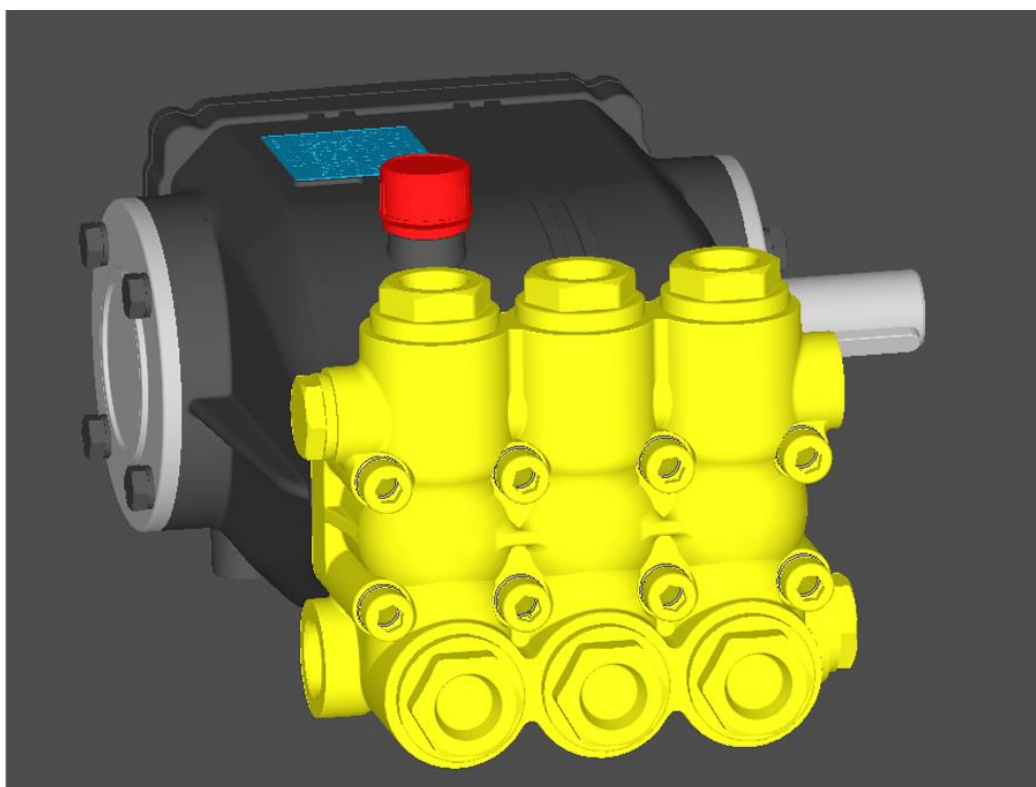




INSTRUCTION MANUAL

Version 001-18
ORIGINAL INSTRUCTIONS



HIGH PRESSURE POSITIVE DISPLACEMENT PISTON PUMPS

SERIES XLT IEX – XLT HT IEX

LEUCO S.p.A

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This manual and associated information can be downloaded from the website: www.hawkspumps.com

This manual is an integral part of the product and should always be made available to any persons using it

PRODUCT		HIGH PRESSURE POSITIVE DISPLACEMENT PISTON PUMPS
SERIES		XLT IEX XLT HT IEX
MODEL		XLT3020IEXS - XLT3816IEXS - XLT1530IEX - XLT1830IEX - XLT2230IEX - XLT2520IEX - XLT2530IEX - XLT2730IEX - XLT3020IEX - XLT3025IEX - XLT3325IEX - XLT3517IEX - XLT4014IEX - XLT4017IEX - XLT4317IEX - XLT5015IEX - XLT5415IEX XLT1520HTIEX - XLT1820HTIEX - XLT2220HTIEX - XLT2520HTIEX - XLT2720HTIEX - XLT3020HTIEX - XLT3320HTIEX - XLT4217HTIEX
TYPE OF DOCUMENT		INSTRUCTION MANUAL (ASSEMBLING INSTRUCTION, annex VI Machines Directive 2006/42/CE)
REV.	DESCRIZIONE	DATA
0	FIRST EDITION	05/2018
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1 GENERAL INFORMATION

1.1 Structure of the Manual

This manual is an integral part of the official documentation provided with the pump. It has been drafted by the Manufacturer in order to provide the operating instructions and the criteria to be followed for the installation, use and maintenance of the pump, referred to in the header.

