



# AUSSIE BLASTER

## Service Fundamentals

### Triplex Pump Technology Explained



*Aussie Pumps*

Australian Pump Industries

OCT 2023

## INTRODUCTION

This manual was developed as a basic guide to understanding the operation and requirements, installation and servicing of **Aussie Pump's 'Big Bertly' Bertolini** positive displacement pumps.

High pressure cleaning equipment is a potentially hazardous if not used correctly and can cause injury and property damage.

Recommended OH&S safety practices must be observed at all times.

Australian Pump Industries does not assume liability or responsibility for the design or operation of a customer's high pressure system.

Refer to the **Australian Safety Standard AS/NZS 4233.01** for guidelines for the Operation and Maintenance of High Pressure Water Jetters.



*Look after your kit & it will pay you back!*

## CONTENTS

Introduction .....	2	Troubleshooting Triplex Pumps .....	10
Australian Safety Standards .....	3	Troubleshooting Blasters .....	11
Bertolini & Aussie .....	3	Direct Drive Bertolini Pump Kits .....	12
How a Triplex Pump Works .....	4	Heavy Duty Bertolini Pump Kits .....	13
Hot water/steam systems.....	4	<b>Triplex Pump Service Guidelines</b>	
<b>System Design</b>		Valve assemblies .....	14
Pump selection .....	5	Removing manifold head .....	14
Motor/engine selection.....	5	Replacing plungers .....	15
Drive System .....	6	Replacing V-packings.....	16
Chemical Injection .....	5	Recommended oils .....	17
Nozzle selection guide .....	6	Test Set .....	17
Determining spray tip size .....	6	Pressure Setting Instructions	
<b>Other components</b>		- engine drive .....	18
Inlet side components .....	7	- electric drive .....	19
Outlet side components .....	7	<b>Preventative Maintenance</b> .....	20
Installation of components.....	8		
Bertolini Pumps & Components used on Aussie Blasters .....	9		



Check out our latest Blaster Blitz online for all our Bertolini pumps, kits & high pressure accessories.

**Change up to a Big Bertly ... the quality change out!**

## AUSTRALIA SAFETY STANDARDS

In 2013 **Australian Safety Standards** were introduced for High Pressure Water Jetting Systems (AS/NZS 4233).

There are two parts to the standard, one covers safe operation and maintenance, the other covers the construction and performance.

Under the Standard machines are split by capability into two classifications ... **Class A & Class B**

Machine's capability is calculated by multiplying the pump's rated pressure (in bar) by flow (in lpm).

**Class A** ... 800 bar lpm to 5,600 bar lpm

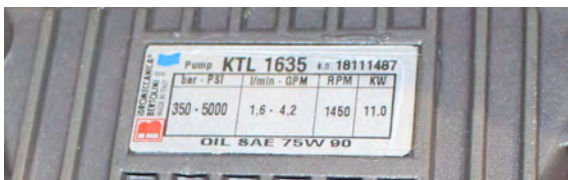
**Class B** ... Over 5,600 bar lpm.

The pump's capability is indicated on the technical data tag. The classification calculated is based on this data and not the pressure and flow set by the unloader.

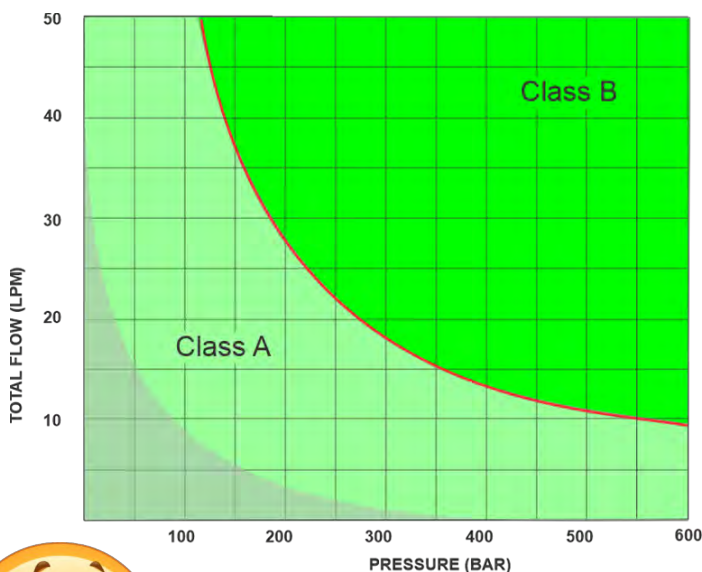


Note: Class B machines require additional safety features including an emergency stop, hose restraints and certified hoses.

Refer to Standard AS/NZS 4233.02 for full details.



Bertolini KTL 1635 ... 350 bar x 16 lpm = 5600 bar lpm Class A



**Call for details on how Class B pumps can be changed out for a Class A Bertolini. Big pumps but no operator certification required**

## BERTOLINI & AUSSIE ... Partners in Pressure

**Aussie Pumps is the exclusive Australian distributor for Bertolini triplex pumps.**

**Bertolini** is an Italian boutique manufacturer with a passion for quality and performance.

All components are sourced from either Europe or America.

**All Bertolini triplex pumps distributed through Aussie Pumps come with a 4 year warranty.**



### DESIGNED FOR PERFORMANCE & LONGEVITY

Here's why **Bertolini 'Big Berty'** pumps have built their reputation for quality and endurance.

- Premium oversized bearings ...** for extended pump life.
- Extra long forged steel crankshaft ...** for a solid coupling pump-motor/engine.
- Oversized connecting rods ...** for extra strength & easier lubrication.
- Large stainless steel martensitic plunger rods ...** stronger, harder, smoother for longer seal life.
- High quality pure ceramic pistons** for years of uninterrupted high-pressure performance.
- Exclusive double "V" and "U" self-lubricating packing seals** with an elastomer designed to prevent water from contaminating the oil in the crankcase. This gives years of leak-free operation.
- Rapid action, mirror finish 316 stainless steel check valves** prevent corrosion.
- Low stress valve caps ...** eliminates water leaks & thread failures, easier pump maintenance.
- High efficiency brass head ...** thicker walls to withstand high pressure.
- Smart 'Cool Fin' crankcase** with high thermal conductivity & pronounced fins to disperse heat. Lower running temperatures extend seal & pump life.

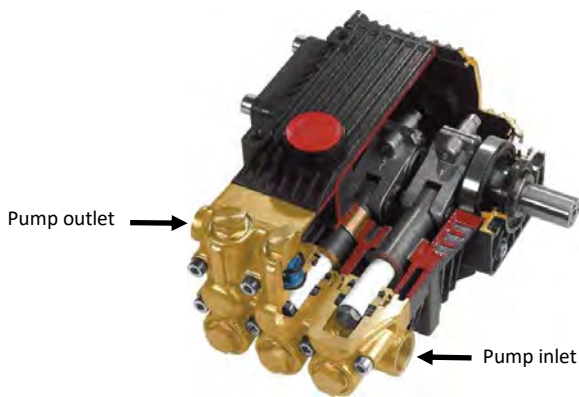
## HOW HIGH PRESSURE TRIPLEX PUMPS WORK

### Pressure

The pressure produced in a pressure washer system is the result of forcing a known volume of water through a restricted **orifice** (spray tip). This pressure is measured in bar or pounds per square inch (psi).

### Flow

The flow is determined by the **speed that the pump shaft** is rotated (rpm). The faster the shaft is rotated the higher the output volume. This water flow is measured in litres per minute.



### Operation

The pump draws water in through a series of inlet check valves as the plungers move back. As the plungers move forward the inlet valves close, forcing the water to travel through a series of outlet check valves and to the pump outlet.

When the water exits the pump, the direction of flow is controlled by means of an **unloader** or regulating valve. A positive displacement pump always delivers a certain volume of water regardless of whether the gun trigger is open or closed.

The unloader controls the direction of flow, either to the gun or redirecting (by-passing) the flow back to the inlet of the pump if the gun trigger is closed.

At least one pressure relief valve must be installed in the outbound side of the pump to protect against unloader failure leading to a pressure spike.

**Note:** Failure to install correct unloader valve or regulator device could result in serious injury and property damage.

### Nozzle Orifice

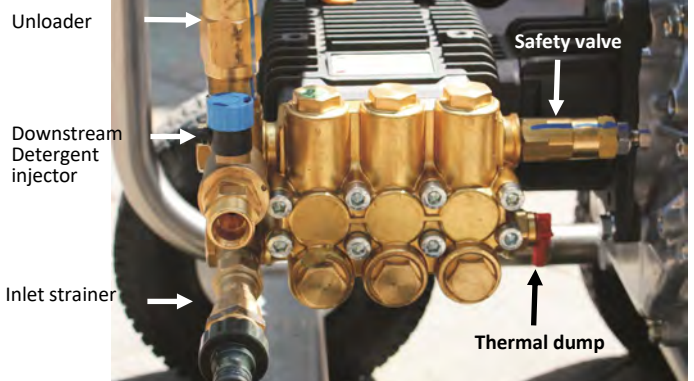
Setting unloader valves for the required pressure of the machine depends entirely on the correct nozzle selection. The correct nozzle orifice can be selected to suit any specific pressure/flow combination using the chart on page 6.

Operators should be conscious that nozzle wear will create a drop in pressure and an apparent malfunction of the machine. The abrasive nature of water and the subsequent wear enlarges the orifice in the nozzle. The larger the orifice, the less pressure and the more danger of subsequent machine malfunction through unloader failure.

Further information on this subject is covered in the Nozzle Selection Guide section.



