ISO-9001: 2008
ISO-14001: 2008

AIRLESS UNIT

Mir 681

PUMP

Original instruction for airless pump
SERVICE Manual-PARTS LIST

Optional Displacement Pump

- Stainless 68S200

<< Standard

		PRO-Mir 681 (68000)
STANDARD SPECIFICATION	AIR MOTOR	68100
	DIS-PUMP	68200
	SURGE TANK	45300
	REGULATOR	68400 (3/4" RL)
	SUCTION	45500
	CART	45600-S
FLUID PRESSURE RATIO		68:1
CYCLE/min		50
DELIVERY/cycle (cc)		179.07
DELIVERY/min (liter)		8.95
MAX. PRESSURE (bar)		476
AIR PRESSURE RANGE (bar)		3-7
STROKE (mm)		120
WEIGHT (NET/PACKING:kgs)		116/140
DIMENSION (NET/PACKING:cm)		80×75×129 / 85×77×142
TYPICAL FLUID HANDLED		ALKYD, EPOXY, URETHANE, WATER, ANTICORROSIVE PRIMER HIGH VISCOSITY PAINT, PRIMER, HIGH BUILD
MAX. LOADAGE (20FT/40FT:unit)		20/42

This manual contains important warnings and information.
READ AND KEEP FOR REFERENCE

INSTRUCTIONS

Table of Contents

General description

Airless pumps are sprayer for liquid or extruder for viscous materials,
it's also high pressure device for professional use only.
These are composed of two main parts: the air motor and the pumping unit.
This has structure of “pumping by air motor”, and high pressure and output in lower pump is closely affected by air inlet pressure into air motor.
Read all instruction manuals, tags, and labels before you operate the equipment.

1. Transport and Handling

1-1 Transport

To transport the equipment only the systems described below can be used.
In any case make sure that the transport and lifting device can bear the weight of the equipment with its packaging.

⚠ WARNING

ALWAYS KEEP THE PACKAGING IN VERTICAL POSITION.

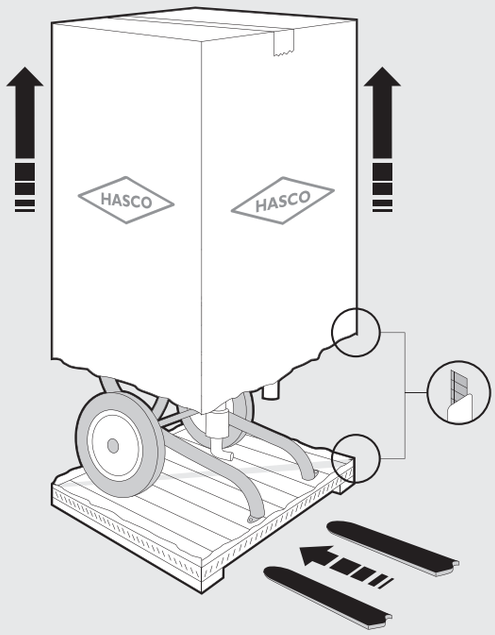
- DO NOT PLACE THE PACKAGING AT A SLANT.
- DO NOT STAND THE PACKAGES UPSIDE DOWN.
- DO NOT PUT OTHER PACKAGES OR WEIGHTS UP ON THE PACKAGING.

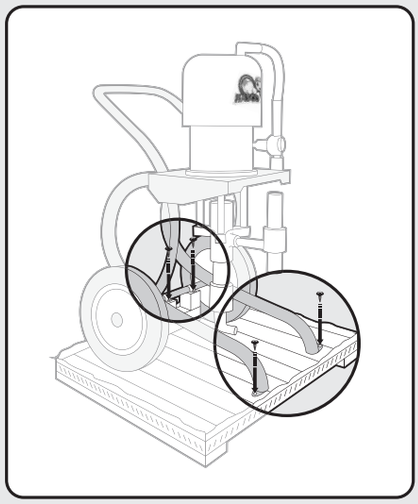
IT IS ADVISABLE THAT THE STAFF IN CHARGE OF HANDLING THE EQUIPMENT WEAR PROTECTIVE GLOVES AND SAFETY SHOES.

WHILE LIFTING OR HANDLING THE EQUIPMENT OR ANY OF ITS COMPONENT CLEAR THE WORKING AREA. LEAVE ALSO A SUFFICIENT SAFETY AREA AROUND THE EQUIPMENT TO AVOID DAMAGING PEOPLE OR OBJECTS WHICH COULD BE THERE.

1-2 Transport with cardboard packaging

Standard packing(cardboard packaging on pallet), the equipment is put inside a cardboad packaging and wrapped with some shockproof material.





1-3 Handling

To handle the cardboard packaging boxes must be moved by a forlelift or trdley. Use a forklift or trolley.
To handle or displace the airless unit only use the handle.
An airless pump unit must be moved by a handle

⚠ WARNING

FOLLOW THE INSTRUCTIONS ON THE PACKAGING BEFORE HANDLING AND OPENING IT.

1-4 Temporary storage

During transport and storage make sure the temperatures between 0 and 40°C are not exceeded.
In case of storage, make sure the equipment is not put in places with an excessive humidity, it's necessary to prevent the equipment from being water, moisture. Keep to prevent water penetration especially from the rain or stagnant water not to get carton case wet.

2. Warning

• Danger symbol

⚠ DANGER ⚠ DANGER ! -High Pressure Device For Professional Use Only
- Read instructon manual before operating: observe all warnings.

FIRE -Always keep spray pump in a well ventilated area a minimum of 25' from spray activity to avoid possible fire or explosion with flammable liquids. High velocity flow of material through equipment may create static electricity. All equipment and object being sprayed must be properly grounded to prevent sparking which may cause fire or explosion.

INJECTION HAZARD -High pressure spray or application equipment can cause serous injury if the spray penetrates the skin. DO NOT point any high pressure device, gun or nozzle at anyone or any part of the body. DO NOT attempt to deflect or stop leaks in the system by hand. In case of penetration, adequate medical aid must be immediately obtained.

• Warning symbol

⚠ WARNING

This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

• Caution symbol

⚠ CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

⚠ WARNING

2-1 EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury.

-This equipment is for professional use only.

-Read all instruction manuals, tags, and labels before you operate the equipment.

-Use the equipment only for its intended purpose. If you are not sure, contact HASCO.

-Do not change or adjust this system.

-Check equipment daily. Repair or replace worn or damaged parts immediately.

-Do not exceed the maximum working pressure of the lowest-rated system component. Refer to the **Technical Data** section for the Maximum pressure of this machine.

-Use fluids and solvents that are compatible with the equipment wetted parts. Refer to the **Technical Data** section of all equipment manuals. Read the fluid and solvent manufacturer's warnings.

-Do not use hoses to pull equipment.

-Route hoses away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not expose HASCO hoses to temperatures above 82°C(180°F)or below -40°C(-40°F).

-Wear hearing protection when you operate this equipment. (Noise range : 70~100 dBa)

-Do not lift pressurised equipment.

-Comply with all applicable local, state, and national fire, electrical, and safety regulations.

⚠ WARNING

2-2 MOVING PARTS HAZARD

Moving parts, such as the air motor piston and displacement rod, can pinch or amputate your fingers.

