

Repair and Exchange Programs

Repair

This applies to equipment sent to our service centers in repairable condition and returned to the customer completely reconditioned. Pumps and compressors are overhauled and tested to exacting specifications. Additional charges may apply to replace missing parts or failed components such as drive motors, heat exchangers - customers will be advised prior to work being completed.

Exchange

Austin Scientific endeavor to maintain an exchange stock of the most common pumps and compressors to reduce equipment downtime to a minimum. If an exchange pump or compressor is available, we can ship within 24 hours. Some metal sealed, OnBoard and non-standard units may not be available for exchange.

Complete Cryopumps

Manufacturer	Model	Warranty
CTI-Cryogenics	Cryotorr®-100*	6 months
CTI-Cryogenics	Cryotorr®-8*	12 months
CTI-Cryogenics	Cryotorr®-10*	12 months
CTI-Cryogenics	Cryotorr®-400*	12 months
CTI-Cryogenics	Cryotorr®-500*	12 months
CTI-Cryogenics	On-Board®-8*, 10*, 400*	12 months
Austin Scientific	CryoPlex®-8	12 months
Austin Scientific	CryoPlex®-10	12 months
Austin Scientific	CryoPlex®-16	12 months
Air Products/APD	DE202, AP-8	6 months

Refrigerator Assy. (less vacuum vessel & arrays)

Manufacturer	Model	Used On	Warranty
CTI-Cryogenics	21 or 22	CT-100, CT-7	6 months
CTI-Cryogenics	350CP	CT-8/8F	12 months
CTI-Cryogenics	1020CP	CT-10	12 months
CTI-Cryogenics	1050CP	CT-400/500	12 months
Leybold	RGD 580/5100	RPK 5000/10000	12 months

Compressors

Manufacturer	Model	Warranty
CTI-Cryogenics	SCW	12 months
CTI-Cryogenics	8200	12 months
CTI-Cryogenics	8300	12 months
CTI-Cryogenics	1020R/RW	12 months
CTI-Cryogenics	8500/8510	12 months
Austin Scientific	125A/125W	12 months
Austin Scientific	450A/450W	12 months
Leybold	RW3	12 months
Leybold	RW4000	12 months
Leybold	RW6000	12 months

As an example of the scope of work performed in our standard overhaul, a CTI cryopump is repaired as follows:

Vacuum Side

1. Disassemble and clean parts to be reused.
2. Replace 15K condensing array with new assembly.
3. If 80K condensing array and 80K radiation shield are not in 'as new' condition, replace with new or reconditioned parts.
4. Inspect and test silicone diode and hydrogen vapor bulb temperature indicator and repair or replace if required.
5. Reassemble in clean room conditions using new indium gasket set.

6. Upgrade to new style relief valve and install 'standpipe' filter.
7. Leak check using helium mass spectrometer.

Helium Circuit

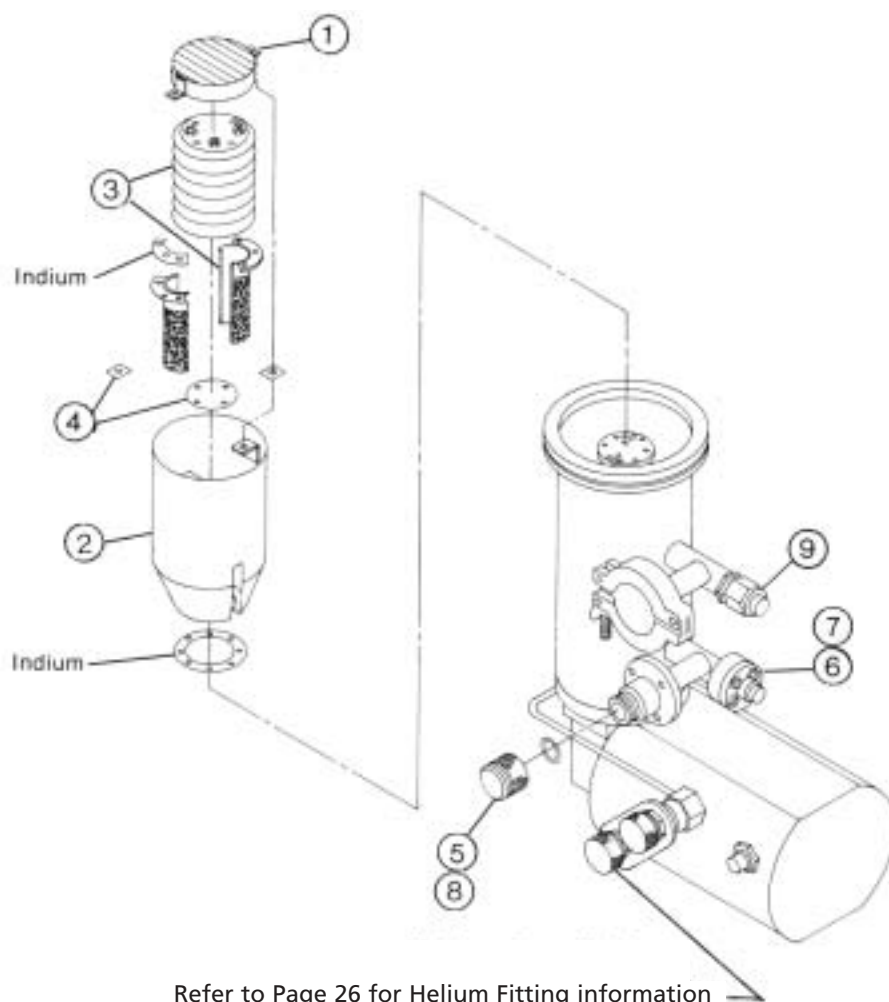
1. Replace all elastomers and all components subject to wear, including top and bottom bushings, drive bearing, cam bearings, motor bearings, displacer seals and kap seals.
2. Inspect displacer regenerator and repack or replace as necessary.

3. Inspect all parts for damage and replace as required, including scotch yoke, valves, valve stems, rocker arms, crankshaft, etc.
4. Set valve timing and test inlet valve for perfect seal.
5. Inspect motor shaft for cracks, replace shaft if required and remagnetize motor.
6. Leak check using helium sniffer probe.
7. Perform cool down test and verify conformance to specifications. Record test results for permanent record.

