Service Manual

Model DS3-2400 ELP
DS3-2400 ENG
p/n WD3241-004000 NG
p/n WD3241-503000 LP

20190107

Machine Registration

_____

INSTALLATION DATE

_____

MAKE/MODEL **SERIAL NUMBER**

_____

SELLER

_____

ADDRESS **CITY/STATE/ZIP**

_____

English to Metric Conversions		
1 gal/m	=	3.7843 L/m
1 hp	=	.7457 kw
100 psi	=	6.8964 bar
1 ft	=	.3048 m
1 in	=	2.54 cm
1 lb	=	.4536 kg
$\frac{(^{\circ}F - 32)}{1.8}$	=	$^{\circ}C$

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warning.ca.gov

ADVERTENCIA: Este producto puede exponerle a productos químicos incluso el plomo, que es conocido al Estado de California causar cáncer y defectos de nacimiento u otro daño reproductivo.

AVERTISSEMENT : Ce produit peut vous exposer aux produits chimiques en incluant l'avance, qui est connue à l'État de Californie provoquer le cancer et les anomalies congénitales ou d'autre mal reproducteur.

WARNING:
ADVERTENCIA:
AVERTISSEMENT:

20180730

California Prop 65 Warning

Table of Contents

Machine Record

Month/Day/Year	***Operating Hours***	***Maintenance Performed***

Specifications

PERFORMANCE

Discharge Volume	
	3.0 gal/m / 11.4 L/m
Pump Head Pressure	
	2400 psi / 165 bar
Temperature Rise	
	140˚F @ 3.0 gal/m / 60˚C @ 11.4 L/m
Temperature Limit	
	210˚F / 99˚C
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	*over 65 psi may require water inlet regulator*
	10 psi / 0.68 bar
Stack Size	
	12” OD / 304.8 mm OD
Spray Tip	
	(#3.5 - 15˚) p/n JA0-15035-2
Hose Assembly	
	3/8” x 50’ P/N 2102-00710
Trigger Gun & Wand	
	p/n J06-00158-B
- Trigger Gun	p/n J06-00158
- Trigger Wand	p/n J06-00104EZ
Belt	
	p/n R02-00233
Coil	
Coil With Wrapper	14”OD x ½”ID x 170” Schedule 80
Coil Back Pressure (New)	
	5 psi / 0.34 bar
Coil Back Pressure Requiring Descaling	
	50 psi / 3.40 bar

Specifications

ELECTRICAL

Machine Voltage	
	230v 60hz 1PH
Current	
	24.5 A
Temp Control, Adjustable	
	p/n F04-00818

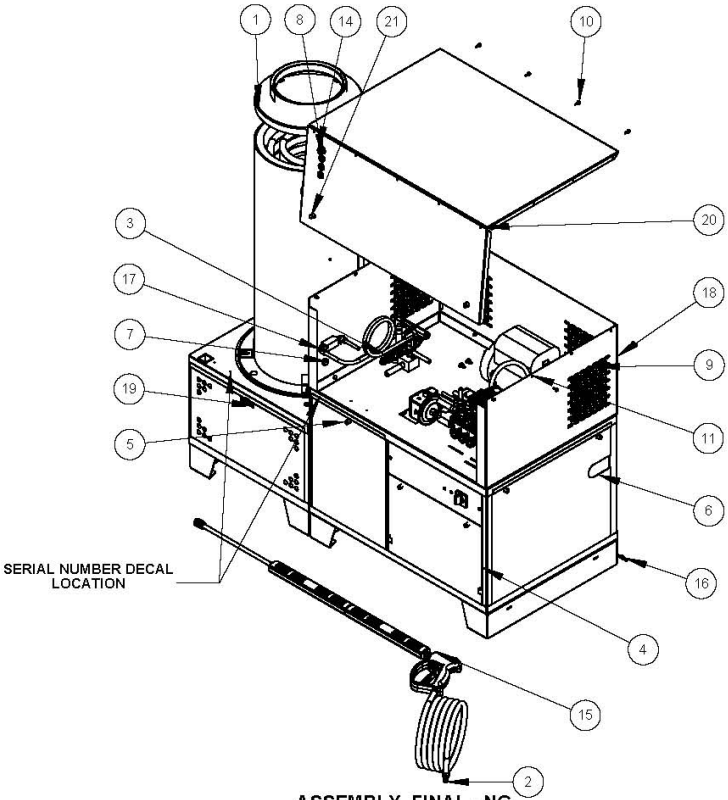
Pump Motor

Motor	P/N F02-00088-U
Motor Horsepower	5.0HP / 3.7 KW
Motor Speed	3450 RPM
Motor Voltage	208v / 230v 60 Hz 1PH

N. G. – 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.
Main Burner Orifice Size	#50 Drill – Pilot 0.020

LIQUID PROPANE L. P. – 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.
Main Burner Orifice Size	#60 DRILL – Pilot 0.014
Voltage	115V 60HZ 1PH

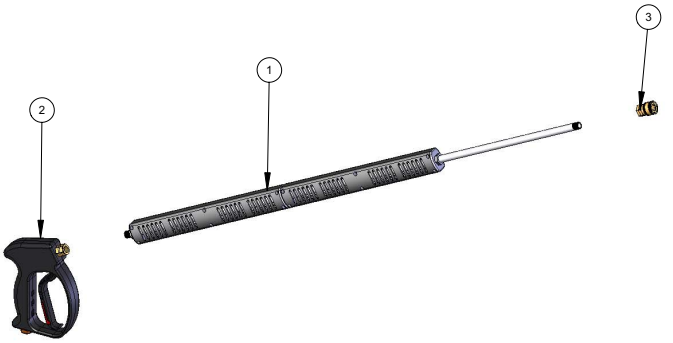
Final Assembly



ASSEMBLY, FINAL - NG
DS3-2400 ENG DS3-2400 ELP
01/07/2019

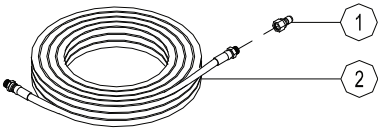
ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	2101-00210	ASSEMBLY, COIL TOP - 14" 9 7/8 STACK 8 3/4" HOLE	1
2	2102-00710	ASS'Y, HOSE - 3/8 X 50 100R1	1
3	4120-00902P	ASSEMBLY, CHEMICAL LINE	1
4	5301A-00186	CONTROL BOX DOOR WELDMENT	1
5	5301A-00187	WELDMENT,PANEL-DOOR	1
6	5301B-00184	WELDMENT,PANEL-DOOR, FLOAT TANK	1
7	F04-00420	BUSHING, INSULATION	1
8	F04-00451	GROMMET, RUBBER	4
9	H04-16423	SCREW, MACHINE 8-32UNC X 5/8	8
10	H04-19011	SCREW, SELF TAP	4
11	H06-16400	NUT,8/32UNC HEX ZINC	8
12	H09-12500	RIVET, POP	2
13	H09-15600	RIVET, POP	5
14	J00-15035-2	TIP, SPRAY - #15035	1
15	J06-00158-B	ASSEMBLY, GUN & WAND - 42"	1
16	S03-00350	PILOT LIGHTER	1
17	W02-00033	CLAMP, HOSE	1
18	W3241B-	ASSEMBLY, GENERAL	1
19	W40-00186	WELDMENT, PANEL-W/LATCHES	2
20	W5301-00152	WELDMENT,COVER	1
21	W5301-00184	WELDMENT,DOOR	1

Gun & Wand Assembly

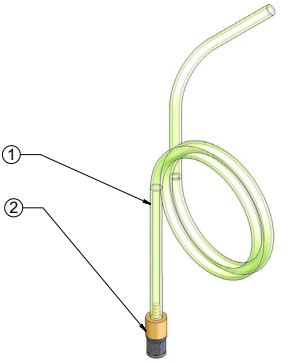


ASSEMBLY, GUN & WAND - 42"
p/n: J06-00158-B
6/2/2009

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	J06-00104E	ASSEMBLY, WAND - 42"	1
2	J06-00158	GUN, TRIGGER	1
3	W04-24225-A	COUPLER, 1/4F X 1/4FNPT	1



2102-00710 PART LIST		
ITEM	PART NUMBER	PART DESCRIPTION
1	W04-31231-B	Coupler, 3/8M X 3/8FNPT
2	K02-03150E5	Assembly, Hose – 3/8 X 50'



4120-00902P PART LIST		
ITEM	PART NUMBER	PART DESCRIPTION
1	C04-00131	Screen, Chemical
2	Z01-08413-2	Hose, Poly Braid – 84"

Trigger Gun

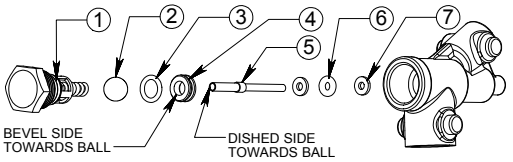
BREAKDOWN, GUN - TRIGGER

EXPLODED VIEW - P/N J06-00158

SPECIFICATIONS

MAXIMUM VOLUME.....10.0 GPM / 37.9 LPM
MAXIMUM PERSSURE.....5000 PSI / 344.7 BAR
RATED TEMPERATURE.....300 F / 150 C
WEIGHT.....1.8 LBS. / 0.8 KG
INLET.....3/8" NPT FEMALE
OUTLET.....1/4" NPT FEMALE

YG3500



KIT, REPAIR PART - NUMBER J06-99158C

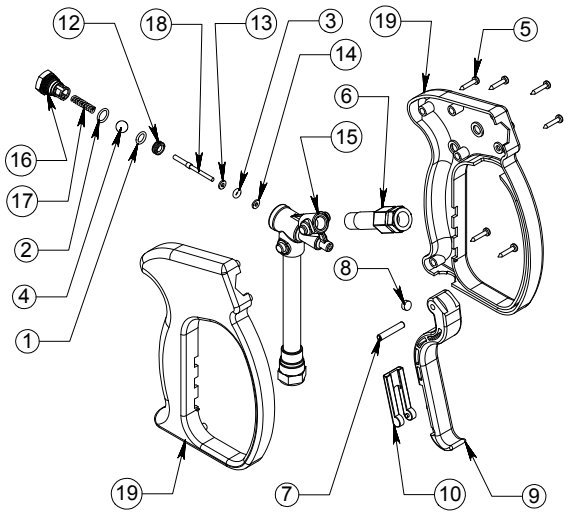
REPAIR INSTRUCTIONS

1. Remove screws from handles and remove handle housings.
2. With 18mm socket remove retainer being careful to catch the spring and ball as they fall out of the housing.
3. Remove and replace parts with those found in the kit.
4. Assembly in reverse order.