-Keep clear of all moving parts when you start and operate the pump.
-Before you service the equipment, follow the Pressure Relief Procedure to prevent the equipment from starting unexpectedly.

2-3 TOXIC FLUID HAZARD

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, or swallowed.

-Know the specific hazards of the fluid you are using.
-Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state, and national guidelines.

Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer.

2-4 Plate Data

HASCO's identification plate is applied on the airless unit.(See picture below)It must not be removed at all, even if the equipment is resold.
For any communication with the manufacturer always mention the serial number written on the plate itself or attached on the pump

Air-Operated Airless Pump	Pro-681	
∘ Serial No.		
∘ Fluid Pressure Ratio	68 : 1	
∘ Output	8.95	L/min
∘ Stroke	120	mm
∘ Air Pressure Range	3~7	bar
∘ Max. Discharge Pressure	476	bar

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3. Installation

3-1 Conditions for installation

1) The equipment must be installed by a specialized and authorized staff.

In any case, follow the instructions below.
Painting must preferably take place inside spray booth equipped with suction device.
Do not use the unit if the suction device is off.

⚠ WARNING

If painting is carried out outside the spray booth, always operate in a place with a right ventilation to avoid concentrating inflammable vapours coming from solvents or paints.

2) The pump requires 0.8m³/min of compressed air while operating at 7bar air pressure and 60cycles per minute. Ensure that you have an adequate compressed air supply.

Bring a compressed air supply line from the air compressor to the pump location. Be sure all air hoses are properly sized and pressure-rated for your system. Use only electrically conductive hoses.
The air hose should have a 1/2" thread.
Install a bleed-type shutoff valve in the airline to isolate the air line components for servicing. Install an air line moisture from the compressed air supply.
Keep the site clear of any obstacles or debris that could interfere with the operator's movement.
Have a grounded, metal pail available for use when flushing the system or draining the fluid filter.

3) Grounding

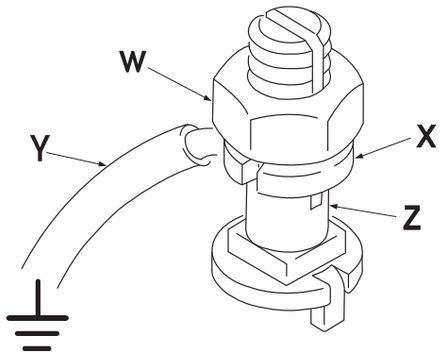
⚠ WARNING

Before operating the pump, ground the system as explained below.

(1) Pump :
- Use the ground wire.(see figure)
- Connect the other end of the wire to a true earth ground.

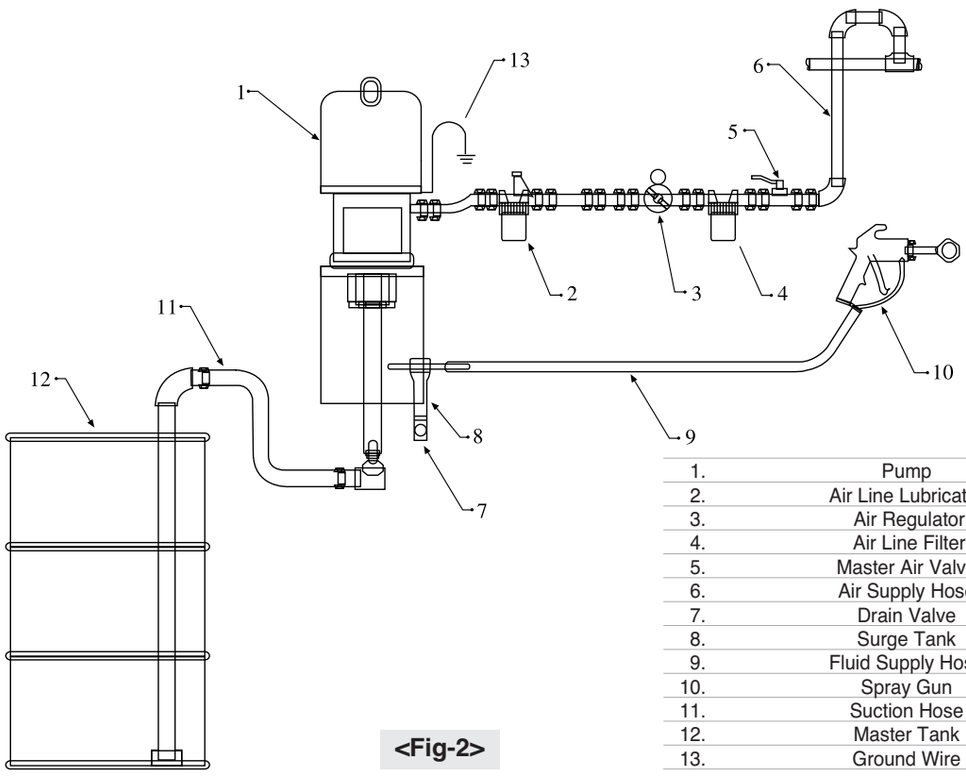
(2) Air compressor : Follow manufacture's recommendations.
(3) Spray gun : Ground through connection to a properly grounded fluid hose and pump.
(4) Fluid supply container : Follow you local code.
(5) Object being sprayed, Follow your local code.
(6) Solvent pails used when flushing :
- Follow your local code.
- Use only metal pails, which are conductive, placed on a grounded surface.
- Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts the grounding continuity.

(7)To maintain grounding continuity when flushing or relieving pressure, hold a metal part of the spray gun firmly to the side of a grounded metal pail, then trigger the gun.



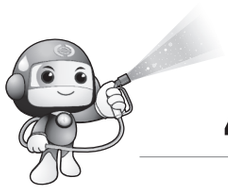
<Fig-1>

3-2 Typical installation



<Fig-2>

1.	Pump
2.	Air Line Lubricator
3.	Air Regulator
4.	Air Line Filter
5.	Master Air Valve
6.	Air Supply Hose
7.	Drain Valve
8.	Surge Tank
9.	Fluid Supply Hose
10.	Spray Gun
11.	Suction Hose
12.	Master Tank
13.	Ground Wire



4. Operation

4-1 Pressure relief procedure

⚠ WARNING

INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Fluid under high pressure can be injected through the skin and cause serious injury.
To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the **Pressure relief Procedure** whenever you :

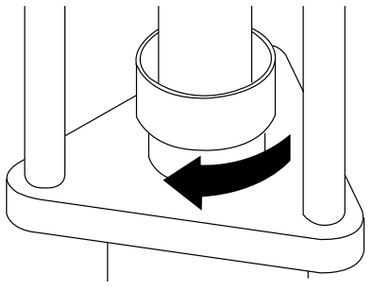
- are instructed to relieve the pressure
- stop spraying
- check or service any of the system equipment, or install or clean the spray tips.

1. Lock the gun trigger safety.
2. Close the red-handed bleed-type master air valve(5, required in your system).
3. Unlock the gun trigger safety.
4. Hold a metal part of the gun firmly to the side of a grounded metal pail, and trigger the gun to relieve pressure.
5. Lock the gun trigger safety.
6. Open the drain valve(7, required in your system), having a container ready to catch the drainage.
7. Leave the drain valve open until you are ready to spray again.

