



12 & 13 CHEMICAL PUMP



CP12/13-RP-S-APR12



**ARROW
ENGINE COMPANY**
a TRIMAS company

In 1955 Arrow Engine Company opened for business, beginning the tradition of providing premium service and exceptional products to the oil & gas industry, as well as the industrial engine market, throughout the world.

Arrow is a part of the Engineered Components segment formed by TriMas Corporation. Headquartered in Bloomfield Hills, Michigan, TriMas Corporation (NASDAQ- TRS) provides engineered and applied products for growing markets worldwide. TriMas Corporation is organized into the following reportable segments: Packaging, Energy, Aerospace & Defense, Engineered Components, Cequent North America, and Cequent Asia Pacific. With almost a billion dollars in sales, TriMas Corporation has approximately 4,000 employees at over 60 different facilities in 11 countries.

With a consistent focus on our customers' needs, striving to help them grow their business, and producing the most reliable equipment and parts in the industry, Arrow has forged a 55-year tradition of excellence.



12 SERIES 12

FEATURES

- ▶ All 300 Series S.S. construction
- ▶ Compact, easy to mount 11" x 9" x 3", weighs only 7lb. 2 oz.
- ▶ Mounts in vertical position for easy operation
- ▶ Up to a maximum 5500 PSI discharge
- ▶ Supply gas ports plumbable for return to low pressure system or exhaust
- ▶ Packing gland grease jack for positive lubrication
- ▶ Either horizontal or vertical suction entry to the pump
- ▶ Up to 1" stroke available, outside adjustable
- ▶ Furnished with S.S. line check valve
- ▶ 2 1/4" Piston
- ▶ Either 1/4" or 1/2" plunger sizes available



To order specify 12-GC2S. Please advise chemical to be pumped by brand and number.

PRODUCT INFORMATION

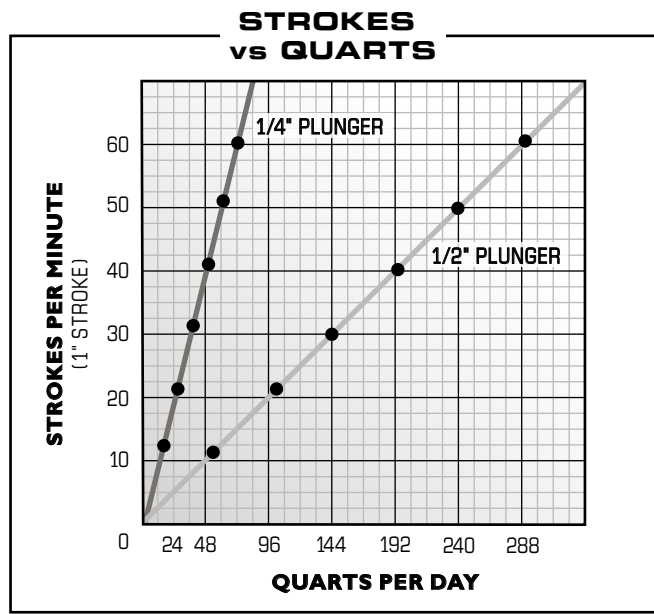
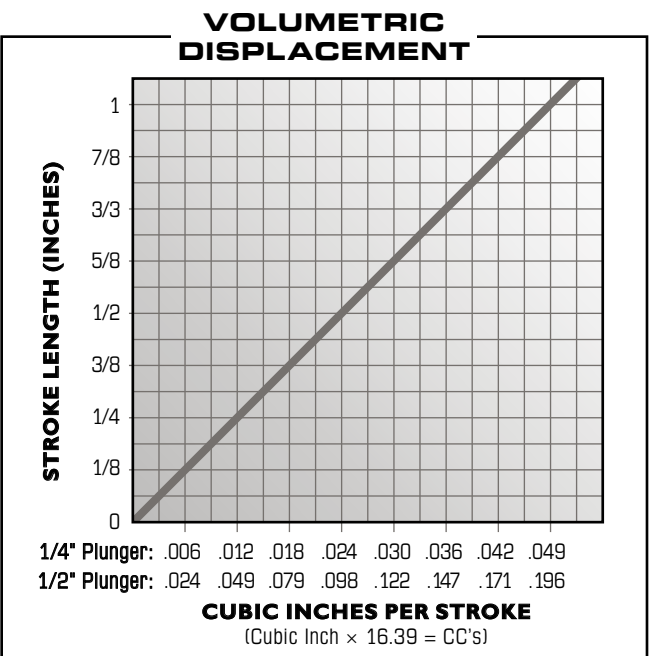
The Arrow Series 12 Gas-O-Matic Chemical Pump operates on gas or air at a regulated supply pressure of 15 to 75 PSI. It is constructed of high quality 316 stainless steel, with the piston rod composed entirely of 17-4 PH. Buna and Viton packing are available for the Series 12 Gas-O-Matic. The stainless steel timer assembly contributes to a longer life for the chemical pump. Due to the small piston volume, the Series 12 Chemical Pump is extremely economical to operate.

PERFORMANCE & SPECS

The Arrow Series 12 Gas-O-Matic Chemical Pump is a positive displacement unit powered by gas or air. The Series 12 Pump fills the requirements of a broad range of applications because of its ability to achieve high discharge pressures and wide volume ranges. The pumps are precision designed to consistently inject metered amounts of demulsifiers, solvents, corrosion inhibitors, methanol, and desalting agents into wellheads and pipelines.

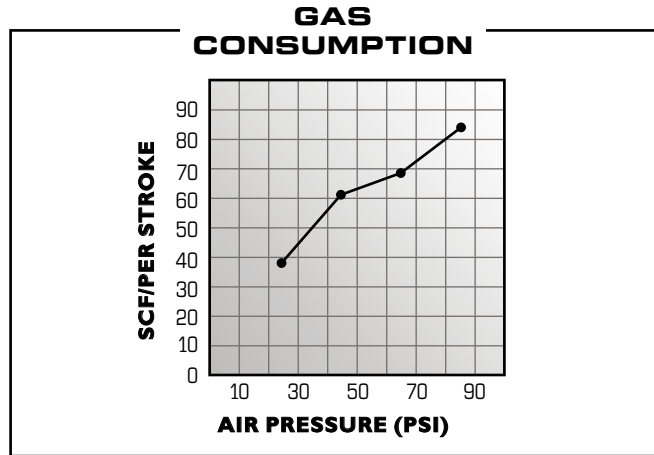


PERFORMANCE SPECIFICATIONS



ASA-5046-BA

PLUNGER	SUPPLY PRESSURE	DISCHARGE PRESSURE	PRESSURE RATIOS
1/4" (6.3MM)	15/75 PSI 1-5.1 ATMS	5500 Max. 374 ATMS	73.3
1/2" (12.7MM)	15/75 PSI 1-5.8 ATMS	1500 Max. 102 ATMS	17.6



STARTUP

If the pump is mounted on a drum or tank with the suction flooded, open the **ASA-5032-BA** bleeder valve to prime the pump. Allow the pump to operate until clear fluid, without bubbles, is discharged and then close the bleeder valve for normal operation. If the pump is to be mounted on a drum that will be in a vertical position, then an **ASA-5052-BA** drum adapter is used. Mount the drum adapter in the large bung hole on the drum and push the drum adapter extension pipe down until the foot valve touches the bottom of the drum. The clamp on the drum adapter pipe extension must now be filled with the same fluid that is to be pumped. The suction valve body of the pump can now be screwed onto the drum adapter extension pipe.

