AIRLESS UNIT

Nare 281/101
Hemi 231

PUMP

Original instruction for airless pump
SERVICE Manual-PARTS LIST

Optional Displacement Pump

- Stainless 28S200 / 23S200

<< Standard

		PRO-Nare 281 (28000-W)	PRO-Nare 101 (10000)	PRO-Hemi 231 (23000)	PRO-Hemi 171 (17000)
STANDARD SPECIFICATION	AIR MOTOR	28100-W		23100	17100
	DIS-PUMP	28200	10200	23200	28200
	SURGE TANK	28300			
	REGULATOR	28400 (3/8" R)		17400 (3/8" R)	
	SUCTION	28500			
	CART	28600			
FLUID PRESSURE RATIO		28:1	10:1	23:1	12:1
CYCLE/min		60			
DELIVERY/cycle (cc)		60.67	190.79	28.75	48.53
DELIVERY/min (liter)		3.64	11.45	1.73	2.91
MAX. PRESSURE (bar)		196	70	161	84
AIR PRESSURE RANGE (bar)		3 - 7			
STROKE (mm)		100		80	
WEIGHT (NET/PACKING:kgs)		34/42	37/45	29/37	29/37
DIMENSION (NET/PACKING:cm)		55×50×91 / 57×52×107		55×50×87 / 57×52×107	
TYPICAL FLUID HANDLED		ALKYD, EPOXY, URETHANE, WATER, PRIMER, TOP COAT			
MAX. LOADAGE (20FT/40FT:unit)		88/176			

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.

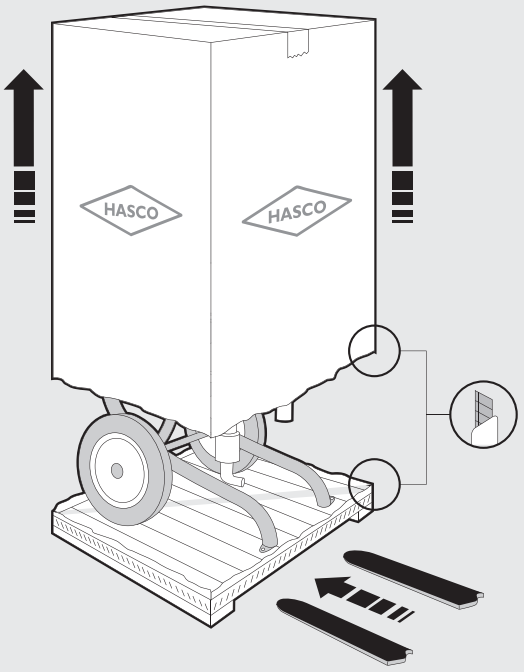
- DO NOT PLACE THE PACKAGING AT A SLANT.
- DO NOT STAND THE PACKAGES UPSIDE DOWN.
- DO NOT PUT OTHER PACKAGES OR WEIGHTS UP ON THE PACKAGING.

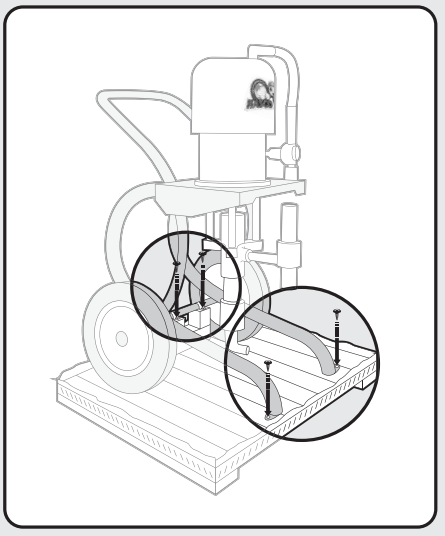
IT IS ADVISABLE THAT THE STAFF IN CHARGE OF HANDLING THE EQUIPMENT WEAR PROTECTIVE GLOVES AND SAFETY SHOES.

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-281	
Serial No.	7	
Fluid Pressure Ratio	28 : 17	
Output	3.647	L/min
Stroke	1007	mm
Air Pressure Range	3~77	bar
Max. Discharge Pressure	196	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.

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

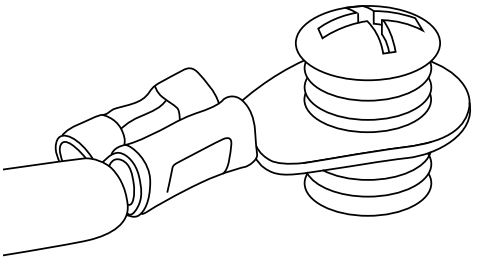
⚠ WARNING

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.

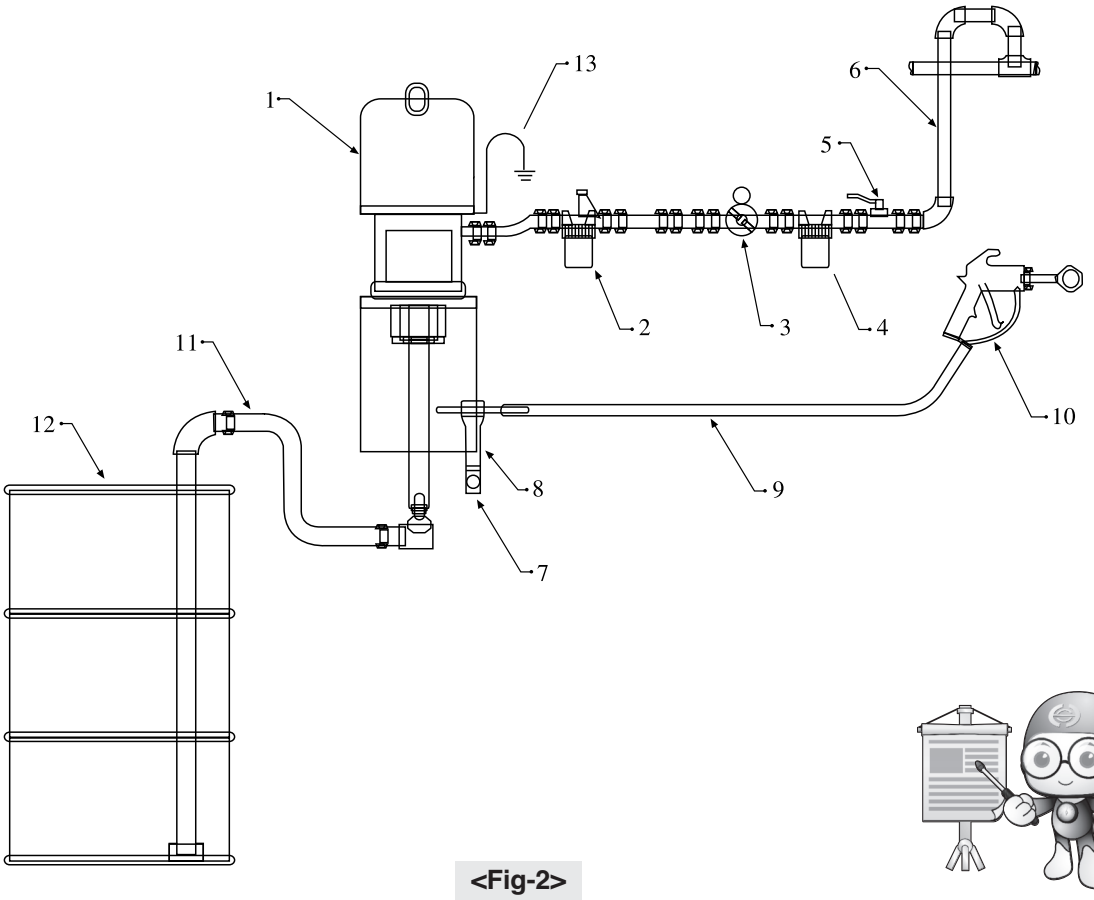
(2) Air compressor : Follow manufacture's recommendations.
(3) Spray gun : Ground through connection to a properly grounded fluid hose and pump.
(4) Fluid supply container : Follow you local code.
(5) Object being sprayed, Follow your local code.
(6) Solvent pails used when flushing :
- Follow your local 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.

