MODEL 4201B

SPECIFICATIONS

PERFORMANCE

DISCHARGE VOLUME.....3.6 GPM / 13.6LPM

PUMP HEAD PRESSURE..... 2000 PSI / 138 BAR

TEMPERATURE RISE.....140°F @ 4.0 GPM / 60°C @ 15.1 LPM

TEMPERATURE LIMIT..... UP TO 200 DEGREES

COMBUSTION SMOKE/BACHARACH SCALE..#1 OR #2 SMOKE

CARBON MONOXIDE ALLOWED..... 0.01%

DRAFT/STACK INSTALLATION..... 0.2" - 0.04" WC READING

HEAT INPUT ..... 320,000 BTU/HR / 80,640 KCAL/HR

GENERAL

MINIMUM INLET WATER PRESSURE.....10 PSI / 0.68 BAR

STACK SIZE ..... 12" DIA / 304.8 MM DIA

WEIGHT (DRY) ..... 710 LBS / 323 KG

SPRAY TIP ..... (#5.5-15DEG) J00-15055-2

WAND 42" AND TRIGGER GUN ..... P/N J06-00158-B

HOSE, HIGH PRESSURE ..... 3/8" X 50' P/N K02-03150E1

BELT - MOTOR TO PUMP..... P/N R02-00235

FLOAT VALVE..... P/N C03-00636

COIL SIZE.....14" O.D. X 1/2"ID X 170' X SCHEDULE 40

REPLACEMENT COIL w/ WRAPPER..... P/N 20-200-2

COIL BACK PRESSURE (NEW)

.....5 PSI @ 4.8 GPM / 0.34 BAR @ 18.2 LPM

COIL BACK PRESSURE REQUIRING DESCALING

..... 50 PSI @ 4.8 GPM / 3.40 @ 18.2 LPM

ELECTRICAL

MACHINE VOLTAGE..... 230V 60HZ 1PH

CAM SWITCH..... P/N F04-00743A

TEMP CONTROL, ADJUSTABLE ..... P/N F04-00818

CURRENT ..... 208V / 21 AMP 230V / 22 AMP

PUMP MOTOR

MOTOR HORSEPOWER..... 5 HP / 3.7 KW

MOTOR SPEED…….....3450 RPM

MOTOR VOLTAGE.....208V / 230V 60HZ 3PH

MOTOR PART NUMBER..... P/N F02-00088-U

MOTOR PULLEY..... P/N R03-00339

PUMP & UNLOADER

PUMP .....P/N N07-00080

PUMP PULLEY..... P/N R03-00679

PUMP PULLEY BUSHING..... P/N R04-00001

PUMP TYPE.....GENERAL CERMAIC PLUNGER, OIL BATH

UNLOADER..... P/N C07-04100-B

BURNER

NATURAL GAS - STANDING PILOT

FUEL TYPE..... NATURAL GAS

MINIMUM FUEL INLET PRESSURE..... 7.5"W.C.

MAXIMUM FUEL INLET PRESSURE..... 9"W.C.

MAIN BURNER MANIFOLD PRESSURE..... 3.5"W.C.

ORIFICE SIZE.....MAIN BURNER #50 DRILL - PILOT 0.020

VOLTAGE..... 230V 60HZ 1PH

LIQUID PROPANE GAS - STANDING PILOT

FUEL TYPE..... LIQUID PROPANE GAS

MINIMUM FUEL INLET PRESSURE..... 10"W.C.

MAXIMUM FUEL INLET PRESSURE..... 14"W.C.

MAIN BURNER MANIFOLD PRESSURE.....11"W.C.

ORIFICE SIZE.....MAIN BURNER #60 DRILL - PILOT 0.014

VOLTAGE..... 115V 60HZ 1PH

N. G. - ELECTRONIC IGNITION (OPTION)

FUEL TYPE..... NATURAL GAS

MINIMUM FUEL INLET PRESSURE..... 7.5"W.C.

MAXIMUM FUEL INLET PRESSURE..... 9"W.C.

MAIN BURNER MANIFOLD PRESSURE.....3.5"W.C.

MAIN BURNER ORIFICE SIZE..... #50 DRILL

FLAME SENSOR..... P/N S03-00401

PILOT IGNITOR..... P/N S03-00402

VOLTAGE..... 24V 60HZ 1PH

L. P. - ELECTRONIC IGNITION (OPTION)

FUEL TYPE..... LIQUID PROPANE GAS

MINIMUM FUEL INLET PRESSURE..... 10"W.C.

MAXIMUM FUEL INLET PRESSURE..... 14"W.C.

MAIN BURNER MANIFOLD PRESSURE.....11"W.C.

MAIN BURNER ORIFICE SIZE..... #60 DRILL

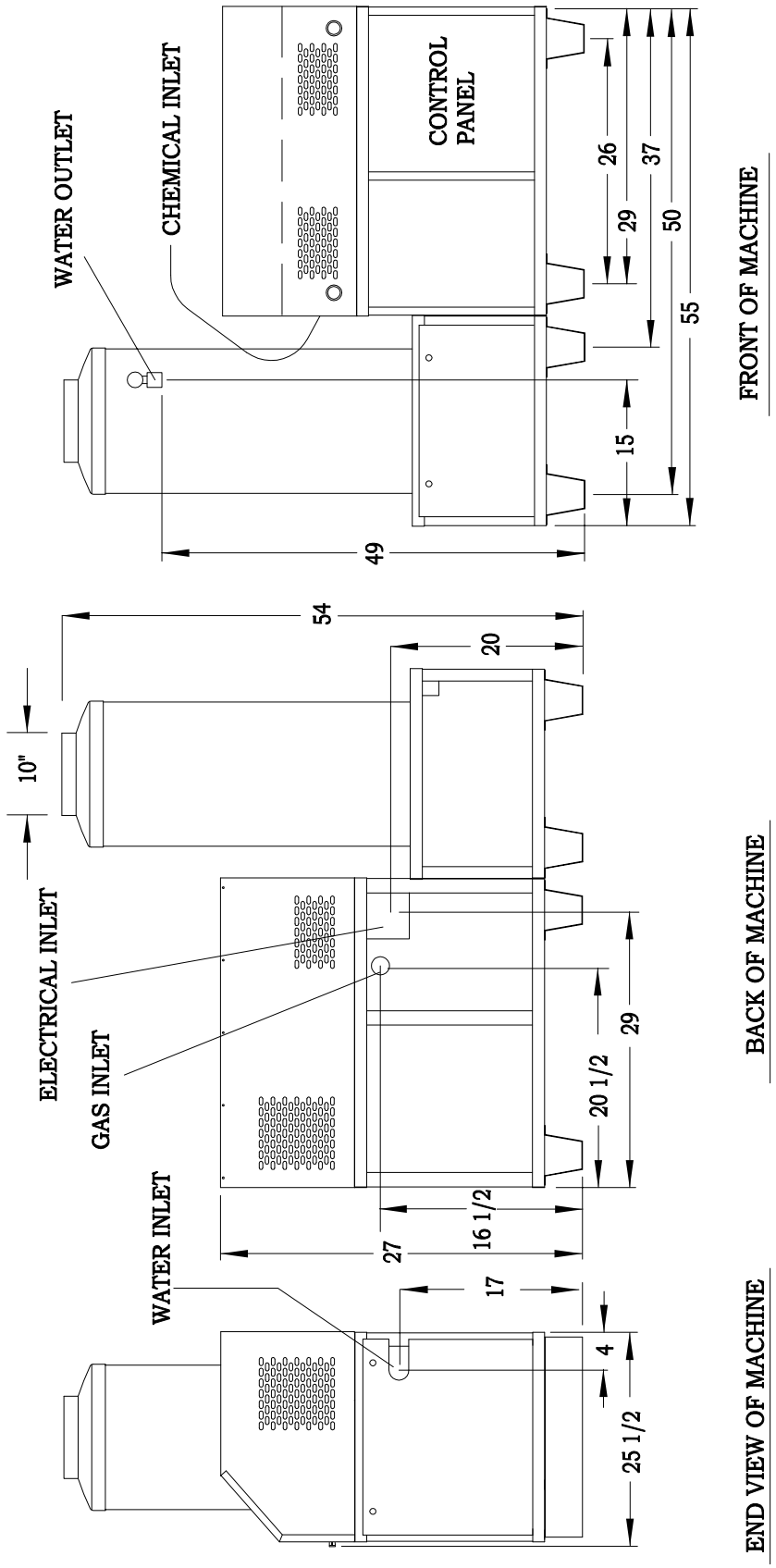
FLAME SENSOR..... P/N S03-00401

PILOT IGNITOR..... P/N S03-00402

VOLTAGE..... 24V 60HZ 1PH

14" COIL - GAS MACHINE - "B" SERIES

DIMENSIONS



DIMENSIONS IN INCHES
UNLESS OTHERWISE NOTED.
(1 INCH = 25.4 MM)

OPERATION TABLE OF CONTENTS

GAS FIRED ELECTRIC DRIVEN CLEANER

SAFETY INSTRUCTIONS

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MACHINE UNPACKING

ALL CLEANERS ARE CAREFULLY INSPECTED AND CARTONED TO PROTECT AGAINST SHIPPING DAMAGE. IF THERE IS DAMAGE OR MISSING PARTS, THE TRANSPORTATION COMPANY AGENT SHOULD MAKE A NOTATION TO THAT EFFECT ON THE BILL. REFER TO THE PARTS LIST IN THIS MANUAL AND ADVISE WHAT PARTS ARE MISSING OR DAMAGED. IF AVAILABLE, GIVE THE INVOICE NUMBER ON ALL ORDER BILLS. THIS PROCEDURE WILL ENABLE NEEDED PARTS TO BE SHIPPED QUICKLY.

THANK YOU for choosing our product. Please READ ALL Installation, Operation, and Maintenance instructions before operating the machine

NOTE: Refer to CLEANER MODEL for **SERIAL NUMBER** location

IMPORTANT SAFETY INSTRUCTIONS

The safety alert symbol ⚠ is used to identify safety information about hazards that can result in personal injury.
A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard

⚠ **DANGER** indicates a hazard which, if not avoided, **will result in death or serious injury.**

⚠ **WARNING** indicates a hazard which, if not avoided, **could result in death or serious injury.**

⚠ **CAUTION** indicates a hazard which, if not avoided, **might result in minor or moderate injury.**

CAUTION, when used **without** the alert symbol, indicates a situation that **could result in damage to the equipment.**

GENERAL SAFETY

1. Before operating this machine, read and observe all safety, unpacking, and operating instructions. Failure to comply with these instructions could create a hazardous situation.
2. The operator of this equipment should not operate this equipment when fatigued or under influence of alcohol or drugs.
3. The operator of this equipment should be thoroughly familiar with its operation and trained in the job to be accomplished.
4. The operator of this equipment should wear protective face shields and other protective clothing as required for safe operation.
5. Do not leave this machine unattended when it is operating.
6. All installations must conform to all applicable local codes. Contact your electrician, plumber, utility company or seller for details.
7. If a water leak is found, **DO NOT OPERATE THE MACHINE**. Shut off the motor and repair.
8. Follow instructions on how to stop the machine and bleed pressures quickly. Be thoroughly familiar with the controls.
9. Always point the gun assembly in a safe direction and do not direct spray on the cleaner.

⚠ **WARNING:** RISK OF INJECTION OR SEVERE INJURY. KEEP CLEAR OF NOZZLE. DO NOT DIRECT DISCHARGE STREAM AT PERSONS. THIS EQUIPMENT IS TO BE USED ONLY BY TRAINED OPERATORS.

⚠ **AVERTISSEMENT:** RISQUE D'INJECTION ET DE BLESSURES GRAVES. SE TENIR À L'ÉCART DU JET. NE PAS DIRIGER LE JET DE SOTIE VERS D'AUTRES PERSONNES CONFIER L'UTILISATION LE JET DE SOTIE VERS D'AUTRES PERSONNES. CONFIER L'UTILISATION DE CE MATÉRIEL À UN OPÉRATEUR QUALIFIÉ.

10. Do not operate the machine if any mechanical failure is noted or suspected.

11. Do not start the machine unless the gun assembly is firmly gripped by the machine operator. Failure to do this could result in injury from a flying hose and gun assembly.

12. When starting a job, survey the area for possible hazards and correct before proceeding.

13. If chemicals are used in conjunction with this equipment, read and follow the product label directions.

14. During normal operation of this machine, hot discharges and surfaces may be produced. Avoid burns by being aware of these areas and staying clear of them during and immediately after equipment operation.

15. Do not start the burner unless a full flow of water is coming from the gun. Air leaks, insufficient water to the machine, or an open soap valve with no chemical means less than full flow through the coil. This could cause hose failure and burns to the operator.

WARNING: **OPEN FLAME:** Do not operate this machine in an area with combustible materials. A suitable fire extinguisher should be available in operating area.

MECHANICAL SAFETY

1. All guards, shields, and covers must be replaced after adjustments are made. This will prevent accidental contact with any hazardous parts.
2. Drive belts must be inspected and tightened periodically to operate at optimum levels
3. Inspect machine for damaged or worn components and repair or replace to avoid potential hazards. Do not operate the machine if any mechanical failure is noted or suspected.
4. Always use the correct size spray tip found in the GENERAL section of the **MODEL SPECIFICATIONS** or **MODEL EXPLODED VIEW**.

ELECTRICAL SAFETY

1. This machine must be electrically grounded. Failure to have the machine grounded may result in the operator being electrically shocked and even death.
2. Do not plug-in or un-plug machine with wet hands.
3. Keep power cords and connections (connectors) out of water.
4. If an extension cord must be used to operate this machine, it should be as short as possible. The extension cord must be properly sized and fitted with a grounding type plug and receptacle.
5. All wiring and electrical connections should comply with the National Electrical Code (NEC) and with local codes and practices.
6. Fuses or circuit breakers should be compatible with machine requirements. (See ELECTRICAL section of **MODEL SPECIFICATIONS** for power requirements.)
7. High voltage may be present within this machine. Servicing should only be performed by properly trained personnel.

FUEL SAFETY

DANGER: To avoid possible injury, fire, or explosion, please read and follow these instructions.

N.G. (Natural) gas is lighter than air and will generally rise through the venting and escape harmlessly.

L.P. (Propane) gas is **heavier** than air and like water, will flow to the **lowest level**. Before lighting the pilot burner, sniff at the **lowest level**. **If you smell gas**, follow these rules:

1. Get all the people out of the building.
2. **DO NOT** light matches. **DO NOT** turn electric switches or light switches on or off in the area. **DO NOT** use an electric fan to remove gas from the area.
3. Shut off the gas supply from the outside of the building.
4. Telephone (from another location) Gas Company and Fire Departments. Ask instructions. **DO NOT** go back into the building.

5. Use only fuel for the water heater burner specified in the BURNER section of **MODEL SPECIFICATIONS**. The use of incorrect fuel may result in fire or explosion and severe injury to the operator.
6. Fuel burning equipment must have proper ventilation for cooling, combustion air, and exhausting of combustion products.
7. Stacking, where required, must be installed in accordance with all local codes. A draft

diverter must be installed on a machine connected to an exhaust stack to prevent improper operation. (See GENERAL section of **MODEL SPECIFICATIONS** for stack size).

8. Where stacking is not required, provide adequate ventilations to prevent any possible accumulation of hazardous fumes.
9. Personnel trained in and familiar with the type of equipment being serviced should only perform adjustments to fuel burning equipment.

SAVE THESE SAFETY INSTRUCTIONS

INSTALLATION

There are four main things to consider when installing your machine.

1. **GAS LINE** Consider all gas consuming appliances, on the gas line. Total the BTU's required and refer to the chart to get proper line size. Note: A 90 degree elbow is like adding ten feet to the total length. Below is a chart showing the recommended pipe size based on the maximum BTU/hr input to the machine. These pipe sizes are based on proper water column pressure for various gases and on a 0.5 inch pressure drop per 100 feet of pipe.

A. Find your maximum BTU across the top of the chart.

B. On left hand column, read closest distance from meter to machine.

C. The number in the square indicates proper pipe size (in inches).

FUEL SUPPLY**:** This machine must have a fuel supply as specified in the FUEL section of the **MODEL SPECIFICATIONS**

2. **GAS PRESSURE**: Gas pressure to the control is the next step.

Natural gas (N.G.) maximum inlet pressure is 9 inches of water column. With the burner on, the inlet pressure should not fall more than 1.5 inches of water column. Manifold pressure should be regulated to the heat required, but in no case less than 3 inches of water column, or more than five inches of water column. Liquid propane (L.P.) maximum inlet pressure is 13 inches water column. Minimum inlet pressure is 10 inches water column. With the burner on, the inlet pressure should not fall more 1 inch of water column. A regulator must be placed in the gas line before the gas control inlet. The combination gas valve does not have a regulator with L.P.. The manifold pressure will be 1 inch of water column less than the inlet pressure or 10 to 12 inches of water column.

