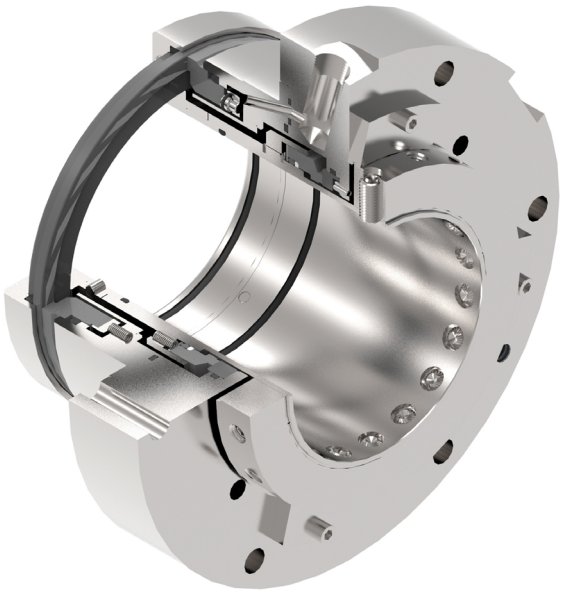
TYPE 5864-USP

DUAL-UNPRESSURISED CARTRIDGE SLURRY SEAL

Installation, Operation & Maintenance Instructions



Foreword

These instructions are provided to familiarise the user with the seal and its designated use. The instructions must be read and applied whenever work is done on the seal and must be kept available for future reference.

ATTENTION These instructions are for the installation and operation of a seal as used in rotating equipment and can help to avoid danger and increase reliability. The information required may change with other types of equipment or installation arrangements. These instructions must be read in conjunction with the instruction manuals for both the vessel and any ancillary equipment.

If the seal is to be used for an application other than that originally intended or outside the recommended performance limits, John Crane must be contacted before its installation and use.

Any warranty may be affected by improper handling, installation or use of this seal. Contact John Crane for information as to exclusive product warranty and limitations of liability.

If questions or problems arise, contact your local John Crane Sales/ Service Engineer or the original equipment manufacturer, as appropriate.

ATTENTION John Crane mechanical seals are precision sealing technologies and must be handled appropriately. Take particular care to avoid damage to lapped sealing faces and flexible sealing rings. Do not excessively compress the seal before or during installation.

Safety instructions

1. The following designations are used in the installation instructions to highlight instructions of particular importance.

NOTE Refers to special information on how to install or operate the seal most efficiently.

ATTENTION Refers to special information or instructions directed toward the prevention of damage to the seal or its surroundings.

⚠ **Refers to mandatory instructions designed to prevent personal injury or extensive damage to the seal or its surroundings.**

2. Installation, removal and maintenance of the seal must be carried out only by qualified personnel who have read and understood these installation instructions.
3. The seal is designed exclusively for sealing rotating shafts. The manufacturer cannot be held liable for use of the seal for purposes other than this.
4. The seal must only be used in technically perfect condition and must be operated within the recommended performance limits in accordance with its designated use set out in these installation instructions.
5. If the pumped fluid is hazardous or toxic, appropriate precautions must be taken to ensure that any seal leakage is adequately contained. Further information on sealing hazardous or toxic fluids should be obtained from John Crane prior to seal installation.
6. Fluorocarbon components should never be burned or incinerated as the fumes and residues are highly toxic. If fluorocarbons are accidentally heated above 400° C (750° F), they can decompose. Protective gloves should be worn as hydrofluoric acid may be present.
7. PTFE components should never be burned or incinerated as the fumes are highly toxic.

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Before starting the equipment

1. Check the machine at the coupling for proper alignment of the driver or motor.
2. Ensure that the gland plate nuts/bolts are securely tightened according to the vessel manual instructions and all screws are securely fastened.
3. Complete the assembly of the vessel and turn the shaft (by hand if possible) to ensure free rotation.
4. Consult all available equipment operating instructions to check for correctness of all piping and connections, particularly regarding seal recirculation/flush, heating or cooling requirement and services external to the seal.

ATTENTION This mechanical seal is designed to operate in a liquid, so the heat energy it creates is adequately removed. The following check should be carried out not only after seal installation, but also after any period of equipment inactivity.