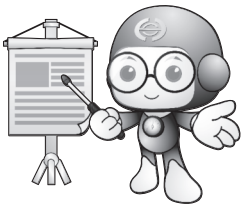
(7)To maintain grounding continuity when flushing or relieving pressure, hold a metal part of the spray gun firmly to the side of a grounded metal pail, then trigger the gun.



<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 :

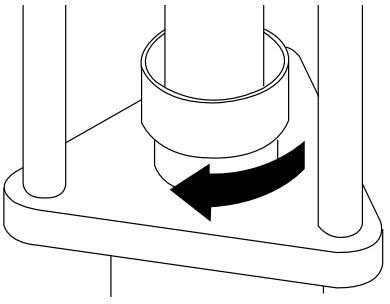
- are instructed to relieve the pressure
- stop spraying
- check or service any of the system equipment, or install or clean the spray tips.

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

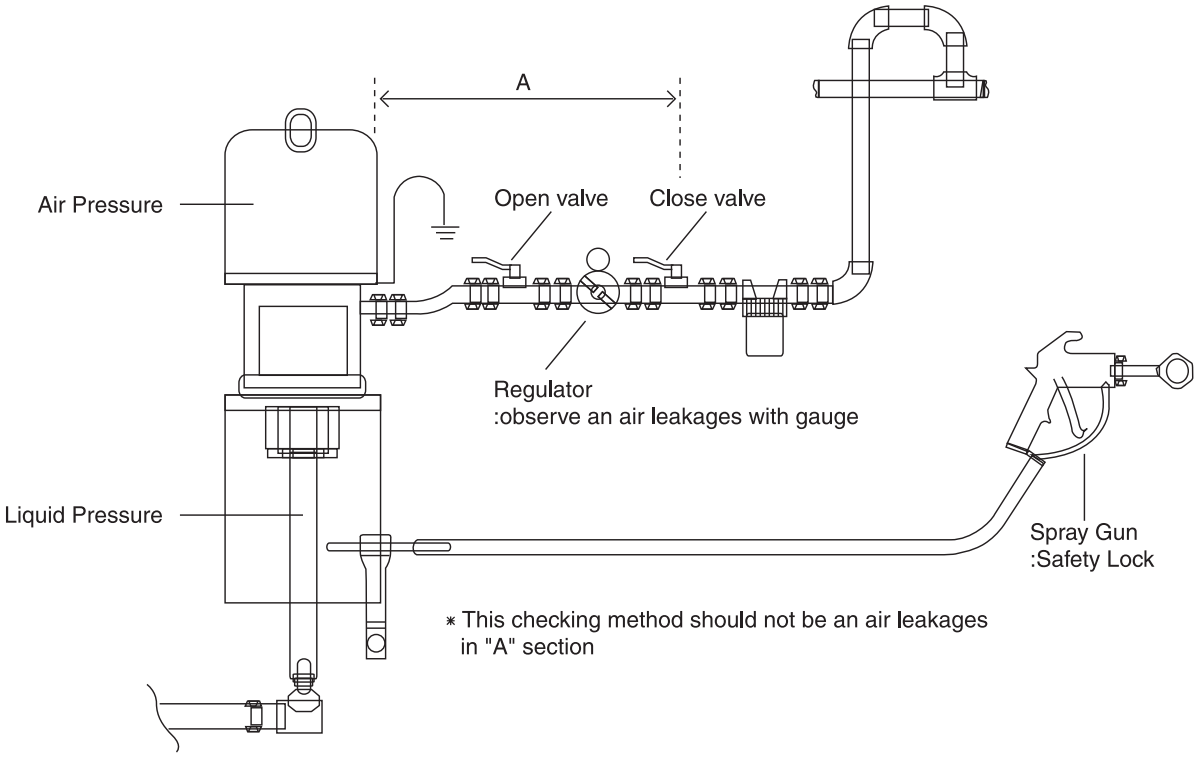
6-1 Air Motor

Troubleshooting

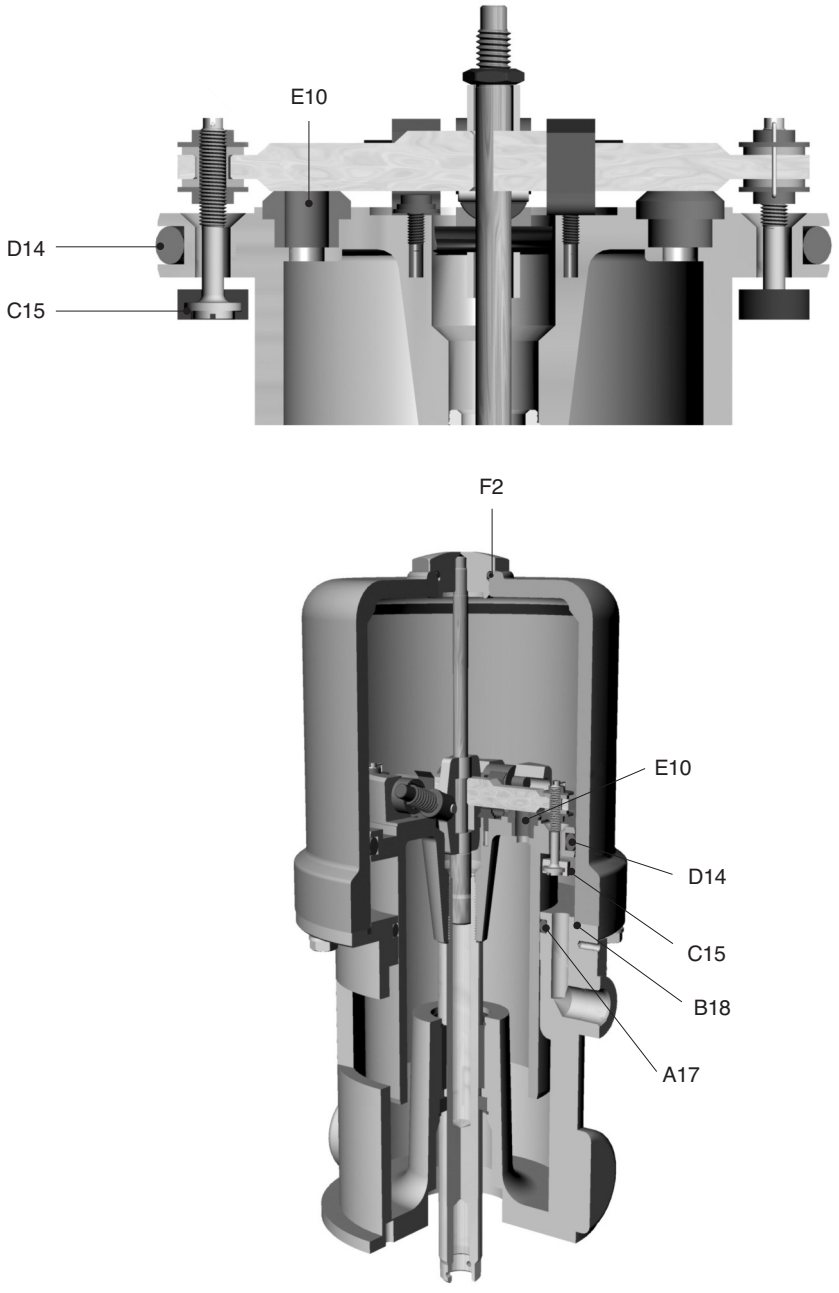
Locating Air Leaks

To locate an air leak, Connect the air hose and turn the air on. Refer to < Fig-4 >.
Use the checking methods listed in the Check Chart below, to find where the air is leaking. Refer to < Fig-5 >.

