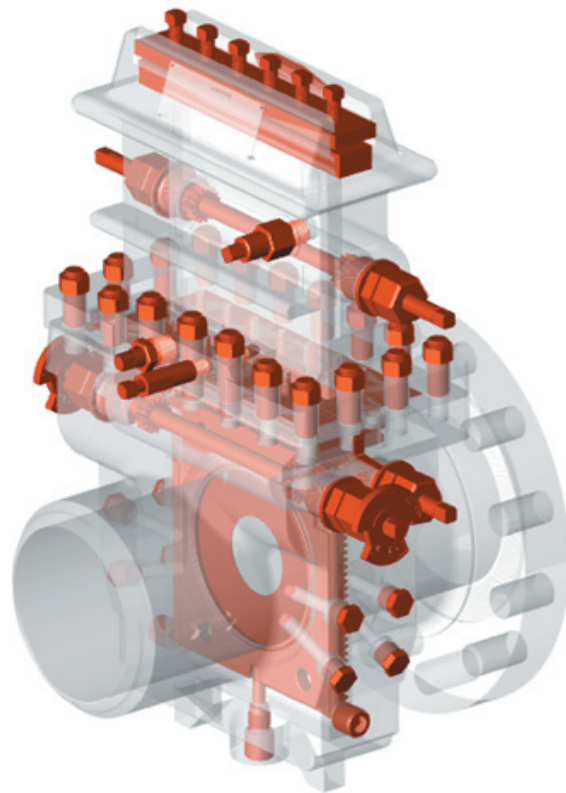




# AXIS DUAL CHAMBER FITTING USER MANUAL

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**MANUFACTURING EXCELLENCE  
IN GAS AND PETROCHEMICAL MEASUREMENT**

**RJ MACHINE CO.**





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## SAFETY

It is the owner's and/or user's responsibility to follow all the safety and equipment limits recommended in this manual. Failure to do so may result in serious injury or death.

**WARNING:** Axis Dual Chamber fittings are extremely heavy devices. Operating staff should be trained and understand the dangers of working with fluids at elevated pressures. Proper PPE (personal protective equipment) and lifting practices should be followed.

This User Manual includes instructions and procedures for the safe installation, operation and maintenance of Axis Dual Chamber Fittings. Users and operators of this equipment should understand and follow the information in this manual.

## Product description:

The Axis Dual Chamber Orifice Fitting by RJ Machine Co. is designed for accurate orifice plate flow measurement and the easy and safe removal and reinstallation of the orifice plate under flowing conditions.

The Axis DC fitting will accurately position the orifice plate in the flow line according to the dimensional requirements of API 14.3, Part 2. The fitting and orifice plate will be part of a larger flow measurement system including a meter tube, flow conditioner, manifold and instrumentation package. Once installed and operating properly, the system will provide custody transfer level accuracy of natural gas.

