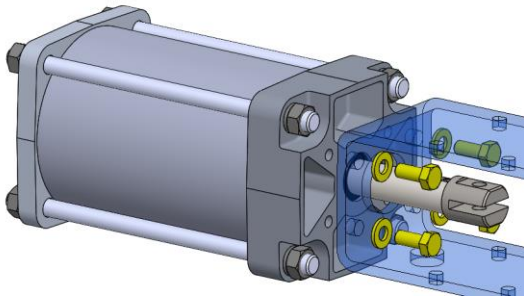


Fig 1.- direct mounting

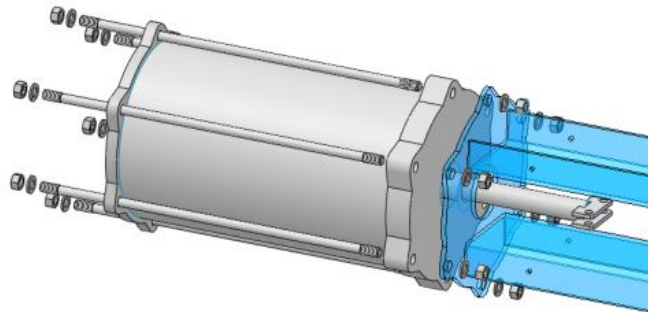


Fig 2.- Mounting with tie rods

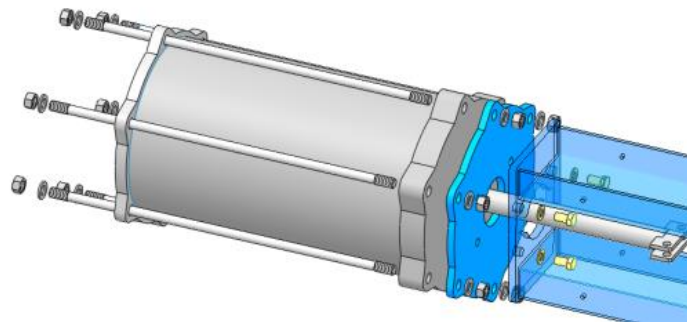
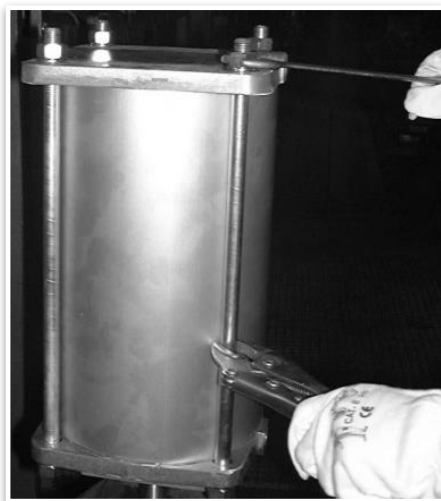
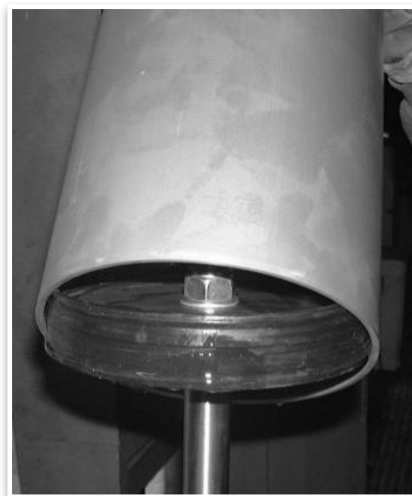
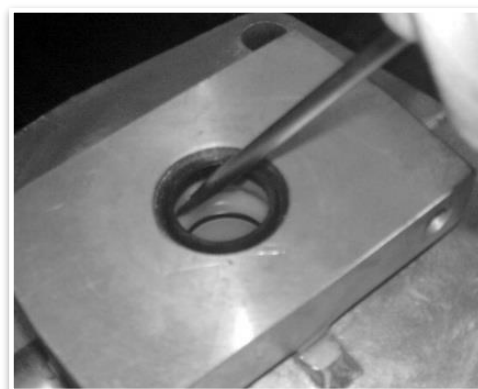


Fig 3.- Mounting with tie rods and intermediate plate

4. Remove any other supports, if any, such as those used to support larger cylinders or horizontal arrangements.
5. Once the cylinder has been removed from the valve, remove the tie rods nuts (17) at the cylinder cap (2).
Fig 4
6. Remove the tie rods nuts (17) at the cylinder head (3).
7. Remove the end cap (2) and head (3).
8. Remove the piston and rod assembly (8, 9, 10, 11 & 4) from the barrel (1). *Fig 5*

*Fig. 4**Fig. 5*

9. Remove circlip DIN 472 (7) at the end head (3) as shown in *fig 6*.
10. Turn the end head around and remove the rod scraper (14) with a screwdriver as shown in *fig 7*.
11. Turn it around again and carefully pull the nylon bush (12) until it comes out.