If you suspect that the spray tip or hose is completely clogged, or that pressure has not been fully relieved after following the steps above, very slowly loosen the tip guard retaining nut or hose end coupling to relieve pressure gradually, then loosen completely. Now clear the tip or hose.

Packing nut / wet-cup

Before starting, fill the packing nut 1/3 full with TSL-OIL.
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the pressure relief procedure.
The packing nut is torqued at the factory and is ready for operation.
If it becomes loose and there is leaking from the throat packings, relieve pressure, then torque the nut to 200kgf·cm using a wrench.
Do this whenever necessary. Do not over tighten the packing nut.
See **<Fig-3>.**



<Fig-3>

4-2 Flush the pump before first use

The pump is tested with lightweight oil ,which is left in to protect the pump parts. If the fluid you are using may be contaminated by the oil, flush it out with a compatible solvent.
Flush the pump

- Before the first use
- When changing colors or fluids
- Before fluid can dry or settle out in a dormant pump(check the pot life of catalysed fluids)
- Before storing the pump

Flush with a fluid that is compatible with fluid you are pumping and with the wetted parts in your system.
Check with you fluid manufacturer or supplier for recommended flushing fluids and flushing frequency.

⚠ WARNING

To reduce the risk of serous injury whenever you are instructed to relieve pressure, always follow the **Pressure relief procedure.**

1. Relieve the pressure.
2. Remove the tip guard and spray tip from the gun. See the gun instruction manual.
3. Remove the filter element from the surge tank. Reinstall the filter or surge tank below.
4. Place the suction tube in a container of solvent.
5. Hold a metal part of the gun firmly to the side of a grounded metal pail.
6. Start the pump. Awlays use the lowest possible fluid pressure when flushing.
7. Trigger the gun.
8. Flush the system until clear solvent flows from the gun.
9. Relieve the pressure.
10. Clean the tip guard, spray tip, and fluid filter element separately, then reinstall them.
11. Clean the inside and outside of the suction tube.

4-3 Using the Airless spray gun

Before operating the equipment, read the instruction manual supplied with the gun.
Spray some test patterns before doing any finished work.
Refer to the gun manual for detailed information on correct spraying technique.

NOTE : To avoid tip-over, the cart must be on a flat level surface. Failure to follow this caution could result in injury or equipment damage.

4-4 Prime the pump

1. Remove the tip guard and spray tip from the gun(10). See the gun insturction manual.
2. Close the air filter/regulator and master air valves(5).
3. Close the fluid drain valve(7).
4. Engage the air line coupler with the mating coupler attached to the air filter/regulator inlet and twist with a wrench to lock.
5. Check that all fittings throughout the system are tightened securely.
6. Place the suction hose(11) into the fluid supply container(12).
7. Open the fluid shutoff valve.
8. Open the master-air valve(5).
9. Hold a metal part of the gun(10) firmly to the side of a grounded metal pail and hold the trigger open.
10. Slowly open the air filter/regulator until the pump starts.
11. Cycle the pump slowly until all air is pushed out and the pump and hoses are fully primed.
12. Release the gun trigger and lock the trigger safety. The pump should stall against pressure.
13. If the pump fails to prime properly, open the drain valve(7). Use the drain valve as a priming valve until the fluid flows from the valves. Close the valve.

4-5 Set the air and fluid pressure

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure relief procedure.**

1. Relieve the pressure. Install the tip guard and spray tip in the gun, as explained in the gun manual.
2. Open the air filter/regulator slowly. Use the regulator to control pump speed and fluid pressrue.
   Always use the lowest air pressure necessary to get the desired results. Higher pressures cause premature tip and pump wear.

⚠ WARNING

COMPONENT RUPTURE HAZARD

To reduce the risk of overpressurising your system, which could cause component rupture and serious injury, never exceed the specified maximum incoming air pressure to the pump(see **Techincal data**)

⚠ CAUTION

Do not allow the pump to run dry. It will quickly accelerate to a high speed, causing damage. If your pump is running too fast, stop it immediately and check the fluid supply. If the container is empty and air has been pumped into the lines, refill the container and prime the pump and the lines, or flush and leave it filled with a compatible solvent. Eliminate all air from the fluid system.

3. With the pump and lines primed, and with adequate air pressure and volume supplied, the pump will start and stop as you open and close the gun.

4-6 Shutdown and care of the pump

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressrue, always follow the **Pressure relief procedure.**

For overnight shutdown, stop the pump at the bottom of its stroke to prevent fluid from drying on the exposed displacement rod and damaging the throat packings. **Relieve the pressure.**
Always flush the pump before the fluid dries on the displacement rod. See **Flushing.**

5. Maintenance and Inspection

5-1 Safety rules during maintenance

The main rules to follow during maintenance interventions on the unit are :

1. Disconnect the pneumatic supply before replacing any component.
2. Do not wear rings, watches, chains, bracelets etc during maintenance.
3. Always use the individual ptotections(Gloves, safety, shoes etc)
4. Do not use naked flames, points or pins for cleaning.
5. Do not smoke.

5-2 Recommended schedule for Maintenance

Daily Maintenance	1. Clean nozzle tip 2. Clean gun filter 3. loosen air regulator to allow pressure to fall to 0 bar by exhausting paint from gun. When you don't clean pump, always keep paint surface in paint container above intake set... 4. Clean fluid intermediate filter
Every 50 hours	1. Clean paint passages (especially when paint has lot of pigments or deposits easily)
Every 100 hours	1. Clean paint passages with cleaning liquid
Every 300 hours	1. Tighten packings of lower pump set
Every 500 hours	1. Apply grease to each sliding section of lower pump set and air motor set
Every 1000 hours	1. Overhaul the whole unit 2. Replace worn parts
CAUTION	**Regarding to the maintenance every 500/1000 hours, ask HASCO before maintenance**

6. Troubleshooting and Service

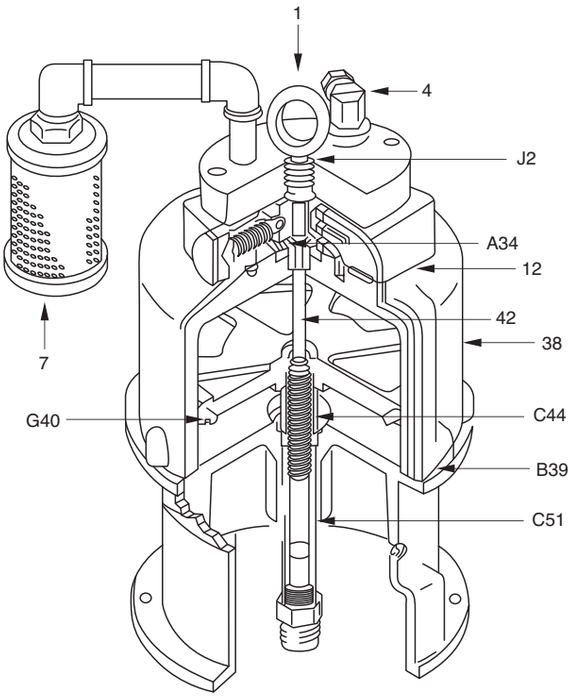
6-1 Air Motor

Troubleshooting

Locating Air Leaks

To locate an air leak, shut off the air supply and disconnect the hose. Screw the inlet union(4) out of the air manifold(12). Remove the shield. Screw the union back into the manifold. Connect the air hose and turn the air on.
Use the checking methods listed in the check Chart, below, to find where the air is leaking. Refer to Fig(4)