Be sure the connection is tight. The pump can be primed sooner when mounted on the drum adapter if the bleeder valve is loosened one turn before starting the pump. Use an oil can to force some of the same liquid that is to be pumped into the bleeder valve hole. Tighten the bleeder valve and prime the pump as above. Refer to the Strokes vs Quarts chart for the injection rate that is needed and adjust the rate per minutes knob to the desired strokes per minute by turning the rate per minutes knob counterclockwise to increase, clockwise to decrease. The stroke adjustment screw can also be used to control the amount of fluid to be injected. The pump parts are subject to normal wear and should be inspected and replaced as needed.

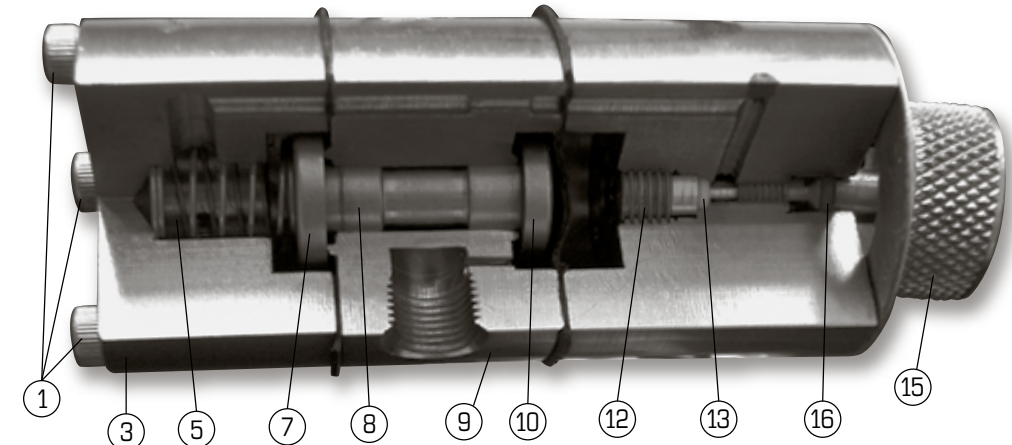
TIMER ADJUSTMENT

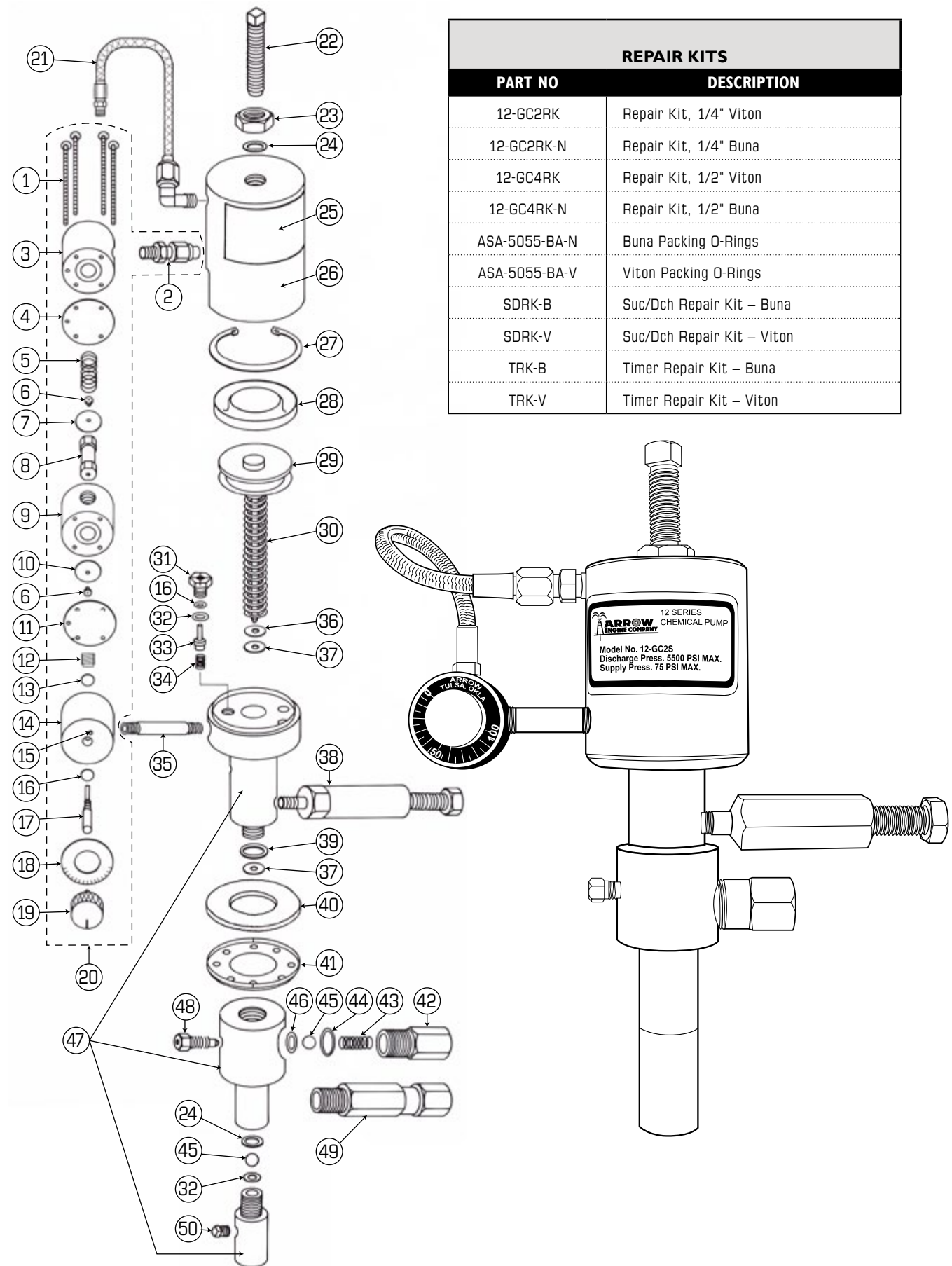
Timer adjustment may be necessary in the field to allow for actual temperature or pressure differences, which are different from the setting at the factory. The adjustment can be done very easily by loosening the set screw of the adjustment knob and removing it from the needle valve shaft. With the supply pressure plumbed to the gas inlet and the bleeding of the fluid side of the pump complete (eliminating air pockets) turn the needle valve shaft counter clockwise with your fingers to the desired strokes per minute. Once you are satisfied with the strokes per minute, reinstall the adjustment knob on the needle shaft.

