

POWER MOTION

MAKE PRECISION UNSTOPPABLE



POWER MOTION

HIGH PRESSURE WASHER W120

OPERATING MANUAL

CONTENTS

1. SAFETY INFORMATION

1.1 General Safety Precautions

1.2 Specific Safety Hazards and Precautions

2. SETUP

2.1 Inspection for Freight Damage

2.2 Inspection of Oil Levels

2.3 Water Supply and Quality

2.4 Supply Hose and Purging of Air

2.5 Pump Oil Levels

2.6 Routine Inspection of Filters, Hoses and Fittings

2.7 Unloader Valve

2.8 Hoses and Couplers

3. OPERATING GUIDELINES

4. NOZZLES

4.1 Nozzle Selection Guide

4.2 Standard Spray Nozzle Applications

5. EQUIPMENT

5.1 Diagram of Main Components

5.2 Connection Guide

5.3 Technical Data

6. SHUTDOWN

6.1 Storage

6.2 Damage Prevention

6.3 Care and Maintenance

7. PARTS AND ASSEMBLY

8. MALFUNCTIONS

1. SAFETY INFORMATION

Please read the following important information carefully.

The following symbols indicate specific types of safety hazards.



Indicates a potential hazard that may cause serious injury to the operator or loss of life.



Indicates a potential hazard that may cause minor injury to the operator or to the equipment.



Indicates important information.



WARNING

This unit is capable of extremely high spraying pressures that can cause serious and/or minor injury by injection and extensive damage to property.



IMPORTANT

All replacement parts and accessories should **ONLY** be purchased from an authorised distributor of POWERMOTION equipment. Servicing should **ONLY** be carried out an authorised distributor of POWERMOTION equipment. If these conditions are not met, the operator assumes all liability for injury and property damage arising from the use of this unit.

1.1 GENERAL SAFETY PRECAUTIONS

✗ NEVER

- use the spray gun without the safety guard in place
- operate faulty units or use faulty accessories
- attempt to repair a damaged hose
- leave this equipment unattended
- move the unit when it is running
- spray outside on windy days

✓ ALWAYS

- ensure that this unit is properly earthed
- ensure that the power cord, air hose and spray hoses are optimally routed to minimise slip, trip and fall hazards
- immediately and thoroughly clean up all material and solvent spills to prevent slip hazards
- follow the material manufacturer's instructions for safe handling of coating materials
- unplug the cord from the outlet before cleaning, maintaining or repairing this unit
- keep the power cord plug in sight during use to prevent accidental shutdowns and startups
- wear ear protection to protect against possible hearing loss from the noise produced by this unit, which can exceed 85 dB(A)
- dress safely in long pants and wear boots or shoes. Other protective equipment is advisable when using chemicals, cleaning detergents or other corrosive or abrasive substances.
- keep this unit out of reach of children, unqualified adults and animals. A minimum distance of 15.35 metres (50 feet) is recommended.
- comply with local codes regarding ventilation, fire prevention, and operation
- operate this unit if you have consumed alcohol or taken medication
- spray directly at glass or fragile objects
- exercise extreme caution after turning off your high pressure washer and water supply, as there is still high-pressure water trapped in the system. You must release the pressure by triggering the gun after the engine/motor has completely stopped.
- know what chemicals you are using and read the manufacturers' precautions

1.2 SPECIFIC SAFETY HAZARDS AND PRECAUTIONS

SAFETY HAZARD: INJECTION INJURY



WARNING

This equipment produces a high-pressure stream that can pierce the skin and subcutaneous tissues, resulting in severe injury and even possible amputation.



IMPORTANT

The maximum operating range of the unit is 120 bar (1740 PSI) fluid pressure.

SAFETY PRECAUTIONS TO PREVENT INJECTION INJURY

✗ NEVER

- put your fingers, hands or any other parts of your body into the spray jet
- point the spray gun at yourself or anyone else (including animals)
- allow the fluid stream to come into contact with any part of your body
- allow any leak in the fluid hose to come into contact with any part of your body
- put your hand in front of the gun

NOTE: Gloves do not provide full protection against injection injury.