MAXIMUM BTU INPUT

NATURAL GAS

	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000	600,000	650,000	700,000	750,000	800,000	850,000	900,000	950,000	1,000,000	1,050,000	1,100,000	1,150,000	1,200,000	1,250,000	1,300,000	1,350,000
0 - 50	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2
0 - 100	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2	2	2	2 1/2	2 1/2	2 1/2
0 - 150	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
0 - 200	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

LP GAS

	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000	600,000	650,000	700,000	750,000	800,000	850,000	900,000	950,000	1,000,000	1,050,000	1,100,000	1,150,000	1,200,000	1,250,000	1,300,000	1,350,000
0 - 50	1	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
0 - 100	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	2	2	2
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0 - 200	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2	2	2	2	2 1/2

WARNING

CARBON MONOXIDE HAZARD

This machine emits **carbon monoxide**, a **deadly gas**, and must be vented if used in an enclosed area. Improper venting can cause poor combustion, delayed ignition, down drafts, and the possibility of freezing the coil. Contact your distributor or local heating and air conditioning dealer for proper materials. Local codes must be observed.

3. **VENTILATION**: The gas fired machine must be vented. See the VENTING section of this manual.
4. **WATER SUPPLY**: This machine must have a water supply meeting or exceeding the maximum discharge volume specified in the PERFORMANCE section, and a minimum water inlet pressure specified in the GENERAL section of the **MODEL SPECIFICATIONS.**

OTHER ITEMS TO CONSIDER BEFORE INSTALLATION

1. **LOCATION**: This machine should be installed by only qualified technicians. The machine should be set upon a level surface where it will not be affected by strong winds, rain, snow, extreme heat, and freezing temperatures. Install the machine considering locations for chemical pick-up, fuel connections, electrical connections, water hook-up, venting, and maintenance.
   All wiring and electrical connections should comply with the National Electrical Code (NEC) and with local codes and practices. Use the chart under item 4 for your cord selection.
2. **GAS AND ELECTRICITY**: Gas and electricity must be shut off when installing or servicing.
3. **LOCAL CODES**: Installation and servicing must only be performed by qualified personnel and must conform to local codes and ordinances and with National Fuel Gas Code (ANSI Z223.1 and NFPA No. 54).
5. **FIRE HAZARD:** Keep combustible materials away from gas machines. DO NOT allow lint or dust to collect in the burner area.
6. **.QUALIFIED PERSONNEL:** All installation and servicing must only be performed by qualified personnel and must conform to the local codes and with the Natural Gas Code ANSI Z223.1/ NFPA No. 54.
7. **BARRIER:** We recommend that a barrier be installed between the machine and wash area to prevent spray from the wand from coming in direct contact with electrical controls, motors and transformers. This will increase the machine's life and lessen electrical problems.
8. **CHEMICALS:** Mix chemicals per the chemical manufacturers printed directions. Follow all mixing, handling, application, and disposal instructions. Wear gloves, boots, goggles, and protective clothing appropriate for the chemical being used.

ELECTRICAL INSTALLATION

WARNING

ELECTRICAL SHOCK HAZARD

1. **ELECTRICAL**: Connect the machine to an electrically grounded circuit that is fused or circuit breaker protected. The circuit must match that specified in the ELECTRICAL section under **MODEL SPECIFICATIONS**.
2. **EXTENSION CORD:** The use of an extension cord that has undersize wire compared to the amp draw of your machine will adversely limit the starting load carrying abilities of the motor and machines performance. Use only 3-wire extension cords that have 3-prong plugs and 3-pole cord connectors that accept the plug from the product. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking "Acceptable for use with outdoor appliances; store indoors while not in use." Use only extension cords having an electrical rating not less than the rating of the product. Do not use damaged extension cords. Use an extension cord in good repair free of frays or cracks in the outer covering. Do not abuse extension cord and do not yank on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.

WARNING: To reduce risk of electrocution, keep all connections dry and off the ground. Do not touch plug with wet hands.

COPPER WIRE SIZE MINIMUM AWG	MACHINE AMP DRAW* 3 CONDUCTOR WIRES	2 CONDUCTOR WIRES
16	10	13
15	--	--
14	15	18
12	20	25
10	25	30
8	35	40
6	45	55
4	60	70
2	80	95

CHART FIGURES ARE BASED ON NOT MORE THAN 100 FOOT

(Based on Ambient Temperature of 86°F (30°C)).

*Use Amp Draw indicated the same or higher than your machine output

EXAMPLE: Machine Amp Draw 51, use 55 (2 Conductor).

The thermostat type of cord shall be C, PD, E, EO, EN, S, SO, SRD, SJ, SJO, SV, SVO, SP.

The thermoset plastic types shall be ET, ETT, ETLB, ETP, ST, STO, SRDT, SJT, SJTO, SVT, SVTO, and SPT.B

FUEL INSTALLATION

1. **N.G. AND L.P.:** Caution must be taken to ensure that no raw gas is present in the surrounding area before attempting to put the machine into operation, or when relighting the pilot burner.
2. **GAS SUPPLY:** Do not connect the machine to supply piping before testing gas supply pressure. Excessive pressure may cause damage to gas control valve.
3. **LEAK TEST:** All the gas connections should be tested for leaks per the LEAK TEST instructions found in the **GAS VALVE SERVICING**..
4. **CONVERTING N.G. to L.P.:** The regulator and vent tube must be removed, a plate installed on the gas valve, and main burner and pilot burner jets changed.
5. **CONVERTING L.P. to N.G.:** A regulator must be installed on the gas valve, a vent tube added, and main burner and pilot burner jets changed.
6. **L.P. FIRED MACHINES:** This machine should be installed with consideration to cold weather. As weather gets colder, the rate of liquid being vaporized into gas in the fuel storage tank will decrease. The storage tank (s) must be sized sufficiently large enough to ensure an adequate supply of vaporized fuel at all anticipated outdoor temperatures. Your L.P. supplier can recommend the correct tank(s) knowing the piping layout and the BTU demand found the in **MODEL SPECIFICATIONS**.
7. **FUEL OUTAGE:** If your L.P. tank runs out of fuel or if the natural gas supply is interrupted, turn off the gas at the machine. After L.P. tank is filled, or the natural gas is restored, relight pilot burner per LIGHTING PILOT BURNER instructions.

WATER INSTALLATION

1. **WATER TEMPERATURE VARIATION:** On machines not equipped with a temperature control device, the temperature of the discharged water is dependant on the incoming water temperature. Some minor adjustment to the fuel input may be required if the incoming water is significantly different than 50 degrees fahrenheit.
2. **WATER CONDITIONS**: Local water conditions affect the coil and spray tip more adversely than any other element. In areas where troublesome conditions may exist with like equipment (such as water heaters), we recommend the use of a water softener.
3. **FREEZING:** This machine must be protected from freezing according to STORAGE section of **MACHINE MAINTENANCE**.
4. **WATER EXPOSURE:** If your gas control valve has been exposed to water in any way, do not attempt to use it. It must be replaced. Do not attempt to repair the gas control valve.

VENTING

WARNING: This machine emits carbon monoxide, a deadly gas, and must be vented if used in an enclosed area. Improper venting can cause poor combustion, delayed ignition, down drafts, and the possibility of freezing the coil. Contact your distributor or local heating and air conditioning dealer for proper materials. Local codes must be observed.

The information contained herein is offered for reference only. You must comply with local codes and investigate through your gas and other utility companies when installing, as there may be some special local requirements you must comply with. Also see ANSI Z223.1

GAS FIRED MACHINES operate on the "Natural Draft" principle that rising heat creates an air lift. To eliminate a draft through the combustion chamber and cause pilot outages, a bell type draft diverter must be used.

OIL FIRED MACHINES use a forced air burner. The oil burner can be influenced by "Natural Draft" even though they have their fan. A bell type draft diverter must be used here also.

OIL OR GAS FIRED MACHINES ARE NOT TO BE CONNECTED TO A TYPE B GAS VENT.

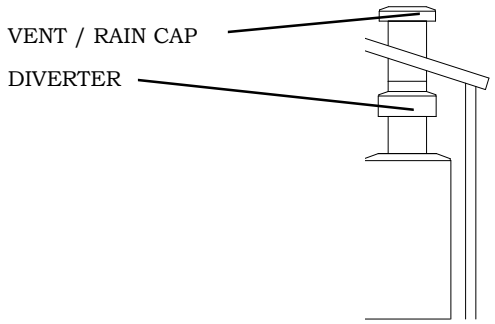
NE PAS RACCORDER CET APPAREIL À UN TUYAU D'ÉVACUATION DE GAZ DU TYPE B.

DRAFT DIVERTERS:

1. A draft diverter must be used on all cleaners that are stacked. This includes any chimney even if not expelled to the outside.
2. Use a draft diverter of the inverted funnel or bell type that meets all codes for capacity and materials. Mount the draft diverter directly to the stacking flange on the machine.
3. The draft diverter's function is to insure that the barometric pressures are as close to the same as possible at the air inlet and outlet to the coil and will not be changed by either up drafts or down drafts.
4. Installation of a draft diverter **WILL NOT PREVENT THE COIL FROM FREEZING**. In areas where freezing temperatures are common, some type of down draft prevention must be used. Check local codes for acceptable methods for the prevention of down drafts.

VENTING INSTALLATION INFORMATION:

1. Never Reduce the Stack size. The diverter and stacking should be the same size as the stack opening on the machine.
2. Straight Stacking through the a roof is preferred. Horizontal runs are not desirable, but if necessary, be sure to pitch the stack upward at a rate of two inches per foot. When horizontal stacks are used, vertical stacking must extend at least two feet for every foot of horizontal stack.
3. Stack Extension above the roofline should be sufficient to clear the peak of the roof. Refer to the ANSI Z223.1.
4. A Rain Cap that is U.L. approved should be installed on the stack.



OPERATING INSTRUCTIONS

PRE START-UP

1. The first time the machine is operated, after repairs have been made, or if the machine has set for a period of time (30 days or more) follow the following procedures.
   A. Check the tension of the belt (if so equipped) per instructions in **MACHINE MAINTENANCE**.
   B. Flush the machine per instructions in **MACHINE MAINTENANCE**.
   C. Install float tank drain plug (if so equipped).
   D. Open float tank ball valve (if so equipped).

- **CAUTION:** Always use the factory supplied pressure wash hose with your machine. Do not substitute other hoses as a potential safety problem may develop.
- **CAUTION:** If machine has been exposed to sub-freezing temperatures, it must be thoroughly warmed to above freezing before operating. Failure to warm machine can cause damage to the pump packings and other components.

2. Read and observe all items in "CLEANER INSTALLATION".

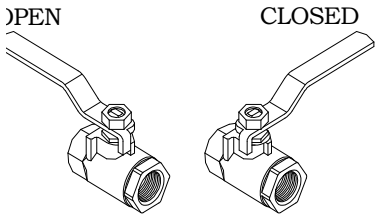
START-UP

- Refer to the **MAINTENANCE SCHEDULE** for any maintenance to be performed before operation.

WARNING

ELECTRICAL SHOCK HAZARD

- **ELECTRICAL**: Connect the machine to an electrically grounded circuit that is fused or circuit breaker protected. Do not use any type of adapter. If the correct type of receptacle is not available, have one installed by a qualified electrician.
- **OIL LEVEL**: Check the oil level in the water pump, the gear case (if so equipped), and the engine.
- **BELT** (if so equipped): Make sure the belt tension and condition is as specified in **MACHINE MAINTENANCE**.
- **METERING VALVE** (if so equipped): Make sure the metering valve is closed before operation. If air enters the system through this valve, poor performance and machine damage will occur. Refer to the metering valve insert for proper operation.
- **FUEL FILTER**: Inspect the fuel filter for any evidence of water contaminants.
- **FUEL**: Make sure the fuel is the type specified in the BURNER section of **MODEL SPECIFICATIONS**
- **FUEL QUANTITY**: Make sure the fuel supply is sufficient to complete the job. See the GENERAL section of **MODEL SPECIFICATIONS** for the fuel tank capacity.
- **WATER SUPPLY**: This machine must have a water supply meeting or exceeding the maximum discharge volume specified in the PERFORMANCE section, and a minimum water inlet pressure specified in GENERAL section of the **MODEL SPECIFICATIONS**.
- **LIME:** Water containing large amounts of lime, calcium or other similar materials can produce a coating on the inside of the impact nozzle or spray tip and coil pipe.
- **FLOAT TANK**: Check the float tank to assure it is full and the float tank valve shuts off securely.
- **BALL VALVE**: Check the position of the ball valve (if so equipped) on outlet line of the float tank assuring that it is in the open position.



1. Light the pilot per LIGHTING PILOT in **GAS VALVE SERVICE**.
2. Select temperature (if so equipped).
3. With the gun assembly in hand (on trigger gun models hold the trigger gun valve in open position) and with a good flow of water turn on the pump switch.

   CAUTION: A good flow of water must be flowing from the end of a gun within 30 seconds, before proceeding. Lack of water can cause damage to the water pump.

   CAUTION: On a machine equipped with a trigger gun valve, if the trigger gun valve remains in the closed position for more than 3 minutes, water pump damage may occur.
4. Turn the switch to the burner position. NOTE: .The .burner will Ignite within 5 to 30 seconds.

   CAUTION: OIL FIRED MACHINE Do not run the machine with the burner switch in the on position when the fuel tank is empty. This will cause damage to the fuel pump and void warranty.

   CAUTION: Do not operate with the trigger gun valve closed for more than 3 minutes or water pump damage may occur.
5. To **CLEAN**:

   A. Start on the lower portion of the area to be cleaned and work up using long, even, overlapping strokes.

   B. Dirt is generally removed easily if grease and/or oil is not present. However if grease and/or oil are present, hot water and chemical will accelerate in the cleaning process.

6. **TO APPLY CHEMICAL**:

   CHEMICAL: Use factory recommended chemicals for best cleaning action and for extended pump life. Contact your dealer for chemicals available. Follow instructions on chemical container.

   Mix chemicals per label instructions. Use necessary safety precautions.

   A. Insert chemical screen into chemical container

   B. Adjust metering valve (if so equipped).

   C. If the gun assembly is equipped with variable or multiple nozzle assembly, adjust as desired.

7. To **RINSE:** (For cold water rinse, turn the burner switch off.)

   A. If the machine is equipped with a panel mounted metering valve, close the chemical metering valve. NOTE: It is advisable to dip the chemical screen in a container of clean water and open the valve 1 minute to clean the valve of any remaining residue.

   B. If the gun and wand is equipped with variable or multiple nozzle assembly, open and close to clean nozzle of any remaining residue.

   C. After a clear flow of water is noted from the end of the wand, start from the top, working downward using long, overlapping strokes.

SHUT-DOWN

1. Turn the burner switch off. (If not already done so in the cold water rinse.)
2. After cool, clear water is coming from the end of the wand, turn the pump switch to off.
3. Turn off the water supply.
4. Disconnect from the electrical supply.
5. Replace the stack cover (if so equipped)
6. If freezing conditions may exist, refer to STORAGE in **MACHINE MAINTENANCE**.
7. Replace stack cover (if so equipped).

COMBINATION OPTION INSTRUCTIONS

WARNING: This machine should be operated only by personnel instructed in and familiar with its operation. The discharge produced is 300°F / 150°C and can cause **SERIOUS BODILY INJURY** to you and anyone coming in contact with it.

NOTE: In process of making steam, the water flow through the coil has to be decreased. The amount of water is determined by the pressure and water temperature of your location.

If the incoming water temperature is as high as 70°F, the amount of water going through the coil has to decrease very little.

If the incoming water temperature is as low as 40°F, the amount of water going through the coil has to be decreased quite a bit.

The water temperature is relative to the season variation and should be taken in consideration when operating steam.

1. Install the open gun assembly.
2. Open the ball valve on coil inlet assembly.
3. Set the temperature control to 300°F MAXIMUM.
4. For startup see “START UP” section on the previous page.
5. Regulate the temperature indicated on the thermometer to 300°F by turning the regulating valve on the coil inlet assembly clockwise to DECREASE the temperature and counter clockwise to INCREASE the temperature.
6. For shut down follow “SHUT DOWN” previously shown on this page.
7. Close the ball valve on the coil inlet assembly.

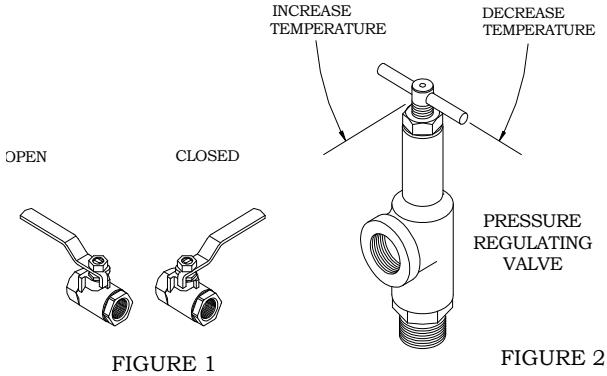


FIGURE 1 FIGURE 2

MACHINE MAINTENANCE

ELECTRIC DRIVEN GAS FIRED CLEANERS

FLUSHING

1. Connect machine to an electrically grounded circuit that is fuse or circuit breaker protected.
2. Connect machine to a pressurized water supply meeting the requirements specified in the GENERAL section of the **MODEL SPECIFICATIONS**.
3. Turn on the water supply.
4. Check the float tank (if so equipped) to assure it is full and the float valve shuts off securely.
5. Check the position of the ball valve (if so equipped) on outlet line of the float tank assuring it is in the open position.
6. Remove spray tip from gun assembly.
7. With gun assembly in hand, turn on the pump switch. On trigger gun models hold the trigger gun valve in open position. **CAUTION:** DO NOT RUN PUMP WITHOUT WATER, AS THIS WILL CAUSE DAMAGE TO THE PUMP AND VOID WARRANTY.
8. When clean water flows from gun, turn off the switch.
9. Reinstall spray tip.
10. With gun assembly in hand, turn on the switch. On trigger gun models hold the trigger gun valve in open position.
11. When clean water flows from gun, turn off the pump switch.
12. If freezing conditions may exist, refer to "STORAGE" section.
13. Turn off and disconnect the water supply.
15. Disconnect electrical supply.