WARNING:
DO NOT USE ACID CONCENTRATES THROUGH THE GUN

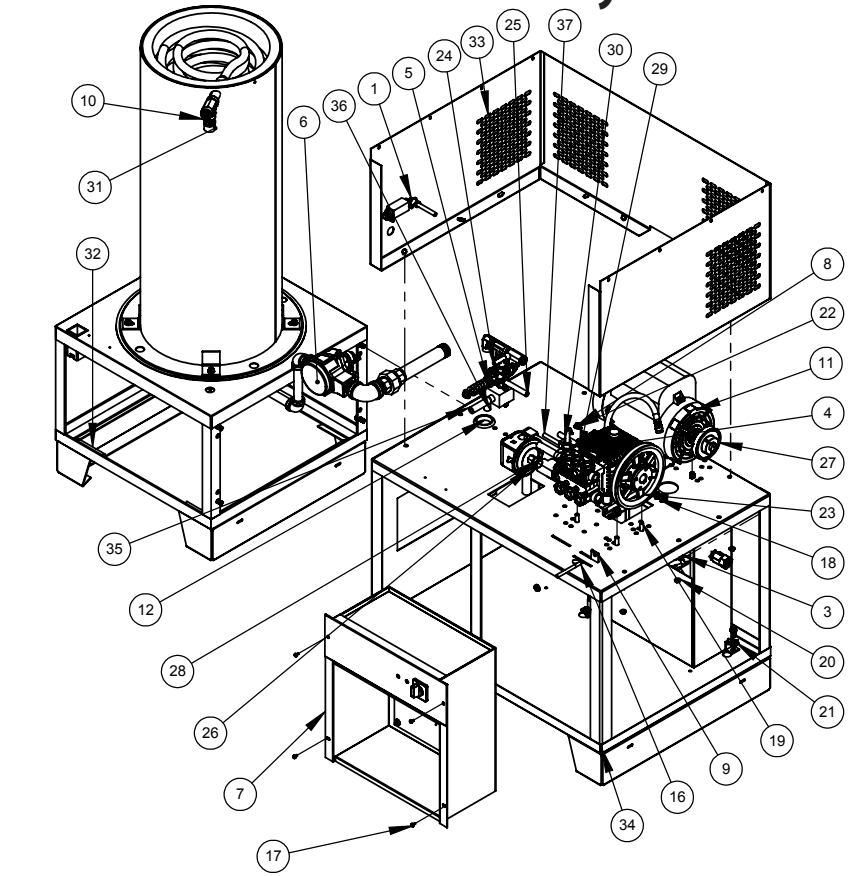
WARNING:
Never secure trigger gun in an open postion (trigger pulled back) by means other than the operator's hand. Bodily harm may occur if the operator loses control of the trigger gun.

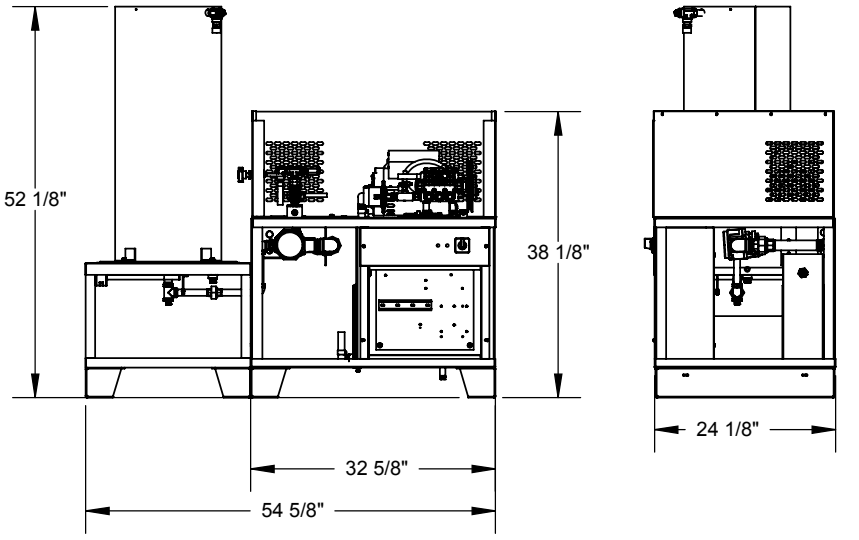
CAUTION:
Always engage trigger safety latch when not in use.



PART LISTS			
ITEM	***PART NUMBER***	***PART DESCRIPTION***	***QTY.***
1	C07-01300-08	O-RING - 1/16CS X 5/16ID	1
2	C07-01425	FILTER, WATER	1
3	J06-00121-07	O-RING - 3/32 CS X 1/8 ID	1
4	J06-00121-15	BALL, SS 5/16	1
5	J06-00132-19	SCREW, SELF TAP - 3.5MM X 18MM	7
6	J06-00158-01	FITTING, DISCHARGE - 1/4 FNPT	1
7	J06-00158-02	PIN, TRIGGER - 5MM X 27.5MM	1
8	J06-00158-03	CAM	1
9	J06-00158-04	TRIGGER	1
10	J06-00158-05	LATCH, SAFETY	1
11	J06-00158-06	FITTING, INLET - 3/8 FNPT	1
12	J06-00158-08A	SEAT, VALVE	1
13	J06-00158-09	WASHER, FLAT	1
14	J06-00158-10	WASHER, FLAT - BRASS	1
15	J06-00158-11	HOUSING, VALVE	1
16	J06-00158-12A	RETAINER, VALVE	1
17	J06-00158-13	SPRING, COMPRESSION	1
18	J06-00158-14	PIN, VALVE - 4MM X 44MM	1
19	J06-99158A	HOUSING, HANDLE	1

General Assembly





ASSEMBLY, GENERAL
W3241B-00620I
01/07/2019

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	10301-00520	ASSEMBLY, METERING VALVE	1
2	2161B-00523	ASSEMBLY, INLET - COIL	1
3	3111B-00121	ASSEMBLY, FLOAT TANK	1
4	3111B-00501G	ASSEMBLY, PUMP	1
5	33241B-00515	ASSEMBLY, UNLOADER	1
6	4301A-00405	ASSEMBLY, BURNER - NG	1
7	5181B-00326	ASSEMBLY,CONTROL-BOX	1
8	5301B-00256	BARACKET, BURNER PIPE	1
9	AA18-00109-P	BRACKET,ANGLE-1/8 x 1 1/4 x 1 1/4 x 1	1
10	E09-00004-2	PLUG, PIPE	1
11	F02-00088-U	MOTOR, ELECTRIC - 5 HP, UL, 208-230/1, 50 HZ, 3600 RPM, ODP	1
12	F04-00450	GROMMET	1
13	F04-00512	COVER, J-BOX - 4 X 4	1
14	F04-00615	TERM, SPLICE	2
15	H03-25007	BOLT, U - 1/4-20UNC	1
16	H03-31311	BOLT,J-5/16-18UNC x 3 1/2	1
17	H04-16400	SCREW,SELF TAP 8-32UNC	4
18	H04-31306	SCREW, CAP - 5/16 X 3/4	10
19	H04-37512	BOLT, HEX	4
20	H06-25003	NUT, HEX	10
21	H06-25006	NUT, TINNERMAN - 5/16	2
22	H06-31300	NUT, LOCK - 5/16"	14
23	H06-37500	NUT,LOCK-3/8-16UNC HEX	4
24	K31-01800	HOSE, WATER	1
25	K33-01300	HOSE, WATER - 3/8 X 13"	1
26	K60-02800	HOSE, WATER - 5/8 X 29"	1
27	R03-00234	PULLEY	1
28	W02-00031	CLAMP, HOSE	2
29	W02-00032	CLAMP, HOSE	2
30	W02-00033	CLAMP, HOSE	4
31	W04-34155-A	COUPLER, 3/8F X 1/2MNPT	1
32	W3181-00105	ASSEMBLY, CHASSIS - WH	1
33	W5301-00151	WELDMENT, MOTOR COMPARTMENT	1
34	W5301B-00130	WELDMENT,FRAME	1
35	K02-03225A2	ASSY,HOSE 3/8" x 25"	1
36	K02-03238A2	ASSY, HOSE 3/8" x 38"	1
37	Z01-02013-2	HOSE, POLYBRAID - 1/4 X 20"	1

Metering Valve

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

Minimum Flow ..... 0 - 20 GPH / 0 - 76 LPH
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.