CHECK CHART			
Stroke Position	Fig Ref. Points	Checking Method	Cause of Leakage
UP only (air valve housing down)	A	By listrning for air leak at exhaust outlets	Worn trip rod packing(34)
	B	By feel	Blown air cylinder gasket(39)
	C	Squirt oil around wiper(51)	Worn throat packing(44)
	D	By feel	Damaged air manifold gasket (Fig-5;30)
DOWN only (air valve housing down)	E	By feel	Damaged air manifold gasket (Fig-5;30)
BOTH	F	By feeling exhaust, or hearing a high-pitched sound	Worn director valve(fig-5;24) Replace, or lap faces with no.500 grit sandpaper
	G	By feeling or hearing a high-pitched sound	Worn piston o-ring(40)
	H	By feel	Blown manifold gaskets (fig-5;30)
	I	Squirt oil around o-ring(Fig-5:17)	Damaged housing o-ring(Fig-5:17)
	J	By feel	Damaged o-ring(2)



<Fig-4>

- Grounding -

⚠ WARNING

For your safety, read the **FIRE OR EXPLOSION HAZARD** section on page 3 and ground your entire system as instructed there.

⚠ WARNING

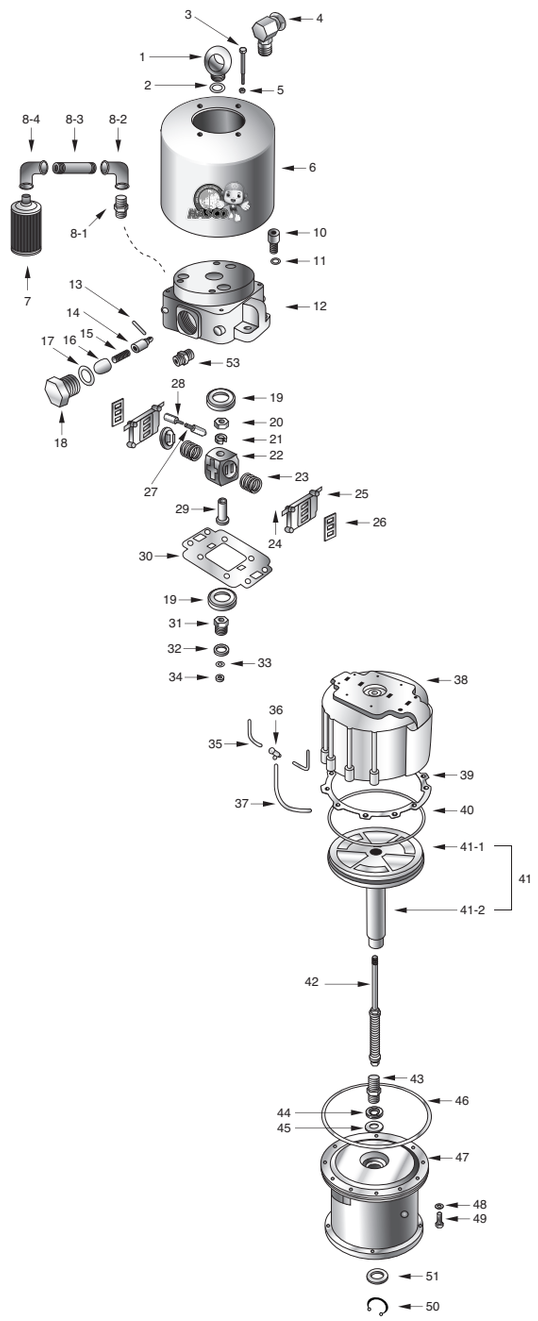
Keep fingers out of the detent housing(14) to reduce the risk of pinching or amputating them.

1) Parts Drawing and List

AIR MOTOR 68100

NO	CODE	DESCRIPTION	QTY
Sub Total	68100	AIR MOTOR	
1	68101	RING	1
2	68102	O-RING	1
3	68103	SCREW	4
4	45102	UNION	1
5	68105	LOCK WASHER	8
6	68106	SHIELD	1
7	68107	MUFFLER	2
8	68108	ELBOW & NIPPLE & PIPE	1
8-1	45403	NIPPLE(3/4"×3/4")	2
8-2	68108-2	ELBOW(3/4"×1")	2
8-3	68108-3	PIPE	2
8-4	45505	ELBOW(1")	2
9	68109	SCREW & WASHER	4
9	45104	WASHER(SPRING:1/4")	4
9	68109-1	SCREW	4
10	68110	SCREW	4
11	68111	LOCK WASHER	4
12	68112	AIR MANIFOLD	1
13	68113	PIN	2
14	68114	SPRING HOUSING	2
15	68115	SPRING	2
16	68116	GUIDE	2
17	68117	O-RING	2
18	68118	RETAINER	2
19	68119	PAD	2
20	68120	NUT	1
21	45118	WASHER(SPRING:M10)	1
22	68122	VALVE HOUSING	1
23	68123	SPRING	2
24	68124	VALVE	2
25	68125	PLATE	2
26	45123	SEAL VALVE PLATE	2
27	68127	NUT	4
28	68128	SCREW	4
29	68129	HUB	1
30	68130	GASKET	1
31	68131	BEARING	1
32	45133	GASKET FIAT:COPPER	1
33	45134	WASHER(LEATHER)	1
34	68134	V-PACKING	1
35	68135	TUBE(6)	2
36	68136	T-FITTING	1
37	68137	TUBE(6)	1
38	68138	CYLINDER	1
39	45137	GASKET(Cylinder)	1
40	45138	PISTON O-RING	1
41	45139	PISTON ASSEMBLY	1
41	45139-1	PISTON PAN	1
41	45139-2	PISTON ROD	1
42	68142	TRIP ROD ASSEMBLY	1
43	68143	STUD	1
44	45142	U-PACKING Nitrile Rubber	1
45	45143	WASHER Back-up	1
46	45144	O-RING Nitrile Rubber	1
47	45145	BASE Air Motor	1
48	45148	WASHER	12
49	45149	SCREW	12
50	45150	SNAP PING	1
51	45147	SEAL Plan Enclosed	1
53	68153	ONE TOUCH FITTING(6)	2

NOTE : Parts marked in grey are subject to wear



<Fig-5>

2) Repair Kits List

R-68000-1	Model	RPK	QTY
	68-102	O-RIING	1
	68-124	VALVE	2
	68-130	GASKET	1
	68-132	GASKET	1
	68-133	WASHER	1
	68-134	V-PACKING	1
	68-139	BASE GASKING	1
	68-140	O-RIING	1
	68-144	U-PACKING	1
	68-145	WASHER(BACK-UP)	1

3) How to service for Air Motor

Disassembling

Disconnect all hoses, rods, tubes, controls, etc. from the air motor as necessary to provide ease in servicing.
Clamp the base (47) securely. Remove the union (4) and the eight screws (3) and lockwashers (5). Remove the shield (6).

