User Manual

HB 970E/960E/870E

Airless Line Striper

For the application of line striping materials. For professional use only. For outdoor use only. Not approved for use in explosive atmospheres or hazardous locations.

- 3300 psi (22.8 MPa, 228 bar) Maximum Working Pressure

Important Safety Instructions
Read all warnings and instructions in this manual, related manuals, and on the equipment. Be familiar with the controls and the proper usage of the equipment. Save these instructions.

Only for HVBAN original parts replacement
Replacement of non-HVBAN original parts may void warranty

Warning

The following warnings include general safety information for this equipment.

"!" means general warnings, while other warning symbols means danger what associated with specific operating procedures.

When the symbols appear in the manual or the warning, please refer back.

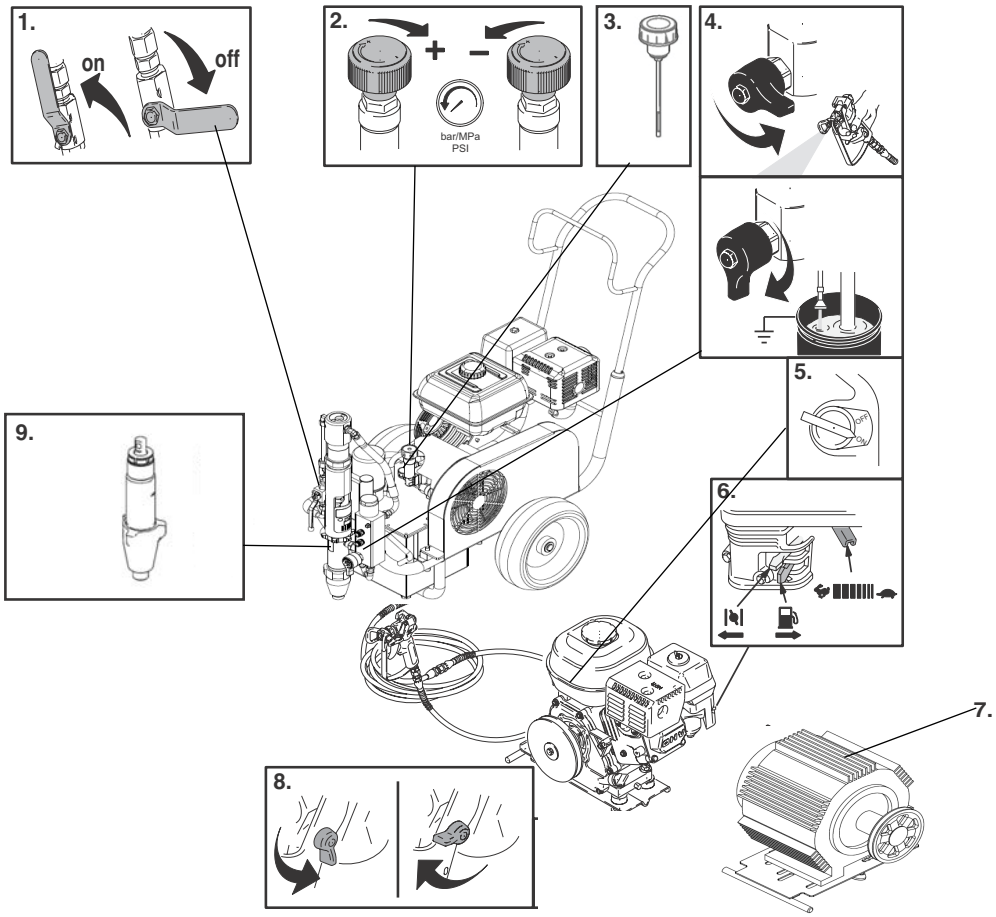
Further product specific warnings may be included in the text where applicable

	WARNING
   	**FIRE AND EXPLOSION HAZARD** Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion: • Use only in an extremely well ventilated area. • Do not fill fuel tank while engine is running or hot. should shut down the engine and makes it cooler • Eliminate all ignition sources; such as pilot lights, cigarettes and plastic drop cloths (static arc hazard). • Ground equipment and conductive objects in work area. Read Grounding instructions • Do not spray or clean solvent under high pressure. • Keep work area free of debris, including solvent, rags, and gasoline • Do not plug or unplug power cords or turn lights on or off when flammable fumes are present. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately.Do not use equipment until you identify and correct the problem. • Keep effective fire extinguisher in work area.
    	**INJECTION HAZARD** • High pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment. • Do not point the gun at anyone or at any part of the body. • Do not stop or deflect leaks with your hand, body, glove or rag. • Do not spray without tip guard and trigger guard installed. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking or servicing equipment. • Equipment still keep pressure after cutting off power. When unattended, do not leave the equipment in power or pressure. • Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately • Do not use components rated less than sprayer Maximum Working Pressure 3300PSI. • Engage trigger lock when not spraying. • Tighten all fluid connections before operating the equipment • Keep know how to quickly shut down and pressure relief. Fully familiar with the control equipment