Change nozzles regularly to maintain system pressure



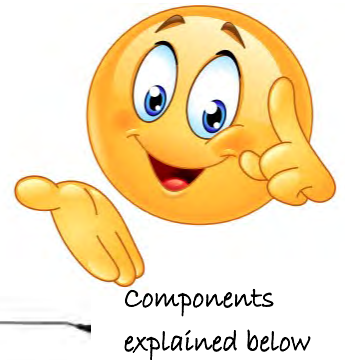
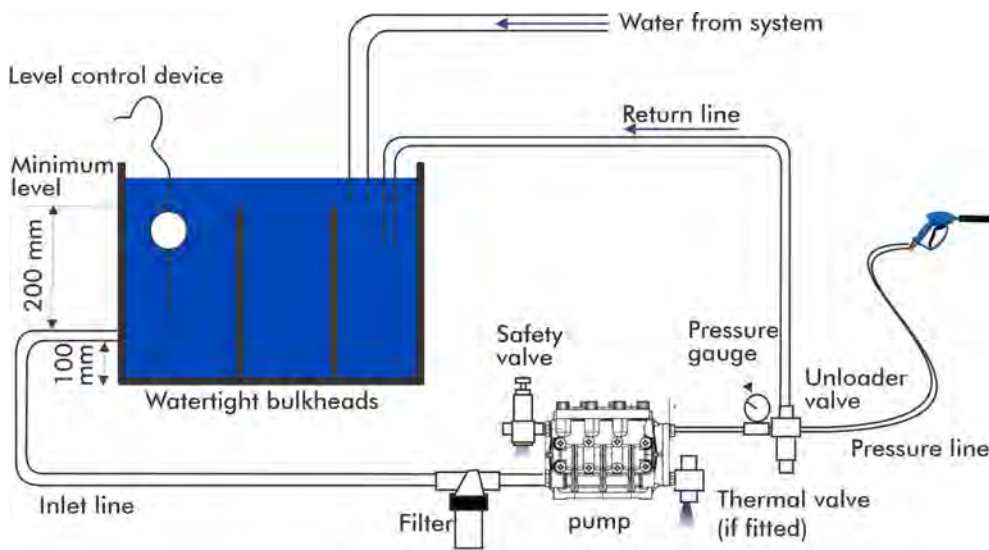
### Hot Water/Steam Cleaners

Heated pressure washers and steam cleaners increase the ability of high pressure water flow to break down dirt and grease.

The cleaning action of most detergents is also increased. Units incorporating a boiler are complex and potentially more hazardous than cold water systems.

These systems should be designed by qualified professionals with a through knowledge of fuels, heat transfers, etc.

## SYSTEM DESIGN



Typical system with break tank fitted

## PUMP SELECTION

The heart of an Aussie pressure washer is a **'Big Berty' Bertolini** pump. The pump has been specially chosen to suit the motor/engine on the blaster.

**Choose a pump that's right for your application.** Higher pressure is not necessarily best. Too much pressure and flow will cause unnecessary wear on your pressure system and could damage surfaces to be cleaned.

**Never exceed the maximum pressures** or rotation speed stated in the pump technical data. Refer to the pump technical data for the **correct rpm** required.

### Motor/Engine Selection

The size of the motor required is determined by the flow (litres/minute) and the pressure (bar/psi) desired.

Ensure that a petrol engine runs fast enough to supply the required horsepower but **do not exceed the engine manufacturer's specifications**. Consult pump and engine manufacturer's technical guidelines.

### Drive System

There are three common methods of driving or connecting the pump and motor/engine.

1. Direct drive
2. Gear reduction drive
3. Belt drive is considered inefficient (belt slip) and can have negative OH&S ramifications.

## Chemical injection

Cleaning chemicals or detergents may be introduced into either the **inbound** or **outbound** flow of water.

An inbound chemical injector uses the pump's ability to draw fluid in to introduce a chemical into the water flow. This 'upstream' injector means chemicals are applied to the surface to be cleaned at normal high water pressures.

As any detergents or cleaning agents introduced upstream pass through the pump body, care must be taken to ensure the liquids are compatible with the pumps construction materials and seals.

An outbound or downstream chemical injector uses a venturi system to draw chemical into the water stream.

This type of injector requires low pressure to activate chemical flow. Low pressure is achieved by enlarging the outlet orifice by changing to a larger spray tip or by an adjustable nozzle.

Here's the advantages to using a downstream injector:

1. Fewer pump component parts are exposed to the cleaning chemicals which may extend system life.
2. The operator can control the flow of chemicals by changing the system pressure at the nozzle.
3. Applying the chemical at lower pressure is more economical as less chemical bounces off the work surface.



## NOZZLE SELECTION GUIDE

MEG	Sizing for vario & grit-blast heads	Flow in l/min at the indicated pressures																									
		20 BAR	30 BAR	40 BAR	50 BAR	60 BAR	70 BAR	80 BAR	90 BAR	100 BAR	110 BAR	120 BAR	130 BAR	140 BAR	150 BAR	160 BAR	180 BAR	200 BAR	220 BAR	250 BAR	280 BAR	310 BAR	340 BAR	370 BAR	400 BAR	450 BAR	500 BAR
		290 psi	435 psi	580 psi	725 psi	870 psi	1015 psi	1160 psi	1305 psi	1450 psi	1595 psi	1740 psi	1885 psi	2030 psi	2175 psi	2320 psi	2610 psi	2900 psi	3190 psi	3625 psi	4060 psi	4560 psi	5000 psi	5440 psi	5880 psi	6525 psi	7250 psi
020	0,99	2	2,5	2,8	3,2	3,5	3,7	4	4,2	4,5	4,7	4,9	5,1	5,3	5,5	5,7	6	6,4	6,7	7,6	7,7	8,1	8,2	8,8	9,2	9,8	10,3
025	1,00	2,5	3,1	3,5	4	4,3	4,7	5	5,3	5,6	5,9	6,1	6,4	6,6	6,9	7,1	7,5	7,9	8,3	8,9	9,4	9,9	10,3	10,8	11,2	11,9	12,5
030	1,09	3,1	3,7	4,3	4,8	5,3	5,7	6,1	6,3	6,8	7,2	7,4	7,7	8	8,3	8,7	9,2	9,6	10	10,8	11,4	12	12,5	13,1	13,6	14,4	15,2
035	1,15	3,6	4,4	5,1	5,6	6,2	6,7	7,3	7,7	8,1	8,4	8,8	9,2	9,6	9,9	10,4	10,9	11,4	12	12,6	13,4	14,1	14,8	15,4	16,0	17,0	17,9
040	1,19	4,2	5,2	5,9	6,6	7,3	7,8	8,4	8,9	9,4	9,8	10,3	10,7	11,1	11,5	11,9	12,4	13,2	14,1	14,1	14,7	16,0	16,9	17,5	18,2	19,3	20,3
045	1,27	4,5	5,5	6,4	7,1	7,8	8,4	9	9,6	10,2	10,6	11,2	11,6	11,8	12,5	12,6	13,2	14,4	15	16,3	17,2	18,1	19,0	19,5	20,6	21,8	23,0
050	1,35	5	6,2	7,1	8	8,7	9,4	10	10,7	11,3	11,7	12,1	12,9	13,4	13,8	14,3	15,1	15,9	16,9	17,9	18,9	19,9	20,9	21,8	22,7	24,2	25,5
055	1,4	5,6	6,8	7,8	8,7	9,6	10,3	11,1	11,8	12,4	13	13,5	14,1	14,7	15,2	15,7	16,4	17,5	18,6	19,8	20,9	22,0	23,0	24,0	25,0	26,5	28,0
060	1,47	6	7,4	8,6	9,6	10,4	11,3	12,1	12,8	13,6	14,2	14,9	15,5	16	16,6	17,2	18	19,2	20,4	21,5	22,9	24,1	25,3	26,4	27,4	29,1	30,6
065	1,52	6,6	8	9,3	10,4	11,3	12,3	13,2	14	14,7	15,5	16,1	16,7	17,4	18	18,6	19,4	20,7	22	22,9	24,8	26,1	27,3	28,5	29,6	31,4	33,1
070	1,6	7,1	8,6	10	11,2	12,2	13,2	14,1	15	15,8	16,6	17,3	18	18,7	19	19,7	21,3	22,3	23,7	25,3	26,8	28,2	29,5	30,8	32,0	33,9	35,8
075	1,65	7,6	9,3	10,7	12	13,1	14,2	15,2	16,1	16,9	17,7	18,5	19,2	20	20,7	21,4	22,6	23,8	25,3	27,0	28,6	30,1	31,5	32,9	34,2	36,2	38,2
080	1,7	8	9,8	11,3	12,7	14	15,1	16,1	17,1	18	18,9	19,7	20,5	21,3	22	22,8	23,8	25,4	27	28,8	30,5	32,0	33,6	35,0	36,4	36,8	40,7
085	1,75	8,5	10,4	12,1	13,5	14,8	16	17,1	18,1	19,1	20	20,9	21,7	22,5	23,4	24	25,5	27	28,2	30,7	32,5	34,2	35,8	37,3	38,8	41,2	43,4
090	1,8	9,8	11,5	13,3	14,8	16,3	17,6	18,8	19,9	21,0	22,0	23,0	23,9	24,8	25,7	26,6	28,2	29,7	31,1	33,2	33,5	37,0	38,7	40,4	42,0	44,5	47,0
095	1,85	9,7	11,9	13,4	15,4	16,8	18,1	19,4	20,0	21,7	22,7	23,8	24,7	25,9	26,9	27,8	29,5	31,1	32,6	34,8	36,8	38,7	40,6	42,3	44,0	46,7	49,2
100	1,9	10	12,3	14,2	16,0	17,8	19,2	20,6	21,8	23,0	24,1	25,2	26,2	27,2	28,2	29,1	30,9	32,5	34,1	35,4	38,5	40,5	42,4	44,2	46,0	48,8	51,4
110	1,98	11,1	13,6	15,7	17,6	19,3	20,8	22,2	23,6	24,9	26,2	27,4	28,5	29,6	30,6	31,6	33,5	35,4	37,1	39,5	41,8	44,0	46,1	48,1	50,0	53,0	55,9
120	2,08	12,1	14,8	17,2	19,2	21,0	22,7	24,3	25,8	27,1	28,1	29,4	30,6	31,8	32,9	34,0	36,0	38,0	39,8	42,4	45,0	47,6	50,2	51,9	54,0	57,3	60,4
125	2,13	12,7	15,6	18,0	20,1	22,0	23,8	25,5	27,0	28,5	29,5	30,8	32,1	33,3	34,5	35,6	37,8	39,8	41,8	44,5	46,9	49,3	51,6	53,9	56,0	59,4	62,6
130	2,16	13,2	16,1	18,6	20,8	22,8	24,6	26,3	27,9	29,4	30,8	32,2	33,5	34,8	36,0	37,2	38,9	42,5	44,5	47,4	50,2	52,8	55,3	57,7	60,0	63,6	67,1
140	2,26	14,2	17,4	20,0	22,4	24,5	26,5	28,4	30,1	31,7	33,2	34,7	36,1	37,5	38,8	40,1	42,5	44,8	47,0	50,1	53,2	56,3	59,4	61,7	64,4	67,9	71,6
150	2,34	15,1	18,5	21,3	23,9	26,1	28,3	30,2	32,1	33,8	35,6	37,2	38,7	40,2	41,6	43,0	45,6	48,0	50,4	53,7	57,0	59,9	62,7	65,4	68,0	72,1	76,0
160	2,41	16,2	19,8	22,9	25,6	28,0	30,3	32,4	34,4	36,2	37,8	39,5	41,1	42,7	44,2	45,6	48,4	51,0	53,5	57,0	60,2	63,4	66,4	69,2	72,0	76,4	80,5
180	2,54	18,2	22,3	25,7	29,0	31,8	34,3	36,7	38,6	41,0	43,0	44,9	46,7	48,5	50,2	51,9	55,0	58,0	60,8	64,8	68,6	72,2	75,6	78,9	82,0	87,0	91,7
200	2,69	20,1	24,7	28,5	32,5	35,6	38,5	41,1	43,6	46,0	48,2	50,4	52,4	54,4	56,3	58,2	61,7	65,1	68,2	72,7	77,0	81,0	84,8	88,5	92,0	97,6	102,9
250	2,99	25,2	30,9	35,7	39,8	43,6	47,1	50,4	53,4	56,4	59,1	61,8	64,3	67,0	69,1	71,3	75,1	79,8	84,0	89,3	94,6	99,9	105,2	109,8	114,1	120,9	127,5