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Replacement Parts & Accessories

CTI Cryo-Torr® 100* Cryopump



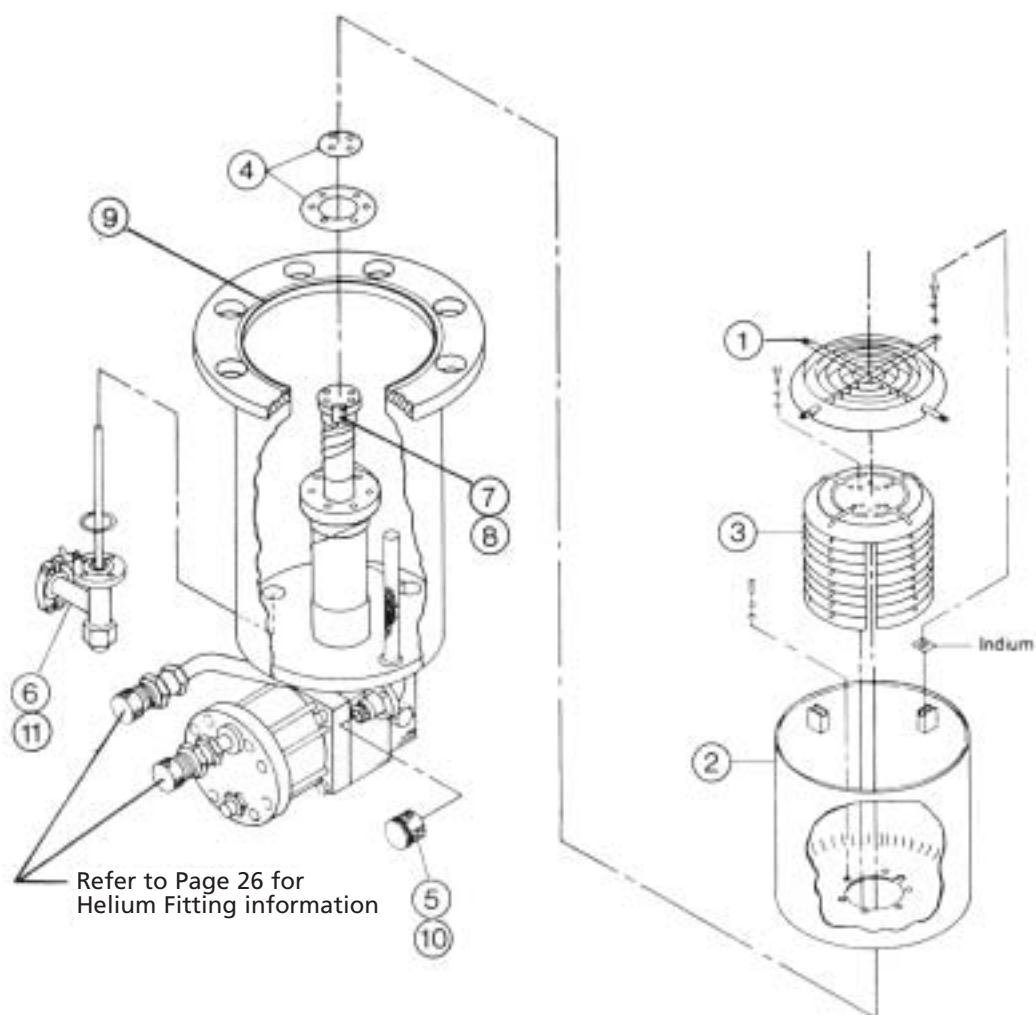
Refer to Page 26 for Helium Fitting information

Item	Description	CTI P/N	ASC P/N	Notes	Item
1	80K Condensing Array	8080002K001	80KCA-100	Incl. O-Ring, Gloves, etc.	1
2	80K Radiation Shield	8080002K004	99-0002-100	Incl. I-CT100, O-Ring, etc.	2
3	15K Condensing Array	8080002K003	99-0004-100	Incl. I-CT100, O-Ring, etc.	3
4	Indium Gasket Set-Precut	n/a	I-CT100	99.99% Pure Indium	4
4a	Indium Sheet 3" x 5" x .005"	n/a	I-3x5	99.99% Pure Indium	
5	Pressure Relief Valve	8080250K045	1027	New Improved Design	5
6	Silicon Diode Temp. Sensor	8080250K012	99-0002-001	Incl. Block and Leads	6
7	Silicon Diode Retrofit Kit	8080250K009	99-0002-000	Incl. Flange/Connector	6
8	Relief Valve Seal Kit	n/a	SK-RV		8
9	Purge Fitting Seal Kit	n/a	SK-RPF		9

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Replacement Parts & Accessories