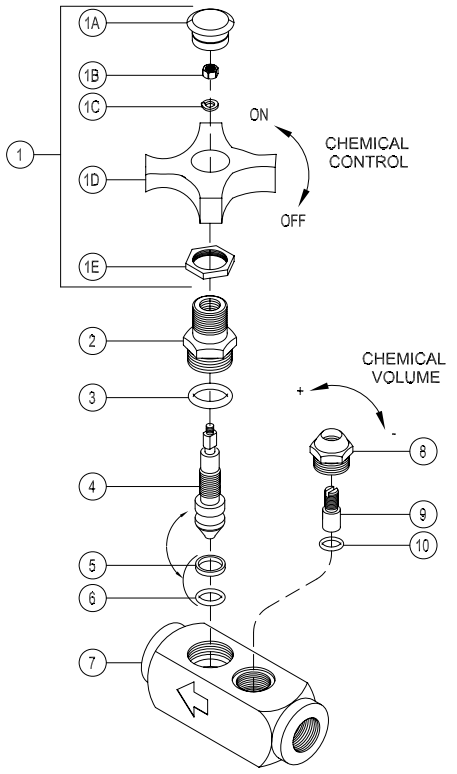
REMOVE FLOW ADJUSTING SCREW -

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

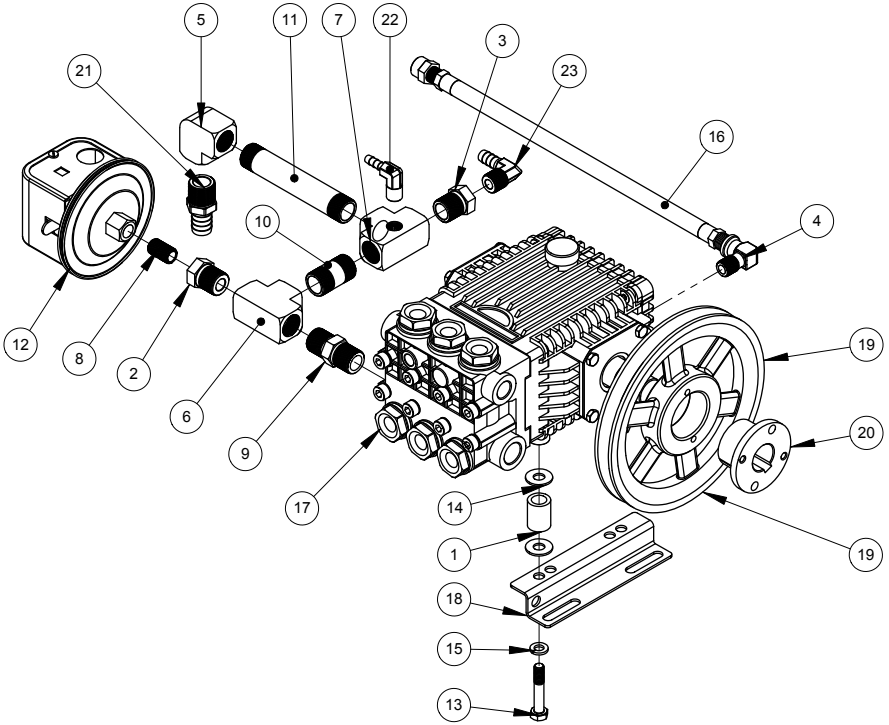
EXPLODED VIEW



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

Pump Assembly

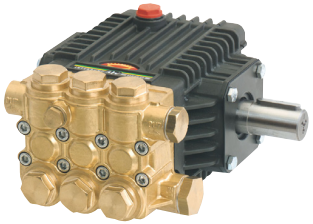


ASSEMBLY, PUMP
p/n: 3111B-00501G
06/25/2013

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	AP12-00102	PIPE, HRS	4
2	E04-00005-48	BUSHING, PIPE	1
3	E04-00006-48	BUSHING, PIPE	1
4	E08-00006-48	ELBOW, PIPE	1
5	E08-00016-4	ELBOW, 1/2FNPT	1
6	E10-00005-4	TEE, PIPE	1
7	E11-00012-4T	TEE, PIPE	1
8	E13-00010-2	NIPPLE, PIPE - 1/4"	1
9	E15-00010-58	NIPPLE, HEX	1
10	E15-00018-48	NIPPLE, BRASS 1/2"	1
11	E15-00045-2	NIPPLE, PIPE - GS	1
12	F04-00762	SWITCH, VACUUM	1
13	H04-31504	SCREW, CAP	4
14	H05-31300	WASHER, FLAT - 5/16	8
15	H05-31304	WASHER	4
16	K21-02214-1/4	ASSEMBLY, HOSE-OIL, DRAIN	1
17	N07-00179	PUMP, WATER - 3PGM @ 3000PSI	1
18	N16-50110216	MOUNT, PUMP	1
19	R03-00671	PULLEY, V	1
20	R04-00001	BUSHING, PULLEY	1
21	W02-10025-8	BARB, HOSE	1
22	W02-10031	BARB, HOSE	1
23	W02-10040-8	BARB, HOSE	1

Pump
Specifications
p/n N07-00179
Pump Specifications

Pump Model	N07-00179 TX1513S17
Maximum Volume (GPM)	3.0 GPM / 11.4 LPM
Max. Discharge Pressure (PSI)	3000 PSI / 207 Bar
Maximum Pump Speed (RPM)	1750
Bore	.591 in. / 15 mm.
Maximum Inlet Pressure	125 PSI
Maximum Inlet Vacuum	3 ft. water (2.6 in. Hg)
Crankcase Oil Capacity	14 ounces. / 0.414 liter
Crankshaft Rotation	Clockwise & Counterclockwise
Maximum Fluid Temperature	165˚F
Inlet Port Thread	1/2-14 BSPP-F
Discharge Port Thread	3/8-19 BSPP-F
Shaft Diameter	.945 in. / 24 mm
Weight	19 lbs. / 8.6 grams
Dimensions	8.4 in. x 8.3 in. x 4.8 in.



Pump Kits
Parts Packages – N07-00179

Part No.	Description	Item	Qty
N07-99123	Kit, Valve Assembly		
	Ass'y, check valve	36	6
	O-Ring	36A	6
N07-99124	Valve Plugs		
	Plug	38	6
	O-Ring	37	6
N07-99159	Kit, Crosshead Seals		
	Seal, Crosshead	45	3
N07-99160	Kit, V-Packing		
	Seal, Water – 15mm	26	3
	Packing, V – 15mm	28	3
N07-99166	Kit, Plunger Packing		
	Retainer, Seal–15mm	24	1
	O-Ring	25	1
	Seal, Water – 15mm	26	1
	Adapter – 15mm	27	1
	V-Packing – 15mm	28	1
N07-99165	Adapter, Female – 15mm		
	Adapter, Front	27	3
N07-99162	Seal Retainer – 15mm		
	Retainer, Seal	24	3

Oil Change

We recommend the first oil change after the first 50 hours, with the pump stopped and the oil still warm.
This change is not recommended because the oil has lost its properties, but rather to eliminate the impurities that have gotten into the oil during the running-in phase. If these impurities are not removed, but are allowed to remain in the oil, they may cause premature wear to the moving parts and the oil seals. After this initial change, the oil can then be changed every three months or 300 hours of operation thereafter.
Please note: If the pump works in conditions with high humidity and with sharp temperature changes, it is possible that condensation will appear inside the crankcase, which mixing with the oil can change its properties. This is easy to see because the oil changes to a white, milky color.
If the pump does not have excessive water leaking from the packings, and the oil becomes milky, the oil has to be changed more frequently.
The percentage of water in the oil must not exceed 20%.

Freezing Conditions / long Time Storage

1. Drain all of the water out of the pump.
2. Run a 50% solution of a RV or non-toxic/ biodegradable antifreeze through the pump.
3. Flush the pump with fresh water before the next use.
4. In freezing conditions failure to do this may cause internal pump damage.
5. For long periods of storage in non-freezing areas the solution will keep the seals and O-rings lubricated.

Pump Maintenance Record

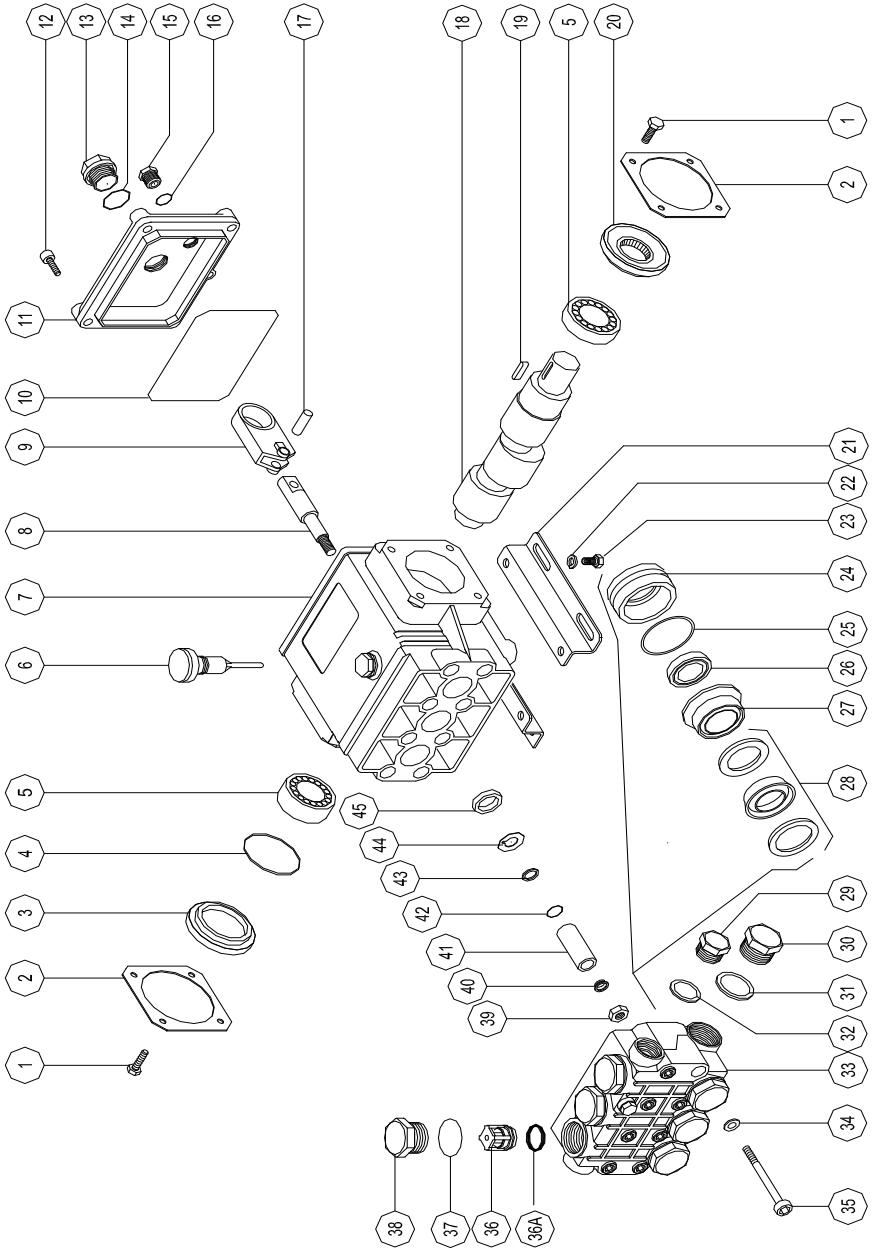
Oil Change

Month/Day/Year	Operating Hours	Oil Brand & Type

Pump Service

Month/Day/Year	Operating Hours	Type of Service

Exploded View



Pump Exploded View - N07-00179

Pump Parts List - N07-00179

Item	Part No.	Description
1	N07-20018	Screw, Cap
2	N07-20019	Retainer, Bearing
3	N07-40029	Cover, Crankshaft
4	N07-20021	O-Ring
5	N07-20022	Bearing, Roller
6	N07-20024	Dipstick, Oil
7	N07-98023	Crankcase
8	N07-98038	Crosshead
9	N07-98034	Rod, Connecting
10	N07-29026	O-Ring
11	N07-98026	Cover, Rear
12	N07-20027	Screw, Cap
13	N07-98029	Indicator, Oil Level
14	N07-80009	O-Ring
15	N07-20030	Plug, Pipe
16	N07-20028	O-Ring
17	N07-98032	Pin, Crosshead
17	N07-17931	Crankshaft
18	N07-98033	Key
19	N07-98045	Seal, Oil
20	N07-98026	Cover, Rear
21	N07-20046	Mount, Pump
22	N07-20047	Washer, Lock

