



# 180™ HEAVY DUTY CARTRIDGE SINGLE SEAL

## SEAL INSTALLATION

### Preparation

**Determine if the pump is in good condition.**

#### A. Check the shaft or sleeve.

1. Remove all burrs and sharp corners, especially in areas where the o-ring has to slide. Cover threads and keyway slots with a thin tape to prevent cutting the o-ring. The distance from the face of the stuffing box to the center of the o-ring groove is approximately .05" (1,3 mm) for 1" through 1.625" (25-43 mm), .75" (19 mm) for 1.75" through 2.50" (45-60 mm) and .81" (20,6 mm) for 2.625" through 4.75" (65-120 mm).
2. The shaft finish should be 32 micro-inches RA (0,8 microns) maximum. It should feel smooth if you run your fingernail along the shaft in the axial direction.
3. **Make sure the shaft or sleeve diameter is within tolerance (no more than +/- .002" (0,05 mm) from nominal). Example: 1.750" shaft should not be larger than 1.752" or smaller than 1.748".**
4. Use a dial indicator to measure the shaft runout in the area where the seal is to be installed. **Readings should not exceed .001" TIR per inch (0,001 mm TIR per millimeter) of shaft diameter.**
5. Place the dial indicator on the shaft and alternately push and pull the shaft axially to measure end play. End play should not exceed .005" (0,12 mm) TIR.
6. Protect the sleeve o-ring by lubricating the shaft with a clean silicone based lubricant as that provided with the seal.

#### B. Check the stuffing box.

1. The stuffing box face must be a maximum of 125 microinches RA (3,2 microns) for a gasket to seal.
2. Split case pumps will sometimes cause a step (misalignment) to occur on the stuffing box face. This step must be machined flat.
3. Make sure the stuffing box is clean and clear along its entire length.
4. If possible, attach the base of a dial indicator to the shaft and rotate shaft and indicator slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box face relative to the shaft should not exceed .005" TIR per inch (0,12 mm TIR per millimeter) of shaft diameter.

### Installation

1. Check the chemical listing to determine if the o-rings installed in this seal are compatible with the fluid being sealed.
2. **CAUTION: If the seal is operating at a stuffing box pressure over 300 psig (20 bar) for sizes 1" to 2 1/2" (25-60 mm), or 250 psig (16 bar) for sizes 2 5/8" to 4 3/4" (65-120 mm) or if the shaft is case-hardened, replace the 316 stainless steel set screws with the hardened steel set screws supplied with the seal.** The 1/4 dog point set screws go into the small holes in the sleeve. Do not disengage these screws from the sleeve when positioning the seal. The cup point set screws go through the larger holes in the sleeve. Make sure all screws are engaged in the sleeve but do not protrude into the ID bore. Also, when repositioning or removing the seal, make sure the centering clips and socket head cap screws are engaged.

3. Centering clips have been preset at the factory. If for any reason you loosen or remove the centering clip cap screw, retighten as follows prior to installing the seal on the equipment: Tighten the cap screw finger tight. Then using hex wrench, tighten cap screw an additional 1/8 turn. This will approximate the 30 inch-pounds (3,4 Nm) of torque for sizes 1.75" to 2 1/2" (45-60 mm), and 40 inch-pounds (4,5 Nm) of torque for 2 5/8" to 4 3/4" (65-120 mm) set at the factory. For sizes 1" to 1.625" (25-43 mm) tighten the button head screws to 20 inch-pounds (2,3 Nm) of torque.
4. Slide the completely assembled 180 seal onto the shaft, by pushing on the lock ring. Make sure that all set screws are engaged through the sleeve but do not protrude into the sleeve ID bore.
5. Reassemble the pump and make necessary shaft alignments and impeller adjustments. The impeller can be reset at any time, as long as the centering clips are in place and the seal set screws are loosened while the shaft is being moved.
6. Orient the flush connection to the location required. The port is plugged prior to shipping. Removal of the plug will require 50 ft-lbs. (67 Nm) of torque for sizes 1" to 2 1/2" (25-60 mm) and requires 80 ft-lbs. (108 Nm) of torque for sizes 2 5/8" to 4 3/4" (65-120 mm).
7. Piping connections should not be made prior to tightening the gland bolts.
8. Tighten the gland bolts evenly. **IMPORTANT: The gland bolts must be tightened before tightening the screws onto the shaft.**

## SEAL INSTALLATION

9. **IMPORTANT: All 1/4 dog point set screws must be tightened FIRST.** If rotation of the lock ring is required for tightening set screws, loosen or remove one centering clip. Once the 1/4 dog point set screws are tightened, evenly tighten the cup point set screws to the shaft with the hex key provided. After all sets screws have been tightened by hand, retighten the six set screws with a torque wrench to 50-60 in-lb (5,6-6,8 Nm) for sizes 1" to 2 1/2" (25-60 mm), and tighten screws to 65-75 in-lbs (7,3-8,5 Nm) for sizes 2 5/8" to 4 3/4" (65-120 mm).
10. Remove the three centering clips. The clips should be saved to reset the seal each time the set screws or gland nuts are loosened for impeller adjustments or for other reasons.
11. **IMPORTANT:** It is important to make sure that the gland is properly centered over the sleeve. To do this, turn the shaft by hand to make sure the seal turns freely. If you hear metal to metal contact within the seal, it was improperly centered. Re-install the centering clips finger tight. Loosen the gland bolts. Fully tighten clips. Loosen

the set screws. Re-tighten the gland bolts. Re-tighten the set screws. Remove the clips. If metal to metal contact still exists check the centering of the stuffing box.

12. Take all necessary precautions and follow normal safety procedures before starting the equipment.

## STANDARD MATERIALS\*\*\*

### All Metal Parts:

316SS.

### Springs:

- Hastelloy C\*

### O-rings:

- Fluorocarbon, AFLAS\*\* or EPR installed

### Rotary Face:

- Carbon, Silicon Carbide, Tungsten Carbide

### Stationary Face:

- Silicon Carbide, Tungsten Carbide

\*Haynes International, Inc. Registered Trademark.,

\*\*Asahi Glass Company Ltd. Registered Trademark.,

\*\*\*Other materials available upon request.

## OPERATING LIMITS

### Speed:

- To 5000 FPM (25 mps).
- Over 8000 rpm consult factory.

### Pressure:

- 1" to 2 1/2" (25-60 mm) 400 psig (26 bar g) 400 psig (26 bar g) to 600 psig (40 bar g), 4 gland bolts recommended.
- >600 psig (40 bar g), consult factory.
- 2 5/8" to 4 3/4" (65-120 mm) to 300 psig (20 bar g) 300 psig (20 bar g) to 600 psig (40 bar g), 4 gland bolts and environmental controls recommended.
- >600 psig (40 bar g), consult factory.
- 28" Hg Vacuum – all sizes.

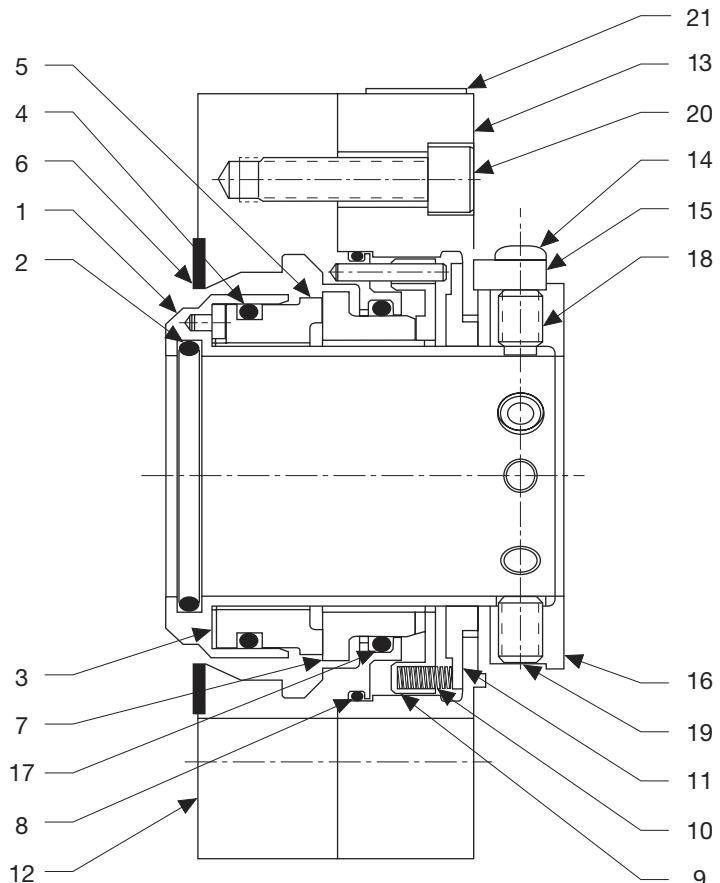
### Temperature:

- To 300°F (150°C) Ethylene Propylene
- To 400°F (205°C) FKM, AFLAS
- To 500°F (260°C) FFKM