CTI Cryo-Torr® 8* Cryopump

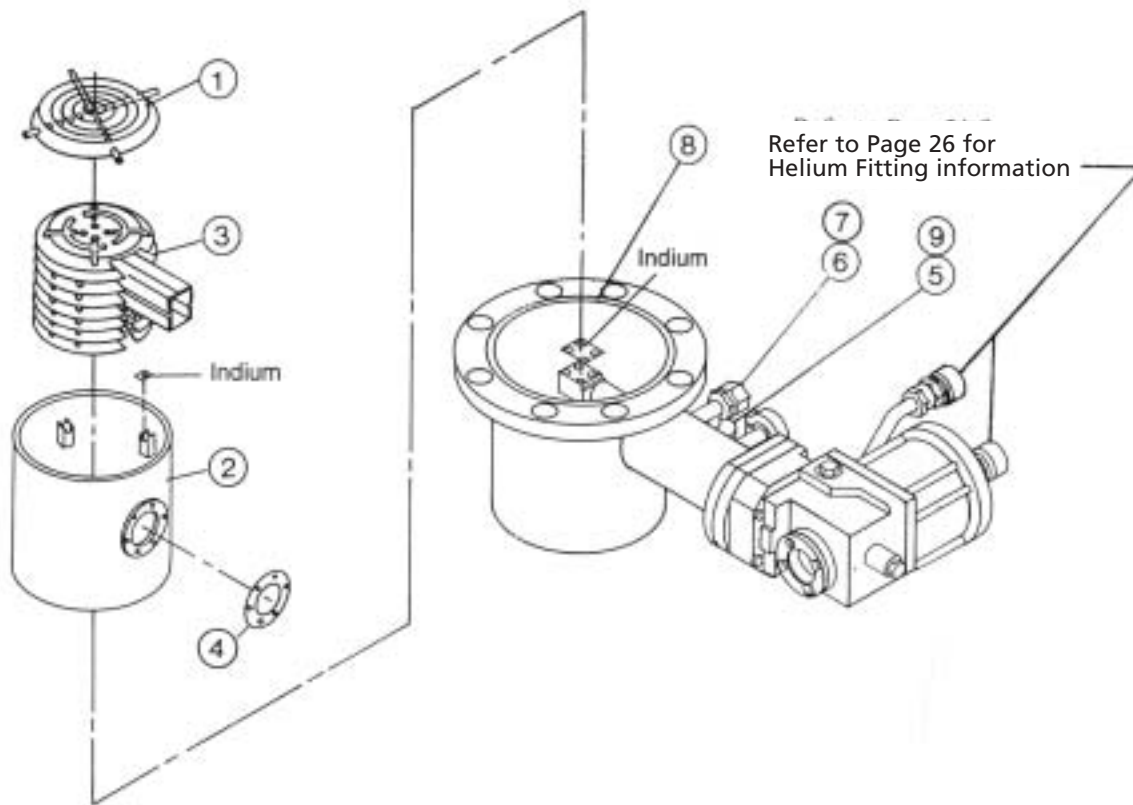


Item	Description	CTI P/N	ASC P/N	Notes	Item
1	80K Condensing Array	8080002K001	99-00018-008	Incl. I-CT8, O-Ring, etc.	1
2	80K Radiation Shield	8080002K004	80KRS-8F	Incl. I-CT8, O-Ring, etc.	2
3	15K Condensing Array	8080002K010	15KCA-8	Incl. I-CT8, O-Ring, etc.	3
4	Indium Gasket Set-Precut	n/a	I-CT8	99.99% Pure Indium	4
4a	Indium Sheet 3" x 5" x .005"	n/a	I-3x5	99.99% Pure Indium	
5	Pressure Relief Valve	8080250K045	10127	New Improved Design	5
6	Regeneration Purge Fitting	8044041G002	80029-PTA8	Complete Assy.	6
7	Hydrogen Vapor Bulb Assy.	8080250K006	10162	Complete Kit	7
7a	Silicon Diode Temp. Sensor	808025K012	99-00002-001	Incl. Block & Leads	
8	Silicon Diode Retrofit Kit	8080250K009	99-00002-000	Incl. Flange/Connector	8
9	Inlet Flange O-Ring	586441	2-172V		9
10	Relief Valve Seal Kit	n/a	SK-RV		10
11	Purge Fitting Seal Kit	n/a	SK-RPF		11

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Replacement Parts & Accessories

CTI Cryo-Torr® 8F* Cryopump

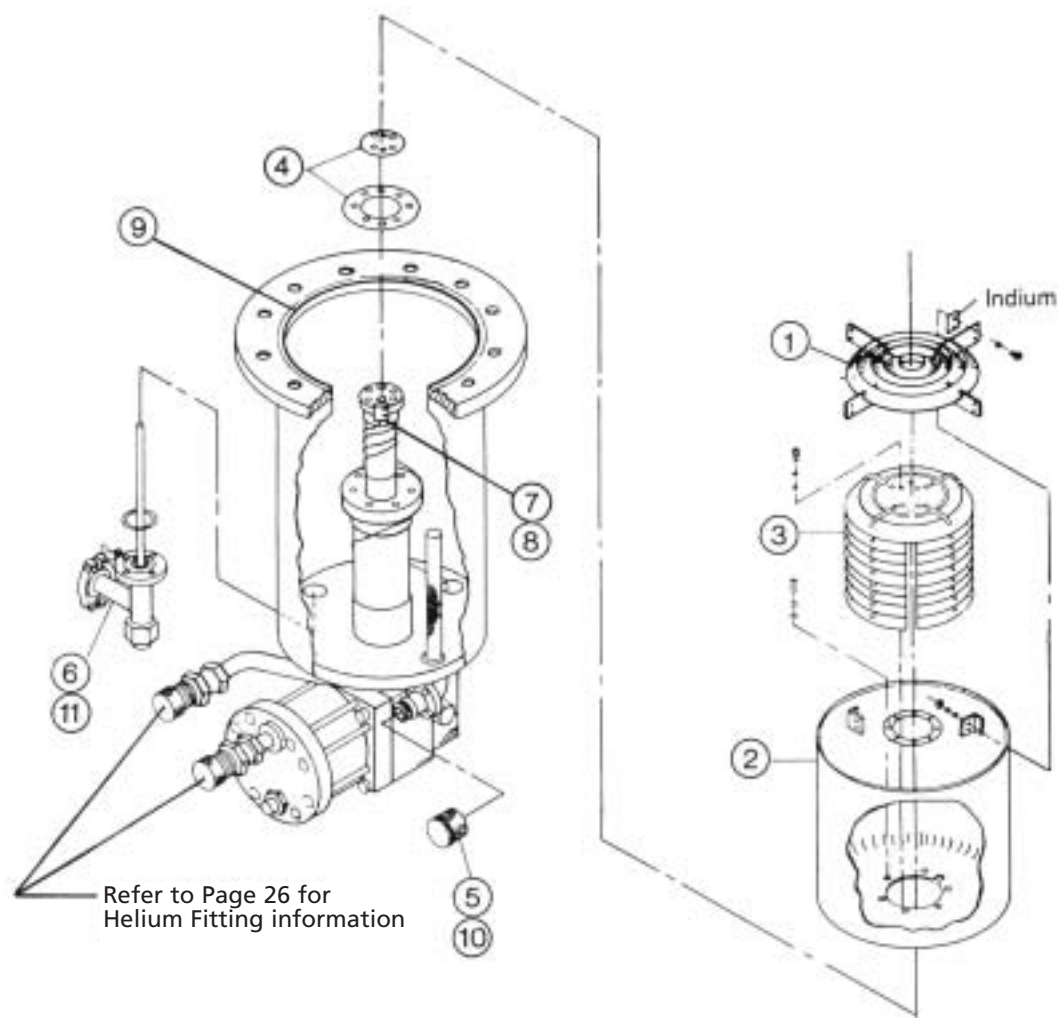


Item	Description	CTI P/N	ASC P/N	Notes
1	80K Condensing Array	8080007K001	99-00018-008	Ind. I-CT10, O-Ring, etc.
2	80K Radiation Shield	8080007K004	99-00025-008	Ind. I-CT10, O-Ring, etc.
3	15K Condensing Array	8080007K010	15KCA-8F	Ind. I-CT10, O-Ring, etc.
4	Indium Gasket Set-Precut	n/a	I-CT8	99.99% Pure Indium
4a	Indium Sheet 3" x 5" x .005"	n/a	I-3x5	99.99% Pure Indium
5	Pressure Relief Valve	8080250K045	10127	New Improved Design
6	Silicon Diode Temp. Sensor	8080250K012	99-00002-001	Incl. Block & Leads
7	Silicon Diode Retrofit Kit	8080250K009	99-00002-000	Incl. Flange/Connector
8	Inlet Flange O-Ring	586441	2-172V	
9	Relief Valve Seal Kit	n/a	SK-RV	
	Purge Fitting Seal Kit	n/a	SK-RPF	

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Replacement Parts & Accessories