Refer to Fig 4. Remove the detent spring retainers (18), springs (15), guides (16) and plungers (14). Inspect the parts for wear or damage, and replace parts as necessarty.

⚠ CAUTION

HANDLE THE SPRINGS CAREFULLY.
Scrathches or nicks will cause early spring failure.

Remove the four screws (3,10) and lockwashers (5,11) Lift the housing off the manifolds. Don't drop the detent rollers (13); take them out of the housing and check the pin(13) for wear and damage. If the pin is worn or damaged, replace the pin. Remove the rubber pad (19) and check them carefully for damage.

Pull the manifold (12) up, and remove the valves and springs (23). Take the nut (20) and washer (10,11) off the trip rod (42). Pull the valve housing off the hub (29). Grip the trip rod velow the housing hub (29) with a padded pliers, and screw the hub off the trip rod.

⚠ CAUTION

Take special care to avoid damaging the plated surface of the trip rod.

Check the valve plates (25). When attaching a new valve plate to the manifold, be sure the mating surfaces of the plate and manifold are completely clean. Handle the plate carefully.

⚠ WARNING

The openings in the valve plates (25) are razor sharp!
Be careful not to cut yourself when checking or handling them.

Remove the rubber pad (19) from the cylinder (38). Screw the trip rod bearing (31) out of the cylinder and carefully pull it up off the trip rod. Check the packing (34), washer (33) and gasket (32) and replace them if necessary. Grease the packings before installing them in the cylinder.

Remove the twelve screws holding the air cylinder (38) to the base (47). Pull the cylinder straight up off the piston. If the cylinder is tuck to the base, use a plastic hammer to break it loose. Be careful not to tilt the cylinder since this could damage the smooth inner surface. Check the piston o-ring (40) for wear or damage and replace if necessary.

Lift the piston and rod (41) from the base. Inspect the v-block throat packing (44) and back-up washer (45) in place. If replacement is necessary, remove the old packing and back-upwasher, and carefully tuck a new back-up washer and packing into the throat cavity. The lips of the v-packing must face up towards the piston. Pack light, water-proof grease into the cavity above the wiper sea and thoroughly lubricate the packing before reassembling.

⚠ CAUTION

Handle the trip rod and spring carefully.
The spring surface must be free of nicks or scratches.

To inspect or replace the trip rod (42), clamp the flats of the piston (41) in a vise and unscrew the stud (43) from the piston tube. Don't damage the polished surface of the tube.

Whenever the trip rod (42) is removed from the piston rod (41) or a new trip rod is being installed, check to make sure the distance between the inside shoulders of the spring guides is **EXACTLY 4.634 in. (117.7mm)**

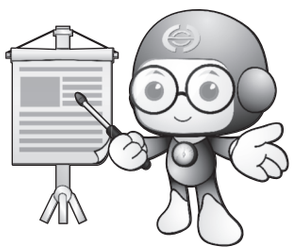
If the spring guide(s) (P) is removed or the setting is not exacty or if any part of the trip rod is damaged, the entire trip rod assembly (42) must be replaced. Refer to Fig-5

⚠ CAUTION

DO NOT attempt to redjust the spring guides (P)!
Readjustment could cause air motor failure.

Lubricate the spring and guides with light waterproof grease. Pack the grease into the cavity rod of the air piston (41).
use thread sealer on the threads of the stud(43) and torque to a minimum of 150 ft-lb (203 N · m).

Before installing the air cylinder (38), check to see that the gasket (39) is in place and the trip rod bearing (31) is removed from the cylinder top. Carefully place the cylinder (38) over the piston (41).



⚠ CAUTION

DO NOT tilt or force the cylinder since this could damage the smooth inner cylinder wall.

Be sure the floating o-ring seal is in place before bolting the cylinder (38) to the base (47). Be sure the air inlet is in line with the fluid outlet.

Using thread sealer, install the twelves screws (49) in the base. Torque the screws to 20-25 ft-lb (27-33 N · m). Install the gasket (32) on the trip rod bearing. Carefully twist the bearing down over the trip rod and tighten it securely into the cylinder. Place the rubber pad (19) into the cylinder top.

Grease and install the valve housing hub (29), housing (22), lockwahser (21) and nut (20) on the trip rod. Adjust the hub and nut until 0.04 in. (1mm) of the rod projects, then lock it in place by torquing the bearing (31) to 14-18 ft-lb (19-24 N · m)

Place the springs (23) and air valve rings (24), into the valve housing (22). Install the air manifold gasket (30) into the cylinder.ed. Operating clearance must not be more that 0.04 in. (1mm). Check to be sure the housing moves up and down freely. Then tighten the shorter screws (10,11) holding the manifold to the cylinder.

Assemble the housing(14) and spring(15) into the guide(16) Lubricate the pin(13) and slide it into the housing. Slide these assembled parts into the housing. Slide these assembled parts into the air manifold(12).
be sure the pin(13) is aligned with the slot of the air valve housing(22) before assembling the rest of the air valve.
Repeat for other side.
Install the o-ring(17) on the retainer(18). Screw the retainers into both sides of the manifold(12) they should readily screw all the way into the manifold by hand.
if they don't the parts are not assembled correctly; inspect, and correct any misalignment.
Now firmly tighten the retaniners(18).
Install the shield(6) and ring(1).

6-2 Displacement Pump

Troubleshooting

NOTE : CHECK ALL POSSIBLE PROBLEMS AND SOLUTIONS BEFORE DISASSEMBLING PUMP.

	CAUSE	SOLUTION
Pump fails to operate	Restricted line or inadequate air supply	Clear : increase air supply
	Obstructed fluid hose, gun, or dispensing valve	Open, clear
	Exhausted fluid supply	Refill : purge all air from pump and fluid lines
	Fluid dried on displacement rod	Clean : always stop pump at bottom of stroke: keep wet-cup 1/2 filled with compatible solvent
	Damaged air motor	Service air motor
Pump operates but output low on both strokes	Restricted line or inadequate air supply	Clear : increase air supply
	Obstructed fluid hose, gun, or dispensing valve	Open, clear
	Exhausted fluid supply	Refill : purge all air from pump and fluid lines
	Air in displacement pump and hose	Reprime. See page 8
	Packing nut too tight or too loose	Adjust. See page 7
	Worn throat packings	Replace. See page 20
Pump operates but output low on down strokes	Held open or worn intake valve	Clear : service. See page 20
Pump operates but output low on up strokes	Held open or worn fluid piston valve or packings	Clear : service. See page 20
Erratic or accelerated operation	Exgausted fluid supply	Refill : purge all air from pump and fluid lines
	Packing not too tight	Adjust. See page 7
	Held open or worn intake valve	Replace. See page 20
	Held open or worn fluid piston valve or packings	Replace. See page 20

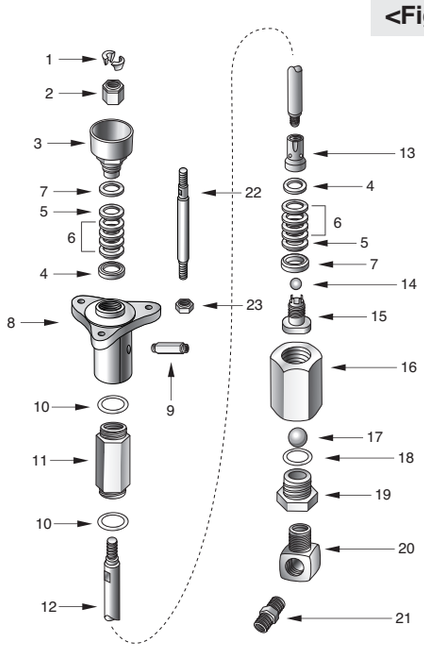
To determine if the fluid hose or gun/valve is obstructed, follow the Pressure Relief Procedure Warning below. Disconnect the fluid hose and place a container at the pump fluid outlet to catch any fluid. Turn on the air just enough to start the pump (about 20-40psi=1.4-2.8bar).
If the pump starts when the air is turned on, the obstruction is in the fluid hose or gun/valve.