	WARNING
	**CARBON MONOXIDE HAZARD** Exhaust contains poisonous carbon monoxide, which is colorless and odorless. Breathing carbon monoxide can cause death. • Do not operate in an enclosed area.
	**BURN HAZARD** Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns • Do not touch hot fluid or equipment.
 	**QUIPMENT MISUSE HAZARD** Misuse can cause death or serious injury. • Do not use equipment when tired or drinking alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. Read Technical Data in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. Read Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings.For complete information about your material, request MSDS from distributor or retailer. • Do not leave the equipment in power or pressure when unattended • Check equipment daily. Repair or replace worn or damaged parts immediately • Follow Pressure Relief Procedure in this manual, when you stop spraying • Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately • Do not alter or modify equipment.may lead to agency certification failure and cause safety hidden trouble • Ensure all equipment has been rated and certified and can available for your work area. • Use equipment only for its intended purpose. Call your distributor for information • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or overbend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	**PRESSURIZED ALUMINUM PARTS HAZARD** • Do not use 1,1,1-trichloroethane, methylene chloride, and/or other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use can cause serious chemcal reaction and equipment rupture,and result in death, serious injury, and/or property damage.
 	**MOVING PARTS HAZARD** Moving parts can pinch or amputate fingers and other body parts. • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure in this manual. Disconnect power or air supply.

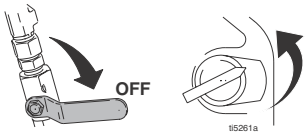
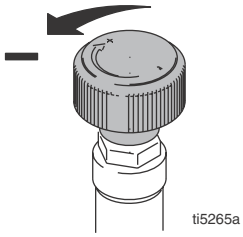
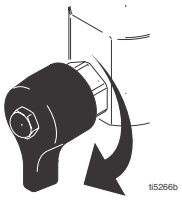
	WARNING
	**TOXIC FLUID OR FUMES HAZARD** Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed. • Read MSDS's to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	**PERSONAL PROTECTIVE EQUIPMENT** You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to: • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves

Component Identification

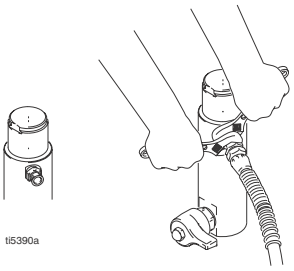
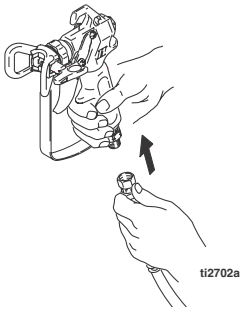
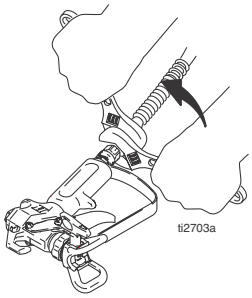
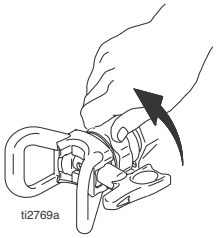


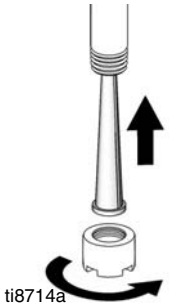
	Component Identification
1	Hydraulic pump valve
2	Pressure control
3	Hydraulic Oil Cap
4	Drain valve
5	Engine ON/OFF switch
6	Engine controls
7	Electric machinery
8	GunTrigger Lock
9	Displacement Pump

Pressure Relief

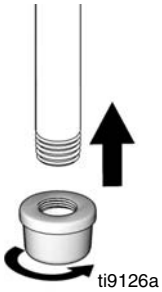
			
1 Set pump valve OFF. Turn engine OFF.	2 Turn pressure to lowest setting. Trigger gun into pail to relieve pressure.	3 Turn prime valve down.	If after following these steps you suspect the spray tip or hose is still clogged or that pressure has not been fully relieved, ***very slowly*** loosen tip guard retaining nut or hose end coupling to relieve pressure gradually. Then loosen completely.