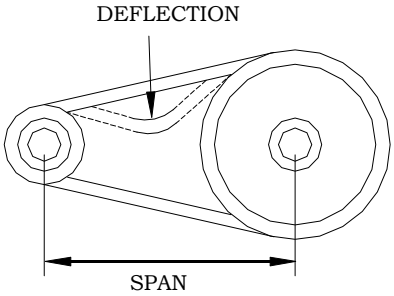
STORAGE

1. Rinse the Soap Line by inserting the screen into a container of clear water and open the metering valve 1 minute to clean it of any remaining residue. Be sure the chemical metering valve is closed when finished.
2. Disconnect the water supply.
3. Remove the spray tip nozzle from gun assembly and wire to machine.
4. Check the position of the ball valve (if so equipped) on the outlet of the float tank assuring it is in the closed position.
5. Attach an air chuck to the air valve stem on the pump assembly. With the trigger gun in the open position, apply air until a mixture of air and very little water is coming from the gun wand Then turn switch to the burner position and depress the vacuum switch. Run it for 45 seconds allowing any remaining water to turn to steam.
6. Fill a 1-gallon container with Ethylene Glycol type antifreeze. Minimum should be a mixture of ½ antifreeze and ½ water strength before each use, as the antifreeze will dilute with each use.
7. Install a 2-ft. Garden hose to the water inlet. Insert the other end into a container of antifreeze solution.
8. With the discharge gun assembly in hand, turn on the switch. On trigger gun models hold the trigger gun valve in open position.
9. Turn off the switch just prior to running out of antifreeze mixture.
10. Disconnect electrical supply.
11. Disconnect gun and hose.
12. Place machine in a dry place protected from weather conditions.

SPRAY TIP MAINTENANCE

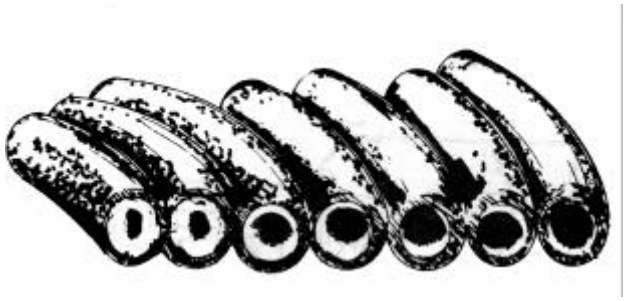
1. Remove the spray tip from the gun assembly.
2. Blow out debris with compressed air from the outside in. Any debris remaining in the inlet side of the nozzle should be cleaned out. If lime or chemical scale is present in the inlet side, the nozzle may be soaked in descaling solution or replaced. If the tip is worn, replace with one specified in the GENERAL section of **MODEL SPECIFICATIONS** or **MODEL EXPLODED VIEW**.
3. Before replacing spray tip flush the machine per "FLUSHING".
4. Reinstall Spray tip to gun assembly.

BELT TENSION



1. Correct belt tension will allow a 1/64-inch deflection for each inch of span between pulley centers with a 6-pound force applied in the middle of the span. EXAMPLE: A 6-pound force applied at the middle of an 8 inch span should produce a deflection of 8/64 inch or 1/8 inch.
2. Belts can be tightened or loosened by loosening the nuts holding the pump assembly to the motor mount. Then tighten or loosen the j-bolt on the motor mount. Retighten the pump assembly after the desired tension is reached.

COIL BACK PRESSURE CHECK



Above is a cross section view showing the progressive liming of coils.

A regular maintenance schedule for descaling your heating coil is essential to insure its longevity.

The frequency of descaling depends upon the amount of use and the condition of the water.

COIL BACK PRESSURE CHECK INSTRUCTIONS

1. Check the condition of your water pump unloader valve. Remove the hose and gun assembly from the coil outlet.
2. Remove any flow restrictions, such as guns and hoses, from the coil outlet.
3. Install a pressure gauge between the water pump and coil inlet.

DISCHARGE VOLUME GPM	BACK PRESSURE REQUIRING DESCALING
2-3 GPM	50 PSI
3-4 GPM	75 PSI
4-5 GPM	100 PSI
6 GPM	150 PSI
8-10 GPM	175 PSI

USE A 1000 PSI PRESSURE GAUGE

3. Turn on the water supply. Check the float valve (if so equipped) to assure float tank is full and the float valve shuts off securely.
4. Check the position of the ball valve (if so equipped) on the outlet line of the float tank assuring it is in the open position.
5. Turn on the pump switch. If the coil back pressure reading is above that found in the GENERAL section of the **MODEL SPECIFICATIONS** then your machine needs to be descaled.

A separate descaling pump is recommended so scale and other chemicals will not come in contact with your water pump and causes premature wear.

NOTE: Contact your local dealer for descaling of your unit.

7. Disconnect the water supply.
8. Disconnect the electrical supply.
9. Reinstall the hose and gun assembly.
10. Remove the pressure gauge.

ACCESSORIES

PART NO.	DESCRIPTION
Y02-00001	0-1000 PSI (69 BAR) Pressure Gauge
Z01-00070-1.....	3/8" x 100 Yards Thread Tape

NOTE: All Gauges are Glycerin Filled ¼ NPT

MACHINE MAINTENANCE

ELECTRIC DRIVEN GAS FIRED CLEANERS	DAILY	EACH HR FIRST 8 HRS	AFTER FIRST 50 HRS	EVERY 50 HRS	EVERY 100 HRS	EVERY 500 HRS	YEARLY
1. **OIL BATH WATER PUMP:**							
Oil Level – check and add as needed per **PUMP SERVICE** insert.	●						
Oil Change – drain and refill per **PUMP SERVICE** insert. **CAUTION:** Used oil must be disposed into an environment safe container and brought to an oil recycling center.			●			●	
Oil Contamination – Milky color indicates water	●						
2. **HOSES:**							
Blistering, Loose Covering.	●						
Abrasion of cover exposing reinforcement.	●						
Cuts exposing reinforcement.	●						
3. **BELTS:**							
Cracks or fraying	●						
For correct belt tension, see **MACHINE MAINTENANCE** insert.		●		●			
4. **FILTER – WATER:**							
Check water inlet hose screen for debris	●						
Check float tank screen for debris	●						
5. **SPRAY TIP:**							
Check Tip for debris.	●						
6. **FUEL:**							
Adequate fuel supply.	●						
7. **PUMP MOTOR WITH GREASE FITTINGS:**							
Remove drain plug. Use 1 or 2 full strokes of Shell "DOLIUM R", Chevron "SR1 No. 2" or Texaco "PREMIUM RB". Operate for 20 minutes and replace drain plug.							●
8. **GUARDS AND SHIELDS:**							
Check that all guards and shields are in place and secure.	●						
9. **FREEZING TEMPERATURES:**							
Freezing temperatures break coils and water pumps. See STORAGE in the **MACHINE MAINTENANCE** section for cold weather instructions.	●						

CLEANER TROUBLESHOOTING

ELECTRIC MOTOR DRIVEN OIL FIRED CLEANERS

TROUBLE	POSSIBLE CAUSE	REMEDY
1. Poor Cleaning Action.	A. Hard water. B. Low Pressure. C. Little or no chemical being drawn. D. Improper chemical. E. Improper chemical mixture. F. Low Discharge Pressure.	A. Connect machine to water softener. B. See "Low operating pressure" C. See "Machine will not draw chemical". D. Obtain proper chemical. E. Mix chemicals per the label. Follow all mixing, handling, application, and disposal instructions. F. See "Low operating pressure"
2. Machine will not draw chemical.	A. No chemical solution. B. Metering valve not open. C. Chemical line strainer clogged.Air leak in chemical line. D. Metering valve clogged. E. Restrictor orifice too large or missing.	A. Replenish supply. B. Turn metering valve knob to open. C. Remove screen and clean. D. Tighten all fittings and hoses for the chemical line. E. Disassemble and clean. Install proper size orifice.
3. Low operating pressure	A. Insufficient water supply. B. Incoming water hose too small. C. Water supply hose too long. D. Belt slippage. E. Worn Belt. F. Spray tip worn or wrong size. G. Dirty or worn check valves in water pump. H. Water supply hose kinked. I. Inlet filter screen clogged. J. Motor runs slow. K. Air leak in inlet plumbing. L. Defective water pump. M. Leaking discharge hose. N. Chemical metering valve open and sucking air. O. Defective unloader valve. P. Inlet ball valve not fully open (if so equipped) Q. Restricted coil	A. The water supply must meet or exceed the maximum discharge volume specified in the PERFORMANCE section, and minimum water inlet pressure specified in the GENERAL section of the **MODEL SPECIFCATIONS** section. B. Use larger water supply hose. C. Use shorter water supply hose. D. Tighten belt per instructions in **MACHINE MAINTENANCE** insert. E. Replace belt per **CLEANER EXPLODED VIEW.** F. Replace with spray tip specified in the GENERAL section of **MODEL SPECIFICATIONS**. G. See **PUMP TROUBLESHOOTING**. H. Straighten hose. I. Clean water filter screen or hose inlet screen. J. See "Pump engine starts slow or overheats and stops". K. Tighten all fittings. L. See **PUMP TROUBLESHOOTING**. M. If a water leak is found, **DO NOT OPERATE THE MACHINE**. Disconnect the power and replace hose. N. Resupply chemical, place soap screen in water, or shut off metering valve. O. Repair or replace unloader valve. P. Open inlet ball valve completely. (Handle parallel w/valve body). Q. See COIL BACK PRESSURE CHECK on **MACHINE MAINTENANCE.**

CLEANER TROUBLESHOOTING (CONT.)

ELECTRIC MOTOR DRIVEN OIL FIRED CLEANERS

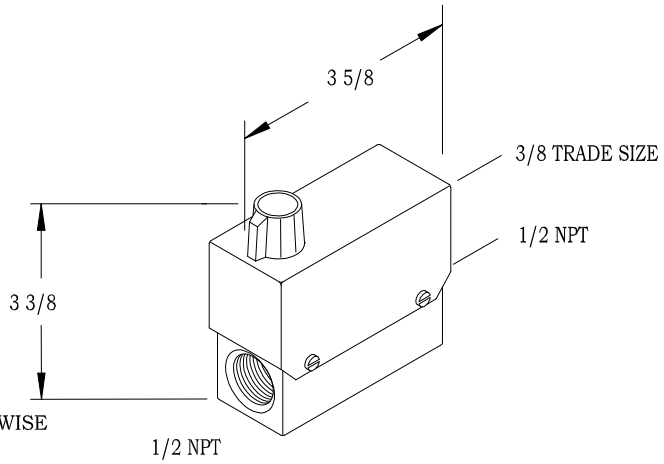
TROUBLE	POSSIBLE CAUSE	REMEDY
4. Excessive, unusual noise.	A. Defective Pump. B. Defective motor. C. Pulleys rubbing. D. Misalignment of pump & motor	A. See **PUMP TROUBLESHOOTING**. B.Call service technician or take engine to Repair/Warranty station. C. Adjust shields or pulley(s). D. Realign pump and engine.
5. .Belts slipping.	A. Belts too loose. B. Excessive Back Pressure. C. Defective Water Pump.	A. Tighten belt per instructions on **MACHINE MAINTENANCE**. B. See "Excessive Back Pressure" below. C. See **PUMP SERVICE**.
6. Excessive Back Pressure	A. Spray tip built up with lime. B. Water pump turning too fast. C. Coil built up with lime. D. Relief valve defective.	A. Remove and clean, or replace spray tip with tip specified in the *GENERAL* section of **MODEL SPECIFICATIONS**. Flush machine per *FLUSHING* in **MACHINE MAINTENANCE** B. See **MODEL SPECIFICATIONS**. C. Delime coil. D. Remove and replace.
7. Excessive vibration.	A. Defective Belt. B. Defective Pump. C. Defective accumulator	A. Remove and replace using belt specified in **CLEANER EXPLODED VIEW** or the *GENERAL* section of **MODEL SPECIFICATIONS**. B. See **PUMP TROUBLESHOOTING.** C. Recharge/Replace.
8. Pump motor will not start (motor does not hum)	A. No Power. B. Defective motor starter or ON/OFF switch. C. Defective motor.	A. Use a different outlet,check fuses in main disconnect switch. Replace fuse if blown. B. Call service technician. C. Call service technician, or take motor to Repair/Warranty station.
9. Pump motor will not start (motor hums)	A. Pump frozen. B. Defective motor. C. Defective water pump. D. Excessive back pressure	A. Machine must be thoroughly warmed to above freezing. B. Call service technician or take motor to Repair/Warranty station. C. See **PUMP SERVICE**. D. See "Excessive Back Pressure" above.
10. Pump motor starts slow or overheats and stops.	A. Low voltage B. Excessive back pressure C. Defective motor	A. See "Low voltage" below. B. See "Excessive Back Pressure" above. C. Call service technician, or take motor to Repair/Warranty station.
11. Pump motor stops and will not start.	A. Motor starter "kicked out" (if so equipped) or thermal overload tripped. B. Excessive back pressure. C. Defective motor.	A. Turn motor starter off to reset, then turn on, or push thermal overload reset button on motor. B. See "Excessive Back Pressure". above. C. Call service technician, or take motor to Repair/Warranty station.
12. Low voltage	A. Incoming voltage incorrect. B. Not large enough extension cord. C. Too long extension cord	A. Have a qualified technician check the motor terminal voltage. Correct voltage is in **MODEL SPECIFICATIONS**. B. Use an extension cord with amperes or watts rating as high or higher than that of the **MODEL SPECIFICATIONS**. C. Shorten extension cord.
13. Machine shocks operator	A. Machine improperly grounded. B. Outlet not grounded	A. **STOP!** Operating machine. Call service technician. B. Have properly wired outlet installed.

GAS WATER HEATER TROUBLESHOOTING

TROUBLE	*POSSIBLE CAUSE*	*REMEDY*
1. Machine will not rise to operating temperature.	A. Low fuel pressure	A. See specified pressure in the FUEL section of **MODEL SPECIFICATIONS**
	B. Poor combustion	B. See "Poor Combustion".
	C. Improper fuel supply	C. Use fuel specified in FUEL section of the **MODEL SPECIFICATIONS**.
	D. Temperature control inoperative	D. See the **TEMPERATURE CONTROL** section.
	E. Incoming water temperature too low	E. Raise incoming water temperature.
2. Machine overheats (Dry steam – very little moisture, very hot steam)	A. Insufficient water	A. Increase water flow and pressure. Check coil back pressure.
	B. Temperature control inoperative	B. See the **TEMPERATURE CONTROL** section.
	C. Improper fuel supply	C. Use fuel specified in FUEL section of the **MODEL SPECIFICATIONS**.
	D. Improper fuel pressure	D. See FUEL section of the **MODEL SPECIFICATIONS** for specified fuel pressure.
	E. Incoming water temperature too high	E. Lower incoming water temperature.
3. Machine Smokes	A. Improper fuel supply	A. Use fuel specified in FUEL section of the **MODEL SPECIFICATIONS**.
	B. Improper burner jets	B. Remove and replace jets per **BURNER ASSEMBLY**.
	C. Loose burner jets	C. Tighten burner jets.
	D. Missing burner jets	D. Install appropriate burner jets see **BURNER ASSEMBLY**.
4. Machine fumes (exhaust burns eyes)	A. Improper fuel pressure	B. See specified pressure in the FUEL section of **MODEL SPECIFICATIONS**.
5. Poor Combustion	A. Low fuel pressure	A. See specified pressure in the FUEL section of **MODEL SPECIFICATIONS**.
	B. Improper fuel supply	B. Use fuel specified in FUEL section of the **MODEL SPECIFICATIONS**.
	C. Improper venting	C. See National Fuel Gas Code (ANSI Z223.1 and NFPA No. 54)
	D. Fuel pressure too high	D. See specified pressure in the FUEL section of **MODEL SPECIFICATIONS**.
6. Pilot will not stay lit	A. Check for drafts	A. Install draft diverter.
	B. Pilot flame not sharp blue	B. Clean pilot orifice.
	C. Defective thermocouple.	C. Test and/or replace thermocouple.
	D. Improper fuel pressure	D. See specified pressure in the FUEL section of **MODEL SPECIFICATIONS**.
	E. Incorrect pilot orifice	E. See pilot orifice specified in the FUEL section of **MODEL SPECIFICATIONS**.

