

8/02/01

ARIEL CORP. - BLACKJACK DIV.
SALES ORDER COVER SHEET

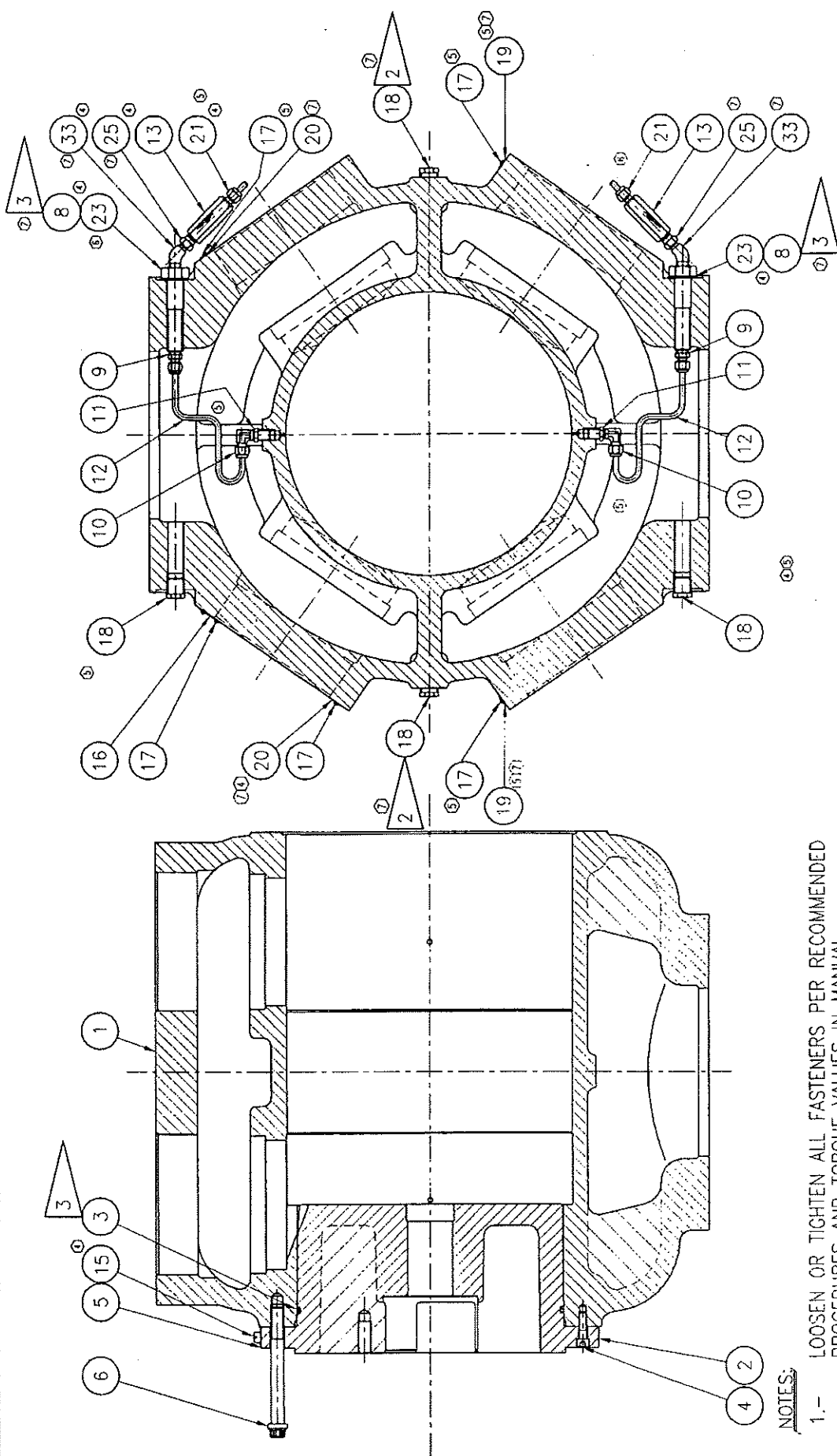
C/N: 001

RHCOVP02

SERIAL NUMBER: C-52110-11

PART: 13-1/2E CLASS DESCRIPTION: 13-1/2" JGE CYLINDER CLASS

PART NUMBER	QUANTITY	DESCRIPTION	DRAWING NO.
G-3369	1	CYL ASSY, 13-1/2H:E, STD	300 A-4896
G-0733	2	SUC.VLV ASY, 13-1/2R:H:E:RJ	D-0476
G-2332	4	DIS.VALVE ASSY, 13-1/2E:RJ	D-0477
G-7938	1	PIST. 13-1/2H:E, 2PC	A-10229
B-2372-U	2	SUC.VALVE, 147CHT, NY	A-9275
B-3056-U	2	SUC VALVE W/UNL, 147CHT, NY PL	A-9307
B-2373-DD	4	DIS.VALVE, 147CHT, MT	A-9276
G-9100	2	SUC VLV UNL ASSY, 13-1/2RJ:E	A-10608



- NOTES:
- 1.- LOOSEN OR TIGHTEN ALL FASTENERS PER RECOMMENDED PROCEDURES AND TORQUE VALUES IN MANUAL.
 2. USED TO PLUG INDICATOR PASSAGES WHERE APPLICABLE.
 3. OIL O-RING AND STAT-O-SEALS BEFORE INSTALLING.

7	8213	3	7704	REV	ECN	REV	ECN
6	8295	2	6953	REV	ECN	REV	ECN
5	7510	1	6282	REV	ECN	REV	ECN
4	8001	0	5428	REV	ECN	REV	ECN

ARIEL CORPORATION
 35 BLACKJACK ROAD
 MOUNT VERNON, OHIO 43050

APPROVED: _____
 SEAL: NONE

DATE: WRB 1/3/95
 REVISION: 1/5/95

ASSEMBLY DWG. NO. **A-4896**

REV	DESCRIPTION
7	ITEM 19 WAS ITEM 20. ITEM 20 WAS ITEM 19. CHANGED FLAG NUMBER FROM 2 TO 3 ON ITEMS NUMBER 8. REMOVED NOTE 2. APPLY AN ANTI-SEIZ LUBRICANT TO CASNET SURFACES. ADDED AND STAT-O-SEALS TO NOTE 3. NOTE 2 WAS NOTE 4.
6	ITEM 23 LUBRICANT WAS NEW (CRITICAL TO OIL RING SEAL) ITEM 23 LUBRICANT WAS RAN PARALLEL TO THE HORIZONTAL CENTERLINE CONFIGURATION.

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8/02/01

PARTS LIST

GROUP NO. G-3369

13-1/2" JGH:E CYLINDER BODY, ION-NITRIDED
TOP & BOTTOM LUBE AND CRANK END HEAD
RDP 275#, MAWP 300#
REF. DRWG. A-4896

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION	
001	D-1695	0	CYL BODY, 13-1/2H:E	300
002	C-0598	0	C E HEAD, 13-1/2H CL	
003	A-0653	1	O-RING, VT, 12.395 O.D.X.210	
004	FC0110EH	4	SOC HD CAP, 3/8-16 X 1-1/4	G8
005	B-0369	1	GASKET, RND, 16, X 1/64	
006	FC0120HV	12	12 PT, 5/8-11 X 5-1/2	G8
008	FW0550ID	2	STAT-O-SEAL, VT, 75DUR. 3/4 DIA	
009	A-0830	2	MALE CONN, STL, 1/4T X 1/8P	
010	A-0815	2	MALE ELBOW, STL, 1/4T X 1/8P	
011	A-0811	2	HEX RED BUSH, STL, 1/4M X 1/8F	
012	PT0200CB	90.	" SS, TUBING, 1/4 O.D.X.035 WALL	
013	A-3780	2	CHK.VLV, DOU.BALL SOFT SEAT SS	
015	A-0256	1	MACHINE SCREW PLUG, PL, 1/2-13	
016	A-0465	1	DATA PLATE, CYLINDER SPEC	STD
017	FR0570CC	12	DRIVE SCREW, #6 X 1/4 U-TYPE	
018	PP0810GB	6	PIPE PLUG, 1/2NPT, HEX HD, STL	
019	A-0640-A	2	INFO PLATE, SUCTION	
020	A-0640-B	2	INFO PLATE, DISCHARGE	
021	A-0827	2	MALE CONN, STL, 1/4T X 1/4P	
022	A-3989	2	STREET ELBOW, 45, 1/8P	STL
023	A-0583	2	LUBE FITTING, 3/4-10 X 3-1/2	
025	A-2114	2	HEX PIPE NIPPLE, STL, 1/4 X 1/8	

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.