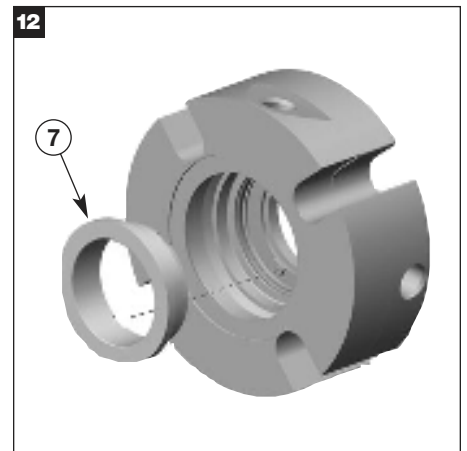
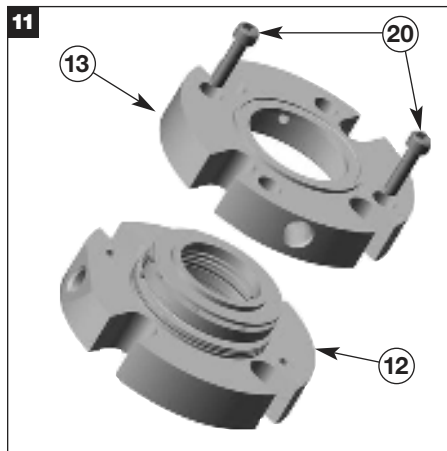
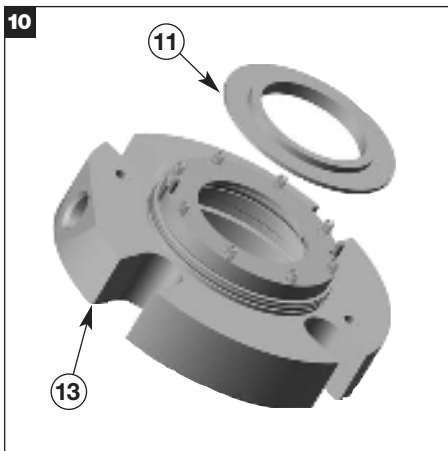
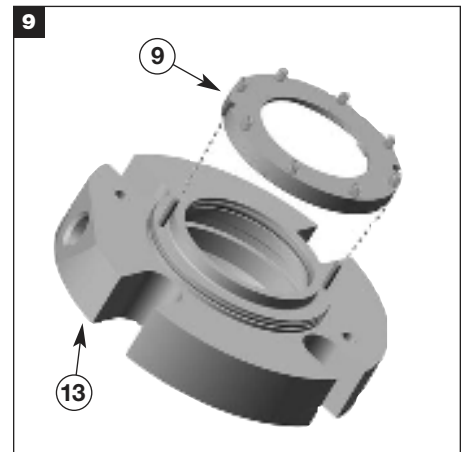
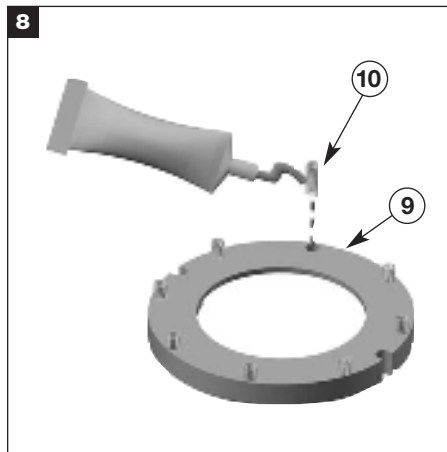
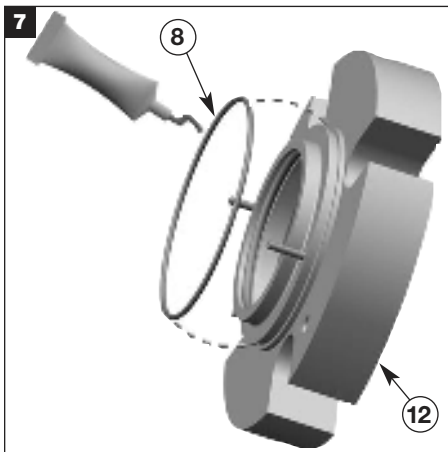
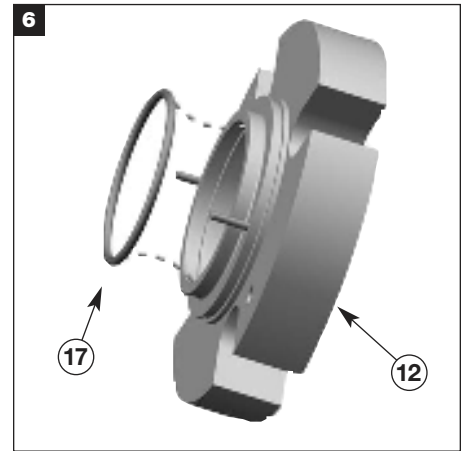
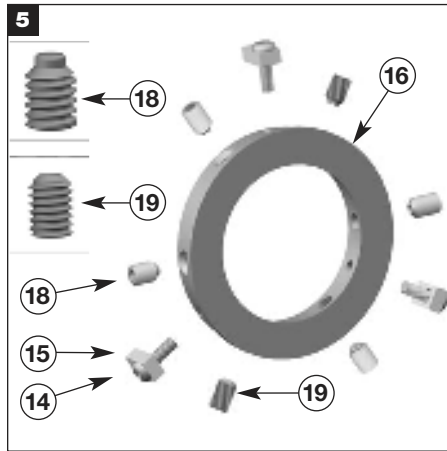
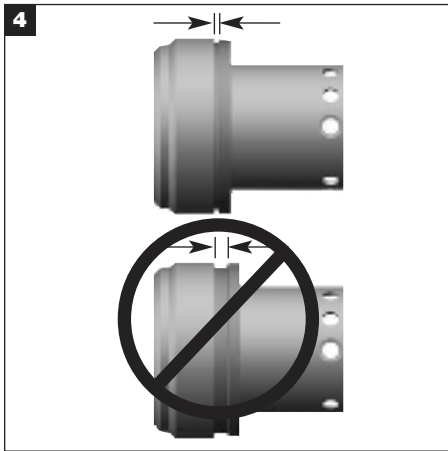
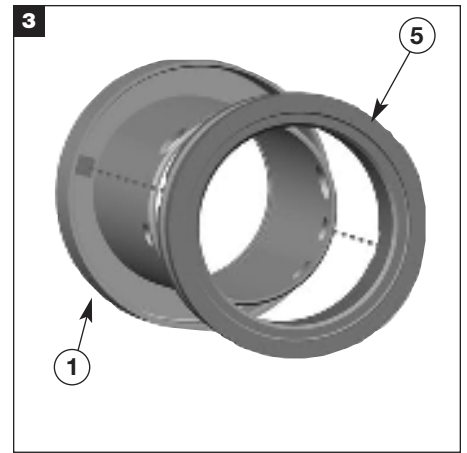
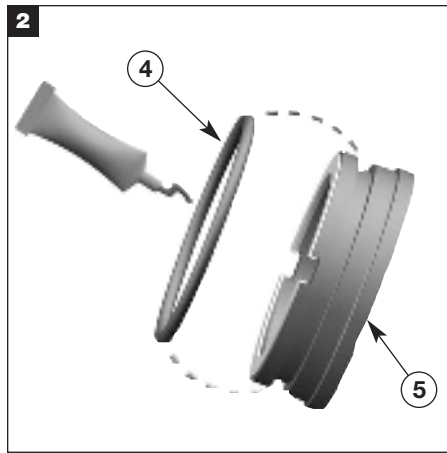
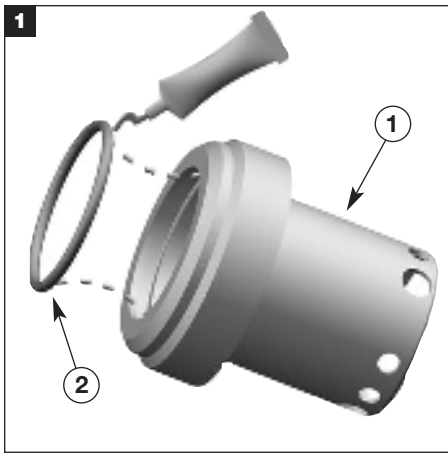
## 180 EXTRA SMALL STANDARD PARTS IDENTIFICATION