SWITCH, TEMPERATURE CONTROL - P/N F04-00818

DIMENSIONS



ALL DIMENSIONS ARE
IM INCHES UNLESS OTHERWISE
NOTED. 25.4 MM = 1 INCH

SPECIFICATIONS

STANDARD TEMPERATURE RANGE.....50°F / 10°C TO 200°F / 93°C
MAXIMUM TEMPERATURE RANGE.....50°F / 10°C TO 300°F / 149°C
TEMPERATURE TOLERANCE.....+30DF - 10°F / +17°C - 6°C
MAXIMUM VOLTAGE..... 230 VAC
CURRENT (RESTRICTIVE).....10A @ 115 VAC/5A @ 230 VAC
ELECTRICAL CONNECTION.....60 INCH 14 GAGE LEADS
WEIGHT.....1.0 LB 6 OZ / 0.70 KG

TEMPERATURE RANGE ADJUSTMENT

TO SET LOWER TEMPERATURE LIMIT

1. NOTE: WHEN SETTING A LOWER TEMPERATURE LIMIT, THE UPPER TEMPERATURE LIMIT WILL BE 300°F / 149°C.
2. LOOSEN SETSCREW IN KNOB (ITEM 1) AND REMOVE KNOB.
3. REMOVE STOP COLLAR (ITEM 2).
4. ROTATE SHAFT OF SWITCH (ITEM 7) FULLY COUNTER-CLOCKWISE.
5. POSITION STOP COLLAR ON SWITCH SHAFT AT 50°F POSITION. (FIGURE 1)

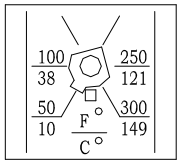


FIGURE 1

6. ROTATE SHAFT OF SWITCH CLOCKWISE TO DESIRED LOWER TEMPERATURE LIMIT.
7. WITHOUT DISTURBING POSITION OF SHAFT ON SWITCH, REMOVE STOP COLLAR AND REINSTALL AT 50°F POSITION.
8. ROTATE SHAFT OF SWITCH FULLY CLOCKWISE.
9. REINSTALL KNOB WITH POINTER POSITIONED AT 300°F AND TIGHTEN SCREW.
10. ROTATE KNOB COUNTER-CLOCKWISE AGAINST STOP AND CLOCKWISE AGAINST STOP NOTING RANGE OF CONTROL. READJUST AS NECESSRY.

TO SET UPPER TEMPERATURE LIMIT

1. NOTE: WHEN SETTING A UPPER TEMPERATURE LIMIT, THE LOWER TEMPERATURE LIMIT WILL BE 50°F / 10°C.
2. LOOSEN SETSCREW IN KNOB (ITEM 1) AND REMOVE KNOB.
3. REMOVE STOP COLLAR (ITEM 2).
4. ROTATE SHAFT OF SWITCH (ITEM 7) FULLY CLOCKWISE.
5. POSITION STOP COLLAR ON SWITCH SHAFT AT 300°F POSITION. (FIGURE 2)

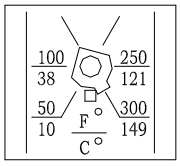


FIGURE 2

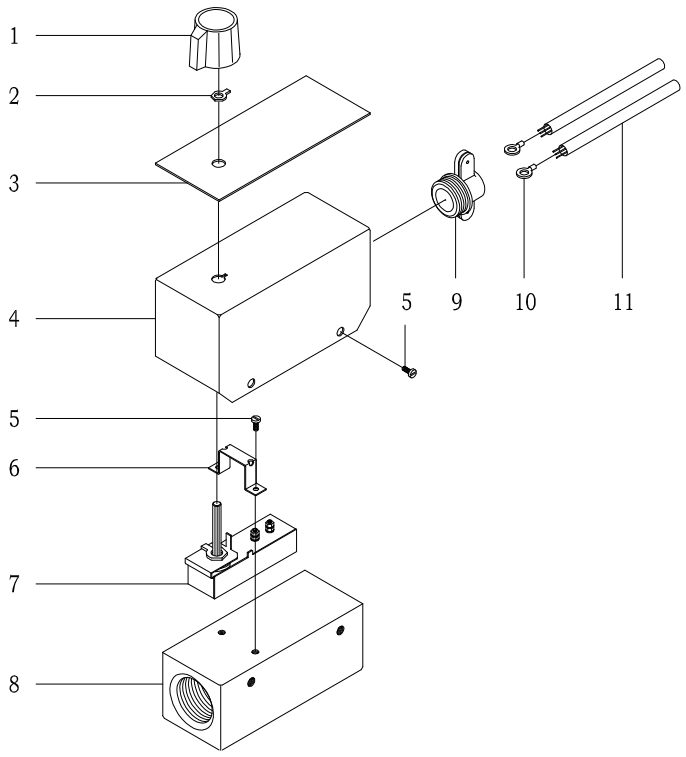
6. ROTATE SHAFT OF SWITCH COUNTER-CLOCKWISE TO DESIRED LOWER TEMPERATURE LIMIT.
7. WITHOUT DISTURBING POSITION OF SHAFT ON SWITCH, REMOVE STOP COLLAR AND REINSTALL AT 300°F POSITION.
8. ROTATE SHAFT OF SWITCH FULLY COUNTER-CLOCKWISE.
9. REINSTALL KNOB WITH POINTER POSITIONED AT 50°F AND TIGHTEN SCREW.
10. ROTATE KNOB CLOCKWISE AGAINST STOP AND COUNTER-CLOCKWISE AGAINST STOP NOTING RANGE OF CONTROL. READJUST AS NECESSRY.

ACCESSORIES

THERMOMETER, 0 TO 400°F.....PART NUMBER Y01-00017

SWITCH, TEMPERATURE CONTROL - P/N F04-00818

EXPLODED VIEW



PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	F04-00818-5	KNOB, SHAFT	7	F04-00818-1	SWITCH, THERMOSTAT
2	F04-00818-6	COLLAR, STOP	8	F04-00818-4	BLOCK, TEMPERATURE
3	D01-00027	DECAL, TEMP CONTROL	9	F04-00310	CONNECTOR, CONDUIT
4	F04-00818-3	COVER, TEMP CONTROL	10	F04-10000	TERMINAL, INSULATED HOOK
5	H04-11203	SCREW, MACHINE	11	F14-06010	WIRE, BLACK
6	F04-00818-2	BRACKET, SWITCH			

SWITCH REPLACEMENT

1. ROTATE KNOB (ITEM 1) AGAINST LOWER AND UPPER LIMIT STOPS AND RECORD TEMPERATURES INDICATED BY POINTER ON KNOB FOR USE IN STEP 10.
2. LOOSEN SETSCREW IN KNOB AND REMOVE KNOB.
3. REMOVE STOP COLLAR (ITEM 2).
4. REMOVE SCREWS (ITEM 5) AND COVER (ITEM 4).
5. REMOVE HEX NUTS FROM SWITCH (ITEM 7) AND TERMINALS (ITEMS 10) FROM SWITCH.
6. REMOVE SCREWS (ITEM 5), BRACKET (ITEM 6), AND SWITCH.
7. INSTALL REPLACEMENT SWITCH, AND REINSTALL BRACKET AND SCREWS.
8. REINSTALL TERMINALS AND HEX NUTS ON SWITCH.
9. REINSTALL COVER AND SCREWS.
10. REINSTALL STOP COLLAR AND KNOB PER TEMPERATURE RANGE ADJUSTMENT INSTRUCTIONS TO OBTAIN TEMPERATURE LIMITS RECORDED IN STEP 1.

TEMPERATURE CALIBRATION

1. TEMPERATURE CALIBRATION SHOULD BE PERFORMED ONLY AFTER ANY SWITCH REPLACEMENT AND/OR TEMPERATURE RANGE ADJUSTMENT HAS BEEN PERFORMED.
2. NOTE: TEMPERATURE CONTROL CAN BE CALIBRATED AT ONLY ONE TEMPERATURE. ALL OTHER TEMPERATURES INDICATED ON TEMPERATURE SELECTOR SCALE WILL BE WITHIN SPECIFIED TOLERANCE.
3. ADJUST KNOB (ITEM 1) ON TEMPERATURE CONTROL TO OBTAIN DESIRED CALIBRATION TEMPERATURE AS MEASURED WITH REFERENCE THERMOMETER.
4. LOOSEN SETSCREW IN KNOB AND REMOVE KNOB WITHOUT DISTURBING POSITION OF SHAFT ON SWITCH (ITEM 7).
5. WITHOUT DISTURBING POSITION OF SHAFT ON SWITCH, REINSTALL KNOB ON SHAFT WITH POINTER OF KNOB POSITIONED AT THE CALIBRATION TEMPERATURE INDICATED ON THE TEMPERATURE SELECTOR SCALE.

VALVE, METERING - P/N C03-00307

OPERATION

HANDLE

Turning Chemical flow handle clockwise will shut off chemical flow.

FLOW ADJUSTING SCREW

Turning the flow adjusting screw clockwise lowers the chemical flow. Turning the screw counterclockwise lowers the flow.

SPECIFICATIONS

Maximum Pressure.....4000 PSI / 276 BAR
Maximum Flow .....12 GPM / 45 LPM
Minimum Flow .....1.0 GPM / 3.8 LPM
MAXIMUM TEMPERATURE .....200F° / 93°C
WEIGHT.....0.75 LBS. / 0.33 KG
INLET.....1/4 FNPT
OUTLET .....1/4 FNPT
O-RINGS.....VITON
VALVE HOUSING MATERIAL.....BRASS

MAINTENANCE

VALVE STEM REMOVAL -

1. Using screw driver remove cap (item 1A).
2. Holding handle and using socket remove nut (item 1B) and lock washer (item 1C) found inside handle.
3. Remove mounting nut (item 1E).
4. Holding valve housing (item 7), turn the valve retainer (item 2) counter clockwise be careful not to lose o-ring off bottom of retainer.
5. Holding the valve retainer (item 2) turn stem (item 4) counterclockwise until it comes out of the bottom of the retainer.

VALVE STEM INSTALLATION -

Reinstall in reverse order lubing o-rings before reinstallation.
Torque retainer (item 2) to 13 ft/lbs.

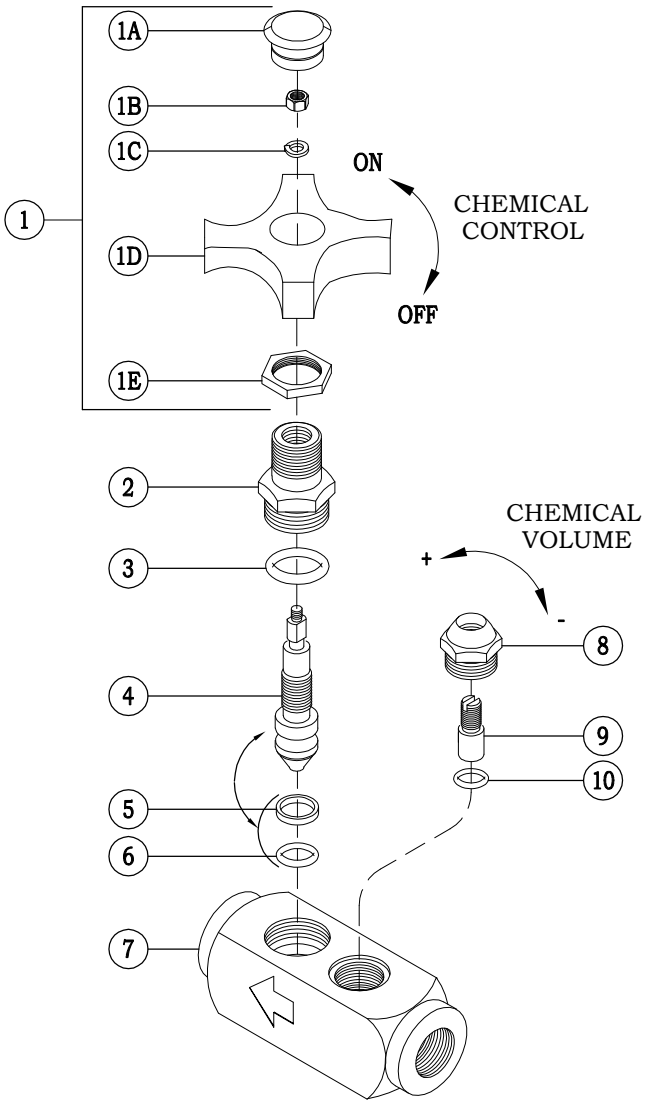
REMOVE FLOW ADJUSTING SCREW -

1. Remove the adjusting screw retainer (item 8) turning couter-clockwise.
2. Hold the retainer (item 8), using a screw driver turn the adjusting screw (item 9) clockwise until it comes out of the bottom.
3. Inspect screw for any nicks or scratches and replace as necessary.
4. Remove and replace o-ring (item 10).

REINSTALL FLOW ADJUSTING SCREW -

Reinstall in reverse order lubing o-rings before reinstallation.
Torque retainer (item 2) to 30 ft/lbs

EXPLODED VIEW

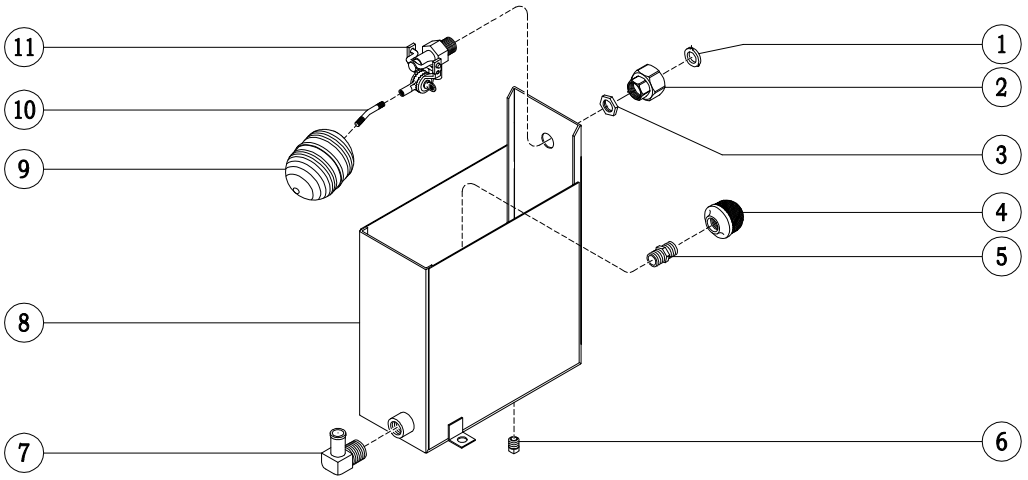


PARTS LIST

ITEM	PART NO.	DESCRIPTION
1	C07-00307-01	KIT, HANDLE
1A	----------	CAP, PLASTIC
1B	----------	NUT, HEX
1C	----------	WASHER, LOCK
1D	----------	HANDLE, ADJUSTMENT
1E	----------	NUT, HEX
2	----------	RETAINER, VALVE STEM
3	----------	O-RING - VITON 1/16CS X 3/16ID
4	----------	STEM, VALVE - SHUT-OFF
5	----------	RING, ANTI-EXTRUSOIN
6	----------	O-RING - VITON 3/32CS X 1/4ID
7	----------	HOUSING, VALVE
8	----------	RETAINER, ADJUSTING SCREW
9	----------	SCREW, ADJUSTING - FLOW
10	----------	O-RING - VITON 1/16CS X 1/8ID
	D01-00060	DECAL, METERING VALVE

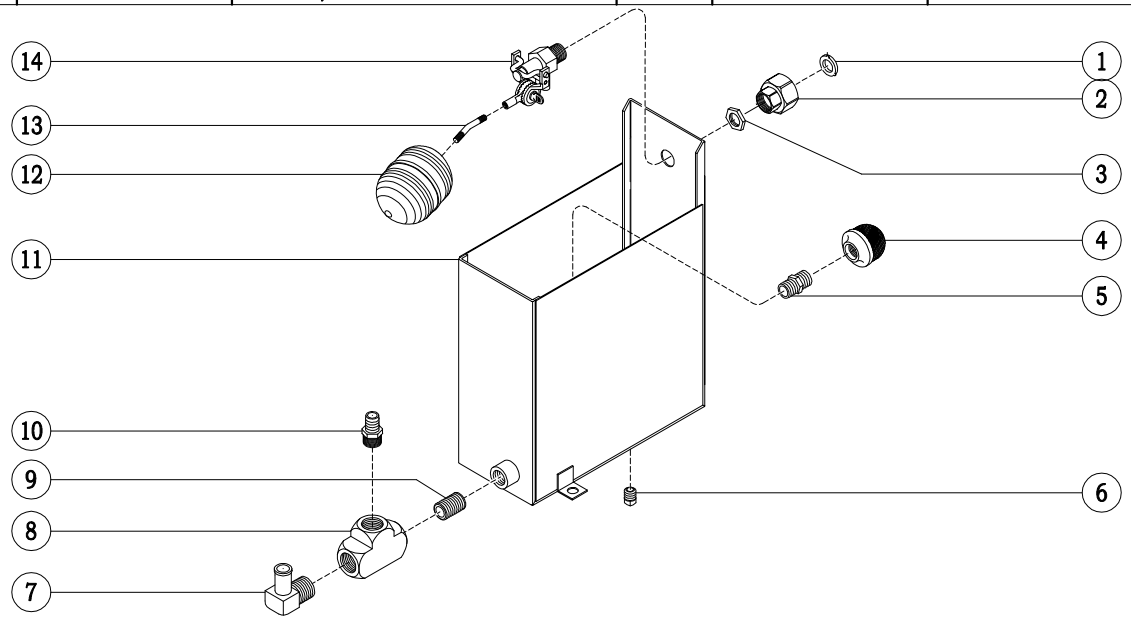
ASSEMBLY, FLOAT TANK

TRIGGER GUN - 4181B-00121, COMBI - 4181B-00124



PARTS LIST - P/N 4181B-00121

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	C05-00271	WASHER, HOSE	7	W02-10057-8	BARB, HOSE
2	C05-00273	ADAPTER, GARDEN HOSE	8	4181B-00120	TANK, FLOAT
3	C03-00629-01	NUT, HEX	9	C03-00622-B	BALL, FLOAT
4	C04-00120	SCREEN, FILTRATION	10	AR14-00100-B	ROD, FLOAT
5	4120-10540	ASS'Y, RESTRICRTOR - 11/32 ORF	11	C03-00636	VALVE, FLOAT
6	E09-00002-P	PLUG, PIPE			



