Integrated Professional Cleaning

IPC

Service Manual

Rev.1.0 January 2013

PW-C25 & PW-C25P

Models

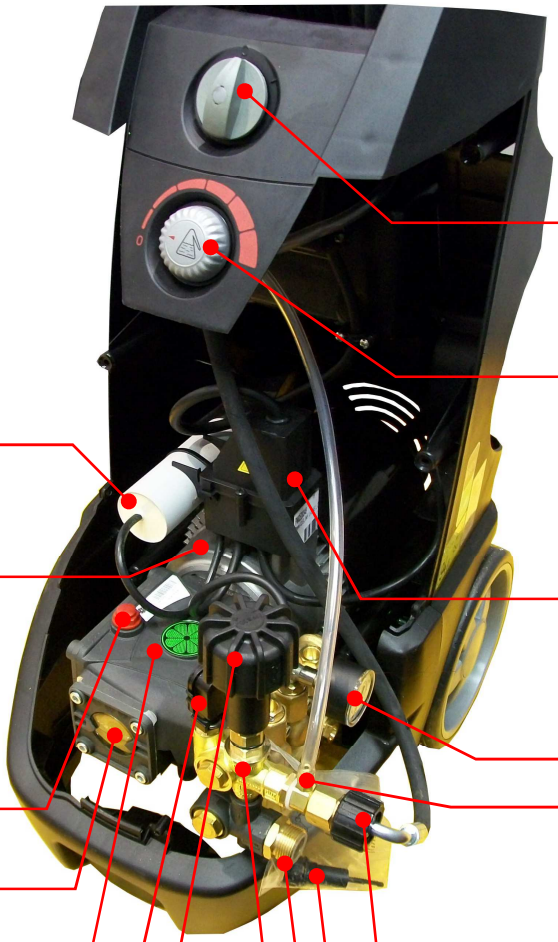
1509P-M 230V 50Hz
I1509P-M 230V 50Hz
1813P-T 400V 50Hz
I1813P-T 400V 50Hz
I1310P4-M 230V 50Hz

PW-C25 / PW-C25P outer layout

High pressure hose – spray gun – lance

PW-C25 / PW-C25P inner layout

Standard accessories set, that includes the inlet water filter and “garden” quick inlet fitting.



Main switch

Chemical tap and dose

Electric motor starting capacitor

Electric motor

Electric enclosure

Pressure gauge

Chemical injector

Oil cap for handling and transportation

Oil level window

High pressure pump

Total stop micro-switch

Pressure adjusting knob

Water outlet fitting

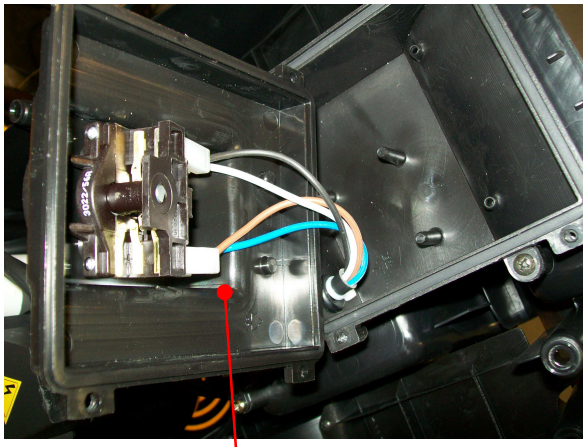
Oil cap with air breath

Water inlet fitting

By-pass valve

PW-C25 / PW-C25P
electric box components layout

Electric box for wiring the electric motor, the starting capacitor, the total stop switch and the power cord.



Electric box for on – off main switch

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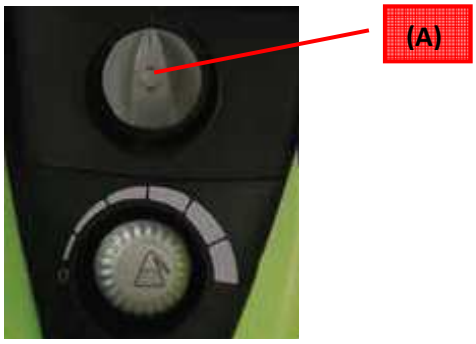
INDEX

Topics

1. The machine doesn't starts

1) ***TROUBLE:*** Rotating the main switch "0 – I" (A) the high pressure cleaner doesn't starts or starts, but suddenly stops after a while.



CAUSES:

1a No electrical connection
1b No electrical supply to the electric motor or motor thermal sensor overload intervened or burnt fuses
1c The micro-switch of bypass valve not working (only for machine with total stop system)
1d Contactor not working (on versions three phase or P4)

REMEDIES:

1a Check the power supply voltage using a "multimeter".
The machine power supply characteristics are indicated on the machine data plate placed on the rear side of its chassis.
For single-phase models, the allowed voltage tolerance is +/- 5%.
For three-phase models, the allowed voltage tolerance is +/- 10%.

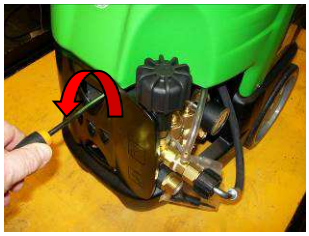
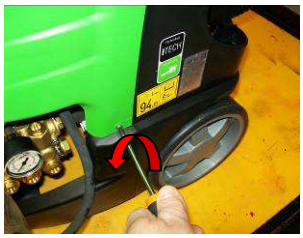
Machine data plate

If the voltage is over or lower than the above mentioned tolerance, the machine electric components may become damaged.
Pay maximum attention while checking electric component: **danger of electric shocks**.

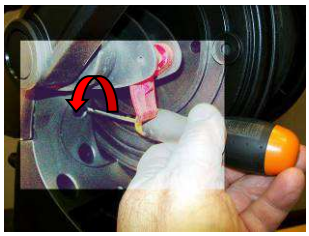
1b Pay maximum attention: **danger of electric shocks.**
Disconnect the machine from the power supply before opening the electric enclosures, hence:

- check using a multimeter, the conductivity of the main switch contacts, rotate the switch knob to position “I” and in case of problems, replace the switch with a new component.
To open the electric enclosures, proceed as following described:

Opening:

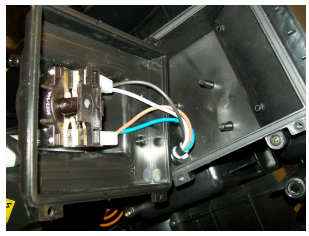



1. Remove the machine cover

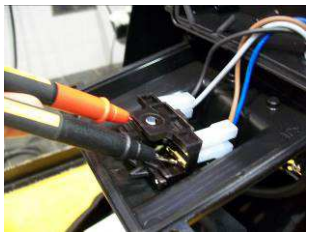
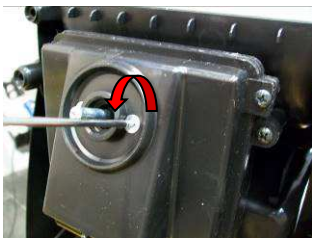
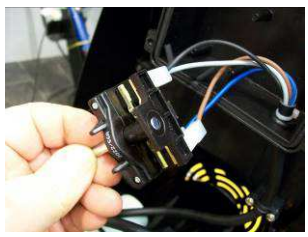