Before choosing and/or using any LEUCO product, it is important that the purchaser clearly analyses all aspects regarding the specific application thereof and carefully examines the information provided in the LEUCO technical and sales catalogues. As a result of the numerous different conditions in which LEUCO products can be operated and/or applied, sole responsibility for choosing the most suitable product lies with the purchaser, who must carry out all the relevant analyses and tests to ensure the appropriate functional and safety specifications are complied with.

LEUCO reserves the right to make changes to the products and to this handbook without notice.

The purchaser must see to it that the pump is installed in accordance with the instructions contained in this manual and with the laws and national and local regulations currently in force.

The Manufacturer declines any responsibility for damage of any kind caused by incorrect use, negligence, superficial application of or failure to apply the safety concepts set out in this manual.

1.1.1 Purpose and contents

These instructions for use contain all the indications regarding the installation, use, maintenance, storage and all the stages in the life cycle of the XLT IEX – XLT HT IEX high-pressure piston pumps. These instructions must be followed by the assembler/end user in order to prevent the risk of causing effective ignition sources in potentially explosive atmospheres.

Before carrying out operations of any kind, qualified technicians and operators must read the instructions in this manual carefully.

Should any doubts arise on how to interpret the instructions correctly, contact LEUCO S.p.A. for clarification.

1.1.2 Who the manual is for

The instructions are for expert, suitably trained operators entrusted with installing the pump and carrying out ordinary maintenance.

Purchaser

The person, entity or company that has purchased the pump and intends to use it for the purposes it was designed for. This may be the assembler, if in possession of the necessary requisites.

User/Operator

An authorised person who possesses the requisites, skills and information necessary to use the pump, the machine or the plant the pump is installed in, and to carry out ordinary maintenance work.

Ordinary/general maintenance

The set of operations required to keep the machine in good working order, to guarantee a longer working life and to maintain security requisites constant. The frequency and methods of intervention are described by the Manufacturer in this manual. These operations must be carried out by specialised staff, which may be the operators, as described above.

Extraordinary maintenance

The set of operations required to keep the machine in proper, efficient working order. These operations, required when unexpected anomalies arise, must be carried out by specialised technicians only.

Installer/Assembler

An authorised technician in possession of the requisites and specific skills to carry out the tasks required for installing the pump and/or similar machines and to carry out maintenance operations in a safe, automatic and risk-free manner.

Training

A necessary stage to provide operators with the knowledge necessary to carry out operations correctly and without risk.




Exposed person

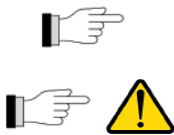



Any person partially or fully inside a dangerous area.

1.1.3 Storage


The instruction manual must be stored in the immediate vicinity of the machine, in an appropriate container, protected from liquids or anything else liable to affect legibility.

1.1.4 Symbols used in the manual

SYMBOL	MEANING	COMMENT
	DANGER	Indicates a danger with potentially serious risk for the user/assembler.
	DANGER OF CRUSHING UPPER LIMBS	Indicates the risk of upper limbs being crushed while positioning and handling the pump.
	DANGER OF MOVING MECHANICAL PARTS	Indicates danger due to the presence of mechanical parts in movement (e.g. transmission shaft, reducers, etc..)

SYMBOL	MEANING	COMMENT
	WARNING SAFETY INFORMATION	Indicates a warning or a note on key functions or useful information. Pay the utmost attention to blocks of text marked with these symbols.
	CONSULTATION	Consult the Instructions before carrying out a particular operation.
	IMPORTANT ATEX WARNING	This symbol accompanies the notes that must be complied with for safe use in a potentially explosive atmosphere.
	ADJUSTMENT/MAINTENANCE	For particular functions and/or anomalies, a particular kind of mechanical adjustment may be required.

1.2 Manufacturer

	<p>LEUCO S.p.A. Via Colletta, 20 - 42124 Reggio Emilia (RE) - ITALY</p>
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1.3 Assistance Centres

For any needs regarding the use or maintenance of equipment, contact LEUCO S.p.A., or specialised staff authorised by the Manufacturer.

For all requests for technical assistance, indicate the data on the ID plate of the pump and the type of anomaly detected.