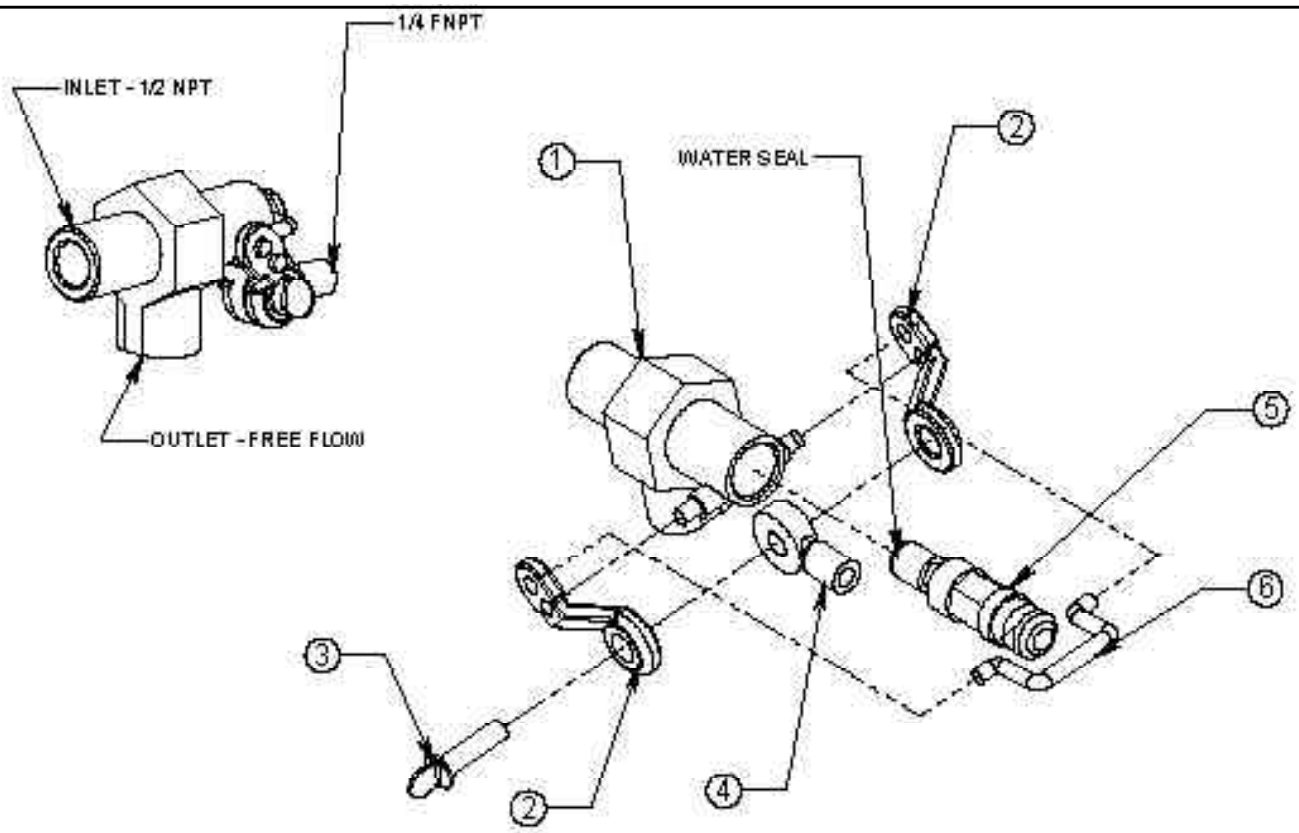
PARTS LIST - P/N 4181B-00124 - COMBINATION GUN OPTION

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	C05-00271	WASHER, HOSE	8	E10-00005-4	TEE, PIPE
2	C05-00273	ADAPTER, GARDEN HOSE	9	E15-00010-48	NIPPLE, PIPE
3	C03-00629-01	NUT, HEX	10	W02-10057-8	BARB, HOSE
4	C04-00120	SCREEN, FILTRATION	11	4181B-00120	TANK, FLOAT
5	E15-00010-P	NIPPLE, PIPE	12	C03-00622-B	BALL, FLOAT
6	E09-00002-P	PLUG, PIPE	13	AR14-00100-B	ROD, FLOAT
7	4250-00560A	ASS'Y, RESTRICTOR - 11/32 ORF	14	C03-00636	VALVE, FLOAT

VALVE, FLOAT
P/N C03-00636

SPECIFICATIONS

• MAXIMUM FLOW	14 GPM / 53 LPM / 35 PSI
• MATERIAL - HOUSING	BRASS
• MATERIAL - WATER SEAL	BUNA - N
• MATERIAL - PLUNGER	FLUTED CELCON
• WEIGHT	0.82 LBS. / 0.37 GM
• INLET	1/2 MIP

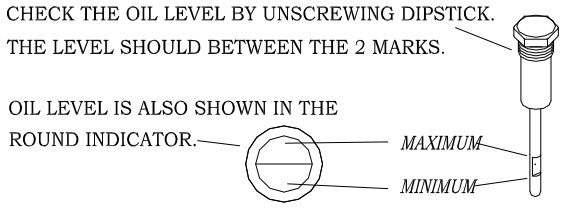


PART LISTS

ITEM	PART NUMBER	PART DESCRIPTION	QTY.
1	BODY	HOUSING, VALVE	1
2	ANGLE	ARM, PLUNGER	2
3	BOLT	SCREW, WING	1
4	Part14	ARM, BALL	1
5	PLUNGER	PLUNGER	1
6	U PEICE	LINK,PLUNGER	1

GENERAL PUMP MAINTENANCE

OIL LEVEL



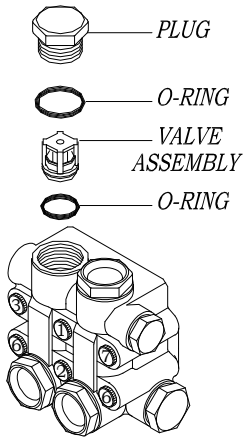
TOOL KITS

PACKING EXTRACTION KIT - P/N Z09-00028

COMPLETE TOOL KIT - P/N Z09-00021

VALVE SERVICE

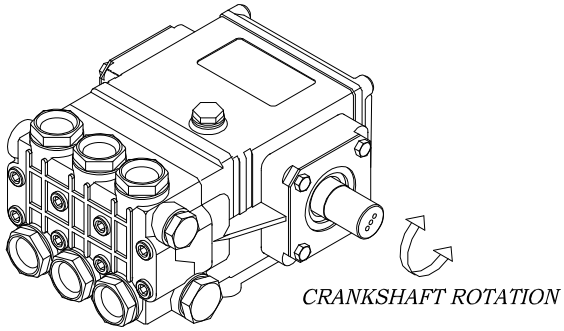
1. Remove the plugs holding the valve assemblies.
2. Remove and discard o-rings from the plugs. Clean plugs with solvent or soap and water. Allow to dry.
3. Using a needle nose pliers, fingers, or hook shaped tool, remove the valve assemblies from the head. Remove and discard the o-rings from the valve assemblies and/or head. Examine each valve assembly and discard damaged parts. Refer to the "**PUMP BREAKDOWN"** for part numbers of any replacement items.
4. Clean any accumulated debris from the valve cavities and flush with water.
5. Wash the valve assemblies in clean water and rinse. While still wet, test each valve assembly by sucking on the valve seat. A properly sealing valve will allow a good vacuum to be developed and maintained, while a malfunctioning valve will not. Good valve assemblies should be set aside for installation in step 7.



6. Malfunctioning valve assemblies must be replaced.
7. Lubricate a new o-ring with the pump crankcase oil and install into valve cavity in the head. Install a good valve assembly into the cavity as illustrated.
8. Lubricate a new o-ring with pump crankcase oil and place on a plug cleaned in step 2 above.
9. Install a plug into the pump head. Tighten plug by hand.
10. Torque the plug to the value indicated in the "TORQUE" section of the pump specifications.
11. Repeat steps 7 through 11 for remaining valve assemblies.

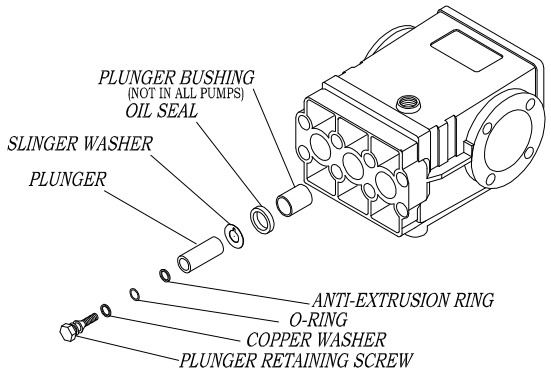
HEAD REMOVAL

1. Remove the cap screws holding the pump head to the crankcase. A metric tool is required for this step. Be careful not to lose the washer on each cap screw.
2. Remove the head by rotating the crankshaft and tapping the head away from the crankcase with a soft mallet. Keep rear surface of the head parallel to the front surface of the crankcase to prevent binding on the plungers.
3. Once the head is removed, protect the plungers from damage.



PLUNGER SERVICE

1. Remove pump head per "HEAD REMOVAL".
2. Remove any packings and retainers left on the plungers by pulling them straight off.
3. Examine each plunger, looking for a smooth surface free of any scoring, cracks, or pitting. Any defective plungers should be removed per "PLUNGER REMOVAL".
4. Discard and replace any defective plungers.
5. Reinstall the plunger per "PLUNGER INSTALLATION".
6. Reinstall head per "HEAD INSTALLATION".



PLUNGER REMOVAL

NOTE: When the plunger screw is removed, it is important to install new o-ring, anti-extrusion, and copper washers.

1. Remove the plunger screw is removed, it is important to install new o-ring, anti-extrusion, and copper washers.
2. Remove the plunger retaining screw by turning counterclockwise. Remove and replace copper washer.
3. Remove and discard o-ring and anti-extrusion ring from retainer screw.
4. Remove the plunger from the cross head and examine it for cracks, scoring, or pitting.
5. Remove and discard copper flinger washer, clean with solvent and allow to dry.

PLUNGER INSTALLATION

1. Install the copper flinger washer onto the cross head.
2. Slide the plunger onto the crosshead.
3. Lubricate an o-ring with crankcase oil and install into the groove on the plunger screw. Install the anti-extrusion ring into the groove next to the o-ring. Note: The o-ring should be nearest the screw head and the anti-extrusion ring nearest the threads.
4. Apply a drop of thread sealant to the threads of the retainer screw.
5. Thread the plunger retainer screw into the cross head making sure the copper flat washer is installed onto the screw.
6. Torque the plunger retainer screw to the value indicated in the torque section of the pump specifications.

PACKING SERVICE

1. Remove the head per "PUMP HEAD REMOVAL".
2. Remove any packings and female adapters left on the plungers by pulling them straight off. Insert proper packing extractor onto the extractor hammer. Insert packing extractor and tool through the packings and adapters remaining in the head. Tighten the hammer and remove the remaining items in the head. Remove packings and o-rings from adapters. Discard the o-rings and packings.
3. Clean the packing canities in the head and rinse with clean water.
4. Clean exposed plungers. Clean male and female adapters with soap and water and allow to dry.
5. Examine male and female adapters, discard worn items. Trial fit the female adapters into the head

checking for binding or damage. Discard and replace damaged items.

6. Lubricate packing cavities in the head and all packings and adapters with pump crankcase oil.

7. Lay head on the bench with packing cavities up. Install one male adapter in each cavity with the flat side down.

8. Install one v-packing into each cavity with the lips pointing down. A packing insertion too of the appropriate size is recommended for this operation.

9. Install the restop ring with the lips pointing down.

10. Install a front female adapter into each cavity with the flat side up. Make certain the adapter goes all way down into the cavity.

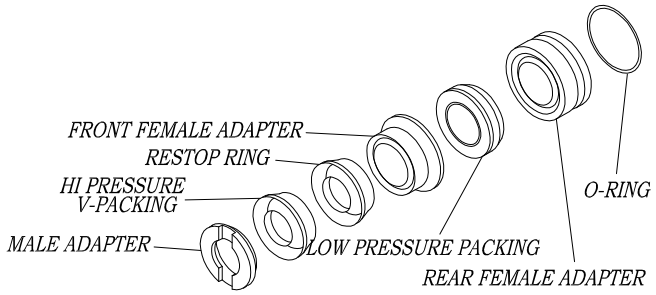
11. Install the low pressure packing with the flat side down.

12. Install the rear female adapter into each cavity with the lips pointing down.

13. Lubricate o-rings with pump crankcase oil and install one into the groove of each adapter.

14. Install one adapter and o-ring into each cavity with the flat side up. Each adapter and o-ring assembly should push into the head to approximately 1/16 inch of being flush with the surface of the head. Only hand pressure should be required to perform this operation. This step is ***VERY IMPORTANT.*** If the rear female adapter does not fit almost flush, something is not properly positioned. If a proper fit is obtained, proceed to step 16. If a proper fit is not obtained, remove the female adapters from the offending cavity and reinstall items per steps 8 through 15.

15. Install head per "HEAD INSTALLATION".



HEAD INSTALLATION

1. Prepare pump head per instructions in "PACKING SERVICE".

2. Rotate the plungers so the outer plungers are projecting the same distance from the crankcase.

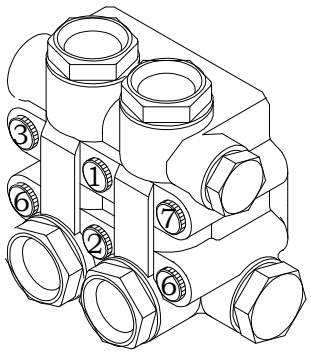
3. Lubricate the exposed plungers with crankcase oil.

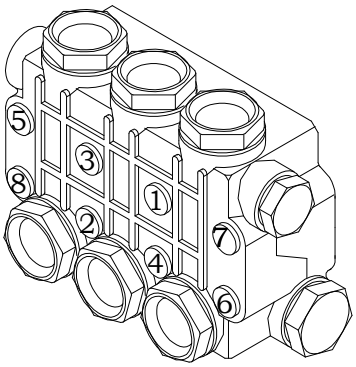
4. Start the head onto the plungers and using a soft mallet, tap the head evenly until it comes in contact with the crankcase.

5. Start the cap screws through the head and into the crankcase. Do not forget the lock washer on each screw.

6. Tighten all cap screws by hand.

7. Torque the cap screws to the value indicated in the "TORQUE" section of **PUMP SPECIFICATIONS**. Torque the cap screws in the order listed below.





PUMP MAINTENANCE RECORD

OIL CHANGE

MONTH / DAY / YEAR	OPERATING HOURS	OIL BRAND & TYPE

PUMP SERVICE

MONTH / DAY / YEAR	OPERATING HOURS	TYPE OF MAINTENANCE

PUMP TROUBLESHOOTING

TROUBLE	*POSSIBLE CAUSE*	*REMEDY*
1. Oil leaking in the area of water pump crankshaft.	A. Worn crankshaft seal. B. Bad bearing. C. Grooved shaft. D. Failure of retainer o-ring	A. Remove and replace. B. Remove and replace. C. Remove and replace. D. Remove and replace.
2. Excessive play on crankshaft.	A. Defective bearings. B. Excess shims.	A. See "Worn bearing". B. Set up crankshaft.
3. Loud knocking in pump.	A. Loose conecting rod screws. B. Worn connecting rod. C. Worn bearings. D. Loose plunger bushing screw.	A. Tighten connecting rod screws per **PUMP SPECIFICATIONS**. B. Replace connecting rod per **PUMP MAINTENANCE.** C. Replace bearings per **PUMP MAINTENANCE**. D. Tighten plunger screw per **PUMP SPECIFICATOINS.**
4. Oil leaking at the rear portion of the pump.	A. Damaged or improperly installed oil gauge window gasket. B. Damaged or improperly installed rear cover. C. Oil gauge loosed. D. Rear cover screws loose. E. Pump overfilled with oil, displaced through crankcase breather hole in oil cap/dipstick.	A. Replace gasket or o-ring. B. Replace gasket or o-ring. C. Tighten oil gauge. D. Tighten rear screws. to torque values in **PUMP SPECIFCATIONS. S** E. Drain oil: refill to recommended oil level as stated in OIL LEVEL in **PUMP MAINTENANCE**.
5. Water in crankcase	A. May be caused by humid air condensing into water inside the crankcase. B. Worn or damaged plunger screw o-ring.	A. Maintain or step up lubrication schedule. B. Remove and replace. See PLUNGER SERVICE in **PUMP MAINTENANCE.**
6. Worn bearing	A. Excessive belt tension. B. Oil contamination.	A. See BELT TENSION in **MACHINE MAINTENANCE**. B. Check oil type and change intervals per **PUMP SPECIFICATIONS.**
7. Short bearing life	A. Excessive belt tension. B. Misalignment between pump and motor. C. Oil has not been changed on regular basis.	A. See BELT TENSION in **MACHINE MAINTENANCE**. B. Re-align pump and motor. C. Check oil type and change intervals per **PUMP SPECIFICATIONS.**
8. Short seal life	A. Damaged plunger bushing. B. Worn connecting rod. C. Excess pressure beyond the pump's maximum rating. D. High water temperature.	A. Replace punger bushing. B. Peplace connecting rod. C. Match pressure stated in **PUMP SPECIFICATIONS**. D. Lower water tempersture stated in **PUMP SPECIFCATIONS**.