8/02/01

PARTS LIST

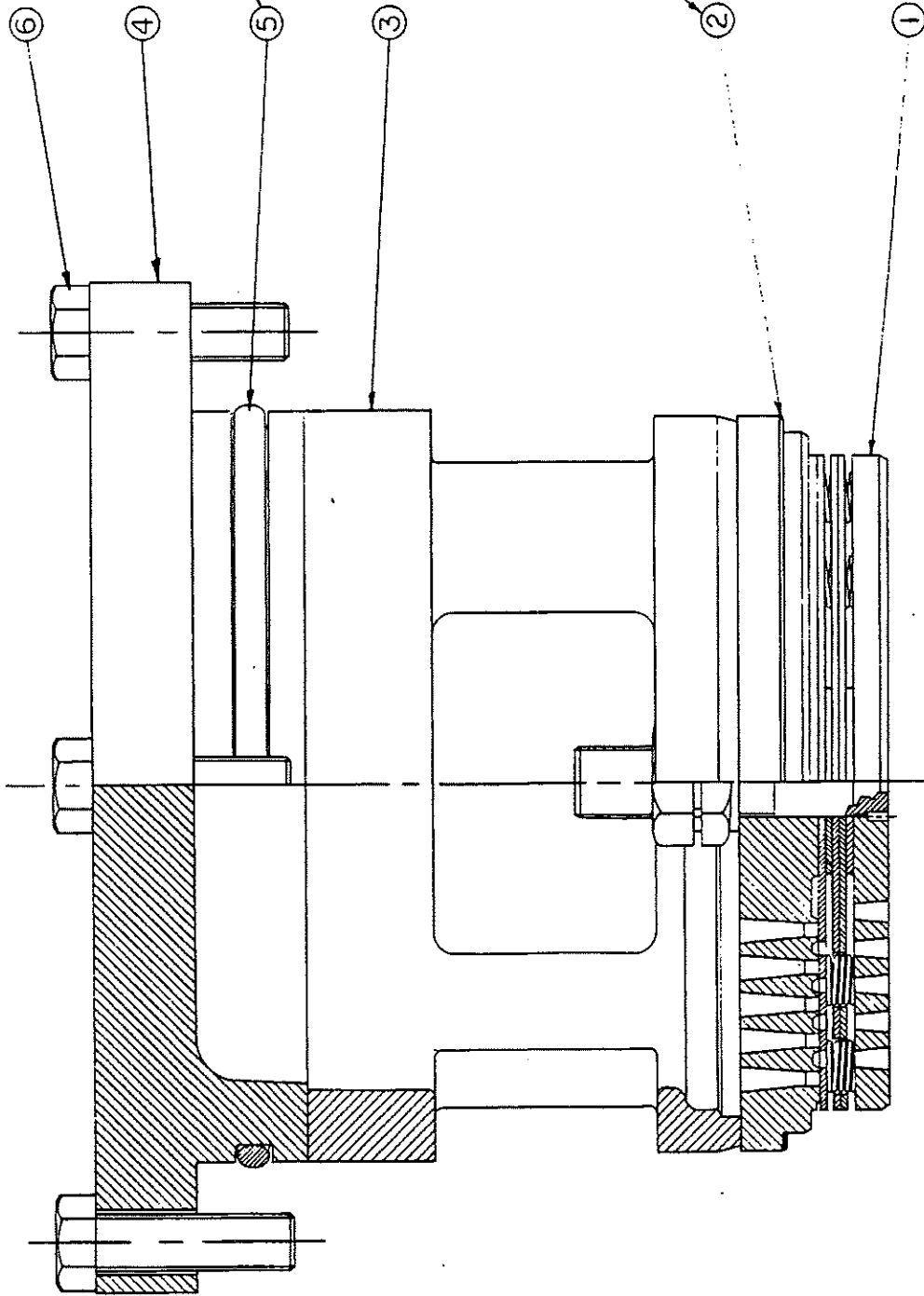
100 HD-1695

1 CYL ASSY,13-1/2H:E

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.

G-733
G-733-2

NOTE: LOOSEN OR TIGHTEN ALL BOLTS PER RECOMMENDED PROCEDURES AND TORQUE VALUES



NOTE: OIL O-RING
BEFORE INSTALLING

APPLY AN ANTI-SEIZE
LUBRICANT TO GASKET SURFACE

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RECORDING, OR BY ANY INFORMATION
STORAGE AND RETRIEVAL SYSTEM
WITHOUT PERMISSION IN WRITING
FROM THE U.S. GOVERNMENT

ASSY. DWG. No.
D-476

8/02/01

PARTS LIST

GROUP NO. G-0733

SUCTION VALVE, RETAINER AND CAP
13-1/2" JGR, JGH, JGE & RJ CLASS CYLINDER
REF. DRWG. D-0476

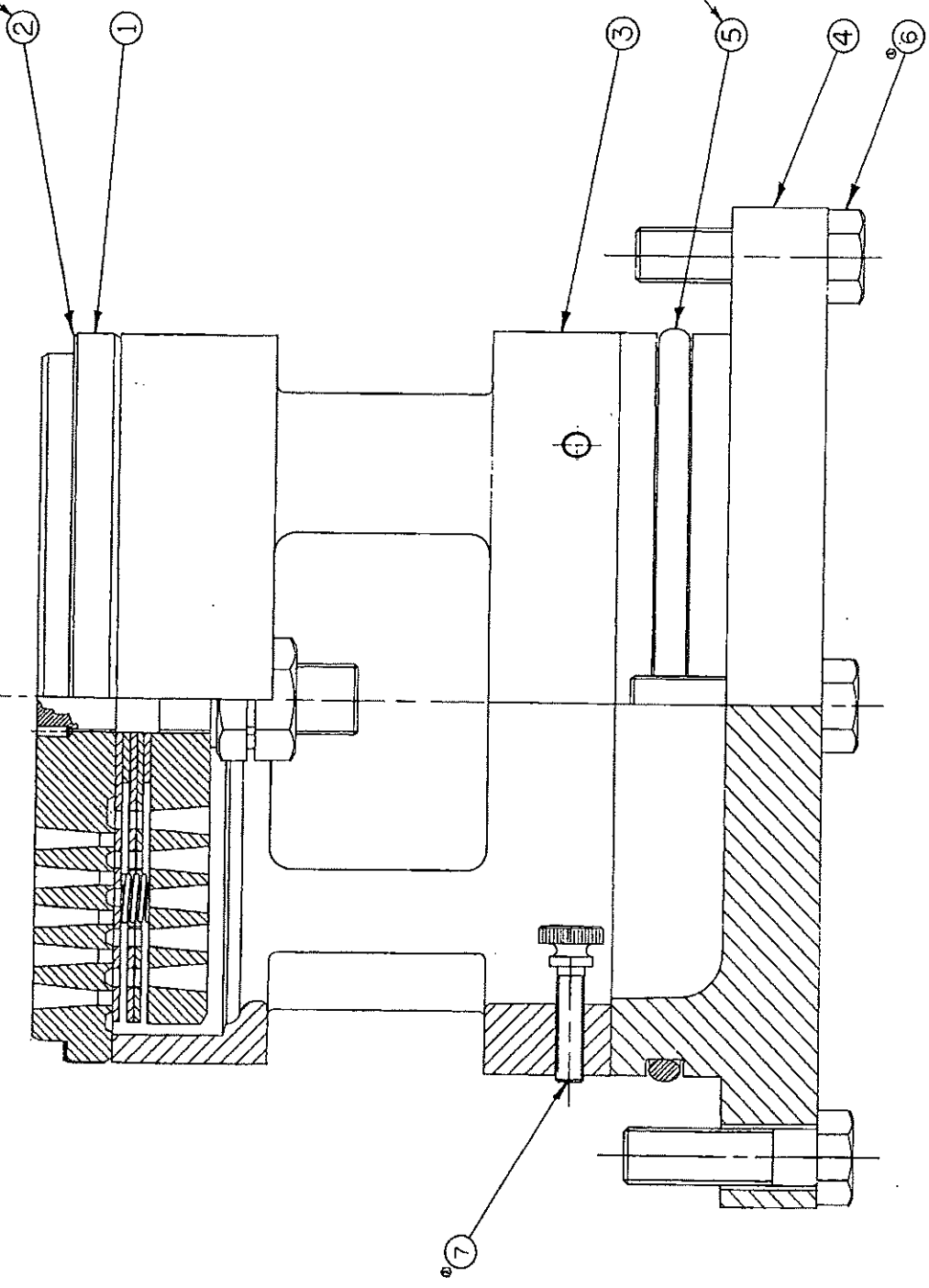
ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	SUCTION VALVE	0	FOR PART NO. SEE COVER SHEET
002	A-0655	1	STL GASKET, 6.448 X 6.147 X30
003	B-0535	1	VALVE RET, SUC, 13=17-1/4R:RJ
004	B-0534	0	VLV CAP, 13-1/2R:H:E:RJ CL
005	A-0031	1	O-RING, VT, 6.395 O.D.X.210
006	FC0171CDD	4	12 PT, 1/2-13 X 1-3/4 X 9/16 G8

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.