Setup

			
Complete Setup			
1 Connect appropriate Graco high-pressure hose to sprayer. Tighten securely. **Note:** Remove second gun port plug for multiple guns and repeat steps 1 - 4.	2 Connect other end of hose to gun.	3 Tighten securely.	4 Remove tip guard.



OR



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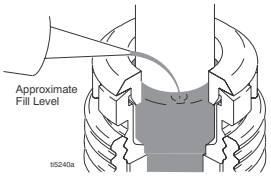
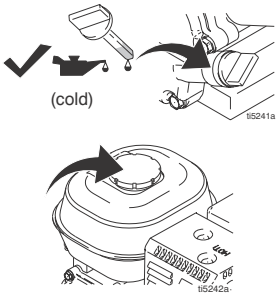




Complete Setup

5 Depending on your model, either, install inlet strainer into bottom of suction hose. Then place inlet nut over end of hose and hand tighten securely.

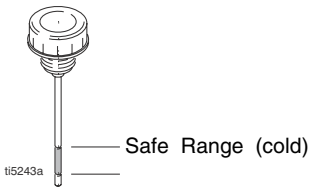
OR

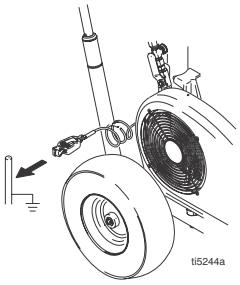
Screw inlet strainer to bottom of suction hose and hand tighten securely

6 Fill throat packing nut with Throat Seal Liquid (TSL) to prevent premature packing wear. Do this each time you spray and store.

7 Check engine oil level. Add SAE 10W-30 (summer) or 5W-20 (winter), if necessary.

8 Fill fuel tank.



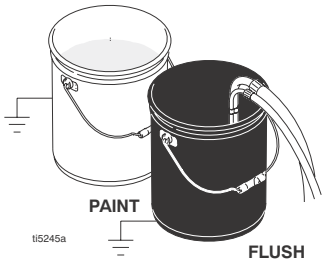


Complete Setup

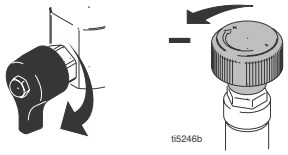
9 Check hydraulic oil level. Add only Graco Hydraulic Oil, ISO Grade 46, 169236 (5 gallon/18.9 liter) or 207428 (1 gallon/3.8 liter). Hydraulic tank capacity is 1.25 gallon (4.75 liter).

10 Attach sprayer grounding clamp to earth ground.

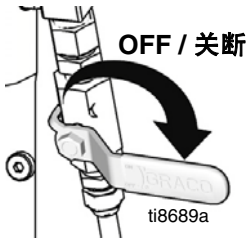
Startup



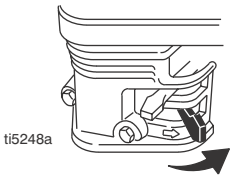
1 Place suction tube and drain tube in grounded metal pail partially filled with flushing fluid. Attach ground wire to pail and to earth ground.

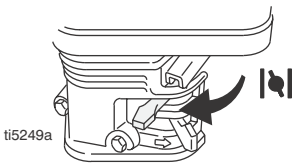


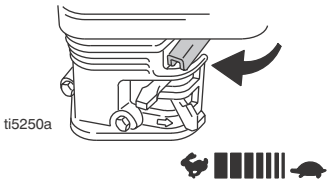
2 Turn prime valve down. Turn pressure control counterclockwise to lowest pressure.