2. Remove the handle cover


3. Remove the main switch knob

4. Open the electric box cover

5. Check the main switch contacts continuity using a multimeter, if damaged replace it.

- If the thermal sensor of the electric motor is intervened, the electric motor is disconnected and the machine cannot work.
The thermal sensor, intervenes when the motor winding temperature is over 155°C and in order to cool it down and allows its automatic reset, are required some minutes with the electric motor off.
The thermal sensor is built-in into the motor winding of single phase models, while is wired into the electric box for three-phase models or for P4 models.
The thermal sensor is a protection against overload and needed to prevent burning of the motor windings, but has a limited life in term of number of interventions and if the machine has been used continually under overloaded, the thermal sensor can become damaged and loose the capacity to self reset, hence not allowing the motor to restart when decreases the winding temperature.

In order to restore a damaged thermal sensor, is needed to replace the complete electric motor stator.

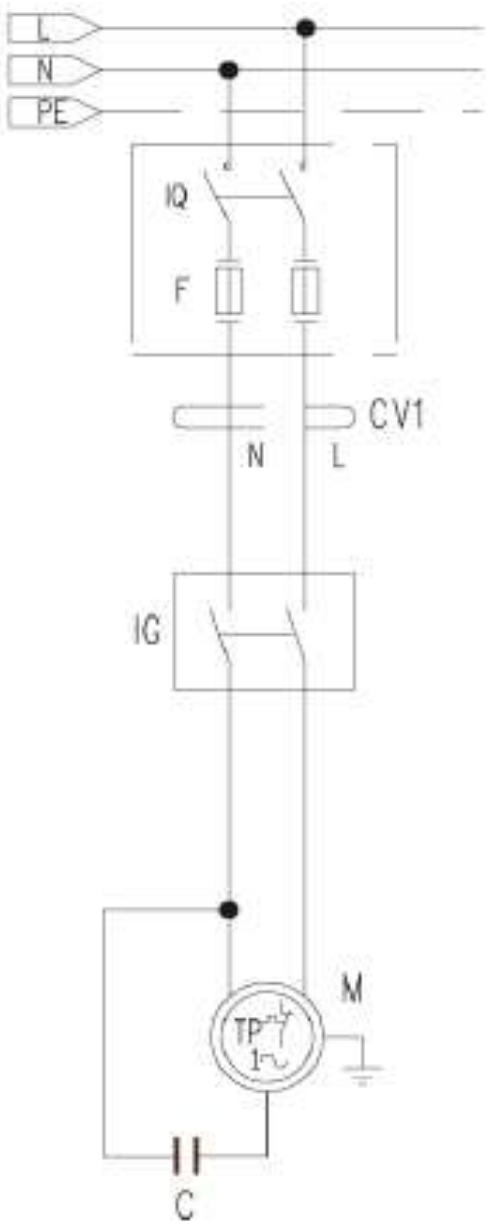
- If the fuses of the socket or to the plug are burnt, the machine is not power supplied; replace the fuses and check if their amperage is enough for the machine Amperage characteristics that are readable on its data plate.
Take into consideration that a low voltage supply can cause difficulties to the motor starting and as a consequence can makes that fuses burn.
We recommend to check the machine amperage using a clamp meter in order to be sure that the machine working at the maximum pressure is not absorbing more Ampere than what indicated on its data plate.

Check the Amperage with a A clamp meter after switching on the machine and checking that the machine is correctly power supplied by the fuses.

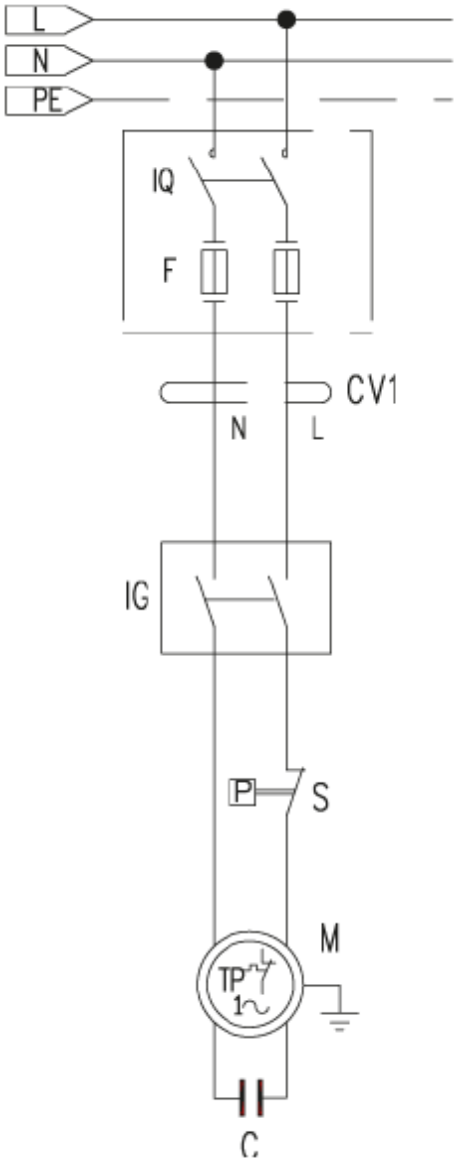
Measured Amperage should be less or equal than Amperage wrote to the machine data plate.