Item	Part No.	Description
23	N07-20048	Screw, Cap
24	N07-82083	Retainer, Seal – 15mm
25	N07-98016	O-Ring
26	N07-82063	Seal, Low Press - 15mm
27	N07-99164	Adapter, Female – Front 15mm
28	N07-82084	Packing, V – High Press 15mm
29	N07-20049	Plug, Pipe
30	N07-20050	Plug, Pipe
31	N07-20051	Washer, Flat
32	N07-20011	Washer, Flat
33	N07-94001	Head, Pump – 15mm
34	N07-20003	Washer, Flat
35	N07-98002	Screw, Cap – 8mm x 65mm
36	N07-99123	Kit, Valve Assembly
36A	N07-20004	O-Ring
37	N07-20009	O-Ring
38	N07-47010	Plug, Pipe
39	N07-12056	Nut, Hex
40	N07-98085	Adapter, Plunger
41	N07-47040	Plunger – 15mm
42	N07-98028	O-Ring
43	F04-76509	Ring, Anti-Extrusion
44	N07-20039	Washer, Flinger – Copper
45	N07-99159	Kit, Crosshead Seals

Torque

Valve Plug (38)	73.7 ft lbs / 100 kg M
Mount to Crankcase (23)	14.7 ft lbs / 2.0 kg M
Rear Crankcase Cover to Crankcase (12)	7.3 ft lbs / 10 kg M
Bearing Retainer to Crankcase (1)	7.3 ft lbs / 10 kg M
Rear Crankcase Cover to Plug (15)	14.7 ft lbs / 2.0 kg M
Nut to Crosshead (39)	11.0 ft lbs / 15.0 kg M
Plug to Pump Head (29,30)	29.4 ft lbs / 40 kg M
*Head to Crankcase (35)	14.7 ft lbs / 2.0 kg M

*Note: When plunger nut is removed, install a new copper washer and flinger washer to ensure proper fit and seal of ceramic plunger. Each time the plunger screw is torqued, copper washers form to plunger. If same copper washers are reused cracking or a poor seal may result.

Kit N07-OIL CA

Kit N07-OIL CA-1

Kit N07-OIL CA-2

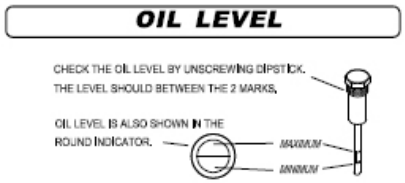
Accessories

Oil – Case (6) One Pint Bottles	p/n N07-OILCA
Oil – Bottle (1) One Pint Bottle	p/n N07-OILCA-1
Oil – Case (24) One Pint Bottles	p/n N07-OILCA-2

Pump Maintenance

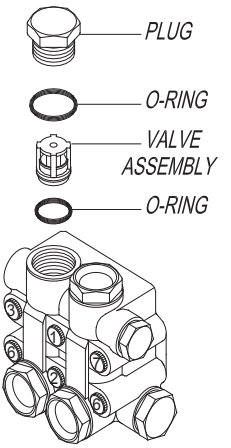
General

PACKING EXTRACTION KIT P/N Z09-00028
COMPLETE TOOL KIT P/N Z09-00021



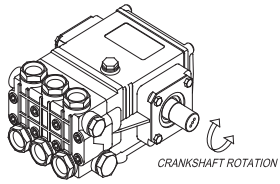
Valve Service

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 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, Removal, Installation

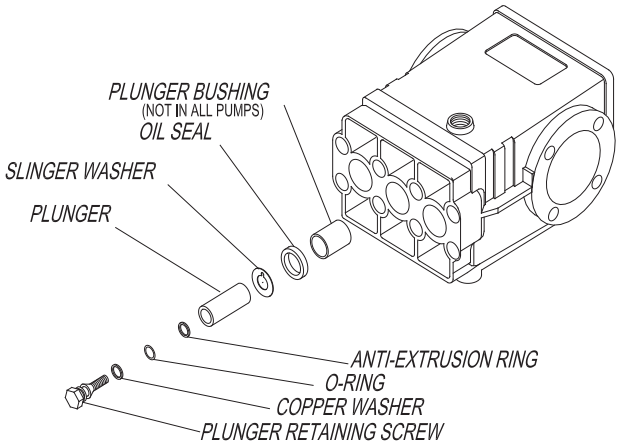
Plunger Service

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. When the plunger screw is removed, it is important to install a 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.

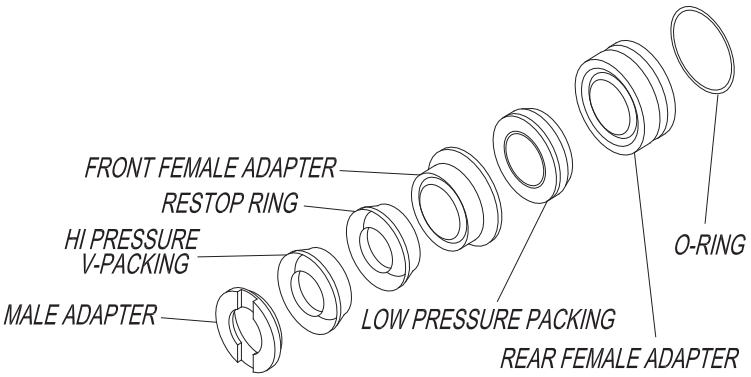


Plunger Installation

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

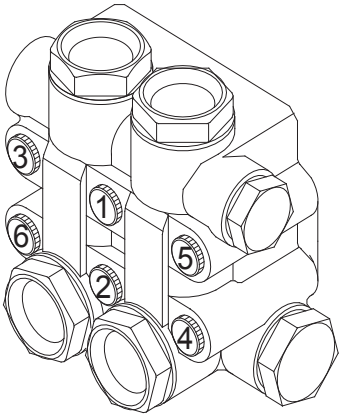
1. Remove the head per PUMP HEAD REMOVAL.
2. Remove any packings and female adapters left on the plungers by pulling them straight off. Insert proper packing extractor onto the extractor hammer. Insert packing extractor and tool through the packings and adapters remaining in the head. Tighten the hammer 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 it 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 tool of the appropriate size is recommended for this operation.
9. Install the re-stop 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 the 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 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.

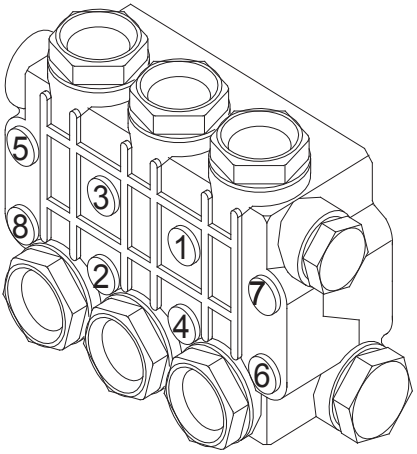


Head Installation - Torgue Sequence

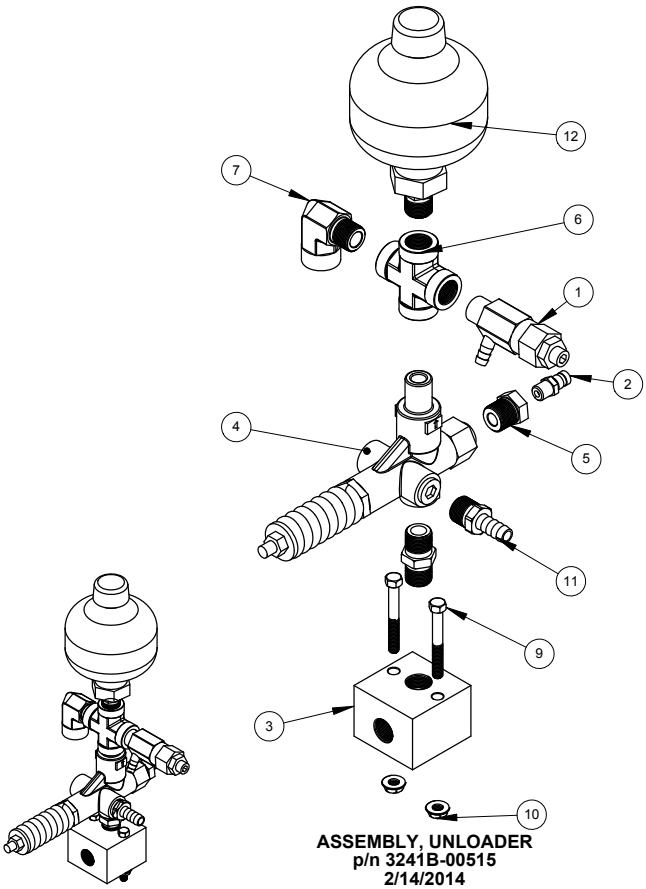
Head Installation

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.





Unloader Assembly



ASSEMBLY, UNLOADER
p/n 3241B-00515
2/14/2014
s/n 272369 & UP

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	C03-00509-45	VALVE, RELIEF - SS	1
2	C03-00810	VALVE, AIR	1
3	C07-00002-4	BLOCK, UNLOADER	1
4	C07-04504-MA	VALVE UNLOADER	1
5	E04-00002-58	BUSHING, PIPE	1
6	E07-00006-5	CROSS, PIPE - HIGH PRESSURE	1
7	E08-00006-5	ELBOW, PIPE	1
8	E14-00010-68	NIPPLE, HEX - 3/8MNPT	1
9	H04-25022	SCREW, CAP - 1/4UNC X 2	2
10	H06-25003	NUT, HEX	2
11	W02-10021-8	BARB, HOSE	1
12	Y01-00123	ACCUMULATOR	1

Relief Valve

WARNING: The relief valve has been factory set and is a field nonadjustable part. Please contact the factory before setting the valve and will void the manufacturer warranty.

If pressure from should exceed safe limits it will automatically open to relieve dangerous system pressure overloads which can harm equipment and can also be dangerous for the operator.

Caution: Inspect relief valve annually for any obstruction.

Valvua de alivio

ADVERTENCIA: La válvula de descarga ha sido ajustado de fábrica y es un campo no ajustable. Por favor, póngase en contacto con el fabricante antes de la válvula y se anulará la garantía del fabricante.