### DETERMINING SPRAY TIP SIZE

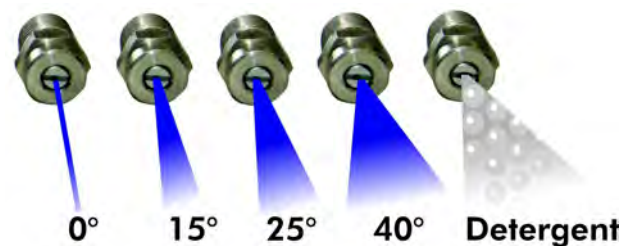
The **outlet pressure** is determined by ejecting a known volume of water through a spray tip.

Example: 2030 psi at 11 litres per minute, calculate 90% of flow value = 035 nozzle.

The size of this tip is an important factor of efficient pressure cleaner performance. A tip that is too large may produce insufficient pressure. A tip that is too small may cause the pump to be over pressurized causing damage to the pump and system components.

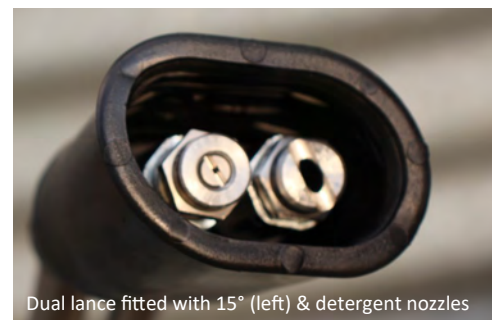
**Aussie Laser Tip Nozzles** are available in various sizes and spray angles. Aussie use 15° nozzles in our standard gun/lance assemblies.

Refer to the above chart to **select the correct nozzle size** for your application.



Check the **output pressure and flow** on the pump's technical data tag.

Select the **pump pressure** (psi) in the table above and read down the column until you reach the closest flow that matches the pumps performance.



Dual lance fitted with 15° (left) & detergent nozzles

Read off the MEG size in the row heading. **Drop down one size** because the calculation should always be made using 90% of the flow.

Adjustable nozzles, like the Aussie 'Vario-Zoom' lance, allow the user to change both the spray angle and switch between high and low pressure.



**Change nozzle if pump pressure is dropping**

## OTHER SYSTEM COMPONENTS

### INLET SIDE COMPONENTS

#### Inlet filter

It is important to install a water filter on the intake line to remove any impurities or solids in the water. This will increase the operating life of your pump and reduce problems.



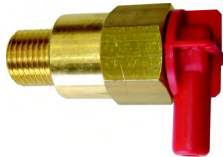
A 60-120 mesh screen filter is recommended to stop foreign matter clogging valves and orifices, scratching internals, abrading packing and wearing the components.

#### By-pass provision

The unloader valve or regulator redirects the water flow back into the pump when the gun trigger is released. An inlet water holding tank can be installed to accept this redirected flow, or it can be by-passed back through the pump.

#### Thermal relief valve

Water continuously re-circulated through the pump by the unloader valve will heat up and may damage seals. The thermal relief valve opens at a predetermined temperature and dumps the hot water.



#### Upstream detergent injector

This device uses the pump to introduce the detergent into the water stream before it enters the pump. This type of injector is not recommended for harsh or corrosive chemicals as passage through the pump may damage internal components.

#### Pressure reducing valve

A pressure reducing valve must be installed if the water supply pressure is higher than the maximum inlet pressure specified for the pump.

#### Check valve

A check valve is installed to prevent any chemicals or detergents being back-flushed into the water supply. Local water supply authority regulations must be observed.

An alternative to a check valve is the use of a holding tank to collect any back flush. Ensure that you do not exceed the negative pressure rating of the pump.

### OUTLET SIDE COMPONENTS

#### Unloader or regulator valve

The unloader controls the water pressure inside the pump. It is necessary for operator safety and for system protection.



Bertolini unloader with internal bypass plumbing

When the gun trigger is opened the water is passes into the outlet hose. When the gun trigger is closed the water is re-directed through the by-pass hose back into the pump.

Installation of unloader valves must be carried out strictly in accordance with the manufacturer's instructions. It should be checked and serviced regularly.



VB350 unloader used on professional Aussie Blasters to 5,000 psi

The unloader valve should be mounted as close to the pump outlet as possible. Do not use hose between the unloader valve and the pump outlet.

#### Pressure relief valve

This valve prevents a dangerous build up of pressure in the system. It is necessary for operator safety and for system protection. This valve will open and dump water if the system becomes over pressurized due to any component failure.



Protects pump & operator from pressure spikes

Installation of pressure relief valves must be carried out strictly in accordance with the manufacturer's instructions and should be checked and serviced regularly.

#### Pulsation dampener

This device smooths pulsations caused by the pump itself and absorbs pressure spikes when the gun is closed suddenly. A duplex pump may require a pulsation dampener, generally one is not required with a triplex pump. Long runs of hose may generate a hammer effect which a pulsation dampener may soften or eliminate.



Check Blaster Blitz for replacement accessories

**OTHER SYSTEM COMPONENTS**

**OUTLET SIDE COMPONENTS continued**

**Pressure gauge**

This displays the operating pressure and not only allows the operator to determine peak performance, but also may indicate any deficiencies occurring within the system. For instance, a decrease in system pressure may indicate a **worn spray tip**; an increase in pressure may suggest a blockage in the system or faulty unloader valve.



Select a gauge that is:

- liquid filled to absorb pressure fluctuations
- installed with a restriction orifice to avoid pressure spike damage appropriate for your system’s normal pressure range

**Downstream injector**

This component introduces a detergent downstream of the pump. The size of the injector must be selected taking into account the pump pressure. Refer to the injector manufacturer for technical data.



If the injector is too small a large pressure drop will result in a high concentration of detergent. If the injector is too large it will be unable to create sufficient suction to pick up any detergent.

Downstream injectors require low pressure to activate the chemical flow. Approximately 200 psi is sufficient.

