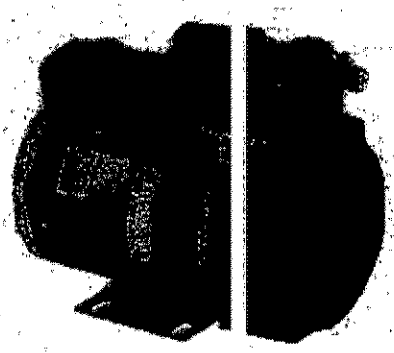
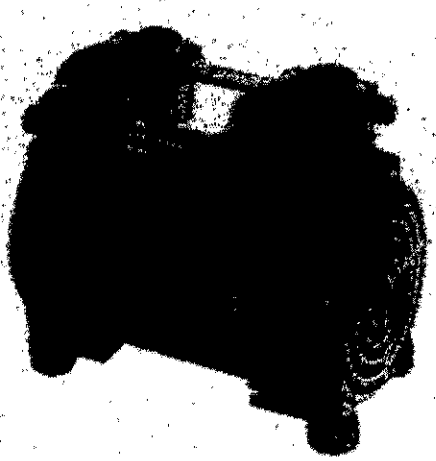
GAST
A Unit of IDEX Corporation

70-6800 G495PL (Rev. F)

71R & 72R SERIES ROCKING PISTON PUMP OPERATING & MAINTENANCE MANUAL





CONTENTS:

ISO 9001 CERTIFIED

KEEP THIS DOCUMENT FOR FUTURE REFERENCE

B1

This is the hazard alert symbol: ⚠ When you see this symbol, be aware that pers hal injury or property damage is possible. The hazan is explained in the text following the symbol. Reac the information carefully before proceeding.

The following is an explanation of the three different types of hazards:

⚠ **DANGER**	Severe person injury or death will occur if haz rd is ignored.
⚠ **WARNING**	Severe person injury or death can occur if ha ard is ignored.
⚠ **CAUTION**	Minor injury or roperty damage can occur if ha ard is ignored.

GENERAL INFORMATION

This pump is designed to be us d for the purpose of pumping air. The pump should ot be used for the pumping of fluids, particles, sol ls or any combustible substances likely to cause expl sions.

⚠ **DANGER**	Do not pump fl mmable or explosive gases or opers e the unit in an atmosphere contain ng them.
⚠ **CAUTION**	The pump is d signed for pumping air. Do not allow c rrosive gases or particulate mat rial to enter the pump. Water, oil-bas d contaminants, or other liquids m st be filtered out.
⚠ **CAUTION**	Normal ambie t temperature should not exceed 40 C (104° F). For operation at hi her temperatures, consult the fac ory.
⚠ **WARNING**	Exhaust air te perature can become very hot Keep away from air stream.
⚠ **CAUTION**	Never lubricat this oil-less pump. To do so will dam ge the unit.

Performance is reduced by lo atmospheric pressure found at high altitudes. Consu a Gast distributor for details.

INSTALLATION

⚠ **WARNING**	To avoid risk electrocution do not use this produ t in an area where it could come in contact with water or other liquids. exposed to the elements, it mus be weather protected.
⚠ **CAUTION**	Do not block e flow of cooling air over the pum in any way.

MOUNTING THE PUMP

The pump may be installed in any orientation as long as the flow of cool, ambient a over the pump is not blocked. To reduce noise and vibration, use shock mounts and affix to a stable, gid operating surface.

⚠ **CAUTION** Remove the plastic plugs in the intake and exhaust ports before operating unit.

PLUMBING

To prevent air flow restriction, use pipe and fittings that are the same size or larger than the threaded ports of the pump. NOTE: Be sure to connect the intake and exhaust plumbing to the correct inlet and outlet ports.

ACCESSORIES

Filters and mufflers are supplied on some models. Check periodically and replace when necessary. Consult a Gast Representative for filter recommendations. For best results, install relief valves and gauges at the inlet or outlet, or both, to monitor performance.

WIRING

⚠ **WARNING**	Incorrect wiring can result in electric shock. Wiring must conform to all required safety codes and be installed by a qualified person. Grounding is required for all AC models. All power to the motor must be de-energized and disconnected when servicing.
⚠ **WARNING**	Metal capacitor shell must contact a grounded surface. Electrical shock can result from touching ungrounded capacitor.