## Specifications and options:

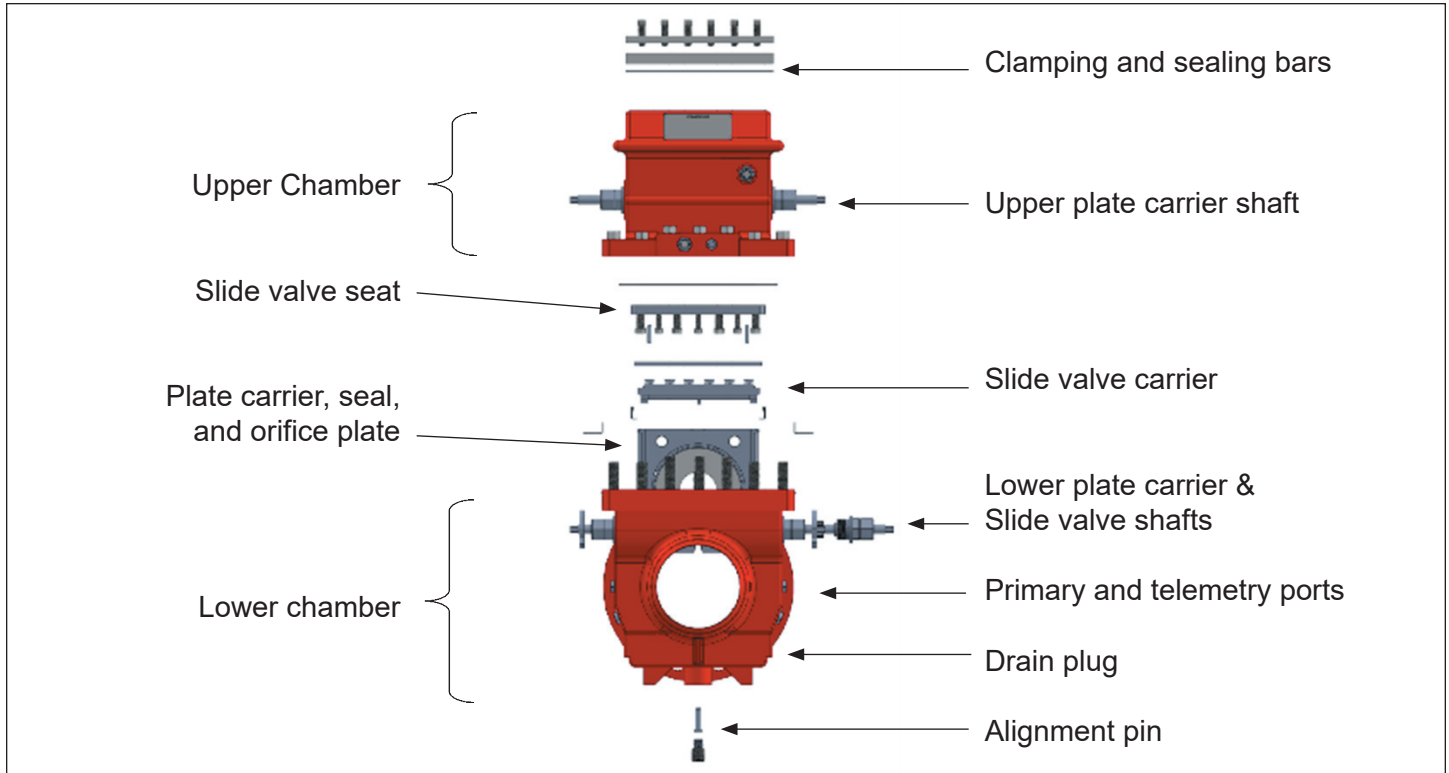
Line sizes .....	2" – 8" NPS
Pipe schedule .....	Sch 40 and Sch 80
Pressure class .....	600# ANSI
Temperature limits .....	-20 to 200 °F
End connections .....	Flange x Weldneck
Casting material .....	A216 WCB
Trim material .....	Parts conform to NACE MR0175
Pressure connections .....	½" NPT, Primary and telemetry taps on each side
Seal ring material .....	NBR, HNBR, FKM, PTFE
Operating shafts .....	Double ended with PTFE packing
Design .....	According to API 14.3 Part 2

\* Please consult the factory for other options



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## Major components:



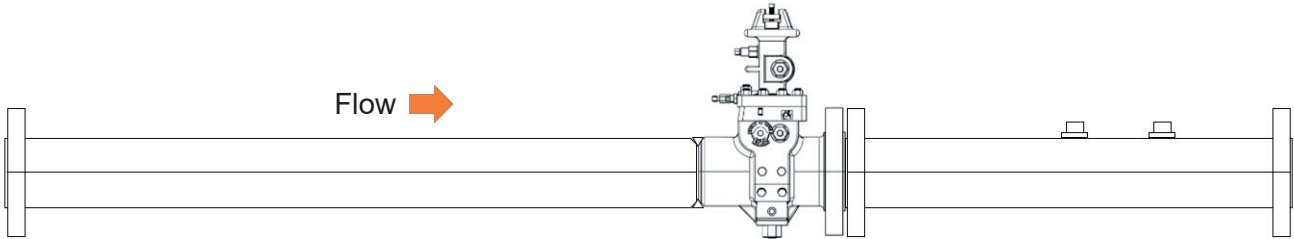
## Installation:

All Dual Axis fittings are hydrostatic pressure tested before leaving the factory. Prior to commissioning, ensure all pressure-containing components are tight and have not loosened during shipment.