You have three options for repositioning the knob on the needle valve shaft.

- 1 By locating on the dial face the strokes per minute number, (1-100) set the knob indicator on your number and retighten the set screw.
 - 2 For setting your strokes per minute number as a minimum speed and to allow for faster settings, place the stop lever of the knob to the left of the stop stud of the valve body.
 - 3 For setting your stroke per minute number as a maximum speed and to allow for slower settings place the stop lever of the knob to the right of the stop stud of the valve body (the dial plate is used only for reference of position).
- NOTE: The Timer Adjustment is applicable to both 12-Series and 13-Series chemical pumps.

TIMER ADJUSTMENT ASSEMBLY		
ITEM NO	PART NO	DESCRIPTION
Item numbers correspond to timer assembly cutaway below and chart on page 7.		
1	ASA-5008-BA	Capscrew Hx Skt Hd
2	ASA-5033-BA	Upper Housing
5	ASA-5005-BA	Spring Spool Valve
7	ASA-5040-BA	Spl Vlv End Pit-Init
8	ASA-5038-BA	Spool Valve Body
9	ASA-5036-BA	Center Housing
10	ASA-5039-BA	Spl Vlv End-Dia
12	ASA-5037-1A-BA	Set Screw Needle Hsg Assy
13	ASA-5010-BA	O-Ring Teflon
15	ASA-5042-BA	Knob
16	ASA-5013-BA	1/4" & 1/2" O-Ring Viton
	ASA-5046-BA	1/4" & 1/2" Buna O-Ring





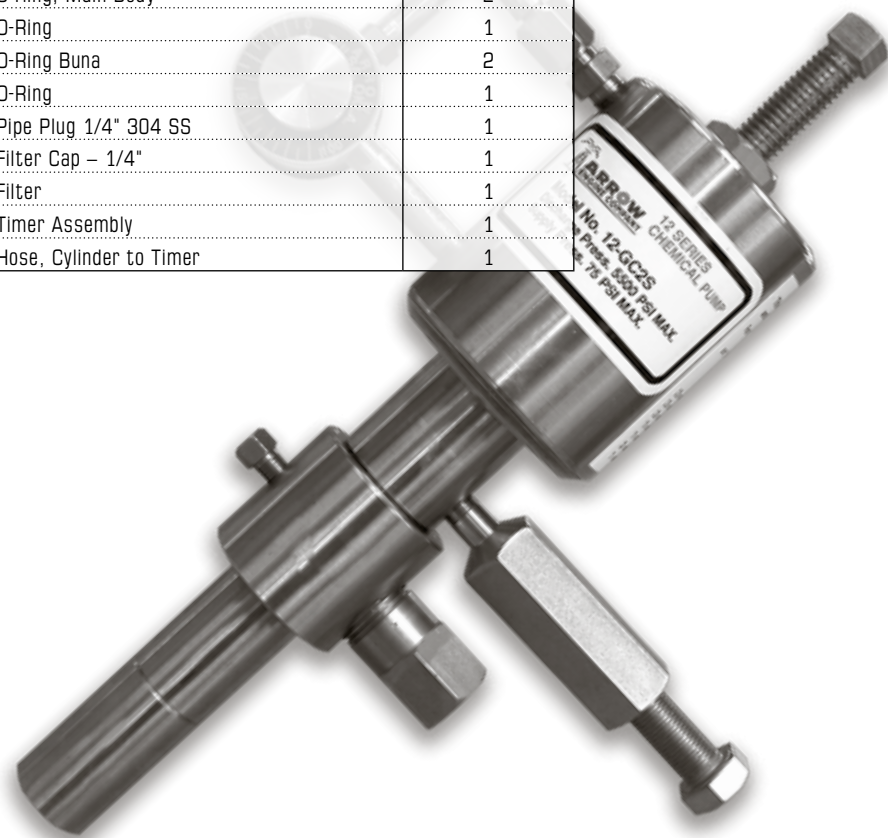
ITEM NO	PART NO	DESCRIPTION
All parts listed apply to both 1/2" and 1/4" pumps unless specific measurement is given.		
1	ASA-5008	Capscrew Hex Skt Hd
2	ASA-5011-BA	Connector
3	ASA-5033-BA	Upper Housing
4	ASA-5020-BA	Gasket
5	ASA-5005-BA	Spring Spool Valve
6	ASA-5045-BA	Screw Sq Hd
7	ASA-5040-BA	Spool Valve End Plate-Init
8	ASA-5038-BA	Spool Valve Body
9	ASA-5036-BA	Center Housing
10	ASA-5039-BA	Spool Valve End-Dia
11	ASA-5003-BA	Diaphragm
12	ASA-5037-1A-BA	Set Screw Needle Housing Assembly
13	ASA-5010-BA	O-Ring Teflon
14	ASA-5037-A-BA	Housing for Needle Valve - New Style
15	41A-1/8X3/8	Roll Pin
16	ASA-5013-BA	1/4" & 1/2" O-Ring Viton F/Cross Section
	ASA-5046-BA*	1/4" & 1/2" Buna O-Ring
17	ASA-5041-A-BA	Needle Valve
18	ASA-5043-BA	Dial Face
19	ASA-5042-BA	Knob
20	ASA-5076-BA	Timer Assembly
21	ASA-5112-BA	Cyl Timer Hose
22	ASA-5022-BA	Screw Stroke Adjusting
23	ASA-5023-BA	Jam Nut
24	ASA-2184	O-Ring Viton
	ASA-5050-BA*	1/4" & 1/2" Buna O-Ring
25	ANP-48-GC2S-N	1/4" Buna Front Name Plate
	ANP-48-GC2S	1/4" Viton Front Name Plate
	ANP-48-GC4S-N	1/2" Buna Front Name Plate
	ANP-48-GC4S	1/2" Viton Front Name Plate
	ANP-34	Viton Black Name Plate (not shown)
	ANP-35	Buna Black Name Plate (not shown)
26	ASA-5025-BA	Cylinder
27	11A-N5002-244	Retaining Ring Int