CHECK CHART			
Stroke Position	Fig Ref. Points	Checking Method	Cause of Leakage
BOTH (UP & DOWN)	A	Needle of gauge falling down by an air leakages. (BOTH CYCLES)	Worn seal(17)
	B		Damaged seal(18)
UP only	C	Needle of gauge falling down by an air leakages. (UP CYCLE ONLY)	Worn or damaged poppet(15)
	D		Worn O-ring:seal(14)
DOWN only	E	Needle of gauge falling down by an air leakages. (DOWN CYCLE ONLY)	Worn or damaged poppet(10)
	F		Damaged O-ring:seal(2)



<Fig-4>



<Fig-5>

- Grounding -

⚠ WARNING

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

1) Parts Drawing and List

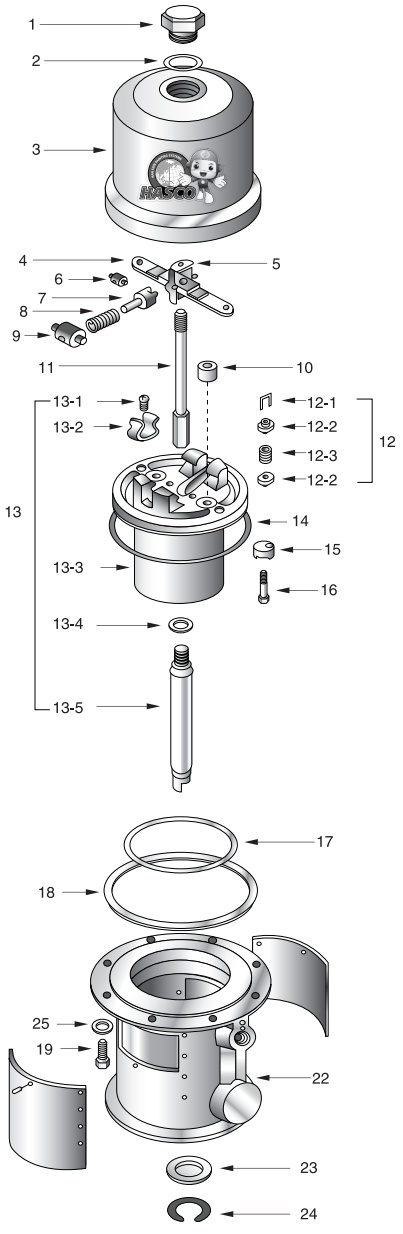
AIR MOTOR

NO	CODE	DESCRIPTION	QTY	NO	CODE	DESCRIPTION	QTY
Sub Total	28100-W	NARE AIR MOTOR		Sub Total	23100	HEMI AIR MOTOR	
0	17120	GROUND CLIP	1	0	17120	GROUND CLIP	1
0	17126	GROUND CLIP SCREW	1	0	17126	GROUND CLIP SCREW	1
1	28101	NUT(PACKING)	1	1	28101	NUT(PACKING)	1
2	45127	O-RING Nitrile Rubber	1	2	45127	O-RING Nitrile Rubber	1
3	28103	CYLINDER	1	3	17103	CYLINDER	1
4	28104-W	ACTUATOR(WIRE TYPE)	1	4	17104	ACTUATOR	1
5	28105	YOKE	1	5	28105	YOKE	1
6	28106	PIN	2	6	28106	PIN	2
7	28107	ARM	2	7	28107	ARM	2
8	28108	SPRING	2	8	17108	SPRING	2
9	28109	ROCKER	2	9	28109	ROCKER	2
10	28110	POPPET	2	10	17110	POPPET	2
11	28111	TRIP ROD	1	11	17111	TRIP ROD	1
12	28112-W	LOCK SET(WIRE TYPE)	1	12	17112	LOCK SET	1
12	28112-1-W	LOCK WIRE	2	12	17112-3	POPPET	2
12	28112-2-W	NUT	4	12	28112-1-W	LOCK WIRE	2
12	28112-3-W	POPPET	2	12	28112-2-W	NUT	4
13	28113	PISTON ASSEMBLY	1	13	17113	PISTON ASSEMBLY	1
13	28113-1	SCREW	2	13	28113-1	SCREW	2
13	28113-2	CLIP	2	13	17113-2	CLIP	2
13	28113-3	PISTON	1	13	17113-3	PISTON	1
13	28113-5	ROD	1	13	17113-5	ROD	1
13	45133	GASKET FIAT:COPPER	1				
14	28114	SEAL	1	14	17114	SEAL	1
15	28115	POPPET	2	15	28115	POPPET	2
16	28116	STEM	2	16	28116	STEM	2
17	28117	SEAL	1	17	17117	SEAL	1
18	28118	SEAL	1	18	17118	SEAL	1
19	28119	SCREW	8	19	17119	SCREW	6
22	28122	BASE	1	22	17122	BASE	1
23	28123	SEAL	1	23	28123	SEAL	1
24	28124	SNAP RING	1	24	28124	SNAP RING	1
25	28125	SPRING WASHER	8	25	68105	LOCK WASHER	6

NOTE : All parts in grey are "Wear and Tear" parts to be replaced with HASCO Repair Kit.(RPK) HASCO Repair Kit would be greatly contribute to the customers' stable maintenance.

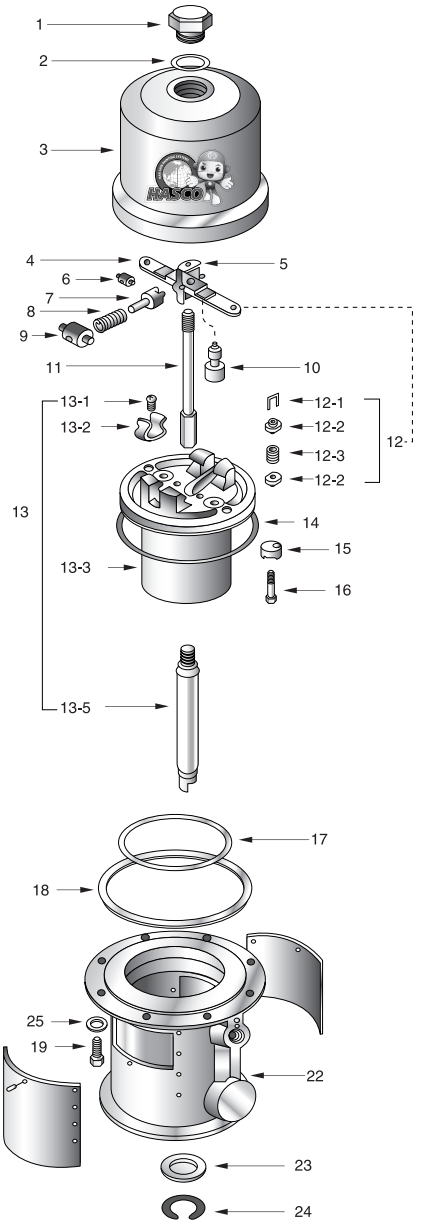
AIR MOTOR

NARE AIR MOTOR (28100-W)



<Fig-6>

HEMI AIR MOTOR (23100)



<Fig-7>

2) Repair Kits List

Air Motor	Model	RPK
	Nare(28100-W)	R28100
	Hemi(23100)	R23100

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(22) securely. Unscrew the nut(1) and Separate the nut(1) from the trip rod(11),
Hang to prevent to drop the trip rod(11) down with using a nut[5/16"].
Unscrew the bolts(19)/washers(25), Remove the cylinder(3).