CTI Cryo-Torr® 10* Cryopump

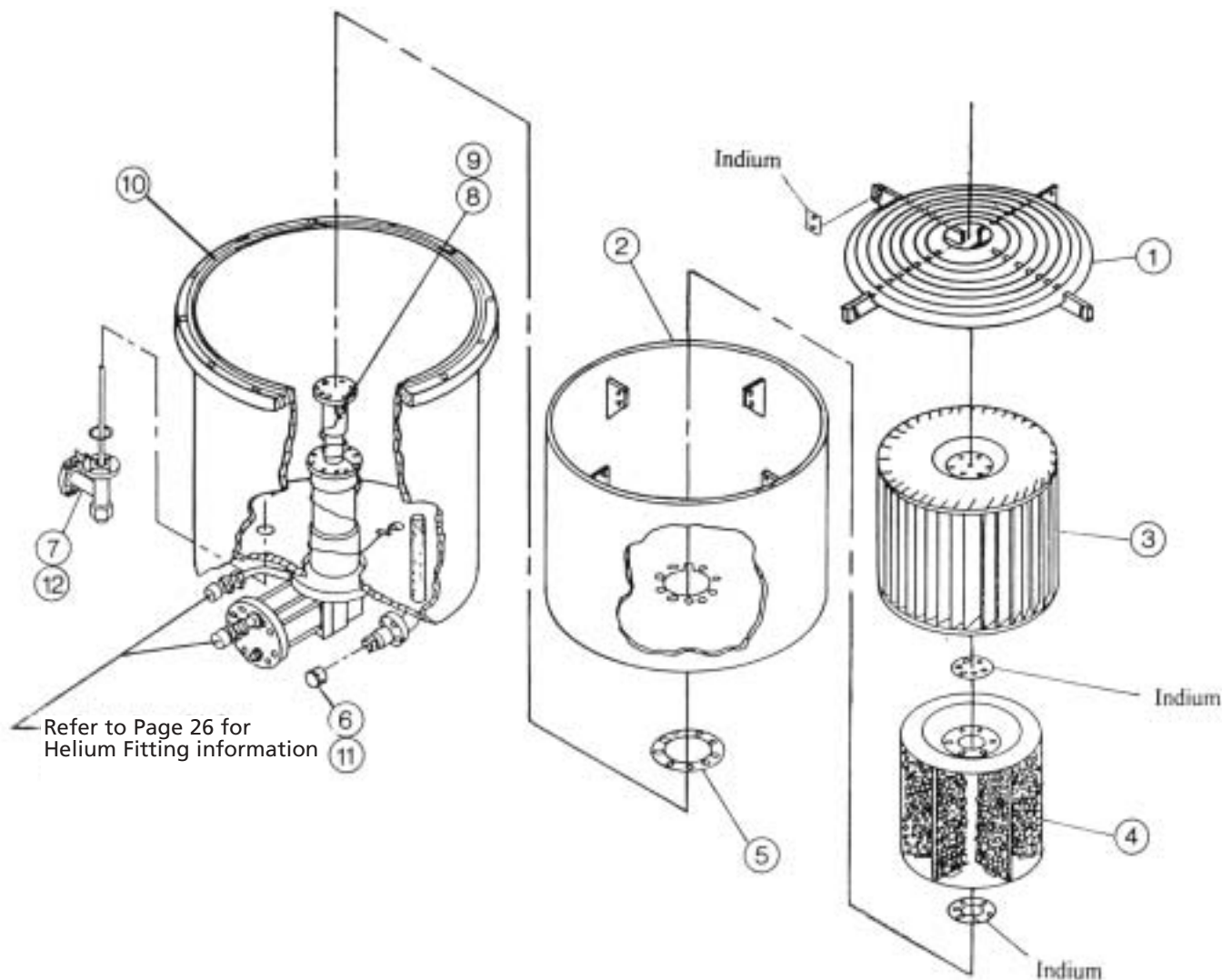


Item	Description	CTI P/N	ASC P/N	Notes
1	80K Condensing Array	8080003K001	99-00018-010	Incl. I-CT10, O-Ring, etc.
2	80K Radiation Shield	8080003K004	80KRS-10	Incl. I-CT10, O-Ring, etc.
3	15K Condensing Array	8080003K010	15KCA-10	Incl. I-CT10, O-Ring, etc.
4	Indium Gasket Set-Precut	n/a	I-CT10	99.99% Pure Indium
4a	Indium Sheet 3" x 5" x .005"	n/a	I-3x5	99.99% Pure Indium
5	Pressure Relief Valve	8080250K045	10127	New Improved Design
6	Regeneration Purge Fitting	044041G003	80029-PTA-10	Complete Assy.
7	Hydrogen Vapor Bulb Assy.	8080250K006	10162	Complete Kit
7a	Silicon Diode Temp. Sensor	8080250K012	99-00002-001	Incl. Block & Leads
8	Silicon Diode Retrofit Kit	8080250K009	99-00002-000	Incl. Flange/Connector
9	Inlet Flange O-Ring	7011001P278	2-278V	
10	Relief Valve Seal Kit	n/a	SK-RV	
11	Purge Fitting Seal Kit	n/a	SK-RPF	

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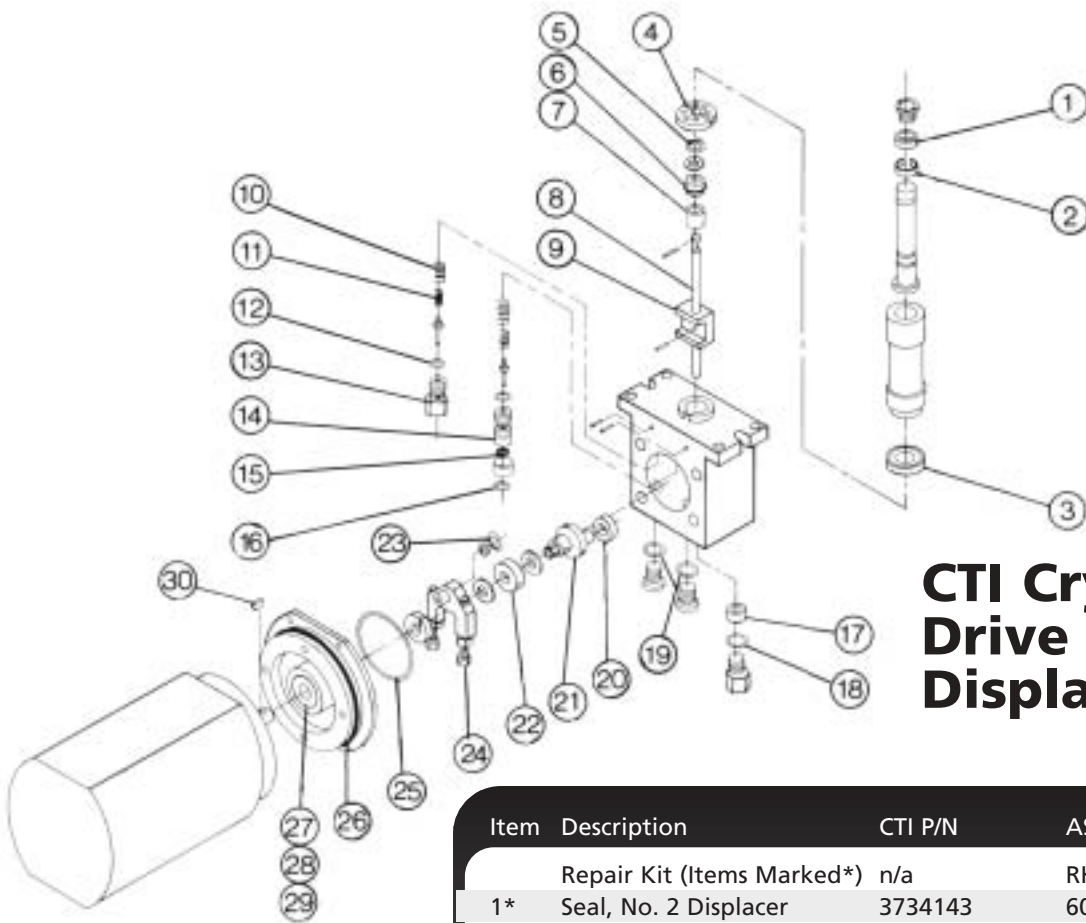
Replacement Parts & Accessories