- put your fingers, hands or any other parts of your body into the spray jet

✓ ALWAYS

- ensure that the gun trigger is locked, the fluid pump is shut off, and all pressure is released before servicing, cleaning the nozzle holder, changing spray tip, or leaving the unit unattended

- ensure that the nozzle holder remains in place during spraying
- remove the spray tip before flushing or cleaning the system
- carefully check the paint hose for leaks before each use, as even small leaks can cause injection injury
- ensure that all accessories, including but not limited to spray tips, guns, extensions and hose, are rated at or above the maximum operating pressure



IMPORTANT MEDICAL INFORMATION

Injection injury is a traumatic injury that requires immediate medical attention. Any laceration of the skin, no matter how minor it seems, should not be treated as a simple cut. Fully inform the medical team about the coatings or solvents involved, as some coatings are toxic when injected directly into the bloodstream. For serious injuries, a plastic surgeon or reconstructive hand surgeon should be consulted.

SAFETY HAZARD: EXPLOSIONS, FIRE AND BURNS



WARNING

Solvent and paint fumes may be explosive and/or flammable. In the event of explosion or ignition, serious injury and/or property damage can occur.

SAFETY PRECAUTIONS TO PREVENT EXPLOSIONS AND FIRE

✗ NEVER

- smoke while operating this unit, or in the vicinity of its operation
- fill the with gasoline when the engine is running, hot or near an open flame
- run power washers in an enclosed area. Exhaust fumes contain poisonous carbon monoxide gas. Breathing exhaust gases can cause serious illness or death.
- touch or come in contact with hot mufflers, cylinders, cooling fins or hot exhaust gases as this may result in severe burns
- tamper with governor spring, governor links or other components which may increase the speed (RPM) of the engine operate pressure cleaners in the presence of flammable vapours or gases. When servicing pressure cleaning equipment, be sure to properly dispose of any flammable materials.
- make adjustments to your equipment without first removing the spark plug
- use an extension cord other than the factory-supplied Botuolini

✓ ALWAYS

- use a circuit dedicated only to this unit
- ensure that the circuit is installed by a licensed electrician and checked to supply adequate voltage under load (Voltage/Phase/Hertz). If the distance from the panel is too long, the wire size is too small or the voltage is initially too low, this will cause the GFCI or Thermal overload to trip.
- plug your cord into the receptacle

2. SETUP

Please read the following important information carefully.

2.1 INSPECTION FOR FREIGHT DAMAGE

When you receive your commercial pressure washer:

- check for signs of concealed freight damage
- report any damage to the delivering carrier

2.2 INSPECTION OF OIL LEVELS

Check all oil levels in the pump or engine (if applicable).

NOTE: Failure to check all levels could result in pressure washer damage. Most pumps are shipped with oil from factory and the crankcases are sealed. You may have to remove a shipping plug and install a dipstick in the pump. Oil type is stated on the pump breakdown and in the engine manual.

2.3 WATER SUPPLY AND QUALITY

Your water supply must provide water to the equipment that exceeds the Gallon Per Minute (GPM) rate of your machine.

To check your GPM:

- use a 5-gallon bucket and a timer
- if your machine is 5 GPM or less and the bucket fills in less than a minute you have adequate supply

NOTE: Some water supply systems are affected by factors such as washing machines, livestock watering systems and flushing of toilets. Be sure the supply is still adequate when these operations are taking place. The water temperature cannot exceed 50 and the pressure should not exceed 3 bar / 47 PSI.



IMPORTANT INFORMATION

Never let your pump run dry. Failure to secure adequate water supply to your commercial pressure washer will result in pump damage.



IMPORTANT INFORMATION

Ensure that no sand or scale particles are present in the water supply. Failure to do so will result in clogged filters and damage to the unit.

NOTE: Your water should not contain particles larger than 80 microns. Although there are small filters in the unit, they can only filter poor quality water for a short period of time before they clog.

2.4 SUPPLY HOSE AND PURGING OF AIR

Hook a garden hose from the faucet to the unit, making sure to check the inlet water filter or screen.

This hose should be a least 5/8" diameter and a length at least 15 feet. This hose length helps isolate the water supply from pulsations from the pump.