⚠ WARNING

Always keep your fingers clear of the toggle assemblies(E) to avoid pinching or amputating them.

Use a screwdriver to push down on the trip rod yoke(5), and Snap the toggle assemblies(E) down.
Grip the toggle rocker(9) with pliers, Compress the spring(8), Swing the toggle assembly(E) up and away from the piston lugs(H), and Remove the parts.
See <Fig-8>, Remove upper adjusting nuts(12-2) from the air transfer stem valves(G), Screw the valve stems(16) and lower adjusting nuts(12-2). Remove the valve poppets(15) from the valve stems(16), and Inspect them for cracks.
Inspect the valve actuator(4) to be sure it is supported by the spring clips(13-2) but slides into them easily.
Remove the trip rod yoke(5), valve actuator(4), and the trip rod(11). Check the exhaust valve poppets(10) for cracks.
Pull the piston(13-3) up out of the base(22), and Inspect the o-ring(14,17) in the base casting.

Reassembling

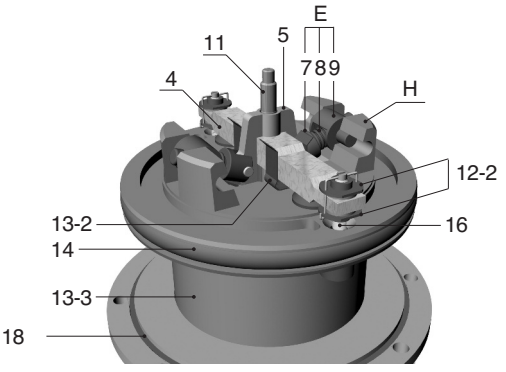
Clean all parts thoroughly and Inspect for wear or damage. Replace parts as necessary.
Inspect the polished surfaces of the piston(13-3), piston rod(13-5) and cylinder(3) inside walls for scratches or wear.
Lubricate all parts with a light waterproof grease.
Be sure the o-rings are in place, slide the piston rod down through the throat bearing and the lower piston into the base(22).

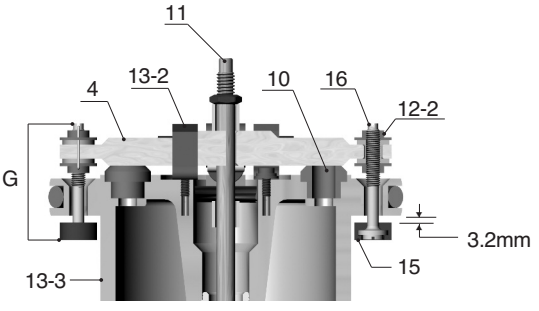
[Nare Air Motor] Place the exhaust valve poppets(10) on piston(13-3),
[Hemi Air Motor] Pull the exhaust valve poppets(10) into the valve actuator(4), and clip off the top part shown with dotted lines.

Install the poppets(15) on the valve stems(16), and reassemble the valve stem(16), adjusting nuts(12-2), trip rod(11), valve actuator(4), trip rod yoke(5) and toggle assemblies(E) on the piston(13-3). See <Fig-8>.
Adjust the valve stems(16) so there is a 3.2mm clearance between(the toggle assemblies are in the down position).
Reinstall the cylinder(3) and the cap nut(1) with the o-ring(2).
Reassemble the air motor to the displacement pump.
Before mounting the pump, connect an air hose to the air motor, and run the pump to be sure it operates smoothly.

⚠ WARNING

Never operate the pump with the air motor plates removed.
The piston in the air motor, located behind the air motor plates moves when air is supplied to the motor. Moving parts can pinch or amputate your fingers or other body parts.





<Fig-8>

6-2 Displacement Pump

Troubleshooting

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

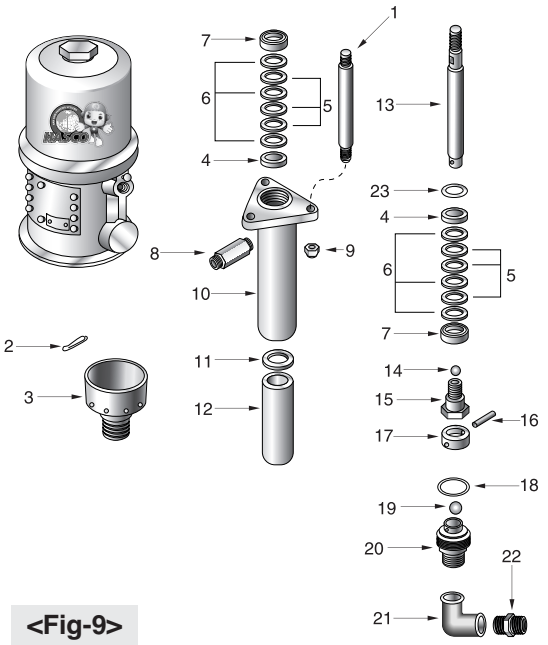
	CAUSE	SOLUTION
Pump fails to operate	Restricted line or inadequate air supply	Clear : increase air supply
	Obstructed fluid hose, gun, or dispensing valve	Open, clear
	Exhausted fluid supply	Refill : purge all air from pump and fluid lines
	Fluid dried on displacement rod	Clean : always stop pump at 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 17
Pump operates but output low on down strokes	Held open or worn intake valve	Clear : service. See page 17
Pump operates but output low on up strokes	Held open or worn fluid piston valve or packings	Clear : service. See page 17
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 17
	Held open or worn fluid piston valve or packings	Replace. See page 17