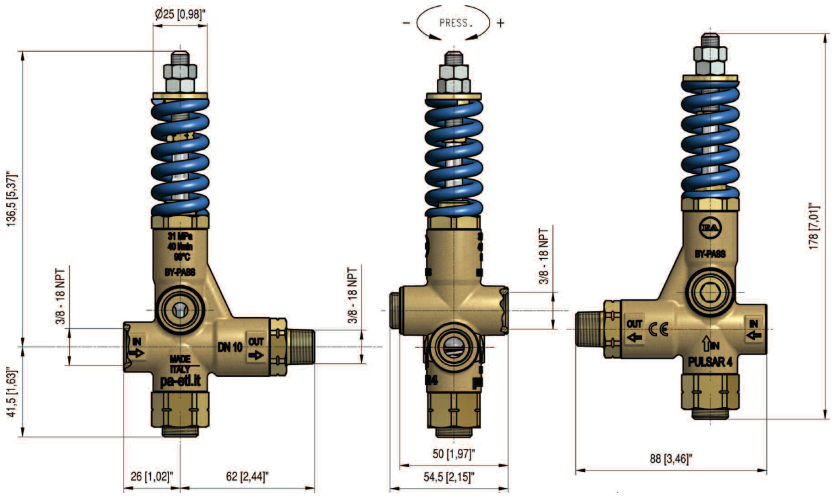
Si la presión de prueba debe superar límites, se abrirá automáticamente a aliviar sistema peligroso sobrecargas de presión que pueden dañar equipos y también puede ser peligroso para el operador.

Precaución: Inspeccionar la válvula de alivio al año para cualquier obstrucción.

Unloader
Specifications
p/n C07-04504M-A

Specifications

Maximum Flow	10.5 gal/m / 40L/m
Unloading Press	
Rated	4050 psi / 280 bar
Max	4500 psi / 310 bar
Maximum Temperature	195˚F / 88˚C
Weight	1.54 lbs / 700 G
Bypass	3/8 FNPT
Inlet	3/8 FNPT
Discharge	3/8 MNPT



Parts List
p/n C07-04504M-A

Item	Part Number	Description	Qty	Kit
1	C07-04504-11	Guide, Piston	1	
2	C07-04504-01	O-Ring	2	*
3	C07-04504-09	Piston – SS	1	
4	C07-04504-02	Ring, Back-Up	1	*
5	N07-20028	O-Ring	1	*
6	----------	Housing	1	
7	C07-04500A-05	Kit Seat & O-Ring	1	*
7A	C07-02300-08	O-Ring 1/16CS x 11/16OD	1	
9	C07-04500-03	Ball, SS-13/32	1	
10	C07-04504-03	Spring, 1.6x11x20MM	1	
11	C07-04504-04	Coupling, Inlet 3/8 NPT	1	
12	N16-28110084	Washer, Flat	2	
13	C07-04504-05	Plug-3/8NPT	2	
14	C07-04504-07	Ring, back-up	1	*
15	P04-00215	O-Ring, 1.78 x 6.07mm	1	*
16	C07-04504-08	O-Ring, 3 x 6mm	2	*
17	C07-04504-12	Valve, Check	1	
18	C07-01009A-18	Spring, Compression	1	
19	C07-04504-16	O-Ring, 1/16cs x 5/8	1	*
20	C07-04504M-10	Fitting, Outlet – 3/8”M	1	
21	C07-04504-14	Nut, Hex	2	
22	C07-04504-13	Follower, Spring	1	
23	C07-04504-15	Nut, Hex - Brass	1	
24	C07-04500-13	Spring, Comp. Blue	1	
	C07-9904504	**Kit, Repair - Parts Package**		*

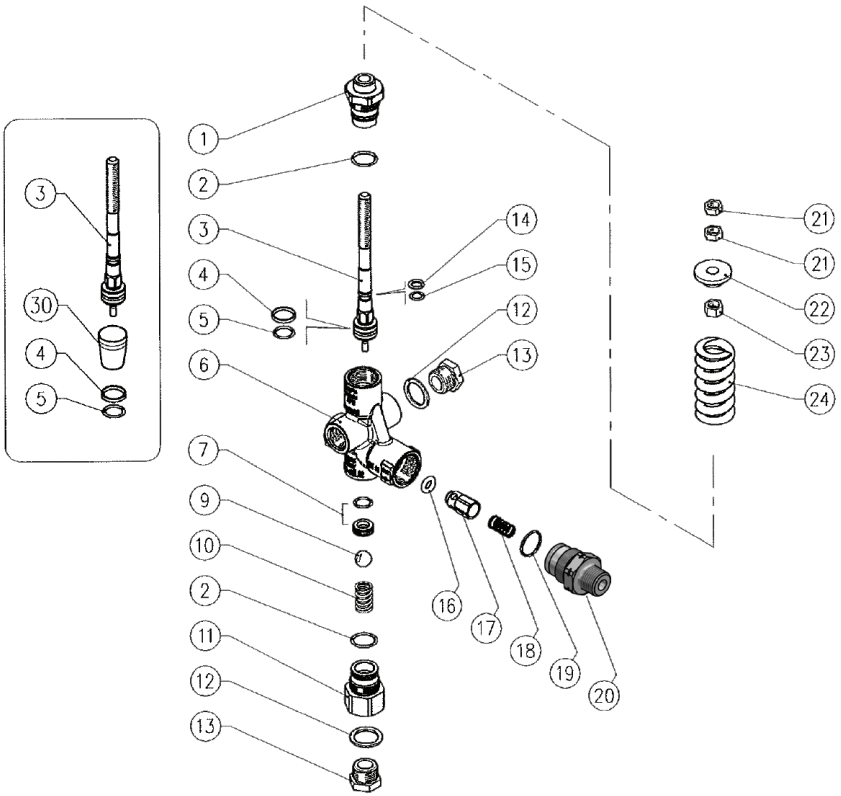
ATTENTION: the nut in position 21 is a mechanical security device that limits the maximum pressure; it must absolutely NOT be removed.

MAINTENANCE STANDARD: every 400 working hours, check and lubricate the seals with water resistant grease.

NOTE: CONVERTING
C07-04504-A to C07-04504M-A
Replace outlet fitting item #24 p/n C07-04500-17 with item #20 C07-04505M-10
NOTE: Outlet connection fittings will have to be changed.

Maintenance - Exploded View

p/n C07-04504M-A



UNLOADER PRESET AT FACTORY – DO NOT READJUST

Unloading Adjustment – Adjustment only after repair or replacement

1. Install an appropriate pressure gauge in pump head outlet. The gauge should have a range twice the operating pressure.
2. Install the spray nozzle in the end of the wand.
3. Ensure the relief valve is set properly.
4. Loosen top lock nut (upper Item 21) and turn the nut (lower Item 21) counter clockwise until minimum spring tension.
5. With machine turned on, open the trigger gun, start the pump, and observe pressure gauge reading. Slowly loosen the nut (lower Item 21) until pressure starts to drop on the gauge.
6. Tighten adjusting nut (lower Item 21) on the unloader. Pressure should start to increase. Tighten adjusting nut (lower Item 21) until pressure stops climbing.
7. 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.
8. Lock the setting by tightening the lock nut (upper Item 21).

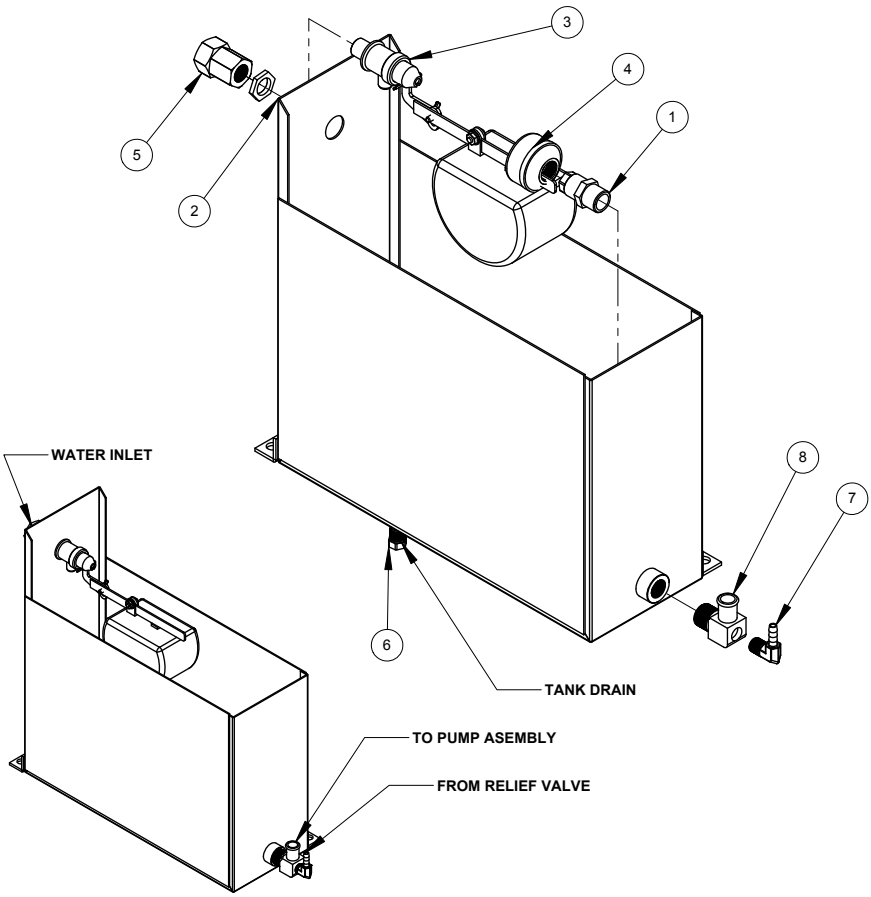
Trouble Shooting

p/n C07-04504M-A

Troubleshooting

Trouble	Possible Cause	Remedy
Frequent valve recycles	Damaged check valve O-ring	Remove and replace
	Leaking connections	Check or renew
	Restricted bypass or too small diameter of	Clean or adapt passage diameter
Valve does not reach pressure	Piston O-rings worn out	Remove and replace
	Debris between seat and shutter	Clean the seat
	Seat worn out	Remove and replace
	Nozzle worn out	Remove and replace
	Incorrect choice of nozzle	Fit with smaller nozzle
High pressure peaks at gun closure	There is not a minimum of 5% of total flow discharged in bypass	Reset Correctly
	Excessive flow in bypass	Change type of valve or adjust passages
	Adjustment with spring totally compressed	Loosen adjustment screw and eventually
Valve does not discharge at low pressure at gun closure	Jammed check valve	Jammed check valve
	Debris on check valve	Clean