### KEY

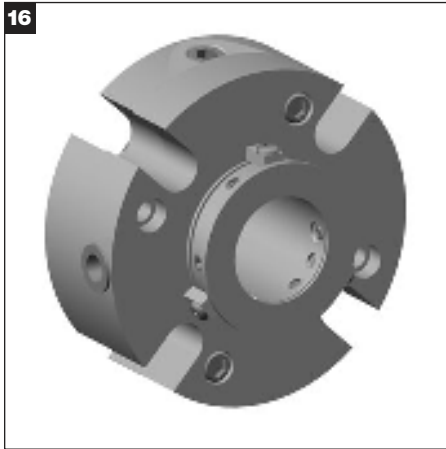
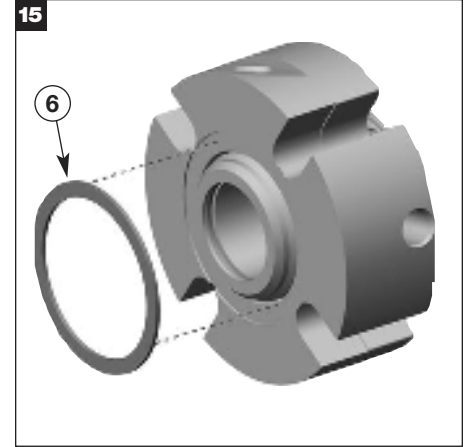
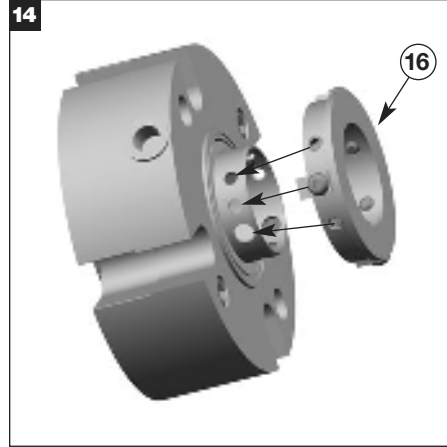
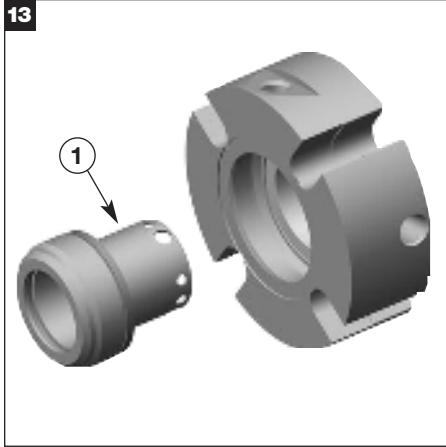
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- 2 - Shaft O-Ring
- 3 - Rotary Gasket
- 4 - Rotary O-Ring
- 5 - Rotary Seal Ring
- 6 - Gland Gasket
- 7 - Stationary Seal Ring
- 8 - Gland O-Ring
- 9 - Pusher
- 10 - Spring
- 11 - Bushing
- 12 - Inner Gland Assembly
- 13 - Outer Gland
- 14 - Centering Clip Screw
- 15 - Centering Clip
- 16 - Lock Ring
- 17 - Stationary O-Ring
- 18 - Dog Pt Set Screw
- 19 - Cup Pt Set Screw
- 20 - Socket Head Cap Screw
- 21 - Caplug



# 180 EXTRA SMALL STANDARD SEAL ASSEMBLY



## 180 EXTRA SMALL STANDARD SEAL ASSEMBLY



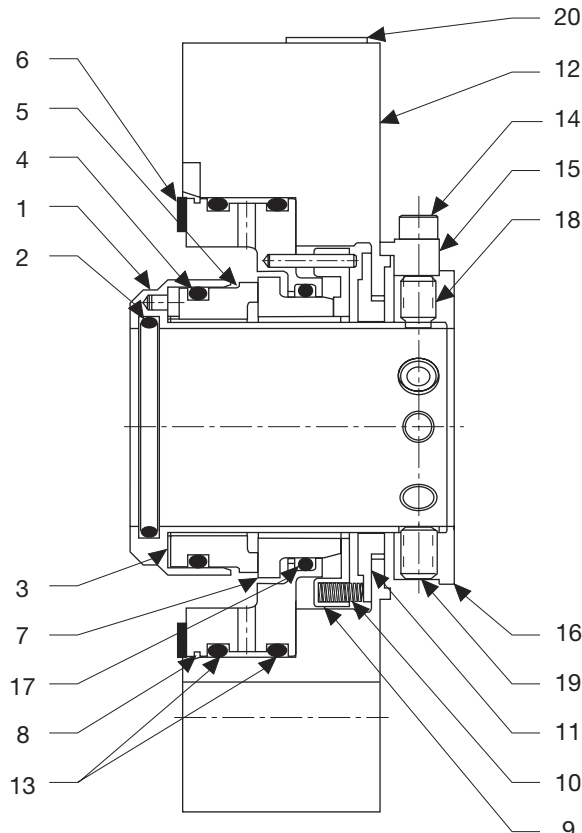
### CAUTIONS

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of their plant for the successful use of mechanical seals. If in doubt, get assistance from someone in the plant who is familiar with seals or delay the installation until a seal representative is available. All necessary auxiliary arrangements for successful operation (heating, cooling, flushing) as well as safety devices must be employed. These decisions are to be made by the user. The chemical listing is intended as a **general** reference for this seal **only**. The decision to use this seal or any other Chesterton seal in a particular service is the customer's responsibility.

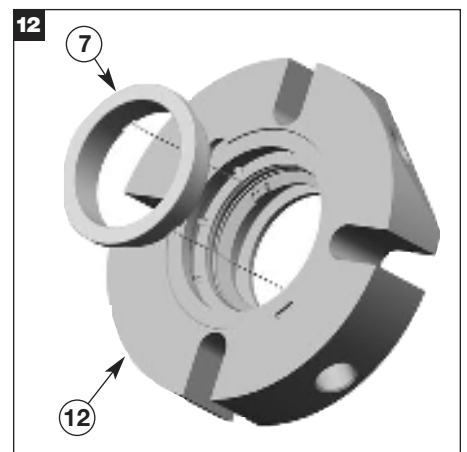
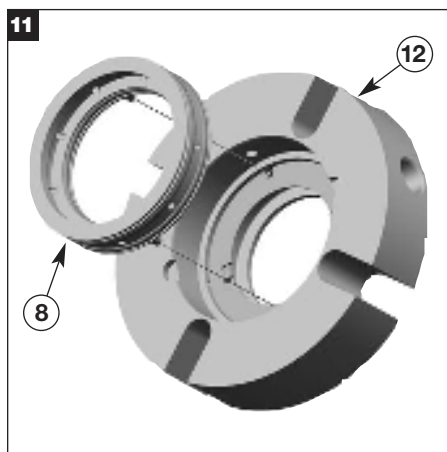
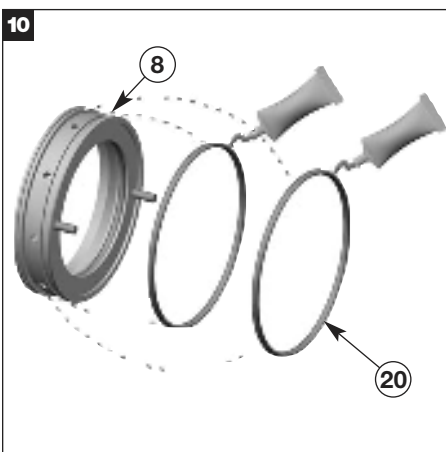
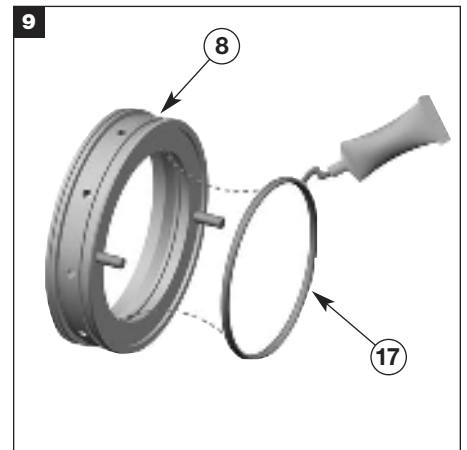
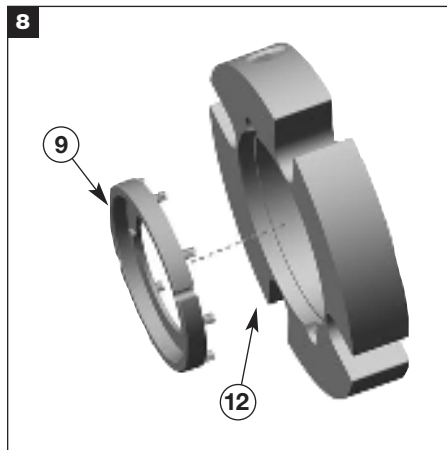
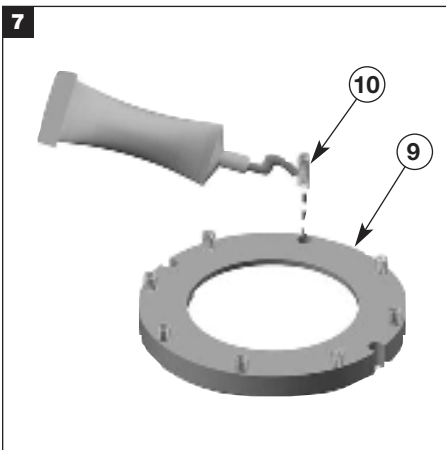
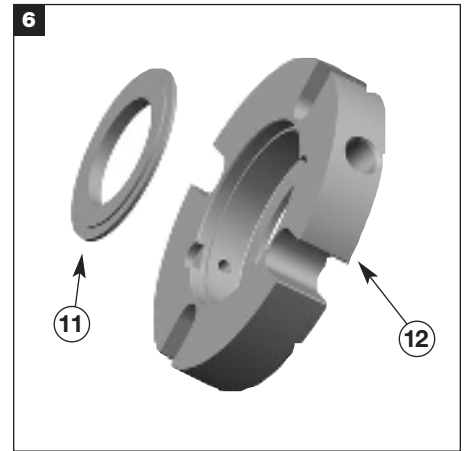
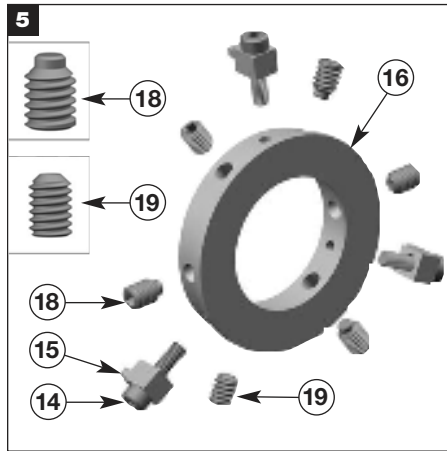
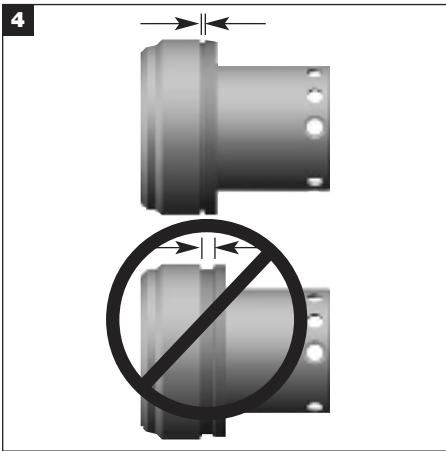
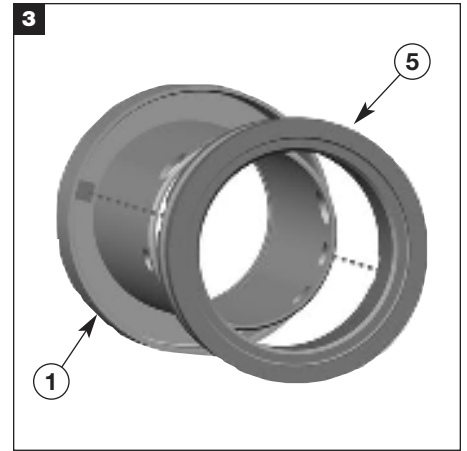
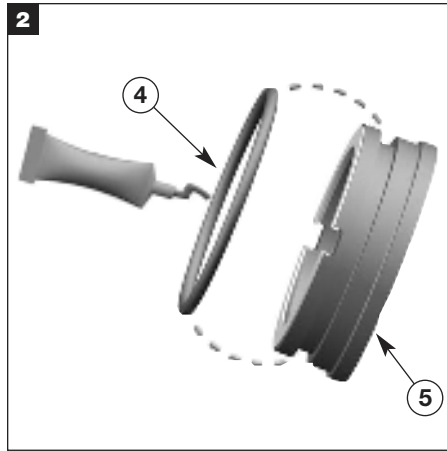
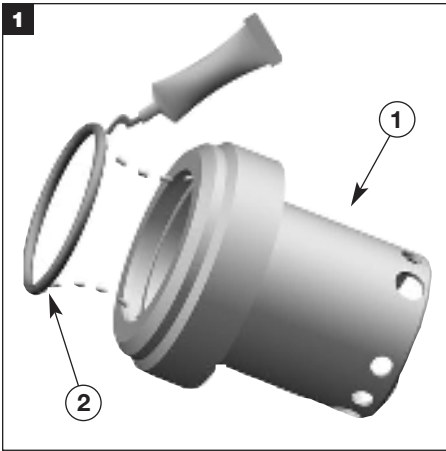
## 180 EXTRA SMALL OVERSIZE PARTS IDENTIFICATION