Electric diagrams

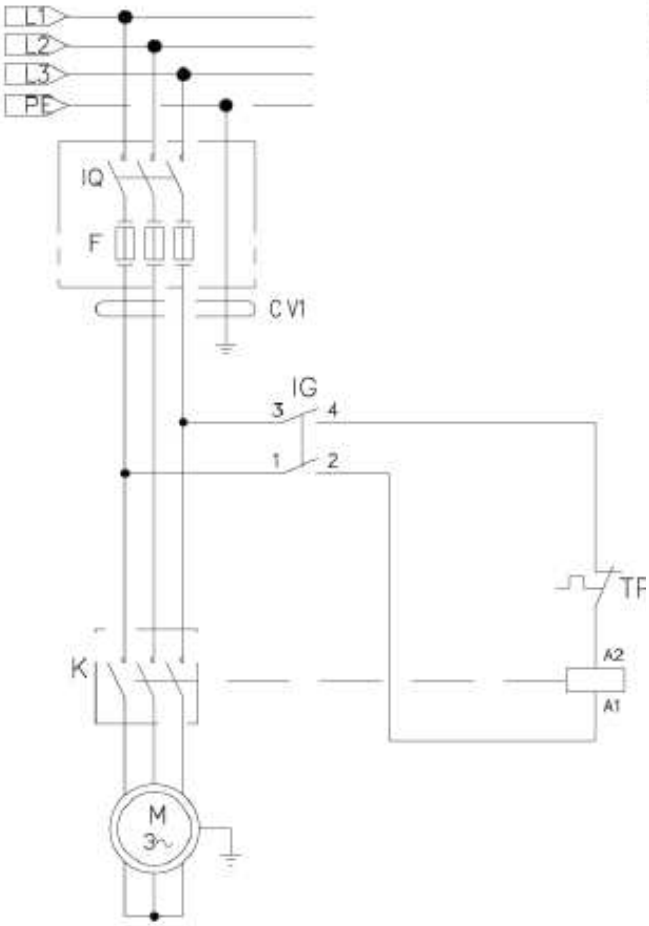
Single phase by-pass



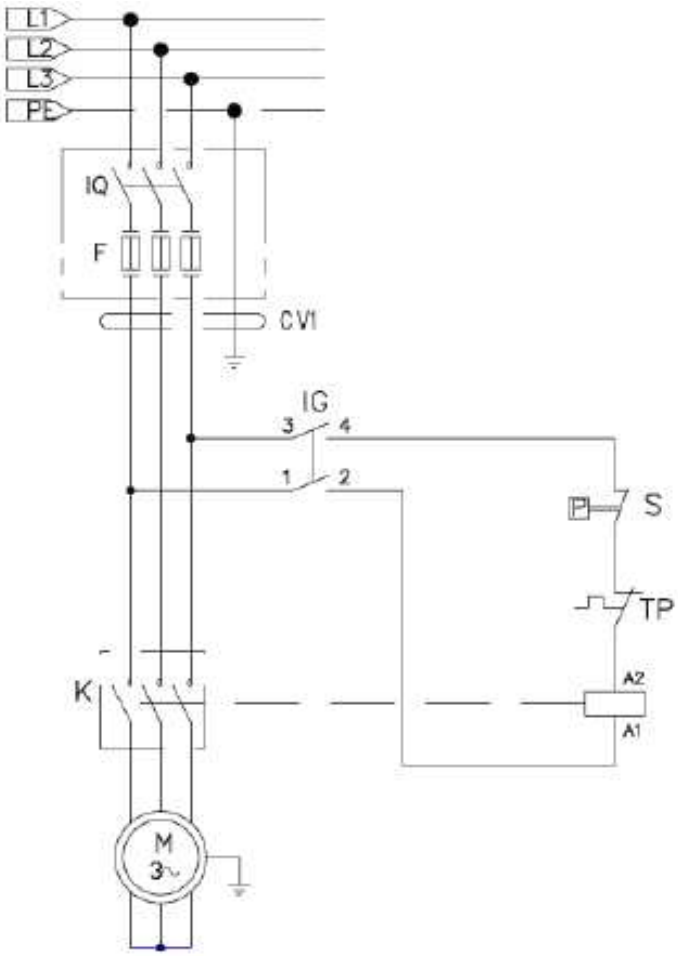
Single phase total stop



Three phase by-pass



Three phase total stop



On which :

- IQ = Main switch of the power supply socket
- F = Fuses of the power supply socket
- CV1 = Machine power cord
- IG = Machine main switch
- M = Electric motor
- TP = Thermal overload protection (clicson)
- C = Electric motor starting capacitor
- K = Contactor
- A1 – A2 = Contactor coil

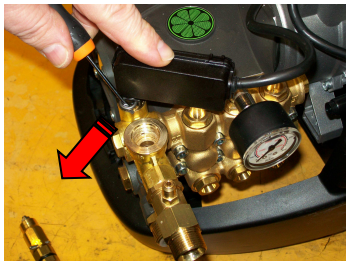
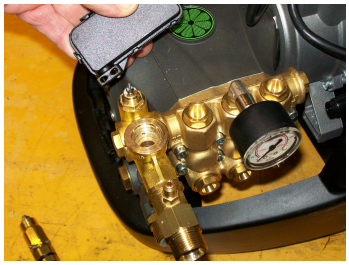
1c Total stop versions have a micro-switch “S” that controls the contactor “C” on three phase models and that controls directly the electric motor on single phase models, hence makes the pump and motor unit to start and to stop accordingly with the position of the spray gun trigger:

- When the spray gun trigger is activated, and the lance is ready to spray water, the micro-switch “S” is closed (on), the contactor (if present) is activated (on) and the electric motor is power supplied.

- When the spray gun trigger is released, the lance stops to spray water, the micro-switch “S” is open (off), the contactor (if present) is open (off) and accordingly the electric motor is not power supplied and stops in “total stop mode”.

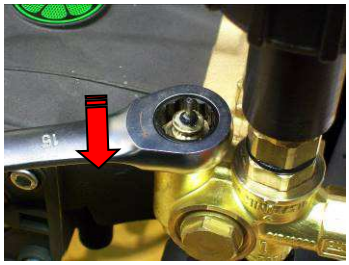
In case that the micro-switch “S” is defective or the piston that activate the micro-switch is not sliding inside of the by-pass valve, the machine cannot start.

Check the pressure-switch continuity using a multimeter as following described:

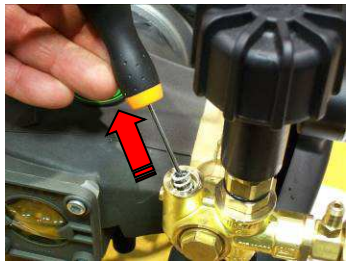

Dismount the and open the micro-switch enclosure.

Check the pressure-switch switching capacity and continuity by using a multimeter.



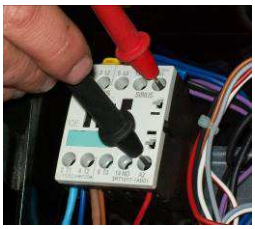
Unscrew the piston that activates the micro-switch

Slide out the piston and its spring, check if parts are wear and tear and if necessary replace them. Lubricate with grease at the reassembly.



1d The contactor “C” is installed only on three phase or P4 models and power supplies the electric motor accordingly to the status of the micro-switch “S” and main switch “IG” for machine total stop version and only the status of main switch “IG” for machines by pass version.

Check using a multimeter if the contactor coil “A1-A2” is power supplied and check if the power contact of contactor have continuity when are closed.



We recommend to check the proper functioning of safety electric components, at least once a year.

2. No water jet at the lance nozzle

2) ***TROUBLE:*** No water jet sprayed from the lance nozzle.

CAUSES:
2a Bad or missing water feeding connection
2b Inlet water filter clogged
2c Air intake from the water feeding circuit
2d Pump head valves ceased
2e High pressure nozzle clogged

REMEDIES:

2a Check the supply water flow (l/min), in order to ensure that supply water available is sufficiently high compared with the machine characteristics.
The supply water flow (l/min) must exceed at least 10%, than the water flow characteristics declared in the machine data plate.
Check the fittings to the water inlet circuit and particularly ensure they are not damaged or not properly sealed, causing flow obstruction or air intakes.

2b Check and clean the water supply inlet filters and if necessary, replace them.