NOTE: Many states/regions require a Vacuum Break or back flow preventor to be installed at the faucet, before the garden hose, to ensure the water source cannot be contaminated. Be sure to check local and state regulations upon installation.

To purge any air in the hose:

- turn on the water supply and open the spray gun
- look for water leaks and stop any leaks found

NOTE: Leaks can cause erratic pump behaviour.

2.5 PUMP OIL LEVELS

Prior to turning on the power switch or starting the engine, check the oil level in the pump. When turning on the power switch, pull spray gun and check for adequate pressure.

Pump oil should be changed:

- after the first 50 hours of operation
- every 2 months or 500 hours of operation thereafter for average service, or more frequently for extensive use or hostile environments (dusty or high moisture)

2.6 ROUTINE INSPECTION OF FILTERS, HOSES AND FITTINGS

Water filters, hoses and fittings should be checked prior to every operation for cleanliness, leaks and repair needs. Repair or replace as needed.

2.7 UNLOADER VALVE

Pressure cleaners are built with one of two types of unloaders:

- Trapped Pressure Unloader
- Flow Actuated Unloader

After the pump is filled with water, the direction of water flow must be controlled with the unloader or regulating valve. A positive displacement pump is always delivering a specific volume of water whether the spray gun is open or closed. Therefore a device is needed to control the direction of flow, either to the open spray gun or redirecting the flow back to the inlet side of the pump when the spray gun is closed.

IMPORTANT INFORMATION

Without an unloader valve, dangerously high pressure will be produced when the spray gun is closed because the water being forced out of the pump has no place to go. The unloader is used as a safety device to guard against failure of component parts, and the development of dangerously high pressures.

2.8 HOSES AND COUPLERS

Factory-supplied hoses are sized in length and diameter for optimal operational performance and size within the pressure capabilities.

When replacing or disconnecting the quick couplers, ensure the unit is shut off and relieve the pressure from all hoses.



IMPORTANT INFORMATION

Adding a non-factory-supplied hose to the machine may affect the performance of the machine.

3. OPERATING GUIDELINES

Please read the following important information carefully.

The pressure was set at the factory during the testing procedure, and no adjustments should be required for operation.

During operation, do not leave the unit running for more than 2 minutes without pulling the spray gun. If the unit will not be discharging water for more than 2 minutes, shut the machine off.



IMPORTANT INFORMATION

Although the unit has a by-pass valve and may have a thermal relief system, failure to keep the unit running without pulling the spray gun or discharging water for more than 2 minutes can cause extensive pump damage.

4. NOZZLES

Please read the following important information carefully.

4.1 NOZZLE SELECTION GUIDE

Spray nozzles can be identified by the nozzle 'number', a 5- or 6-digit number that is stamped on the nozzle, which indicates the spray angle and orifice size. In most cases the second and third digits of the nozzle number indicate the spray angle in degrees.

For example:

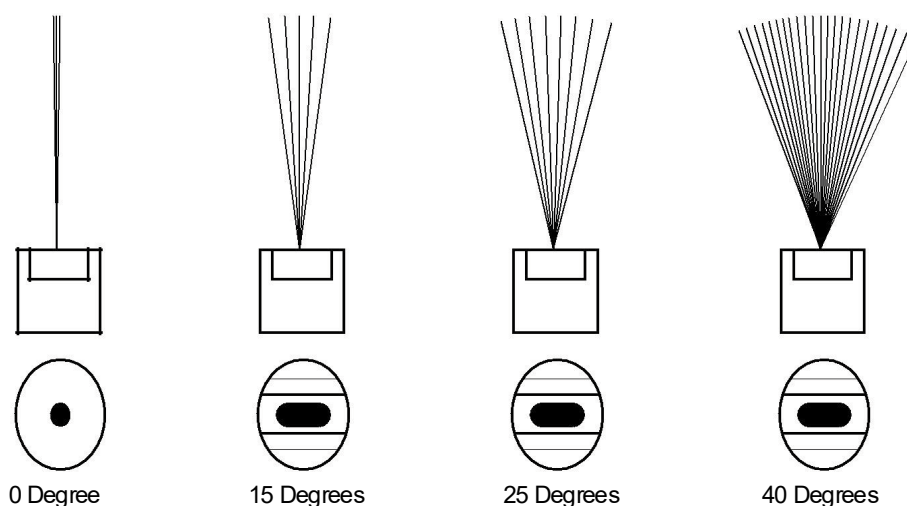
00 is 0 degrees, 15 is 15 degrees, and 40 is 40 degrees.