5. Check that the seal chamber fluid lines are open and free of any obstruction and ensure that the seal chamber is properly vented and filled with liquid — refer to the vessel instruction manual.

ATTENTION Wet seals that are operated without adequate liquid lubrication will often give rise to a squealing noise from the seal area and result in overheating and scoring or other damage to the sealing surfaces, causing excessive emissions and a reduced seal life.

⚠ **Before start-up, ensure that all personnel and assembly equipment have been moved to a safe distance so there is no contact with rotating parts on the vessel, seal, coupling or motor.**

WARNING Seal installation should be handled only by qualified personnel. If questions arise, contact the local John Crane representative. Improper use and/or installation of this product could result in injury to the person and/ or harmful emissions to the environment and may affect any warranty on the product. Please contact the company for information as to exclusive product warranty and limitations of liability.

Operating conditions

The following are the operating limits of the Type 5864-USP seals. The selection of materials used in the construction of the seal should be made with regard to their temperature and chemical resistance and compatibility with the liquid being sealed.

Pressure limit: Full Vacuum to 40 barg (580 psig)

Temperature limit: -40° to 80° C (-40° to 176° F)

Speed limit: Up to 1250 FPM (6.5 m/s) (Or 500-1450 RPM)

* Minimum speed rating of 2.5 m/s (500 FPM).

** Minimum 2cc/min of upstream flow against max state process pressure.

General instructions

1. Study the engineering layout drawing to confirm the proper seal arrangement for the equipment being used. The following instructions describe the standard configurations.
2. To ensure satisfactory operation, handle seal with care. Take particular caution to see that the lapped sealing faces are not scratched or marred.

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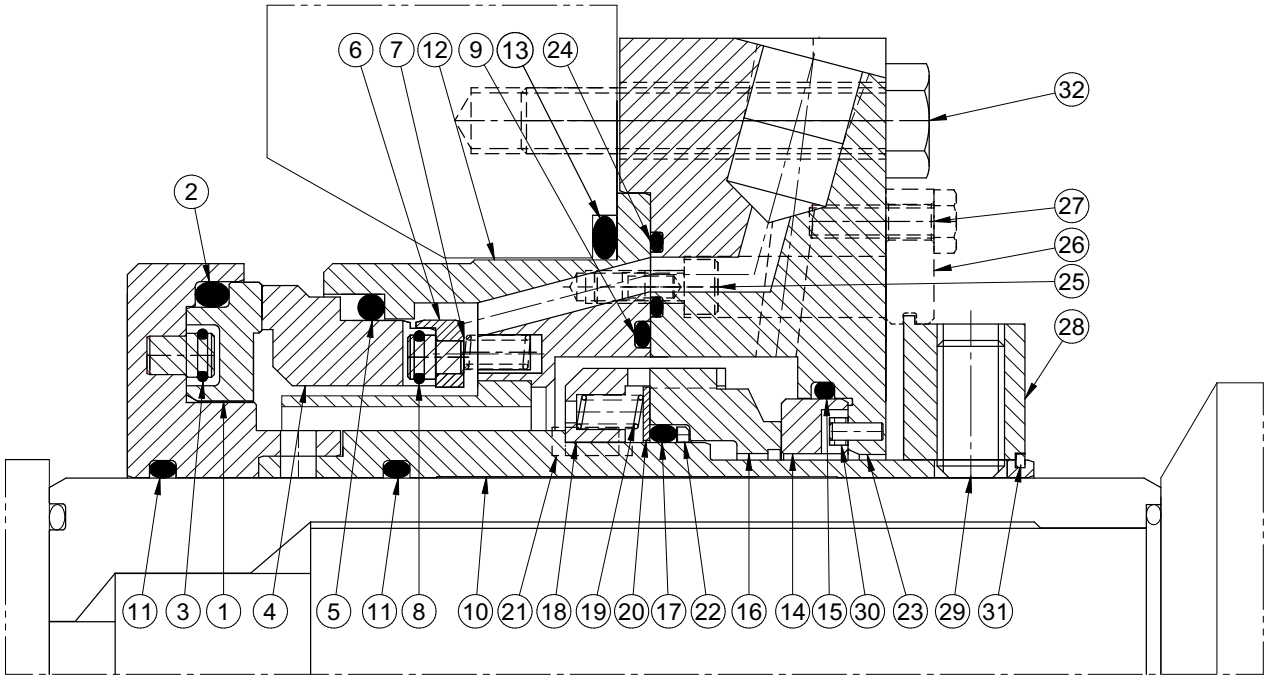
Typical arrangement Type 5864-USP