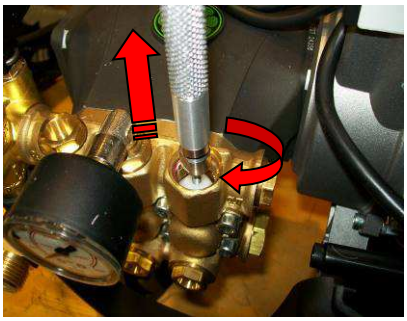
Check and clean the filter place the high pressure pump inlet or at the water tap outlet.

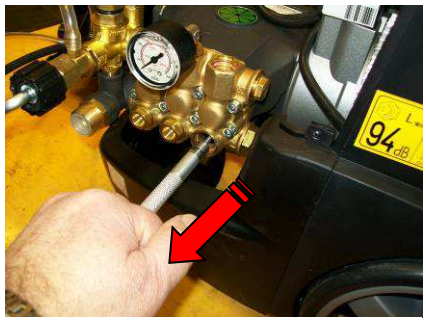
We recommend to check the water filter every 50 hours (or every week)

2c Check the water circuit that connects the water tap to the high pressure pump inlet, particularly check that fittings are properly tightened and not leaking water.
This model has not capacity to intake water from a tank placed lower than the machine inlet fitting, hence this machine can only to intake the water from a tank placed above than the machine water inlet fitting.
In the above functioning circumstance is important to check that the inlet circuit is perfectly sealed to avoid air intakes.

2d Check the inlet and outlet valves placed into the pump head; if the valves are sticky, unstick the valve from its seat manually pressing gently the valve disk until released.
If the valves are dirty, disassemble them and clean.

Unscrew the inlet valve caps





Strip out the valves, use a screw M4 to link and pull out the valve

Remove the 6 valve from the pump head and replace them if wear and tear

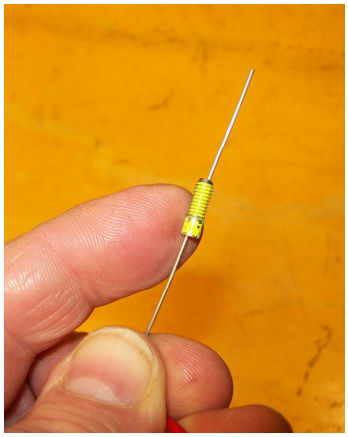
Unstick the valve from its seat pressing gently with a pin.

Reassemble the caps using sealing glue type Loctite 542.

We recommend the replacement of inlet and outlet valves every 500 hours or one a year.

2e Clean the high pressure nozzle and if necessary, replace it with a new genuine part. Check the spare part book in order to identify the nozzle size.

Unscrew the nozzle using an Allen key size 2 mm.



Clean the nozzle orifice with the help of a steel wire diameter ≤ 1 mm.

The nozzles are colored with different colors to make possible the identification of their size, the part number description include the color information (see the part manual for PW-C25).

We recommend the high pressure nozzle replacement every 200 hours or any time the machine working pressure become 20% lower than rated pressure.

3. No pressure to the lance

3) ***TROUBLE:*** The high pressure pump rotates, but doesn't achieve the rated pressure or the pressure is not stable and fluctuates.

CAUSES:

3a Defective water feeding connection
3b Inlet water filter clogged
3c Air intake from the water feeding circuit
3d Pump head valves ceased or worn
3e Lance nozzle set in low pressure mode (detergent mode)
3f High pressure nozzle worn or deformed
3g Pressure adjusting valve setting at minimum position
3h Seat of pressure adjusting valve damaged
3i Pump gaskets worn or water leaks from the pump head

REMEDIES:

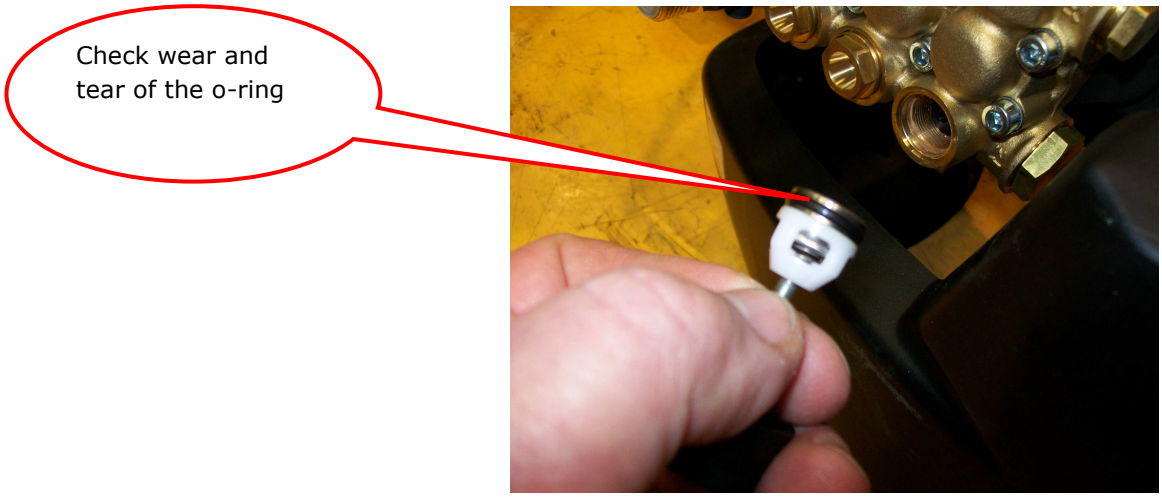
3a Check the feeding water flow (l/min), in order to ensure that feeding water available is sufficiently high compared with the machine characteristics.
The feeding water flow (l/min) must exceed at least 10%, than the water flow characteristics declared in the machine data plate.
Check the fittings to the water inlet circuit and particularly ensure they are not damaged or not properly sealed, causing flow obstruction or air intakes.

3b Check and clean the water inlet filters and if necessary, replace them.

We recommend to check the water filter every 50 hours (or every week)

3c Check the water circuit that connects the water to the high pressure pump inlet, particularly check that fittings are properly tightened and not leaking water.
In case of leakages, proceed with the circuit repair.
If the machine is in-taking water from an external tank, being its high pressure pump, not designed for self priming, is possible that its working pressure being lower and the machine can operate under this condition only temporarily, we do not recommend to use this machine continuously as self-priming.
The maximum deep to allow this pump self priming is 50 cm.

3d Check the inlet and outlet valves placed into the pump head; if the valves are sticky, unstick the valve from its seat manually pressing gently the valve disk until released.
If the valves are dirty, disassemble them and clean.
If the valves are worn or deformed, replace them and also replace the o-ring placed under the valves.



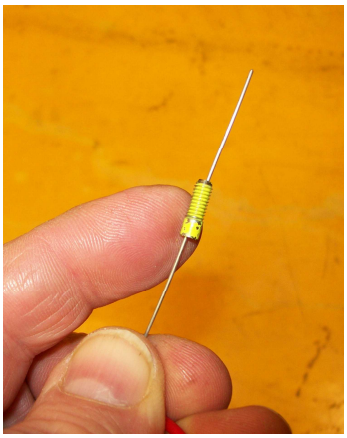
We recommend the replacement of inlet and outlet valves every 500 hours or one a year.