### KEY

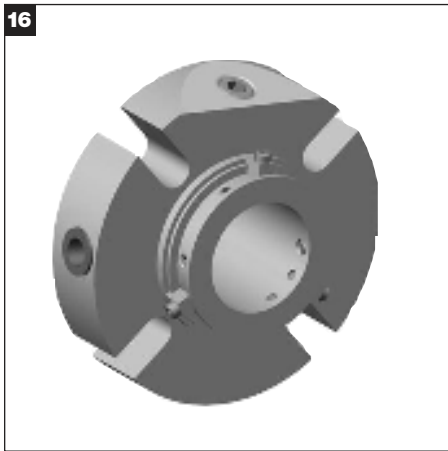
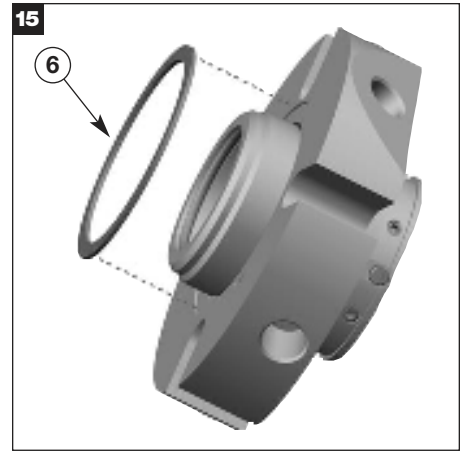
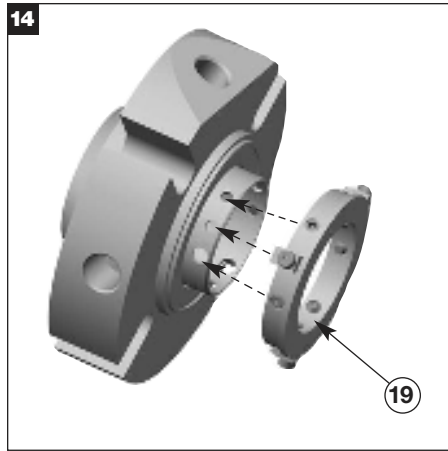
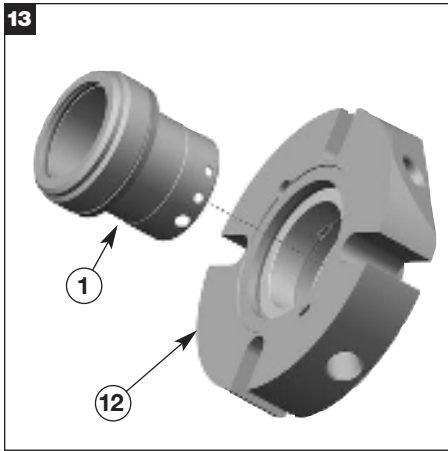
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- 7 - Stationary Seal Ring
- 8 - Adapter Assembly
- 9 - Pusher
- 10 - Spring
- 11 - Bushing
- 12 - Gland
- 13 - Adapter O-Rings
- 14 - Centering Clip Screw
- 15 - Centering Clip
- 16 - Lock Ring
- 17 - Stationary O-Ring
- 18 - Dog Pt Set Screw
- 19 - Cup Pt Set Screw
- 20 - Caplug