Item	Description
1	Mating ring
2	O-Ring
3	O-Ring
4	Primary ring
5	O-Ring
6	Disc assembly
7	Spring
8	O-Ring
9	O-Ring
10	Sleeve assembly
11	O-Ring
12	Adapter plate
13	O-Ring
14	Mating ring
15	O-Ring
16	Primary ring

Item	Description
17	O-Ring
18	Retainer
19	Spring
20	Disc
21	Drive key
22	Anti-X ring
23	Gland plate assembly
24	O-Ring
25	Cap screw
26	Spacer
27	Cap screw
28	Collar
29	Set screws
30	Pin sleeve
31	Split ring
32	Hex-head cap screw

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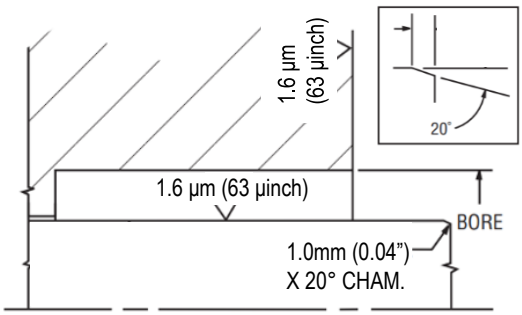
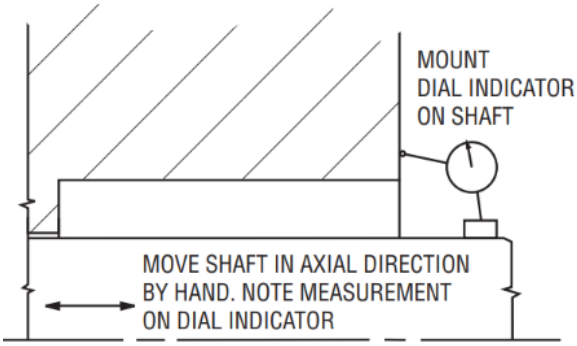
Installation, Operation & Maintenance Instructions

Preparing the equipment

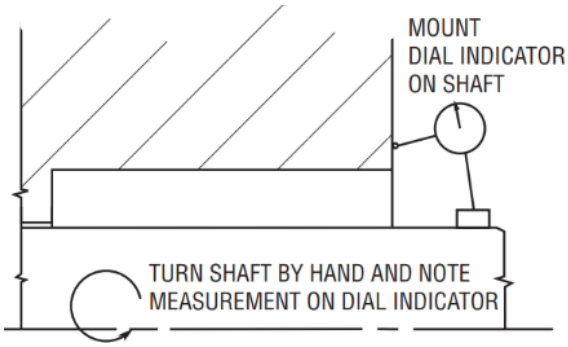
1. Check seal chamber dimensions and finishes.



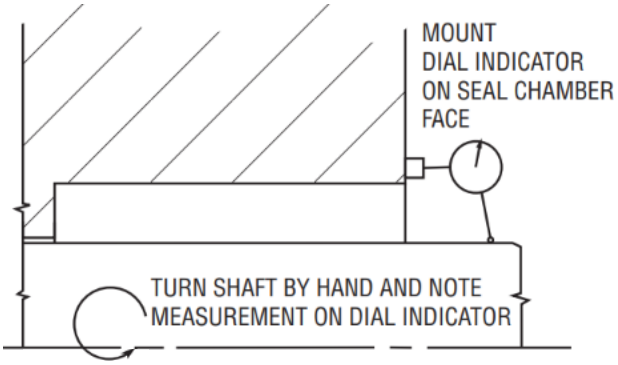
2. Measure axial end play ±0.13mm (± 0.005") max.



3. Determine squareness of seal chamber face to shaft 0.001 mm per mm of bore diameter (0.001" per inch of bore diameter, max).