CTI Cryo-Torr® 400* Cryopump



Item	Item Description	CTI P/N	ASC P/N	Notes
1	80K Condensing Array	8080004K001	99-00018-016	Incl. I-CT400, O-Ring, etc.
2	80K Radiation Shield	8080004K004	15KCA-400	Incl. I-CT400, O-Ring, etc.
3	15K Condensing Array	8080004K002	15KCA-400	Incl. I-CT400, O-Ring, etc.
4	15K Cryo-Adsorbing Array	8080004K003	15KCAA-400	Incl. I-CT400, O-Ring, etc.
5	Indium Gasket Set-Precut	n/a	I-CT400	99.99% Pure Indium
5a	Indium Sheet 3" x 5" x .005"	n/a	I-3x5	99.99% Pure Indium
6	Pressure Relief Valve	8080250K045	10127	New Improved Design
7	Regeneration Purge Fitting	8044043G003	80029-PTA16	Complete Assy.
8	Hydrogen Vapor Bulb Assy.	8080250K006	10162	Complete Kit
8a	Silicon Diode Temp. Sensor	8080250K012	99-00002-001	Incl. Block & Leads
9	Silicon Diode Retrofit Kit	8080250K009	99-00002-001	Incl. Flange/ Connector
10	Inlet Flange O-Ring	8080004K005	2-462V	
11	Relief Valve Seal Kit	n/a	SK-RV	
12	Purge Fitting Seal Kit	n/a	SK-RPF	

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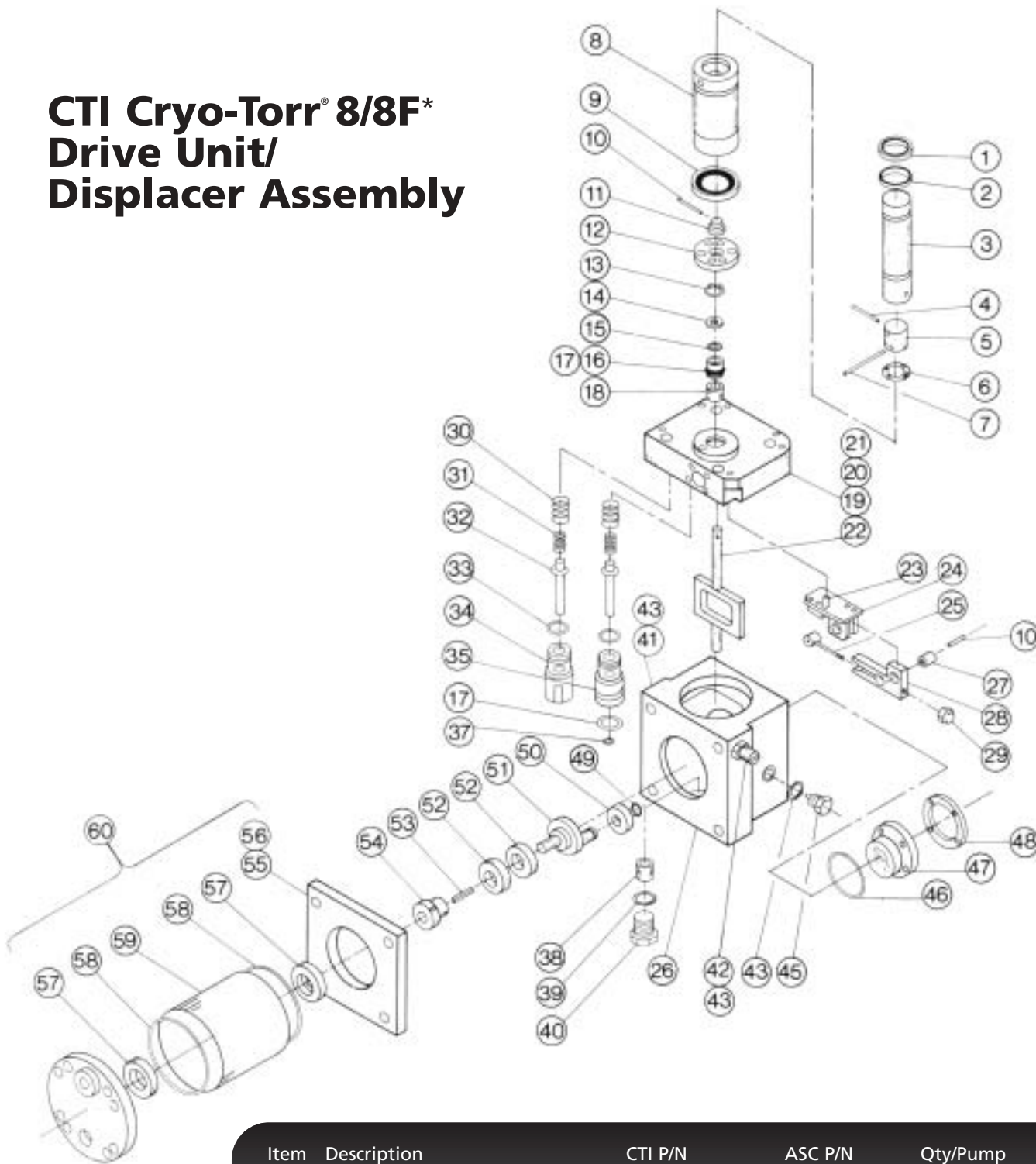