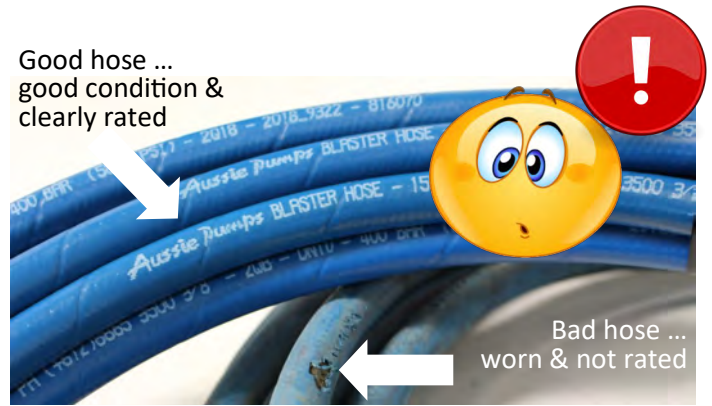
A double nozzle or lance enable both a low pressure and high pressure spray tip to be mounted. This allows the detergent to be applied at low pressure and washed off at higher pressure. An adjustable nozzle may also be used to the same effect.

**REFER TO AS/NZS 4233.02 for additional requirements for systems greater than 5600 bar litres/minute.**



Check **Blaster Blitz** for replacement accessories

Good hose ... good condition & clearly rated



Bad hose ... worn & not rated

Replace damaged hose ... it’s dangerous!

**High pressure hose**

Ensure that the high pressure hose in your system is compatible with any chemicals used and is rated to more than the maximum pressure of the pump.

**Do not use hose clamps** to secure the hose as they may be dislodged under pressure. M22 (4,000 psi) or M24 (5,000 psi) Quick Couplings fitted to the ends of the hose make it convenient to disconnect hose from machine and gun assembly.

Check the hose regularly for damage or abrasion and replace if necessary. Check couplings regularly for leaks or corrosion and replace if necessary.

Avoid unnecessarily long lengths of high pressure hose to prevent pressure accumulation when releasing the gun trigger and to minimise operating pressure loss.

**Spray gun**

The gun must be selected to withstand operating pressure, volume, temperature and chemicals in the system.

The gun selected should also be comfortable to use to reduce operator fatigue, and capable of being locked when not in use.



Check out **Blaster Blitz** for complete gun/lance kits for simple swap outs.

**Quick Couplings**

Use M22 (4,000 psi) or M24 (5,000 psi) quick couplers for fast, convenient, tool free connection of hose and accessories.



Replace o-rings if leaking, do not use plumbers tape.





## INSTALLING COMPONENTS



**Install all components according to manufacturer's recommendations to ensure operator safety, to avoid property damage and to ensure efficient system operation.**

Any plumbing and component parts must be the **same size** or larger than the inlet and outlet of the pump. The thread sizes are a guide to the required sizes of plumbing for correct water flow.

**Minimise bends** and other restrictions in hoses and other plumbing. This will ensure maximum efficiency of the motor or engine and reduce turbulence and cavitation which may damage system components.

It is important to **eliminate all air leaks**. These will cause a reduction in pressure, excessive noise and increased pump wear.

It is recommended that a **thread sealant** be used on all connections before tightening securely (not on M22 or M24 Quick couplers). Hose clamps are not acceptable as they are susceptible to leaks and fail under pressure.

Mount the motor/engine so that the rotation of the pump crankshaft is **counterclockwise** as you face the pump crankshaft. The rotation of a petrol engine varies according to manufacturer. Check the specifications before assembling. In most cases electric motors may be operated in either direction according to the wiring. Check the manufacturer's specifications before connection.

**Caution - Electrical components should only be installed by a qualified professional.** Water and electricity are a dangerous combination. All electrical components must be watertight. Never allow the spray or leak to contact any electrical component. This could cause serious injury.

Never introduce acids, caustic substances or abrasive liquids into to pressure system. Such substances entering the system will damage the pump and other components and will void any guarantee.

**CAUTION: The pump and system must be protected from freezing.**



Check Blaster Blitz for replacement Bertolini Pump kits & SAVE

## BERTOLINI PUMPS & COMPONENTS USED ON AUSSIE BLASTERS

Pump Model	Unloader valve	Safety valve	Thermal Dump Valve	Pressure Gauge	Gearbox	Nozzle size	Safety Classification	Aussie Blaster
<b>WBL917</b>	BAPRI20ADJ	-	MPA60063050	AGCDR0102	-	035	Class A	<b>Monsoon 140</b>
<b>WBXG3025</b>	BAPRI-I-35ADJ	MTM00033003	MPA60063050	-	-	035	Class A	<b>AB30</b>
<b>TMG4035</b>	BAPRI 40ADJ	MPA60156000	MPA60063070	-	-	030	Class A	<b>AB40</b>
<b>WBL1114</b>	BAPRI20ADJ	MTM00033003	MPA60063050	-	B318699973	035	Class A	<b>BB100</b>
<b>TTL1520</b>	M215010400	MTM00033003	MPA60063070	AGCDR0102	B318870973	045	Class A	<b>Scud 350/ Monsoon 200</b>
<b>TTL2120</b>	M215010400	MTM00033003	MPA60063070	AGCDR0102	B318870973	060	Class A	<b>Scud 351/ Monsoon 300</b>
<b>TTL1330</b>	BVB350	MPA60156000	MPA60063070	AGCDR0102	B318870973	050	Class A	<b>Scud 400/ Monsoon 400</b>
<b>TTL2028</b>	BVB350	MPA60156000	MPA60063070	AGCDR0102	B318870973	050	Class A	<b>Ultra A/Cobra A/ Monsoon 400 Maxi</b>
<b>TTK3021</b>	M215010400	MPA60156000	MPA60063070	AGCDR0102	B319110973 (GX630)	055	Class A	<b>Monsoon 300</b>
<b>TTK2130</b>	BVB350	MPA60156000	MPA60063070	AGCDR0102	B319110973 (GX630)	055	Class B	<b>Ultra/Cobra</b>
<b>KTL1635</b>	BVB350	MPA60058000	MPA60063070	AGCDR0102	B319110973 (GX630)	035	Class A	<b>King Cobra A/ Predator A/ Hurricane</b>
<b>KTL2035</b>	BVB350	MPA60058000	MPA60063070	AGCDR0102	B319111973 (1 1/8 engine shaft)	045	Class B	<b>King Cobra Stubbie</b>
<b>RAL2035</b>	BVB350	MPA60058000	MPA60063070	AGCDR0102	B318880973 (B319219973)	045	Class B	<b>King Cobra</b>
<b>RAL2535</b>	BVB350	MPA60058000	MPA60063070	AGCDR0102	B318880973 (B319219973)	055	Class B	<b>Predator/ King Cobra</b>
<b>RAS4482</b>	BVB350	MPA60058000	MPA60063070	AGCDR0102	B318880973 (B319219973)	070	Class B	<b>Python</b>
<b>RA1650</b>	BVB53	MPA60520000	MPA60063070	AGAUGE600BAR	B318880973 (B319219973)	025	Class B	<b>Raptor 16</b>
<b>RA1850</b>	BVB53	MPA60520000	MPA60063070	AGAUGE600BAR	B318880973 (B319219973)	030	Class B	<b>Raptor 18</b>

**TRIPLEX PUMP TROUBLESHOOTING**

PROBLEM	CAUSE	REMEDY
 <p><b>Pulsation</b></p>	Faulty pulsation damper	Check pre-charge, if low recharge or replace
	Worn nozzle	Replace nozzle
	Belt slippage	Tighten or replace
	Air leak in inlet plumbing	Disassemble, reseal and reassemble
	Unloader stuck, partially blocked or improperly adjusted, valve seat worn	Clean, adjust unloader, check for worn and dirty valve seats. Replace if required
	Inlet suction strainer clogged or improperly sized	Clean. Check more frequently
	Worn packing. Abrasives in pumped fluid or severe cavitation. Inadequate water	Install proper filter. Suction at inlet manifold must be limited to less than 6m lift or 8.5psi
	Fouled or dirty inlet or discharge valves	Clean inlet and discharge valve assemblies
	Worn inlet, discharge valve blocked or dirty	Replace worn valves, valve seats.
	Cracked pistons due to dry running	Replace pistons
<p><b>Low pressure</b></p>	Leaky discharge hose or connectors	Replace worn valves, valve seats and/or discharge hose
	Restricted inlet or air entering the inlet plumbing	Check inlet plumbing size. Check seals are air tight
<p><b>Pump runs extremely rough, pressure very low</b></p>	Inlet restrictions and/or air leaks. Stuck inlet or discharge valve	Replace worn cup or cups, clean out foreign material, replace worn valves.
<p><b>Water leakage from under manifold, slight leakage</b></p>	Worn packing	Install new packing
<p><b>Oil leak between crankcase and pumping section</b></p>	Worn crankcase piston rod seals, O-rings on plunger retainer worn	Replace crankcase piston rod seals. Replace o-rings.
<p><b>Oil leaking in the area of crankshaft</b></p>	Worn crankshaft seal or improperly installed oil seal o-ring	Remove oil seal retainer and replace damaged o-ring and/or seals
	Faulty bearing	Replace bearing
<p><b>Excessive play in the end of the crankshaft pulley</b></p>	Worn main bearing from excessive tension on drive belt	Replace crankcase bearing and/or tension drive belt
<p><b>Water in crankcase (pump oil is milky)</b></p>	Humid air condensing into water inside the crankcase	Change oil more frequently. Use high grade automotive 30 weight nondetergent oil
	Worn packing and/or piston rod sleeve. O-rings on plunger retainer worn	Replace packing. Replace o-rings
<p><b>Oil leaking from underside of crankcase</b></p>	Worn crankcase piston rod seals	Replace seals
<p><b>Oil leaking at rear portion of the crankcase</b></p>	Damaged crankcase, rear cover o-ring, drain plug o-ring or sight glass o-ring	Replace cover o-ring, drain plug o-ring, or sight glass o-ring
<p><b>Loud knocking noise in pump</b></p>	Pulley loose on crankshaft	Check key and tighten set screw
	Broken or worn bearing	Replace bearing
<p><b>Frequent or premature failure of the packing</b></p>	Scored, damaged or worn plunger	Replace plungers
	Overpressure to inlet manifold	Reduce inlet pressure
	Abrasive material in fluid being pumped	Install proper filtration on pump inlet plumbing
	Excessive pressure and/or temperature of fluid being pumped	Check pressures and fluid inlet temperature, ensure they are within specified range
	Over pressure of pump	Reduce pressure
	Running pump dry	Do not run pump without water