*Fig. 6**Fig. 7*

4.2. SINGLE ACTING CYLINDER

⚠ DO NOT DISASSEMBLE any single acting cylinder. Spring loaded inside the cylinder. There is risk of serious injury. Should you require servicing it, please contact Orbinox for technical assistance.

5. ASSEMBLING INSTRUCTIONS

Part numbers description can be found in chapter 8 of this manual

1. Before assembling make sure all wear parts are in good condition. These wear parts are:
 - Seals (5, 6, 8, 13, 14)
 - Piston seal (9)
2. Check the internal surface of the cylinder barrel (1) and the external surface of the piston rod (4). The condition of these surfaces will determine the life of the seals.
3. Once all pieces are cleaned and in good condition proceed with assembly following the disassembly instructions in reverse.
4. Use a Synthetic lubricating grease, based on silicone fluids (consistency, NLGI Grade: 2), during assembly to lubricate the seals and bush (12) mounting, and to coat the piston rod (4) and internal surface of the cylinder barrel (1).

6. SPARE PARTS KIT

It is absolutely essential that, in order to guarantee the highest level of safety and performance, only original ORBINOX spare parts are used. ORBINOX will not be responsible of valve malfunction or failure of any non-ORBINOX or non-approved parts.

The cylinder spare kit includes:

- Seals (5, 6, 8, 13, 14)
- Piston seal (9)

7. STORAGE

Orbinox cylinders are normally delivered already installed on Orbinox knife gate valves.

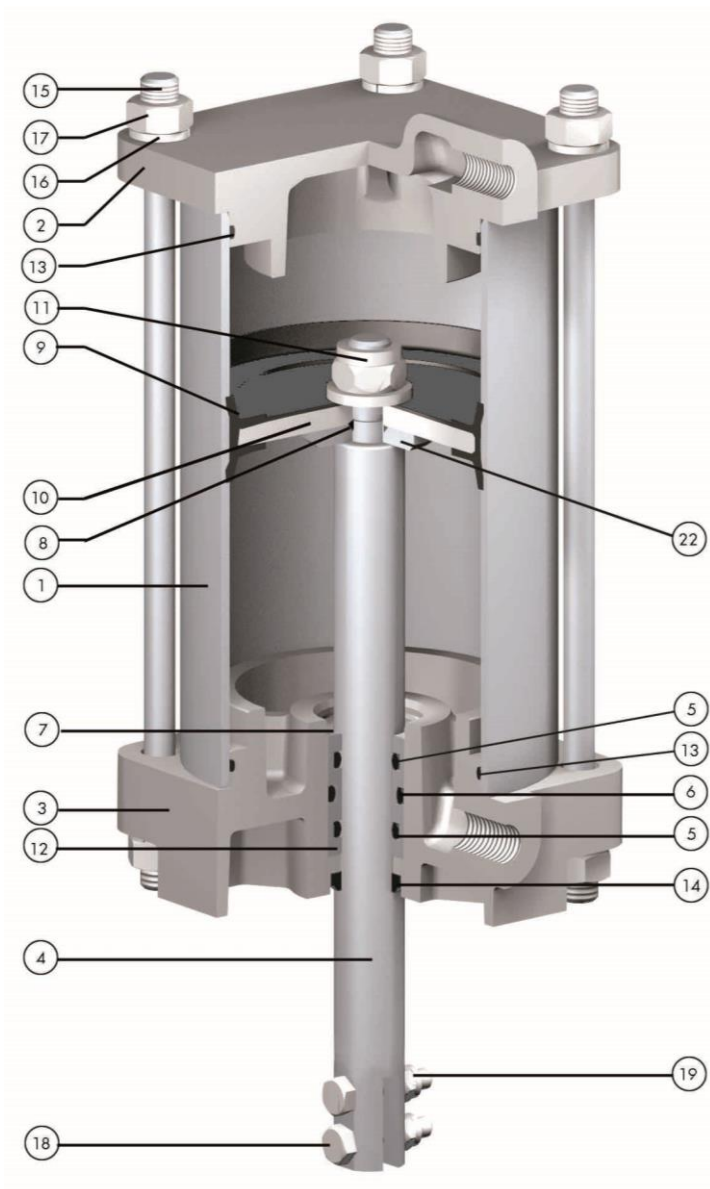
- For long storage periods keep the valves indoors in a safe and dry place and protect it from any impact and or vibrations.
- Storing temperatures: -10°C to +40°C
- Valves must be stored in either full open or full closed position. Exception: slurry valves shall be stored always in the open position.