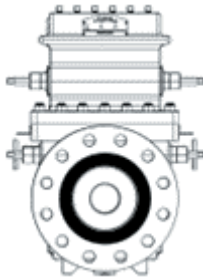


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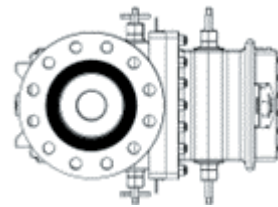
Installation horizontally to the ground is always recommended. Support pipe and fitting as required.



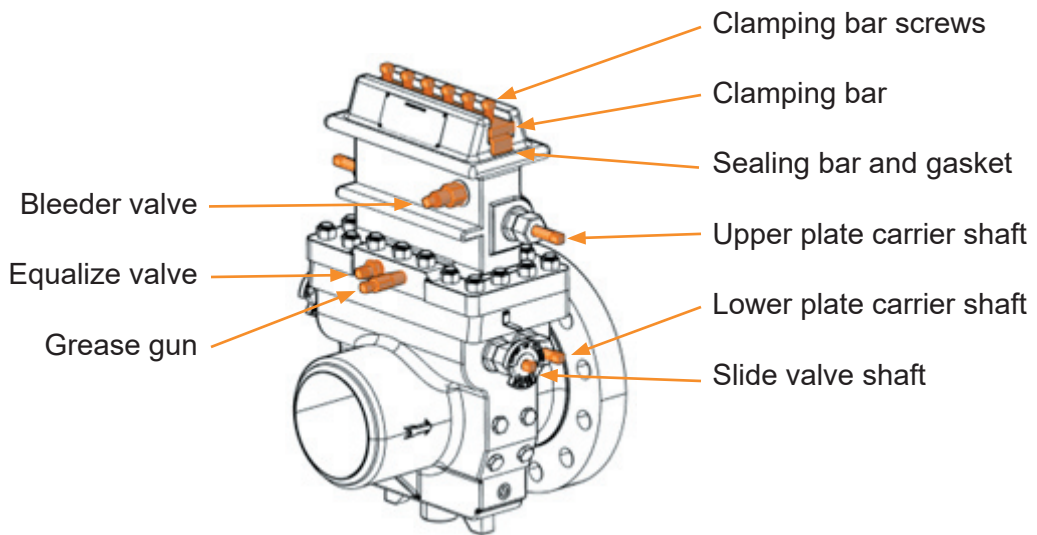
“Up” orientation  
is recommended when possible



“Rotated” orientation  
is acceptable to allow taps-up orientation when  
needed  
(either 90° CW or CCW)