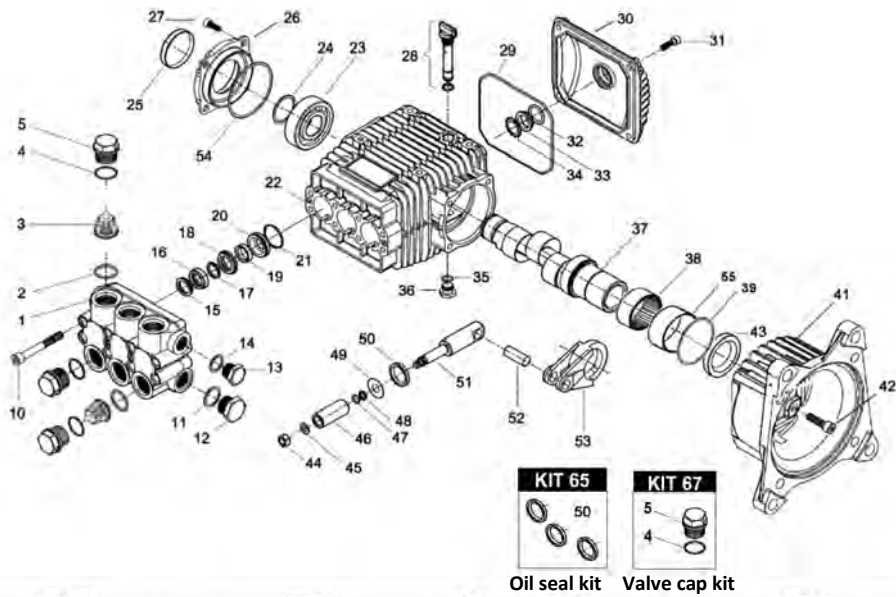
## BLASTER TROUBLESHOOTING (other than pump)

Symptoms	Cause	Action	User check	Service Agent only
<b>Electric drive pressure cleaners</b>				
<b>Machine does not start</b>	Power not connected	Check plug, cable and switch	<input checked="" type="checkbox"/>	
	Wrong voltage	Check mains voltage	<input checked="" type="checkbox"/>	
	Power cable damaged	Replace cable		<input checked="" type="checkbox"/>
<b>Motor hums but does not run</b>	Voltage supply is too low	Check power supply for correct voltage	<input checked="" type="checkbox"/>	
	Pump is stuck	Manually turn motor		<input checked="" type="checkbox"/>
	Spray gun not activated	Activate spray gun when switching on	<input checked="" type="checkbox"/>	
<b>Motor stops suddenly</b>	Cross section of extension lead too small	Use correct dimension extension lead	<input checked="" type="checkbox"/>	
	Cut out switch activated due to overheating	Check power supply is correct. Disconnect machine and allow to cool off for a few minutes.	<input checked="" type="checkbox"/>	
<b>Motor trips out</b>	Unit run on excessive extension lead	Remove lead	<input checked="" type="checkbox"/>	
	Power lead or plug damaged	Fix or replace		<input checked="" type="checkbox"/>
	Excessive pressure build up	Check pressure, nozzle size, unloader setting		<input checked="" type="checkbox"/>
	Motor down to earth e.g. water ingress	Electrician to test, fix or replace		<input checked="" type="checkbox"/>
	Suction amperage cut-out set too low	Reset to correct setting		<input checked="" type="checkbox"/>
<b>Engine drive pressure cleaners .... For further assistance with engine trouble shooting consult the manufacturers handbook</b>				
<b>Machine does not start</b>	Battery dead	Recharge or replace battery		<input checked="" type="checkbox"/>
	Battery cables disconnected	Clean connections and reconnect cables		<input checked="" type="checkbox"/>
	Engine, pump or gearbox is seized	Replace or repair seized part		<input checked="" type="checkbox"/>
	Low oil shutdown is activated	Add oil to engine, consult user guide		<input checked="" type="checkbox"/>
	Low on fuel	Add fuel		<input checked="" type="checkbox"/>
<b>Engine slows down under load, whenever gun trigger is pressed</b>	Engine needs service	Consult engine service centre		<input checked="" type="checkbox"/>
<b>Hot water &amp; Steam cleaners</b>				
<b>Burner is smoking</b>	Water in the fuel tank	Empty fuel tank, clean and refill with clean fuel		<input checked="" type="checkbox"/>
	Fuel pressure incorrect	Adjust fuel pressure		<input checked="" type="checkbox"/>
	Air throttle adjusted incorrectly	Adjust air intake on fan		<input checked="" type="checkbox"/>
	Electrodes positioned incorrectly	Clean, adjust or replace as required		<input checked="" type="checkbox"/>
	Fuel nozzle dirty	Clean fuel nozzle		<input checked="" type="checkbox"/>
	Fuel nozzle worn or damaged	Change fuel nozzle		<input checked="" type="checkbox"/>
	Heating coil blocked by soot	Remove & clean heating coil		<input checked="" type="checkbox"/>
	Fuel pump dirty	Replace fuel pump		<input checked="" type="checkbox"/>
	Fuel solenoid valve not working	Replace fuel solenoid		<input checked="" type="checkbox"/>
<b>Burner will not fire</b>	Burner switch not on	Turn switch on burner	<input checked="" type="checkbox"/>	
	Diesel fuel level low	Add diesel	<input checked="" type="checkbox"/>	
	Trigger on spray gun not pulled	Squeeze trigger to fire burner	<input checked="" type="checkbox"/>	
	Fuel filter blocked	Clean and replace if necessary		<input checked="" type="checkbox"/>
	Overload on burner motor tripped	Consult service manual		<input checked="" type="checkbox"/>
	Low water pump pressure	Trouble shoot pump (see page 105)		<input checked="" type="checkbox"/>
	Fuel blockage	Check fuel system for flow, clear blockage		<input checked="" type="checkbox"/>
	Electrode gap incorrect	Reset		<input checked="" type="checkbox"/>
	No power to electrodes	Trace power & replace faulty parts		<input checked="" type="checkbox"/>
<b>Burner cuts out during operation</b>	Fuel tank is empty (burner will produce white smoke)	Refill the fuel tank	<input checked="" type="checkbox"/>	
	Suction filter is dirty	Remove filter and clean using fuel and a brush		<input checked="" type="checkbox"/>
	Water in fuel	Empty fuel tank, clean and refill with clean fuel		<input checked="" type="checkbox"/>
	Pressure switch not functioning	Replace pressure switch		<input checked="" type="checkbox"/>
	Ignition transformer faulty	Replace transformer		<input checked="" type="checkbox"/>
	Rotation of electrodes	Adjust electrodes		<input checked="" type="checkbox"/>
	Fuel nozzle is dirty	Clean fuel nozzle		<input checked="" type="checkbox"/>
	Fuel nozzle is worn Fuel pump is faulty	Replace fuel pump		<input checked="" type="checkbox"/>
	Fuel solenoid valve not working	Replace solenoid valve		<input checked="" type="checkbox"/>
<b>Water does not reach working temperature</b>	Fuse burnt out	Check & replace		<input checked="" type="checkbox"/>
	Thermostat adjusted too low	Adjust thermostat	<input checked="" type="checkbox"/>	
	Thermostat is faulty	Replace thermostat		<input checked="" type="checkbox"/>
	Scale build up in water circuit	De-scale inside of coil		<input checked="" type="checkbox"/>
	Burner sooted	Remove & clean outside of coil & inside of cove		<input checked="" type="checkbox"/>