NOTE: LOOSEN OR TIGHTEN ALL BOLTS PER RECOMMENDED PROCEDURES AND TORQUE VALUES

APPLY AN ANTI-SEIZE LUBRICANT TO GASKET SURFACES

NOTE: OIL O-RING BEFORE INSTALLING



1000
1000
1000

ASSY. DWG. N^o.
D-477

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DISCHARGE VALVE 1 1/2" JGR

1000
1000
1000

8/02/01

PARTS LIST

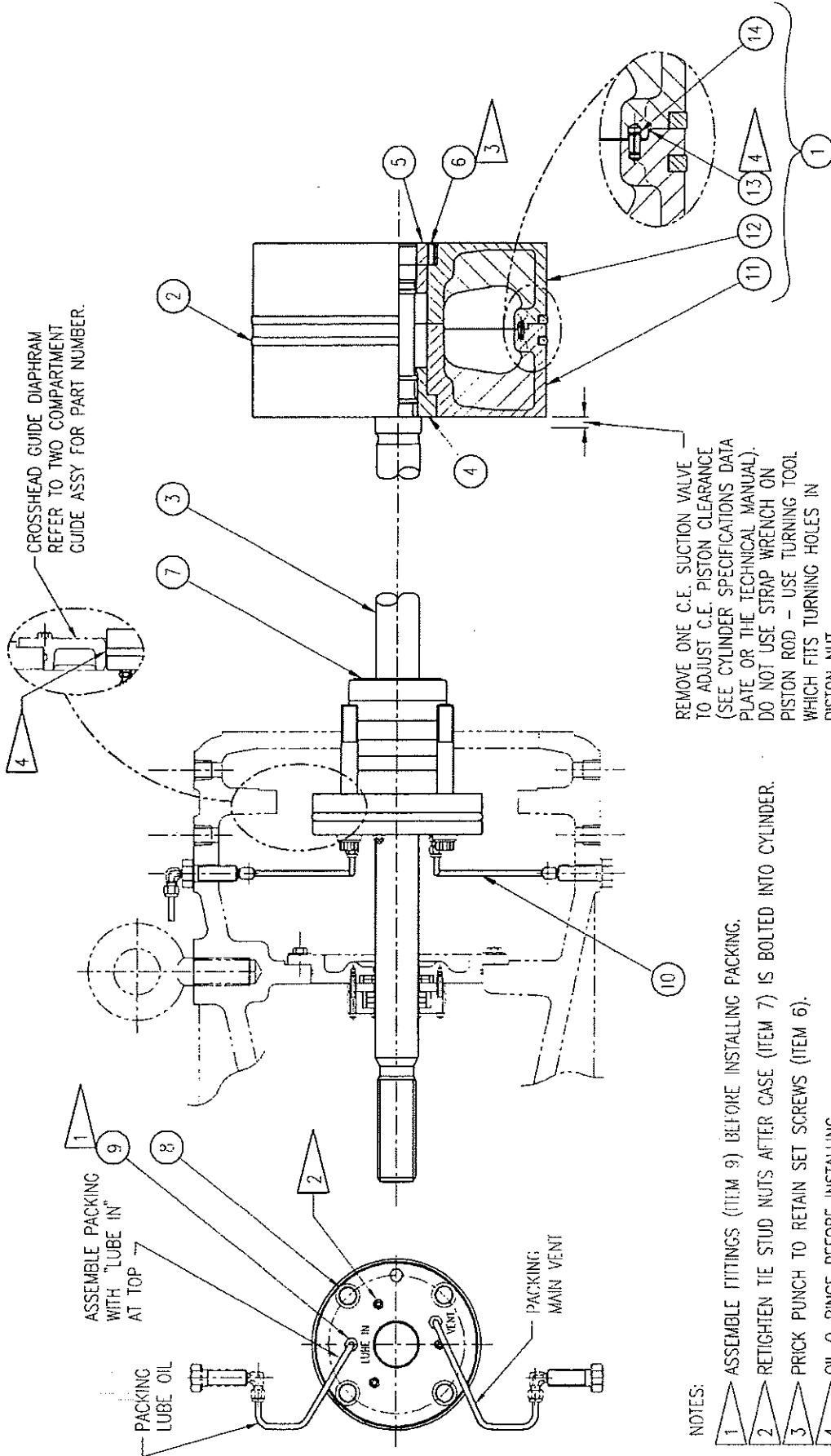
GROUP NO. G-2332

DISCHARGE VALVE, RETAINER AND CAP
13-1/2" JGE:RJ CLASS CYLINDER
REF. DRWG. D-0477

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	DISCHARGE VALVE	0	FOR PART NO. SEE COVER SHEET
002	A-0655	1	STL GASKET, 6.448 X 6.147 X30
003	B-1370	1	VALVE RET,DIS,13.5,17-1/4E:RJ
004	B-0534	0	VLV CAP,13-1/2R:H:E:RJ CL
005	A-0031	1	O-RING,VT, 6.395 O.D.X.210
006	FC0171CDD	4	12 PT,1/2-13 X 1-3/4 X 9/16 G8
007	A-2695	2	THUMB SCREW,NYLON,1/4-20 X 1

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.

OPTIONAL TWO COMPARTMENT GUIDE



CROSSHEAD GUIDE DIAPHRAM REFER TO TWO COMPARTMENT GUIDE ASSY FOR PART NUMBER.

REMOVE ONE C-E. SUCTION VALVE TO ADJUST C.E. PISTON CLEARANCE (SEE CYLINDER SPECIFICATIONS DATA PLATE OR THE TECHNICAL MANUAL). DO NOT USE STRAP WRENCH ON PISTON ROD - USE TURNING TOOL WHICH FITS TURNING HOLES IN PISTON NUT.

NOTES:

- 1 ASSEMBLE FITTINGS (ITEM 9) BEFORE INSTALLING PACKING.
- 2 RETIGHTEN TIE STUD NUTS AFTER CASE (ITEM 7) IS BOLTED INTO CYLINDER.
- 3 PRICK PUNCH TO RETAIN SET SCREWS (ITEM 6).
- 4 OIL O-RINGS BEFORE INSTALLING.
5. LOOSEN OR TIGHTEN ALL FASTENERS PER RECOMMENDED PROCEDURES AND TORQUE VALUES IN MANUAL.