1.4 Certification and CE Marking – Declaration of Incorporation

Hawk high-pressure piston pumps are suitable for use in a potentially explosive atmosphere, and have been designed and constructed in accordance with Directive 2014/34/EU. The EC mark refers to this Directive, because in accordance with the Machinery Directive 2006/42/EC, these pumps are classified as partly completed machinery and thus do not bear the EC mark. This instruction manual complies with Annex I point 1.7.4 of the aforementioned Directive, as well as with the UNI 10893 standard and the ISO/IEC 37 guide.



The list of Directives and the standards applied can be found in the Declaration of Incorporation in the attachments (Attachment I) of this Manual.

Fac-simile

	DECLARATION OF CONFORMITY UE pursuant to attachment II, point B of Directive 2006/42/EC pursuant to attachment X OF Directive 2014/34/UE	 II 2G cT4 TECH. FILE REF. AT18-0025274-01
<p>Product: VOLUMETRIC ALTERNATIVE PISTON PUMP</p> <p>Name of producer: LEUCO S.p.A. Address: Via Pietro Colletta, 20 42124 Reggio Emilia (RE)</p> <p>This declaration of conformity is issued under the sole responsibility of the manufacturer</p> <p align="center">OBJECT OF THE DECLARATION:</p> <p>General name: VOLUMETRIC ALTERNATIVE PISTON PUMP Commercial name: XLT IEX – XLT HT IEX SERIES Model: see list at page 2 Registration nr.: From nr 000001 to nr. 999 999 Product options / available accessories: None</p> <p align="center">THE OBJECT OF THE DECLARATION ABOVE COMPLIES WITH THE FOLLOWING EUROPEAN COMMUNITY DIRECTIVES</p> <p align="center">Directive 2006/42/CE Machines Directive limited for the following E.S.R: 1.1.1 - 1.1.2 - 1.1.3 - 1.1.5 - 1.3.1 - 1.3.2 - 1.3.4 - 1.3.6 - 1.3.7 - 1.3.8.1 - 1.5.4 - 1.5.5 - 1.5.6 - 1.5.7 - 1.5.9 - 1.6.1 - 1.6.4 - 1.6.5 - 1.7.1.1 - 1.7.2 - 1.7.4</p> <p align="center">Directive 2014/34/UE Protection devices and systems to be used in a potentially explosive atmosphere</p> <p align="center">REFERENCE TO THE RELEVANT HARMONIZED DIRECTIVES CONSIDERED OR REFERENCES TO OTHER TECHNICAL SPECIFICATIONS IN RELATION TO WHICH CONFORMITY IS DECLARED:</p> <p>UNI EN 12100:2010 Safety of machinery – General design principles, the assessment and reduction of risk UNI EN 1127-1:2011 Explosive atmospheres – The prevention of explosions and protection against explosions. Fundamental concepts and methodology UNI EN 809:2009 Pumps and pumping units for liquids – General safety requirements</p> <p align="center">ADDITIONAL INFORMATIONS:</p> <p>The technical documentation with reference to AT18-0025274-01 was filed at the IMQ S.p.A. - via Quintiliano, 43 20138 Milano (Notified Body No. 0051), as required by Annex VIII of Directive 2014/34 / EU.</p> <p>The partly-completed machinery MUST NOT BE PUT INTO OPERATION until the final machine in which it is to be incorporated has been declared as complying, if relevant, with the provisions of directive 2006/42/EC. <i>The relevant technical documentation has been completed in compliance with attachment VII part B (Dir. 2006/42/EC). In response to a justified request on the part of a National Authority, the Producer undertakes to transmit information relating to the partly-completed machinery, in a reasonable time period, by fax, e-mail or by hand.</i></p> <p align="center">NAME AND ADDRESS OF THE PERSON/BODY AUTHORISED TO PREPARE THE RELEVANT TECHNICAL DOCUMENTATION, WHO/WHICH MUST BE LOCATED IN THE EUROPEAN COMMUNITY:</p> <p align="center">LEUCO S.p.A. - Via Pietro Colletta, 20 42124 Reggio Emilia (RE) ITALY</p> <p>Signature: Giuseppe Del Duca, LEUCO S.p.A. Legal Representative</p> <p>Reggio Emilia, 07/06/2018</p> 		

1.5 Warranty



Hawk products are guaranteed by LEUCO S.p.A. to be free of defects regarding the working and construction materials for a period of (1) year from the date they leave the factory.

This warranty is limited to the repair and replacement of the parts or products that LEUCO S.p.A. has the exclusive faculty to consider faulty as delivered. All products covered by this limited warranty shall be returned, freight prepaid, for inspection, repair and if necessary replacement by the manufacturer.