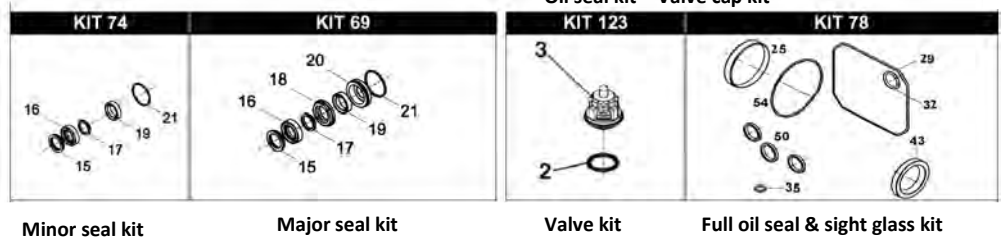
## DIRECT DRIVE & SMALL SLOW SPEED BERTOLINI PUMP SERVICE KITS

Example Bertolini Pump Breakdown  
TMG series

Bertolini pump breakdowns  
available online ...  
aussiepumps.com.au



Check Blaster Blitz for  
Bertolini Pump kits & SAVE



AB30 AB40-GT

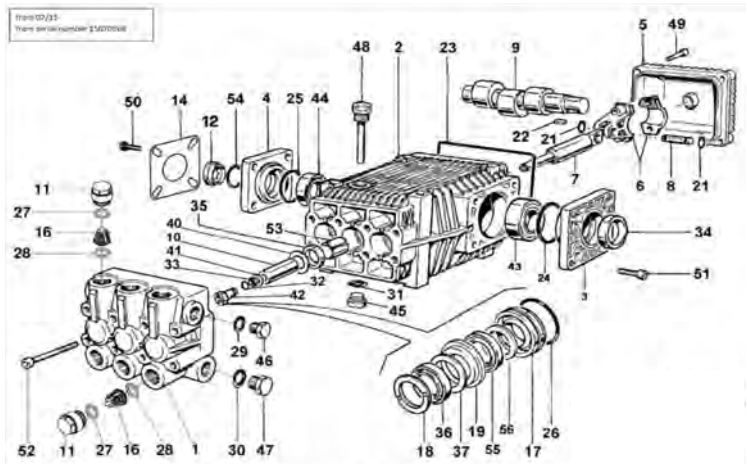
	Part No.	Description	PUMP MODEL									
			WEL 744 WEL 733	WBL 1114	WBL 917 WBL 1111	WS 899G	WBG 2030	WHY 1520	THY 2715	TWSG 3013 TWSG 3016	WBXG 3025	TMG 4035
Valve Kit	BKIT1	(15 pieces)	✓			✓				✓		
	BKIT123	(15 pieces)							✓			✓
	BKIT141	(15 pieces)		✓	✓		✓	✓			✓	
Valve cap kit	BKIT166	(12 pieces)		✓	✓		✓	✓			✓	
	BKIT3	(12 pieces)	✓			✓						
	BKIT18	(12 pieces)							✓			
	BKIT67	(12 pieces)							✓			✓
Minor Seal Kit	BKIT12	(15 pieces)	✓	✓	✓			✓				
	BKIT60	(12 pieces)				✓						
	BKIT21	(15 pieces)							✓			
	BKIT73	(15 pieces)					✓			✓		
	BKIT74	(15 pieces)								✓		✓
	BKIT177	(18 pieces)							✓			
Major Seal Kit	BKIT10	(18 pieces)	✓									
	BKIT70	(21 pieces)		✓	✓			✓				
	BKIT61	(18 pieces)				✓						
	BKIT20	(21 pieces)							✓			
	BKIT68	(21 pieces)					✓			✓		
	BKIT69	(21 pieces)										✓
	BKIT176	(24 pieces)							✓			
Oil Seal Kit	BKIT14	(3 pieces)							✓			
	BKIT64	(3 pieces)	✓					✓				
	BKIT65	(3 pieces)										✓
Full oil seal & sight glass kit	BKIT78	(9 pieces)								✓		✓
	BKIT82	(8 pieces)					✓	✓			✓	
	BKIT83	(8 pieces)		✓	✓							
	BKIT189	(8 pieces)							✓			
Piston	B050010182	18mm	✓	✓	✓			✓		✓		
	B040010182	15mm				✓	✓				✓	
	B070007182	15mm										✓
	B080070182	20mm							✓			
Sight Glass	B853505002	3/8" threaded	✓			✓				✓		
	B040120322	Clip On		✓	✓		✓	✓			✓	✓
Breather Plugs	B852570002	3/8" Yellow	✓			✓				✓		
	B049832973	1/4" Orange	✓	✓	✓		✓				✓	✓
Gearbox	B318699973	Ø 24mm/ 3/4"	✓	✓								✓

# HEAVY DUTY SLOW SPEED BERTOLINI PUMP SERVICE PARTS (TTL & KTL SERIES)

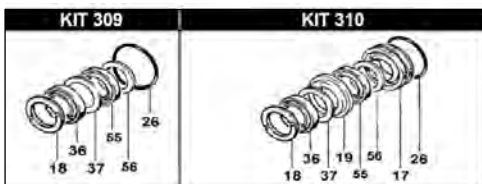
Example Bertolini Pump Breakdown  
TTL 300 series



Check Blaster Blitz for Bertolini Pump kits & SAVE



Bertolini pump breakdowns available online ... aussiepumps.com.au

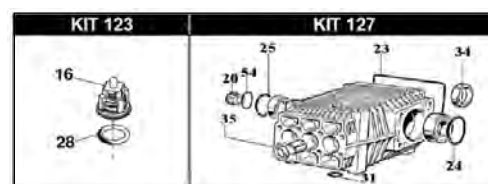


**Minor seal kit**  
HW = hot water seals up to 85°C

**Major seal kit**



**Oil seal kit**



**Valve kit**

**Full oil seal & sight glass kit**



**Valve cap kit**

Scud series

Jetter/Predator series

	Part No.	Quantity	PUMP MODEL									
			TTV 2015 TTV 2021	KTV 3015 TV 3021 KTV 4040	KKV 2028	HDS 5057	TTL 1520 TTL 2120	TTL 1330 TTL 1530	TTL 2030 TTL 2028	TTK 3021	TTK 2130 (4365)	KTL 1635 KTL 2035
<b>Valve Kit</b>	BKIT123	12 pieces	✓	✓			✓	✓	✓		✓	✓
	BKIT249 - HW	12 pieces	✓	✓			✓	✓	✓		✓	✓
	BKIT40	12 pieces			✓							
	BKIT93	12 pieces				✓						
	BKIT148	12 pieces								✓		
<b>Valve cap kit</b>	BKIT67	12 pieces	✓	✓			✓	✓	✓	✓	✓	✓
	BKIT89	18 pieces (BKIT311 s/no 15070568 up)	✓	✓			✓				✓	
<b>Minor Seal Kit</b>	BKIT200 - HW		✓	✓			✓				✓	
	BKIT90	18 pieces			✓					✓		
	BKIT201 - HW	18 pieces			✓					✓		
	BKIT95	18 pieces (BKIT309 s/no 15070568 up)				✓		✓	✓			
	BKIT199 - HW					✓		✓	✓			
	BKIT309	18 pieces										✓
<b>Major Seal Kit</b>	BKIT86	24 pieces (BKIT312 s/no 15070568 up)	✓	✓			✓				✓	
	BKIT87	24 pieces			✓					✓		
	BKIT96	24 pieces (BKIT310 s/no 15070568 up)				✓		✓				
	BKIT310	24 pieces										✓
<b>Oil Seal Kit</b>	BKIT37	3 pieces	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Full oil seal &amp; sight glass kit</b>	BKIT127	10 pieces	✓				✓	✓	✓		✓	✓
	BKIT98	9 pieces		✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Piston</b>	B060009182	20mm	✓	✓			✓				✓	✓
	B060010182	22mm			✓					✓		✓
	B060055182	18mm				✓		✓	✓			✓
<b>Sight Glass &amp; o-ring</b>	B853515502	¾ threaded (with o-ring)		✓	✓	✓				✓	✓	✓
	B060059322	Clip On	✓				✓	✓	✓	✓	✓	✓
<b>Oil Breather</b>	B060020322		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Gearbox</b>	B318870973	∅ 24mm/ 1" Shaft	✓				✓	✓	✓			
	B319110973	∅ 24mm/ 1" Shaft							✓	✓		✓
	B319111973	∅ 24mm/ 1 1/8" Shaft										✓
	B318855973	∅ 30mm/ 1" Shaft		✓	✓							
	B318880973	∅ 30mm/ 1 1/8" Shaft				✓						

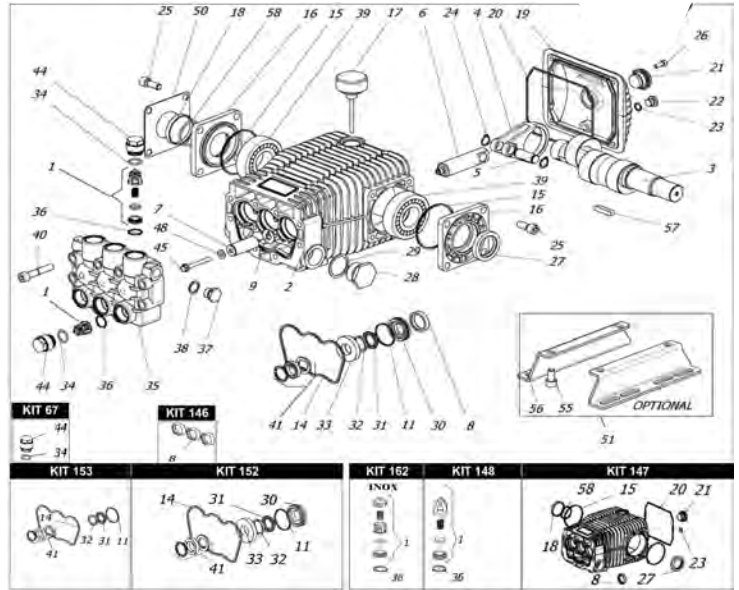
## HEAVY DUTY SLOW SPEED BERTOLINI PUMP SERVICE PARTS (RAL & RAS SERIES)

Example Bertolini Pump Breakdown RAS series

Bertolini pump breakdowns available online ... [aussiepumps.com.au](http://aussiepumps.com.au)