ITEM NO	PART NO	DESCRIPTION
28	ASA-5000-BA	Buna U-Cup
29	ASA-5024-BA	1/4" Piston & Plunger Assy
	ASA-5063-BA	1/2" Piston & Plunger Assy
30	ASA-5007-BA	1/4" Piston Spring
	ASA-5062-BA	1/2" Piston Spring
31	ASA-5030-BA	Exhaust Valve Body
32	ASA-5014-BA	O-Ring Viton
	ASA-5047-BA*	1/4" & 1/2" Buna O-Ring
33	ASA-5031-BA	Exhaust Valve Actuator
34	ASA-5004-BA	Exhaust Valve Spring
35	ASA-5009-BA	Pipe Nipple 1/8" x 2"
36	ASA-5044-BA	1/4" Packing Retainer
	ASA-5061-BA	1/2" Packing Retainer
37	ASA-5002-BA	1/4" Viton O-Ring w/Polypak
	ASA-5065-BA	1/2" Polypak
	ASA-5001-BA*	1/4" Buna O-Ring w/Polypak
38	ASA-558	Grease Jack Assembly
39	ASA-4246-BA	1/4" Viton O-Ring
	ASA-5060-BA	1/2" Viton O-Ring
	ASA-4251-BA	1/4" Buna O-Ring
	ASA-5066-BA	1/2" Buna O-Ring
40	ASA-5057-BA	Filter
41	ASA-5056-BA	Filter Cap
42	ASA-5027-BA	Check Valve Body Discharge
43	ASA-5006-BA	Check Valve Spring
44	ASA-5016-BA	O-Ring Viton F/Cross Section
	ASA-5049-BA*	1/4" & 1/2" Buna O-Ring
45	ASA-54	SS Ball 3/8"
46	ASA-5051-BA*	1/4" & 1/2" Buna O-Ring
	ASA-5018-BA	O-Ring Viton
47	ASA-5026-BA	1/4" Center Lower Hsing Assembly
	ASA-5064-BA	1/2" Center Lower Hsing Assembly
48	ASA-5032-BA	Bleeder Valve
49	ASA-675	SS Line Check
50	ASA-5053-BA	Pipe Plug

*Alternate sealing parts.



PART NO	DESCRIPTION	QTY
11A-N5002-244	Ring Retaining Int	1
ANP-35	Nameplate Buna Name Tag	1
ANP-48-GC2S-N	Decal CP 12 Series	1
ASA-54	Ball SS 3/8"	2
ASA-558	Jack, Grease Assembly	1
ASA-675	1/4" SS Line Check	1
ASA-4251-BA	O-Ring	1
ASA-5000-BA	U-Cup, Piston Buna	1
ASA-5001-BA	Polypack, Buna	2
ASA-5004-BA	Spring, Exhaust Valve	1
ASA-5006-BA	Spring, Tapered Compression	1
ASA-5007-BA	Spring, Compression	1
ASA-5009-BA	Nipple 1/8 x 2" SS	1
ASA-5011-BA	Connector	1
ASA-5022-BA	Screw Stroke Adj	1
ASA-5023-BA	Jam Nut	1
ASA-5024-BA	Piston & Plunger Assembly	1
ASA-5025-BA	Cylinder	1
ASA-5026-BA	Center Lower Housing Assembly	1
ASA-5027-BA	Body, Discharge Valve	1
ASA-5030-BA	Body Exhaust Valve	1
ASA-5031-BA	Actuator, Exhaust Valve	1
ASA-5032-BA	Valve, Bleeder	1
ASA-5044-BA	Retainer	1
ASA-5046-BA	O-Ring	1
ASA-5047-BA	O-Ring, Main Body	2
ASA-5049-BA	O-Ring	1
ASA-5050-BA	O-Ring Buna	2
ASA-5051-BA	O-Ring	1
ASA-5053-BA	Pipe Plug 1/4" 304 SS	1
ASA-5056-BA	Filter Cap - 1/4"	1
ASA-5057-BA	Filter	1
ASA-5076-BA	Timer Assembly	1
ASA-5112-BA	Hose, Cylinder to Timer	1

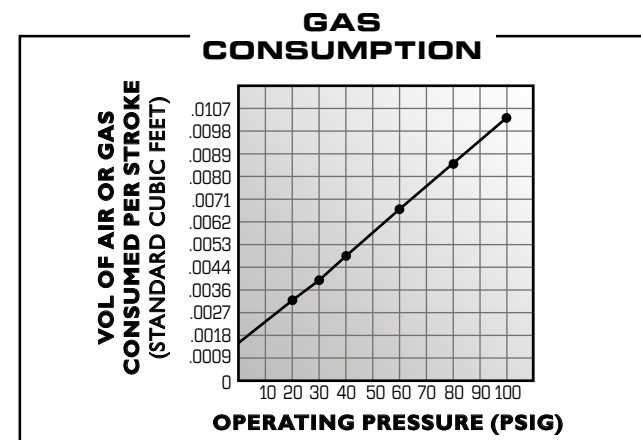


13 SERIES 13

FEATURES

- ▶ All Stainless Steel wetted parts, piston housing, and timer assure minimum corrosion
- ▶ No External Lubricator required due to plunger packing design
- ▶ Economical Operation due to small piston volume
- ▶ Adjustable from one pint per day up to 54 quarts per day
- ▶ Stainless Steel timer assembly
- ▶ 17-4 PH heat treated plunger for longer life
- ▶ 1½" Piston

PRODUCT INFORMATION



To order specify 13-GC2S. Please advise chemical to be pumped by brand and number.

PRESSURE	
Max. Disc. Pressure	2500 PSI (172 Bar)
Inlet Air/Gas pressure to Operate Pump	15-85 PSI (1/5.7 Bar)
Max. volume per day	14 gallons/day (53 liters)
Min. volume per day	.006 gallons/day (.94 liters)
Speed range	3-50 strokes per minute

WETTED PARTS	
Pump Body	316 SS
Plunger ¼"	17-4 PH SS
Standard Plunger Seal	Teflon
Power Cylinder	1½" Diameter 303 SS
Amplification Rate	29 to 1
Timer	303 SS

PERFORMANCE & SPECS

The Arrow Series 13 Gas-O-Matic Chemical Pump operates on gas or air at a regulated supply pressure of 15 to 85 PSI. This positive displacement pump allows field adjustments of injection rates with complete accuracy. Injection applications include chemicals into wellheads or pipelines, methanol into gas systems to prevent freezing and corrosion, and scale inhibitors into refining and processing plants.

INSTALLATION INSTRUCTIONS

When sizing a pump near its maximum volume or pressure capacity, consult with your Arrow Distributor to verify performance parameters. Please note that all performance information is based on perfect conditions in a controlled environment. Performance may vary based on individual conditions and applications.

1	This pump requires a flooded suction and must be located lower than the chemical supply tank. Vertical installation of the piston housing is required.
2	Connect suction line through a strainer to the suction check valve.
3	Connect discharge line to desired location. An in-line check valve is recommended to prevent back flow to pump during shut down or servicing.
4	Connect a supply pressure line to the timer. Air is the recommended supply, however, any dry filtered gas may be used. The supply pressure to the timer must be regulated.
5	Set regulator to proper pressure to overcome discharge pressure.

6	To prime the pump, loosen the bleed screw. Allow the liquid to flow into the pump chamber, venting the air.
7	Tighten bleed screw, start the pump, and give sufficient time for pump to discharge continuously and smoothly.
8	The stroke length is adjusted by rotating the volume adjustment screw on top of the Piston Housing. Loosen the jam nut and adjust screw as necessary. Minimum stroke length is 1/8".
9	The stroke rate is adjusted by rotating the knob on the timer. Rotate the knob counter-clockwise to increase the stroke rate, clockwise to decrease the stroke rate.