		APPROVE: _____ SCALE: NONE	
		DRAWN: RLW 08-14-00	ASSEMBLY DWG. NO. A-10229
REV: 0	EGN: 8367	CHECKED: CAH 08-15-00	NONE

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REV	DESCRIPTION

8/02/01

PARTS LIST

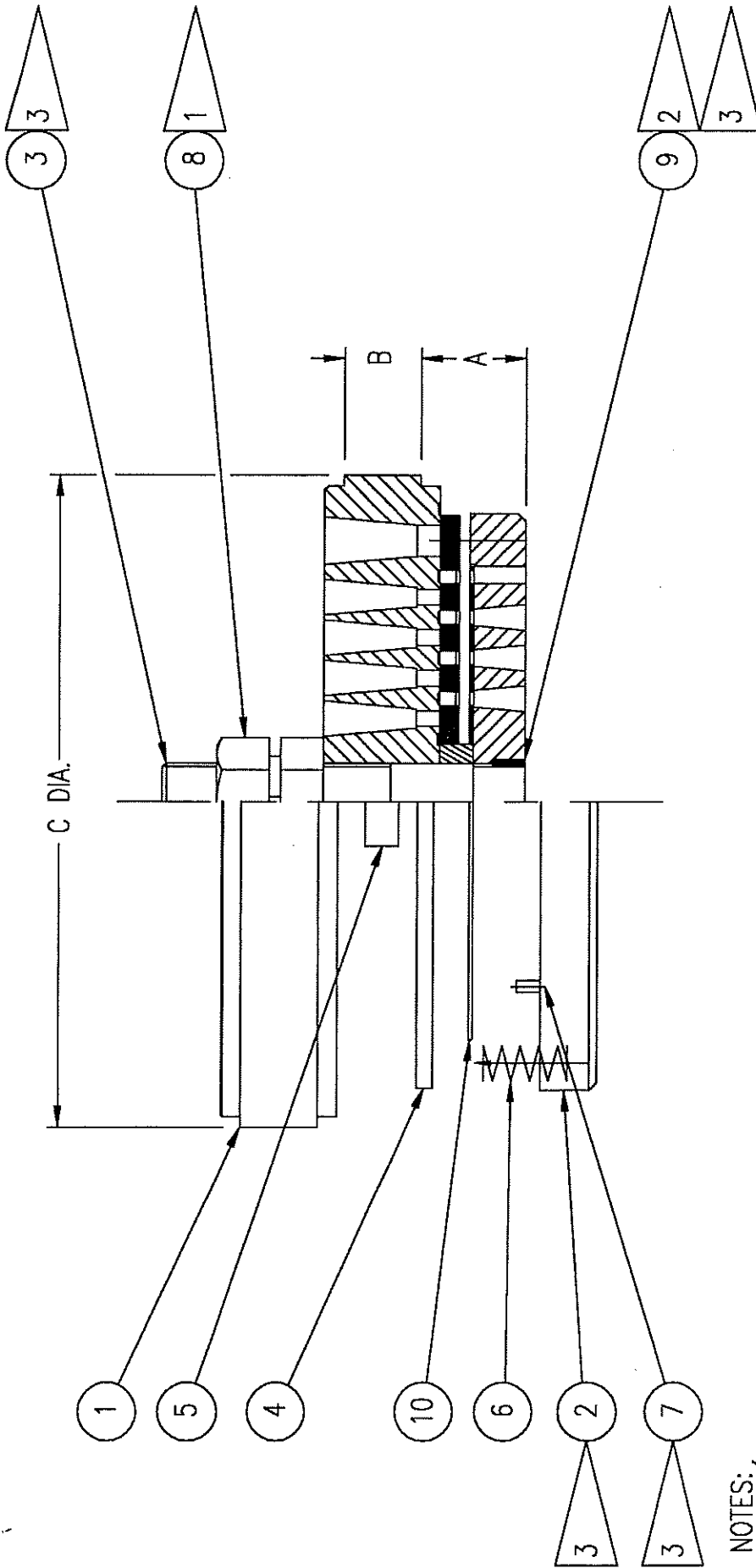
GROUP NO. G-7938

13-1/2"JGH PISTON, TWO PIECE,
PISTON/RIDER RINGS, TFE/CI PACKING
REF. DRWG. A-10229

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	C-2739	1	PISTON ASSY,RR,2PC, 13-1/2H:E
002	A-3420	2	RIDER RING,13-1/2R:H:E
003	C-0604	1	P ROD, 4.50STK/37.698LG
004	B-0846	1	PISTON COLLAR, JGH:E
005	B-0847	1	PISTON NUT, JGH:E
006	FS0405DG	2	CUP PT.SET-SCREW,5/16-24 X 1
007	B-1582	1	PKG,2.000, 350,STD,BTR
008	FC0120IW	4	12 PT,3/4-10 X 6 G8
009	A-0827	0	MALE CONN,STL, 1/4T X 1/4P
010	PT0200CB	18.	" SS,TUBING, 1/4 O.D.X.035 WALL
011	SC-2737	0	PISTON,RR,CE/PC 13-1/2H:E
012	SC-2738	0	PISTON,RR,HE/PC 13-1/2H:E
013	A-8220	0	O-RING,VT, 11.140 O.D. X .070
014	FP0505FD	0	ROLL PIN, 1/4 X 5/8
099	B-1582-K	0	PIST ROD PACKING,REBUILD KIT
099	B-1687-K	0	WIPER PKG,REB KIT,2.000,WAT

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.





NOTES:

1. SEE MANUAL FOR TORQUING VALUES (ITEM #8).
2. INSTALL PER ER-52.
3. VALVE GUARD ASSEMBLY (ITEM #2) CONSISTS OF VALVE GUARD, CENTER BOLT (ITEM #3), SPIROL PIN (ITEM #7) AND DOWEL PIN (ITEM #9).

ARIEL CORPORATION
 35 BLACKJACK ROAD
 MOUNT VERNON, OHIO 43050

SUCTION VALVE, CHT

TITLE:	SUCTION VALVE, CHT		
MATERIAL:	PROCURED		
DATE:	IG 9/27/99	R.S. No.	
CHECKED:	ED 10/1/99	PART NO.	
SCALE:	NONE	DWG. No.	A-9275

REV	0	7799	REV	ECN
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REV	DESCRIPTION

8/02/01

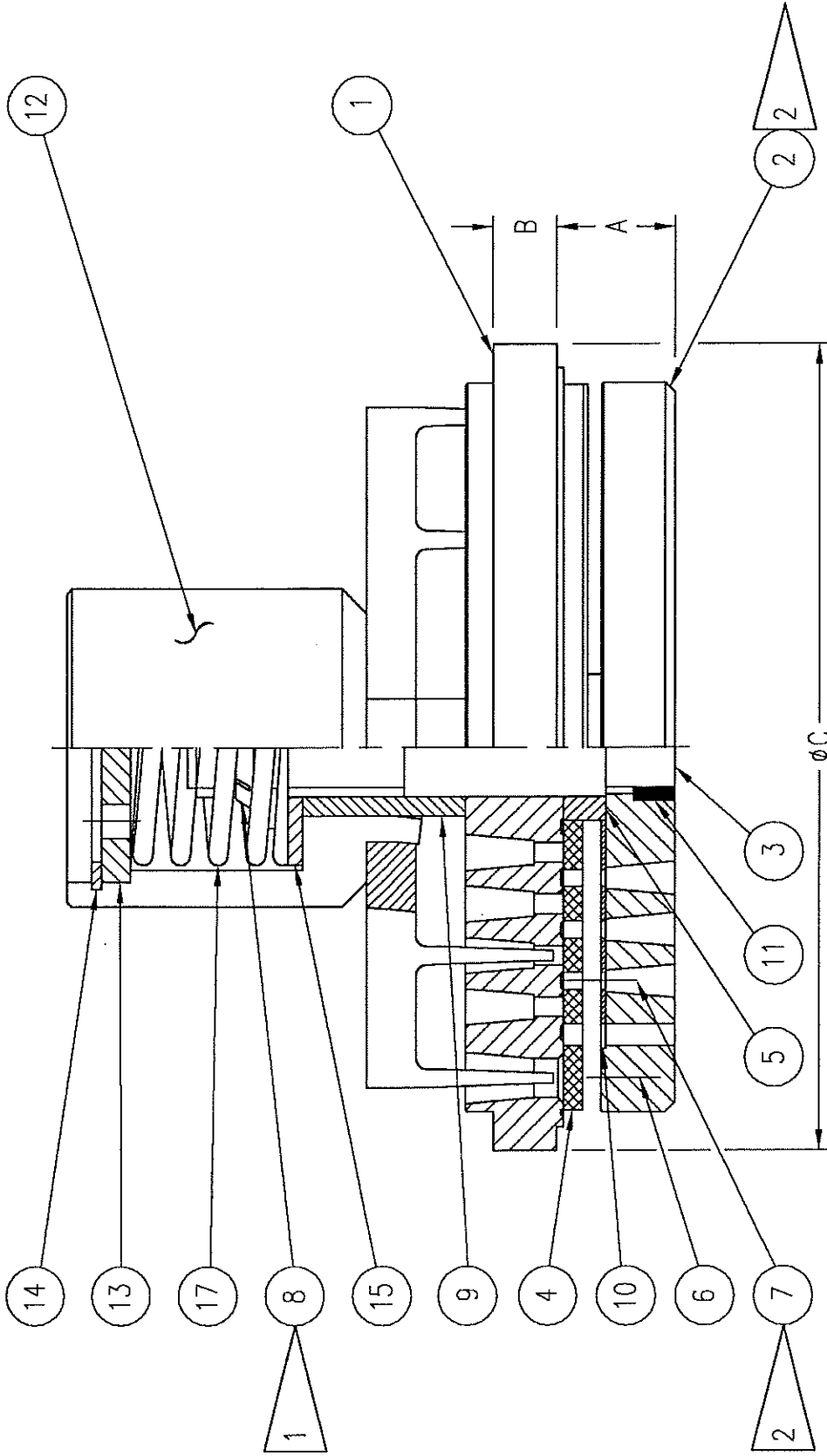
PARTS LIST

B-2372-U

0.9410=A
0.5120=B
6.4760=C
0.1020=LFT
REF DRWG. A-9275
ITEM

NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	A-2853	1	SUC.VALVE SEAT,147CHT
002	A-2854-A	1	SUC.VALVE GUARD ASSY,147CHT
003	A-2855	1	CENTER BOLT,3/4-16
004	A-8904	1	VALVE PLATE,147CT.197THK,NY
005	A-2859	1	GUIDE RING,147CHT,.338 THICK
006	A-1343	16	SPRING(.354/.276DX.630 WHITE)
007	A-2039	2	SPIROL PIN, 1/8 X 5/8
008	A-1462	1	LOCKNUT, DRAKE,3/4-16
009	A-1481	1	DOWEL PIN,134-164
010	A-2858	1	WAFER PLATE.147CHT

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.



NOTES:

1. SEE MANUAL FOR TORQUE VALUES (ITEM #8).
2. VALVE GUARD ASSEMBLY (ITEM #2) CONSISTS OF VALVE GUARD AND SPIRO PIN (ITEM #7).
3. REFER TO ACCOMPANYING PARTS LIST FOR ITEMS (AND QUANTITIES OF EACH) REQUIRED FOR THIS PARTICULAR VALVE. NOT ALL PARTS SHOWN ON THIS DRAWING MAY BE USED IN ALL VALVES.