Refer to the motor name plate, for wiring diagram and capacitor options. Be sure to check that supply voltage agrees with motor name plate.

ELECTRIC MOTOR CONTROL

The motor must be protected against short circuit, overload and excessive temperature rise. Fuses, motor protective switches and thermal protective switches provide the necessary protection in these circumstances. Fuses only serve as a short circuit protection of the motor (wiring fault). Fuses in the incoming line should be chosen so as to be able to withstand the starting current of the motor, not as a protection against overload. Motor starters, incorporating thermal magnetic overload or circuit breakers protect the motor from overload or reduced voltage conditions. Selection of the correct overload setting is required to provide the best possible protection. Refer to the motor starter manufacturer's recommendations.

OPERATION

⚠WARNING Solid or liquid m terial exiting the unit can cause e re or skin damage. Keep away fror air stream.

⚠WARNING Always disconn ct the power before servicing. The n otor may be thermally protected and w l restart automatically when it cools if t e thermal protection switch is tripped

⚠WARNING Do not operate ithout the grille(s), if provided, in plac . Failure to do so could result in s vere personal injury.

⚠ WARNING The head surfac (s) can be very hot depending on pu np duty and speed. Do not touch the e parts during operation.

⚠ CAUTION Do not operate its above recommended pressur s or vacuum duties. To do so will dan age the unit.

STARTING

⚠ CAUTION Do not start age st a vacuum or pressure load.

If the pump is extremely cold, let warm up to room temperature before starting. If the pump does not operate properly, see the troubles ooting guide.
NOTE: Some of these models m y exceed 70 dB(A). When in close proximity to these odels hearing protection is required. Refer to th Technical Data Sheet for your specific model.

MAINTENANCE AND INSPE TION

Intake filter and mufflers require p iodic inspection and replacement. Initial inspection is uggested at 500 hours, then the user should deter ine the frequency thereafter. Most problems can be prevented by keeping filters and mufflers clean. Dirt filters and mufflers decrease pump performance and an decrease pump life.

FILTER INSPECTION AND REPL CEMENT

The head surface(s) on some mo ts can be very hot during operation. Do not touch th se parts until the pump has been turned off and allo ved to cool. Some filter element(s) are held together y a snap fit. Remove the cover to replace the felt, and reassemble.

SHUTDOWN PROCEDURES

Proper shutdown procedures mus be followed to prevent pump damage. Failure to lo so may result in premature pump failure. The Gast Manufacturing non-lubricated vacuum pumps and com pressors are constructed of ferrous metals or al minum which are subject to rust and corrosion when pumping condensable vapors such as water.

Follow the steps below to assure correct storage and shutdown between use:

1. NEVER oil this non-lubricated pump.
2. After using the pump, disconnect plumbing and allow the pump to run "open" for at least 5 minutes before shutdown.
3. Plug the open ports to prevent dirt or other contaminents from entering the pump. It is now ready for storage.

SERVICE KIT INSTALLATION

PUMP DISASSEMBLY:

1. Disconnect the pump from the electrical power.

⚠WARNING You must disconnect the pump from electrical power before servicing it. Failure to do so can result in severe personal injury or death

2. Vent all air lines to the pump to remove pressure.

⚠WARNING You must vent all air lines to the pump to remove pressure before servicing it. Failure to do so can result in severe personal injury.

NOTE: Gast will not guarantee the performance of a field rebuilt pump. You can return the pump to a Gast authorized facility, or perform the rebuild procedures described below:

Refer to the exploded view diagram during the following procedures.

- Note the orientation of the ports, or label them, so that the head covers are reassembled properly.
- Remove the head bolts and remove the head covers.
- Remove the valve plates and the valves.
- Remove tubes from both valve plates.
- Remove the retainer plate, cup, and cylinder.
- Discard the old cup, cylinder, retainer screws, cylinder o-ring, tube o-rings, head o-rings, valves, and valve retainers.

RE-ASSEMBLY

- Place new cup on rod (for pressure units, cup faces up; for vaccuum units, cup faces down).
- Reinstall the retainer plates. The retainer screws have a thread locking compound coating and should be torqued to 34-38in.-lbs.
- Carefully place the cylinders over the cups (install cylinder at an angle to avoid tearing or damaging cup).
- Clean any residue from the valve plates with a water based solvent (be careful not to scratch the valve seats).
- Replace the valves and valve retainers in their original position (make sure the notched or "x" corner of the valve retainer is facing up).