180 EXTRA SMALL OVERSIZE SEAL ASSEMBLY



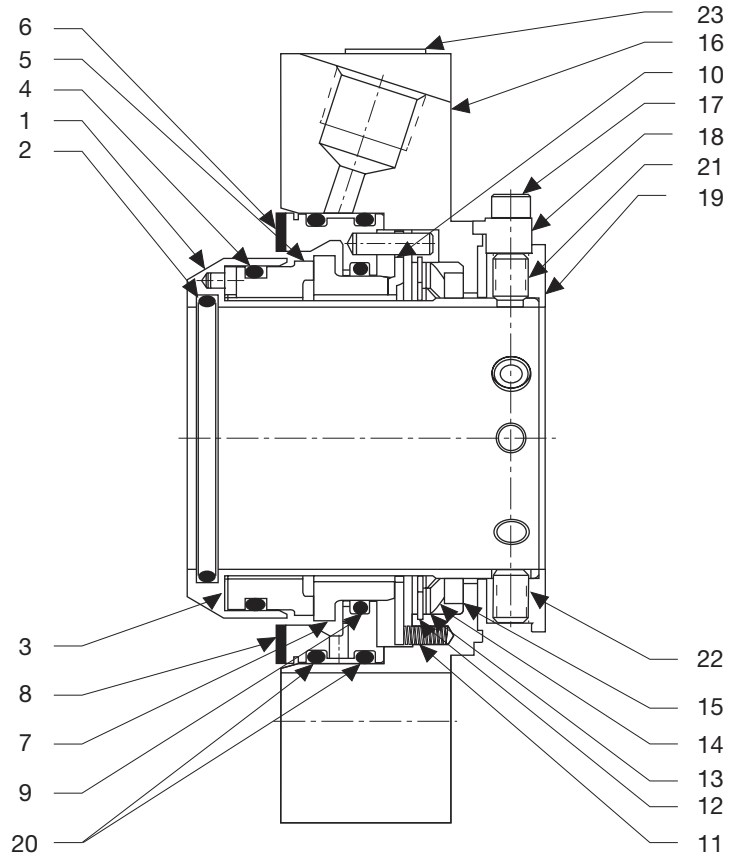
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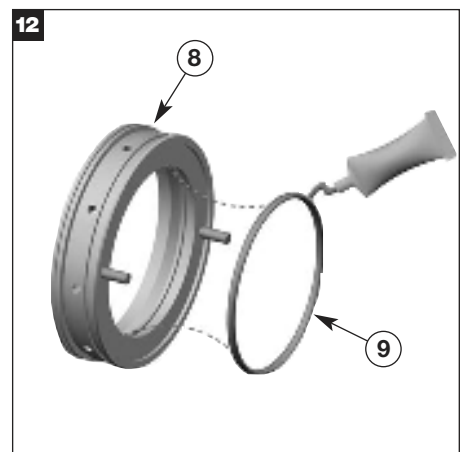
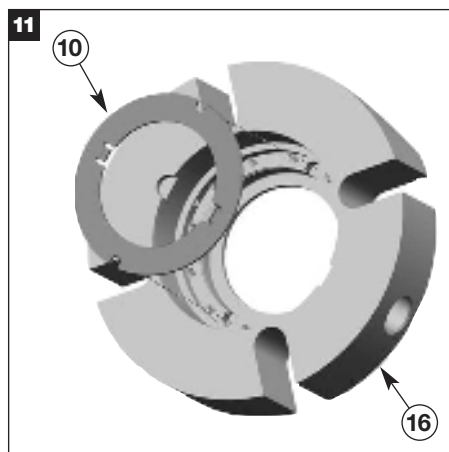
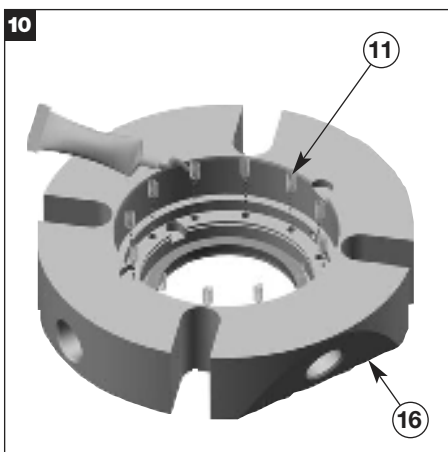
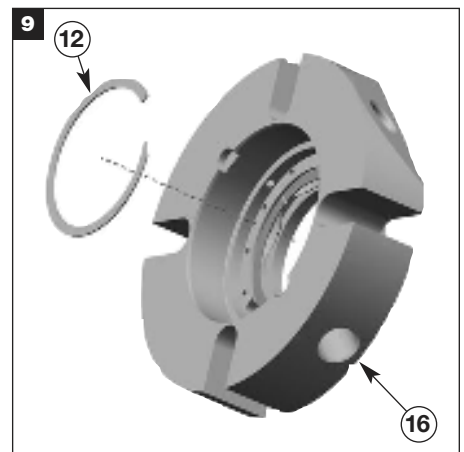
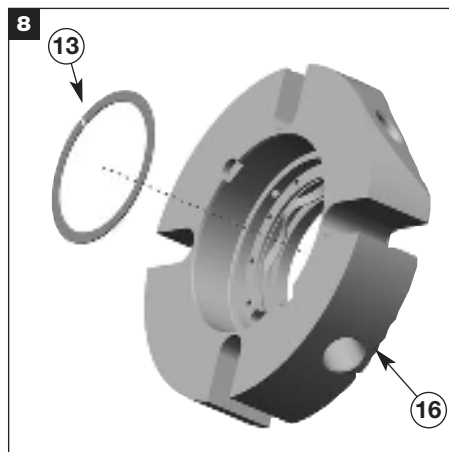
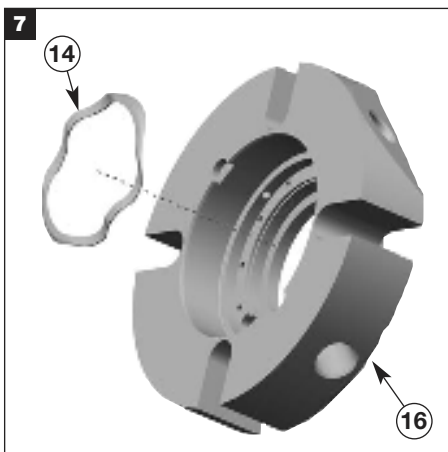
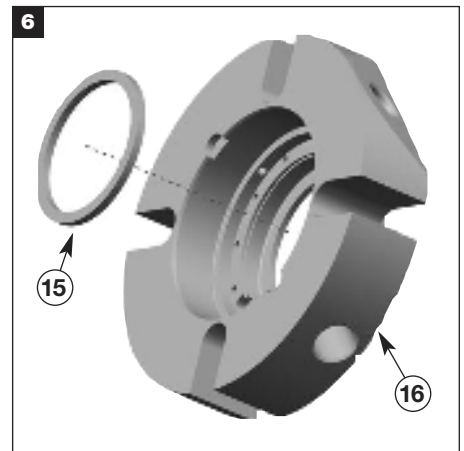
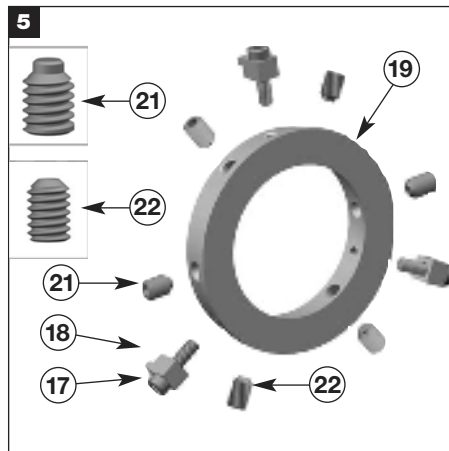
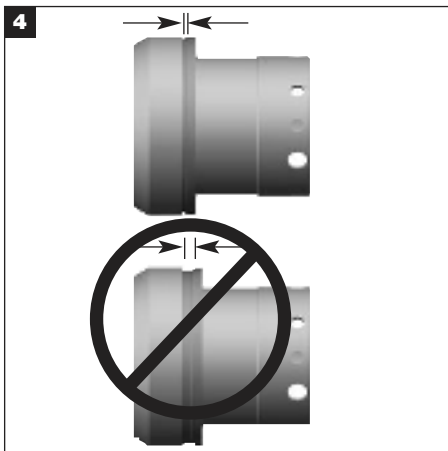
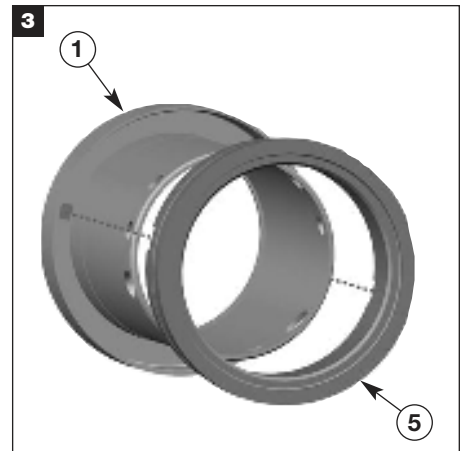
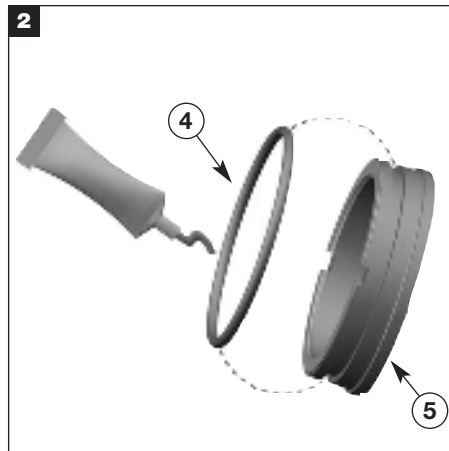
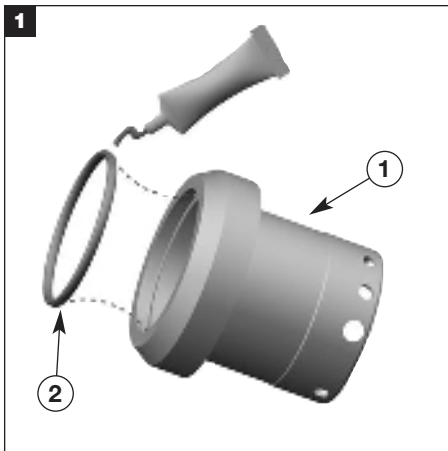
# 180 SMALL, LARGE & OVERSIZE PARTS IDENTIFICATION