Check out our Jetter Handover Guide for more maintenance & service tips



Current Jetter/Predator range 500 BAR

		PUMP MODEL					
		Part No.	RAL 2035	NEW RAL 2035-P 2535-P	RAS 4482	NEW RAS 4482 Premium	RA 316
Valve Kit		BKIT123	12 pieces	✓	✓		
		BKIT249 - HW	12 pieces	✓	✓		
		BKIT148	12 pieces			✓	✓
		BKIT253 - HW	12 pieces			✓	✓
Valve cap kit		BKIT67	12 pieces	✓	✓	✓	
		BKIT211	18 pieces				✓
Minor Seal Kit		BKIT153	19 pieces		✓		
		BKIT283	19 pieces			✓	
		BKIT164	19 pieces	✓			
		BKIT271	19 pieces		✓		
		BKIT219 - HW	19 pieces		✓		
Major Seal Kit		BKIT227	13 pieces				✓
		(BKIT277 premium series)					
		BKIT152	25 pieces			✓	
		BKIT282	25 pieces				✓
		BKIT165	25 pieces	✓			
Oil Seal Kit		BKIT270	25 pieces		✓		
		BKIT228	19 pieces				✓
		(BKIT276 premium series)					
Full oil seal & sight glass kit		BKIT146	3 pieces	✓	✓	✓	✓
		BKIT147	11 pieces	✓	✓	✓	
Piston		BKIT210	10 pieces				✓
		B080070182	20mm	✓	✓	✓	✓
Sight Glass & o-ring		B853515502	¾ threaded (with o-ring)	✓	✓	✓	✓
		B060059322	Clip On	✓	✓		
Oil Breather		B060020322		✓	✓	✓	✓
Gearbox		B318880973	∅ 30mm/ 1 1/8" Shaft	✓	✓	✓	✓

## TRIPLEX PUMP SERVICE GUIDELINES

### VALVE ASSEMBLIES



- All inlet and discharge valves can be serviced without disconnecting the inlet or discharge plumbing.
- The inlet and discharge valves are identical in all models.
- To service any valve remove valve cap and extract valve assembly.
- Examine o-rings and replace if there is any evidence of cuts, abrasions or distortion.
- Remove valve assembly (retainer, spring, valve, valve seat) from valve cavity.
- Only one Aussie Pumps valve kit is required to repair all valves in the pump. The kit contains o-rings, valve seats, poppets, springs and retainers.
- Install new o-ring in valve cavity.
- insert assembly into valve cavity.
- Replace valve cap and torque to specifications.



**NOTE:**  
Hot water seal & check valve kits available, for selected slow speed models, to handle water up to 85°C. Call for details.

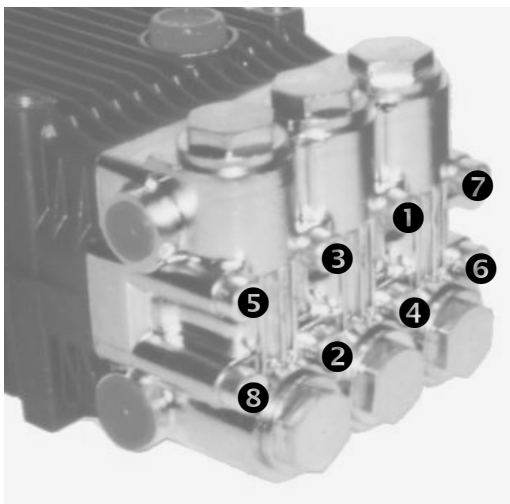
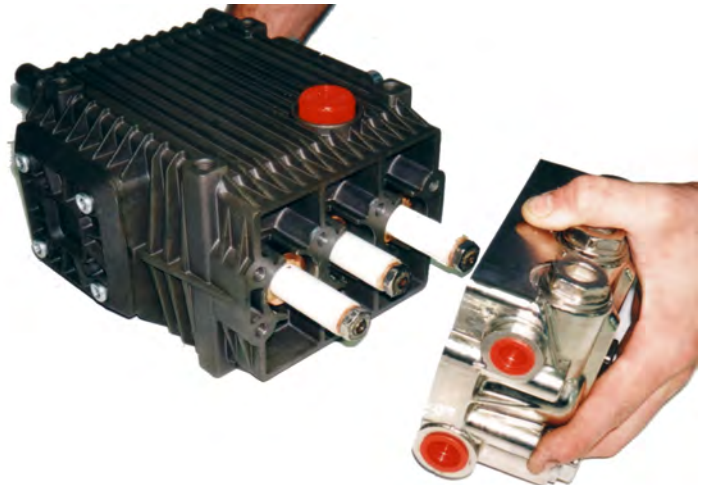
Check Valve Caps torque settings	
SERIES	TORQUE
WEL-WESL-WE-WES-WSG	70 Nm*
HG-ALG	50 Nm*
WJL-WJC-WJS-WJH-WJG	50 Nm*
BX-WJCU-WB-WBX	22 Nm
WM	70Nm
TW-TWS-TWSG-KWE	120 Nm
TML	70 Nm
TTV-KTV-TTL-TTK-KTL-RA	70 Nm
KKV-KKL-RB	100 Nm
HD (bolts M12)	70 Nm

\*After each check valve service, apply Loctite or equivalent sealant to the check valve cover threads and tighten to the proper torque.

**CAUTION!** If you are not sure about the right torque, apply a little amount of Loctite 243 or equivalent sealant to the valve cover thread.

### REMOVING MANIFOLD HEAD

- Remove the fasteners retaining head
- Separate head from crankcase. It may be necessary to tap head *lightly* with soft mallet to loosen. Care should be taken not to damage plungers when sliding head from crankcase.
- The V-packing assemblies may come off with the head. Examine plungers. The surface should be smooth and free from scoring and pitting. If not, replace.
- Replace manifold head and torque to specifications using the sequence shown below:



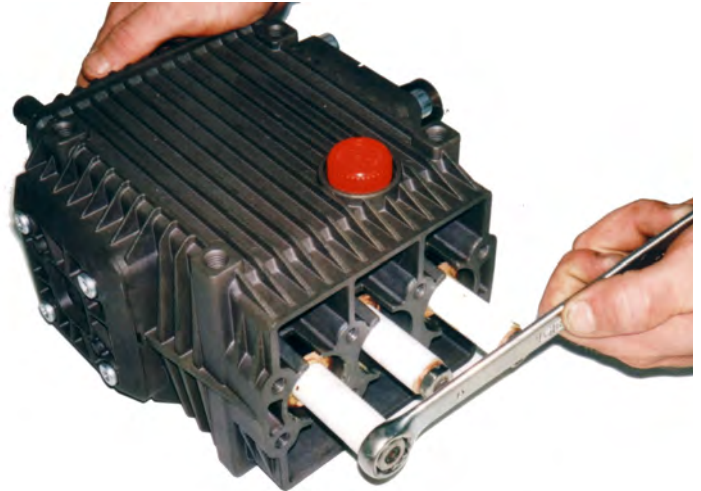
### TORQUE SEQUENCE FOR TIGHTENING HEAD

- Install all head bolts finger tight. Torque to 14 Nm in sequence as shown, then re-torque to specifications following the same sequence

## TRIPLEX PUMP SERVICE GUIDELINES

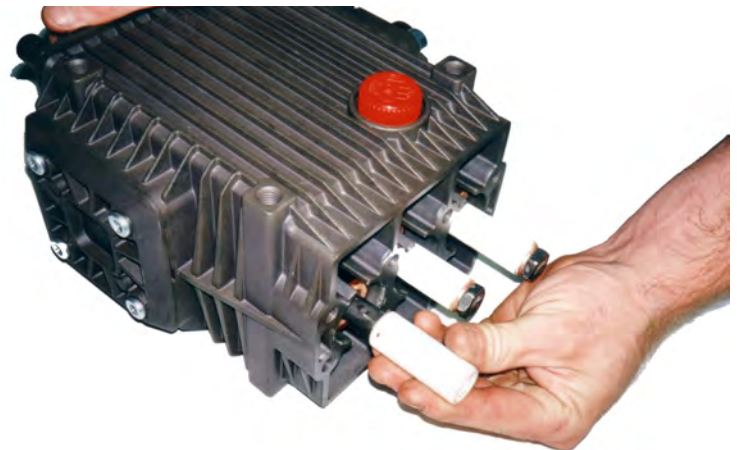
### REPLACING PLUNGERS

- Remove stainless steel piston nut and copper washer from piston rod
- If slinger washer comes off with plunger ensure this is replaced before the new plunger is installed.



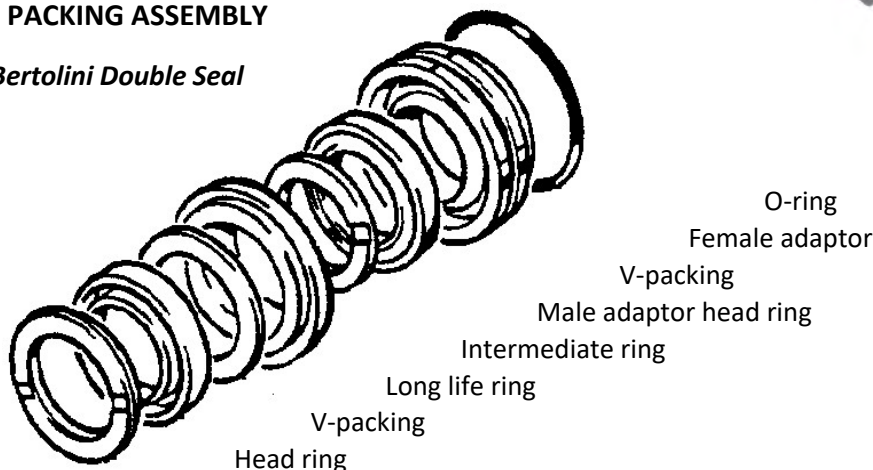
- Separate piston from plunger
- Install new o-ring and teflon backup ring on plunger.
- A thin film of grease on the outside of the o-rings will ensure a better seal.

- Carefully press piston over plunger
- Fit new copper washer, apply a little Loctite 243 or equivalent sealant to the thread. Replace nut and tighten to 13Nm torque.