## Operating components:

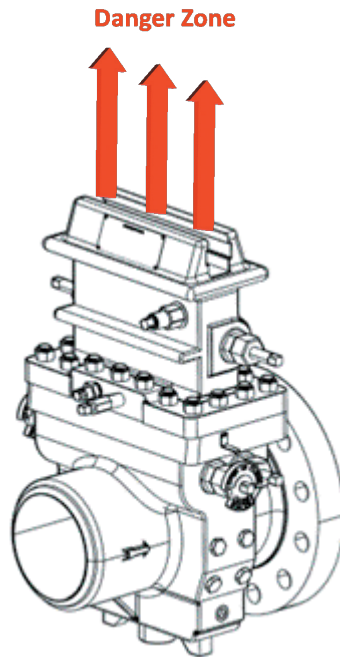




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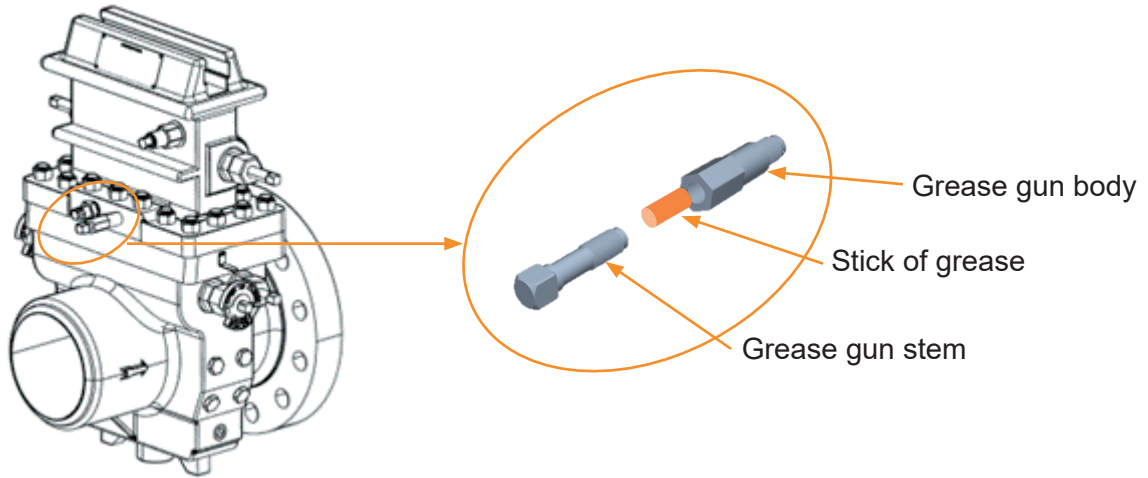
## Retracting an orifice plate:

**Safety:** Never place any part of your body over the top of the fitting (Danger Zone) during plate installation or retraction.



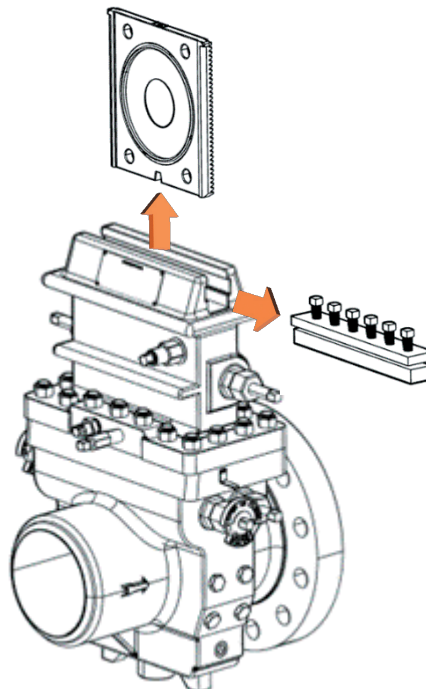
**Note:** With double-ended operating shafts, the user will need to determine the rotational direction for proper operation.

1. Ensure clamping bar screws are tight and the bleeder valve is closed.
2. Open the equalizer valve to equalize pressure between the lower and upper chambers.
3. Rotate the slide valve shaft to open the slide valve. This opens a slot for passage of the plate carrier assembly into the upper chamber.
4. Rotate the lower plate carrier operating shaft to move the plate carrier assembly towards the upper chamber. Continue rotating until the upper operating shaft turns slightly, indicating that the plate carrier is engaged with the upper operating shaft.
5. Rotate the upper operating shaft until the top of plate carrier assembly stops against the bottom of the sealing bar.
6. Rotate the slide valve shaft to close the slide valve.
7. Close the equalizer valve.
8. Open the bleeder valve.
9. Insert one stick of grease into the grease gun.
10. Slowly turn the grease gun stem by hand to inject grease into the slide valve assembly.



**Warning:** Rotating the grease gun stem too fast can damage internal parts of the fitting. Use only the supplied operating wrench to rotate the stem.