PUMP TROUBLESHOOTING		
TROUBLE	***POSSIBLE CAUSE***	***REMEDY***
9. Dirty or worn check valves.	A. Normal wear. B. Debris	A. Remove and replace. B. Check for lack of water inlet screens.
10. Presence of metal particles during oil change.	A. Failure of internal component. B. New pump.	A. Remove and disassemble to find probable cause. B. New pumps have machine fillings and debris and should be drained and refilled per **PUMP SPECIFICATIONS**.
11. Water leakage from under head.	A. Worn packing. B. Cracked/scored plunger. C. Failure of plunger retainer o-ring.	A. Install new packing. B. Remove and replace plunger. C. Remove and replace plunger retainer o-ring.
12. Loud knocking noise in pump	A. Pulley loose on crankshaft. B. Defective bearing. C. Worn connecting rod. D. Worn crankshaft. E. Worn crosshead.	A. Check key and tighten set screw. B. Remove and replace bearing. C. Remove and replace connecting rod. D. Remove and replace crankshaft. E. Remove and replace crosshead.
13. Frequent or premature failure of the packing	A. Scored, damaged, or worn plunger. B. Overpressure to inlet manifold. C. Abrasive material in the fluid being pumped. D. Excessive pressure and or temperature of fluid being pumped. E. Over pressure of pumps. F. Running pump dry.	A. Remove and replace plungers. B. Reduce inlet pressure. C. Install proper filtration on pump inlet pumping. D. Check pressures and fluid inlet temperature; be sure they are within specified range. E. Reduce pressure. F. Do not run pump without water.
14. Low Pressure	A. Dirty or worn check valves. B. Worn packing. C. Belt slipping. D. Improperly sized spray tip or nozzle. E. Inlet filter screen is clogged. F. Pitted valves.	A. Clean/Replace check valves. B. Remove and replace packing. C. See BELT TENSION in **MACHINE MAINTENANCE.** D. See **MACHINE SPECIFICATIONS** for specified spray tip or nozzle. E. Clean inlet filter screen. F. See VALVE SERVICE in **PUMP MAINTENANCE.**
15. Erratic pressure: pump runs rough	A. Dirty or worn check valves. B. Foreign particles in valve assemblies. C. High inlet water temperature	A. Clean/Replace check valves. A. Clean/Replace check valves. C. See temperature in **PUMP SPECIFICATIONS**.
16. Excessive vibration	A. Dirty or worn check valves	A. See "Dirty or worn check valves"
17. Scored plungers	A. Abrasive material in fluid being pumped.	A. Install proper filtration on pump inlet plumbing
18. Pitted plungers	A. Cavitation	A. Decrease inlet water temperature and/or increase inlet water pressure.
19. Cavitation	A. High inlet fluid temperatureLow inlet pressure.	A. Lower inlet fluid temperature.Raise inlet fluid pressure.

BREAKDOWN, UNLOADER VALVE

TRAPPED PRESSURE ACTUATED UNLOADER - C07-04100B

UNLOADING ADJUSTMENT

1.Install an appropriate pressure gauge in pump head outlet. the gauge should have a range twice the operating pressure.

2.Loosen set screw (Item 10) using 5/64 allen wrench and nut (Item 9) and turn the knob & retainer (Item 11 & 8) counter clockwise.

3.Open the trigger gun, start the pump, and observe pressure gauge reading. Slowly tighten the knob.

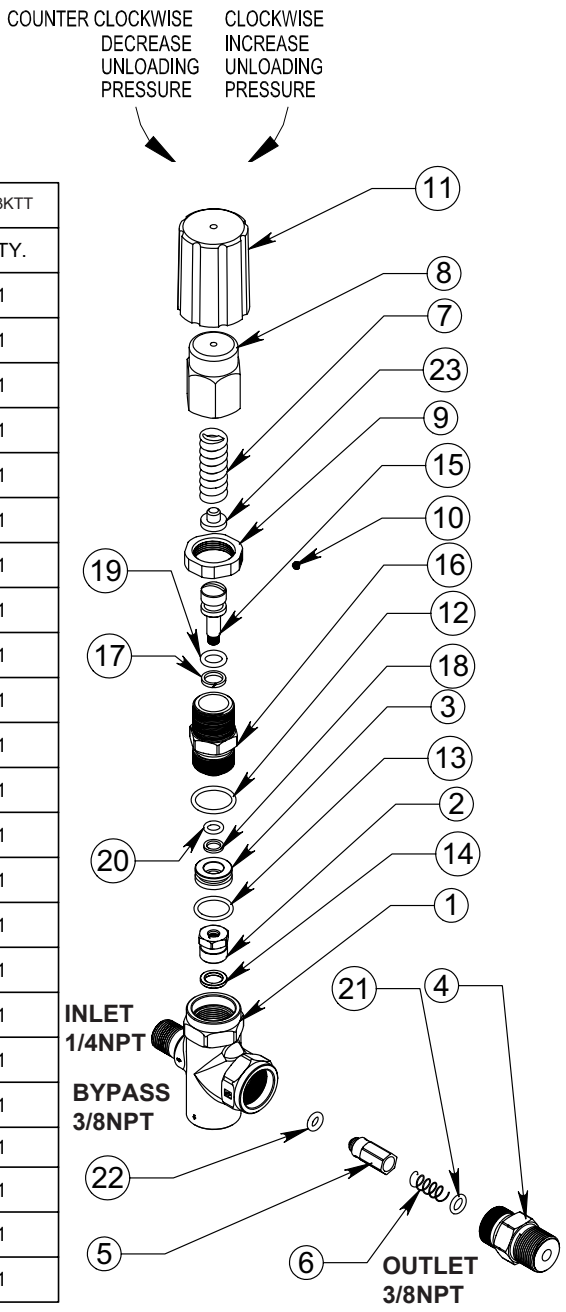
4.Close and open the trigger gun to check unloading pressure and bypass function of the unloader valve. The unloading pressure should not exceed operating pressure more than 400 PSI.

5.Lock the setting by tightening the locking set screw (item 10)

NOTE: Once the operating pressure is reached, turning the knob clockwise will increase the unloading pressure only.

SPECIFICATIONS

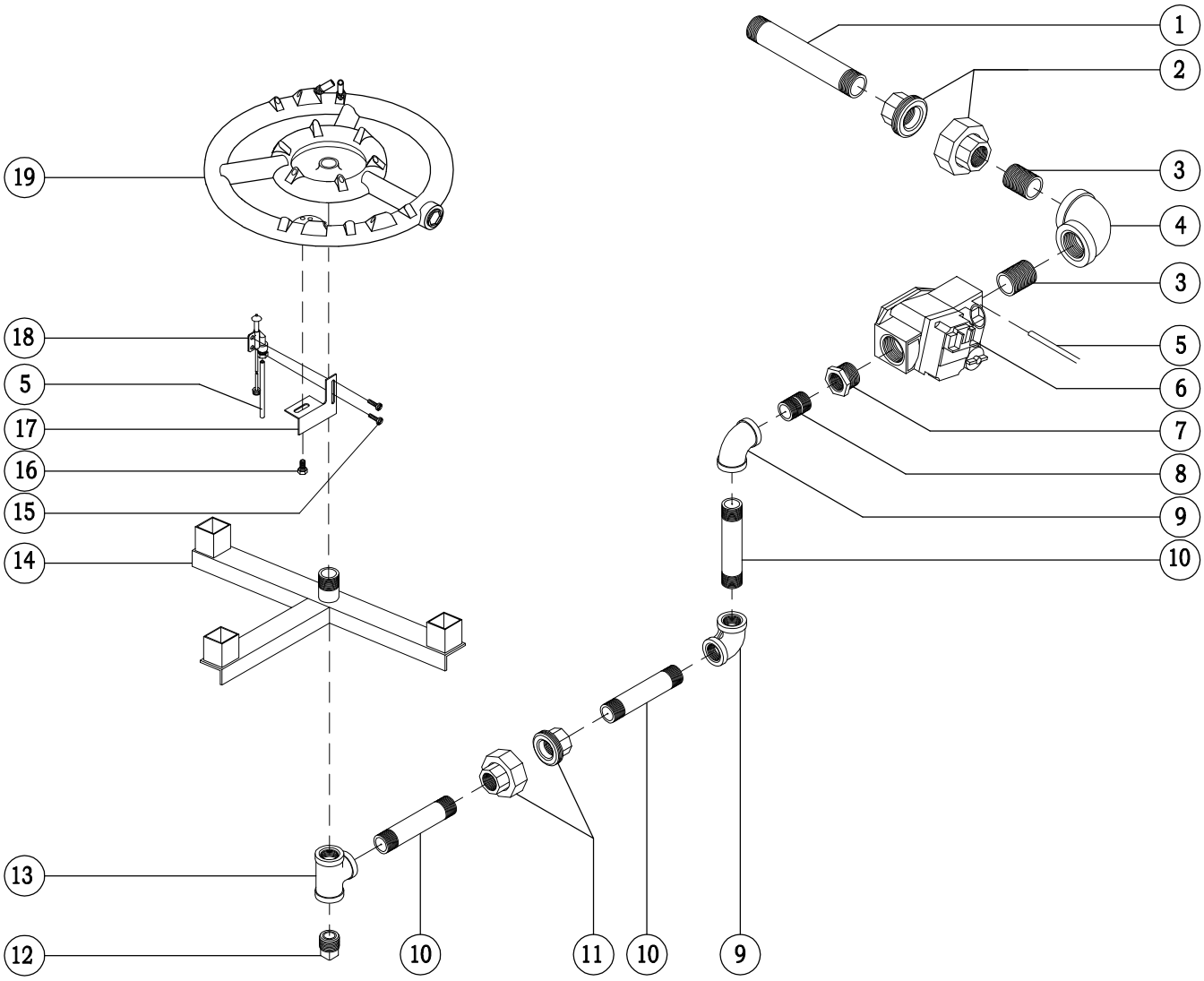
- MAXIMUM FLOW 6.5 GPM / 24.6 LPM
- MAX UNLOADING PRESS 3600 PSI / 248.2 BAR
- MAXIMUM TEMPERATURE 195°F / 91°C
- WEIGHT 1.6 LBS. / 0.73 KG
- BYPASS 3/8 FNPT
- INLET 1/4 NPT
- OUTLET 3/8 FNPT



PART LISTS			YVB3KTT
ITEM	PART NUMBER	PART DESCRIPTION	QTY.
1	C07-04100B-03	HOUSING, UNLOADER	1
2	C07-04100B-09	HOUSING, BALL	1
3	C07-04100B-10	GUIDE, PISTON - SS	1
4	C07-04100B-08	ADAPTER, OUTLET	1
5	C07-04100B-04	VALVE, CHECK	1
6	C07-04100B-02	SPRING, COMPRESSION SS	1
7	C07-04100B-06	SPRING, COMPRESSION 1.6 X .5CS	1
8	C07-04100B-05	RETAINER, SPRING	1
9	C07-04100B-07	NUT, HEX	1
10	C07-01009-09	SCREW, SET	1
11	C07-04100B-01	KNOB, ADJUSTMENT	1
12	C07-19505	O-RING - 1/16CS X 5/8ID	1
13	8RS6-000SV01	O-RING - 1/16CS X 1/2ID	1
14	C07-03500-06	SEAT, VALVE - SS	1
15	C07-03500-13	PISTON	1
16	C07-03500-11	HOUSING, PISTON	1
17	C07-03500-12	RING, BACK-UP - 8MM X 11MM	1
18	C07-03500-10	RING, BACK-UP - 8MM X 6MM	1
19	C07-01300-08	O-RING - 1/16CS X 5/16ID	1
20	P04-00215	O-RING - 1/16CS X 1/4ID	1
21	J06-20209	O-RING - 1/16CS X 7/32ID	1
22	C07-03500-04	O-RING - .16ID X .10CS	1
23	C07-03500-14	GUIDE, SPRING	1

ASSEMBLY, BURNER (L.P.) - P/N 4301A-00402

EXPLODED VIEW

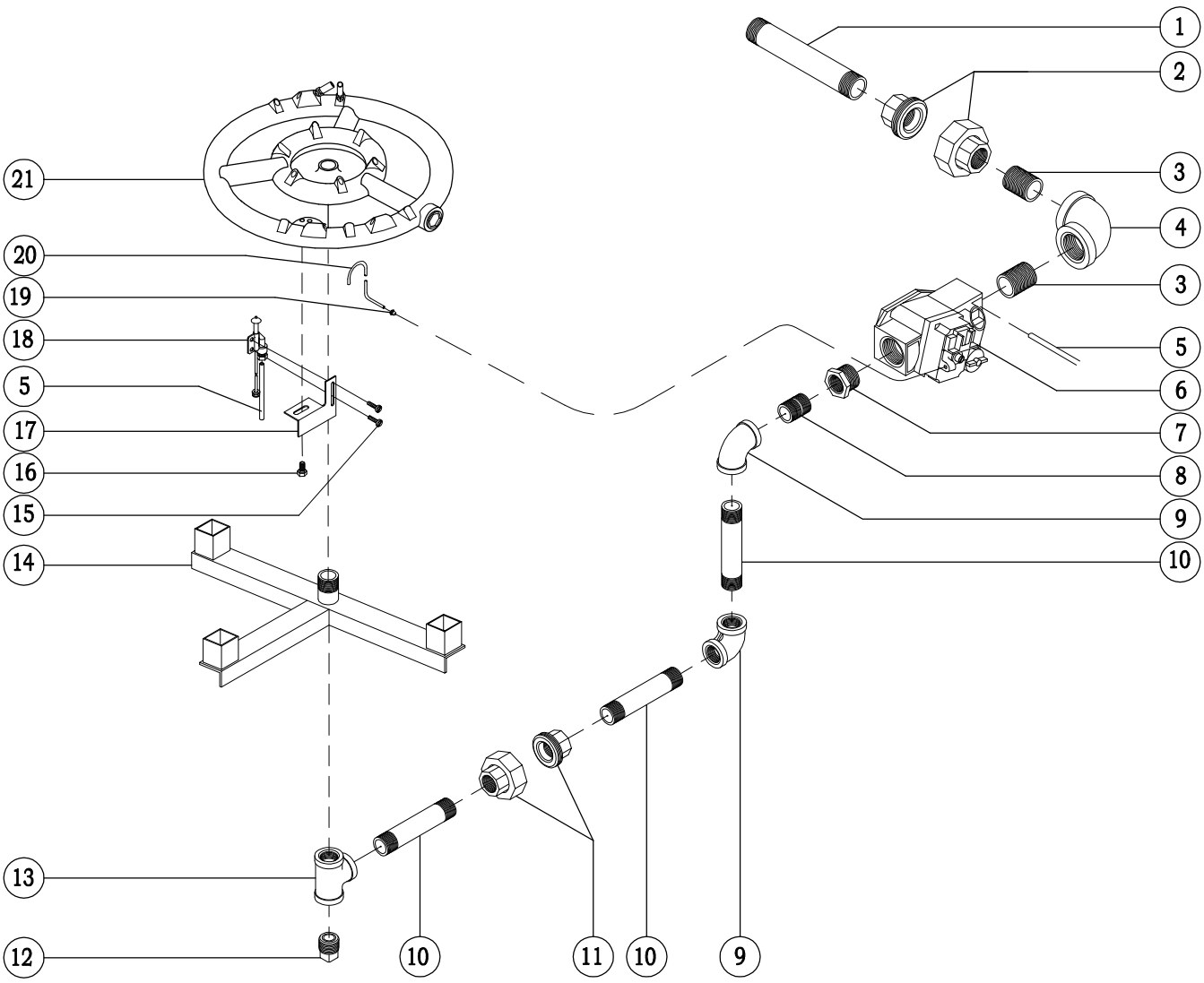


PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	E17-00070	NIPPLE, PIPE	11	E11-00004	UNION, PIPE
2	E11-00005	UNION, PIPE	12	E09-00005	PLUG, PIPE
3	E17-00010	NIPPLE, PIPE	13	E10-00008	TEE, PIPE
4	E08-00020	ELBOW, PIPE	14	4121-00423A	SUPPORT, BURNER
5	AT14-03601	TUBING, ALUNINUM - (1/4 X 36)	15	H04-19001	SCREW, MACHINE
6	S03-00415	VALVE, GAS	16	H04-25000	SCREW, CAP
7	E04-00011	BUSHING, PIPE	17	AS1600207NPB	BRACKET, MOUNT - PILOT
8	E16-00010	NIPPLE, PIPE	18	S03-00281	PILOTCOUPLE - 0.014 ORIFICE
9	E08-00019	ELBOW, PIPE	19	S03-00121	BURNER, GAS - #60 JETS
10	E16-00050	NIPPLE, PIPE			