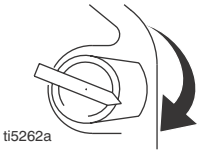


3 Set hydraulic pump valve OFF.









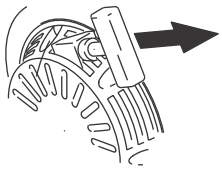
4 Start engine

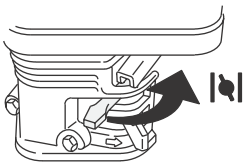
a Move fuel valve to open

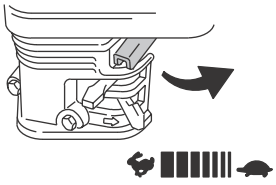
b Move choke to closed

c Set throttle to fast

d Set engine switch to ON







4 Start engine (cont.)

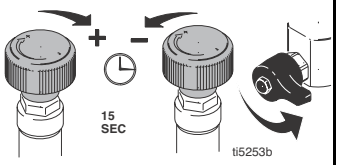
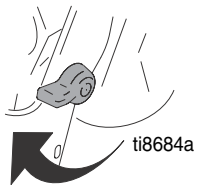
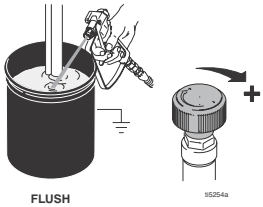
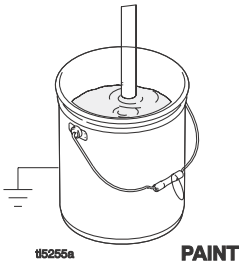
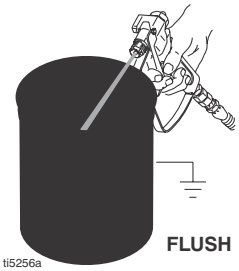
e Pull starter rope

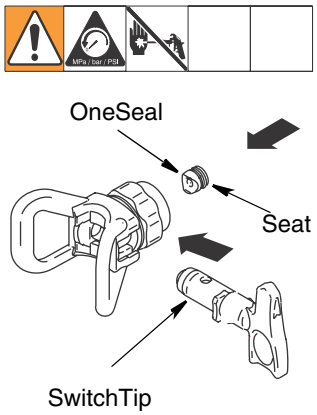
f After engine starts, move choke to open

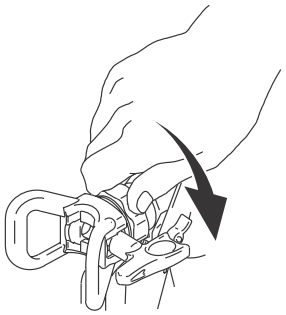
g Set throttle to desired setting

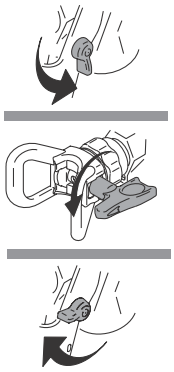
5 Set hydraulic pump valve ON.

- Hydraulic motor is now active -

			
6 Increase pressure enough to start hydraulic motor stroking and allow fluid to circulate for 15 seconds; turn pressure down, turn prime valve horizontal.	7 Take spray gun trigger safety OFF.	8 Hold gun against grounded metal flushing pail. Trigger gun and increase fluid pressure slowly until pump runs smoothly.	Inspect fittings for leaks. Do not stop leaks with your hand or a rag! If leaks occur, turn sprayer OFF immediately. Do Pressure Relief in Cleanup, 1. - 3. Repeat Startup, 1. - 5. If no leaks, continue to trigger gun until system is thoroughly flushed. Proceed to 6.
			
9 Place siphon tube in paint pail.	10 Trigger gun again into flushing fluid pail until paint appears.		







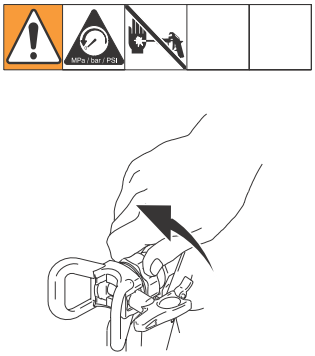
SwitchTip and Guard Assembly

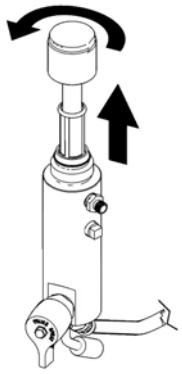
1 If you have been operating equipment, relieve pressure and lock trigger safety.
2 Insert SwitchTip. Insert seat and OneSeal.
3 Screw assembly onto gun. Hand tighten.

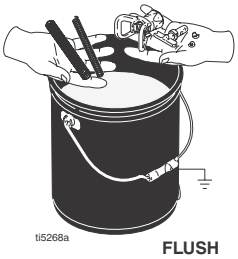
Clearing Tip Clogs

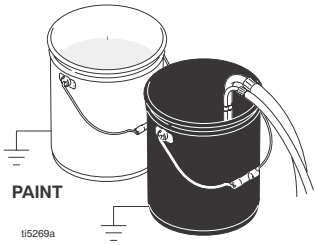
1 Release trigger, put trigger safety ON. Rotate Take trigger safety OFF and trigger gun to clear the clog.
2 Put trigger safety ON, return to original position, take trigger safety OFF and continue spraying.