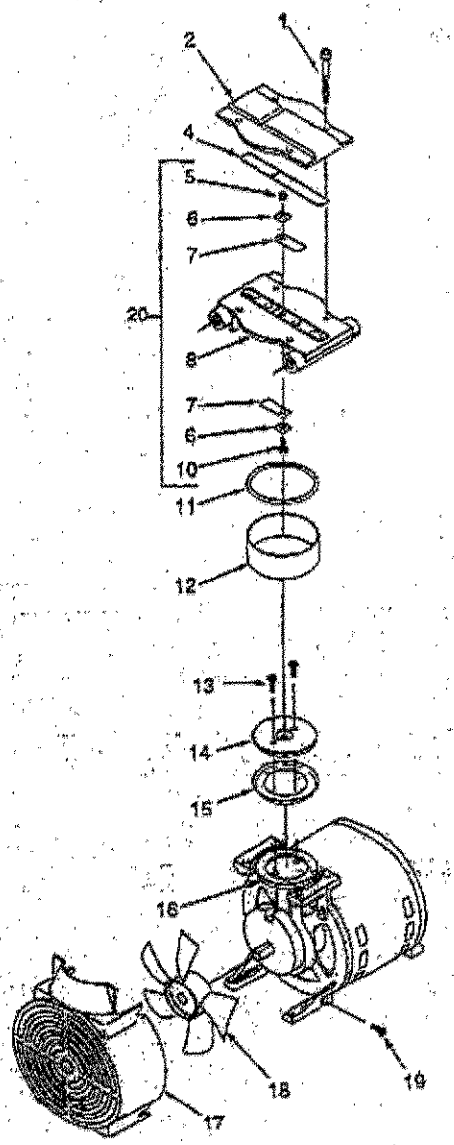
Service Kit Installation(cont from pg. 3)
•Install the valve retainer sc ew and torque to 11-13 in.-lbs.
•Reinstall the new tube o-ri gs on the tubes and install in the valve plates.
•Replace the cylinder o-ring in the bottom of the valve plates and positio valve plates over the cylinders (check to be s re that the cylinders are properly aligned with th o-ring groove).
•Check that the orientation f the ports are correct.
•Place the head o-ring in th o-ring groove on top of the valve plate.
•Place the head covers ove the valve plates (again check the orientatior of the ports).
•Torque the head bolts to 3 -38in.-lbs.

For Kit Installation of Model 71R545-P315B the servicing is slightly diffe ent (Refer to Fig. 1), use the following steps to s rvice these models.

NOTE: For the low pressu or inlet side of the unit, use the Service Kit Ins allation instructions beginning on page 3. For t e high pressure or outlet side (shown in Fig. 1' use the following steps to install kit:

DISASSEMBLY

•Disconnect the pump from the electrical power.
⚠**WARNING** You must disconnect the pump from electrical power before servicing it. Failure to do so can result in severe personal injury or death
•Vent all air lines to the pump to remove pressure.
⚠**WARNING** You must vent all air lines to the pump to remove pressure before servicing it. Failure to do so can result in severe personal injury.
•Remove tubes from the valve plate, while keeping it together at the filter, as the tubes are threaded and locktighted together.
•Remove the eight head cover screws, cover, and o-ring (note orientation for reassembly).