OPERATION

A supply of air or gas is connected to the timer. The chemical to be injected is connected to the suction check valve. The timer adjustment knob sets the desired strokes per min. Supply pressure in the timer causes the pneumatic timer to actuate. The timer applies supply pressure to the top of the piston. The piston drives the plunger to displace the chemical in the pump body, ejecting it through the discharge check valve. At the bottom of the cycle, the piston trips the vent valve which causes the timer to reset. The piston and plunger are returned by the spring to the bottom of the stroke adjustment screw. It is now ready for the next cycle.

MAINTENANCE

INSTRUCTIONS	
The following steps must be taken before proceeding with any maintenance operations:	
1	Disconnect supply pressure from timer.
2	Disconnect piping from check valves.
3	Open bleed screw to release any pressure.

SEAL LUBRICATION	
1	Remove plug from center housing.
2	Screw lubricator (ASA-558) filled with lubricant into pump body.*
* Dow Corning Molykote	

MAINTENANCE

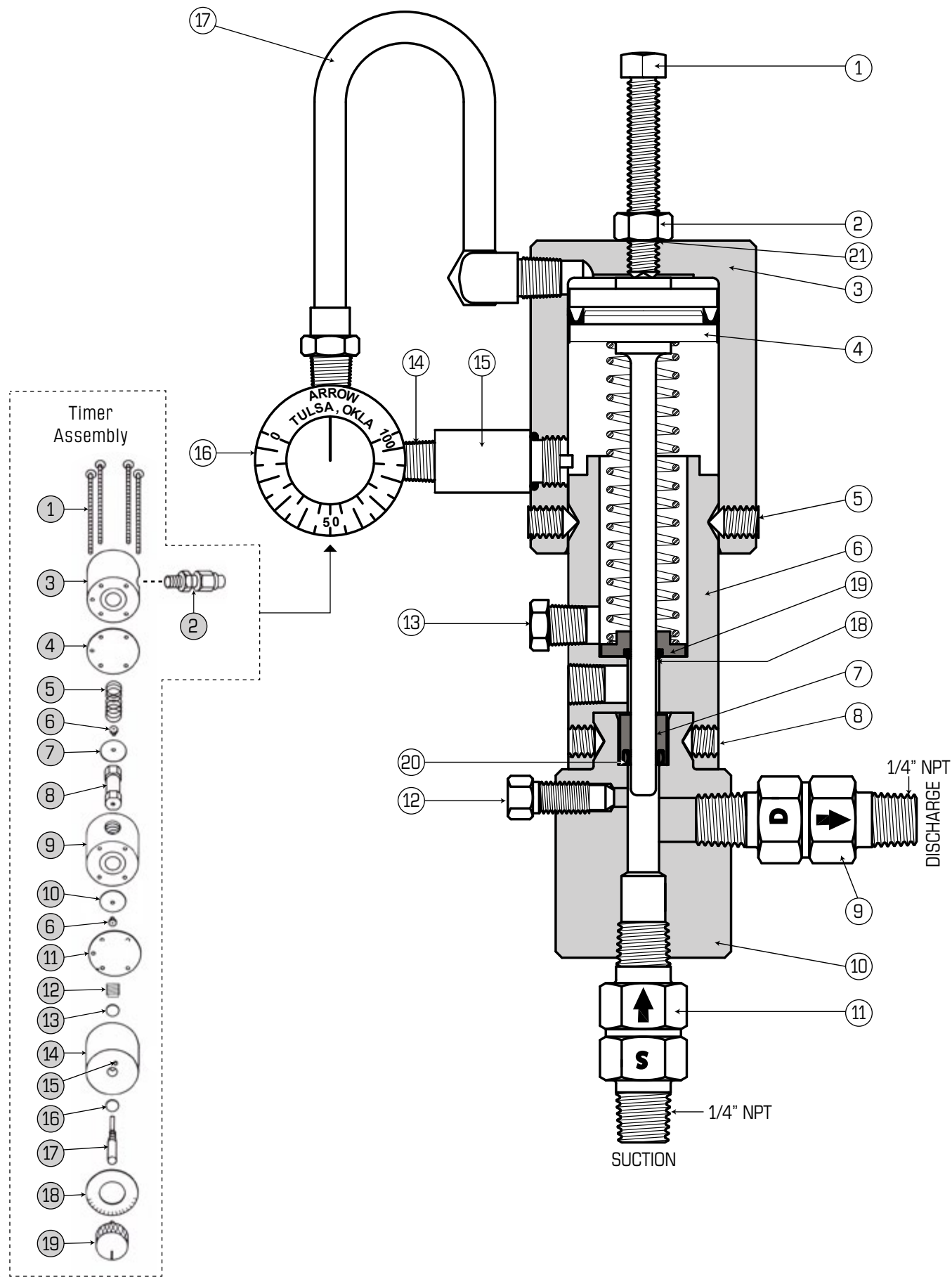
TIMER	
1	Disconnect supply pressure from timer.
2	Disconnect tubing assembly between timer and piston housing.
3	Unscrew timer from nipple.
4	Loosen and remove the four cap screws from timer.
5	Separate timer sections. Remove and discard gasket and diaphragm.
6	Reassemble timer using a new gasket and diaphragm. Make certain holes in gasket and diaphragm line up with holes in sections of timer. For timer to work properly, the large disc in the center housing assembly must be against the spring and the diaphragm must be against the small disc.
7	Thread end of timer marked "vent" onto nipple.
8	Reconnect tubing assembly.
NOTE: Field repair of needle and center housing assembly is not recommended. Replace if necessary. These assemblies may be cleaned and flushed.	

PRESSURE SEAL	
1	Loosen set screws on center housing. Remove lower housing.
2	Remove seal backup and seal.
3	Install new seal onto lower housing, O-ring side down. Place seal backup on top of seal.
4	Install lower housing into center housing. Secure with set screws (see note).
NOTE: Use LOCITITE #620 or equal to secure set screws to prevent them from loosening due to vibration.	

CHECK VALVES	
Field repair of check valves is not recommended. Replace only if necessary.	

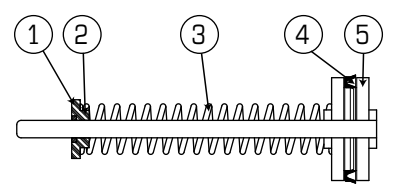
VENT VALVE	
1	Remove tubing assembly.
2	Unscrew timer and nipple from vent valve assembly.
3	Unscrew vent valve assembly from piston housing.
4	Remove retaining ring. TIP: Place on flat surface with actuator pin pointing up. Gently knock out using hammer on actuator.
5	Remove spring, vent actuator, and O-rings.
6	Inspect spring and vent actuator for wear. Replace if necessary.
7	Reassemble with new O-rings.

PISTON/PLUNGER	
1	Loosen set screws on piston housing.
2	Grasp piston housing and pull up to remove.
3	Grasp piston and pull away from center housing to remove. Inspect plunger for wear (especially longitudinal grooves) and inspect seal. Replace if necessary.
4	Remove spring, O-ring, O-ring retainer, and O-ring from spring cavity. Replace O-ring.
5	Lubricate seal and piston assembly with oil to protect against possible damage during assembly.
6	Reassemble piston plunger assembly and install into center housing.
7	Install piston housing and secure with set screws (see note).
8	Reinstall vent valve assembly, timer, and tubing assembly.
NOTE: Vent valve assembly must be removed before proceeding.	