Cleanup

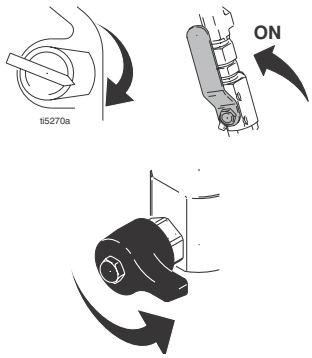




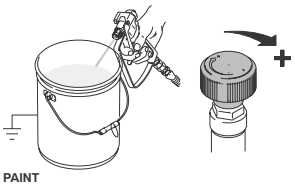




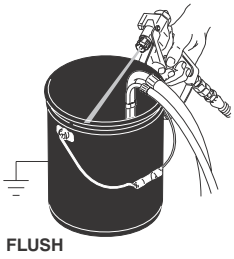
1 Relieve pressure.
2 Remove guard and SwitchTip.
3 Unscrew bowl, remove filter. Assemble without filter. Clean fliter.
4 Clean filter, guard and in flushing fluid.
5 Remove siphon tube set from paint and place in flushing fluid.
Use water for water base paint and mineral spirits for oil base paint.



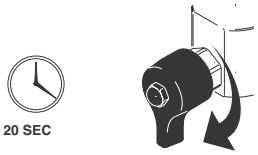
6 Turn engine ON and start engine.
Set hydraulic pump valve ON.
Turn prime valve horizontal.



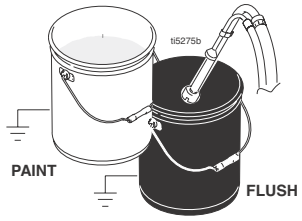
7 Hold gun against paint pail. Take trigger safety OFF. Turn pressure control up until motor begins to drive pump. Trigger gun until flushing fluid appears.



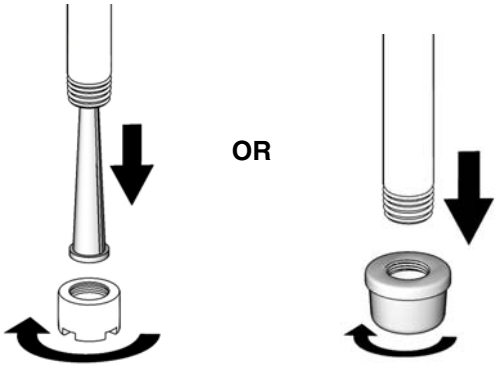
8 Move gun to flushing pail, hold gun against pail, trigger gun to thoroughly flush system.
Release trigger and put trigger safety ON.



9 Turn prime valve down and allow flushing fluid to circulate for approximately 20 seconds to clean drain tube.



10 Raise siphon tube above flushing fluid and run sprayer for 15 to 30 seconds to drain fluid. Turn hydraulic pump valve OFF. Turn engine OFF.

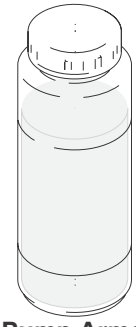


11 Depending on your model, either remove nut and inlet strainer screen from bottom of suction tube

OR

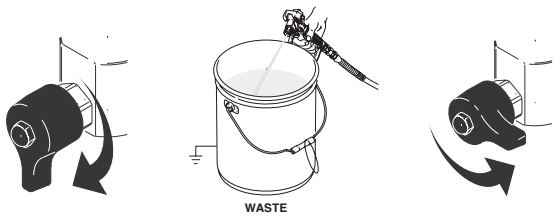
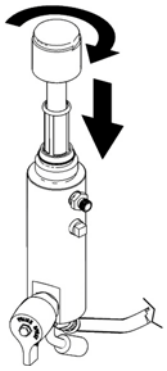
12 unscrew and remove inlet strainer.