ASSEMBLY, BURNER (N.G.) - P/N 4301A-00403

EXPLODED VIEW

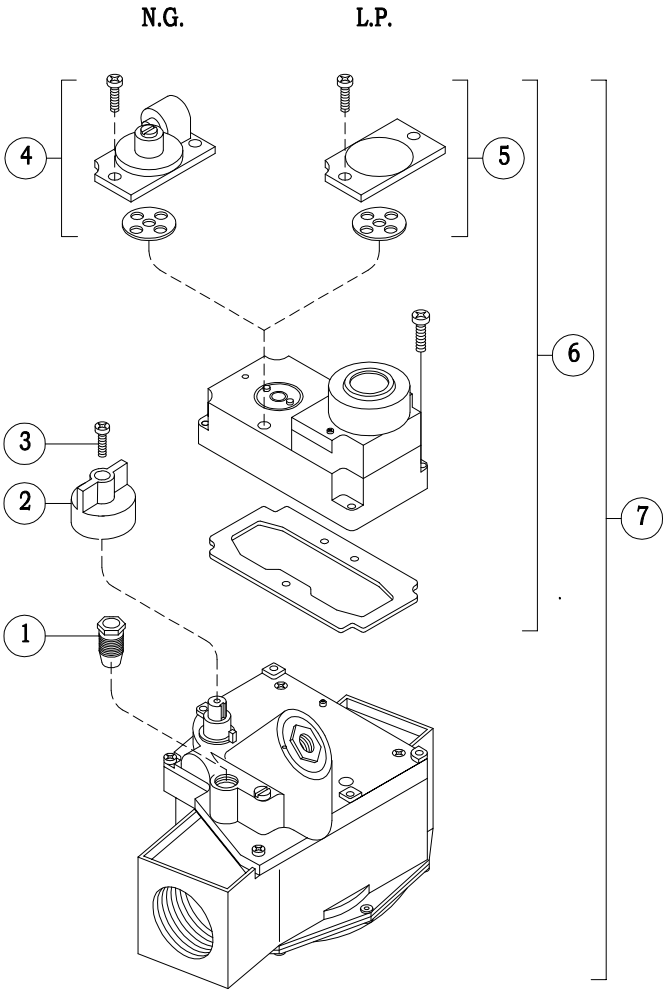


PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	E17-00070	NIPPLE, PIPE	12	E09-00005	PLUG, PIPE
2	E11-00005	UNION, PIPE	13	E10-00008	TEE, PIPE
3	E17-00010	NIPPLE, PIPE	14	4121-00423A	SUPPORT, BURNER
4	E08-00020	ELBOW, PIPE	15	H04-19001	SCREW, MACHINE
5	AT14-03601	TUBING, ALUNINUM - (1/4 X 36)	16	H04-25000	SCREW, CAP
6	S03-00409	VALVE, GAS	17	AS1600207NPB	BRACKET, MOUNT - PILOT
7	E04-00011	BUSHING, PIPE	18	S03-00282	PILOTCOUPLE - 0.020 ORIFICE
8	E16-00010	NIPPLE, PIPE	19	C05-00460	NUT, THREADED SLEEVE
9	E08-00019	ELBOW, PIPE	20	AT18-01800	TUBING, ALUNINUM - (1/8 X 18)
10	E16-00050	NIPPLE, PIPE	21	S03-00120	BURNER, GAS - #50 JETS
11	E11-00004	UNION, PIPE			

BREAKDOWN, GAS VALVE & PILOT COUPLE

EXPLODED VIEW



VALVE, REGULATED GAS (N.G.)

PARTS LIST

ITEM	PART NO.	DESCRIPTION
1	S03-00531	NUT, THREADED SLEEVE
2	S03-41801	KNOB, VALVE
3	H04-13802	SCREW, MACHINE
4	S03-00425	KIT, REGULATOR (N.G.)
6	S03-00427	KIT, ACTUATOR (24 VAC) (BLACK)
	S03-00422	KIT, ACTUATOR (115 VAC) (BROWN)
	S03-00423	KIT, ACTUATOR (230 VAC) (GREEN)
7	S03-00413	VALVE, GAS (24 VAC) (3/4 X 1)
	S03-00420	VALVE,GAS (115 VAC) (3/4 X 1)
	S03-00419	VALVE, GAS (230 VAC) (3/4 X 1)
	S03-00408	VALVE, GAS (24 VAC) (1 X 1)
	S03-00411	VALVE, GAS (115 VAC) (1 X 1)
	S03-00409	VALVE, GAS (230 VAC) (1 X 1)

*NOTE: ITEM 7 INCLUDES ITEMS 1, 2, 3, 4, & 6

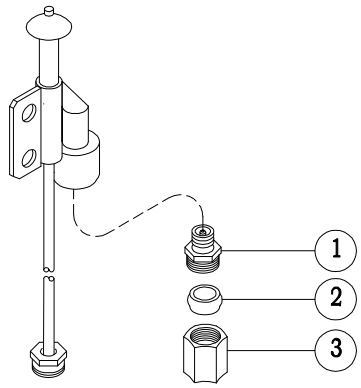
VALVE, NON-REGULATED GAS (L.P.)

PARTS LIST

ITEM	PART NO.	DESCRIPTION
1	S03-00531	NUT, THREADED SLEEVE
2	S03-41801	KNOB, VALVE
3	H04-13802	SCREW, MACHINE
5	S03-00421	KIT, NON-REGULATED (L.P.)
6	S03-00423-A	KIT, ACTUATOR (24 VAC) (BLACK)
	S03-00426	KIT, ACTUATOR (115 VAC) (BROWN)
	S03-00423-B	KIT, ACTUATOR (230 VAC) (GREEN)
7	S03-00416	VALVE, GAS (24 VAC) (3/4 X 1)
	S03-00417	VALVE,GAS (115 VAC) (3/4 X 1)
	S03-00418	VALVE, GAS (230 VAC) (3/4 X 1)
	S03-00412	VALVE, GAS (24 VAC) (1 X 1)
	S03-00414	VALVE, GAS (115 VAC) (1 X 1)
	S03-00415	VALVE, GAS (230 VAC) (1 X 1)

*NOTE: ITEM 7 INCLUDES ITEMS 1, 2, 3, 5, & 6

EXPLODED VIEW



PILOT COUPLE P/N S03-00282 (N.G.)

ITEM	PART NO.	DESCRIPTION
1	S03-00280-2	ORIFICE, PILOT - 0.020 (N.G.)
2	C05-00110	SLEEVE, COMPRESSION
3	C05-00120	NUT, COMPRESSION

PILOT COUPLE P/N S03-00281 (L.P.)

ITEM	PART NO.	DESCRIPTION
1	S03-00280-1	ORIFICE, PILOT - 0.014 (L.P.)
2	C05-00110	SLEEVE, COMPRESSION
3	C05-00120	NUT, COMPRESSION

GAS VALVE SERVICING

LIQUID PROPANE & NATURAL GAS VALVE

IMPORTANT SAFETY INSTRUCTIONS

FUEL SAFETY

⚠ **DANGER:** To avoid possible injury, fire, or explosion, please read and follow these instructions.

N.G. (Natural) gas is lighter than air and will generally rise through the venting and escape harmlessly.

L.P. (Propane) gas is **heavier** than air and like water, will flow to the **lowest level**. Before lighting the pilot burner, sniff at the **lowest level**. **If you smell gas**, follow these rules:

1. Get all the people out of the building.
2. **DO NOT** light matches. **DO NOT** turn electric switches or light switches on or off in the area. **DO NOT** use an electric fan to remove gas from the area.
3. Shut off the gas supply from the outside of the building.
4. Telephone (from another location) Gas Company and Fire Departments. Ask instructions. **DO NOT** go back into the building..

1. **QUALIFIED PERSONNEL AND LOCAL CODES:** All installation and servicing must only be performed by qualified personnel and must conform to the local codes and with the Natural Fuel Gas Code (ANSI Z223.1/NFPA No. 54).
2. **GAS AND ELECTRICITY**: Gas and electricity must be shut off when installing or servicing. Turn back on to test or operate.
3. **FIRE HAZARD:** Keep combustible materials away from gas machines. DO NOT allow lint or dust collect in the burner area.
4. **N.G. AND L.P.:** Caution must be taken to ensure no raw gas is present in the surrounding area before attempting to put the machine into operation, or when relighting pilot.
5. **GAS SUPPLY:** Do not connect the machine to supply piping before testing gas supply pressure. Excessive pressure may cause damage to gas control valve. This machine must have a fuel supply as specified in the FUEL section of the **MODEL SPECIFICATIONS**

SAVE THESE SAFETY INSTRUCTIONS

GENERAL INFORMATION

1. **LEAK TEST:** All gas connections should be tested for leaks per the LEAK TEST instructions.
2. **CONVERTING N.G. to L.P.:** The regulator and vent tube must be removed, a plate installed in it's place, a regulator added to the incoming supply line, and main burner and pilot orifice changed.
3. **CONVERTING L.P. to N.G.:** A regulator must be installed on the gas valve, a vent tube added, and main burner and pilot orifice changed.
4. **L.P. FIRED MACHINES:** As weather gets colder, the rate of liquid being vaporized into gas in the fuel storage tank will decrease. The storage tank(s) must be sized sufficiently large enough to ensure an adequate supply of vaporized fuel at all anticipated outdoor temperatures. Your L.P. supplier can recommend the correct tank(s) knowing the piping layout and the BTU demand found in **MODEL SPECIFICATIONS**.
5. **FUEL OUTAGE:** If your L.P. tank runs out of fuel or if the natural gas supply is interrupted, turn off the gas at the machine. After L.P. tank is filled, or the natural gas is restored, relight pilot per LIGHTING PILOT instructions.
6. **WATER EXPOSURE:** If your gas control valve has been exposed to water in any way, do not attempt to use it. It must be replaced. Do not attempt to repair the gas control valve.

LEAK TEST

1. Use soapy water or leak detecting solution (never a match or open flames) when checking for leaks.
2. Apply the water or solution over the connections and observe carefully to see if bubbles expand, indicating a leak is present. A large leak can blow the solution away before the bubbles have a chance to form.
3. To correct leak, try tightening first. If leak continues, take the connection apart and inspect the threads. Replace defective items.
4. If step 3 doesn't correct the problem, look for sand holes in the pipe or fittings. If found replace the complete device.

LIGHTING PILOT

1. Turn on the line valve.
2. Set the temperature control (if so equipped) to the lowest setting.
3. Turn on the gas control valve knob to "Pilot" position.
4. Depress and hold knob down while lighting pilot. Allow pilot to burn 1/2 minute before releasing valve knob. If pilot does not remain lit, repeat the operation allowing a longer period before releasing. If pilot still does not remain lit or does not light, the pilotcouple may be defective and needs to be replaced. (if pilot adjustment is necessary see "PILOT FLAME ADJUSTMENT".
5. Turn knob to "ON" position.
6. Set temperature control (if so equipped) to the desired temperature position. **NOTE: Do Not** use knob on gas control valve to adjust gas flow. Turn to full "ON". **Do Not** adjust gas input between "PILOT" and "ON" positions of the knob.

PILOT FLAME ADJUSTMENT

1. Remove machine screw located next Remove machine screw located next to the pilot connection. Be careful not to lose the gasket.
2. Turn the recessed screw clockwise to reduce the pilot flame and counter-clockwise to increase the pilot flame.
3. With gasket in place, replace machine screw securely over adjustment screw.

RELIGHTING PILOT

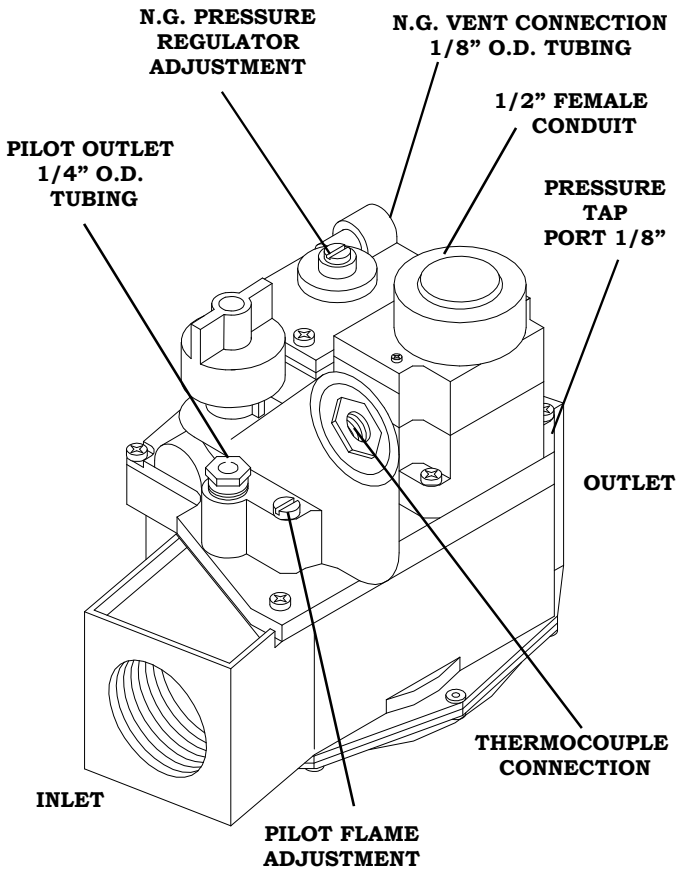
1. Partially depress and turn gas control valve knob to "Off" position.
2. Wait at least 5 minutes to allow gas to escape the burner compartment.
3. See **LIGHTING PILOT** section above.

PRESSURE REGULATOR ADJUSTMENT

NOTE: Pressure regulator is normally preset at factory. However, field adjustment may be accomplished as follows:

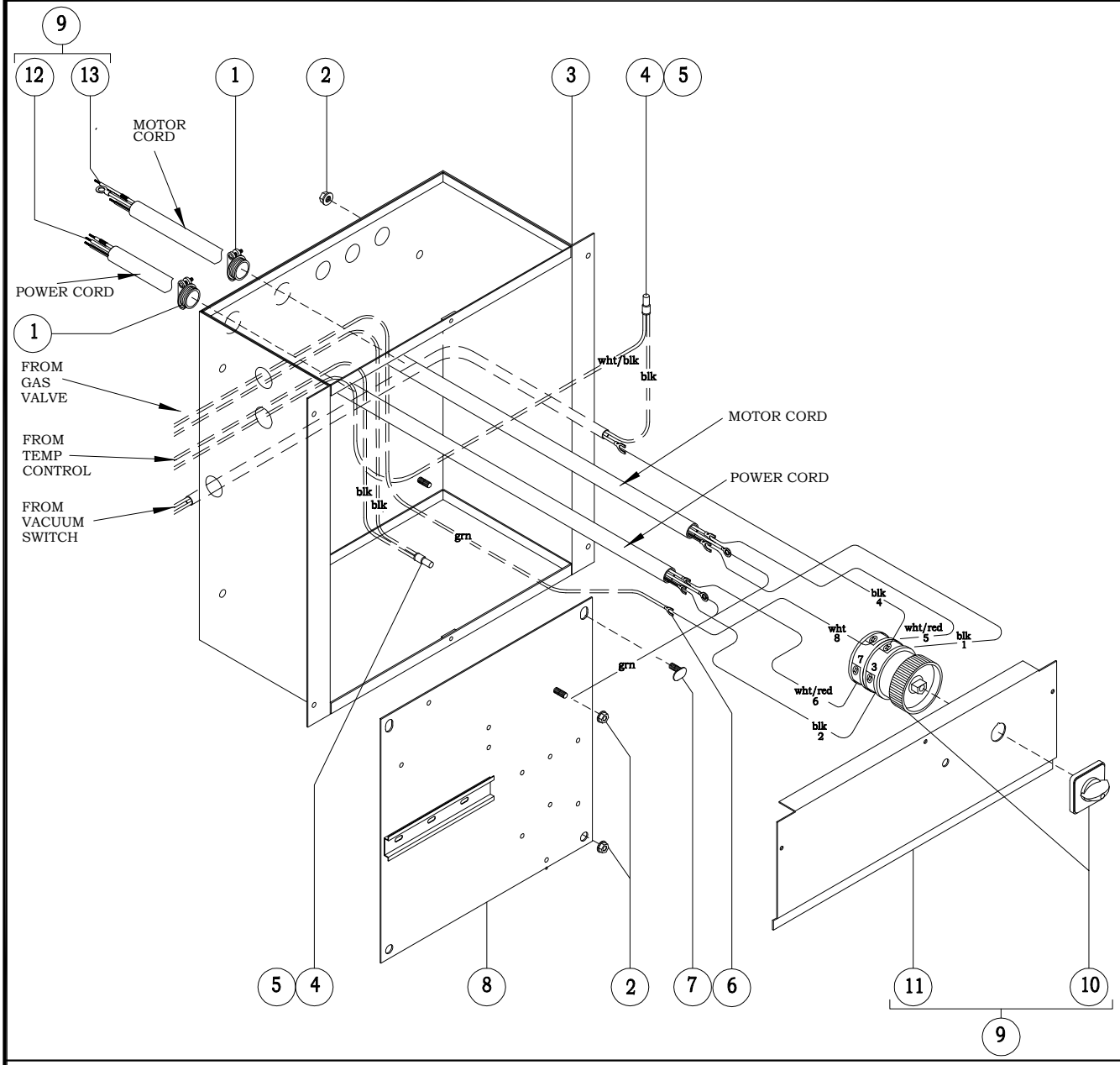
1. Monometer or attachment may be accomplished at pressure tap port.
2. Remove plug on top of regulator.
3. Rotate the adjustment screw "clockwise" to increase or "counterclockwise" to decrease pressure. See **MODEL SPECIFICATIONS** for proper pressure setting.
4. Replace plug securely.