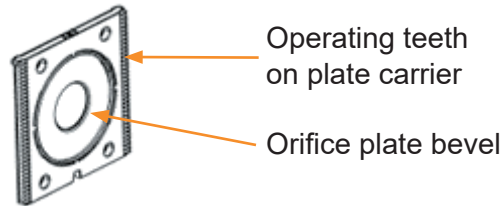
11. Repeat steps 9 and 10 until there is no gas leakage from the bleeder valve. Larger fittings will require more grease. With the bleeder valve open and there is no evidence of leakage, the upper chamber is now depressurized.
12. Loosen the clamping bar screws. Leave the clamping bar in place for now.
13. Rotate the upper plate carrier shaft to slightly move the sealing bar. This will help loosen the sealing bar if it has adhered to the upper chamber surface.
14. Remove the clamping bar, sealing bar, and sealing bar gasket.
15. Rotate the upper plate carrier shaft until the plate carrier assembly is reachable.
16. Remove the plate carrier assembly by hand



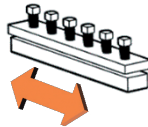


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**Note:** Observe the orientation of the orifice plate bevel on removal of the plate carrier assembly. The bevel should be facing downstream, on the same side as the operating teeth of the plate carrier. An orifice installed with the bevel facing upstream will have a significant negative effect on the measurement signal.



Also observe the orientation of the clamping and sealing bars. It is best practice to reinstall these bars in the same orientation as they were removed.



**Safety:** The greased seal of the slide valve is a temporary seal. If the plate will be removed for 15 minutes or more, replace the sealing bar gasket, sealing bar and clamping bar and tighten to seal. Close the bleeder and equalize valves. When the plate carrier assembly is ready for re-installation, follow steps 7-12 above to ensure the upper chamber is depressurized.

17. Remove the plate by pushing the orifice plate out from the downstream side of the plate carrier.
18. Remove the seal ring and inspect both orifice plate and seal ring.

## Plate and seal ring inspection:

Inspect the seal ring for:

1. Damage including nicks, cuts, or gouges.
2. Swelling or any change in dimensions.

If any damage or swelling exists, replace the seal ring.

Inspect the orifice plate:

**Safety:** An orifice sharp edge must be handled carefully to avoid cuts. Use proper PPE.

The orifice should be sharp, flat, and clean.

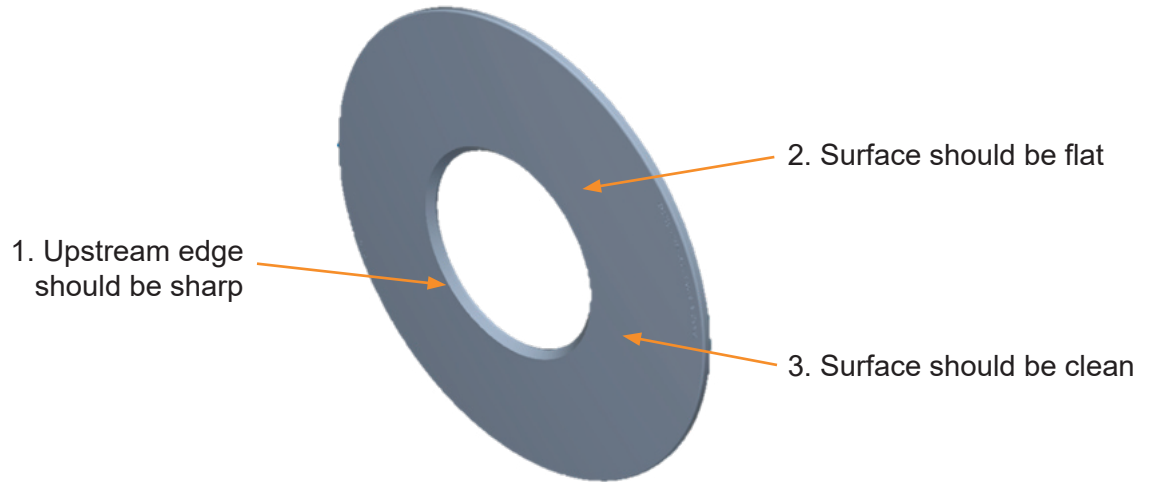
1. Sharp: Inspect for damage to the upstream sharp edge including nicks or rounding of the edge. The edge should appear sharp without any reflection of light.
2. Flat: Inspect for change in flatness by laying the orifice plate on a flat surface and placing a known straight edge across its surface. No light should be seen between the plate and the straight edge.
3. Clean: Remove accumulation on the surface of oil, grease, dirt, sand or any other foreign substance.