1) Parts Drawing and Parts List

STANDARD 68200 / OPTIONAL STAINLESS 68S200

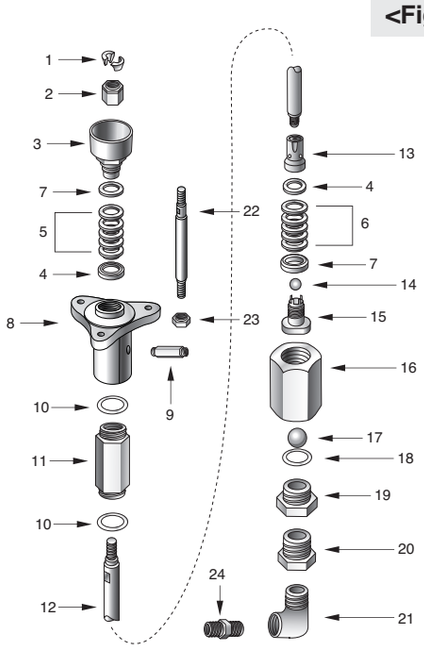
NO	CODE	DESCRIPTION	QTY
Sub Total	68200	PARTS DRAWING AND PARTS LIST	
1	45202	COUPLING	2
2	45201	COUPLING NUT	1
3	68203	PACKING NUT	1
4	68204	GLAND(M)	2
5	68205	V-PACKING(TEFLON)	2
6	68206	V-PACKING(LEATHER)	8
7	68207	GLAND(F)	2
8	68208	PUMP HOUSING	1
9	68209	NIPPLE(PT3/4"× PF3/4")	1
10	68210	SEAL(TEFLON)	2
11	68211N	SLEEVE	1
12	68212N	DISPLACEMENT ROD	1
13	68213	HOUSING	1
14	68214	BALL(3/4")	1
15	68215	PISTON	1
16	68216	HOUSING(INTAKE)	1
17	45221	BALL(1-1/4" DIA)	1
18	68210	SEAL(TEFLON)	1
19	68219	VALVE(INTAKE)	1
20	45224-A	TUBE(NEW)	1
22	68222	TIE ROD	3
23	68223	NUT(TEFLON)	3

<Fig-6>



NO	CODE	DESCRIPTION	QTY
Sub Total	68S200	PARTS DRAWING AND PARTS LIST	
1	45202	COUPLING	2
2	45201	COUPLING NUT	1
3	68203	PACKING NUT	1
4	68S204S	GLAND(M)	2
5	68205	V-PACKING(TEFLON)	5
6	68205	V-PACKING(TEFLON)	5
7	68S207S	GLAND(F)	2
8	68S208S	PUMP HOUSING	1
9	68S209S	NIPPLE(PT3/4×PF3/4)	1
10	68210	SEAL(TEFLON)	2
11	68211S	SLEEVE	1
12	68212S	DISPLACEMENT ROD	1
13	68213S	HOUSING	1
14	68214S	BALL(19mm)	1
15	68215S	PISTON	1
16	68216S	HOUSING(INTAKE)	1
17	45216S	BALL(1-1/4)	1
18	68210	SEAL(TEFLON)	1
19	45S218S	VALVE(INTAKE)	1
20	45S221S	BUSHING	1
21	45S219S	ELBOW	1
22	68222	TIE ROD	3
23	68223	NUT(TEFLON)	3
24	45S220S	HOSE NIPPLE	1

<Fig-7>



NOTE : Parts marked in grey are subject to wear

2) Repair Kits List (Must be purchased separately)

R-68200	Model	RPK
	68204/68S204S	GLAND(M)
	68205	V-PACKING(TEFLON)
	68206	V-PACKING(LEATHER)
	68207/68S207S	GRAND(F)
	68210	SEAL(TEFLON)
	68214/68S214S	BALL(19MM)/BALL(19MM)
	45221/45S216S	BALL(1-1/4" DIA)/BALL(1-1/4)
	68210	SEAL(TEFLON)

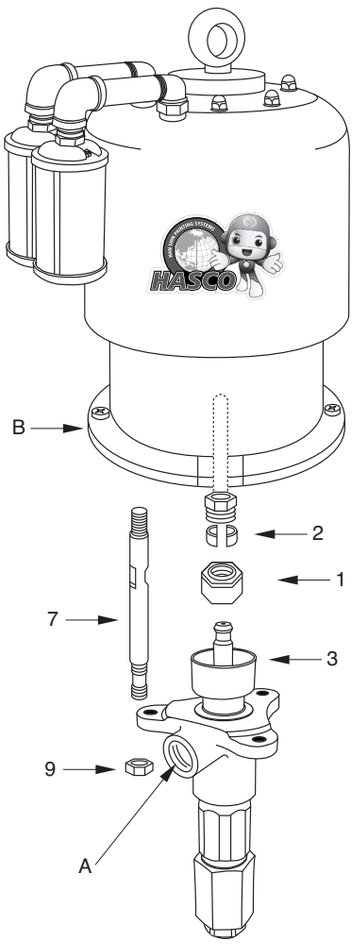
3) How to service for the Pump

Disconnecting the displacement pump

- Flush the pump if possible. Stop the pump at the bottom of its stroke. Follow the Pressure Relief Procedure Warning on page8.
- Disconnect the air and fluid hoses. Remove the pump from its mounting.
- Screw the coupling nut(1) off of the air motor piston rod. Be careful not to lose the two couplers(2) as you lower the nut. Unscrew the tie rod locknuts (9) from the tie rods (7). Carefully pull the displacement pump away from the air motor. See Fig 4.
- To service the displacement pump, refer to Displacement Pump Service on page 17through the bottom of the sleeve(11).

Reconnecting the displacement pump

- Align the pump's fluid outlet (A) to the optional fluid outlet (B) of the air motor. Position the displacement pump on the tie rods (7). See Fig 4
- Make sure the couplers (2) are in place inside the coupling nut (1). Screw the coupling nut up onto the air motor piston rod snugly. Screw the locknut (9) onto the tie rods (7) loosely.
- Mount pump and reconnect all hoses. Reconnect the ground wire if it was disconnected during repair.
- Tighten the tie rod locknuts (9) evenly, and torque to 40 -50 ft-lb(54-68 N · m). Torque the coupling nut (1) to 145-155 ft-lb (195-210 N · m)
- Start the pump and run it slowly, at about 40psi(2.8bar) air pressure, to check the tie rods for signs of binding. Adjust the tie rods as necessary to eliminate binding. Tighten the packing nut/wet-cup (3) with the wrench supplied, soit tis just snug-notighter.
  Fill the wet-cup half full with Throat Seal Liquid or compatible solvent.