3e Check the lance head (nozzle) position, it must be set in high pressure mode, not in detergent mode; during the detergent mode the water flow is discharged without pressure.

Detergent mode

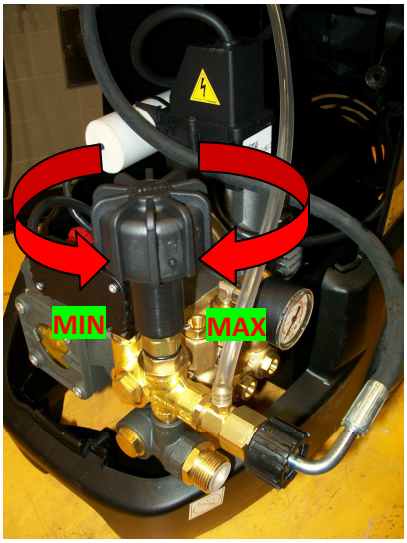
High pressure mode

3f Replace the high pressure nozzle with a new genuine part.
Check the spare part manual to identify the correct nozzle size.
Instruction to disassembling the nozzle: see **2e**

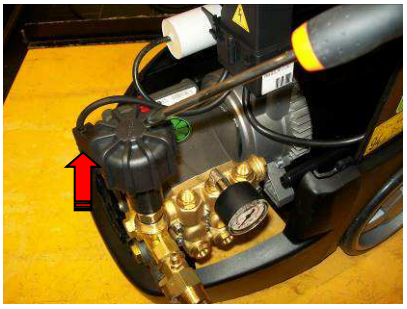


We recommend the high pressure nozzle replacement every 200 hours or any time the machine working pressure become 20% lower than rated pressure.

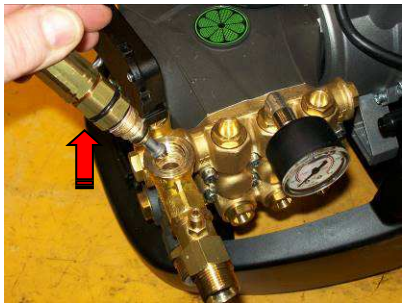
3g Check if the pressure adjusting knob is set to maximum position.
The position maximum is when the knob it fully rotated clockwise.

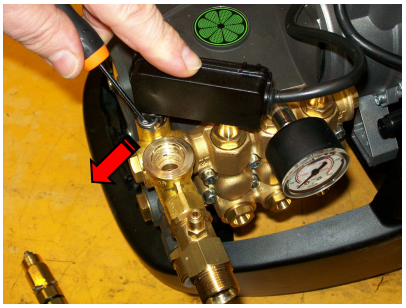


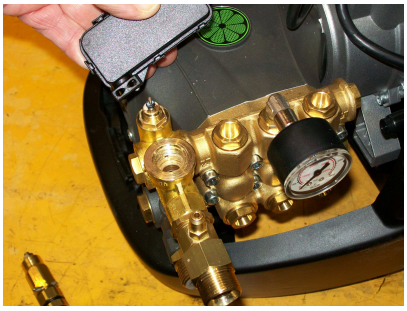
3h Repair the pressure adjusting valve (by pass valve) by replacing its cartridge that is part of the dedicated repairing kit.

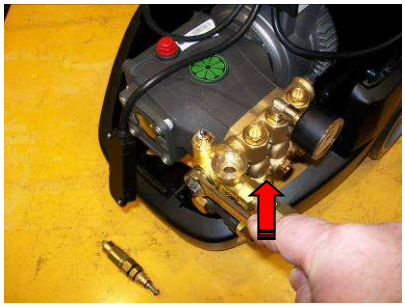

Remove the knob by pulling it out

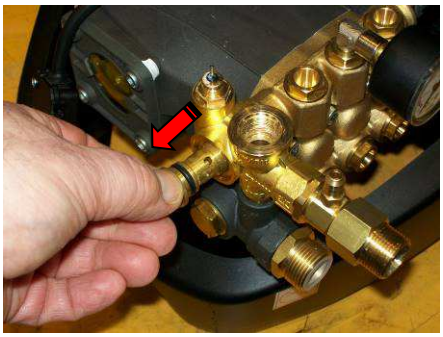

Unscrew the valve cartridge


Strip out the valve


Remove the pin holding the switch


Strip out the switch box


Unscrew the fixation bolt of the by-pass place at the high pressure side.

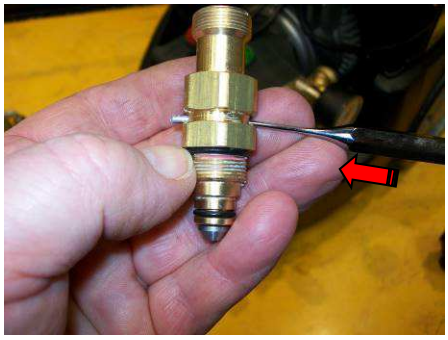


Slide out the fixation bolt of the by-pass

The by-pass valve is so disassembled, if necessary it can be replaced with a new one.

To disassemble the by-pass seat, push it out with the help of a screwdriver, as in the picture.

To disassemble the by-pass piston, slide out and remove the locking pin.

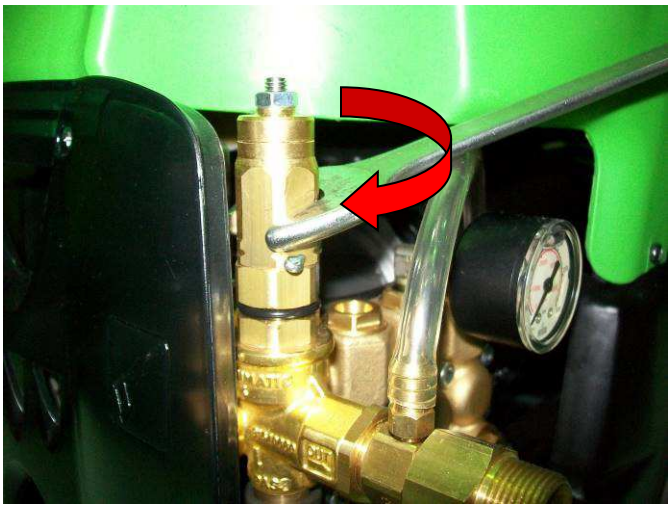


To disassemble the by-pass piston, push out and remove the locking pin.