The last two numbers of the nozzle number indicated the orifice size, a standard industry designation.

For example:

60 is a 6.0 orifice, and 55 is a 5.5 orifice.

These numbers correspond to the actual size of the orifice. They do not however directly indicate gallons per minute, flow rates or inches in diameter of the orifice. Some power washers come with an adjustable nozzle which is fixed to the end of the wand. The fan spray may be adjusted by turning the nozzle and chemicals may also be applied by pulling outward on the nozzle.



4.2 STANDARD SPRAY NOZZLE APPLICATIONS



WARNING

The spray force from these nozzles can cause injuries if pointed directly at yourself or others. Before observing directly, always disconnect from spray wand.

A. 0 Degree – Blasting

Ideal for:

- removing caked on mud from heavy construction, farm or lawn equipment
- cleaning tar, glue or stubborn stains from concrete
- cleaning overhead areas
- removing rust from steel and oxidation from aluminium

B. 15 Degrees – Stripping

Ideal for:

- removing caked on mud from heavy construction, farm or lawn equipment
- cleaning tar, glue or stubborn stains from concrete
- cleaning overhead areas
- removing rust from steel and oxidation from aluminium

C. 25 Degrees – Cleaning

Ideal for:

- general cleaning of dirt, mud and grime
- cleaning roofs, gutters and downspouts
- removing light mildew stains
- removing algae and bacteria build-up from pools
- rinsing surfaces in preparation for painting

D. 40 Degrees – Washing

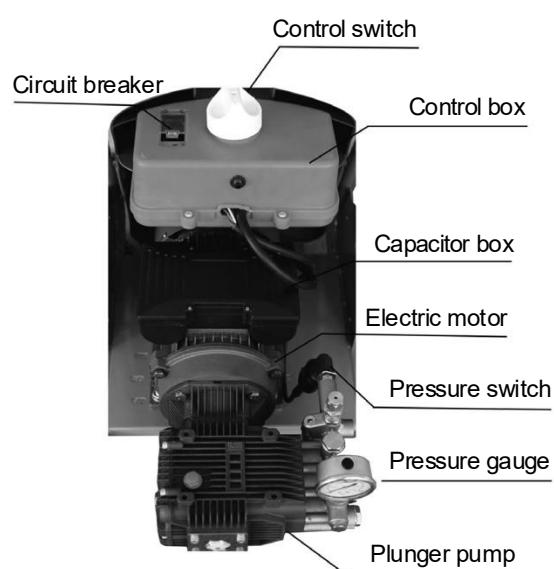
Ideal for:

- light cleaning and washing
- washing and rinsing of automobiles and boats
- cleaning roofs, windows, patios and driveways

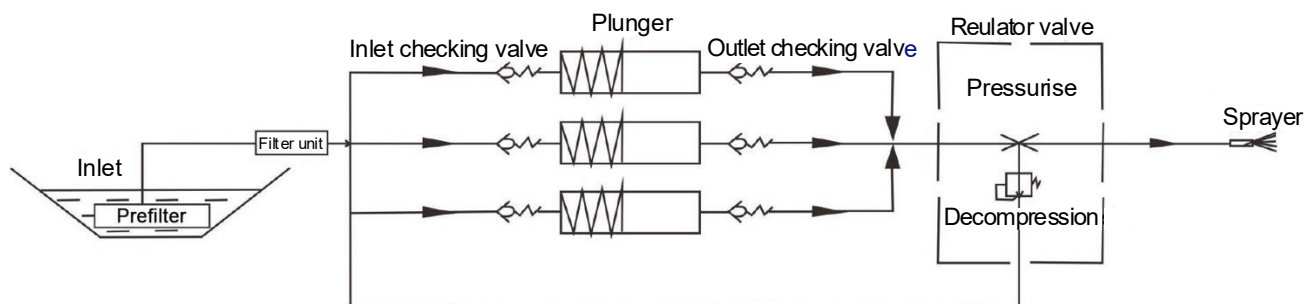
5. EQUIPMENT

Please read the following important information carefully.