PARTS ORDER NG INFORMATION

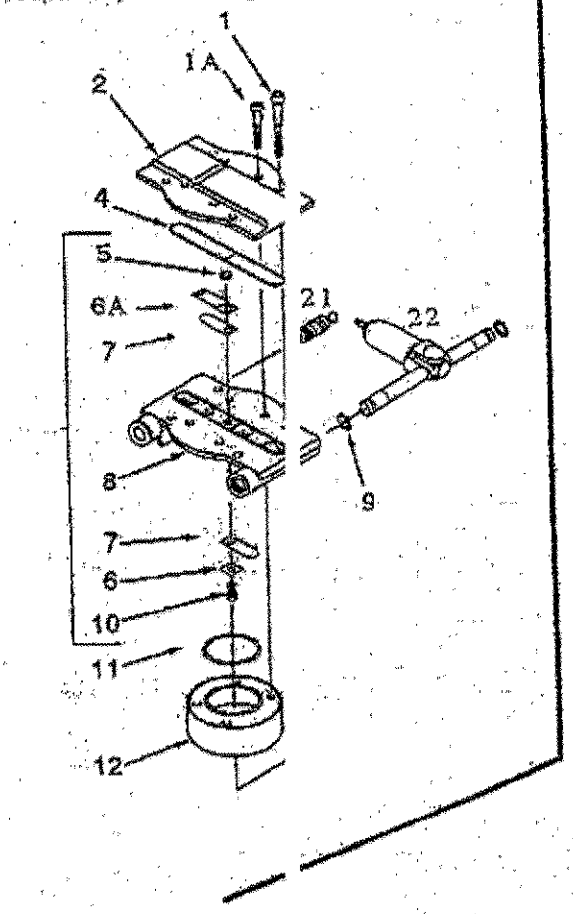
Ref. No.	Description	Qty	71R1	5-P601B	71R142-P601B	72R142-P601B
1	Cap Screw	4		5570	BB570	BB570
2	Head	1	A	268G	AT268G	AT265
*4	Head O-Ring	1		258	AT258	AT258
5	Hex Nut	1		C164	BC164	BC164
*6	Valve Retainer	2	A	819A	AF819A	AF819A
*7	Leaf Valve	2		817	AF817	AF817
8	Valve Plate	1	A	631E	AT631E	AT281E
10	Valve Screw	1	E	330B	BB330B	BB330A
*11	Cylinder O-Ring	1		256	AT256	AT276
*12	Cylinder	1		272	AT272	AT275
*13	Retainer Screw	2		283	AT283	AT283
14	Retainer Plate	1		715	AT715	AT666A
*15	Piston Cup (invert for vacuum use)	1		329	AT329	AT280
16	Rod Assembly	1	A	526KZ	AT526GZ	AT527GZ
17	Shroud	1		266	AT266	AT266
18A	Fan-Lead End	1		280A	AT280A	AT280A
19	Shroud Screw	4		R61	AT261	AT261
20	Valve Plate Assembly	1		633K	AT633K	AT282K
	Filter (not shown)	1		300F	B300F	B300F
	Service Kit	1		704	K704	K705

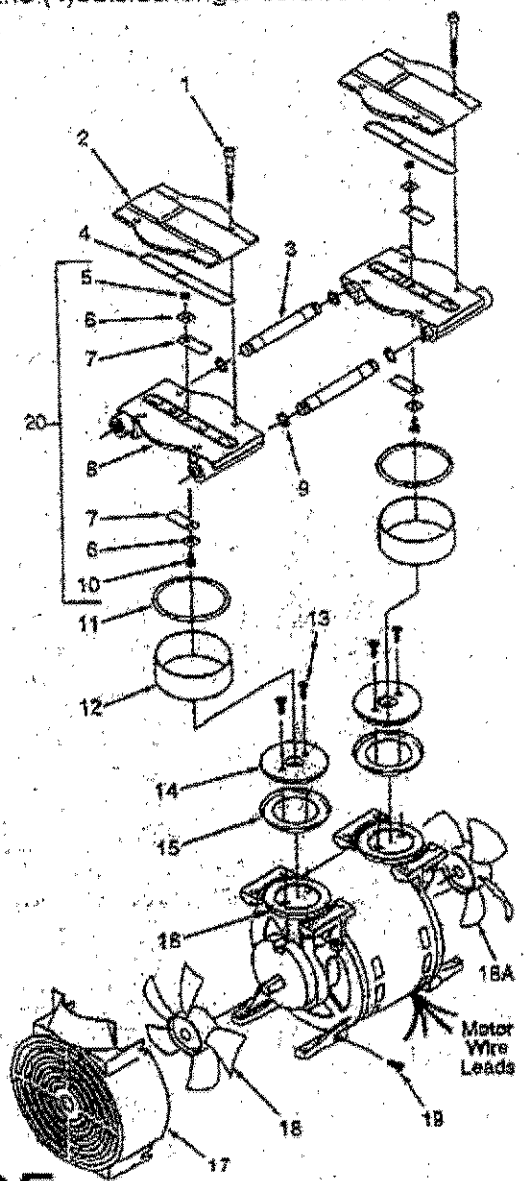
•Before removing hex screw, note the component arrangement of the valves, limiter, and retainer, for reassembly.
•Remove o-ring & cylinder, b ing sure to keep the same number and location of all shims.
•Remove the retainer screw retainer plate, and cup.
•Discard the old cup, cylinde retainer screws, cylinder o-ring, head o-ring, valves, and retainers.