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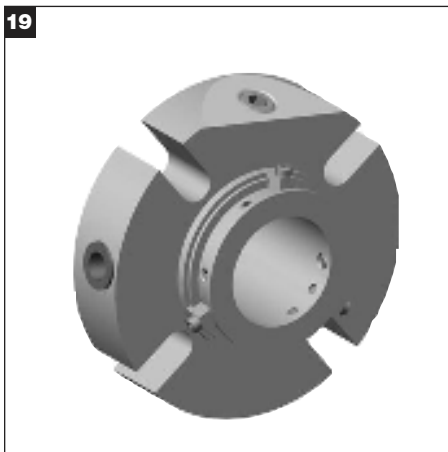
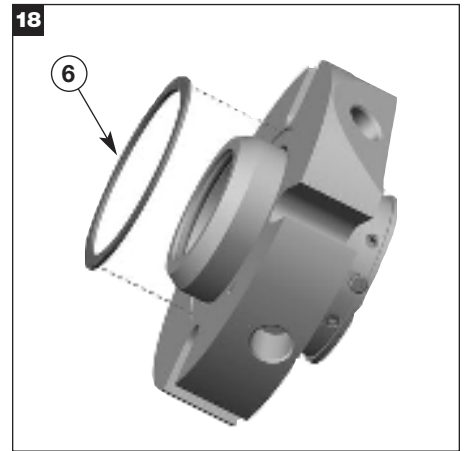
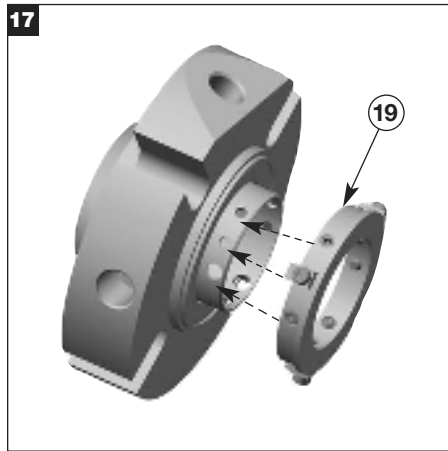
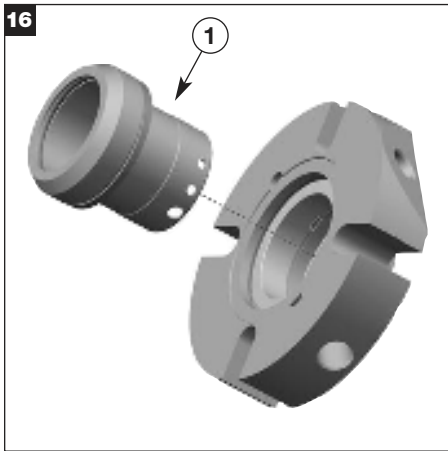
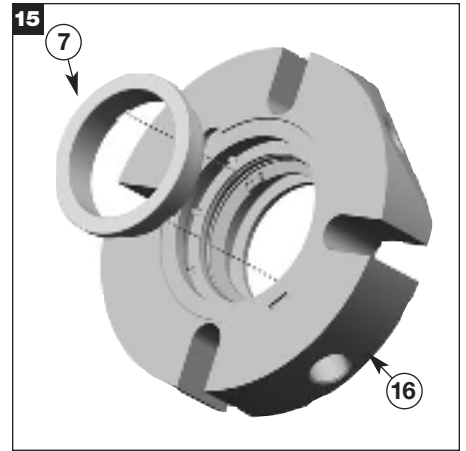
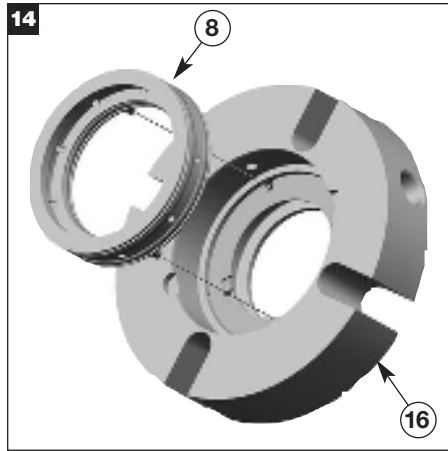
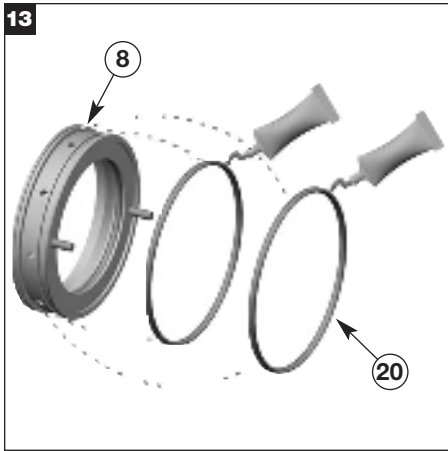
- 1 - Sleeve Assembly
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  - 4 - Rotary O-Ring
  - 5 - Rotary Seal Ring
  - 6 - Gland Gasket(s)\*\*
  - 7 - Stationary Seal Ring
  - 8 - Adapter Assy
  - 9 - Stationary O-Ring
  - 10 - Pusher Plate
  - 11 - Spring
  - 12 - Snap Ring\*
  - 13 - Shim\*
  - 14 - Wave Spring\*
  - 15 - Throttle Bushing\*
  - 16 - Gland
  - 17 - Centering Clip Screw
  - 18 - Centering Clip
  - 19 - Lock Ring
  - 20 - Adapter O-Ring(s)\*\*
  - 21 - Dog Pt Set Screw
  - 22 - Cup Pt Set Screw
  - 23 - Caplug
- \*Optional  
 \*\*Oversize design uses  
 1 o-ring (20) and 2 gaskets (6)



# 180 SMALL, LARGE & OVERSIZE SEAL ASSEMBLY



180 SMALL, LARGE & OVERSIZE SEAL ASSEMBLY



## 180 EXTRA SMALL DIMENSIONAL DATA (INCH)

DASH NO.	SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
													SHAFT	ROTARY	STATIONARY	GLAND
													V	W	X	Y
	A	B	C	C	D	E	F	G MIN			H	J				
		MAX	MIN	MAX	MAX	MIN	MAX	3/8"	1/2"	5/8"		MAX				
-8	1.000	4.11	1.63	2.01	1.55	0.22	2.11	2.88			0.44	1.62	120	126	127	033
-9	1.125	4.11	1.75	2.04	1.67	0.22	2.11	2.88			0.44	1.62	122	128	129	034
-10	1.250	4.11	1.88	2.27	1.80	0.22	2.11	3.14			0.44	1.62	124	130	131	035
-11	1.375	4.36	2.00	2.33	1.92	0.22	2.11	3.13	3.25*		0.57	1.62	126	132	133	036
-12	1.500	4.49	2.13	2.44	2.05	0.22	2.11	3.33	3.45		0.57	1.62	128	134	135	037
-13	1.625	4.99	2.25	2.69	2.17	0.22	2.11	3.52	3.65		0.57	1.62	130	136	137	038

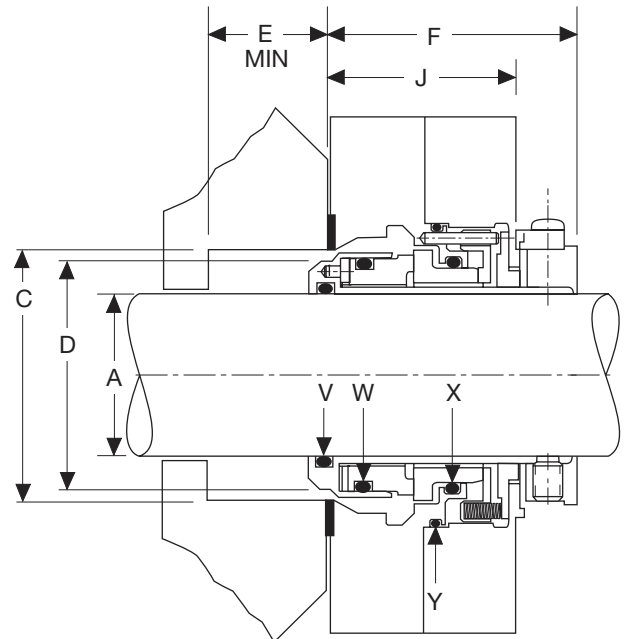
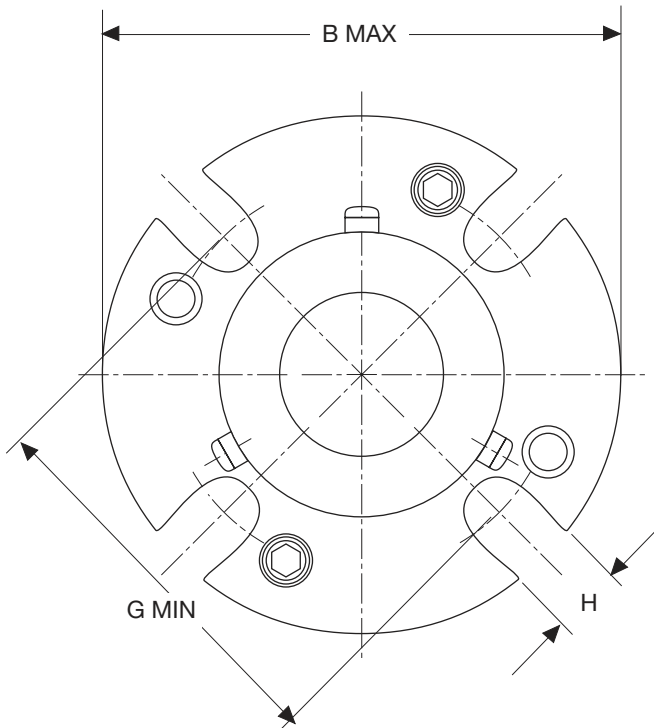
\*Requires SHCS or D shaped washers.