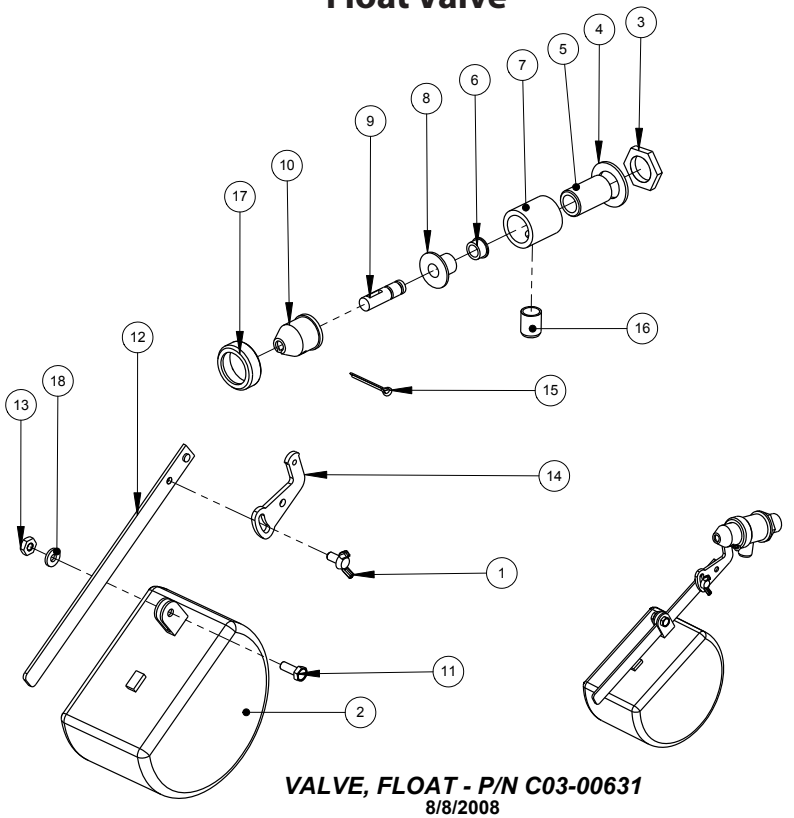
Float Tank Assembly



ASSEMBLY, FLOAT TANK
p/n 3111B-00121
8/8/2013

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	645-10542	ASS'Y, RESTRICTOR - 9/32" ORF	1
2	2161B-00120	TANK, FLOAT	1
3	C03-00631	FLOAT VALVE	1
4	C04-00120	FILTER, SOAP SCREEN	1
5	C05-00274	ADAPTER, GARDEN HOSE	1
6	E09-00002-P	PLUG, PIPE - NYLON	1
7	W02-10031	BARB, HOSE	1
8	W02-10057-8T	BARB, HOSE	1

Float Valve



VALVE, FLOAT - P/N C03-00631

8/8/2008

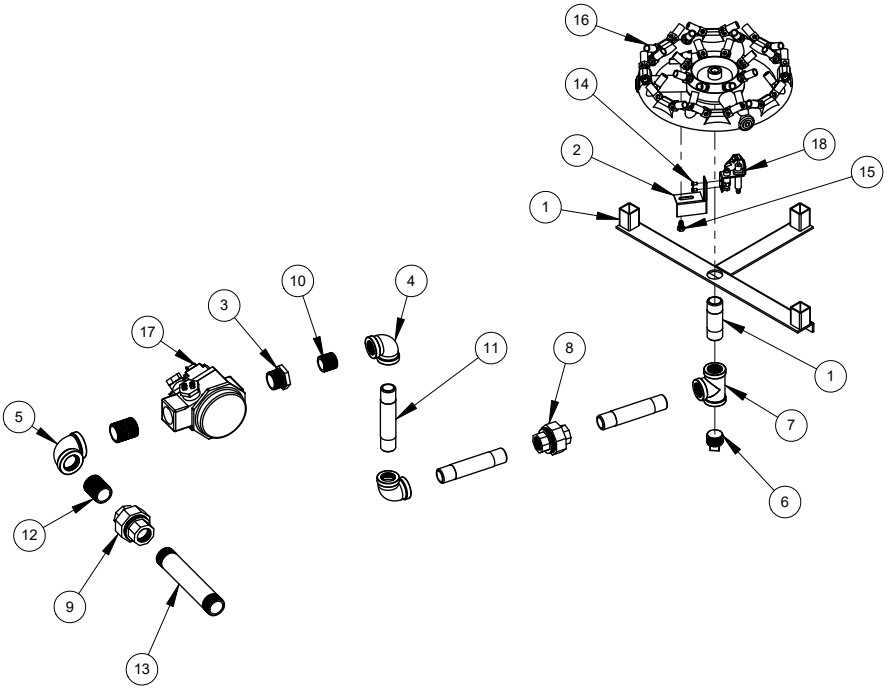
PARTS LIST

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	C03-00625-10	SCREW, WING - 10-32UNF	1
2	C03-00628	FLOAT, PLASTIC	1
3	C03-00631-01	NUT,HEX - 3/8FNPT	1
4	C03-00631-02	WASHER, FLAT - RUBBER	1
5	C03-00631-03	NIPPLE, BRASS - 3/8NPT	1
6	C03-00631-04	SEAT, VALVE-NYLON	1
7	C03-00631-05	HOUSING, VALVE	1
8	C03-00631-06	PISTON	1
9	C03-00631-07	ROD, PISTON-5/16CS X 1 1/4 PLASTIC	1
10	C03-00631-08	GUIDE, PISTON	1
11	C03-00631-10	SCREW, CAP	1
12	C03-00631-11	ARM, FLOAT	1
13	C03-00631-14	NUT, HEX - BRASS	1
14	C03-00631-16	LEVER - BRASS	1
15	C03-00631-17	KEY, COTTER	1
16	C03-00631-18	NIPPLE, TOE	1
17	C03-0631-09	NUT, RETAINER	1
18	H05-18700	WASHER, FLAT	1

SPECIFICATIONS

MAXIMUM VOLUME.....7 GPM / 26 LPM
MAXIMUM PRESSURE.....140 PSI / 10 BAR
MAXIMUM TEMPERATURE .....140˚ F/60˚ C
PORT SIZE - INLET.....3/8" NPT
DIMENSIONS...11.4 X 4.1 X 2.8 IN / 290 X 104 X 71MM
WEIGHT.....0.6 LB / 0.3 KG
HOUSING MATERIAL .....BRASS
O-RING MATERIAL.....BUNA-N

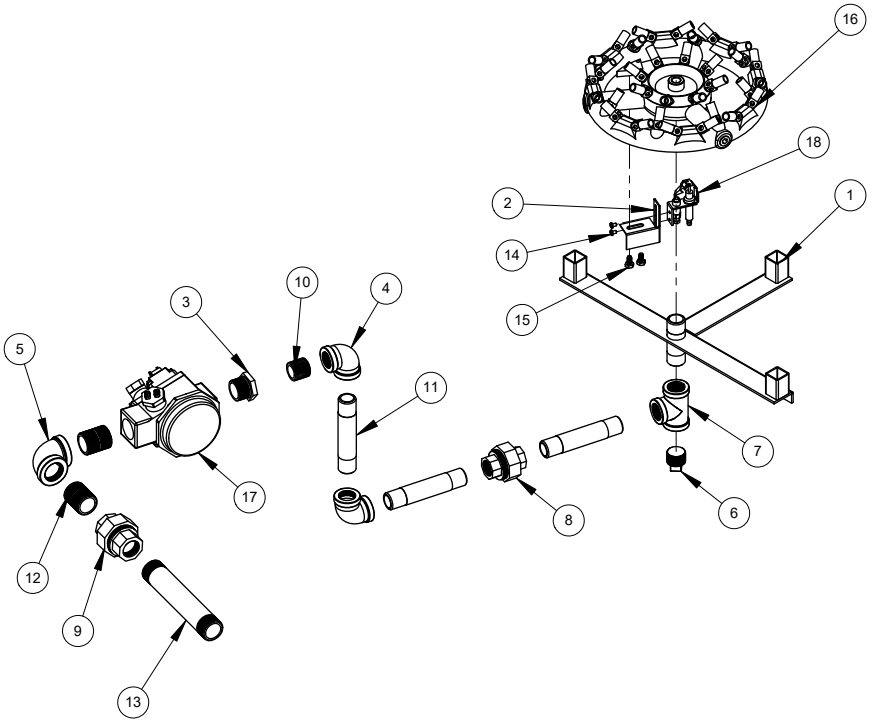
Burner Assembly - Natural Gas



ASS'Y, BURNER - EI NG 24V
p/n: 4301A-00405
4/4/2018

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	4121-00423A	SUPPORT, GAS BURNER	1
2	AS1600208NPB	BRACKET, MOUNT - PILOT (EI)	1
3	E04-00011	BUSHING, PIPE	1
4	E08-00019	ELBOW, PIPE 3/4" X 90 SCH 40 PS	2
5	E08-00020	ELBOW, PIPE 1FNPT X 90 SCH 40 PS	1
6	E09-00005	PLUG, PIPE	1
7	E10-00008	TEE, PIPE	1
8	E11-00004	UNION, PIPE	1
9	E11-00005	UNION, PIPE	1
10	E16-00010-1	NIPPLE, 3/4MNPT	1
11	E16-00050	NIPPLE,PIPE 3/4NPT X 5" SCH 40 PS	3
12	E17-00010	NIPPLE, 1MNPT	2
13	E17-00070	NIPPLE, 1MNPT	1
14	H04-19017	SCREW, MACHINE - 10-32UNF X 1/4 SLOTTED FLAT HEAD ZP	2
15	H04-25000	SCREW, CAP	1
16	S03-00120	BURNER, #X-11 N.G. w/32 .640 #50 ORIFICE 32 BRASS JETS	1
17	S03-00400	VALVE, NG, EI, (24 VAC) (1 X 1)	1
18	S03-00450	IGNITOR/SENSOR - EI	1

Burner Assembly - Liquid Propane



ASS'Y, BURNER - EI LP 24V
p/n: 4301A-00404
4/4/2018

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	4121-00423A	SUPPORT, GAS BURNER	1
2	AS1600208NPB	BRACKET, MOUNT - PILOT (EI)	1
3	E04-00011	BUSHING, PIPE	1
4	E08-00019	ELBOW, PIPE 3/4" X 90 SCH 40 PS	2
5	E08-00020	ELBOW, PIPE 1FNPT X 90 SCH 40 PS	1
6	E09-00005	PLUG, PIPE	1
7	E10-00008	TEE, PIPE	1
8	E11-00004	UNION, PIPE	1
9	E11-00005	UNION, PIPE	1
10	E16-00010-1	NIPPLE, 3/4MNPT	1
11	E16-00050	NIPPLE,PIPE 3/4NPT X 5" SCH 40 PS	3
12	E17-00010	NIPPLE, 1MNPT	2
13	E17-00070	NIPPLE, 1MNPT	1
14	H04-19017	SCREW, MACHINE - 10-32UNF X 1/4 SLOTTED FLAT HEAD ZP	2
15	H04-25000	SCREW, CAP	2
16	S03-00121	L.P. BURNER X-11 #60 ORFICE .640 BRASS 32 JET	1
17	S03-00400-LP	VALVE, LP, EI, (24 VAC) (1 X 1)	1
18	S03-00450	IGNITOR/SENSOR - EI	1

Gas Valve

Safety, General Information

GAS VALVE SERVICING - ELECTRONIC IGNITION
LIQUID PROPANE & NATURAL GAS VALVE

IMPORTANT SAFETY INSTRUCTIONS

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

FLAMME OUVERTE. Ne pas fonctionner cette machine dans un secteur avec les matériels combustibles. Un extincteur d'incendie convenable doit être disponible dans l'opération de secteur.