RE-ASSEMBLY

•Place the new cup on the r d (cup faces up).
•Reinstall the retainer plates install new retainer screws and torque to 34-38in.-lbs.
•Carefully place the cylinder over the cup and align screw holes. Replace the cylinder o-ring.
•Clean any residue from the valve plates with a water based solvent (to careful not to scratch the valve seats).
•Replace the valves and val e retainers in their original position (make sure notched or "x" corner of the valve retainer is facing up). nstall new valve screw and torque to 14-15 in.-lbs.
•Reinstall the new tube o-rir gs on the tubes and install each end of the tube into the valve plate.
•Check that the orientation f the ports are correct and place the head o-ring in the o-ring groove on top of the valve plate.
•Place the head covers ove the valve plate and torque the (4)outside/longer screws to 34-38 in.-lbs. and the (4) inside/shorter sc ews to 100 in.-lbs.

(FIG.)
For Models 71R 15-P315B
Cover/Valve Plate A mb. shown separately to show High P essure end of unit





PARTS ORDERING INFC RMATION

Ref. No.	Description	Qty	71R645-P112 71R645-V114	71R655-P112 71R655-V114	72R645-P112 72R645-V114	72R655-P112 72R655-V114	71R545-P315B
1	Cap Screw	8	BB570	BB570	BB570	BB570	(4) BB570
1A	Cap Screw	4					(4) BB614B
2	Head	2	AT265G	AT265G	AT265G	AT265G	(1) AT265G (1) AT265H
3	Crossover Tube	2	AT252A	AT252B	AT252A	AT252B	AT442D
*4	Head O-Ring	2	AT258	AT258	AT258	AT258	AT258
5	Hex Nut	2	BC164	BC164	BC164	BC164	BC164
* 6	Valve Retainer	4	AF819A	AF819A	AF819A	AF819A	(3)AF819A
6A	Valve Limiter	1					(1) AH406
*7	Leaf Valve	4	AF817	AF817	AF817	AF817	(2) AF817 (2) AJ627A
8	Valve Plate	2	AT631	AT631	AT632	AT632	(1) AT631C (1) AT632X
*9	Tube O-Ring	4	AK846	AK846	AK846	AK846	(2) AT529
10	Valve Screw	2	BB330	BB330	BB330	BB330	BB330B
*11	Cylinder O-Ring	2	AT256	AT256	AT276	AT276	(1) AT256 (1) AJ787
*12	Cylinder	2	AT272	AT272	AT275	AT275	(1) AT272 (1) AT291
*13	Retainer Screw	4	BB557	BB557	AT283	AT283	(2) AT283 (2) BB557
14	Retainer Plate	2	AT273	AT273	AT274C	AT274C	(1) AT715 (1) AT443A
*15	Piston Cup (invert for vacuum use)	2	AT329	AT329	AT280	AT280	(1) AT329 (1) AT299A
16	(PRES. MODELS) Rod Assembly (VAC. MODELS)	2 2	AT465FZ AT468FVZ	AT547BZ AT569BVZ	AT467FZ AT468FVZ	AT584BZ AT483BVZ	(1) AT453FZ (1) AT459QZ
17	Shroud	2	AT266	AT266	AT266	AT266	AT266
18	Fan	1	AT260A	AT260A	AT260A	AT260A	AT260A
18A	Fan-Lead End	1	AT259A	AT259A	AT259A	AT259A	AT259A
19	Shroud Screw	8	AT261	AT261	AT261	AT261	AT261
20	Valve Plate Assembly	1 1	AT633 AT633A	AT633 AT633A	AT634 AT634A	AT634 AT634A	AT633G AT634X
21	Relief Valve	1					AT471
22	Filter	1					AT441
	Rubber Feet (not shown)	4	AB319	AB319	AB319	AB319	AB319
	Service Kit	1	K557	K557	K558	K558	K634

Parts listed are for stock mod ls. For specific OEM models consult the factory.
*Denotes parts included in th service kit.
When corresponding or order ng parts, please give complete model and serial numbers.