ARIEL CORPORATION
 35 BLACKJACK ROAD
 MOUNT VERNON, OHIO 43050

TITLE:	VALVE WITH UNLOADER, CHT
MATERIAL:	PROCURED
DRAWN:	IG 2/21/01
CHECKED:	ED 2/21/01
SCALE:	NONE
REV	FCN
0	8575
REV	FCN
DESCRIPTION	A-9307

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--- DO NOT SCALE DRAWING ---

DIMENSIONING AND TOLERANCING PER ARIEL SPECIFICATION ER-17.0.1 UNLESS OTHERWISE SPECIFIED.

8/02/01

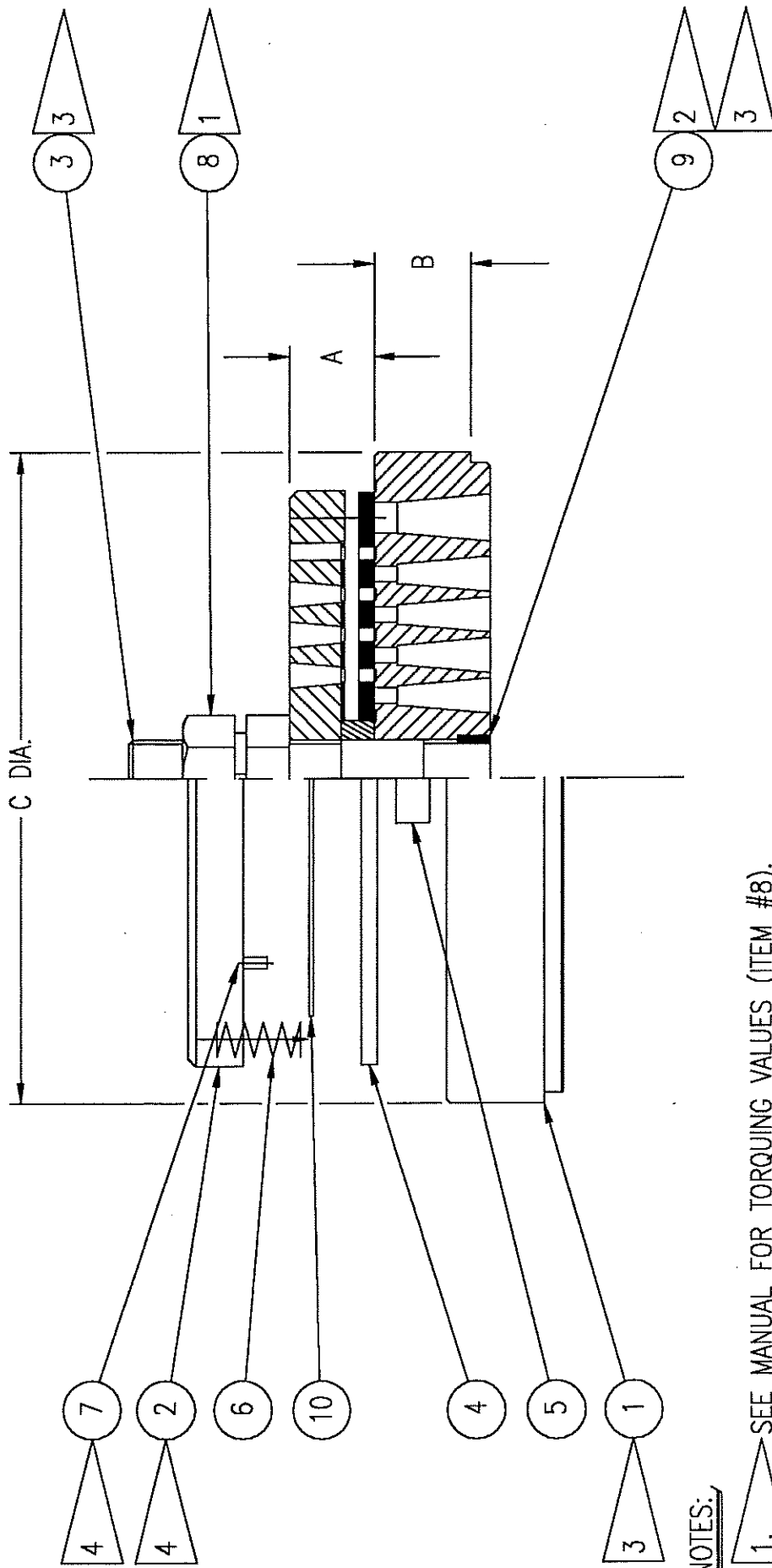
PARTS LIST

B-3056-U

0.9410=A
0.5120=B
6.4760=C
0.1020=LFT
REF DRWG. A-9307
ITEM

NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	A-2853	1	SUC.VALVE SEAT,147CHT
002	A-2854-B	1	SUC.VALVE GUARD ASSY,147 CHT
003	A-6456	1	CNTR STUD,3/4-16,SUC.VLV.UNL
004	A-8904	1	VALVE PLATE,147CT.197THK,NY
005	A-2859	1	GUIDE RING,147CHT,.338 THICK
006	A-1343	16	SPRING(.354/.276DX.630 WHITE)
007	A-2039	2	SPIROL PIN, 1/8 X 5/8
008	A-4958	1	LOCKNUT, GREER, 3/4-16
009	A-1481	1	DOWEL PIN,134-164
009	A-4633	1	BUSHING GUIDE,SUC.VLV.UNL
010	A-2858	1	WAFER PLATE.147CHT
012	A-6457	1	UNLOADER,147CHT,SUC.UNL
013	A-4636	1	UNLOADER COVER,147CHT
014	A-4639	1	RETAINING RING,SUC.UNLOADER
015	A-4638	1	WASHER,147CHT, SUC. UNL
016	A-4637	1	SPRING,147CHT, SUC. UNL

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.



NOTES:

1. SEE MANUAL FOR TORQUING VALUES (ITEM #8).
2. INSTALL PER ER-52.
3. VALVE SEAT ASSEMBLY (ITEM #1) CONSISTS OF VALVE SEAT, CENTER STUD (ITEM #3) AND DOWEL PIN (ITEM #9).
4. VALVE GUARD ASSEMBLY (ITEM #2) CONSISTS OF VALVE GUARD AND SPIROL PIN (ITEM #7).

ARIEL CORPORATION
 35 BLACKJACK ROAD
 MOUNT VERNON, OHIO 43050

TITLE: DISCHARGE VALVE, CHT	
MATERIALS: PROCURED	
DRAWN: IG 9/27/99	P.L.S. No.
CHECKED: ED 10/4/99	PART NO.
SCALE: NONE	DWG. No: A-9276

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DO NOT SCALE DRAWING	
DIMENSIONING AND TOLERANCING PER ARIEL SPECIFICATION ER-17.0.1 UNLESS OTHERWISE SPECIFIED.	
REV	EDN
0	7799