5.1 DIAGRAM OF MAIN COMPONENTS



5.2 CONNECTION GUIDE



5.3 TECHNICAL DATA

Voltage	220 V/ 50 Hz
Motor output	2.2 kW
Motor speed	1,450 RPM
Flow rate	12 L/min
Max. operating pressure	120 bar
Pressure regulating valve	Yes
Auto-switch	Yes
High pressure hose	15 m
High pressure gun	Long gun
Dimensions (L x W x H)	700 x 450 x 960 mm

6. SHUTDOWN

Please read the following important information carefully.

6.1 STORAGE

After usage and before storing, follow these steps carefully.

1. Turn off the power switch on the unit
2. Relieve pressure on line by pulling spray gun
3. Shut off water supply and disconnect garden hose

Be sure to check for water leaks or oil leaks that should be repaired before the next operation.

If you are going to store the machine for extended periods of time in a cold climate, be sure to antifreeze the equipment. A 50% anti-freeze solution may be drawn in through the inlet of the pump using a short remnant of garden hose. This fluid should be run through the pump when the fluid is discharged from the pump discharge your machine is winterised. Do not allow machine to freeze.

Add a fuel stabiliser fuel stabiliser for gas if unit is to be stored for 30-90 days. If storing unit over 90 days drain fuel tank, shut off fuel valve and run unit until it stops.

6.2 DAMAGE PREVENTION

Avoid extending hoses across high traffic areas while using power washers, and never leave the hose where it may be run over by vehicles of any type.

Never pull on the hose to move the pressure washer.

Never pull your pressure hose around a tight corner or force it into a small loop. The wire braid hose has a minimum bend radius of 5", and should not be forced into any small bend.

Wrap up the pressure washer hose when finished cleaning and store it on a hose hook, hanger, reel or at another safe location.

Check oil levels (pump and engine) at every fuelling to prevent low oil damage.

Inspect inlet water filter for cleanliness and damage. If soiled or dirty, rinse with fresh water. If damaged, replace with new filter.

When lifting or transporting power washers, secure and lift only with appropriate lifting handles.