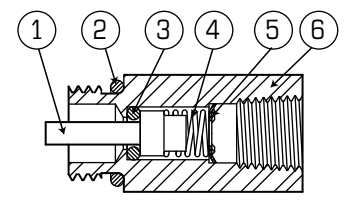


MODEL 13-GC2S			
ITEM NO	PART NO	DESCRIPTION	QTY
Item numbers correspond to illustration on page 12.			
1	ASA-11391	Adjusting Screw	1
2	ASA-11392	Nut	1
3	ASA-23144	Piston Housing	1
4	ASA-23143	Piston & Plunger Assembly	1
5	ASA-11358	Set Screw	3
6	ASA-23145	Center Housing	1
7	13-SPACER	Spacer for 13-Series Polypak	1
8	ASA-11390	Set Screw	3
9	ASA-22878*	Discharge Check Valve	1
10	ASA-23146	Lower Housing	1
11	ASA-22879*	Suction Check Valve	1
12	ASA-5032-BA	Bleeder Valve	1
13	ASA-10278	Pipe Plug	1
14	ASA-10610	Close Nipple	1
15	ASA-30964	Vent Valve Assembly	1
16	ASA-5076-BA	Timer Assembly	1
17	ASA-5112-BA	Cyl-Timer Hose Assembly	1
18	ASA-10107	O-Ring	1
19	ASA-23142	O-Ring Retainer	1
20	ASA-5002-BA-TFE	Polypak w/Teflon O-Ring	1
21	ASA-5047-BA	O-Ring	1
*Recommended Spare			

TIMER ASSEMBLY (ASA-5076-BA)			
ITEM NO	PART NO	DESCRIPTION	QTY
Item numbers correspond to illustration shown on page 12..			
1	ASA-5008	Slotted Head Capscrew	4
2	ASA-5011-BA	Connector	1
3	ASA-5033-BA	Upper Housing	1
4	ASA-5020-BA	Gasket	1
5	ASA-5005-BA	Spring Spool Valve	1
6	ASA-5045-BA	Screw Sq Hd	1
7	ASA-5040-BA	Spool Valve End Plate	1
8	ASA-50388-BA	Spool Valve Body	1
9	ASA-5036-BA	Center Housing	1
10	ASA-5039-BA	Spool Valve End-Dia	1
11	ASA-5003-BA	Diaphragm	1
12	ASA-5037-1A-BA	Set Screw Needle Hsg Assembly	1
13	ASA-5010-BA	O-Ring Teflon	1
15	41A-1/8X3/8	Roll Pin	1
14	ASA-5037-A-BA	Hsg for Needle Valve - New Style	1
16	ASA-5013-BA	1/4" & 1/2" O-Ring Viton	1
17	ASA-5046-BA*	1/4" & 1/2" Buna O-Ring	1
17	ASA-5041-A-BA	Needle Valve	1
18	ASA-5043-BA	Dial Face	1
19	ASA-5042-BA	Knob	1
*Alternate Sealing Parts			



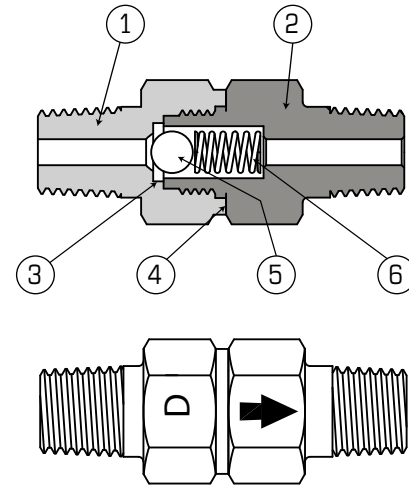
1/4" PISTON PLUNGER ASSEMBLY ASA-23143			
ITEM NO	PART NO	DESCRIPTION	QTY
Item numbers correspond to illustration shown above.			
1	ASA-10107*	O-Ring	1
2	ASA-23142	O-Ring Retainer	1
3	ASA-10448	Spring	1
4	ASA-11388*	Seal U-Cup	1
5	ASA-23141	Piston & Plunger	1
*Recommended Spare			



VENT VALVE ASSEMBLY ASA-30964			
ITEM NO	PART NO	DESCRIPTION	QTY
Item numbers correspond to illustration shown above.			
1	ASA-23148	Actuator	1
2	ASA-10113*	O-Ring	1
3	ASA-5046-BA*	O-Ring	1
4	ASA-10285	Spring	1
5	ASA-11290*	Retaining Ring	1
6	ASA-23147	Body	1
*Recommended Spare			

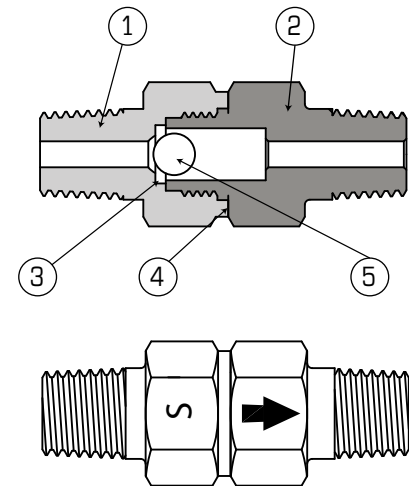
DISCHARGE CHECK VALVE

DISCHARGE CHECK VALVE ASA-22878			
ITEM NO	PART NO	DESCRIPTION	QTY
1	ASA-23257	Seat	1
2	ASA-23256	Body	1
3	ASA-10313*	Teflon O-Ring	1
4	ASA-10113	Buna O-Ring	1
5	ASA-126*	1/4" SS Ball	1
6	ASA-11438	Compression Spring	1
*Recommended Spare			



SUCTION CHECK VALVE

SUCTION CHECK VALVE ASA-22879			
ITEM NO	PART NO	DESCRIPTION	QTY
1	ASA-23257	Seat	1
2	ASA-23256	Body	1
3	ASA-10313*	Teflon O-Ring	1
4	ASA-10113	Buna O-Ring	1
5	ASA-126*	1/4" SS Ball	1
*Recommended Spare			