REV	DESCRIPTION

8/02/01

PARTS LIST

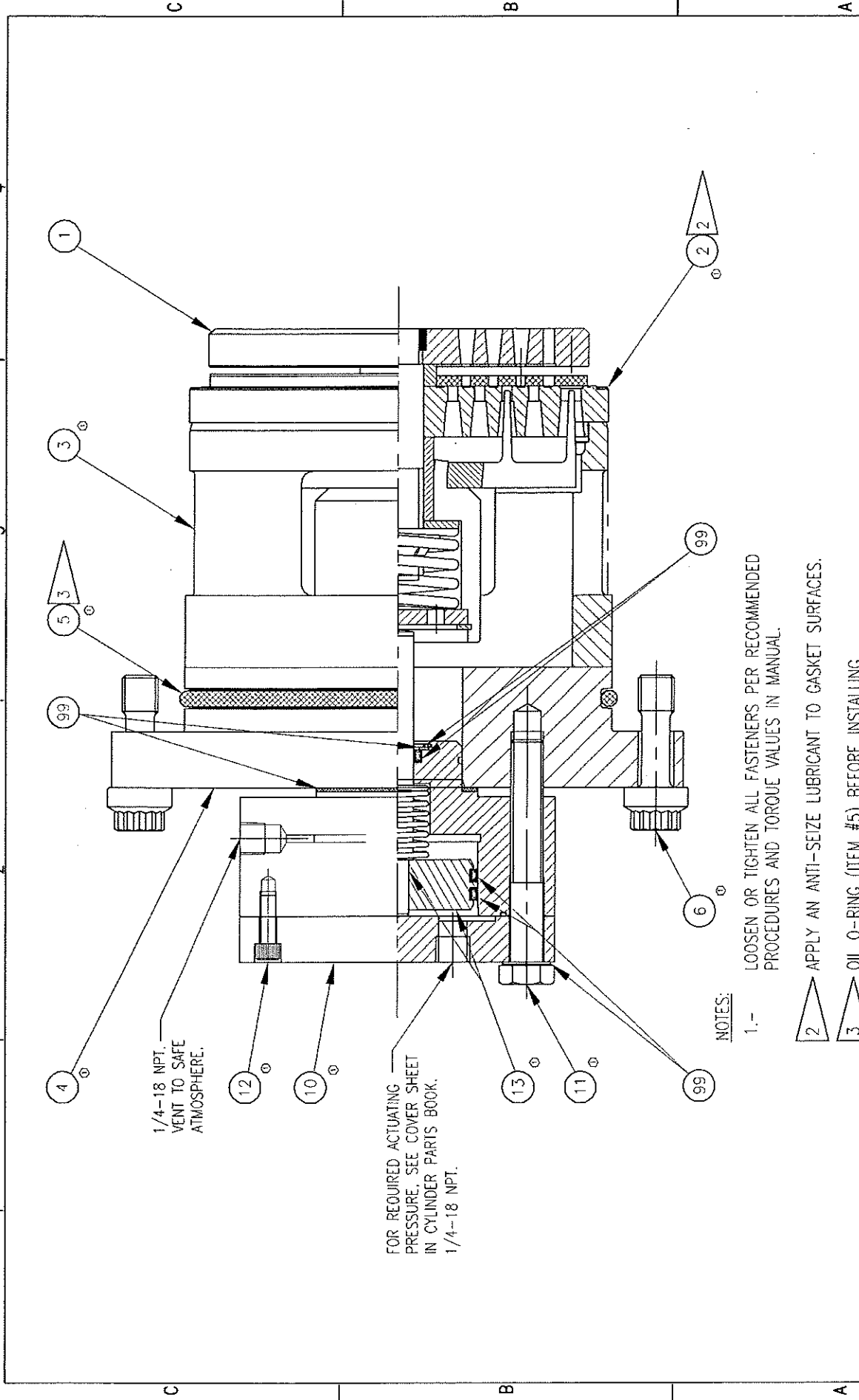
B-2372-DD

0.8900=A
0.4720=B
6.4530=C
0.1020=LFT
REF DRWG. A-9276
ITEM

NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	A-2860-A	1	DIS.VALVE SEAT ASSY,147CHT
002	A-2862-A	1	DIS.VALVE GUARD ASSY,147CHT
003	A-2861	1	CENTER STUD, 3/4-16
004	A-9592	1	VALVE PLATE,147CHT.197THK,MT
005	A-2859	1	GUIDE RING,147CHT,.338 THICK
006	A-1344	32	SPRING(.354/.276DX.630 GREEN)
007	A-2039	2	SPIROL PIN, 1/8 X 5/8
008	A-1462	1	LOCKNUT, DRAKE,3/4-16
009	A-1481	1	DOWEL PIN,134-164
010	A-2858	1	WAFER PLATE.147CHT

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.

1 2 3 4



1/4-18 NPT.
VENT TO SAFE
ATMOSPHERE.

FOR REQUIRED ACTUATING
PRESSURE, SEE COVER SHEET
IN CYLINDER PARTS BOOK.
1/4-18 NPT.

NOTES:

- 1.- LOOSEN OR TIGHTEN ALL FASTENERS PER RECOMMENDED PROCEDURES AND TORQUE VALUES IN MANUAL.
2. APPLY AN ANTI-SEIZE LUBRICANT TO GASKET SURFACES.
3. OIL O-RING (ITEM #5) BEFORE INSTALLING.
- 4.- ITEM "99" PARTS ARE INCLUDED IN THE REBUILD KIT.

REV	DESCRIPTION	INT./DATE
1	AT ZONE C1, ITEM #4 WAS #5, ITEM #12 WAS #9, ADDED ITEM #10. AT B1, ITEM #11 WAS #7, ADDED #13. AT C3, ITEM #5 WAS #6, #3 WAS #4. AT #4, ITEM #2 WAS #3. AT #2, ITEM #8 WAS #5.	IC 8/14/01

<p>ARIEL CORPORATION 35 BLACKJACK ROAD MOUNT VERNON, OHIO 43050</p>		APPROVED:	ASSEMBLY DWG. NO. A-10608
		<p>DRWING: IG 2/21/01 CHECKED: ED 2/21/01</p>	
1	8585		
0	8575		
REV	ECN	REV	

8/02/01

PARTS LIST

GROUP NO. G-9100

SUCTION VALVE UNLOADER, RETAINER AND CAP
ACTUATING PRESSURE 75-90 PSI
13-1/2" JGE:RJ CYLINDER CLASS
REF. DRWG. A-10608

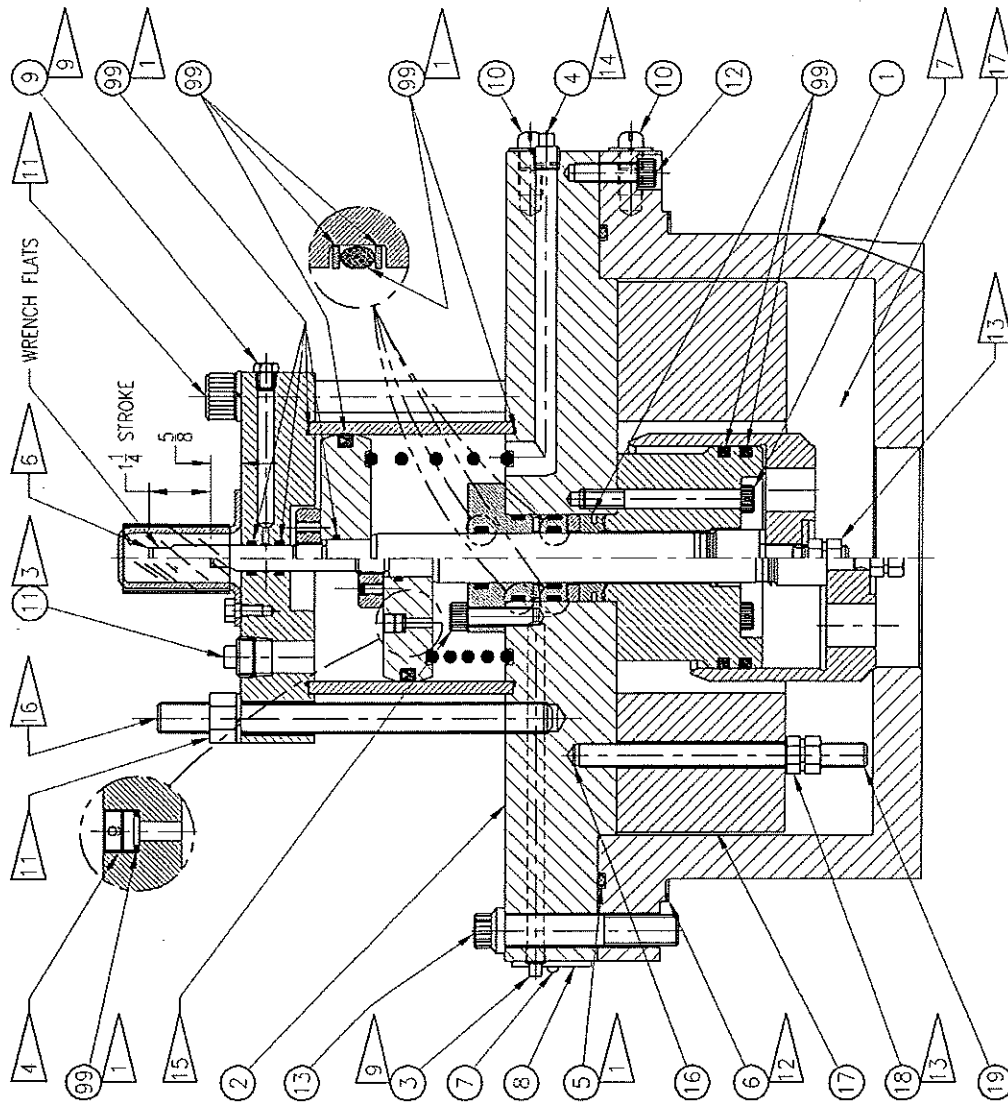
ITEM


NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	SUC.VALVE W/UNL	0	FOR PART NO. SEE COVER SHEET
002	A-0655	1	STL GASKET, 6.448 X 6.147 X30
003	B-2042	1	RETAINER, SUC VLV UNL, 13R
004	B-3055	1	VLV CAP, SVU, 13-1/2RJ
005	A-0031	1	O-RING, VT, 6.395 O.D.X.210
006	FC0171CDD	4	12 PT, 1/2-13 X 1-3/4 X 9/16 G8
010	A-10602	1	PISTON ACTUATOR, SUC.UNL, PA63M
011	FC0100GQ	4	HEX HD CAP, 1/2-13 X 3-1/2 G9
012	A-4825	0	SOCKET HD. CAPSCR, 1/4-20X3/4
099	A-8500-K	0	REBUILD KIT, PISTON ACT., PA63M

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
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NOTES:

- 1 OIL O-RING BEFORE INSTALLING.
- 2 LOOSEN OR TIGHTEN ALL FASTENERS PER RECOMMENDED PROCEDURES AND TORQUE VALUES IN MANUAL.
- 3 1/2 NPTF CONTROL MEDIA CONNECTION - 60 PSIG MIN. TO CLOSE UNLOADER (LOAD COMPRESSOR); MEDIA OFF AND VENTED TO OPEN UNLOADER (UNLOAD COMPRESSOR). MAX CONTROL PRESSURE IS 150 PSIG. RECOMMEND LOCALLY MOUNTED RELAY VALVE AND 1/2" O.D. MIN. TUBING SUPPLY LINE FOR HIGH SPEED UNITS. RECOMMENDED SINGLE LINE SIZE: 1/2" O.D. X .040 WALL TUBING.
- 4 APPLY LOCKTITE 272 TO THREADS.
- 5 LUBRICATE ALL SLIDING SURFACES WITH MAGNALUBE-G (DO NOT USE EXCESSIVE AMOUNTS).
- 6 DO NOT PAINT INDICATOR END OR SHAFT (PROJECTION). SHAFT IS STAINLESS STEEL.
- 7 TORQUE TO 13 FT-LBS. LOCKWIRE IN PAIRS.
- 8 WARNING: ALWAYS BE CERTAIN THERE IS NO RESIDUAL PRESSURE IN THE COMPRESSOR CYLINDER BORE OR ANY PASSAGEWAYS OF ANY VOLUME CONTAINMENT VESSEL BEFORE ATTEMPTING TO REMOVE ANY PRESSURE CONTAINMENT CLOSURE COVER PLUG, AND/OR FASTENERS DIRECTLY OR INDIRECTLY RELATED.
- 9 VENT TO SAFE ATMOSPHERE (NO BACK PRESSURE). VENT ANY LEAKAGE PAST THE PRIMARY GAS SEAL. THE SECOND SEAL PREVENTS GAS LEAKAGE FROM VENTING TO ATMOSPHERE. IF AN INERT GAS IS USED FOR CONTROL MEDIA THEN THIS VENT MAY BE PLUGGED OR LEFT OPEN.
- 10 ITEM "99" PARTS ARE INCL. IN THE UNLOADER REBUILD KIT.
 - 11 TORQUE TO 60 FT-LBS.
 - 12 APPLY ANTI SEIZE TO GASKET SURFACES.
 - 13 TORQUE TOP HALF TO 20 FT-LBS AND BOTTOM HALF TO 30 FT-LBS.
 - 14 1/4 NPTF VENT THIS CONNECTION TO SAFE ATMOSPHERE - NO BACK PRESSURE. USE MINIMUM 3/8" O.D. TUBING.
 - 15 TORQUE TO 13 FT-LBS.
 - 16 TORQUE TO 40 FT-LBS.
 - 17 ADDED FIXED CLEARANCE VOLUME= 46.5 CU. IN.



 ARIEL CORPORATION 35 BLACKJACK ROAD MOUNT VERNON, OHIO 43050		APPROVED:	NONE
		SCALE:	
REV	ECN	DATE	BY
0	8757	IG 7/25/01	DAH
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ASSEMBLY DWG. NO. A-10907			

9/10/01

PARTS LIST

GROUP NO. G-9329

HEAD END UNLOADER PLUG ASSEMBLY
13.5"R:H:E:RJ CYLINDER, 200 CU. IN.
REF DRWG: A-10907

ITEM NUMBER	PART NUMBER	QUANTITY	DESCRIPTION
001	C-3387	1	PNU UNL HE HD,13-1/2R:H:E:RJ
002	B-3104	1	PNU PLUG HE UNL,13.5R:EH:RJ200
003	PP0802RD	1	PIPE PLUG,1/8NPT,SQ HD,PLASTIC
004	PP0802CD	1	PIPE PLUG,1/4NPT,SQ HD,PLASTIC
005	A-0469	1	O-RING,VT,13.395 O.D.X.210
006	A-0654	1	STL GASKET,13.938 X 13.625 X60
007	FR0570CC	2	DRIVE SCREW, #6 X 1/4 U-TYPE
008	A-2247	1	DATA PLATE,UNLOADER SPEC, PNEU
009	PP0810RB	1	PIPE PLUG,1/8NPT,HEX HD,STL
010	A-0256	2	MACHINE SCREW PLUG,PL, 1/2-13
011	PP0802GD	1	PIPE PLUG,1/2NPT,SQ HD,PLASTIC
012	FC0110EH	2	SOC HD CAP,3/8-16 X 1-1/4 G8
013	A-10994	12	12 PT,5/8-11 X 4-1/8 G8
016	A-5671	2	LOCKWASHER, .394 O.D.
017	A-10906	1	VOLUME FILLER, 200 CI
018	A-1368	2	LOCKNUT, DRAKE 1/2-20
019	A-5670	2	DOG PT.STUD, 1/2-20 X 5
099	B-3104-K	0	REBUILD KIT,13-1/2R:E PLUG UNL

WHEN A ZERO APPEARS IN THE QUANTITY COLUMN IT
DOES NOT REPRESENT THE QUANTITY REQUIRED.

VARIABLE VOLUME CLEARANCE POCKET



1.0 PURPOSE

1.1 This procedure is to be used when installing a head end variable volume clearance pocket (VVCP) on a compressor cylinder.

1.2 Also provides VVCP adjustment instructions.

2.0 SELECTION

2.1 Check with your distributor or Ariel to be sure that you have the correct VVCP for your cylinder.

2.2 Volumetric efficiency should be evaluated for each cylinder end. The addition of excessive clearance on a cylinder end can result in a volumetric efficiency of zero for that cylinder end, even though the volumetric efficiency calculations based on overall clearance can appear acceptable. Calculation error can result in driver overload or discharge valve failures.

3.0 INSTALLATION INSTRUCTIONS

3.1 Be certain the cylinders are vented to atmospheric pressure.

CAUTION! To prevent personal injury, assure that compressor crankshaft cannot be turned by the driver or compressor cylinder gas pressure during maintenance:
- on engine-driven compressors, remove the center coupling or lock the flywheel,
- on electric motor-driven compressors, if it is inconvenient to detach the driver from the compressor, the driver switch gear must be locked out during maintenance. Before starting any maintenance or removing any components, relieve all pressure from the compressor cylinders (see packager's instruction for completely venting the system). For compressors in sour gas service or other hazardous gas, follow proper venting and purging procedures to prevent personal injury.

3.2 Remove the standard head end cylinder head.

CAUTION! Before removing the cylinder head, back off all capscrews 1/8 inches (3 mm). Make sure the head is loose and that all gas pressure in the cylinder is vented.

REV 1: ECN 6667

1	Generally revised to consolidate both versions & add adjustment running.
REV	DESCRIPTION

VARIABLE VOLUME CLEARANCE POCKET



3.3 New capscrews (12 point, grade 8) are provided with the VVCP. Make sure threads and seating surfaces are free of burrs, clean and lubricated with petroleum type lubricant. Install a new cylinder head gasket (included with the VVCP). Tighten the capscrews to the recommended torque value and procedures in the Ariel Operator's¹ Manual.

NOTE! After installing the VVCP, check total piston end clearance and re-set crank end / head end clearance with VVCP completely closed. See Ariel Operator's Manual for values.

3.4 As a double check, bar the crankshaft over manually to be sure the compressor rolls free.

3.5 Tube the VVCP packing vent off of the skid, or out of the building, to a safe atmosphere.

3.5.1 A VVCP in sour gas service must have the packing vent connected to an appropriate vent header for proper disposal.

4.0 ADJUSTMENT INSTRUCTIONS

4.1 VVCP clearance volume may be changed with the compressor running or stopped. Consult the Packager's instructions regarding where to set the VVCP. Also reference the VVCP data sheet in the Ariel Operator's Manual Parts Book.

4.1.1 The VVCP piston ring is designed not to be gas tight to allow a nearly balanced gas pressure for ease of VVCP adjustment with cylinder pressurized. Gas pressure behind the VVCP piston normally vents when the cylinder is vented. Process debris around the VVCP piston ring can make a seal that takes some time to vent. If gas is trapped behind the VVCP piston, the VVCP can be adjusted when the cylinder is pressurized but difficult to turn when cylinder is vented. This problem is corrected by disassembling the VVCP and cleaning.

CAUTION! Trapped gas pressure (sweet or sour) can present a personal safety hazard when servicing the VVCP. Work in a well ventilated, non sparking area. Do not breathe gas omitted from VVCP when venting trapped gas pressure.

4.2 Be sure the threads of the VVCP stem are clean.

4.3 To adjust the volume in the VVCP:

¹Operators Manual to be called Technical Manual in future.

VARIABLE VOLUME CLEARANCE POCKET



4.3.1 Loosen the stem locking handle (or jam nut), so that the stem is free to turn.

4.3.2 Turn the stem by use of the handwheel (or a wrench on the stem flats) on the outboard end of the shaft. Turn the handwheel clockwise to load; counterclockwise to unload.