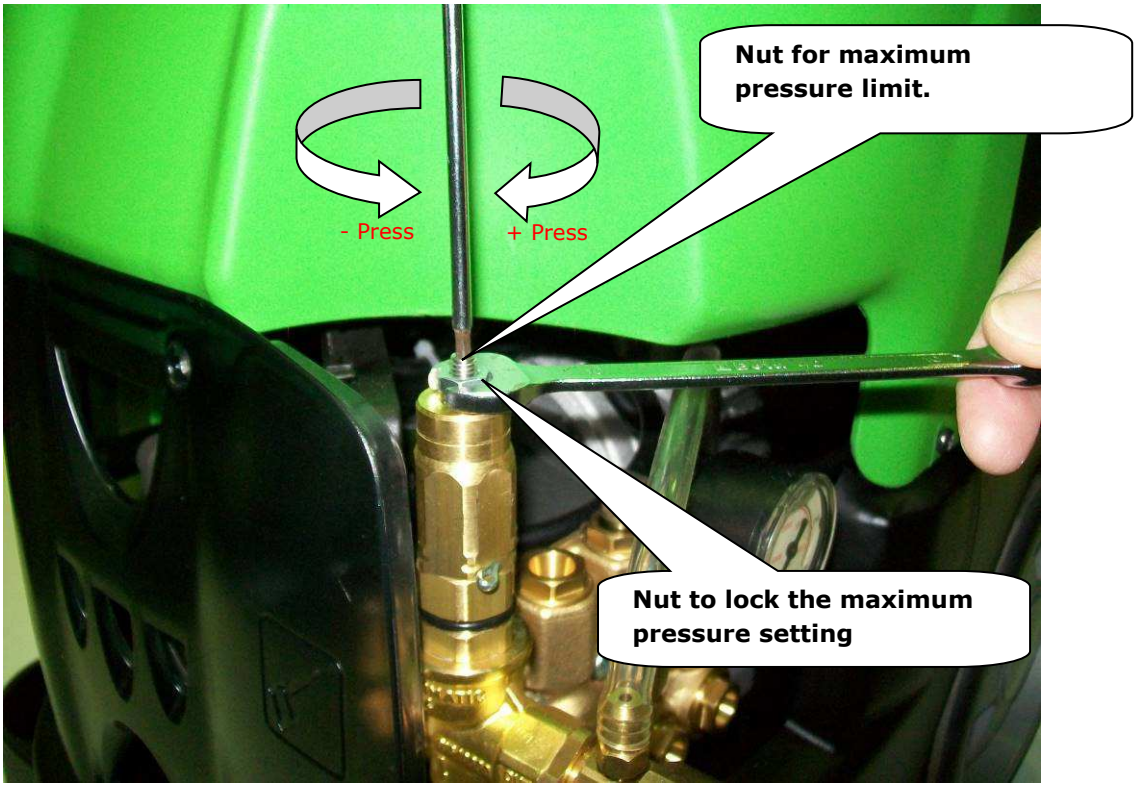
The by-pass system is now completely disassembled and can be repaired or replaced by a new by-pass repair kit.

To reassemble the by-pass whole cartridge to the by-pass valve, we recommend the use of Loctite 542.

After replaced the by-pass valve kit, will be necessary to readjust the machine maximum working pressure.
The pressure adjustment can be done trough the adjusting screw as indicated in the following picture:

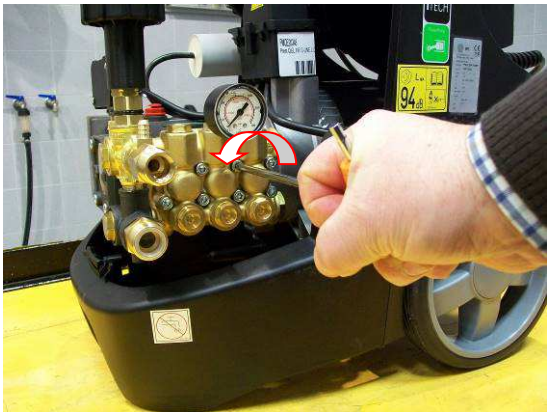


Before adjust the bypass, maximum pressure setting, ensure that the pressure adjust knob is completely screwed-in.

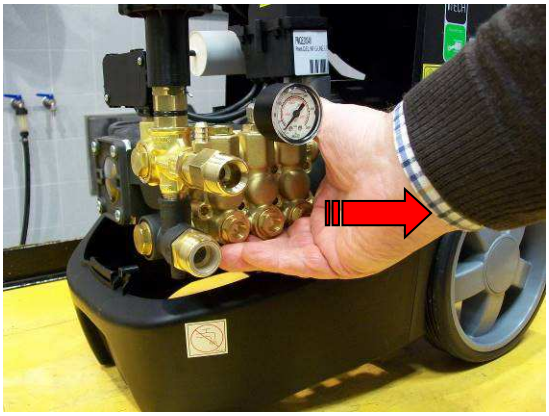


In order to readjust the machine pressure setting, **the lance high pressure nozzle must be brand new**; for setting values, check the pressure characteristics indicated in the machine data plate.
The working pressure setting can be done looking at the pressure displayed to the machine pressure gauge.

3i Replace the high pressure pump gaskets kit and ensure that the ceramic pistons are not damaged. If ceramic pistons are cracked, replace them following the instruction as described in the paragraph **5c**.

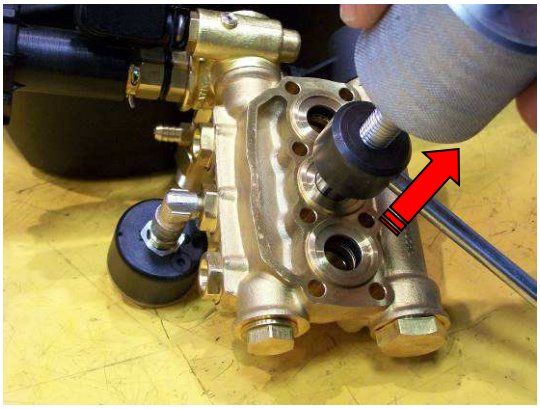


Unscrew the 6 screws that hold the pump head



Pull out the pump head

Remove the pump head



Extract the seals packing using the extractor tool part number PVVR31382.

Tool head AZMC10761 for gaskets with diameter 15

4. Poor detergent delivery

4) ***TRUBLE:*** Poor detergent delivery

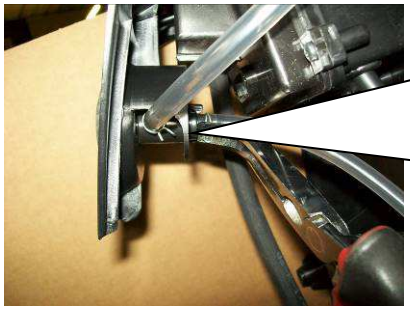
CAUSES:

4a Detergent tap closed/off or clogged
4b Empty detergent tank or nozzle not set in detergent mode
4c The check valve of the detergent circuit is sticky or clogged
4d High pressure outlet pipes clogged or too much extended (over 20 m)
4e Pressure regulator is not set at maximum position
4f Wear and tear of the detergent nozzle

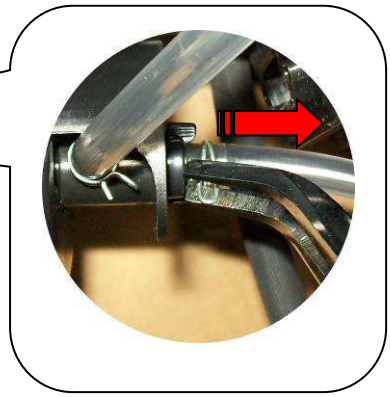
REMEDIES:

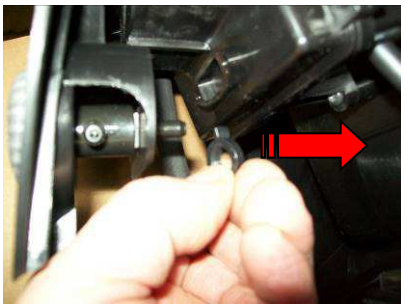
4a Check first if the tap for detergent adjust is open.
If it is open, but doesn't allow the detergent suction, it may be defective and not functioning (i.e. clogged), hence replace it with a new one.