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 List

STANDARD 28200 / OPTIONAL STAINLESS 28S200

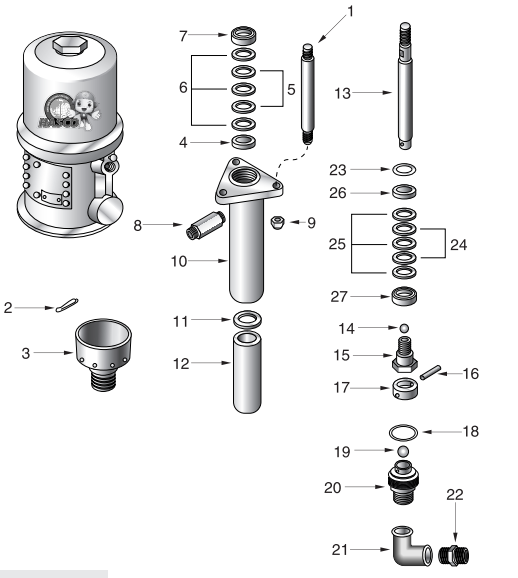
NO	CODE		DESCRIPTION	QTY
Sub	28200		PRO-281(DISPLACEMENT PUMP)	
Total		28S200	PRO-281S(DISPLACEMENT PUMP)	
1	28201		TIE ROD	3
2	28202		COTTER PIN	1
3	28203		PACKING NUT	1
4	28204	28S204S	GLAND(M)	2
5	28205		V-PACKING(LEATHER)	6
6	28206		V-PACKING(TEFLON)	6
7	28207	28S207S	GLAND(F)	2
8	28208	28S208S	NIPPLE(PT3/8"XPF3/8")	1
9	28209		NUT(TEFLON)	3
10	28210	28S210S	PUMP HOUSING	1
11	28211		SEAL(TEFLON:SLEEVE)	1
12	28212N	28S212S	SLEEVE	1
13	28213N	28S213S	DISPLACEMENT ROD	1
14	28214	28S214S	BALL(5/16")	1
15	28215	28S215S	PISTON	1
16	28216	28S216S	PIN	1
17	28217	28S217S	RETAINER	1
18	28218		SEAL(O-RING:INTAKE)	1
19	28219	28S219S	BALL(1/2")	1
20	28220	28S220S	INTAKE HOUSING	1
21	28221	28S221S	ELBOW	1
22	28222	28S222S	NIPPLE	1
23	28223	28S223S	WASHER	1



<Fig-9>

STANDARD 23200 / OPTIONAL STAINLESS 23S200

NO	CODE		DESCRIPTION	QTY
Sub	23200		PRO-231(DISPLACEMENT PUMP)	
Total		23S200	PRO-231S(DISPLACEMENT PUMP)	
1	28201		TIE ROD	3
2	28202		COTTER PIN	1
3	23203		PACKING NUT	1
4	23204	23S204S	GLAND(M)	1
5	23205		V-PACKING(L:UPPER)	2
6	23206		V-PACKING(T:UPPER)	3
7	23207	23S207S	GLAND(F)	1
8	28208	28S208S	NIPPLE(PT3/8"XPF3/8")	1
9	28209		NUT(TEFLON)	3
10	28210	28S210S	PUMP HOUSING	1
11	28211		SEAL(TEFLON:SLEEVE)	1
12	23212N	23S212S	SLEEVE	1
13	23213N	23S213S	DISPLACEMENT ROD	1
14	28214	28S214S	BALL(5/16")	1
15	23215	23S215S	PISTON	1
16	28216	28S216S	PIN	1
17	28217	28S217S	RETAINER	1
18	28218		SEAL(O-RING:INTAKE)	1
19	28219	28S219S	BALL(1/2")	1
20	28220	28S220S	INTAKE HOUSING	1
21	28221	28S221S	ELBOW(PT3/4"xPT3/4")	1
22	28222	28S222S	NIPPLE	1
23	23223	23S223S	WASHER PLATE	1
24	23224		V-PACKING(L:LOWER)	2
25	23225		V-PACKING(T:LOWER)	3
26	23226	23S226S	GLAND(M:PISTON)	1
27	23227	23S227S	GLAND(F:PISTON)	1

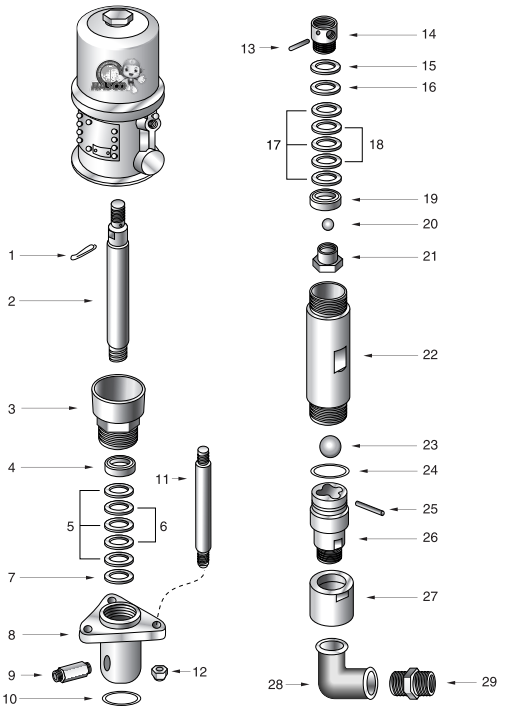


<Fig-10>

NOTE : All parts in grey are "Wear and Tear" parts to be replaced with HASCO Repair kit(RPK). HASCO Repair Kit would be greatly contribute to the customer's stable maintenance.(refer to Repair Kits List)

STANDARD 10200

NO	CODE	DESCRIPTION	QTY
Sub Total	10200	PRO-101(DISPLACEMENT PUMP)	
1	28202	COTTER PIN	1
2	10202N	DISPLACEMENT ROD	1
3	10203	PACKING NUT	1
4	10204	GLAND(F)	1
5	10205	V-PACKING(PE)	3
6	10206	V-PACKING(TEFLON)	2
7	10207	GLAND(M)	1
8	10208	PUMP HOUSING	1
9	28208	NIPPLE(PT3/8"XPF3/8")	1
10	10210	O-RING(T)	1
11	28201	TIE ROD	1
12	28209	NUT(TEFLON)	1
13	10213	PIN	1
14	10214	BALL HOUSING	1
15	10215	WASHER	1
16	10216	GLAND(M)	1
17	10217	V-PACKING(PE)	3
18	10218	V-PACKING(TEFLON)	2
19	10219	GLAND(F)	1
20	10220	BALL(PISTON)	1
21	10221	SEAT(PISTON)	1
22	10222N	SLEEVE	1
23	10223	BALL(INTAKE)	1
24	10224	O-RING	1
25	10225	PIN	1
26	10226	INTAKE VALVE	1
27	10227	INTAKE HOUSING	1
28	68108-2	ELBOW(3/4"x1")	1
29	28222	NIPPLE	1



<Fig-11>

2) Repair Kits List

Dis-Pump	Model	RPK
	28200	R28200
	23200	R23200
	10200	R10200
	28S200	R28S200
	23S200	R23S200

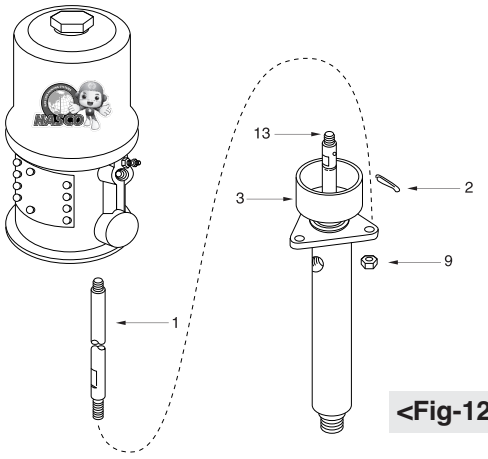
3) How to service for the Displacement Pump

Disconnecting

⚠ WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the Pressure Relief Procedure on page.6

1. Flush the pump if possible. Stop the pump at the bottom of its stroke.
   Follow the Pressure Relief Procedure Warning on page 6.
2. Disconnect the air and fluid hoses. Remove the pump from its mounting.
3. Unscrew the tie rod locknuts(9) from the tie rods(1). Remove the cotter pin(2). Unscrew the displacement rod(13) from the air motor.
   Carefully pull the displacement pump off the air motor.
4. To service the displacement pump, refer to Displacement Pump Service on page 18.