4.3.3 Re-tighten the stem locking handle (or jam nut) to 150 lbs-ft (203 N·m) torque.

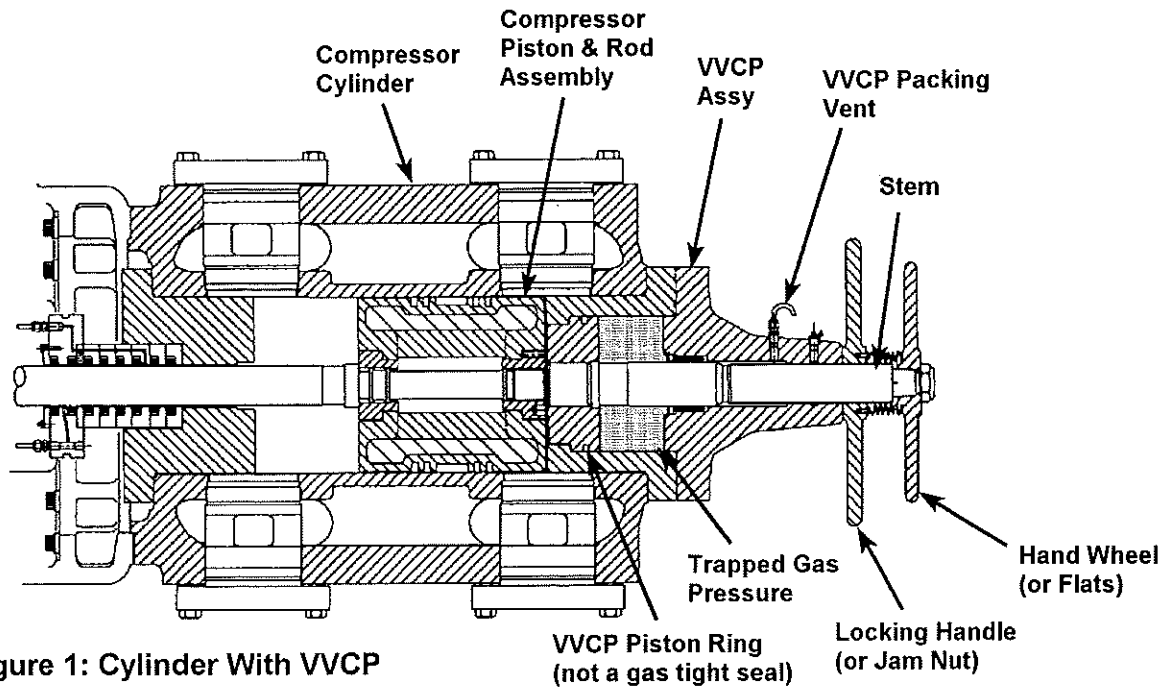


Figure 1: Cylinder With VVCP

VARIABLE VOLUME CLEARANCE POCKET



VARIABLE VOLUME CLEARANCE POCKET (Headend Unloader) DATA SHEET

13-1/2E Class Cylinder

Stroke: 4.50 in 114 mm

Bore: 13.500 in 343 mm

MAWP: 300 psig 20.7 barg 2068 kPa(g)

General Data for VVCP (independent of cylinder):

VVCP piston diameter:	11.25 in	286 mm
Stem thread lead (pitch):	0.125 in	3 mm
Total travel:	2.94 in	7.5 cm
Number of turns from closed to fully open:		23.5
Minimum added fixed clearance:	6.2 in ³	102 cm ³
Additional added clearance when fully open:	292.0 in ³	4785 cm ³
Total added clearance when fully open:	298.2 in ³	4887 cm ³
Clearance volume change per turn:	12.4 in ³	203.6 cm ³
Clearance volume change per change in travel:	99.4 in ³ /in	641.3 cm ³ /cm

Clearance Data for VVCP alone, in percent of swept volume of above cylinder:

Minimum added fixed clearance:	1.0%	
Additional added clearance when fully open:	45.3%	
Total added clearance when fully open:	46.3%	
Head end clearance change per turn:	1.9%	
Head end clearance change per change in travel:	15.4% /in	6.1% /cm

Clearance Data for VVCP installed on above cylinder, in percent of swept volume:

Minimum fixed head end clearance:	15.0%
Total head end clearance when fully open:	60.3%

PLEASE NOTE: It is important to understand that the percent clearance figures for the variable volume clearance pocket above include the cylinder headend clearance. However, any valve spacers or other non-standard added clearances on the unit must be accounted for.

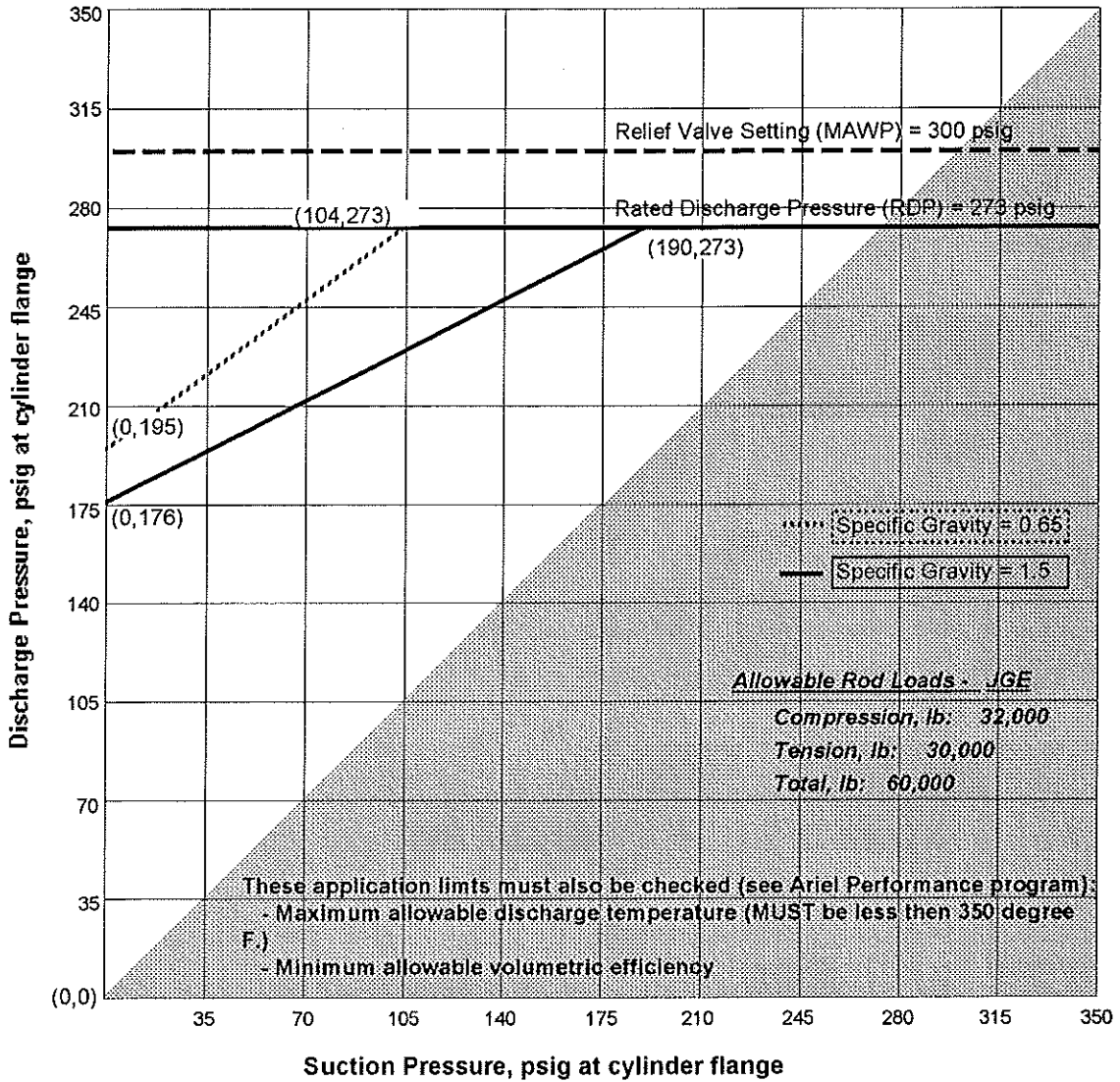
ARIEL CORPORATION

35 Blackjack Road, Mount Vernon, OH 43050 PH:740-397-0311



Estimated Gas Rod Load and Pressure Limits for 4.5 inch stroke at 1500 RPM

Cylinder Class: 13-1/2E Bore, inches: 13.500
 Cylinder Serial Number: C-52110-11



This chart defines allowable operating limits for gas rod loads and standard working pressures. Pressure combinations falling above the line for the applicable Specific Gravity of the gas being compressed will exceed the Rod Load limitations of the equipment.

Calculations are based on 80 degrees Fahrenheit hydrocarbon gas at 1500 ft. elevation.