8. ENVIRONMENTAL CONSIDERATIONS

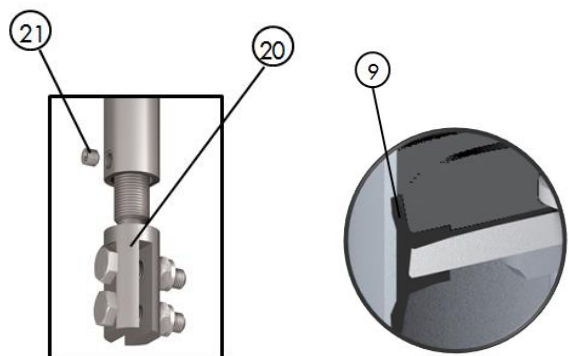
- The packaging is made from environmentally friendly materials. Dispose of the packaging through the available recycling channels
- The valve is designed and manufactured with materials that can be recycled by specialised recycling firms. Once the life of the product is expired, you have to consider a proper disposal of the product in order to prevent any negative impact on the environment and allows for the recycling of valuable commodities
- Please follow the local environmental rules in your country for proper disposal

9. PARTS LIST AND DRAWINGS

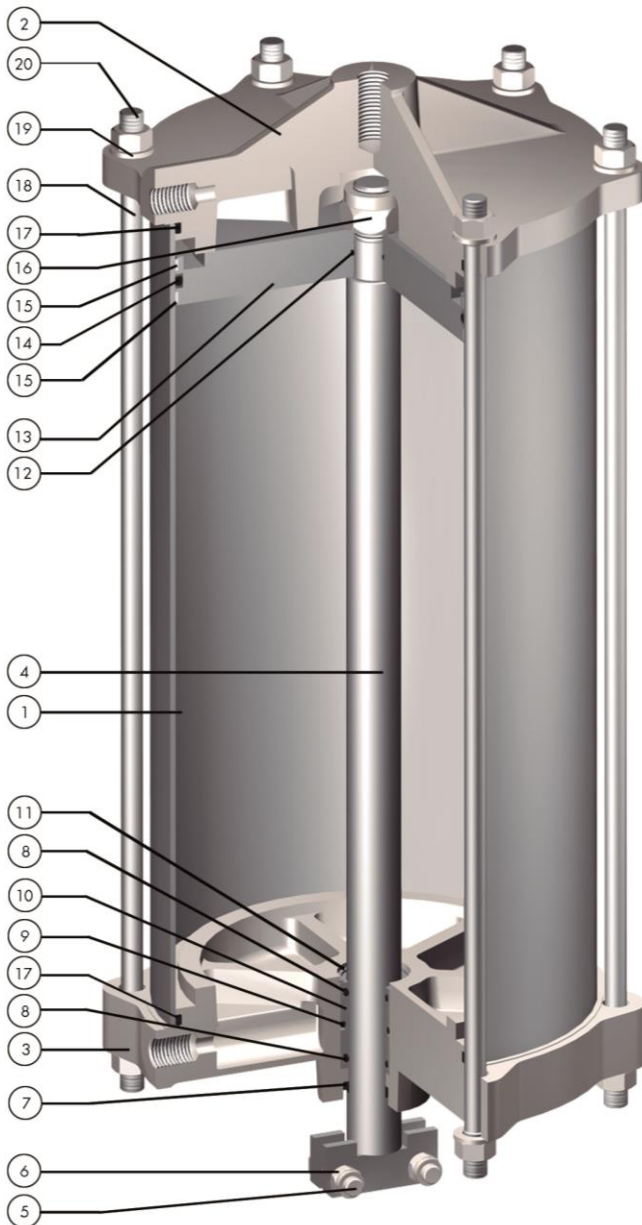
9.1. DOUBLE ACTING CYLINDER Ø 4"/100 to 12"/300mm