4. Measure shaft runout 0.002 mm per mm of shaft diameter (0.002" per inch of shaft diameter) max.



NOTE If the measured dimensions exceed these values given, correct the equipment to meet the specifications prior to seal installation

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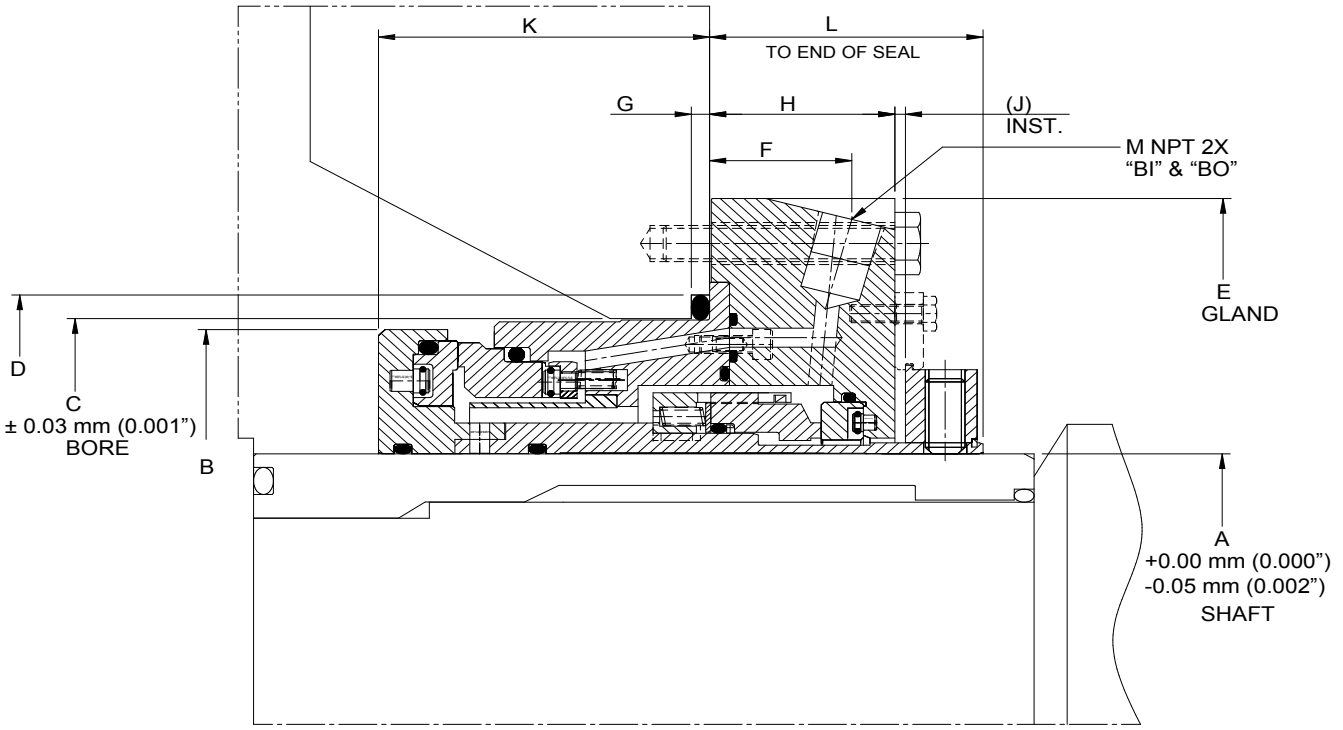
Installation, Operation & Maintenance Instructions

Typical installation of Type 5864-USP



Type 5864-USP dimensional data (metric)

A (Shaft Size)	B	C	D	E	F	G	H	J	K	L	M
50	107.14	133.38	-	138.86	9.75	-	23.11	2.36	42.77	36.98	1/8 NPT
60	136.92	140.03	149.71	175.00	14.05	2.92	20.87	3.17	50.98	38.99	1/8 NPT
85	161.65	162.77	172.44	216.74	14.58	2.80	23.61	3.17	64.92	45.01	1/4 NPT
100	183.79	185.04	200.25	243.00	22.07	4.35	33.67	3.17	76.20	60.08	3/8 NPT
130	207.95	210.04	225.60	290.00	35.00	4.33	47.95	3.17	87.30	74.36	1/2 NPT
145	252.40	270.04	285.75	350.00	30.25	5.52	43.20	3.17	105.41	92.13	1/2 NPT
165	262.71	270.04	285.75	350.00	30.25	5.52	43.25	3.17	96.82	69.86	1/2 NPT
180	262.71	270.04	285.75	350.00	42.95	5.52	55.95	3.17	100.00	82.56	1/2 NPT