13 Clean. Replace strainer screen if necessary. Reassemble.



Pump Armor

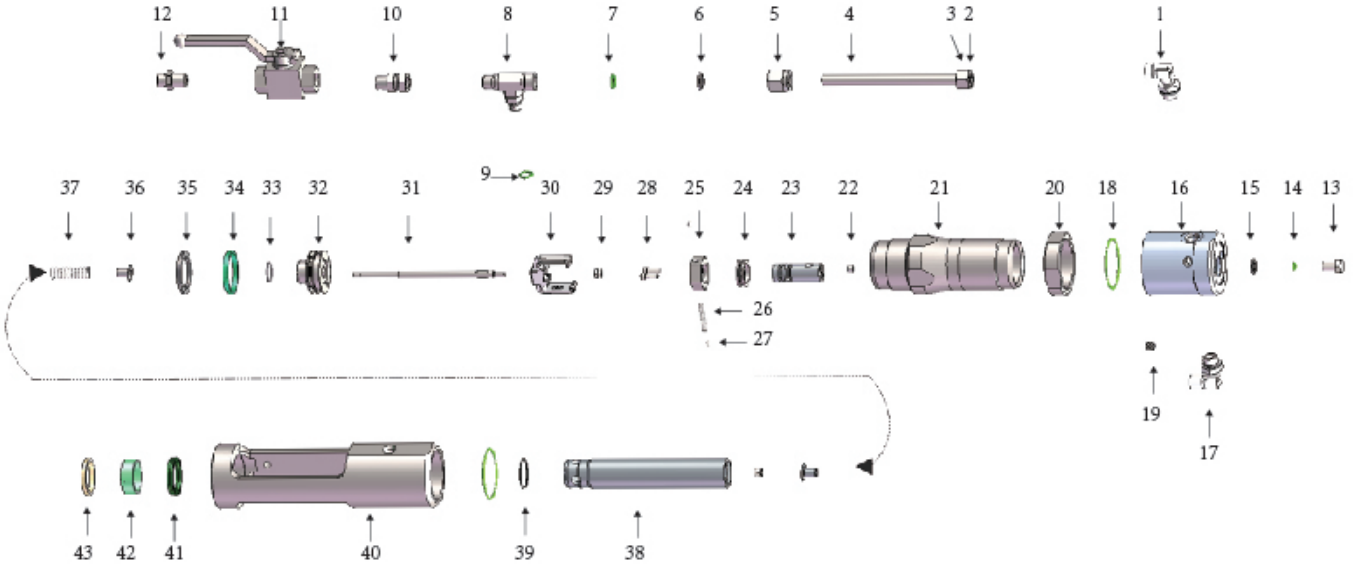
Caution: If flushing with water, do not leave water in sprayer. Flush again with mineral spirits, oil or Pump Armor and leave this protective coating in the sprayer to help prevent freezing or corrosion and increase sprayer life.

		
14 Close prime valve. Trigger gun into flushing pail to purge fluid from hose. Open prime valve.	15 Install filter into filter bowl. Make sure plastic center tube is tightened securely. Hand tighten filter bowl. Hand tighten gun handle.	16 Clean tip, guard and gasket with a soft bristle brush to prevent part failure due to dried materials. Assemble parts and attach loosely onto gun. Wipe sprayer, hose and gun with a rag soaked in water or mineral spirits.

Troubleshooting

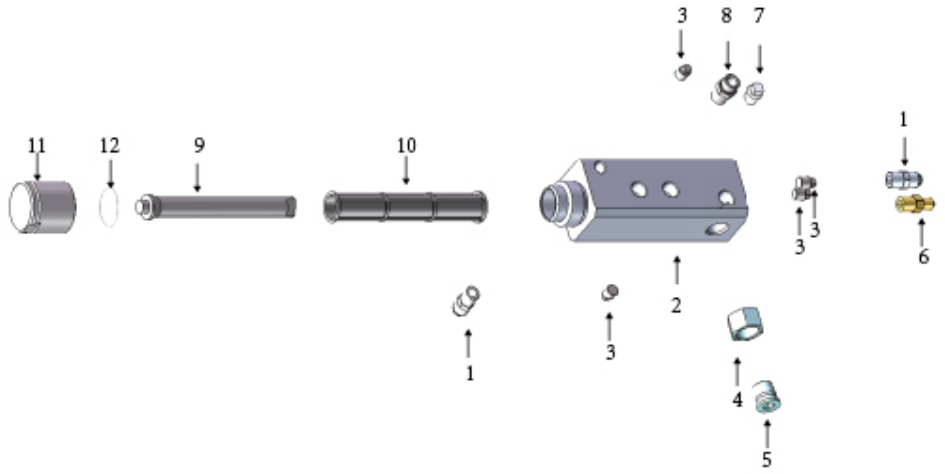
PROBLEM	CAUSE	SOLUTION
Gas engine pulls hard (won't start)	Hydraulic pressure is too high	Turn hydraulic pressure knob counter clockwise to lowest setting
Gas engine does not start	Switch OFF, low oil, no gasoline	Consult engine manual, supplied
Gas engine doesn't work properly	Faulty engine	Consult engine manual, supplied
	Elevation	Refer to Engine Repair Kit. 4.0 hp - 288678 / 5.5 hp - 248943 / 6/5 hp - 248944 / 9.0 hp - 248945
Gas engine operates, but displacement pump doesn't operate	Hydraulic pump valve is OFF	Set hydraulic pump valve ON
	Pressure setting too low	Increase pressure
	Displacement pump outlet filter (if used) is dirty or clogged	Clean the filter
	Tip or tip filter (if used) is clogged	Remove tip and/or filter and clean
	Hydraulic fluid too low	Shut off sprayer. Add fluid*.
	Belt worn or broken or off	Replace.
	Hydraulic pump worn or damaged	Bring sprayer to Graco distributor for repair
	Dried paint seized paint pump rod	Service pump.
	Hydraulic motor not shifting	Set pump valve OFF. Turn pressure down. Turn engine OFF. Pry rod up or down until hydraulic motor shifts.
Displacement pump operates, but output is low on upstroke	Piston ball check not seating properly	Service piston ball check.
	Piston packings worn or damaged	Replace packings.
Displacement pump operates but output is low on downstroke and/or on both strokes	Piston packings worn or damaged	Tighten packing nut or replace packings.
	Intake valve ball check not seating properly	Service intake valve ball check.
	Suction tube air leak	
Paint leaks and runs over side of wetcup	Loosen wet-cup	Tighten wet-cup enough to stop leakage
	Throat packings worn or damaged	Replace packings.
Excessive leakage around hydraulic motor piston rod wiper	Piston rod seal worn or damaged	Replace these parts.
Fluid delivery is low	Pressure setting too low	Increase pressure, page 20
	Displacement pump outlet filter (if used) is dirty or clogged	Clean filter
	Intake line to pump inlet is not tight	Tighten
	Hydraulic motor is worn or damaged	Bring sprayer to HVBAN distributor for repair
	Large pressure drop in fluid hose	Use larger diameter or shorter hose
The sprayer overheats	Paint builup on hydraulic components	Clean
	Oil level is low	Fill with oil.
Spitting from gun	Air in fluid pump or hose	Check for loose connections on siphon assembly, tighten, then reprime pump
	Loose intake suction	Tighten
	Fluid supply is low or empty	Refill supply container
Excessive hydraulic pump noise	Low hydraulic fluid level	Turn sprayer OFF. Add fluid*.
Electric motor does not operate	Power switch is not ON	Turn power switch to ON
	Tripped circuit breaker	Check circuit breaker at power source. Reset motor switch