The limited warranty established herein is the only one valid, over any other explicit or implicit warranty, including any warranty of saleability or suitability for particular purposes; with this declaration, the manufacturer excludes and rejects any such warranties. The repair or replacement of any faulty products shall be carried out solely in accordance with the methods set forth herein, and LEUCO S.p.A. may not be held liable for any other losses, damage or expenses, including accidental and indirect damage that may be caused directly or indirectly by the sale or use of these products.

The unauthorised use of spare parts not originally produced by LEUCO S.p.A. automatically outdates the warranty, which is subject to the installation and operating functions specified here. No warranty extends beyond the terms described above.

All the pumps supplied by LEUCO have been carefully checked during production and subjected to testing cycles prior to dispatch. In order to obtain maximum performance, avoid unpleasant incidents and maintain the warranty conditions valid, it is necessary to ensure strict compliance with the procedures described in this booklet for proper assembly and initial start-up of the pump.

	LEUCO S.p.A. declines all liability for any errors in the drafting of this manual.
	No liability shall be accepted for any changes to the product or parts thereof that have not been agreed upon with the Manufacturer, and such changes shall invalidate the warranty.

2 GENERAL DESCRIPTION

Hawk high-pressure piston pumps are positive displacement pumps. Hawk pumps are designed and built for pumping clean, fresh water or water with a low percentage of commonly used detergents, up to a temperature of 65°C (XLT IEX series), up to a temperature of 85°C (XLT HT IEX series).

The main parameters that determine your choice of Hawk pump are its volume, pressure, rotation speed and power consumption.

- The volume is given in litres per minute and is directly proportional to the rotation speed.
- The speed of rotation is given as revolutions per minute.
- The pressure is given in bars and is the maximum pressure that the pump can reach.
- The power consumption is shown in kW and is the absorption required for the maximum volume and pressure indicated.

When coupled with an electric motor, the power of the motor should be greater than the specification shown in the catalogue.



When coupled with a combustion engine, the power of the engine should be at least 30% more than the specification shown in the catalogue.



The power consumed by the pump in KW is the product of:



$$\text{Power} = \text{Volume (l/min)} \times \text{Pressure (bar)} / 520.$$



LIST OF MODELS

SERIES XLT IEX	XLT3020IEXS - XLT3816IEXS - XLT1530IEX - XLT1830IEX - XLT2230IEX - XLT2520IEX - XLT2530IEX - XLT2730IEX - XLT3020IEX - XLT3025IEX - XLT3325IEX - XLT3517IEX - XLT4014IEX - XLT4017IEX - XLT4317IEX - XLT5015IEX - XLT5415IEX
SERIES XLT HT IEX	XLT1520HTIEX - XLT1820HTIEX - XLT2220HTIEX - XLT2520HTIEX - XLT2720HTIEX - XLT3020HTIEX - XLT3320HTIEX - XLT4217HTIEX