<Fig-8>

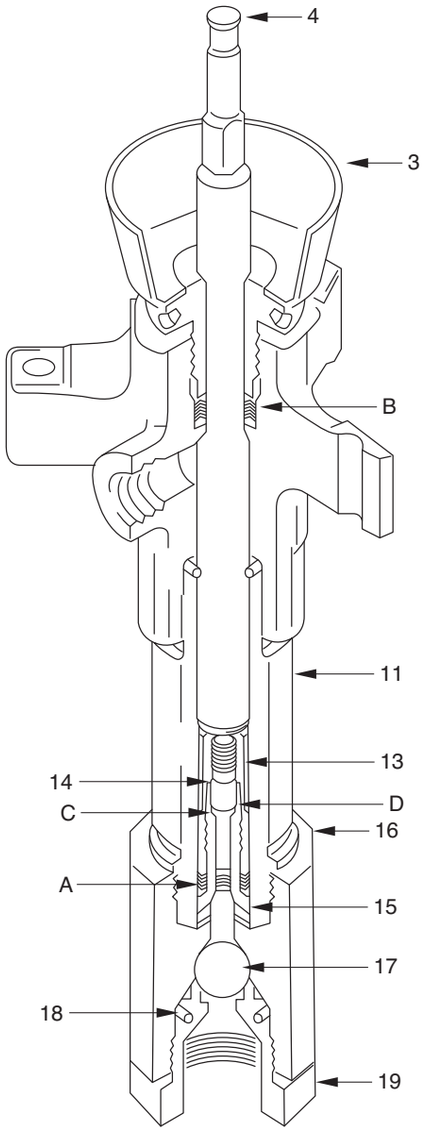
Displacement pump sevice

- Disconnect from the air motor.
- Place the Dis-Pump lengthwise in a vise, using a wrench, loosen.
  Note : Don't remove the packing nut(3)
- Unscrew the intake valve(19) from the intake housing(16)
  Note : Be careful to catch the intake ball(17) as you remove the intake valve(17), so that it does not fall and suffer damage. Inspect the ball(17) and the seat(E) for wear or damage
- Place the intake housing(16) in a vise and remove the intake housing(16) from the sleeve(11)

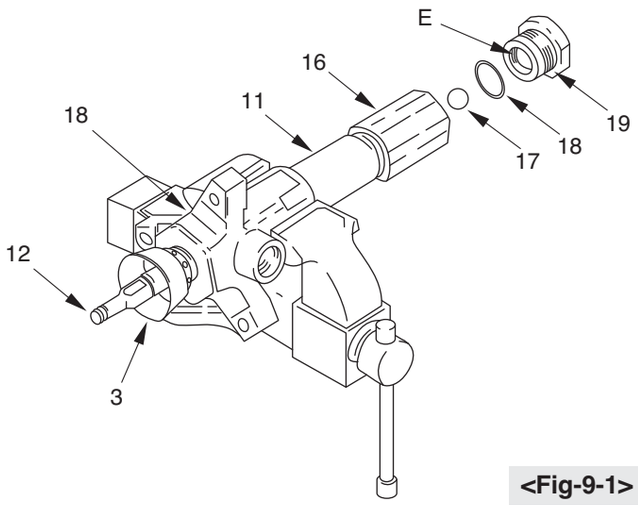
⚠ CAUTION

To reduce the costly damage to the rod(12) and sleeve(11), always use a plastic or wooden block. Never hit the rod(12) with a hammer.

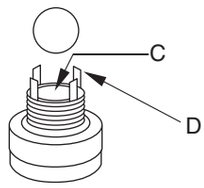
- Turn the sleeve(11) upside down and strike the top of the rod(12) on a block until the piston(15) from the sleeve(11), being careful not to scratch the parts.
- Shine a light into the sleeve(11) to inspect the inner surface for scoring or wear.
- Place the flats of the piston(15) in a vise.
- Unscrew the ball housing(13) from the piston(15)
  Note : Be careful to catch the piston ball(14) as you separate the piston(15) and ball housing(13), so that it does not fall and suffer damage.
- Examine the dis-rod(12) for scratches or other damage. Only if the rod(12) needs rdplacement.
  Place the ball housing(13) in a vise and unscrew the dis-rod(12)
- Remove the glands and V-packing(A) and the ball(14) from the piston(15). Inspect the ball seat(C) and ball guides(D) for wear or damage.<See Fig-8-2>
- Unscrew the packing nut(3) from the pump housing(8). Remove the grands and V-packing(B)
- Clean all parts with a compatible solvent and inspect them for wear or damage.



<Fig-9>



<Fig-9-1>



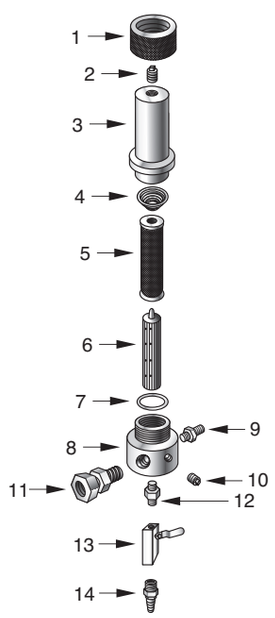
<Fig-9-2>

6-3 Surge Tank Assembly

45300(68300)

NO	CODE	DESCRIPTION	QTY
Sub Total	45300	SURGE TANK:OUTLET 1/4"	
1	45301	RING	1
2	45302	PLUG	1
3	45303	BOWL	1
4	45304	SPRING	1
5	A97060	SURGE FILTER #60	1
6	45306	SUPPORT	1
7	45307	PACKING	1
8	45308	MANIFOLD	1
9	45309	NIPPLE(PT 3/8"×NPS 1/4")	1
10	45302	PLUG	1
11	45311	UNION(3/4")	1
12	45312	NIPPLE(PT 1/4" ×PT 1/4")	1
13	45313	BALL VALVE(HIGH)	1
14	45314	DRAIN NIPPLE	1