Hydraulic reversing pump parts list



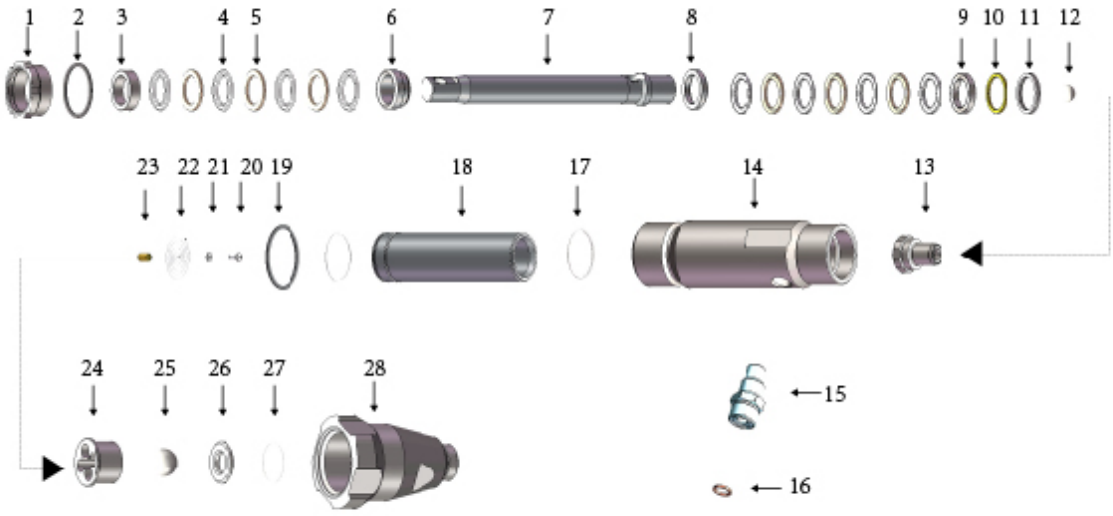
Serial number	Parts	QTY	Serial number	Parts	QTY
1	adjustable screw	1	23	piston rod	1
2	ferrule nut	1	24	sealing ring	1
3	ferrule	1	25	fixed block	1
4	steel tube	1	26	spring	1
5	sealing nut	1	27	Tungsten steel ball	2
6	nylon washer	1	28	screw	2
7	o-ring	1	29	lock nut	2
8	triple connector	1	30	reversing fork	1
9	o-ring	1	31	connecting rod	1
10	connecting nut	1	32	sealing screw	1
11	ball valve	1	33	o-ring	1
12	filter connector	1	34	guiding Belt	1
13	screw	1	35	parker ring	1
14	o-ring	1	36	fixing seat	2
15	washer	1	37	piston rod spring	1
16	stationary cylinder block	1	38	piston rod	1
17	adjustable screw	1	39	circlip	1
18	o-ring	2	40	cylinder	1
19	fixing screw	1	41	sealing ring	1
20	retaining nut	1	42	guiding Belt	1
21	cylinder	1	43	dust-proof ring	1
22	fixing screw	1			