Type 5864-USP dimensional data (imperial)

A (Shaft Size)	B	C	D	E	F	G	H	J	K	L	M
1.968	4.218	5.251	-	5.467	0.384	-	0.910	0.093	1.684	1.456	1/8 NPT
2.362	5.391	5.513	5.894	6.890	0.553	0.115	0.822	0.125	2.007	1.535	1/8 NPT
3.346	6.364	6.408	6.789	8.533	0.574	0.110	0.930	0.125	2.556	1.772	1/4 NPT
3.937	7.236	7.285	7.884	9.567	0.869	0.171	1.326	0.125	3.000	2.365	3/8 NPT
5.118	8.187	8.269	8.882	11.417	1.378	0.170	1.888	0.125	3.437	2.927	1/2 NPT
5.708	9.937	10.631	11.250	13.780	1.191	0.217	1.701	0.125	4.150	3.627	1/2 NPT
6.496	10.343	10.631	11.250	13.780	1.191	0.217	1.703	0.125	3.812	2.750	1/2 NPT
7.087	10.343	10.631	11.250	13.780	1.691	0.217	2.203	0.125	3.937	3.250	1/2 NPT

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Installing the Seal

1. Before starting the installation, read the following instructions carefully.
2. Remove the seal from its packaging, inspect for any damage and wipe clean.
3. The equipment should be clean and meet the specifications noted in "Preparing the Equipment". Lubricate sleeve O-ring with appropriate lubricant to assist in assembly. Lubricate shaft sparingly. Lubricate gland bolts/nuts in order to achieve proper torque values.
4. Make sure that collar set screws do not extend past sleeve ID. Slide complete cartridge seal assembly onto shaft, ensuring the pipe connections are oriented as shown in the seal assembly layout drawing. Align seal cartridge through-holes with customer supplied studs (if applicable). Hand-tighten gland plate bolts/nuts.
5. Finish assembling equipment and complete all necessary adjustments.
6. Continue tightening gland plate bolts/nuts in an alternating pattern (1/4 turns, 180˚ apart) until gland plate is secure. Do not over-stress or distort gland plate.
7. Tighten collar set screws evenly (1/4 turns, 180˚ apart), securing cartridge seal to shaft.
8. Remove spacers and save for future use in cartridge removal.
9. Make appropriate piping connections to seal cartridge.

Decommissioning the equipment

1. Ensure that the vessel is electrically isolated.

If the equipment has been used on toxic or hazardous fluids, ensure that the equipment is correctly decontaminated and made safe prior to commencing work. Remember fluid is often trapped during draining and may exist outside the seal. The vessel instruction manual should be consulted to check for any special precautions.

2. Ensure that the vessel is isolated by the appropriate valves. Check that the fluid is drained and pressure is fully released.

Maintenance

No maintenance of a seal is possible while installed. Therefore, it is recommended that a spare seal unit be held in stock to allow immediate replacement of a removed seal.

It is recommended that used seals are returned to a John Crane Seal Rebuilding Centre, as rebuilding to as-new specifications must be carried out by qualified personnel.

It is the responsibility of the equipment operator to ensure that any parts being sent to a third party have appropriate safe handling instructions externally attached to the package.

Quality assurance

This seal has been assembled in accordance with John Crane's Quality Assurance Standards and with proper maintenance and use will give safe and reliable operation to the maximum recommended performance as shown in any relevant approved John Crane publication.

Please visit www.johncrane.com for material options and operating limits.

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United States of America
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Europe
United Kingdom
Tel: 44-1753-224002

Latin America
Brazil
Tel: 55-11-3371-2500

Middle East & Africa
United Arab Emirates
Tel: 971-481-27800

Asia Pacific
Singapore
Tel: 65-6518-1800

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