TROUBLE SHOOTING GUIDE

REASON	LO PRES	URE	HIGH PRESSURE	LOW VACUUM	EXCESSIVE NOISE	OVER HEATING	WON'T START
Dirty Filter	x						
Dirty Muffler				x			
Dirty Valves	x			x			
Bent/Damaged Valves	x			x			
Worn/Damaged Cup	x			x	x		
Leaky Hose	x			x	x		
Leaky Check Valve	x						x
Plugged Vac. or Press. Line			x	x		x	x
Low Voltage						x	x
Leaky Relief Valve	x						

AUTHORIZED SERVICE STATIONS

Gast Manufacturing Inc.
8970 Red Arrow Highway
Bridgman, MI 49106
TEL: 616-926-6171
FAX: 616-465-4300

Gast Manufacturing Inc.
506 Washington Ave
Carlstadt, NJ 07072
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FAX: 201-933-5545

Brenner Fiedler & Assoc.
13824 Bentley Place
Cerritos, CA 90701
TEL: 800-843-5558
TEL: 310-404-2724
FAX: 310-404-7975

Gast Manufacturing Co., Ltd
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FAX: 44 628 532470

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Pointe-Claire, Quebec
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FAX: 514-697-3070

Wainbee Limited
5789 Coopers Avenue
Mississauga, Ontario
Canada L4Z 3S6
TEL: 416-213-7202
FAX: 416-213-7207

Japan Machinery Co. Ltd.
Central PO Box 1451
Tokyo, 100-91 Japan
TEL: 81-3-3573-6421
FAX: 81-3-3571-7985
or: 81-3-3571-7896

NOTE: General Correspondence should be sent to--
Gast Mfg. Inc./A Unit of IDEX Corporation
P O Box 97
Benton Harbor, MI 49023-0097

Pro-Striker
Ma king Software Adjustments
For Mo lels: 1611PSL, 1615PSL, 1619PSL, 1711PSL, 1715PSL, and 1719PSL

Software ıdjustments are made in "Audit Mode".

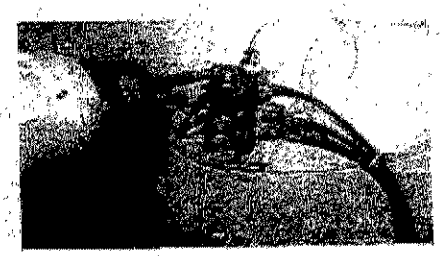
Hc w To Enter "Audit Mode"

With game i ı normal play mode, press the "Audit" button, loca ed on the ticket dispenser side of the lane. The audit m nu will appear on the screen.

Adjustment: can be made with the "Select" and "Enter" butt ons.

Steps to Change a Valve

1. Remove screws holding the valve assembly to the cabinet wall and all air tubing connected to the valve assembly. (Air tubing is removed by pushing in on the brass grommet while pulling tube).



2. Remove wires connecting the faulty valve to the12 volt block and the the O Board.

3. Remove valve screws with an Allen wrench.

4. Remove the end plate.

5. Remove valves until the faulty one is removed.

6. Remove new gasket from bag and place it on the new valve. Replace valve while aligning holes with valve rods.

7. Replace valves. Tighten Allen Screws. Connect wires. Remount to cabinet side.

Physical Inventory Sheets

Design Plus Industries

1951VK	Air Solenoid Valve/Pin Hold
1952VE	Air Solenoid/Exhaust Valve
1960TF	Air Tee Fit 1/4 Thread 1/4 Hos
1981CC	Cleat – Clam- Pin Strings
1981LC	Cleat - Clam - Main Strings
2004PS	Power Supply - Import 12V - 5A
2061TD	Ticket Dispenser-Removable FP
2061CB	Ticket Disp-CircuitBoard Only
2079AR	Relay-ProStriker T92P7D22-12
2082ES	Sensor - Pin Deck - 30mm
3040BB	Ball 4”
3041CB	Ball 4” – Glow
4037PG	Guide – Pin
5141EC	End Cap / Ball Rest
5141EP	End Cap / Plain
SP5Z8K	Speaker - 4C25Z8K - 4"