<Fig-12>

Reconnecting

1. Position the displacement pump on the tie rods(23). See <Fig-12>.
2. Screw the locknuts(9) onto the tie rods(1) loosely.
   Screw the displacement rod(13) into the piston rod of the air motor until the pin holes align the cotter pin(2).
3. Mount pump and reconnect all hoses. Reconnect the ground wire if it was disconnected during repair.
4. Tighten the tie rod locknuts(9) evenly.
5. Start the pump and run it slowly, at about 40psi(2.8bar) air pressure, to check that it is operating properly.
   Tighten the packing nut/wet-cup(3) with the wrench supplied, it's just snug-no tighten.
   Fill the wet-cup half full with Throat Seal Liquid or compatible solvent.

Displacement Pump Service

Disassembly

When disassembling the pump, lay out all removed parts in sequence, to ease reassembly. Refer to <Fig-13>.
Clean all the parts thoroughly when disassembling.
Check them carefully for damage or wear, replacing parts as needed.

- Remove the displacement pump from the air motor as explained on page 17.
- Unscrew the intake valve housing(20) from the pump housing(10).
- Remove the ball stop pin(16), retainer(17), o-ring(18), and ball(19) from the intake valve housing(20).
- Loosen the packing nut(3). Push the displacement rod(13) down as far as possible, then pull it out the bottom of the pump housing(10).
- Secure the flats of the displacement rod(13) in a vise.
  Unscrew the piston(15) out of the rod. Remove the ball(14), washer(23), v-packings(5,6) and glands(4,7).
- Remove the packing nut(3), throat packings(5,6) and glands(4,7) from the pump housing.
- Inspect all parts for damage. Clean all parts and threads with a compatible solvent before reassembling.
  Inspect the polished surfaces of the displacement rod(13) and sleeve(12) for scratches or other damages, which can cause premature packing wear and leaking.

To check, run a finger over the surface or hold the parts up to the light at an angle. Be sure the ball seats of the piston(R) and intake valve housing(S) are not chipped or nicked.
Replace any worn or damaged parts.

NOTE : If the sleeve(12) needs replacement and is hard to be removed, contact your HASCO distributor.

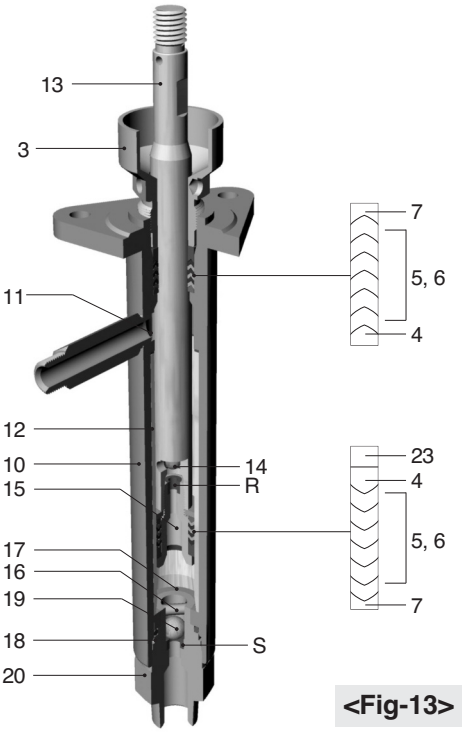
Reassembly

- Lubricate the throat packings(5,6) and install them in the pump housing(10) one at a time as follows, with the lips of the v-packings facing down.
  Install the packing nut(3) loosely. See the throat packing detail in <Fig-13>.
- If you removed the sleeve(12), reinstall it in the pump housing(10), making sure to replace the gasket(11).
  Be sure the tapered end of the sleeve faces down, toward the pump intake housing(20).

⚠ CAUTION

If the inner surface of the sleeve(12) is damaged, it must be replaced.
also when replacing the sleeve(12) sure to install a new gasket(11).

- Lubricate the piston packings(5,6) and install them onto the piston(15) one at a time in the following order, with the lips of the v-packings facing up. See the piston packing detail in <Fig-13>.
- Use thread sealer on the piston(15). Install the piston ball(14) on the piston and screw the piston valve assembly into the displacement rod(13). Torque to 180kgf.cm.
- Insert the displacement rod(13) into the bottom of the pump housing(10) being careful not to scratch the sleeve(12). Push the rod straight up until it protrudes form the packing nut(3).
- Install the ball(19), o-ring(18), retainer(17), and ball stop pin(16) in the intake valve housing(20).
  Apply thread lubricant and screw the intake housing into the pump housing(10). Torque to 800kgf.cm.
- Tighten the packing nut(3) just only enough to stop leakage, but no tighter.(200kgf.cm)
- Reconnect the displacement pump to the air motor as explained on page 18.

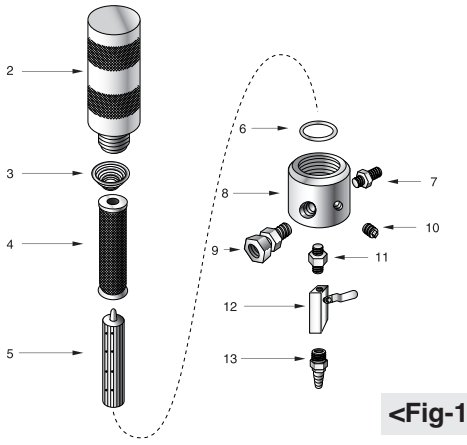


<Fig-13>

6-3 Surge Tank Assembly

STANDARD 28300 / OPTIONAL STAINLESS 28S300

NO	CODE		DESCRIPTION	QTY
Sub Total	28300		SURGE TANK:OUTLET 1/4"	
		28S300	SURGE TANK:OUTLET 1/4"(STAINLESS)	
2	28302		BOWL	1
3	45304		SPRING	1
4	A97060		SURGE FILTER #60	1
5	45306		SUPPORT	1
6	28306		PACKING	1
7	G73007	28S307S	NIPPLE	1
8	28308	28S308S	MANIFOLD	1
9	28309	28S309S	UNION	1
10	28310	28S310S	PLUG	1
11	45312	45S312S	NIPPLE(PT1/4"XPT1/4")	1
12	45313		BALL VALVE(HIGH)	1
13	45314		DRAIN NIPPLE	1