CHEMPUMP 13 PARTS LIST

PART NO	DESCRIPTION	QTY
ASA-126	Ball 1/4" SS	2
ASA-10107	O-Ring, Piston Plunger Assembly	1
ASA-10113	O-Ring	3
ASA-10285	Spring Actuator	1
ASA-10278	Plug Hx Hd	1
ASA-10313	O-Ring Teflon	2
ASA-11388	U-Cup	1
ASA-10448	Spring Compression	1
ASA-10610	Nipple	1
ASA-11290	Ring Retainer	1
ASA-11358	Screw Set	3
ASA-11390	Set Screw	3
ASA-11391	Screw Adj Sq Hd Cup Pt 5/16"	1
ASA-11392	Nut Jam 5/1618 SS w/Ctr Bor	1
ASA-11438	Spring Compression	1
ASA-23256	Body	2
ASA-23257	Seat	2
ASA-23141	Piston & Plunger Welded	1
ASA-23142	O-Ring Retainer	1
ASA-23144	Cylinder	1
ASA-23145	Center Housing for 13 Series	1
ASA-23146	Lower Housing	1
ASA-23147	Exterior Actuator	1
ASA-23148	Vent Actuator	1
ASA-5032-BA	Valve, Bleeder	1
ASA-5002-BA-TFE	Polypak w/Teflon O-Ring	1
ASA-5046-BA	O-Ring	1
ASA-5076-BA	Timer Assembly	1
ASA-5112-BA	Hose, Cylinder to Timer	1
13-SPACER	Spacer for 13 Series Polypak	1
ASA-5047-BA	O-Ring, Main Body	1
ASA-675	1/4" SS Line Check	1
ASA-5011-BA	Connector	1
ANP-1300	Decal 13 Series Pump	1



Troubleshooting

ARROW 12 & 13 GAS/AIR PUMPS

SYMPTOM	CORRECTIVE ACTION
Pump runs but does not pump fluid.	1 Make sure the pump is primed by loosening bleeder valve screw (ASA-5032-BA) and all air is purged. When chemical flows from bleeder valve, screw in and shut off valve.
	2 Inspect plunger. If scored, replace and reinstall.
	3 Check bottom seat on Suction side and replace if needed.
	4 Check Discharge seat and replace if needed.
Timer will not stay set.	1 Be sure your gas supply is dry, filtered, and regulated to correct operating pressures. Check for any leaks with timer.
	2 Clean and/or replace Timer Gasket (ASA-5020-BA) and Diaphragm (ASA-5003-BA).
	3 Clean and/or replace Spool Valve End Plate (ASA-5040-BA) and Spool Valve Diaphragm (ASA-5039-BA).
Pump is locked up.	1 Check for broken piston spring and replace.

Accessories

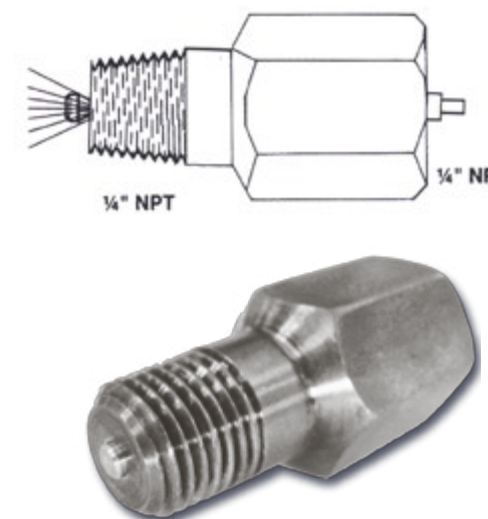
The standard injector heads have steel bodies with stainless steel trim. A 316 stainless steel head assembly is available as an option. Teflon packing and metal-to-metal seats are available as alternatives to standard injector head parts at no additional cost when specified on new pumps. Buna-N O-ring type resilient check seats are standard on all heads.

AM-0001 ATOMIZER

FEATURES

- ▶ Makes chemical more effective by breaking it up at point of injection
- ▶ Accelerates the mixing of liquids or promotes atomization of liquid into gas
- ▶ Use for line check or as a backup for line check
- ▶ All stainless steel construction

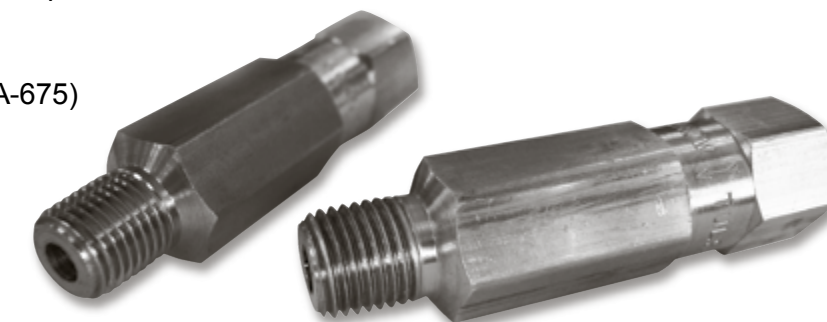
Team up the AM-0001 Atomizer with an Arrow Chemical Pump for the best possible combination.



LINE CHECKS

FEATURES

- ▶ Available in 1/4" brass (ASA-676) 3000 psi max working pressure
- ▶ Available in 1/4" stainless steel (ASA-675) 6000 psi max working pressure
- ▶ Available in 1/2" stainless steel (ASB-283) 6000 psi max working pressure



A line check should be installed in the discharge line as close to the point of injection as possible to prevent backup and contamination of chemical.

TANK PLUGS

- ▶ Patch and/or permanently repair holes in storage tanks
- ▶ Fills a puncture or opening with a permanent and durable seal

PART NO.	DESCRIPTION
1/4-TP	1/4" Tank Plug
3/8-TP	3/8" Tank Plug
1/2-TP	1/2" Tank Plug



TANK PATCHES

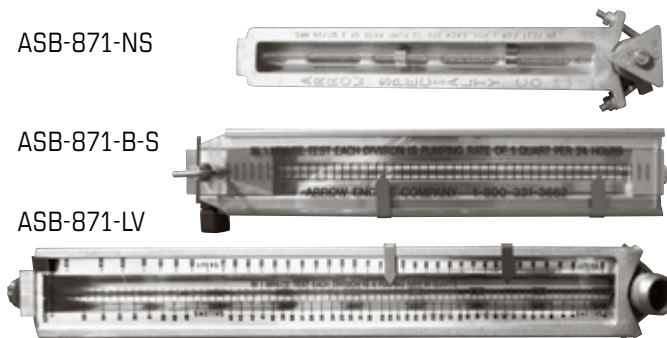
- ▶ Special heat treated, shear proof, solid hinge pin
- ▶ Wetted parts, heavy duty cadmium plated
- ▶ Thick 1/8" neoprene gaskets
- ▶ Installation is easy with only a screwdriver & wrench
- ▶ Patches a 3/4" to 2" hole



PART NO.	DESCRIPTION
ASST-TP	(6) 1/4", (6) 3/8", & (2) 1/2" Tank Plugs
AS-316	Tank Patch w/Lever Operation
AS-317	Vertical Application Toggle-Type Patch

GAUGES

PART NO.	DESCRIPTION
ASB-871-NS	Tank gauge for a 5-gal tank (new style)
ASB-871-B-S	Tank gauge for a 5-gallon tank
ASB-871-LV	Barrel gauge for a 55-gallon barrel



MICRO VALVE

- ▶ Trouble free Microvalve replaces ASA-4147 lapped disk
- ▶ Operates slowly one stroke every two minutes to twenty strokes per minute.
- ▶ Kit available to convert existing pumps part number ASB-446-MV
- ▶ Complete pump with Microvalve



Replace the Pilot Valve Assembly in your 5100 Series TXT or Older 510 Arrow Pump with the new Microvalve Assembly

CHEMICAL PUMP AND CHEMICAL PUMP PARTS WARRANTY

I. TERMS OF EXPRESS LIMITED WARRANTY

Arrow Engine Company warrants that it will repair or replace, at its election and expense, a chemical pump or chemical pump part (hereinafter referred to as "Products") manufactured by Arrow Engine Company, which proves to have had a defect in material or workmanship. All warranty work must be pre-approved by Arrow Engine Company.