The access to the detergent tap is possible just after the machine cover has been removed.

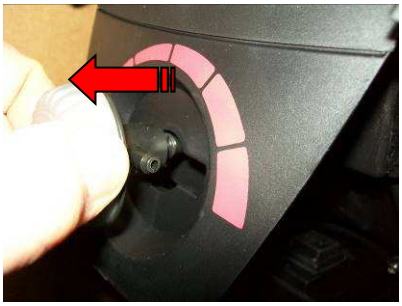


Remove the clips that hold the pipes.



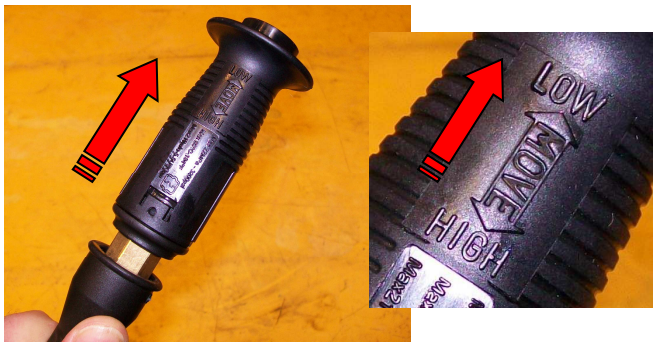


Remove the detergent tap holding ring.

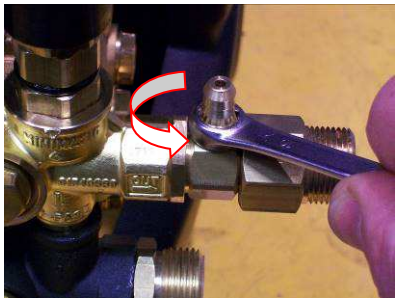
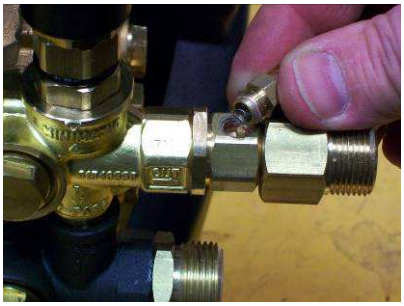


Slide out the detergent tap and replace it if necessary.

4b Refill with detergent the chemical tank if it is empty; we recommend to use only the detergents listed in the catalogue.
Switch the head to the lance in detergent mode (LOW).



4c Dismantle and clean the detergent check valve.

Unscrew and dismantle the detergent check valve placed at the machine outlet.

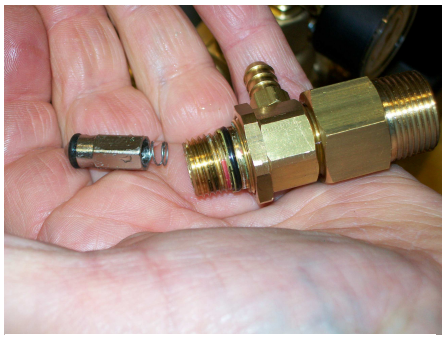

Check the cleanness of o-ring, ball and spring that are inside of the valve and replace them if wear and tear.
Reassemble using some sealing glue, we recommend Loctite 542.

4d If using an high pressure hose longer than 20 m, the detergent suction can result compromised, since the Venturi system cannot work.
At the same, a wrong functioning occurs when the high pressure outlet circuit of the machine is clogged or when using not genuine accessories.
Reduce the length of the high pressure hose at maximum 20 m and ensure that there are not obstruction to the outlet circuit that causes counter pressure, hence not allowing the functioning of the Venturi system.
The Venturi system can be wear and tear and in case has to be replaced as following described:

Unlock the nut that avoid the rotation of the outlet fitting.

Unscrew the Venturi system.

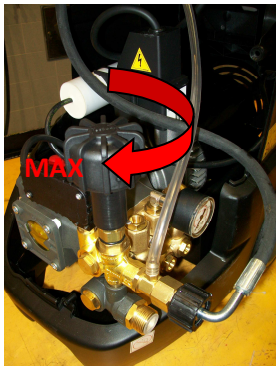
Replace, if necessary, the whole Venturi nozzle and note that the Venturi holds the outlet check valve of the by pass.



The outlet check valve is part of the by-pass and can be wear and tear, if necessary replace it with a new one while checking the Venturi.

Reassemble the Venturi using a bit of Loctite 542 to seal the threads.

4e Adjust the machine working pressure at maximum position.



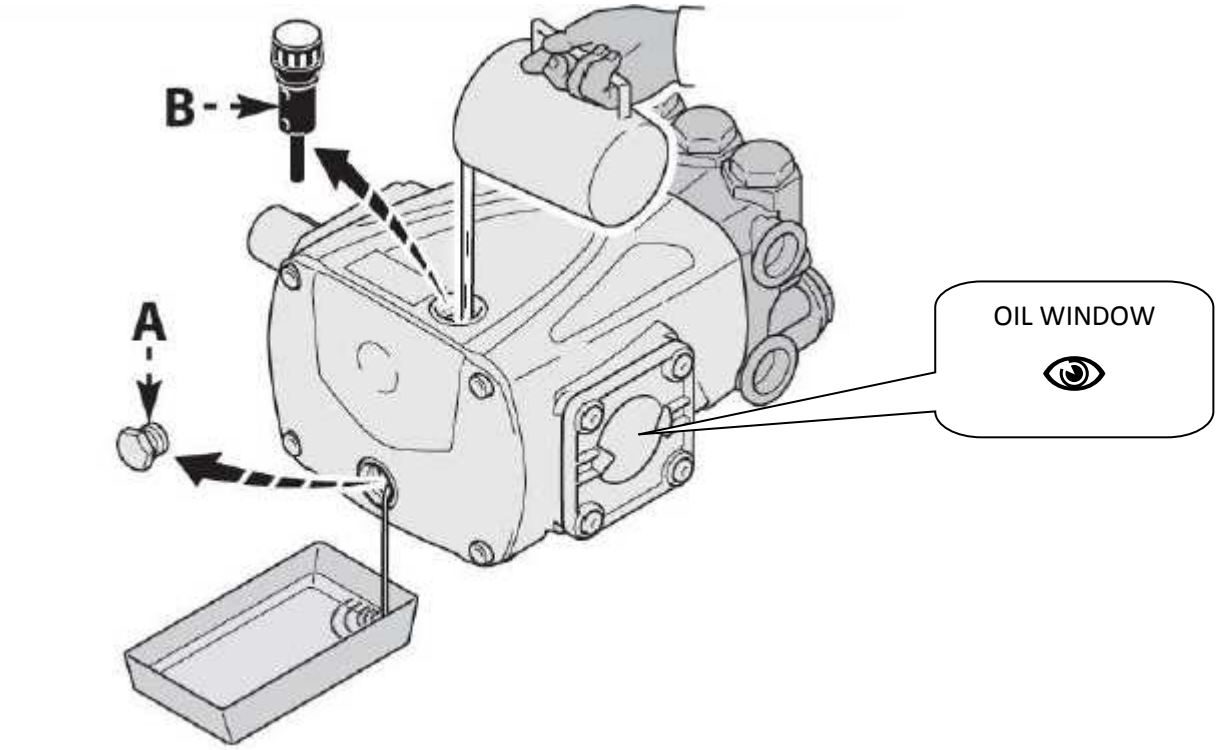
5. Oil and water emulsion phenomena to the high pressure pump oil