CTI Cryo-Torr® 7/100* Drive Unit/ Displacer Assembly

Item	Description	CTI P/N	ASC P/N	Qty/Pump
	Repair Kit (Items Marked*)	n/a	RK-CT7	1
1*	Seal, No. 2 Displacer	3734143	602125	1
2	Expander Ring	3734173	4060-0012	1
3*	Seal, No.1 Displacer	3734142	60218	1
4	Cap, No.1 Displacer	3734045	60332	1
5	Retaining Ring	56-02-57	3850-2000	1
6*	Seal Assy., Yoke	8081203	2540-0003	1
7*	Bushing	n/a	1660-0009	1
8	Yoke Shaft & Pins	8104022	60290	1
9	Yoke Block	n/a	60291	1
10	Valve Spring	57-96-97	4155-0072	2
11	Valve Spring	57-96-94	4155-0073	2
12*	O-Ring, Valve	58-34-06	2-010B	2
13	Exhaust Valve Body	3734023	60195	1
14	Inlet Valve Body	3821077	60196	1
15*	Seal Assy., Inlet Valve	3821084	60217	1
16*	O-Ring	58-34-08	2-011B	1
17*	Bushing	n/a	1660-0010	1
18*	O-Ring, Drive Rod Cap	58-34-07	2-012B	1
19*	O-Ring, Plug	58-34-17	2-013B	2
20*	Drive Bearing	3543128	1600-0047	1
21	Crankshaft	8104032	60194	1
22*	Bearing, Cam	3543433	1600-0048	1
23*	Retaining Ring	56-02-60	3850-2001	1
24	Valve Operator Assy.	8104050	60229	1
25*	O-Ring, Motor	58-43-12	2-033B	1
26*	O-Ring, Motor Housing	58-34-34	2-042B	1
27*	Front Bearing, Motor	3543135	1600-0049	1
28*	O-Ring, Bearing	n/a	2-020V	1
29*	Rear Bearing, Motor	n/a	2-020V	1
30*	Key, Motor Shaft	57-97-43	2670-0002	1
31*	O-Ring, Cylinder	58-54-92	2-037B	1

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CTI Cryo-Torr® 8/8F* Drive Unit/ Displacer Assembly



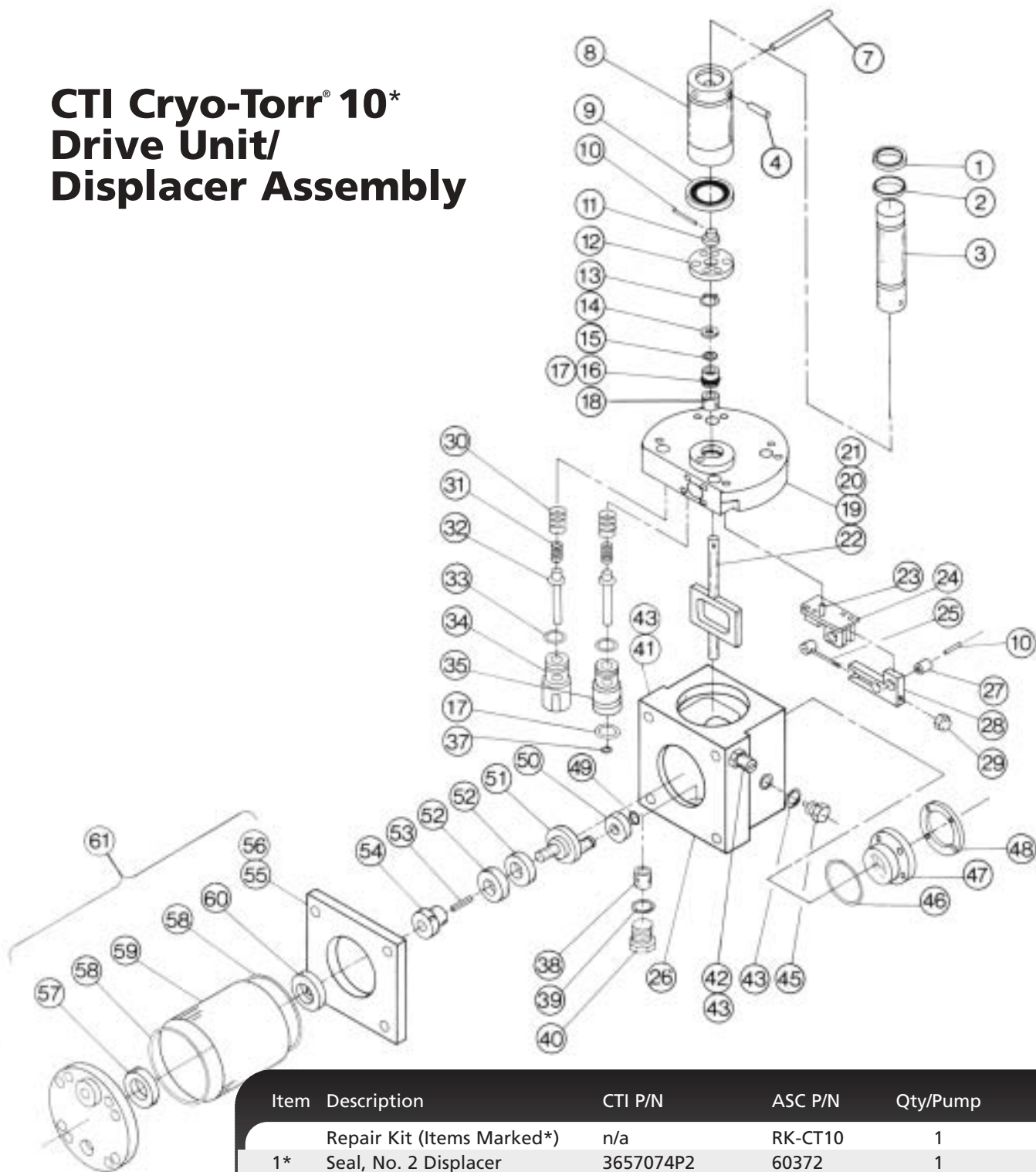
Item	Description	CTI P/N	ASC P/N	Qty/Pump
	Repair Kit (Items Marked*)	n/a	RK-CT8	1
1*	Seal, No.2 Displacer	3592009	L900698	1
2	Tool, Seal Insertion	3592011	L900712	1
3	No.2 Displacer	3592076	L900727	1
4	Pin, No.2 Displacer	52-07-50	3320-0005	1
5	Trunnion Pin	3592069	L900713	1
6	Washer, Spring	52-16-89	4750-0031	1
7	Pin, No.1 Displacer	3592136	L900708	1
8	No. 1 Displacer	3592067	L900723	1
9*	Seal, No.1 Displacer	8033109	L900697	1
10	Dowel Pin	52-01-01	3320-0009	3

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CTI Cryo-Torr® 8/8F* Drive Unit/Displacer Assembly

