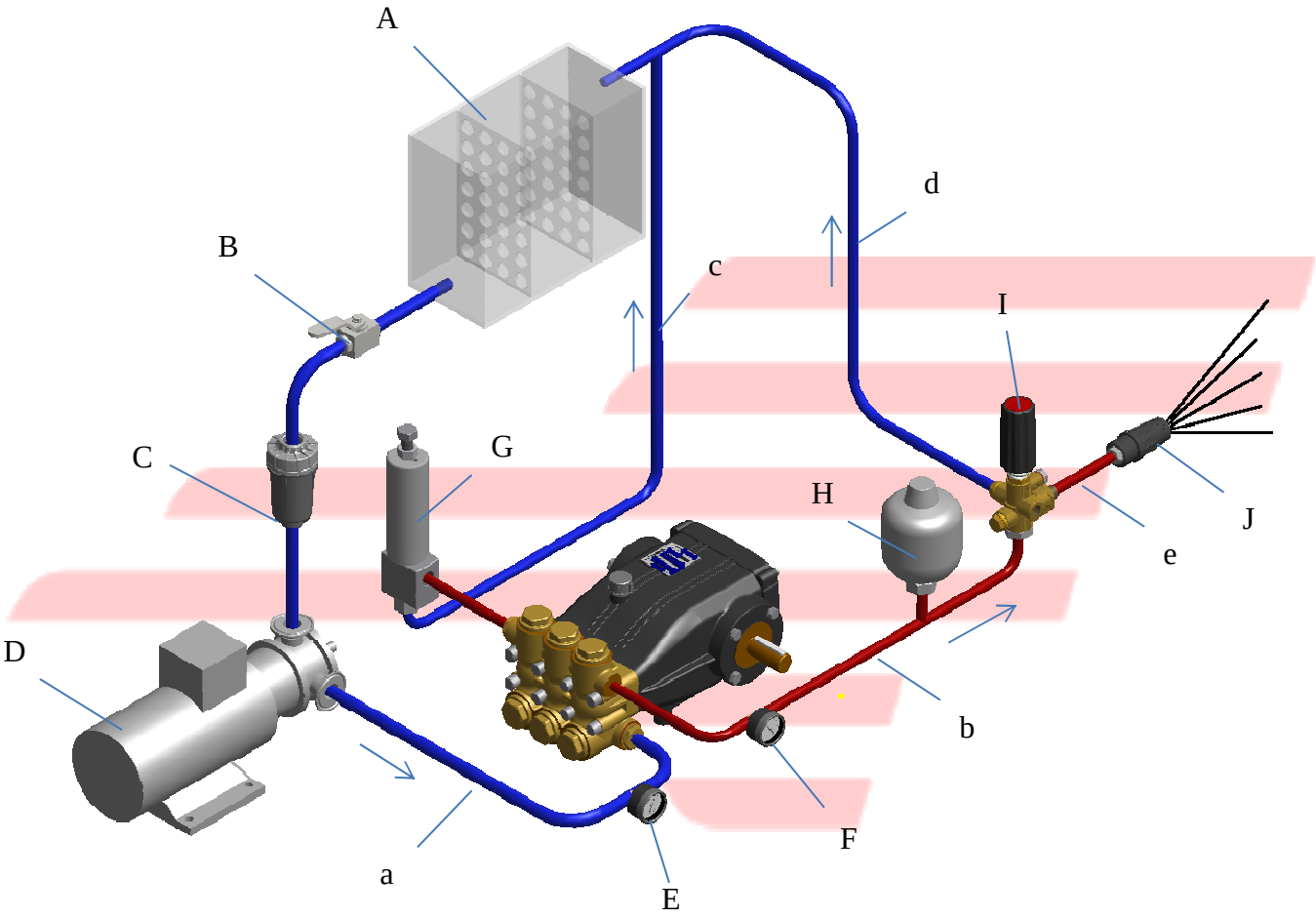
INSTALLATION INFORMATION

The hydraulic connection of the suction line and by pass must comply with the indications provided in datasheet S004-13 “information on the type of supply”. Also refer to datasheets S002-13 “instructions for installation and operation” and S003-13 “drops in pressure”.



