

## **Attaching the HPP:**

- Always check if available oil flows and pressures are matching the HPP type involved.
- The HPP can be mounted in any position, however observe positioning restrictions of HPP attachments.
- Firmly screw the HPP to its carrier vehicle with HPP water inlet T2 directly within or closest possible to the water tank.
- Limit possible excess oil flows, pressures, temperatures, and water level directly at the HPP. Preferably mount directional control valves for switching the HPP on/off directly onto the HPP (see ready-to-use HPP modules).
- Check nozzle size(s) and all equipment for nominal size, strength and combinability.

## **Pressure Oil Line P1**

- Install control and directional control valves directly on the HPP, i.e. avoid pipes and hoses.
- In case of not admissible excess oil flows, screw a flow limiting valve directly into the HPP (effect of 3-way flow divider = low heat development/oil stressing), in no case to the HPP inlet P1, unless the HPP is completely stopped upon gun release.
- If the hydraulic system contains pressure compensated, variable pumps, special care must be taken to avoid overspeed, cavitation, compression surges etc. \*).
- If the hydraulic system contains pressure compensated, variable pumps, special care must be taken to avoid overspeed, cavitation, compression surges etc. \*).
- Before using nozzles, orifices or external flow dividers to limit the flow: unconditionally \*).
- Before introducing twin functions (speed/work cycle; jetting/flushing; jetting boom/pistol; low/high pressure):\*)

## **Tank Oil Return Line T1**

- Provide separate, really free, direct oil return T1: the oil return line must not include throttling valves, flow dividers, braking valves or further oil returns. If return pressures just temporarily can exceed 15bar/210psi including expansion surges: unconditionally \*).
- Do not return the oil to its suction point, but forcibly provide an oil exchange within the oil tank.
- When dimensioning the oil return line, consider all further oil returns and excess oil flows (e.g. caused by expansion surges of separate, in particular pre-tensioned consumers). Select internal diameters of pipe and hose fittings at least as large as within the HPP. Really look into fitting ends to check the internal diameters; do not just estimate them by checking the outer diameters.

## **Suction Water Line T2**

- Put the HPP suction port T2 with its suction filter directly into or below the water tank \*).
- Select kink-resistant, false air eliminating hoses and fittings, mechanically resistant against vacuum.
- Do not use garden hose couplings: their seal rubber deforms plastically so false air may enter and cause compression surges: unconditionally use firm fittings containing permanently elastic seals, and safely lock them.
- Do not allow "cat's bent backs" with air bubbles on top of suction lines, but provide short, only 1x falling, just shortly horizontal, and finally only 1x rising suction water lines.
- Eliminate sipping water by using water level switches, draining caps, separating walls, snorkel valves etc.
- Unconditionally arrange venting valves at the highest point of the suction line, preferably directly flanged to the HPP valve block, but arrange snorkel valves lowest possible -preferably within the water tank- \*).
- Observe prescriptions for suction water filtration and fasten all suction fittings by means of spanners.

## **Pressure Water Line P2**

- Use complete quick screw coupling system SSK within pressure water line P2:  
Sense of mounting the equipment in this case is pre-decided, and no wrong connection is possible.
- Only use on/off pistols: variable pistols may produce hammering surges \*).
- Install air venting lances or automatic venting (optional equipment) to ensure safe de-airing.
- Provide water drainage, valve block pre-heating, anti-freeze flushing and de-icing in winter season.
- Mount pressure water valves directly onto the HPP: avoid separate arrangement.

## **Most Common Errors: Non-compliance with these instructions as follows:**

- Use of nozzles or orifices to limit the flow/speed.
- Transferring experiences with garden hoses to high pressure water techniques.
- False air e.g. produced by garden hose couplings: seal rubber therein will deform plastically.
- Non-admissible excess oil flows (expansion surges; pressure compensated pumps without flow limitation = overspeed).
- Not venting the suction water line: use air venting lance and/or automatic de-aeration.
- Too narrow suction sections, sipping compression, air bubbles in "cat's bent backs", too small tube or hose fittings to loosening under vibration: Select their internal diameters at least as large as within the HPP. Look into HPP fluid ports to see the diameters.
- Using equipment not harmonized with the HPP (e.g. variable lances/pistols; too small hoses; lances without venting possibility).
- Too small suction filters in case of contaminated water (preferably use self-cleaning filters).
- Oil return line overloaded by further oil flows (expansion surges), or not really free/independent (e.g. braking valves).
- Continuing changes of design of the hydraulic, suction or pressure water system without prior tests.

## **Remarks:**

- Installation of pressure gauge: \*\*)
- Wintering: \*\*)
- Operation Manual: must be worked out in harmony to carrier vehicle\*)
- Maintenance, oil change, service: not required
- To avoid functional risks: take ready-to-use, complete HPP modules
- Directly flanging directional control valves, level feelers, air venting, thermic and flow limiting valves: \*\*)

\*) contact the HPP manufacturer for further details

\*\*\*) see special leaflet

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