Item	Description	CTI P/N	ASC P/N	Qty/Pump
11	Collar Assy.	3695118	5400-0003	1
12	Cap, No.1 Displacer	3592304	L900720	1
13	Retaining Ring	56-02-10	3850-0036	1
14	Gland Washer	3588064	L900686	1
15*	Kap-Seal, Gland	3592389	L900709	1
16	Gland, Scotch Yoke	3588011	L900702	1
17	O-Ring, Gland	58-03-10	2-111B	2
18*	Bushing	51-03-43	60287	1
19	Valve Plate	8033013	10411	1
20*	O-Ring, Crankcase	58-03-35	2-234B	1
21*	O-Ring, Vessel	580322	2-140B	1
22	Scotch Yoke	3588300	L900684	1
23	Pin, Locating	52-07-52	3320-0012	1
24	Bracket, Rocker Arm	3588069	L900701	1
25	Adjusting Bolt	3588014	L900705	2
26	Crankcase	3588094G002	60191	1
27	Bushing, Rocker Arm	n/a	L900704	2
28	Rocker Arm & Bushing	3588013	1010-0001	2
29	Stop Nut	52-26-10	3160-0010	2
30	Compression Spring	8081139P0001	L900695	2
31	Valve Spring	8081139P0002	L900696	2
32	Valve Stem	3588017	L900680	2
33*	O-Ring, Valve	58-04-52	2-013B	2
34	Exhaust Valve Body	3588084	L900692	1
35	Inlet Valve Body	3588085	L900691	1
37*	Seal, Inlet Valve	3588079	L900710	1
38*	Bushing	n/a	60288	1
39*	O-Ring, Plug 1 0.5	58-14-10	2-014B	1
40	Plug	3588052	L900693	1
41	Plug	51-10-36	L900694	1
42	Relief Valve	51-24-19	10131	1
43*	O-Ring	58-04-60	2-012B	3
45	Guide Pin & Plug	3588055	L900707	1
46*	O-Ring, Sight Glass	58-04-56	2-129B	1
47	Sight Glass	3588056	L900685	1
48	Retainer, Glass	3588057	L900681	1
49*	Retaining Ring	56-02-15	3850-0096	1
50*	Drive Bearing	3543017	1600-0043	1
51	Crankshaft	3588037	L900689	1
52*	Valve Bearing	3543016	1600-0044	2
53	Key	3588020	L900682	1
54	Valve Eccentric	3588066	L900688	1
55	Motor Front Plate	3588039	60188	1
56*	O-Ring	58-04-57	2-139B	1
57*	Motor Bearing	3543017	1600-0042	2
58*	O-Ring, Motor	58-04-95	2-044B	2
59	Motor Housing	3588033	55250-2026	1
60	Drive Motor Assy.	8033248	3100-0033	1

CTI Cryo-Torr® 10* Drive Unit/ Displacer Assembly



Item	Description	CTI P/N	ASC P/N	Qty/Pump
	Repair Kit (Items Marked*)	n/a	RK-CT10	1
1*	Seal, No. 2 Displacer	3657074P2	60372	1
2	Tool, Seal Insertion	3657028P001	60443	1
3	No. 2 Displacer	n/a	10174	1
4	Pin, No. 2 Displacer	3657066	60386	1
5	n/a			
5	n/a			
7	Pin, No. 1 Displacer	3657025P2	60213	1
8	No. 1 Displacer	n/a	10175	1
9*	Seal, No.1 Displacer	3657077	4060-0017	1
10	Dowel Pin	520101	3320-0009	3
11	Collar Assy.	3761113	5400-0003	1
12	Cap, No.1 Displacer	3761044	60232	1

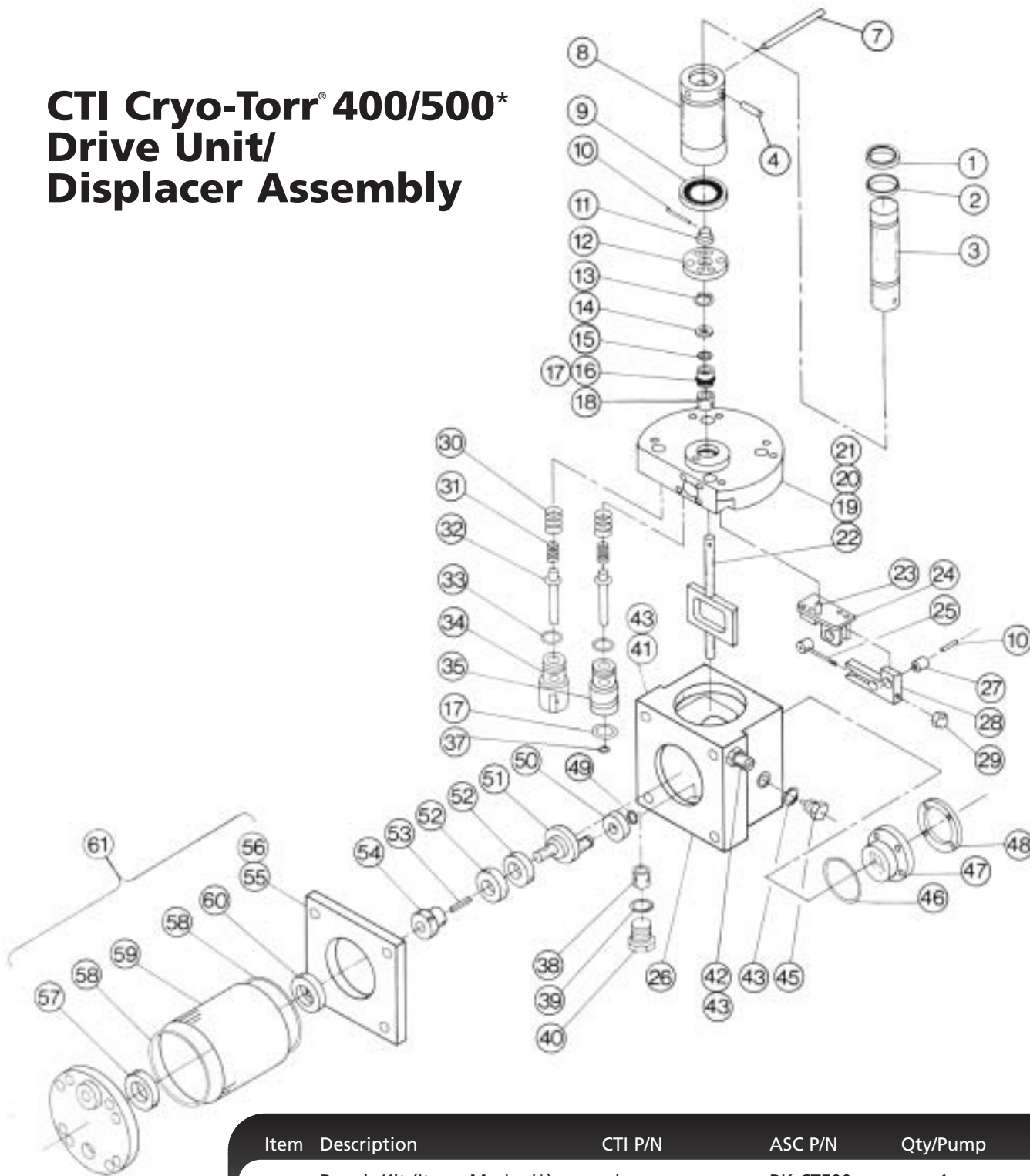
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CTI Cryo-Torr® 10* Drive Unit/Displacer Assembly