<Fig-10>

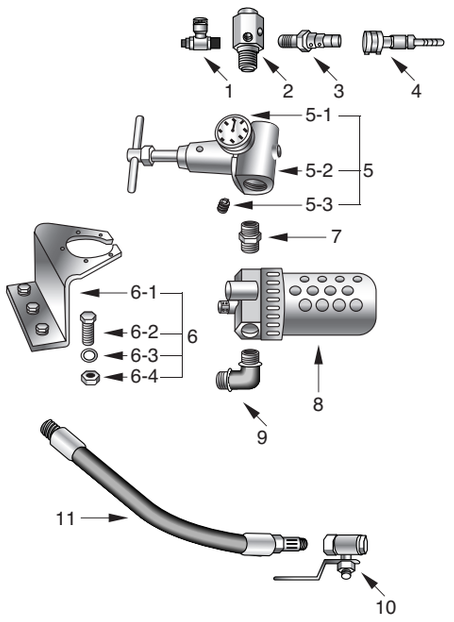


6-4 Air Regulator Assembly

68400

NO	CODE	DESCRIPTION	QTY
Sub Total	68400	AIR REGULATOR ASSEMBLY	
1	68401	SPEED CONTROL	1
2	68402	AIR MANIFOLD	1
3	72402	AIR COUPLING(M:1/2":PM300)	1
4	72403	AIR COUPLING(F:1/2":SH300)	1
5	45404	AIR REGULATOR & GAUGE	1
5	45404-1	AIR REGULATOR	1
5	45404-2	GAUGE	1
5	G74002	PLUG 1/4NPT	1
6	68406	BRACKET SET	1
6	45603-1	BOLT	3
6	45603-2	WASHER	3
6	45603-3	NUT	3
6	68406-1	BRACKET	1
7	68407	NIPPLE(3/4×3/4)	1
8	68408	OILER	1
9	68409	ELBOW(3/4×3/4)	1
10	45402	VALVE(3/4")	1
11	68411	AIR HOSE(570mm)	1

<Fig-11>

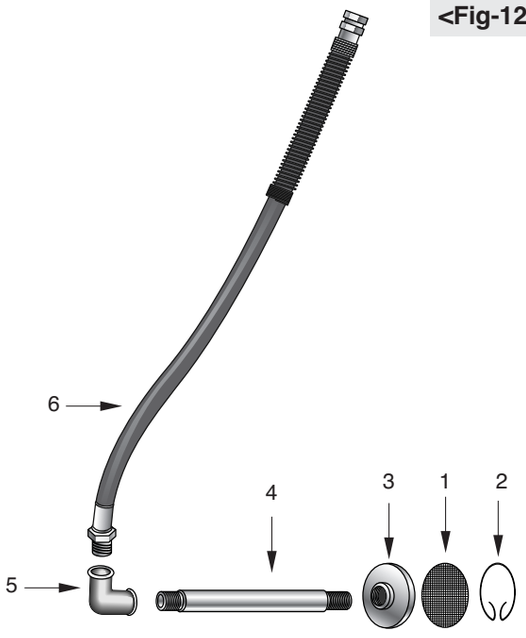


6-5 Suction Assembly

45500(68500)/45S500

NO	CODE		DESCRIPTION	QTY
Sub	45500		SUCTION ASSEMBLY	1
Total		45S500	SUCTION ASSEMBLY(STAINLESS)	1
1	45501		SCREEN	1
2	45502	45S502S-1	CLIP	1
3	45503P		CUP(POM)	1
4	45504	45S504S	PIPE	1
5	45505	45S505S	ELBOW	1
6	45506	45S506S	HOSE	1

<Fig-12>

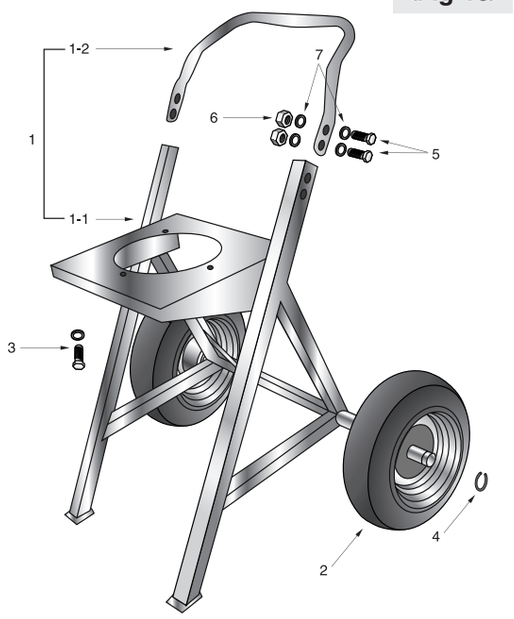


6-6 Cart Assembly

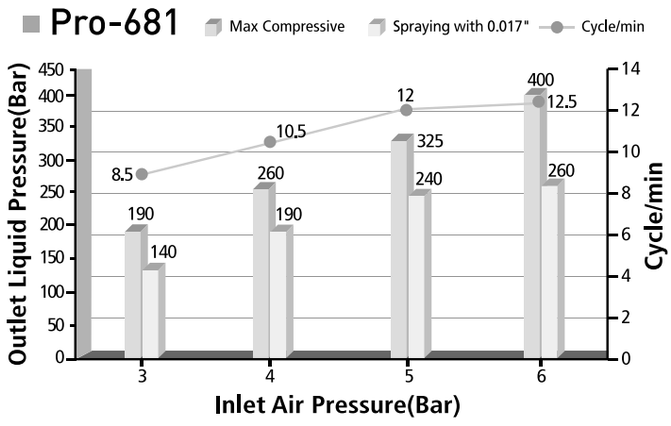
45600(68500)

NO	CODE	DESCRIPTION	QTY
Sub Total	45600	CART ASSEMBLY	
1	45501	CART & HANDLE	1
1	45501-1	CART	1
1	45501-2	HANDLE	1
2	45502	TIRE	2
3	45503	BOLT & WASHER & NUT	1
3	45603-1	BOLT	4
3	45603-2	WASHER	4
3	45603-3	NUT	4
4	45604	TIRE SNAP RING	2
5	45605	BOLT	4
6	45603-3	NUT	4
7	45607	WASHER SET	1
7	45603-2	WASHER	4
7	45607-1	FLAT WASHER	8

<Fig-13>



Technical Data



7. Warranty and Limitations

7-1 Warranty General

All HASCO products have a one year guarantee from the invoice date, unless otherwise stated in writing. The warranty covers all manufacturing faults and material defects. Any spare part replacement or repair operations are covered only if they are carried out by our authorized distributors. This warranty covers when the equipment is installed, operated and maintained in accordance with HASCO's written recommendations. HASCO shall not be liable for, any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of Non-HASCO component parts. This warranty is conditioned upon the CARRIAGE PAID return of the equipment claimed to be defecive to an authorized HASCO distrbutors for verification of the claim. If the claimed defect is verified, HASCO will repair or replace free of charge any defective parts. This components will be returned to the original purchase CARRIAGE PAID If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

7-2 The Warranty does not cover

- Damage or breakdown caused by improper use or assembly.
- Damage or breakdown caused by the use of spare parts that are different from the original or recommended ones.
- Damage or breakdown caused by bad preservation.

Components subject to wear(described in parts list) Warranty Forfeiture:

- In case of delayed payment or other contractual defaults.
- Whenever changes or repairs are carried out on our equipment without prior authorization.
- When the serial number is damaged or removed.
- When the damage is caused by improper use or functioning, or if the equipment falls, is bumped or by other causes not due to the normal working conditions.
- Whenever the unit disassembled, tampered with or repaired without the authorization of HASCO.

7-3 Special Warranty Parts

If the products be supplied to shipyard - industry customers, the warranty period of the following parts shall be limited to 3 months after the delivery to the end user.

DESCRIPTION
Sleeve
Displacement Rod

Note : In other fields, these two parts can be guaranteed for 6 months after the date of delivery to the end user.

HASCO

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