6.3 MAINTENANCE AND CARE

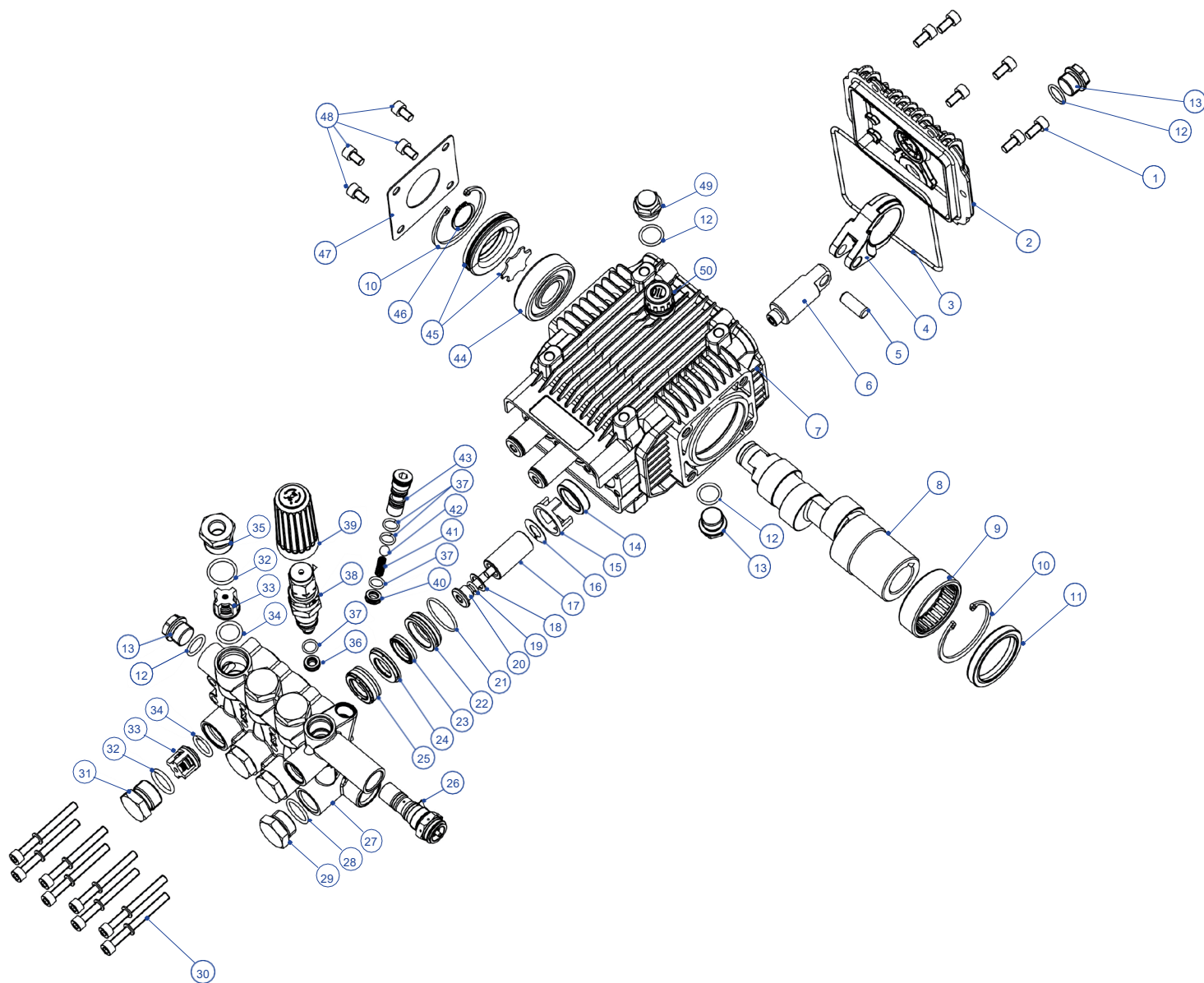
Follow recommended service instructions for engine.

Change oil in pump after the first 50 working hours (break in period) and then every 2 months or 500 hours of operation. The oil drain bolt is located on the bottom side of the pump. When refilling or adding oil to your pump, the pressure cleaner should be on level ground. Most pressure cleaners have a site glass located on the side of pump, the oil level must be in the centre of the site glass.

NOTE: See pump manufacturer's specification sheet for lubrication instructions.

Prevent pump from freezing during freezing conditions. Flush pump with 1 to 1 mixture of automobile anti-freeze and water. This will also act as a lubricant.

7. PARTS AND ASSEMBLY



NO.	NAME	QUANTITY
1	Hexagon socket head screw	6
2	Rear cover assembly	1
3	O-ring	1
4	Connecting rod	3
5	Plunger pin	3
6	Plunger rod	3
7	Crankcase	1
8	15 x C24 Crank shaft	1
8A	08 x C24 Crank shaft	1
8B	12 x C24 Crank shaft	1
8C	13 x C24 Crank shaft	1
8D	08 x C28 Crank shaft	1
8E	12 x C28 Crank shaft	1
8F	13 x C28 Crank shaft	1
8G	15 x C28 Crank shaft	1
9	Needle roller bearing	1
10	Circle clip	2
11	Oil seal	1
12	O-ring	3
13	3/8 plug	2
14	Oil seal	3
15	Support frame	3
16	Retaining plate	3
17	Ceramic tube	3
18	Copper gasket	3
19	O-ring	3
20	Ceramic tube locking bolt	3
21	O-ring	3
22	Rear guide ring	3

NO.	NAME	QUANTITY
23	Seal	3
24	Support ring	3
25	Seal	3
26	Pressure switch assembly	1
27	Pump head	1
28	O-ring	1
29	Plug	1
30	Hexagon socket head screw	8
31	Valve screw	5
32	O-ring	6
33	Valve	6
34	O-ring	6
35	Valve screw	1
36	Sealing gasket	1
37	O-ring	4
38	Pressure regulating assembly	1
39	Pressure regulating hand-wheel	1
40	Valve sealing gasket	1
41	Valve spring	1
42	Ceramic ball	1
43	Valve seat	1
44	Deep groove ball bearing	1
45	Oil lens assembly	1
46	Circle clip for shaft	1
47	Pressure plate	1
48	Hexagon socket head screw	4
49	Oil plug	1
50	Oil component	1

8. MALFUNCTIONS

Refer to the chart below for instructions on how to correct common malfunctions.