Item	Description	CTI P/N	ASC P/N	Qty/Pump
13	Retaining Ring	56-02-10	3850-0036	1
14	Gland Washer	3588064	L900683	1
15*	Kap-Seal, Gland	3592389	L900709	1
16	Gland, Scotch Yoke	3588011	L900702	1
17*	O-Ring, Gland	58-03-10	2-111B	2
18*	Bushing	51-03-43	60287	1
19	Valve Plate	8018077	10414	1
20*	O-Ring, Crankcase	58-03-35	2-234B	1
21*	O-Ring, Vessel	581442	2-232V	1
22	Scotch Yoke	3761009	60223	1
23	Pin, Locating	52-07-52	3320-0012	1
24	Bracket, Rocker Arm	3588069	L900701	1
25	Adjusting Bolt	3588014	L900705	2
26	Crankcase	3588094G002	60191	1
27	Bushing, Rocker Arm	n/a	L900704	2
28	Rocker Arm & Bushing	3588013	1010-0001	2
29	Stop Nut	52-26-10	3160-0010	2
30	Compression Spring	8081139P001	L900695	2
31	Valve Spring	8081139P002	L900696	2
32	Valve Stem	3588017	L900680	2
33*	O-Ring, Valve	58-04-52	2-013B	2
34	Exhaust Valve Body	3588084	L900692	1
35	Inlet Valve Body	3588085	L900691	1
37*	Seal, Inlet Valve	3588079	L900710	1
38*	Bushing	n/a	60288	1
39*	O-Ring, Plug	58-14-10	2-014B	1
40	Plug	3761026	L900693	1
41	Plug	51-10-36	L900694	1
42	Relief Valve	695538	10131	1
43*	O-Ring	58-04-60	2-012B	3
45	Guide Pin & Plug	3588055	L900707	1
46*	O-Ring, Sight Glass	58-04-56	2-129B	1
47	Sight Glass	3588056	L900685	1
48	Retainer, Glass	3588057	L900681	1
49*	Retaining Ring	56-02-15	3850-0096	1
50*	Drive Bearing	3543017	1600-0043	1
51	Crankshaft	3588037	60224	1
52*	Valve Bearing	3543016	1600-0044	2
53	Key	8081351	L900682	1
54	Valve Eccentric	3588066	L900688	1
55	Motor Front Plate	3588039	40-00080-001	1
56*	O-Ring	58-04-57	2-139B	1
57*	Motor Bearing	n/a	1600-0042	1
58*	O-Ring, Motor	58-04-95	2-044B	2
59	Motor Housing	n/a	n/a	
60*	Motor Bearing	n/a	1600-0045	1
61	Drive Motor Assy.	8004110	3100-0034	1
62*	O-Ring, Cylinder	58-64-39	2-157-B	1

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CTI Cryo-Torr® 400/500* Drive Unit/ Displacer Assembly



Item	Description	CTI P/N	ASC P/N	Qty/Pump
	Repair Kit (Items Marked*)	n/a	RK-CT500	1
1*	Seal, No. 2 Displacer	3592009	L900698	1
2	Tool, Seal Insertion	3592011	L900702	1
3	No. 2 Displacer	3592076	10177	1
4	Pin, No. 2 Displacer	3657066	60386	1
7	Pin, No. 1 Displacer	3657025P2	60213	1
8	No. 1 Displacer	n/a	10176	1
9*	Seal, No.1 Displacer	3657077	4060-0017	1
10	Dowel Pin	52-01-01	3320-0009	3
11	Collar Assy.	3761113	5400-0003	1
12	Cap, No.1 Displacer	3761044	60232	1

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CTI Cryo-Torr® 400/500* Drive Unit/Displacer Assembly

Item	Description	CTI P/N	ASC P/N	Qty/Pump
13	Retaining Ring	56-02-10	3850-0036	1
14	Gland Washer	3588064	L900683	1
15*	Kap-Seal, Gland	3592389	L900709	1
16	Gland, Scotch Yoke	3588011	L900702	1
17*	O-Ring, Gland	58-03-10	2-111B	2
18*	Bushing	51-03-43	60287	1
19	Valve Plate	8018077	10414	1
20*	O-Ring, Crankcase	58-03-35	2-234B	1
21*	O-Ring, Vessel	581442	2-232V	1
22	Scotch Yoke	3761009	60223	1
23	Pin, Locating	52-07-52	3320-0012	1
24	Bracket, Rocker Arm	3588069	L900701	1
25	Adjusting Bolt	3588014	L900705	2
26	Crankcase	3588094G002	60191	1
27	Bushing, Rocker Arm	n/a	L900704	2
28	Rocker Arm & Bushing	3588013	1010-0001	2
29	Stop Nut	52-26-10	3160-0010	2
30	Compression Spring	8081139P001	L900695	2
31	Valve Spring	8081139P002	L900696	2
32	Valve Stem	3588017	L900680	2
33*	O-Ring, Valve	58-04-52	2-013B	2
34	Exhaust Valve Body	3588084	L900692	1
35	Inlet Valve Body	3588085	L900691	1
37*	Seal, Inlet Valve	3588079	L900710	1
38*	Bushing	n/a	60288	1
39*	O-Ring, Plug	58-14-10	2-014B	1
40	Plug	3761026	L900693	1
41	Plug	51-10-36	L900694	1
42	Relief Valve	3695538	10131	1
43*	O-Ring	58-04-60	2-012B	3
45	Guide Pin & Plug	3588055	L900707	1
46*	O-Ring, Sight Glass	58-04-56	2-129B	1
47	Sight Glass	3588056	L900685	1
48	Retainer, Glass	3588057	L900681	1
49*	Retaining Ring	56-02-15	3850-0096	1
50*	Drive Bearing	3543017	1600-0043	1
51	Crankshaft	3588037	60224	1
52*	Valve Bearing	3543016	1600-0044	2
53	Key	8081351	L900682	1
54	Valve Eccentric	3588066	L900688	1
55	Motor Front Plate	3588039	60219	1
56*	O-Ring	58-04-57	2-139B	1
57*	Motor Bearing	3543017	1600-0042	1
58*	O-Ring, Motor	58-04-95	2-044B	2
59	Motor Housing	n/a	n/a	1
60*	Motor Bearing	n/a	1600-0046	1
61	Drive Motor Assy.	8004110	3100-0034	1
62*	O-Ring, Cylinder	58-64-39	2-157-B	1

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