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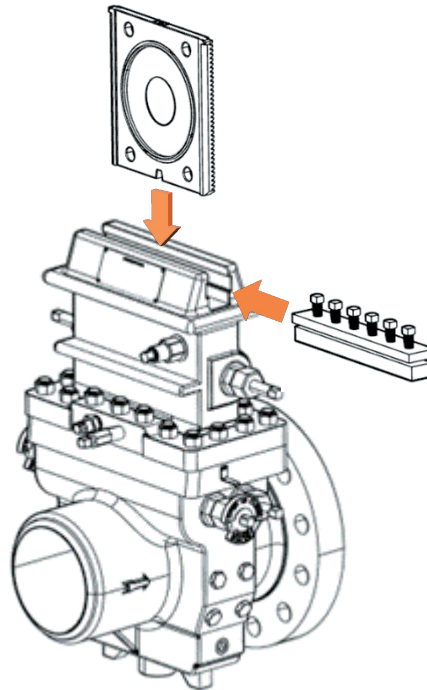
If the sharp edge is damaged or the surface flatness has changed, replace the plate.

If the plate surface is dirty or contaminated, carefully clean the plate. If the plate shows damage after cleaning, replace the plate.



## Installing an orifice plate:

1. Place the orifice plate inside the seal ring.
2. Place the orifice plate with the seal ring inside the plate carrier. Make sure the bevel of the orifice plate (if any) is facing the same direction as the operating teeth on the plate carrier.
3. Close the bleeder valve
4. Insert the plate carrier assembly into the upper chamber through the top slot, making sure the plate carrier is oriented correctly with the alignment notch down.



5. Make sure the plate carrier is aligned evenly with the upper chamber.

**Note:** A misaligned plate carrier assembly may get lodged inside the fitting and require disassembly of the fitting to remove.

**Hint:** Lower the plate carrier until one side is even with the top surface of the upper chamber. Ensure both sides are even with the top surface. If the plate carrier assembly is uneven with the top surface, remove and realign the assembly.

6. Once the plate carrier assembly is properly aligned, rotate the upper plate carrier shaft to slowly lower the assembly until the top of the plate carrier is below sealing bar surface.
7. Using a new sealing bar gasket, reinstall the sealing bar and clamping bar in the same orientation as when it was removed, if possible. Tighten the clamping bar screws.
8. Make sure the bleeder valve is closed.



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9. Open the equalizer valve.
10. Rotate the slide valve shaft to open the slide valve.
11. Rotate the upper plate carrier shaft to lower the plate carrier assembly down into the lower chamber. Continue until the plate carrier engages with the lower plate carrier shaft.
12. Rotate the lower plate carrier shaft until the plate carrier is fully seated in the fitting.
13. Rotate the slide valve shaft to close the slide valve.
14. Close the equalizer valve.

## Lubricant information:

Each Axis DC fitting comes pre-loaded with lubricant. On commissioning and with each plate change operation, more lubricant/grease should be added. The user/operator should choose the best lubricant for their service application. RJ Machine uses a grease designed for sour gas service (with H<sub>2</sub>S) but can be used in sweet gas service as well. The specifications for our standard grease are:

Dropping Point .....	Non-Dropping
Base Oil .....	Synthetic
Shelf Life .....	5-Years (Controlled Environment)
Oxidation Stability .....	Good
Temperature Range .....	-20 Deg. F. to +400 Deg. F.
Penetration (Bulk) .....	NLGI Grade #3 (ASTM D-217 = 220-250)
(Stick) .....	NLGI Grade # 6 (ASTM D-217 = 85-115)
Thickener .....	Inorganic
Color .....	Yellow
Additives .....	Hydrogen Sulfide Suppressor / Oxidation & Corrosion Inhibitor

Non Toxic-Hazardous Material

Flash Point Above 400 Deg. F.