TYPE OF MALFUNCTION	POSSIBLE CAUSES	CORRECTIVE MEASURES
A. Low nozzle pressure	1. Obstructed or clogged nozzle tip 2. Obstructed or clogged inlet filter 3. Unloader valve stuck open due to debris lodged under the check valve ball 4. Customer use of shutoff-type quick connectors 5. Plugged or obstructed hose 6. Insufficient flow in gallons per minute (not pressure) to the pump	1. Disconnect your spray wand from the gun and clean your with a small rigid piece of wire such as a paper clip, then flush the nozzle backwards with water and reconnect the wand to the gun. Restart the pressure washer and depress the trigger on the spray gun. 2. Clean or replace inlet filter 3. Disassemble and clean the valve ball 4. Change connectors 5. Purge air in hose 6. Connect to new water supply NOTE: If the nozzle is still plugged or partially plugged, repeat numbers 1-4. If the previous procedure does not clear the nozzle, replace with a new nozzle.
B. Pressure surges. That is, when the trigger is pulled, pressure is satisfactory for a moment then falls off. When the trigger is released, pressure builds up to normal levels.	1. Water supply cannot provide the flow rate (gallons per minute) required by the pump due to restricted supply 2. Flow rate of water is insufficient for the pump 3. Leaks in the supply fittings, which cause the pump to draw air and perform poorly	1. Make sure that there are no under-sized fittings and the inlet screen is unobstructed 2. First, find the capacity of your pump in gallons per minute (GPM). Then determine the flow rate of your supply by measuring the gallons that can be delivered in one minute. If your supply does not deliver the GPM your pump requires, do not use the pump. It will suck air, causing cavitations which can quickly damage pump components. 3. Check for leaks in the supply fittings and repair if necessary
C. Soap injector is not working properly	1. High pressure nozzle has been mistakenly installed instead of black soap tip 2. Soap injector valve has been turned off 3. A piece of debris may be caught in the injector valve, injector ball valve, or orifice 4. Adjustable nozzle is in the high pressure position	1. If you have interchangeable tips, make sure the black soap tip is installed. Soap injectors will not work when high pressure nozzles are installed. 2. Turn the soap injector valve to desired setting 3. Disassemble and clean the injector 4. Adjust nozzle to the low pressure position (away from the gun) to draw soap