NOTE: This regulator is normally used with a Natural Gas machine, L.P. Gas fired machine requires a regulator on the incoming supply line.



ASSEMBLY, CONTROL BOX - 30A 230V 1PH 60HZ

EXPLODED VIEW - P/N 5181A-00325



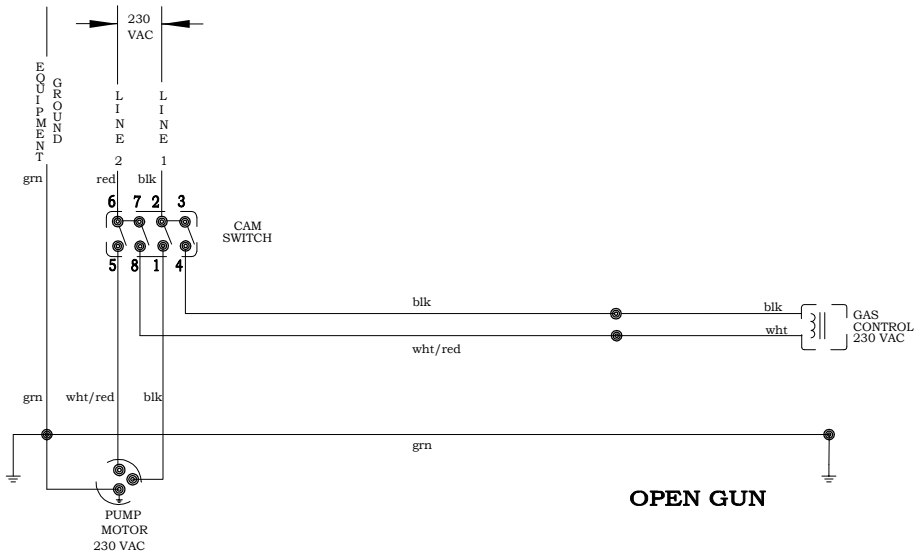
PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	F04-00311	CONNECTOR, ELECTRICAL BOX - 3/4	9	5181A-00306	ASSEMBLY, PANEL - WIRING
2	H06-25003	NUT, HEX	10	F04-00743A	SWITCH, CAM
3	5301A-00321	BOX, CONTROL - SPECIFY COLOR	11	AS1601724NPB	PANEL, CONTROL - SPECIFY COLOR
4	F04-00615	TERMINAL, SPLICE	12	5181A-00346	ASS'Y, CORD - POWER 10/3 SO X 44"
5	F04-00616	INSULATOR, SPLICE	12A	F04-04465	CORD, ELECTRICAL - 10/3 SO X 44"
6	F04-00604	TERMINAL, FORK	12B	F04-00603	TERMINAL, RING
7	H03-25001	BOLT, WELD	12C	F04-00604	TERMINAL, FORK
8	5301A-00301	PANEL, CONTROL	12D	Z06-01100	TAPE, VINYL - RED
			13	5181A-00343	ASS'Y, CORD - MOTOR 10/3 SO X 33"
			13A	F04-03365	CORD, ELECTRICAL - 10/3 SO X 33"
			13B	F04-00603	TERMINAL, RING
			13C	F04-00604	TERMINAL, FORK
			13D	Z06-01100	TAPE, VINYL - RED

SCHEMATICS, ELECTRICAL - GAS FIRED

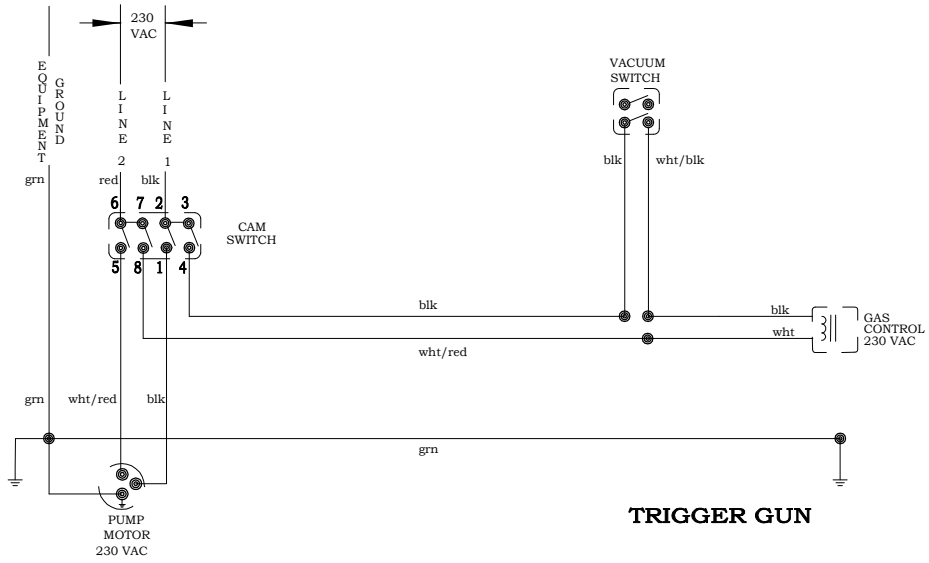
230 VAC 1 PHASE 60 HERTZ

ES-00171



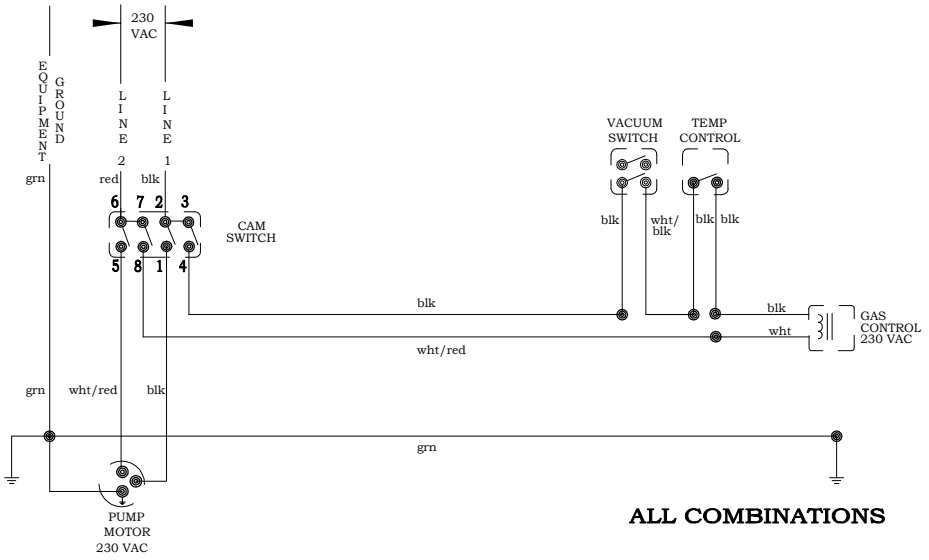
OPEN GUN

ES-00173



TRIGGER GUN

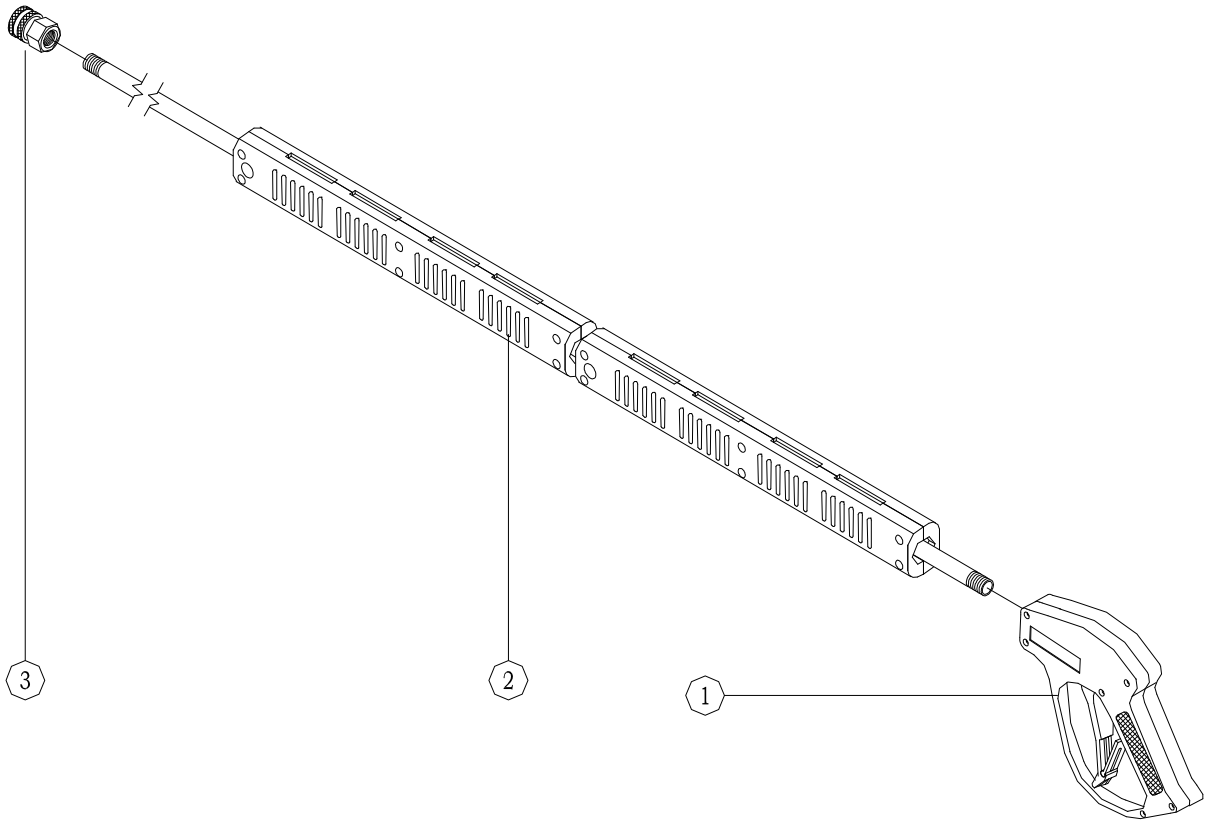
ES-00174



ALL COMBINATIONS

ASS'Y, TRIGGER GUN & WAND

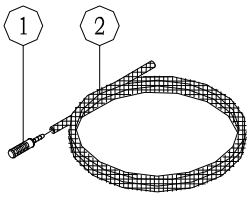
EV - P/N J06-00158-B



PARTS LIST			PARTS LIST		
ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
1	J06-00158	VALVE, TRIGGER GUN	3	W04-24225-A	COUPLING, FEMALE
2	J06-00104E	ASSEMBLY, WAND - 42"			

ASSEMBLY, CHEMICAL LINE

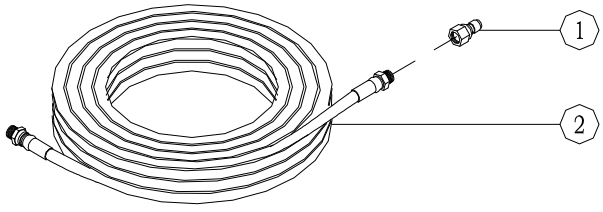
EV - P/N 4120-00902P



PARTS LIST		
ITEM	PART NO.	DESCRIPTION
1	C04-00131	SCREEN, CHEMICAL
2	Z01-08413-2	HOSE, POLY BRAID - 84"

ASSEMBLY, HOSE & COUPLER

EV - P/N 2102-00710



PARTS LIST		
ITEM	PART NO.	DESCRIPTION
1	W04-31231-B	NIPPLE, COUPLER
2	K02-03150-1	ASSEMBLY, HOSE

BREAKDOWN, TRIGGER GUN - P/N J06-00158

SPECIFICATIONS

MAXIMUM VOLUME.....10.0 GPM / 37.9 LPM
MAXIMUM PRESSURE.....5000 PSI / 344.7 BAR
TEMPERATURE RISE.....300˚F / 150˚C
WEIGHT.....1.8 LBS / 0.8 KG
INLET.....3/8" NPT FEMALE
OUTLET.....1/4" NPT FEMALE
DISCHARGE FITTING..... S.S.

REPAIR INSTRUCTIONS

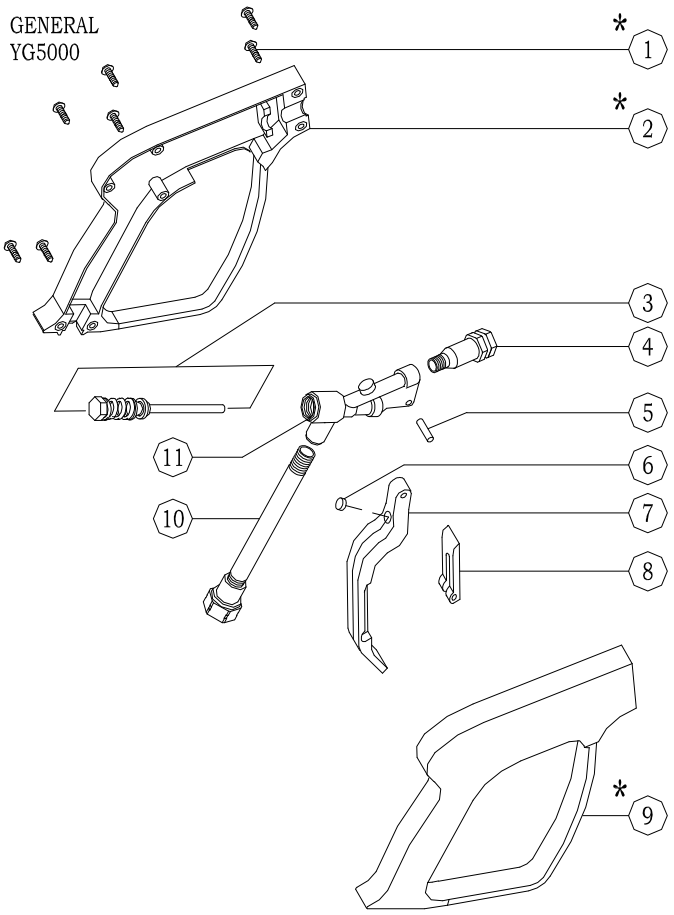
1. Remove screws (Item 1).
2. Remove handle housings.
3. Drive out pin (Item 5).
4. With a small dowel, remove the cam (Item 6) through the backside of the trigger. Replace with new cam.
5. Remove valve retainer (Item 11), springs (Items 13), and ball (Item 14).
6. With a dowel drive out pin (Item 17) and ball seat (Item 15).
7. Assemble in reverse order.

WARNING: DO NOT USE ACID CONCENTRATES THROUGH GUN

WARNING: NEVER SECURE TRIGGER GUN IN AN OPEN POSITION (TRIGGER PULLED BACK) BY MEANS OTHER THAN THE OPERATOR'S HAND, ETC. BODILY HARM MAY OCCUR IF THE OPERATOR LOSES CONTROL OF THE TRIGGER GUN.

CAUTION: ALWAYS ENGAGE TRIGGER SAFETY LATCH (ITEM 8) WHEN NOT IN USE.

EXPLODED VIEW

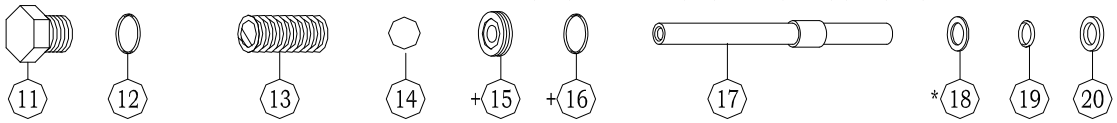


PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
*1	J06-00132-19	SCREW, SELF TAP	7	J06-00158-04	TRIGGER
*2	----------	HOUSING, HANDLE - LEFT	8	J06-00158-05	LATCH, SAFETY
3	J06-99158	KIT, REPAIR	*9	----------	HOUSING, HANDLE - RIGHT
4	J06-00158-01	FITTING, DISCHARGE	10	J06-00158-06	FITTING, INTAKE - 3/8 FNPT
5	J06-00158-02	PIN - 5 X 27.5MM	11	J06-00158-11	HOUSING, VALVE - BRASS
6	J06-00158-03	CAM		*J06-99158A	KIT, HANDLES - HOUSING

KIT, BREAKDOWN - P/N J06-99158

NOTE: POSITION PIN WITH CUPPED END TOWARDS BALL.
* ITEM 18 NOT IN KIT - SHOWN FOR POSITION ONLY



PARTS LIST

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
11	----------	RETAINER, VALVE	17	----------	PIN, VALVE
12	J06-00158-07	O-RING	18	*J06-00158-09	WASHER, FLAT - 3.2 X 7 X 0.5MM
13	----------	SPRING, COMPRESSION	19	J06-00121-07	O-RING - VITON
14	J06-00121-11	BALL, SS - 5/16"	20	J06-00158-10	WASHER, FLAT - 3.2 X 7.5 X 1.2MM
15	J06-00158-08	SEAT, VALVE			
16	C07-01300-08	O-RING - VITON		+J06-99158B	KIT, O-RING AND SEAT