A) Tank or mains water supply
B) Shut-off valve
C) Suction filter
D) Auxiliary pump
E) Suction pressure gauge
F) Delivery pressure gauge
G) Safety valve
H) Pressure damper
I) By-pass and control valve
J) Nozzle

a) Supply pipe line
b) Delivery pipe line
c) Safety valve release pipe line
d) By-pass pipe line
e) Valve outlet pipe line

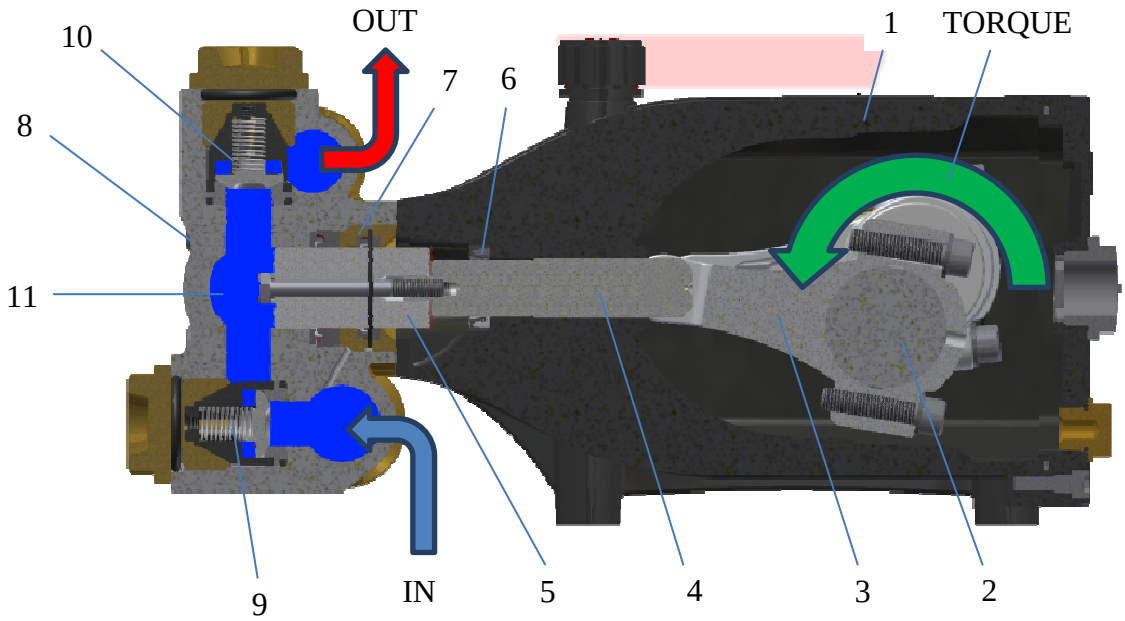
LEUCO S.p.A. - VIA U. DEGOLA, 25 – VILLAGGIO CROSTOLO - 42124 REGGIO EMILIA – ITALY
E.C. VAT registration number: IT 00607420353 - C.F. e Iscrizione al Registro Imprese di RE n. 00607420353
TEL: +39 / 0522 / 927036 – FAX: +39 / 0522 / 926422 - E-mail: info@hawkpumps.com – http:// www.hawkpumps.com
Società soggetta all'attività di direzione e coordinamento di Kärcher Beteiligungs GmbH

OPERATING DIAGRAM

Hawk pumps are delivered with their first oil fill and are fitted with a transportation cap to prevent oil spilling during transport. The oil cap with the dipstick and bleed is supplied separately. Before starting up the pump for the first time, replace the transportation cap with the dipstick cap.

It is essential to connect the piston pump up to a tank (A) or to the main water supply via a pipe line (a). A ball valve (B) can be useful for maintenance purposes. Fit a suitable filter (60÷120) (C) to avoid the possibility of contamination entering the pump, as this could cause the automatic valves to block, clog up the nozzle, scratch the pistons or lead to shorter system life. It may be necessary to fit an auxiliary pump (D) to prevent negative pressure at the pump inlet (the pump should be supplied with positive pressure at 0.5÷3 bar). The pump can be supplied under pressure directly from the mains water supply at max pressure of 10 bar. If the pump is fed from a tank, the level of the water should preferably be above the pump (pump under the water head) or at the same level. Fit a pressure gauge (E) on the supply line in order to monitor the supply pressure. When starting up the piston pump by applying torque to the shaft (2) using an electric, endothermic, hydraulic motor, pulleys, etc, it is possible to pump the fluid towards the pump outlet. If the shaft turns at the rated velocity, the outlet flow will be the same as the rated flow rate for the pump. The flow rate will vary in proportion to the variations in the rpm. Since there is always flow at the outlet as long as the pump is running, we advise fitting a valve with by-pass (I) that sends flow to the nozzle (J) if the gun is open (e) or releasing it if closed (d). To calibrate the system's operating pressure, the dimension of the nozzle (J) should be aligned with the available flow rate and a pressure gauge (F) should be fitted to monitor the pressure. In certain circuits, a pressure damper (H) should be fitted in order to adjust the pressure at the nozzle. A damper should usually be used mainly with duplex pumps or should the water hammer effect occur due to long delivery pipelines. To prevent the risk of excessive pressure in the circuit due to unexpected anomalies, a safety valve (G) should be fitted to open the pressurised circuit and release it through the pipeline (c). Pipe lines (b) and (c) have pressure 0 or have the same pressure as the supply.