Non-Flammable

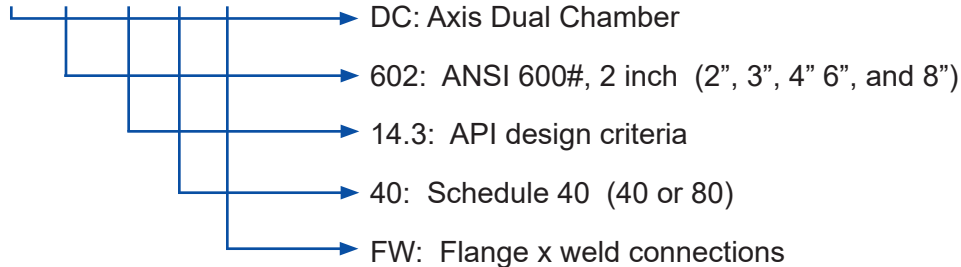
Manufactured in U.S.A. / Country of Origin – U.S.A



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## Fitting Ordering information:

**DC-602-14.3-40-FW**



Standard fitting model numbers:

	2"	3"	4"	6"	8"
Sch40	DC-602-14.3-40-FW	DC-603-14.3-40-FW	DC-604-14.3-40-FW	DC-606-14.3-40-FW	DC-608-14.3-40-FW
Sch80	DC-602-14.3-80-FW	DC-603-14.3-80-FW	DC-604-14.3-80-FW	DC-606-14.3-80-FW	DC-608-14.3-80-FW

## Recommended parts:

Recommended on hand parts during a plate change:

1. Lubricant
2. Sealing bar gasket
3. Seal ring
4. Orifice plate

Recommended spare parts for one-year of operation:

1. Lubricant sticks
2. Sealing bar gaskets
3. Clamping bar screws
4. Body/top gaskets
5. PTFE operating shaft packing

Complete refurbishment kits are available for the complete rebuilding of an orifice fitting. Repair kits are available up to 24" sizes. WSN kits come with body/top studs and nuts. 14.3 kits include plate carriers designed for notched seal rings. Non-14.3 kits are the 1985 design without notches. Kits do not include seal rings.

	2"	3"	4"	6"	8"
Carbon steel 14.3	RK14.3-2CS-WSN RK14.3-2CS	RK14.3-3CS-WSN RK14.3-2CS	RK14.3-4CS-WSN RK14.3-4CS	RK14.3-6CS-WSN RK14.3-6CS	RK14.3-8CS-WSN RK14.3-8CS
Stainless steel 14.3	RK14.3-2SS-WSN RK14.3-2SS	RK14.3-3SS-WSN RK14.3-3SS	RK14.3-4SS-WSN RK14.3-4SS	RK14.3-6SS-WSN RK14.3-6SS	RK14.3-8SS-WSN RK14.3-8SS
Carbon steel	RK-2CS-WSN RK-2CS	RK-3CS-WSN RK-3CS	RK-4CS-WSN RK-4CS	RK-6CS-WSN RK-6CS	RK-8CS-WSN RK-8CS
Stainless steel	RK-2SS-WSN RK-2SS	RK-3SS-WSN RK-3SS	RK-4SS-WSN RK-4SS	RK-6SS-WSN RK-6SS	RK-8SS-WSN RK-8SS



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## Maintenance:

Regular maintenance is suggested. Users should operate the fitting as often as once per month, meaning the plate carrier should be moved up and down. Grease should be added regardless of whether the orifice plate has been removed for inspection or replacement. Operating the fitting without adding grease or leaving grease for long periods of time may shorten the life of the fitting.



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