ADVERTENCIA: LLAMA ABIERTA. No funcione esta máquina en un área con los materiales combustibles. Un extintor conveniente debe estar disponible en área defuncionamiento.

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 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 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 ofvaporized 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.

02-12-07 Z08-00163I

GENERAL OPERTION

Should the pilot flame extinguish (due to an interruption in gas supply, a power failure, or other factors, some environmental, some installation related), the control module loses the pilot justification and stops the flow of gas to the main burner. The igniter will commence an automatic recycling of the pilot until the switch is turned to OFF. In propane models, a "lockout" control module is used. The lockout feature shuts off all gas at the valve should pilot ignition fail to occur after a period of 60 seconds. After 60 seconds, there is a 5 minute delay, before the next ignition period commences (purge time). After three unsuccessful tries, the system goes into lockout and must be manually reset before commencing another ignition cycle.
In all cases, when the switch is turned to OFF, all gas will cease flowing to both the main and pilot burners.

LEAK TEST

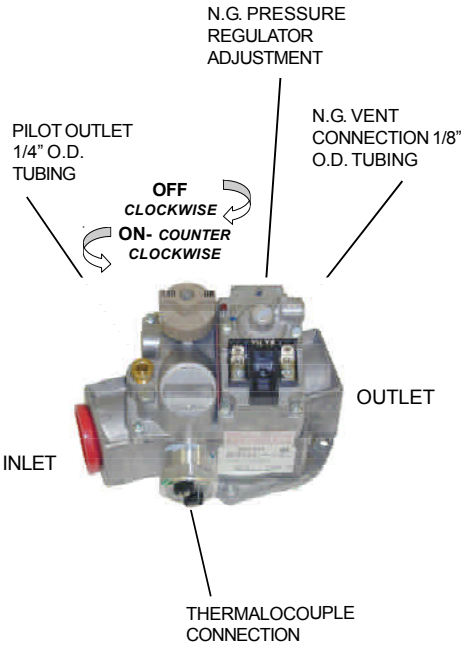
1. Use soapy water or leak detecting solution (never a match or open flames) when checking for leaks.
2. Apply the water or solution over the connections and observe carefully to see if bubbles expand, indicating a leak is present. A large leak can blow the solution away before the bubbles have a chance 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.

AUTOMAICALLY LIGHTED PILOT START-UP

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. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
5. Turn gas knob to "ON" position. **Counter-clockwise**
6. Set thermostat desired temperature setting.
7. If the appliance will not operate, follow the instructions. "To Turn Off Gas To Appliance" and call your service technichian or gas supplier.

SHUT-OFF

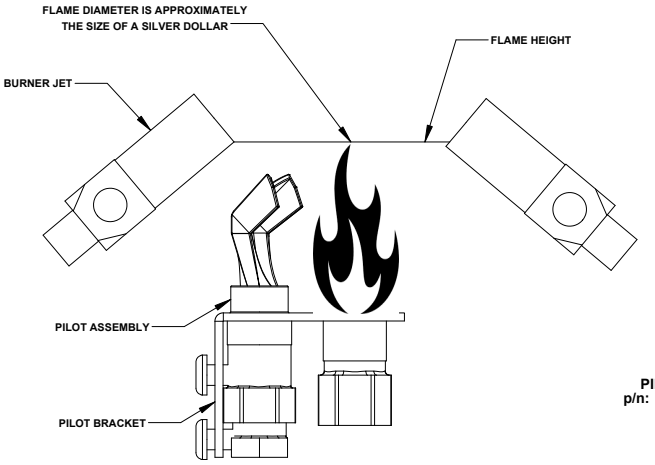
1. Set the thermostat at the lowest setting.
2. Turn off all the electrical power to the aplliance if service is to be performed.
3. Turn gas contol knob **Clockwise**



02-12-07 Z08-00164I

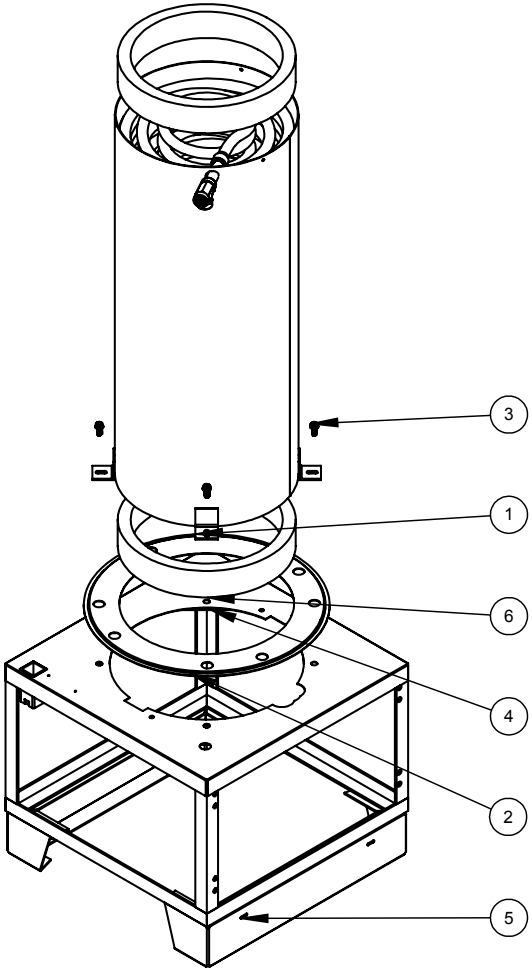
Electronic Ignition Troubleshooting

Trouble	Possible Cause	Remedy
Spark present but **No gas** - Water Heater Lock Out	Gas pressure incorrect	Set fuel pressure at N.G. 7.5" W.C. MIN/ 9"MAX L.P. 10" W.C. MIN/ 14"MAX.
	Low voltage	Correct power supply- 10.5 VDC minimum
	Blocked main burner tube	Clean burner tube
	Blocked main burner orifice	Clean or replace orifice
	Loose wires on valve	Secure wire connections
	Loose valve wire on wiring harness	Repair wire on edge connector or repair wiring circuit board harness
	Defective valve	Replace valve
	Defective circuit board	Replace circuit board
	Defective solenoid valve	Replace coils or solenoid valve
	No gas to solenoid valve	Correct gas supply
	Dirty connector on circuit board	Clean edge connector
Gas present but **No spark**- Water Heater Lock Out	High tension lead wire loose	Secure wire connection on circuit board
	Electrodes loosely attached to main burner	Secure electrodes to main burner
	Dirty electrodes	Clean electrodes
	Wires loose in electrode porcelain	Replace electrode
	Cracked porcelain on electrode	Replace electrodes
	Defective circuit board	Replace circuit board



PILOT SETTING
p/n: PILOT SETTING
8/10/2018

Coil Assembly



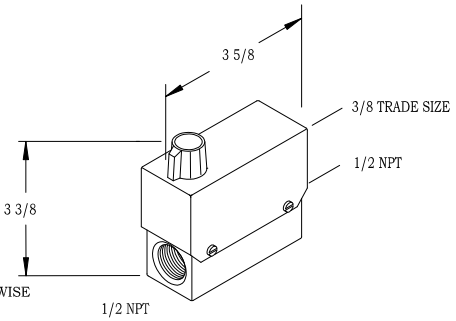
ASSEMBLY, CHASSIS - WH
W3181-00105
11/25/2008

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	20-200-2-3	WELDMENT, COIL - 14", SCH80	1
2	AS16-01925-PCB	ADAPTER,. COIL	1
3	H04-31306	SCREW, CAP - 5/16 X 3/4	4
4	H06-31301	NUT, LOCK - 5/16 - 18UNC	4
5	W4000-00138	WELDMENT, BASE- WATER HEATER	1
6	Z01-05043	INSULATION, CERAMIC FIBER	2

Temperature Control
Specifications, Temperature Range Adjustment

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)

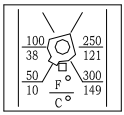


FIGURE 1

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)

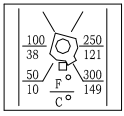


FIGURE 2

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.

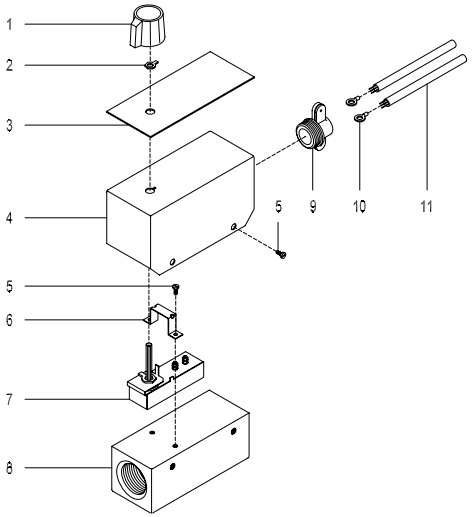
ACCESSORIES

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

Parts List

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			

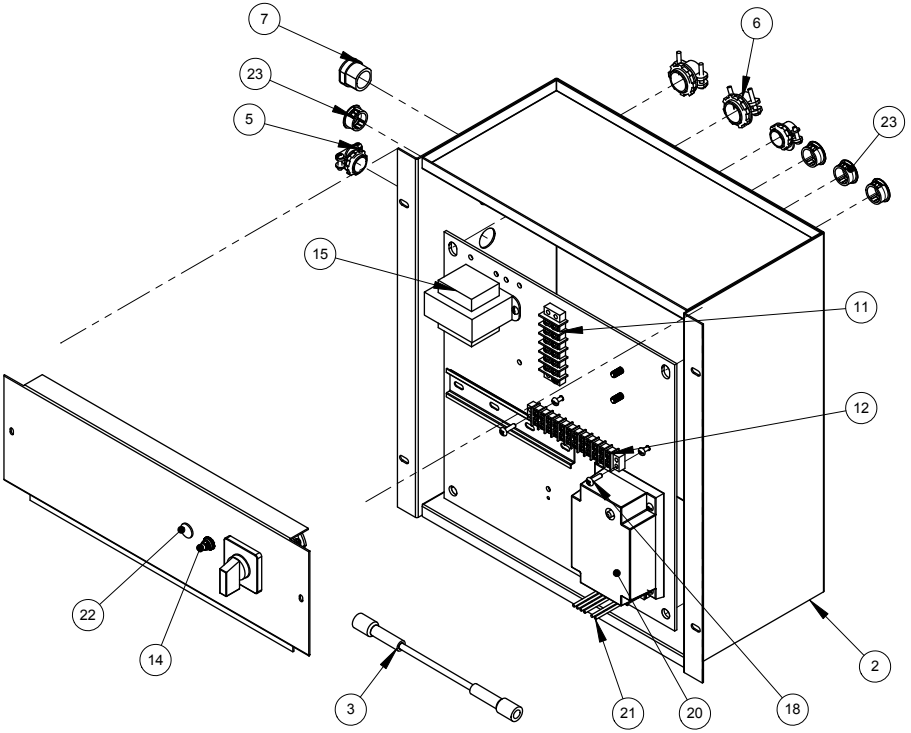
SWITCH REPLACEMENT

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.