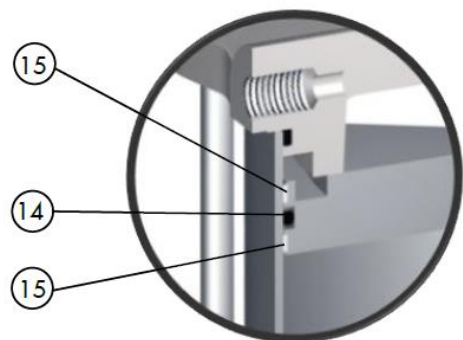
1	Barrel	Aluminum
2	Cap	Aluminum
3	Head	Aluminum
4	Piston Rod	AISI - 304
5	O-Ring	Nitrile
6	O-Ring	Nitrile
7	Circlip DIN472	Steel
8	O-Ring	Nitrile
9	Piston seal	Nitrile
10	Piston	Carbon Steel
11	Self-locking nut	Carbon Steel
12	Bushing	Nylon
13	O-Ring	Nitrile
14	Scraper	Steel + Nitrile
15	Tie rods	Carbon Steel - Zn plated
16	Washer	Carbon Steel - Zn plated
17	Nut	Carbon Steel - Zn plated
18	Bolt	AISI - 304
19	Self-locking nut	AISI - 304
20	Clevis (optional)	AISI - 304
21	Lock pin (optional)	AISI - 304
22	Washer	Carbon Steel - Zn plated



9.2. DOUBLE ACTING CYLINDER Ø14"/350 to 16"/400mm


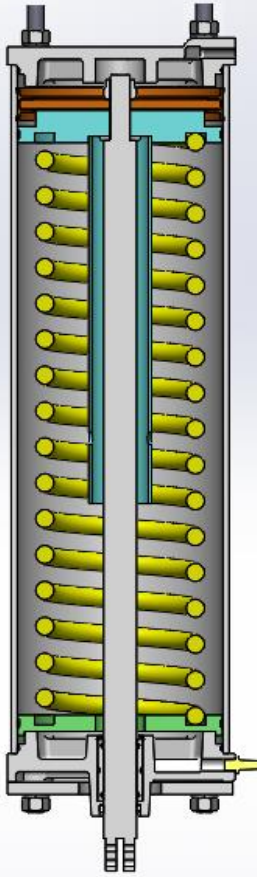
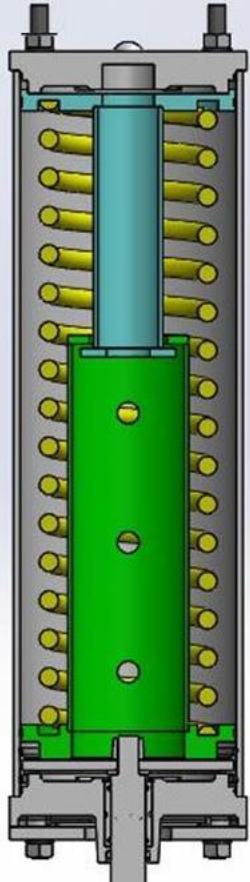


1	Barrel	Composite
2	Cap	Aluminium
3	Head	Aluminium
4	Piston Rod	AISI - 304
5	Bolt	AISI - 304
6	Self-locking nut	AISI - 304
7	Scraper	Carbon Steel + Nitrile
8	O-ring	Nitrile
9	O-ring	Nitrile
10	Bushing	Nylon
11	Circlip DIN472	Steel
12	O-ring	Nitrile
13	Piston	Aluminium
14	Seal kit	Nitrile
15	Piston slider	PTFE
16	Self-locking nut	Carbon Steel
17	O-ring	Nitrile
18	Tie rods	Carbon Steel - Zn plated
19	Washer	Carbon Steel - Zn plated
20	Nut	Carbon Steel - Zn plated



9.3. SINGLE ACTING CYLINDER Ø5"/125 to 10"/250mm

Orbinox has 3 different single acting cylinder designs available:

Type 1	Type 2	Type 3
		
Only available in DN100 barrel	Basic design	Cartridge Design

⚠ DO NOT DISASSEMBLE any single acting cylinder. Spring loaded inside the cylinder. There is risk of serious injury. Should you require service, please contact Orbinox for technical assistance.