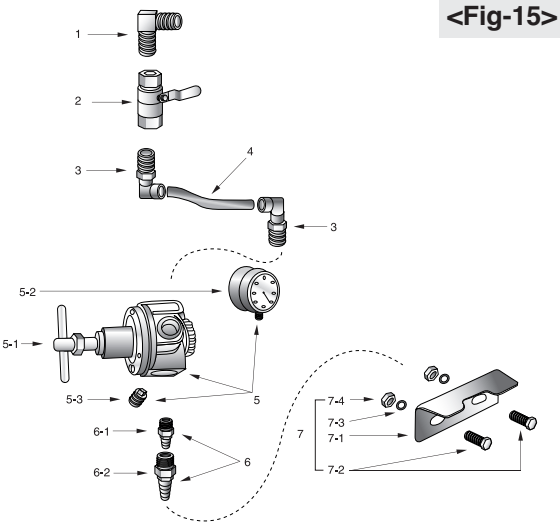
<Fig-14>

6-4 Air Regulator Assembly

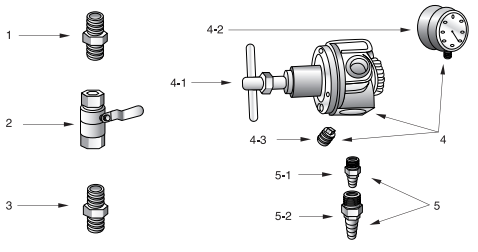
28400 / 17400

NO	CODE	DESCRIPTION	QTY
Sub Total	28400	AIR REGULATOR ASSEMBLY	
1	28401	NIPPLE(1/2"X1/2")	1
2	28402	VALVE(1/2")	1
3	28403	L NIPPLE(1/2"+3/8")	1
3	28403-1	L NIPPLE 1/2"	1
3	28403-2	L NIPPLE 3/8"	1
4	28404	AIR HOSE	1
5	28405	AIR REGULATOR & GAUGE	1
5	28405-1	REGULATOR	1
5	28405-2	GAUGE	1
5	28405-3	PLUG	1
6	28406	AIR COUPLING SET(3/8")	1
6	28406-1	AIR COUPLING(M:3/8":PM30)	1
6	45406-2	AIR COUPLING(F:3/8":SH40)	1
7	28407	BRACKET SET	1
7	28407-1	BRACKET	1
7	28407-4	NUT	2
7	45103	SCREW(1/4~20X1/2")	2
7	45104	WASHER(SPRING:1/4")	2

<Fig-15>



NO	CODE	DESCRIPTION	QTY
Sub Total	17400	AIR REGULATOR ASSEMBLY	
1	17401	NIPPLE(3/8x1/2)	1
2	17T402	VALVE(1/2")	1
3	17401	NIPPLE(3/8x1/2)	1
4	28405	AIR REGULATOR & GAUGE	1
4	28405-1	REGULATOR	1
4	28405-2	GAUGE	1
4	28405-3	PLUG	1
5	28406	AIR COUPLING SET(3/8")	1
5	28406-1	AIR COUPLING(M:3/8":PM30)	1
5	45406-2	AIR COUPLING(F:3/8":SH40)	1

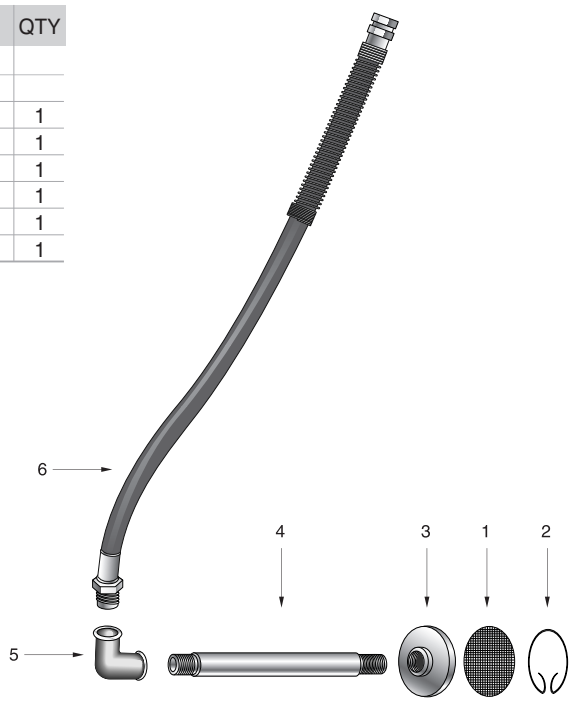


<Fig-16>

6-5 Suction Assembly

STANDARD 28500 / OPTIONAL STAINLESS 28S500

NO	CODE		DESCRIPTION	QTY
Sub Total	28500		SUCTION ASSEMBLY	
		28S500	SUCTION ASSEMBLY(STAINLESS)	
1	28501-A		SCREEN(POM)	1
2	28502-A	28S502S	CLIP(POM)	1
3	28503-P		CUP(POM)	1
4	28504	28S504S	PIPE(3/4")	1
5	28221	28S221S	ELBOW(PT3/4"xPT3/4")	1
6	28506	28S506S	HOSE(3/4")	1

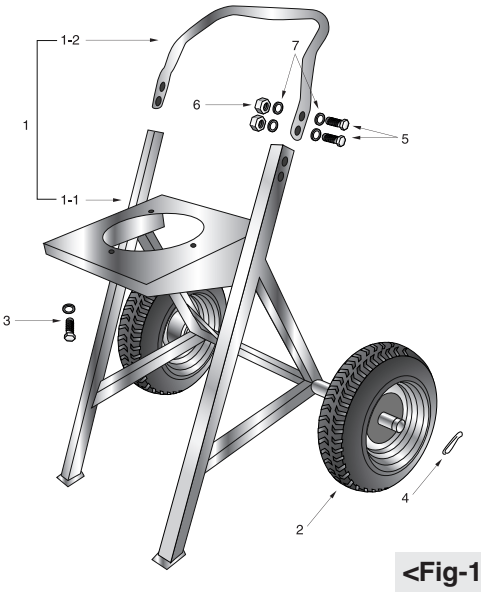


<Fig-17>

6-6 Cart Assembly

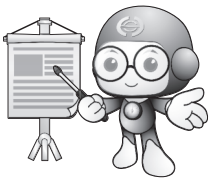
28600

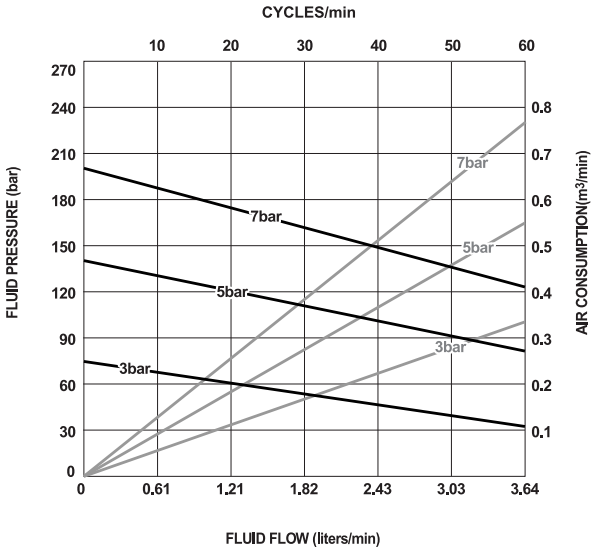
NO	CODE	DESCRIPTION	QTY
Sub Total	28600	CART ASSEMBLY	
1	28601	CART & HANDLE	1
1	28601-1	CART	1
1	28601-2	HANDLE	1
2	28602C	CRUMB WHEEL 10"x2.5"	2
3	28603	BOLT & WASHER	1
3	28125	SPRING WASHER	3
3	28603-1	BOLT	3
4	28604	PIN	2
5	28605	BOLT	4
6	28209	NUT(TEFLON)	4
7	45607-1	FLAT WASHER	8