II. TERM LIMITATIONS OF EXPRESS LIMITED WARRANTY

This coverage shall commence upon shipment of Product and shall expire 1 year after ship date.

III. ARROW ENGINE COMPANY'S RESPONSIBILITIES UNDER THE EXPRESS LIMITED WARRANTY

Arrow Engine Company shall be responsible for:

- The repair or replacement, at Arrow Engine Company's election, of covered product and all reasonable labor required regarding a warranted failure during the express limited warranty and term. All such labor shall be provided by Arrow Engine Company's authorized contractor or distributor.
- Reasonable and necessary travel (total mileage not to exceed 300 miles) and expenses incurred by Arrow Engine Company's authorized contractors or distributor. Additional mileage and/or travel by air, water or land will need preauthorization from Arrow Engine Company.
- Replacement of lubricating oil, coolant, filter elements, or other normal maintenance items that are contaminated and/or damaged as a direct result of a warranted failure.

NOTWITHSTANDING THE FOREGOING, ARROW ENGINE COMPANY SHALL NOT BE RESPONSIBLE FOR LABOR COSTS ASSOCIATED WITH WARRANTY CLAIMS.

IV. OWNER/ DISTRIBUTOR/ CONTRACTOR'S RESPONSIBILITIES UNDER THE EXPRESS LIMITED WARRANTY

Owner shall be responsible for:

- The operation and maintenance of the Product within the guidelines established by Arrow Engine Company.
- Making the Product available to Arrow Engine Company or authorized contractors or distributors for any warranty repair, during normal business hours.
- All additional costs incurred for premium or overtime labor, should owner request that repairs be made on a premium overtime schedule.
- All costs incurred as the result of removal or reinstallation of the Product as may be required to effect any warranted repair.
- All administrative costs and expenses resulting from a warranted failure.
- Any costs of transportation, towing, repair facilities, or associated costs.
- Loss of revenue and loss of/or damage to real and/or personal property.
- All warranty work must be pre-approved by Arrow Engine Company
- Warranted repairs not to exceed 50% of the product replacement cost without prior approval from Arrow Engine Company. Replacement cost equates to distributor net price from factory.

V. LIMITATION OF ARROW ENGINE COMPANY'S OBLIGATIONS

The obligations of Arrow Engine Company under this express limited warranty shall be waived and voided, and Arrow Engine Company shall not, thereafter, be responsible for:

- Any failure resulting from owner or operator abuse or neglect, including but not by way of limitation, any operation, installation, application, or maintenance practice not in accordance with guidelines or specifications established by Arrow Engine Company; or
- Any failure resulting from unauthorized modifications or repairs of the Products or;
- Any failure resulting from overload, overspeed, overheat, accident, improper storage; or
- Failure of owner, contractor or distributor to promptly provide notice of a claimed defect. All warranty claims must be authorized, documented and submitted within 30 days of the failure date while under the warranty period; or
- Failure of Products for which Arrow Engine Company did not receive properly completed start-up reports; or
- Repairs of a covered failure performed with non-genuine Arrow Engine Company parts; or
- Repairs of a covered failure performed by non-authorized contractors or distributors; or
- Failure to make Products available to Arrow Engine Company or its authorized representatives, or
- Failure to supply documents such as drawing and specifications relating to the specific application of the Products.

VI. APPLICABILITY AND EXPIRATION

The warranties set out above are extended to all owners in the original chain of distribution. The warranties and obligations of Arrow Engine Company shall expire and be of no further effect upon the dates of expiration of the applicable warranty periods. The foregoing sets forth Arrow Engine Company's only obligations and owners' exclusive remedy for breach of warranty, whether such claims are based on breach of contract, tort (including negligence and strict liability), or other theories, and the foregoing is expressly in lieu of other warranties whatsoever expressed, implied, and statutory, including without limitation, the IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.

Notwithstanding the preceding, in no event shall Arrow Engine Company be liable for any direct, special, incidental or consequential damages (whether denominated in contract, tort, strict liability, negligence or other theories) arising out of this Agreement or the use of any Products provided under this Agreement. Any action arising hereunder or relating hereto, whether based on breach of contract, tort (including negligence and strict liability), or other theories must be commenced within one (1) year after the cause of action accrues or it shall be barred.

With respect to products not manufactured by Arrow Engine Company, Arrow makes no representations or warranties of whatsoever nature, directly or indirectly, expressed or implied including but not limited to any representations or warranties with respect to suitability, durability, fitness for a particular purpose or merchantability, except to the extent that Arrow can enforce warranties provided by the manufacturers of such parts.

Effective 5/17/06 and supersedes all previously issued warranty.

ARROW MANUFACTURED
**REPLACEMENT
PARTS**

Caterpillar® Engines

G379 G3304
G398 G3306
 G399

Waukesha® Engines

F2895 P9390
F3521 145G/F817
F5108 140G/F554
L5790 WAK/1197
 L7042

Fairbanks Morse® Engines

ZC-118 ZC-503
ZC-208 ZC-739
 ZC-346

Ajax® Engines

5 x 6½
EA-22, 6½ x 8 CMA
EA-30, 7¼ x 8 CMA
E-30, 7½ x 10 CMA
E-42, 8½ x 10 CMA
DP-60, 9½ x 10 CMA
DP-70/80/160, 11 x 14 CMA
DP-115/230, 13¼ x 16

Piston & Rod Assemblies
180
360
600
800

Waukesha®, VHP®, and VGF® are registered trademarks of Dresser Industries, Inc., Caterpillar®, is a registered trademark of Caterpillar, Inc., Fairbanks Morse® is a registered trademark of Coltec Industries, Inc., and Ajax® is a registered trademark of Cameron International Corporation.

OEM

C-Series

*C-46 *C-96
*C-66 *C-101
*C-106 *C-255

VR-Series

VR-155 VR-310
VR-220 *VR-330
VR-232 *VR-330CF
*VR-260 VR-265
VR-283 *VR-380

A-Series

*A42 *A54 *A62

K6 Slow Speed Engine

*

Lufkin Engines

L-333 L-1770
*L-795 L-2165

Witte Engines

98 E15 F32
B12 E20 F42

Arrow Chemical Pumps

* 10 Series (beam operated)
* 12 & 13 Series (pneumatic)
* 430 Series (electric)
* 500 & 510 Series (pneumatic)
* Solar Chempump

Gas Compressors

* VRC-2 * VRC-CNG

Gas Products

* Volume Tanks
* Vertical & Horizontal Separators
* Suction Scrubbers
* Meter Runs
* Coalescers
* Skids



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