970 Hydraulic manifold filter assembly



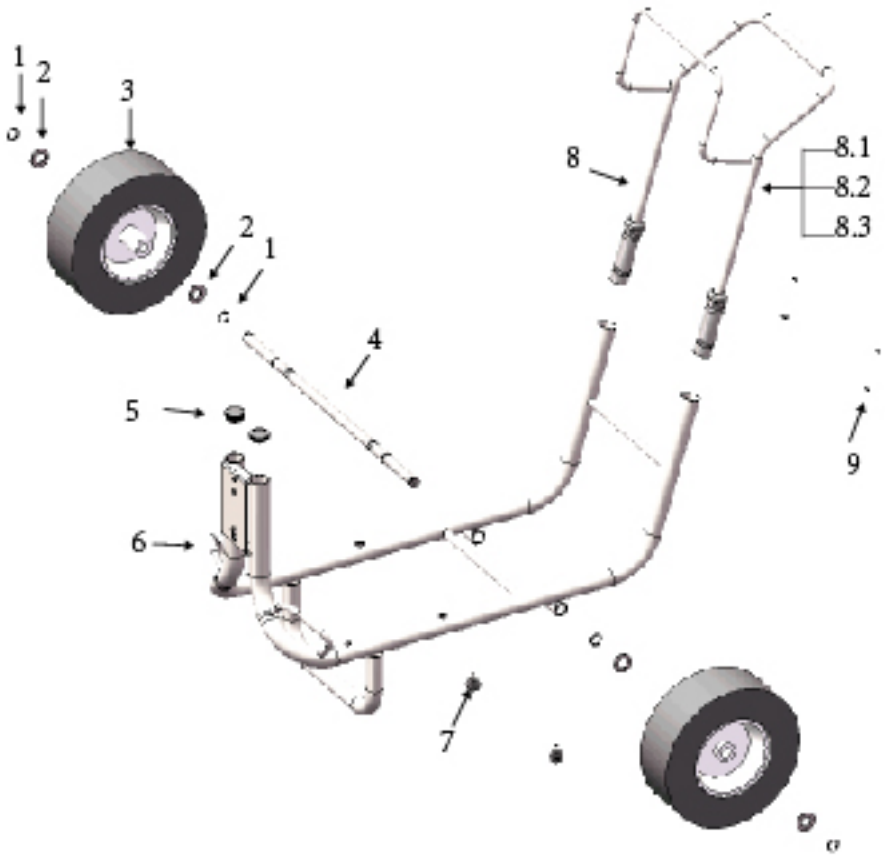
NO	parts	Quantity
1	oil tube connector	2
2	filter	1
3	nipple	4
4	connecting nut	1
5	connecting screw	1
6	prime tube connector	1
7	nipple	1
8	connector	1
9	filter tube	1
10	pump filter core	1
11	fliter cap	1
12	o-ring	1

HB970 Pump assembly



NO	parts	Quantity	NO	parts	Quantity
1	lock nut	1	14	cylinder	1
2	0-ring	1	15	cylinder screw	1
3	ring	1	16	gasket	1
4	V-ring	8	17	o-ring	2
5	leather	6	18	cylinder	1
6	ring	1	19	cylinder	1
7	piston rod	1	20	screw	1
8	ring	1	21	flat gasket	1
9	ring	1	22	spring	1
10	gasket	1	23	nut	1
11	oil seal	1	24	ball seat	1
12	tungsten steel ball	1	25	Tungsten steel ball	1
13	piston valve	1	26	inlet valve	1
13.1	piston valve	1	27	o-ring	1
13.2	outlet guide tube	1	28	intake housing	1

HB970 Rack Assembly



NO	parts	qty
1	circlip	4
2	flat gasket	4
3	inflatable wheel	2
4	rack wheel rod	1
5	nipple	2
6	screw	1
7	screw	2
8	upper rack assembly	1
8.1	upper rack	1
8.2	V-shape shrapnel	2
8.3	flexible sleeve	2
9	screw	4