## 180 EXTRA SMALL DIMENSIONAL DATA (METRIC)

SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
												SHAFT	ROTARY	STATIONARY	GLAND
												V	W	X	Y
A	B	C	C	D	E	F	G MIN			H	J				
	MAX	MIN	MAX	MAX	MIN	MAX	10 mm	12 mm	16 mm		MAX				
25	104	41	51	39	6	54	73			11	41	120	126	127	033
28	104	44	52	42	6	54	73			11	41	122	128	129	034
30	104	46	57	44	6	54	78			11	41	123	129	130	035
32	104	48	58	46	6	54	80			11	41	124	130	131	035
33	113	49	59	47	6	54	81	83		14	41	125	131	132	036
35	111	51	59	49	6	54	80	82*		14	41	126	132	133	036
38	114	54	61	52	6	54	85	87		14	41	128	134	135	037
40	127	56	68	54	6	54	90	92		13	41	129	135	136	038
42	127	58	66	56	6	54	88	90		13	41	130	136	137	039
43	127	59	69	57	6	54	91	93		13	41	131	137	138	039

\*Requires SHCS or D shaped washers.

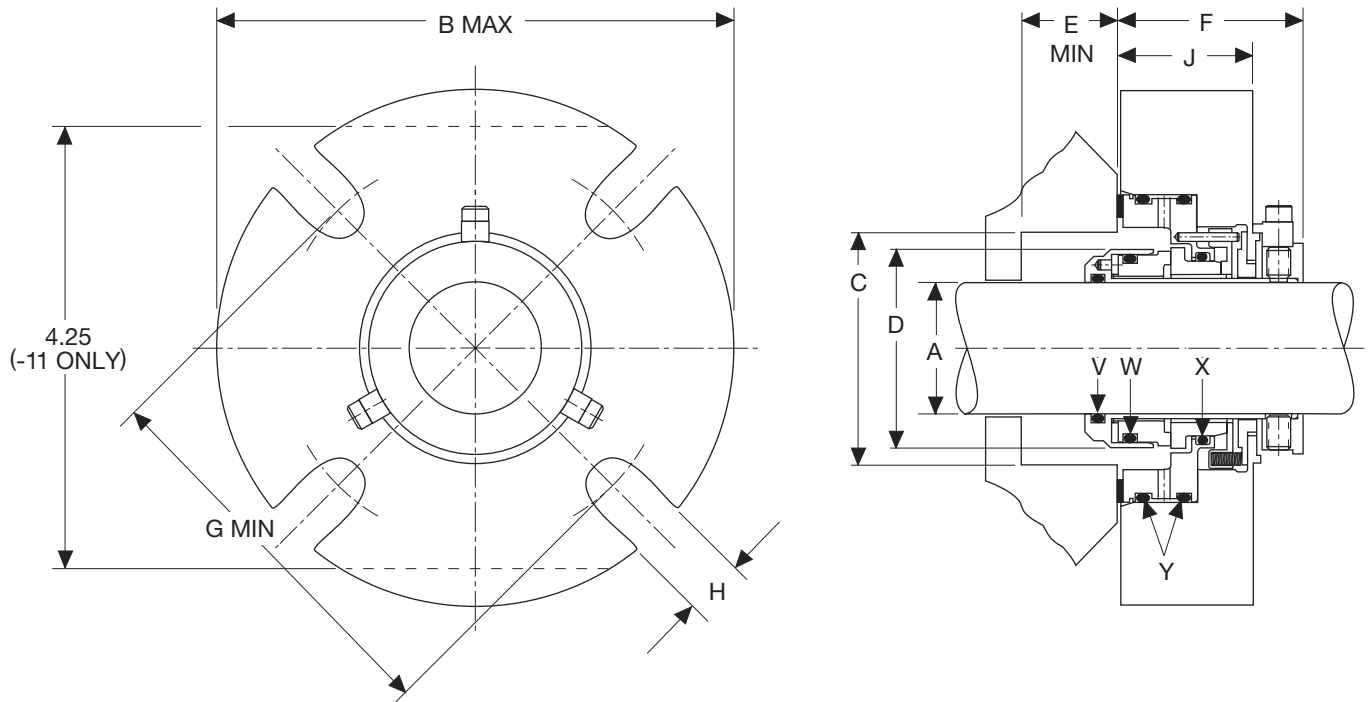
## 180 EXTRA SMALL DIMENSIONAL DRAWINGS



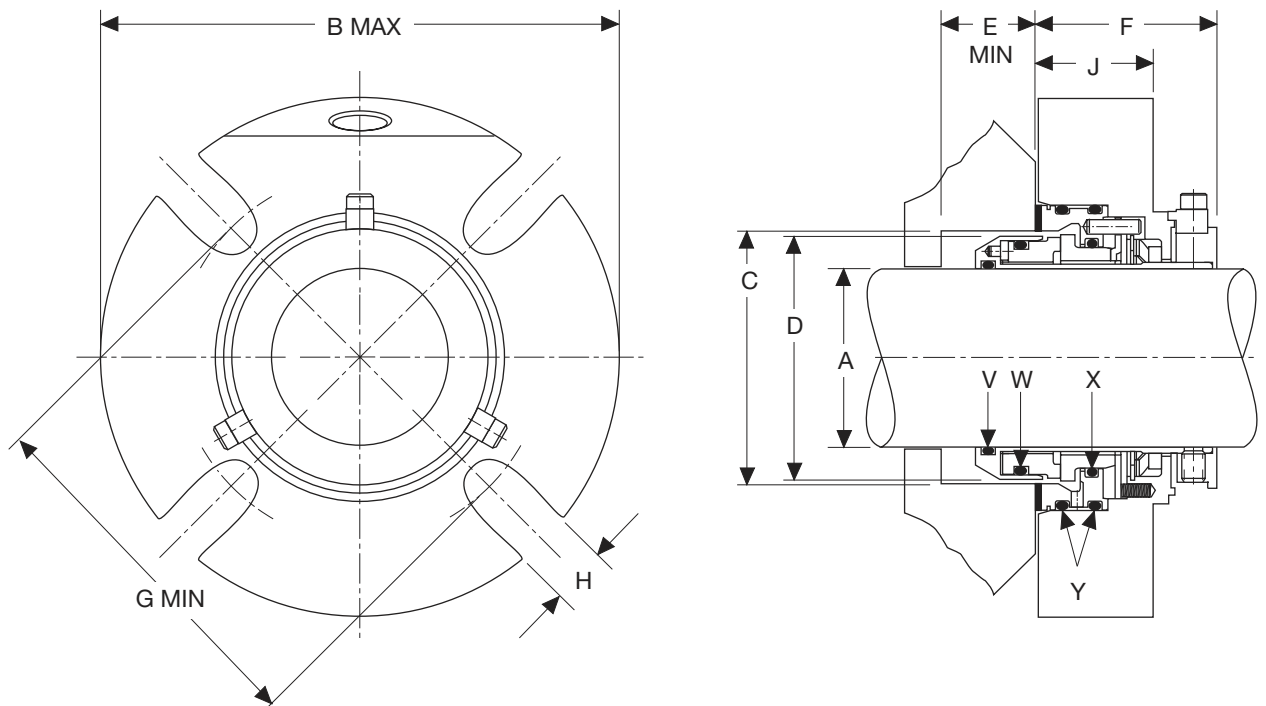
**180 EXTRA SMALL OVERSIZE DIMENSIONAL DATA (INCH)**

DASH NO.	SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
													SHAFT	ROTARY	STATIONARY	ADAPTER
								A	B MAX	C MIN						
-9OS	1.125	4.48	2.50	2.75	1.82	0.40	1.93	3.71			0.44	1.44	122	128	129	150
-11OS	1.375	5.40	2.68	3.00	2.07	0.40	1.93	4.03			0.44	1.44	126	132	133	151