### TYPICAL PACKING ASSEMBLY

#### *Unique Bertolini Double Seal*



NOTE:  
 Hot water seal & check valve kits available, for selected slow speed models, to handle water up to 85°C. Call for details.



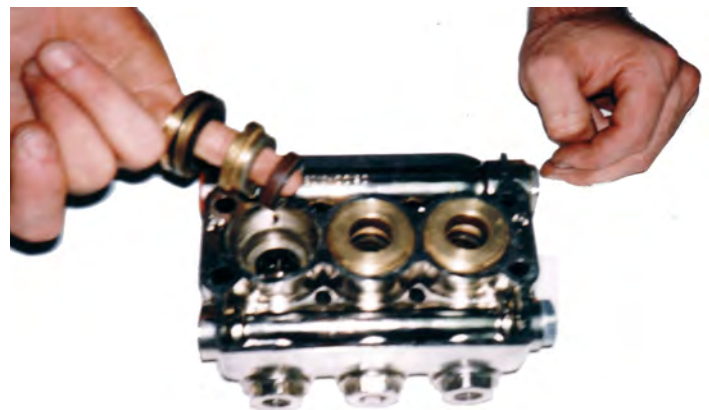
## TRIPLEX PUMP SERVICE GUIDELINES

### REPLACING V-PACKINGS

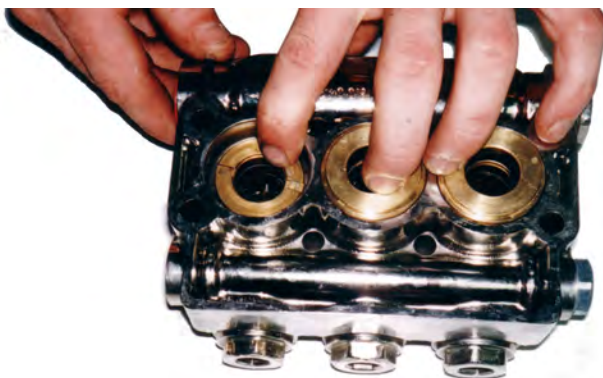


- Remove manifold from crankcase
- Insert proper extractor collet through main seal retainer. Tighten collet and extract retainers, v-packings and head rings.

- Place correct insertion tool in cylinder and install front head ring, v-packing and long life ring and press firmly into cylinder until they will go no further.



- Insert intermediate seal retainer pressing it firmly into cylinder until it will go no further using proper insertion tool.
- Install rear head ring v-packing and main seal retainer into cylinder in order shown and press firmly into cylinder



- Repeat this sequence for each cylinder
- Coat each plunger with grease and carefully remount manifold. Torque head to specifications.



**RECOMMENDED PUMP OILS**

APPLICATION	AUSSIE BLASTER	RECOMMENDED OIL
 <p><b>Axial style wobble-plate pumps</b></p>	H101 H110 H120 H130 F140 F150 F180 Panther Cougar Tiger MkII	Renolin 100B non-foaming oil
 <p><b>Triplex style crankshaft/piston pumps</b></p>	Monsoon Series Scud Series BB Series Super Indy Series Sizzler Series Admiral Terminator Predator	SAE 75W/90 gear oil
<p><b>Pressure cleaner gearbox</b></p>	Slow speed machines	SAE 75W/90 gear oil



Note: Gearbox has a separate oil chamber and filling cap

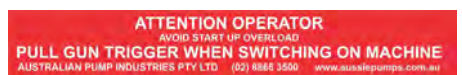
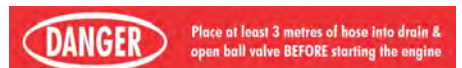
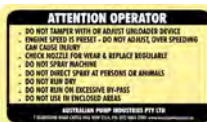
**FREE SAFETY DECALS**



Let us know what Aussie safety decals you need and we'll send them out FREE of charge.



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 www.aussiepumps.com.au



**AUSSIE PRESSURE CLEANER TEST SET**

Professional pressure cleaners occasionally need to have their pressure tested and sometimes reset.

A drop in pressure could indicate nozzles are worn, the pressure regulator is worn, there are leaks in the system, the valves are sticking or signal other problems.

If your system does not include a pressure gauge an Aussie Test Set (p/n ATESTSET) can be supplied.

The kit consisting of a convenient brass T piece, with M22 quick coupler and 6,000 psi pressure gauge.

Simple and quick to fit, you can make sure everything is operating as it should.



## AUSSIE BLASTER PRESSURE SETTING INSTRUCTIONS

A **pressure spike** will cause the safety valve to ‘blow’ to prevent damage to the pump seals.

A pressure spike is generally **caused by the unloader** for the following reasons.

1. **Worn nozzles**

Worn nozzles, fitted in the end of the lance, result in less water bypassing back through the unloader to cool & lubricate it. Without sufficient flow the unloader will overheat and wear.

Pressure cleaner nozzles need to be changed regularly to maintain pump performance. A drop in pressure on the gauge indicates nozzle wear.

Replace worn nozzles.

2. **Dirt in the unloader** may cause it to jam.

Clean out unloader & check inlet filter fitted and clean.

3. **Leaks in the system** can cause unloader ‘chatter’.

This will lead to the unloader wearing prematurely. All leaks must be fixed before using the machine.

**Once the unloader has been serviced or replaced, resetting the safety valve is simple.** This video shows how to adjust the unloader and the safety valve.

For models without a pressure gauge fitted (AB30, AB40, hire spec machines) an **Aussie Test Set** should be installed during this process between the pump outlet and the high pressure hose. (see page 18).

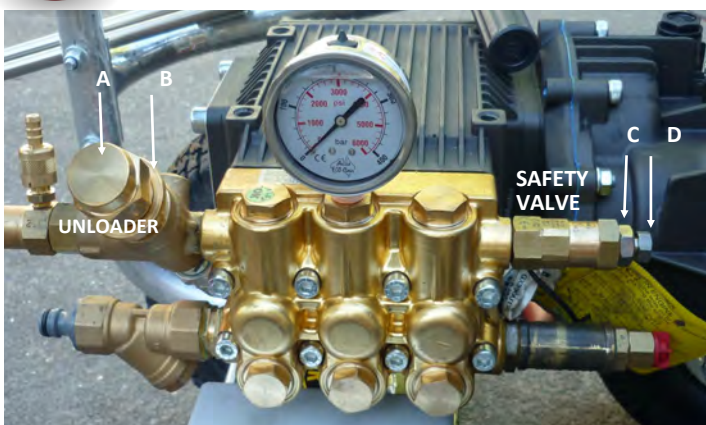
## SETTING SAFETY VALVE & UNLOADER

The following steps should be taken to reset the safety valve, with the unit running.

1. Unscrew the lock nut (C) on the safety valve and the adjusting screw (D), should be screwed in all the way.
2. Using an allen key, loosen the lock nut (B) on the unloader and wind the unloader knob (A) in gradually until the required pressure is obtained whilst the trigger is pulled and water is running through the pump. Do not exceed the maximum rated pressure of the pump.
3. The lock nut (B) should then be wound down until it grounds out at the bottom (do not over tighten as this will further adjust the pressure) and locked with use of the allen key. Paint mark across the nut and knob to identify any tampering with the setting.
4. With the pump running at the required pressure, the adjusting screw (D) on the safety valve should be wound out until there is a slight drip. Screw it in one quarter of a turn, or until the drip stops, this will set the safety valve 10% over the required pressure. The lock nut (C) should then be locked off. Paint mark to identify any tampering.
5. Repeat running with the trigger open and then closed two or three times to ensure safety valve doesn't blow off pressure.
6. If safety valve continues to trip contact your nearest Aussie Eco-clean service centre.



**NOTE: These instructions are intended for the use of Authorised Aussie Eco-Clean service centres only**





# PREVENTATIVE MAINTENANCE



## OVERSPEEDING

Do not operate pump over rated rpm.  
Over speeding can cause serious pump damage.

## EXCESSIVE BYPASS

Do not run on excessive by-pass.

Switch machine off within five minutes of ceasing operation as excessive by-pass can cause heat build up in the pump and subsequent damage.

**Excessive bypass running voids warranty.**

## PRESSURE CLEANER DAILY CHECKLIST

- Check the pump oil level
- Check engine & gearbox oil level
- Check nozzle for wear
- Check all high pressure components for leaks:
  - gun/lance
  - HP hose
  - all fittings
- Check water filter and clean regularly
- Check unloader, safety valve and thermal dump for leaks



**BEWARE** of abrasions on hose and replace if damaged ... **STAY SAFE**

## HIGH PRESSURE SETTING

The unloader valve is factory set to operate at the pumps rated pressure.

Tampering with the pressure regulator will void warranty and can be DANGEROUS.

## CHECK NOZZLE MONTHLY

If pressure drops off check nozzle for wear.

Nozzles should be replaced on a regular basis (every month for machines in regular use, every three months for machines used intermittently).

Using the machine with the incorrect nozzle size or worn nozzle will void warranty and can be **DANGEROUS to the operator.**

## THREE MONTHLY REGULAR SERVICE

All professional machines need to be thoroughly serviced every three months. Use an approved and qualified Aussie service agent. The service should include the engine manufacturer's recommendations (see separate Engine Manual) and the following:

- Change the pump & gearbox oil
- Check filter for foreign debris
- Check unloader, safety valve and thermal dump for leaks
- Check all HP components for leaks: Gun/lance, HP hose and all fittings
- Replace nozzles
- Check gearbox to engine key for wear, and replace as required. NB Damage generated by worn keys is not covered by warranty.



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