TYPE OF MALFUNCTION	POSSIBLE CAUSES	CORRECTIVE MEASURES
D. Low operating pressure	1. Faulty pressure gauge 2. Insufficient water supply 3. Old, worn or incorrect spray nozzle 4. Belt slippage 5. Plumbing or hose leak 6. Faulty or misadjusted unloader valve 7. Worn packing in pump 8. Fouled or dirty inlet or discharge valves in pump 9. Worn inlet or discharge valves 10. Obstruction in spray nozzle 11. Leaking pressure control valve 12. Slow engine RPM 13. Pump is sucking air 14. Valves are sticking 15. Unloader valve seat is faulty	1. Install new gauge 2. Use larger supply hose; clean filter at water inlet 3. Match nozzle number of machine and/or replace with new nozzle 4. Tighten or replace; use correct belt 5. Check plumbing system for leaks. Retape leaks with plumber's tape. 6. Adjust unloader for proper pressure. Install repair kit or replace when needed 7. Install new packing kit 8. Clean inlet and discharge valves 9. Replace with valve kit 10. Remove obstruction 11. Rebuild or replace as required 12. Set engine speed according to correct specifications 13. Check water supply and possibility of air seepage 14. Check and clean or replace if necessary 15. Check and replace if necessary
E. Fluctuating pressure	1. Valves are worn 2. Blockage in valve 3. Piston packing is worn	1. Check and replace if necessary 2. Check and replace if necessary 3. Check and replace if necessary
F. Noisy pump	1. Air in suction line 2. Broken or weak inlet or discharge valve springs 3. Excessive matter in valves 4. Bearings are worn	1. Check water supply and connections on suction line 2. Check and replace if necessary 3. Check and clean if necessary 4. Check and replace if necessary
G. Presence of water in oil	1. Water seal is worn 2. High humidity in air	1. Check and replace if necessary and change oil 2. Check and change oil twice as often
H. Water dripping from under pump	1. Piston packing is worn 2. O-ring plunger retainer is worn 3. Cracked piston 4. Pump protector is engaged	1. Check and replace if necessary 2. Check and replace if necessary 3. Check and replace if necessary 4. Lower water supply pressure. Do not run with spray gun closed longer than 2 minutes.
I. Oil dripping	1. Oil seal is worn	1. Check and replace if necessary
J. Excessive vibration in delivery line	1. Irregular functioning of the valves	1. Check and replace if necessary
K. Detergent is not drawing	1. Air leak 2. Filter screen on detergent section suction hose is plugged 3. Incorrect nozzle has been installed, or adjustable nozzle is in wrong position 4. Dried up detergent is plugging metering valve injector 5. Excessively high viscosity of detergent 6. Hole in detergent line(s) 7. Low detergent level	1. Tighten all clamps, and check detergent lines for holes 2. Clean or replace 3. Install chemical nozzle or push adjustable nozzle forward (away from gun) 4. Disassemble and clean thoroughly 5. Dilute detergent to specifications 6. Repair hole(s) 7. Add detergent, if required

TYPE OF MALFUNCTION	POSSIBLE CAUSES	CORRECTIVE MEASURES
L. Pump is running normally but pressure is low on installation	1. Pump is sucking air 2. Valves are sticking 3. Nozzle incorrectly sized 4. Unloader valve seat is faulty 5. Piston packing is worn	1. Check water supply and possibility of air seepage 2. Check and clean or replace if necessary 3. Check and replace if necessary 4. Check and replace if necessary 5. Check and replace if necessary
M. Relief valve leaks water	1. Relief valve is defective	1. Replace or repair
N. Engine will not start or crank over	1. Battery is dead 2. Pressure has built up in system 3. Battery connection is dirty 4. Battery cables are disconnected 5. Engine, pump or gearbox has seized 6. Keyswitch, solenoid and starter on engine are defective	1. Charge or replace battery, add electrolyte if battery is new 2. Squeeze spray gun to relieve pressure 3. Clean connections 4. Clean 5. Replace or repair seized part 6. Repair or replace
O. Engine will not start but will crank over	1. Engine power switch is off or defective 2. Spark plug is dirty or fouled 3. Low oil shutdown has been activated 4. Engine is low on or out of fuel 5. Fuel filter is clogged 6. Fuel supply valve has been turned off 7. Engine has been flooded or starved	1. Check engine power switch 2. Replace spark plug 3. Add oil to engine, check more frequently 4. Add fuel 5. Replace or clean fuel filter 6. Turn on fuel supply valve 7. Choke only as required
P. Engine bogs down under load, whenever spray gun is triggered	1. Nozzle is incorrect or obstructed 2. Engine needs to be repaired or replaced 3. Struggling to operate at high elevation 4. Carbon deposits on cylinder head	1. Replace with the proper nozzle or clear obstruction 2. See engine manual or engine dealer 3. Lower the pressure of the unit and check for correct engine speed (RPM) 4. Remove head and wire brush deposits
Q. Electric motor does not start	1. No electric power 2. Thermal overload in the motor or starter has been tripped 3. Power switch is inoperative 4. Electric motor or wiring failure	1. Check cord, plug, socket, and breaker 2. Reset manual overload by depressing the thermal switch on the outside of the motor or starter after the motor has cooled 3. Check power switch 4. Replace or repair motor and/or wiring

POWER MOTION

MAKE PRECISION UNSTOPPABLE

Nutech Equipment (S) Pte Ltd
3 Ang Mo Kio Street 62 #01-05 Link@AMK
Singapore 569139 Tel: (65) 6752 2282
www.nutechequipment.com