**180 EXTRA SMALL OVERSIZE DIMENSIONAL DRAWINGS**



**180 SMALL AND LARGE DIMENSIONAL DRAWINGS**



## 180 SMALL AND LARGE DIMENSIONAL DATA (INCH)

DASH NO.	SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
													SHAFT	ROTARY	STATIONARY	ADAPTER
A	B	C	C	D	E	F	G MIN			H	J					
	MAX	MIN	MAX	MAX	MIN	MAX	3/8"	1/2"	5/8"		MAX					
-14	1.750	5.49	2.50	2.81	2.44	0.69	1.91	3.62	3.75*		0.57	1.27	132	138	139	150
-15	1.875	5.49	2.63	2.94	2.57	0.69	1.91	3.75	3.87*		0.57	1.27	134	140	141	151
-16	2.000	5.49	2.75	3.19	2.69	0.69	1.91	4.00	4.13		0.57	1.27	136	142	143	152
-17	2.125	5.99	2.88	3.44	2.82	0.69	1.91	4.25	4.38	4.50	0.69	1.27	138	144	145	153
-18	2.250	5.99	3.00	3.56	2.94	0.69	1.91	4.37	4.50	4.62	0.69	1.27	140	146	147	153
-19	2.375	5.99	3.13	3.59	3.07	0.69	1.91	4.43	4.56	4.68	0.69	1.27	142	148	149	153
-20	2.500	6.49	3.25	3.81	3.19	0.69	1.91	4.62	4.75	4.87	0.69	1.27	144	150	151	154
								1/2"	5/8"	3/4"						
-21	2.625	6.45	3.63	4.04	3.54	0.88	2.50	5.02	5.15		0.69	1.77	231	236	237	242
-22	2.750	7.70	3.75	4.38	3.67	0.88	2.50	5.42	5.55		0.69	1.77	232	236	237	245
-23	2.875	7.83	3.88	4.50	3.79	0.88	2.50	5.50	5.62		0.69	1.77	233	237	238	246
-24	3.000	7.94	4.00	4.69	3.92	0.88	2.50	5.65	5.77		0.69	1.77	234	238	239	247
-25	3.125	7.99	4.13	4.81	4.04	0.88	2.50	5.80	5.92		0.69	1.77	235	239	240	248
-26	3.250	8.19	4.25	4.94	4.17	0.88	2.50	5.93	6.05		0.69	1.77	236	240	241	249
-27	3.375	8.30	4.38	5.06	4.29	0.88	2.50	6.02	6.14	6.27	0.81	1.77	237	241	242	250
-28	3.500	8.44	4.50	5.19	4.42	0.88	2.50	6.18	6.31	6.43	0.81	1.77	238	242	243	251
-29	3.625	8.49	4.63	5.31	4.54	0.88	2.50	6.31	6.44	6.56	0.81	1.77	239	243	244	252
-30	3.750	8.71	4.75	5.39	4.67	0.88	2.50	6.38	6.51	6.63	0.81	1.77	240	244	245	253
-31	3.875	8.84	4.88	5.51	4.79	0.88	2.50	6.52	6.64	6.77	0.81	1.77	241	245	246	254
-32	4.000	8.96	5.00	5.69	4.92	0.88	2.50	6.66	6.78	6.91	0.81	1.77	242	246	247	255
-33	4.125	8.99	5.13	5.81	5.04	0.88	2.50	6.79	6.90	7.03	0.81	1.77	243	247	248	256
-34	4.250	8.99	5.25	5.94	5.17	0.88	2.50	6.91	7.04	7.16	0.81	1.77	244	248	249	257
-35	4.375	9.33	5.38	6.06	5.29	0.88	2.50	7.03	7.15	7.28	0.81	1.77	245	249	250	258
-36	4.500	9.49	5.50	6.19	5.42	0.88	2.50	7.18	7.30	7.43	0.81	1.77	246	250	251	258
-37	4.625	9.49	5.63	6.31	5.54	0.88	2.50	7.28	7.40	7.53	0.81	1.77	247	251	252	259
-38	4.750	10.49	5.75	6.47	5.67	0.88	2.50	7.40	7.53	7.65	0.81	1.77	248	252	253	259

\*Requires SHCS or D shaped washers.

## 180 SMALL AND LARGE DIMENSIONAL DATA (METRIC)

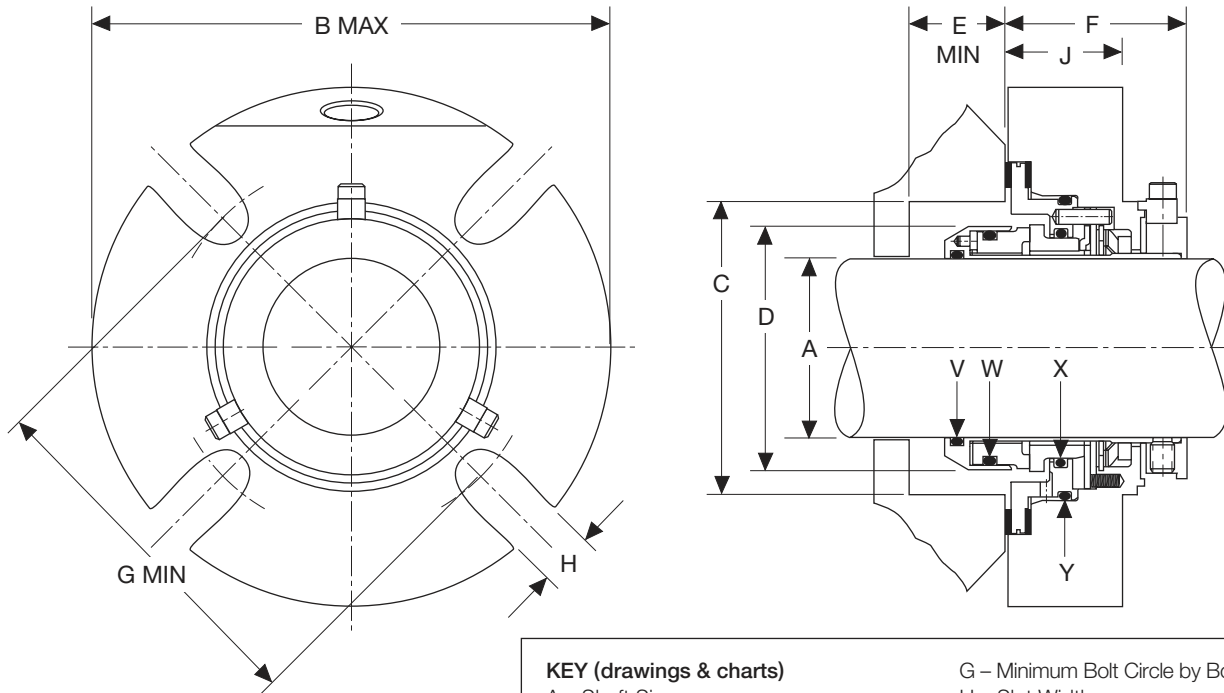
SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
												SHAFT	ROTARY	STATIONARY	ADAPTER
A	B	C	C	D	E	F	G MIN			H	J				
	MAX	MIN	MAX	MAX	MIN	MAX	10 mm	12 mm	16 mm		MAX				
45	139	64	73	63	18	49	95	97		13	43	133	139	140	150
48	139	67	73	66	18	49	95*	97*		13	43	134	141	142	151
50	139	69	78	68	18	49	100	102		13	43	136	142	143	151
53	152	73	87	72	18	49	109	111	115	17	43	137	144	145	153
55	152	74	83	73	18	49	105	107	111	17	43	139	145	146	152
58	152	80	91	78	18	49	114	116	120	17	43	140	148	149	153
60	152	80	91	78	18	49	114	116	120	17	43	142	148	149	153
							12 mm	16 mm	20 mm						
65	164	92	103	90	22	64	127	131		17	45	231	235	236	242
70	196	96	111	93	22	64	137	141		17	45	232	236	237	245
75	202	102	119	100	22	64	143	147		17	45	234	238	239	247
80	203	106	122	103	22	64	150	154		17	45	236	239	240	248
85	211	111	128	109	22	64	152	156	161	20	45	237	241	242	250
90	214	116	132	113	22	64	160	164	168	20	45	239	242	243	251
95	221	121	137	119	22	64	161	165	170	20	45	240	244	245	253
100	228	127	144	125	22	64	168	172	177	20	45	242	246	247	255
110	237	137	154	134	22	64	178	182	186	20	45	245	249	250	258
120	266	146	164	144	22	64	187	191	195	20	45	248	252	253	259

\*Requires SHCS or D shaped washers.

# 180 OVERSIZE DIMENSIONAL DATA

DASH NO.	SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			SLOT WIDTH	GLAND WIDTH	O-RINGS			
													SHAFT	ROTARY	STATIONARY	ADAPTER
								A	B MAX	C MIN						
-14	1.750	6.64	3.50	3.75	2.44	0.69	1.91	5.21	5.33	5.46	0.57	1.44	132	138	139	151
-15	1.875	5.99	3.56	3.81	2.57	0.69	1.91		5.00		0.57	1.44	134	140	141	152
-17	2.125	6.99	3.88	4.25	2.82	0.69	1.91			5.95	0.69	1.44	138	144	145	153
-19	2.375	8.40	4.13	4.50	3.07	0.69	1.91			7.00	0.69	1.44	142	148	149	154
-20	2.500	7.77	4.50	4.75	3.19	0.69	1.91			6.75	0.69	1.44	144	150	151	154
								5/8"	3/4"	7/8"						
-21	2.625	6.98	4.55	4.78	3.54	0.88	2.50	6.00			0.69	1.77	231	235	236	242
-22	2.750	7.89	4.45	4.78	3.67	0.88	2.50		6.38		0.81	1.77	232	236	237	243
-24	3.000	8.64	4.93	5.39	3.92	0.88	2.50	7.00	7.13	7.25	0.94	1.77	234	238	239	246
-27	3.375	8.39	4.95	5.27	4.29	0.88	2.50		6.88		0.82	1.77	237	241	242	248
-30	3.750	9.76	5.08	6.40	4.67	0.88	2.50	8.25			0.82	1.77	240	244	245	252
-33	4.125	9.76	5.95	6.27	5.04	0.88	2.50			8.00	0.82	1.77	243	247	248	255
-36	4.500	12.49	6.75	7.49	5.42	0.88	2.50		10.76		0.88	1.77	246	250	251	258
-38	4.750	11.39	7.20	7.65	5.67	0.88	2.50	9.88	10.00		0.82	1.77	248	252	253	259

# 180 OVERSIZE DIMENSIONAL DRAWINGS



KEY (drawings & charts)	
A – Shaft Size	G – Minimum Bolt Circle by Bolt Size
B – Maximum Gland Diameter	H – Slot Width
C – Stuffing Box Inside Diameter	J – Gland Width
D – Inboard Seal Diameter	V – Shaft O-Ring
E – Required Stuffing Box Depth	W – Rotary Seal O-Ring
F – Outboard Seal Length	X – Stationary Seal O-Ring
	Y – Adapter O-Ring

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FORM NO. 072955 REV. 3

PRINTED IN USA 12/07