5) ***TROUBLE:*** The oil, inside of the high pressure pump looks white color (oil and water emulsion phenomena)

CAUSES:
- **5a** Extremely high environment humidity percentage
- **5b** High pressure pump gaskets worn
- **5c** High pressure pump pistons damaged

REMEDIES:

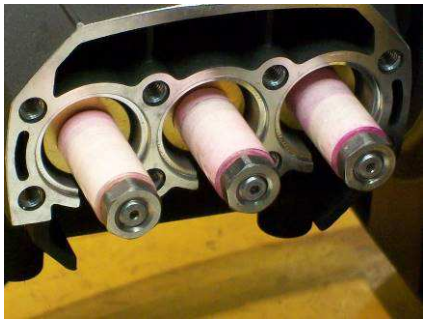
5a Replace the pump oil using oil quality SAE 20W40:
Unscrew the cap "**A**" in order to drain the oil from the high pressure pump; wait until the oil being totally drained out to the recovery tank.
Oil, must be wasted in compliance with the country rules in force for oils. Screw the cap "**A**" and refill the oil into the pump from the port "**B**"; the oil level is detectable from the oil window 👁.



We recommend a proper ventilation of the place where the machine operates, in order to reduce as much as possible the environment humidity percentage.

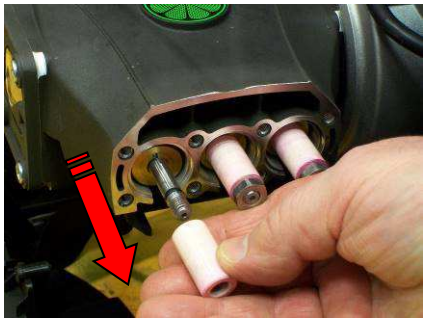
5b Replace the pump water gaskets as described in the section ***3i***

5c Replacement of the pump pistons:

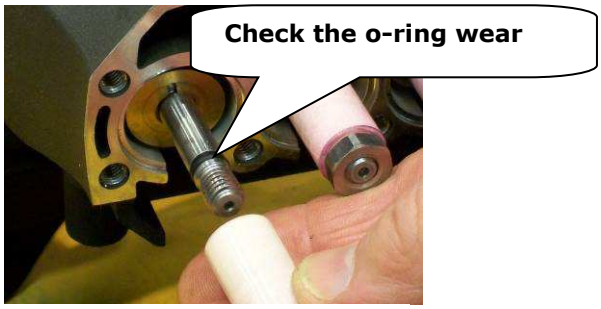


Check if pistons are cracked

Unscrew the piston lock screw

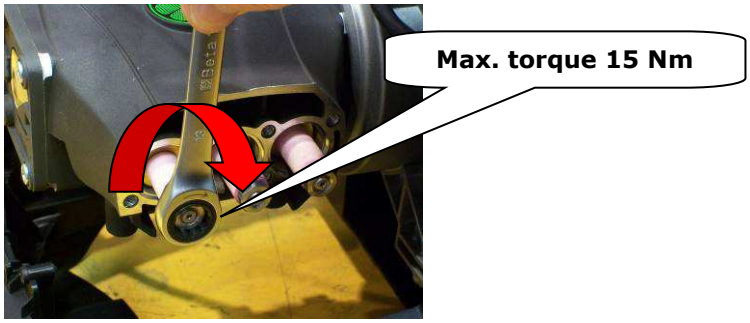


Slide out the damaged piston



If the o-ring is wear and tear replace it with a new one.

Assemble the new piston and secure the screw with “Loctite 541” glue.



Tighten the screw at max. torque 15Nm

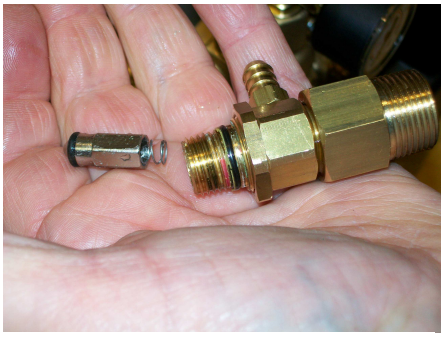
6. The total stop system doesn't intervenes (only for machines having this option)

6) ***TROUBLE:*** When the spray gun trigger is released, the pump and motor unit does not stop automatically or does not restart, when the trigger is reactivated.

CAUSES: **6a** Water leaks from the high pressure outlet circuit.
6b Micro-switch of the by-pass valve, or contactor, not functioning.

REMEDIES:

6a Check the if the outlet check valve, placed at the outlet of the by-pass , is worn or teared.
If damaged, replace the whole check valve or only the o-ring if damaged.



The outlet check valve is part of the by-pass and can be wear and tear, if necessary replace it with a new one.

Check and remove any water leak from the outlet circuit and particularly check the high pressure hose couplings and the spray gun.
When the spray gun trigger is released, the outlet circuit is under pressure and this is necessary to maintain the machine in total stop phase. Any water leak, can cause the restart of the machine and as consequence the total stop failure.

6b Check the micro-switch of the by-pass valve and the piston that activates the switch as described in the section **1c**.
Check the contactor as described in the section **1d.**

Periodical maintenance

	Every day	Every 50h	Every 100h	Every 200h	Every 300h	Every 500h	Every year		
Check the power cord and the high pressure quick couplings.	♦								
First pump oil replacement		♦							
Pump oil replacement						♦			
Water feeding filters cleaning		♦							
Pump's water gaskets replacement						♦			
High pressure nozzle replacement				♦					
Check and adjust of the safety devices or components							♦		

Repairing kits

For a quicker and easier maintenance and repair of this model, some repair kits are available as following shown.
In order to identify their part number accordingly to the machine model, please refer to this machine's spare parts manual.

Pump gasket kit

Pump valves kit

Pump oil seals kit