Control Panel Assembly

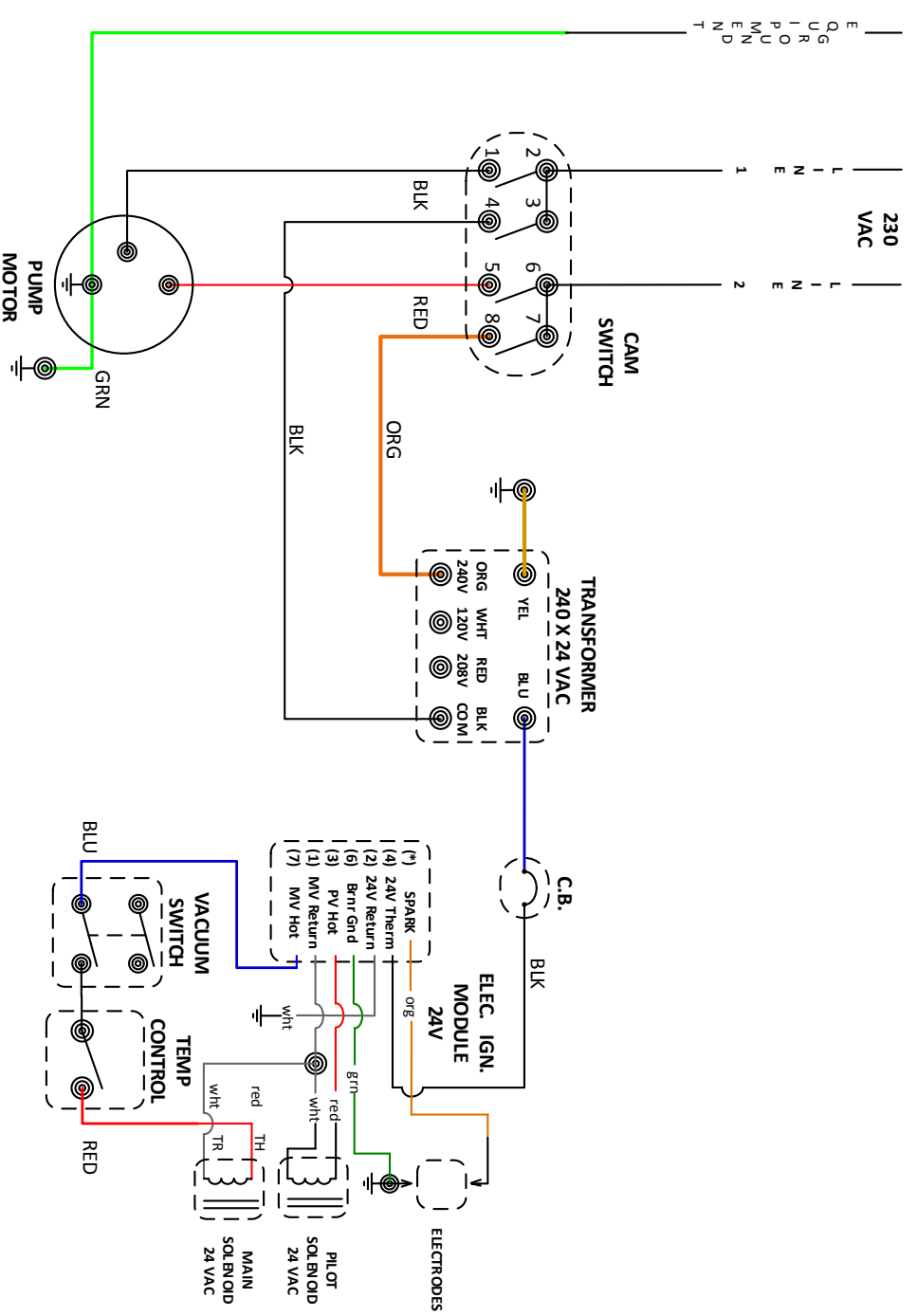


ASSEMBLY, WIRING
p/n 5181B-00326
1/7/2019

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
1	5301A-00301	WELDMENT, PANEL - CONTROL	1
2	5301A-00321	WELDMENT, CONTROL BOX	1
3	5301A-00445A	ASSEMBLY,WIRE-IGNITION	1
4	AS1601724NPB	PANEL, FRONT - CONTROL BOX	1
5	F04-00310	CONNECTOR, CONDUIT	2
6	F04-00311	CONNECTOR, CONDUIT - 3/4" 0.68 - 0.80	2
7	F04-00413	BUSHING, STRAIN RELIEF .60/.69 HOLE	1
8	F04-00601	TERM, FORK - #8 WIRE #10 NON-INSUL	6
9	F04-00612	TERMINAL,RING-16-14 WIRE	4
10	F04-00615	TERM, SPLICE	4
11	F04-00634	TERMINAL, BLOCK - 6 POLE	1
12	F04-00635	TERMINAL, BLOCK - 12 POLE	1

ITEM NO.	PART NUMBER	PART DESCRIPTION	QTY.
13	F04-00743B	SWITCH, CAM - 35AMPS, 2 POLE	1
14	F05-10030	BREAKER, CIRCUIT	1
15	F06-00053	TRANSFORMER	1
16	H04-16401	SCREW, MACHINE - 8-32 X 5/8	7
17	H04-16416	SCREW, MACHINE - 8-32 X 3/8	2
18	H04-16423	SCREW, MACHINE 8-32UNC X 5/8	2
19	H06-25003	NUT, HEX	4
20	S03-00460	MODULE CONTROL - IGNITION	1
21	S03-00461	IGNITION CONTROL WIRE HARNESS	1
22	Z01-00085	CAP, PLASTIC - 3/8"	1
23	Z01-00161	PLUG, DOMED	4

Electrical Schematic



Trouble Shooting
Pump

Trouble	Possible Cause	Remedy
Oil leaking in the area of water pump crankshaft	Worn crankshaft seal, bad bearing, grooved shaft, or failure of retainer o-ring.	Remove and replace.
Excessive play on crankshaft	Defective bearings.	See “Worn bearing.”
	Excess shims.	Set up crankshaft.
Loud knocking in pump	Loose connecting rod screws.	Tighten connecting rod screws per PUMP SPECIFICATIONS
	Worn connecting rod.	Replace connecting rod per PUMP MAINTENANCE.
	Worn bearings.	Replace bearings per PUMP MAINTENANCE.
	Loose plunger bushing screw.	Tighten plunger screw per PUMP SPECIFICATIONS.
Oil leaking at the rear portion of the pump	Damaged or improperly installed oil gauge window gasket or rear cover.	Replace gasket or o-ring.
	Oil gauge loosed.	Tighten oil gauge.
	Rear cover screws loose.	Tighten rear screws to torque values in PUMP SPECIFICATIONS.
	Pump overfilled with oil, displaced through crankcase breather hole in oil cap/dipstick.	Drain oil. Refill to recommended oil level as stated in OIL LEVEL in PUMP MAINTENANCE.
Water in crankcase	May be caused by humid air condensing into water inside.	Maintain or step up lubrication schedule.
	Worn or damaged plunger screw o-ring.	Remove and replace. See PLUNGER SERVICE in PUMP MAINTENANCE.
Worn bearing	Excessive belt tension.	See BELT TENSION in MACHINE MAINTENANCE.
	Oil contamination.	Check oil type and change intervals per PUMP SPECIFICATIONS.
Short bearing life	Excessive belt tension.	See BELT TENSION in MACHINE MAINTENANCE.
	Misalignment between pump and motor.	Re-align pump and motor.
	Oil has not been changed on regular basis.	Check oil type and change intervals per PUMP SPECIFICATIONS.
Short seal life	Damaged plunger bushing.	Replace plunger bushing.
	Worn connecting rod.	Replace connecting rod.
	Excess pressure beyond the pump’s maximum rating.	Match pressure stated in PUMP SPECIFICATIONS.
	High water temperature.	Lower water temperature stated in PUMP SPECIFICATIONS.

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

Excessive vibration	Dirty or worn check valves	See “Dirty or worn check valves.”
Scored plungers	Abrasive material in fluid being pumped.	Install proper filtration on pump inlet plumbing.
Fitted plungers	Cavitation.	Decrease inlet water temperature and/or increase inlet water pressure.
Cavitation	High inlet fluid temperature, low inlet pressure.	Lower inlet fluid temperature and raise inlet fluid pressure.

Water Heater

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

Warranty

WARRANTY POLICY

Machines are guaranteed to be free from defects in material or workmanship under normal use and service for a period of 90 days after day of sale. Any part that is determined to be a warranty will be repaired or replaced at NO CHARGE provided the warranty registration card is filled out in its entirety and the part is sent back freight prepaid. Any replacement parts accepted, as warranty will be returned to you freight prepaid.

Engines and pumps used on the equipment will be subject to the manufacturer's guarantee or warranty. We will assist you in locating warranty stations around the county in cases where that is necessary.

The warranty covers the repair, replacement or credit of defective parts only and does not allow for field labor charges for removal, installation, analysis, or travel expenses.

Our heating coil carries a 2 year warranty. The coil will be repaired or replaced without charge for 2 years after delivery date from the factory for any defect in the coil that was caused by workmanship or defective steel.

Warranty does not apply to any freezing damage, freight damage, damage caused by misuse or misapplication, normal wear, chemical related failures, contaminated filters and screens, moisture related fuel pump failures, stuck check valves, pump packing or seals, nozzles, or orifices, paint, hoses, and gauges. It is impossible to list every exception, so others may arise.

For full warranty information, contact your delivering distributor or contact the manufacturer at info@warrantysvc.com