Physi :al Inventory Sheets

De ign Plus Industries

1800-00	Cylinder Assy.
1802-00	Cylinder/Pin Set Assy.
1804-00	Cylinder/W Ball Lift
1806-00	Ball Lift Bracket Assy.
1807-00	Limit Switch Assy.
1808-00	Cylinder/Pin Hold Assy.
1810-00	Valve Assy./Pin/Ball/Int./Striker
1812-00	Valve Assy./Pin/Ball Pro
1813-00	Bumper Lane Assy. Black Rubber
1816-00	Check Valve Assy.-Pro
1818-00	String Assy. Complete
1818-01	String – Set of 10
1818-02	Main String
1820-00	Compressor Assy 115V 1/3 HP
1826-01	Regulator & Filter Assy.
1833-00	Controller Board Assy.
BSD100	Display Assy.- Striker
1835-00	Display Assy. – Pro
1836-00	Main Board – Striker
1837-00	Main Board – Pro
1833-00	Plasma Controller Board – Pro

PRO-STRIKER SPECIFICATIONS

SOFTWARE VERSION: 2.21

VOLTAGES ON CONTROLLER BOARD

Across Capacitor 5.05-5.08V C-15 or C-18 Locations

FUSES

	Input	Compressor	12V DC	5V DC
115 VAC Game	3Amp	10ASloBlo	(2) 5A SloBlo	3Amp
220 VAC Game	3Amp	7ASloBlo	5A SloBlo	3Amp

AIR SUPPLY

Model #	Description	Pressure
161 PS	115V Internal	80PSI
161 PS		
161 PS		
171 PS	220V Internal	80PSI
171 PS		
171 PS		

Pro Striker DIP Settings
Version 2.21D

SW 4		1	2	3	4	5	6	7	8
Number of coins per player per game	1	OFF	OFF	OFF					
	2	OFF	OFF	ON					
	3	OFF	ON	OFF					
	4	OFF	ON	ON					
	5	ON	OFF	OFF					
	6	ON	OFF	ON					
	7	ON	ON	OFF					
	8	ON	ON	ON					
Bill Acceptor	ON				ON				
	FF				OFF				
$5.00 Bill Bonus	ON					ON			
	FF					OFF			
Win Free Game	ON						ON		
Replay	FF						OFF		
Attract Mode	ON							ON	
Sound	FF							OFF	
Free Play	ON								ON
	FF								OFF

SW 5		1	2	3	4	5	6	7	8
No Tickets Given		OFF	OFF						
Tickets per Strikes		ON	OFF						
Tickets for Points Only		OFF	ON						
Fixed Tickets Per Game Played		ON	ON						
Minimum Tickets per Game	ON			ON					
	FF			OFF					
Maximum Tickets per Game	ON				ON				
	FF				OFF				
Perfect Game Bonus	ON					ON			
	FF					OFF			
Ticket Dispense Mode	Individual						ON		
	Together						OFF		
5 Frame Play	ON							ON	
10 Frame Play	FF							OFF	
Skip Player/Speed Pool	ON								ON
	FF								OFF

*During Free Play Mode, push Select & Enter Buttons at the same time to advance to "Game Over"

9/26/2003

Physical Inventory Sheets

Desig n Plus Industries

1902PD	Deck-No Sensors-30mm
1840-00	Optical Ball Sensor
BSI200	I/O Board – Pro
1845-00	Deck – Sensors – 30mm Sensors
BSI100	I/O Board – Strike
1847-00	Bumper Cabinet Assy. Rubber
1848-00	Pin Assy.
1848-01	Pin Assy. – Neon
1849-00	Pin Bottom Assy. W/Screw
1854-00	Tilt Bob Assy.
1856-00	Triangle Assy.
1858-00	Lexan Guard Assy. W/Metal
1912KIT	Air Compr. Rebuild Kit
1912RF	Rubber Foot – Compressor
1930BT	Air Line (Blue)
1930PT	Air Line (Natural)
1930RT	Air Line (Red)
1932EC	Air Push Conn - 1/4 x 1/4 NPTM
1932PC	Air Push Conn - 1/4 X 1/8
1939VP	Air Solnd Valve/Push & No Flow
1940VP	Air Solnd Valve/Knob & No Flow
1943VK	Air Solnd Valve/MOD 1406 K/F-B
1942VK	Air Solenoid Only/DDBA-4BA