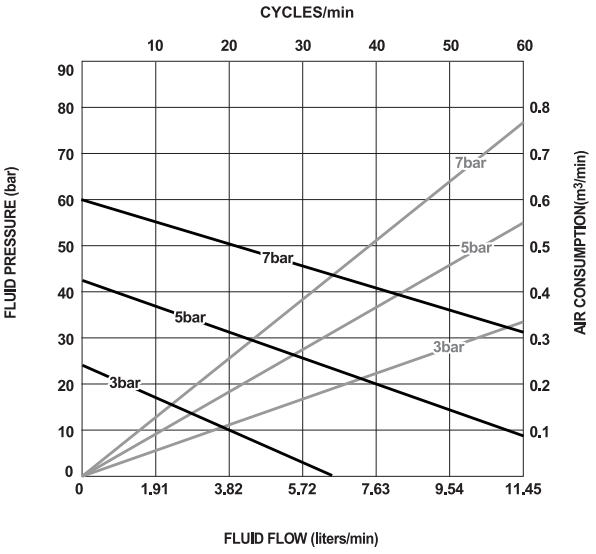
<Fig-18>

Technical Data





[Pro-281]



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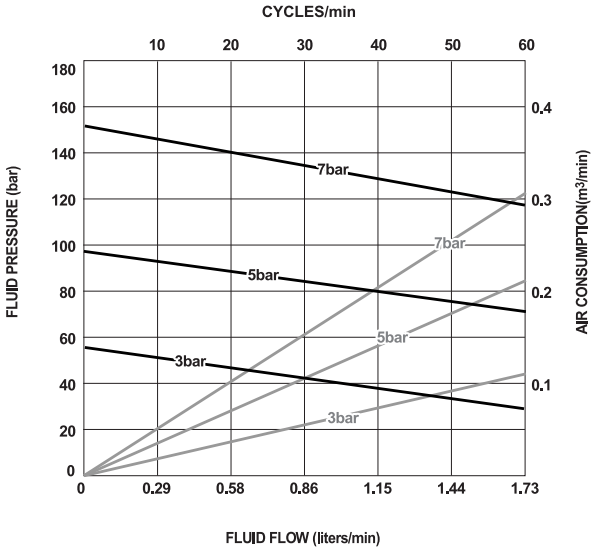

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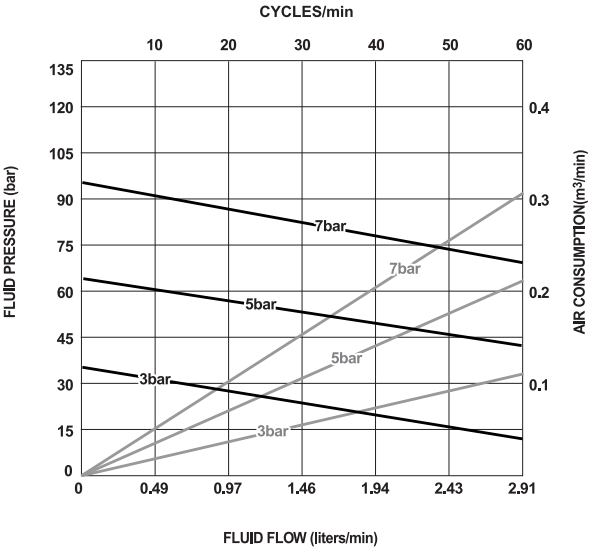


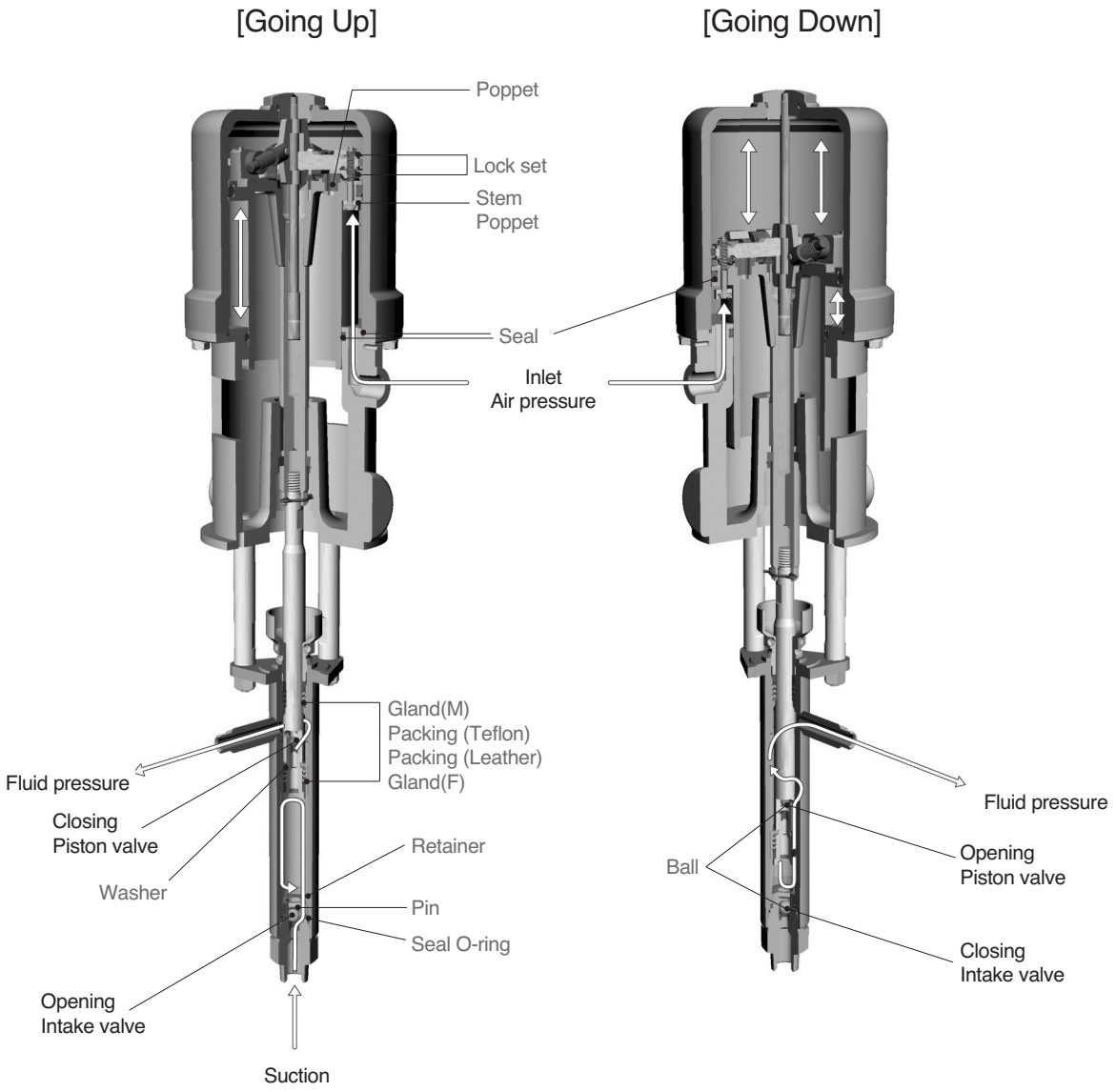
[Pro-171]

Key : Fluid outlet pressure - Black curves
Air consumption - Gray curves

Test Conditions : Air inlet connecting as standard SH40 touch coupler. Fluid outlet size : 1/4" 30m
Test fluid : General hydraulic oil (RANDO 32)

The Flow Mechanism

with Air / Liquid / Pro-281 (double acting)



Note : All parts described in gray color are "Wear and Tear" parts to be replaced with HASCO Repair Kit.(RPK) HASCO Repair Kit would be greatly contribute to the customers' stable maintenance.

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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