The operating diagram of the piston pump is illustrated below



PISTON PUMPS: high pressure piston pumps are positive displacement pumps, i.e. they move a determined amount of liquid from an inlet connector (IN) to an outlet connector (OUT) by means of the alternating motion of one or more pistons 5. The link between the inlet and the outlet is provided by chamber 11. The automatic check valves 9 and 10 send the fluid in a single, given direction. The pump consists of a mechanical part located in the crankcase 1 and a hydraulic part located in the manifold housing 8. The mechanical part consists of a crankshaft 2 that transforms the rotation resulting from drive torque, into linear motion, a connecting rod 3 and a connecting element 4. The pump works with either direction of rotation, however anticlockwise rotation is advisable. The lubrication of the mechanical parts is provided by the oil contained in crankcase 6 and the seal for preventing oil leaks. The hydraulic section consists of the automatic check valves and the high- and low-pressure seals which prevent leaks of liquid. ***It is important to note that the piston pump only produces flow and does not produce any pressure itself.*** The pressure is the outcome of the passage of a given amount of liquid (flow) through an orifice of a determined size, called a nozzle. The specification of each nozzle results in the generation of a given pressure if a given flow rate passes through it. The features of HAWK piston pumps include:

- Twin seals on each pumping unit with intermediate, low pressure chamber to keep the pumped water seals cool and lubricated. This system also enables any leakage through the high pressure seal, if worn, to be put back into circulation.
- Sintered pistons in extra hard ceramic material.
- Connecting rods in special alloys with low friction coefficient, high resistance to wear and high anti-seizure properties.
- The structure of the hydraulic section designed to simplify routine maintenance (replacing the seals and the suction/delivery valves)

CHOOSING THE PISTON PUMP: the piston pump is the heart of the cleaning system. The chosen pump should have higher pressure and flow rate specifications than are actually demanded by the cleaning system in order to avoid excessive strain on the pump. The pump is designed to guarantee the rated flow at the nominal rpm and to support the maximum pressure indicated on the specifications plate. Never exceed the maximum pressure indicated. The power indicated on the specifications plate refers to the pump at its maximum performance. Additional power may be needed when starting up. Therefore, the motor should have a higher power than the pump's rated specification. *(see S012-13 "choosing the pump")*

SAFETY VALVE: This intervenes if dangerously high pressures are generated, for example as a result of a blockage in the delivery circuit. It is advisable to set the valve at no more than 10% of the maximum specified pressure for the pump in order to guarantee the safety system will be triggered in case of malfunction.

CONTROL VALVE: This adjusts the operating pressure of the system. It should be set with circa 10% of the flow rate released in order to guarantee the pressure required by the system even in case of partial wear of the seals. As the seals gradually become worn, the flow rate of the pump will fall and the operating pressure achieved with a nozzle will drop. If there is sufficient quantity released through the valve, this can be adjusted to restore the required pressure.

NOZZLE: As explained above, when a certain amount of liquid (flow rate) passes through an orifice (nozzle), a given pressure is generated. It is therefore very important to choose the right type of nozzle to ensure the correct operation of the system. Refer to the relative table in order to identify the correct choice of nozzle.

Find the operating pressure for the cleaning system (shown at the top of the table) and select the flow rate that you want to pass through the nozzle in the column below. If you have a system with several nozzles, the flow rate of each nozzle is the overall flow rate for the system divided by the number of nozzles. The flow rate of the nozzle should be lower (at least 5% less) than the flow rate for the system in order to guarantee a certain rate of flow is released by the control valve, as explained. Nozzles are available with various spraying angles as well as various nozzles that can alter the aperture of the spray fan.

CONNECTION PIPES: should not be affected by any chemicals used, they should have a rated operating pressure of at least 1.5 times and a bursting pressure of at least 3÷5 times the operating pressure of the system.

LEUCO S.p.A. - VIA U. DEGOLA, 25 – VILLAGGIO CROSTOLO - 42124 REGGIO EMILIA – ITALY
E.C. VAT registration number: IT 00607420353 - C.F. e Iscrizione al Registro Imprese di RE n. 00607420353
TEL: +39 / 0522 / 927036 – FAX: +39 / 0522 / 926422 - E-mail: info@hawkpumps.com – http:// www.hawkpumps.com
Società soggetta all'attività di direzione e coordinamento di Kärcher Beteiligungs GmbH