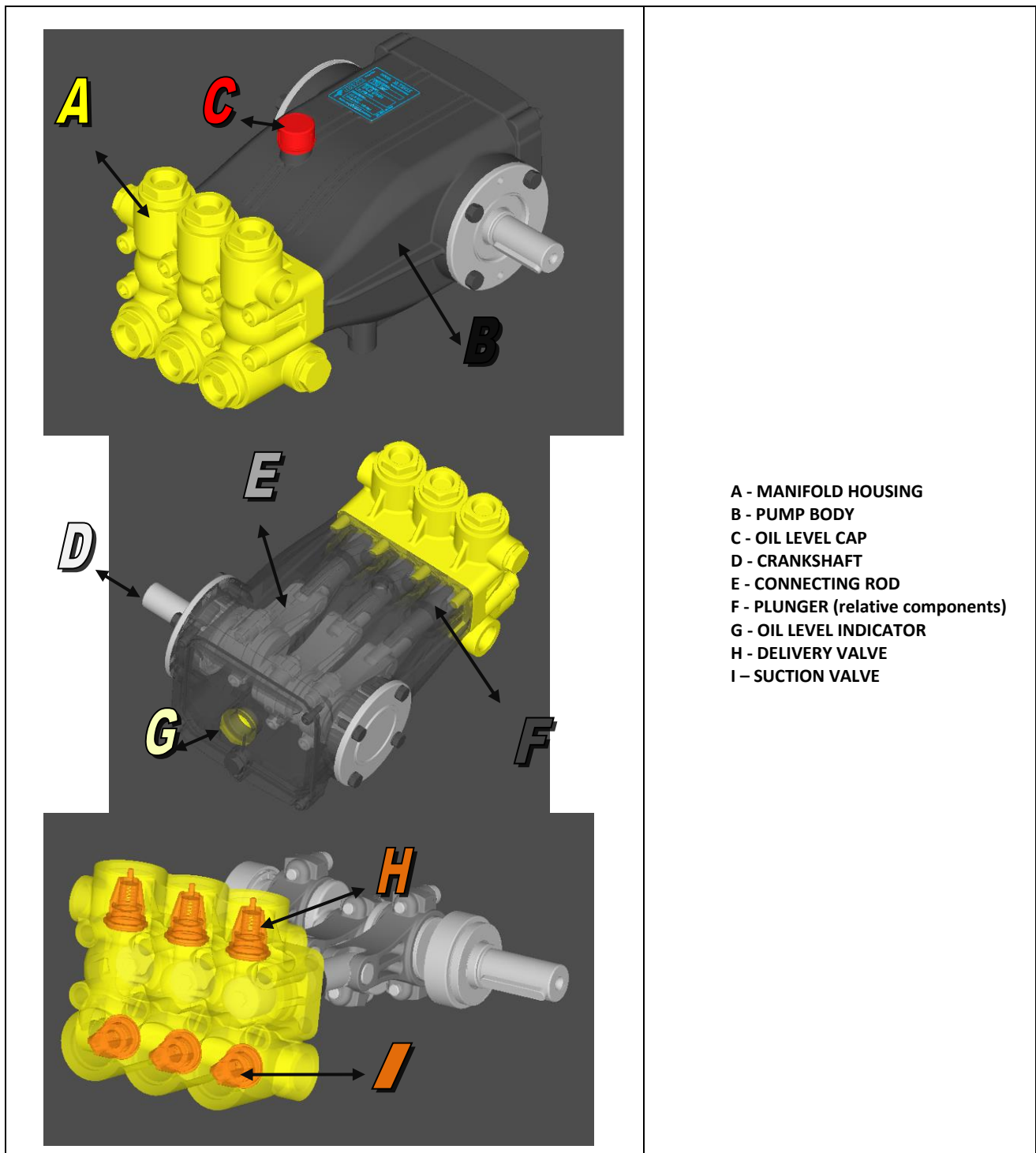
 	<p>Hawk pumps designed with an AISI 316 stainless steel manifold housing should be used for seawater applications, for reverse osmosis, and for use in the food- chemical and pharmaceutical industries.</p>
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 	<p>Hawk pumps were not designed for pumping potentially hazardous liquids (explosive, toxic and flammable liquids). Contact the Manufacturer in case of any doubt.</p>
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 	<p>Before choosing and/or using any LEUCO product, it is important you consider all issues associated with the specific application and examine thoroughly the information contained in the technical product catalogues provided by LEUCO S.p.A. LEUCO products and the relative documents are subject to change at any time without notice.</p>
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 	<p>Do not use Hawk pumps with different materials / fluids, with different motor coupling systems from those described. Contact the Manufacturer in case of any doubt.</p>
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2.1 Main parts



More details on the parts can be found in the exploded views attached to this manual (ATTACHMENT III).

The pumping action is provided by a series of plungers connected to the drive shaft by connecting rods. During motion, the plungers run axially inside the manifold housing where the suction and delivery lines are fitted with valves that enable the liquid to pass in only one direction.

2.1.1 Layout dimensions

The layout is attached to this manual (ATTACHMENT II). A summary of the main dimensional specifications follows:

XLT IEX SERIES

Length	341.5 mm
Depth	263 mm
Height	168.2 mm
Weight	17.9 kg
Capacity	1.2 l

XLT HT IEX SERIES

Length	341.5 mm
Depth	263 mm
Height	168.2 mm
Weight	17.9 kg
Capacity	1.2 l

Detailed technical specifications for each range or series, with the associated product versions, are provided in ATTACHMENT II at the end of this document.



2.2 Operating Conditions

The Hawk pumps described in this manual were designed and built to operate in the presence of a potentially explosive atmosphere.

The operating conditions are listed on the specifications plate (see example in subsection 3.8).

Some conditions are listed below.

Parameter	Tolerated values
Room temperature – XLT IEX Series	from -10°C to +50°C
Room temperature – XLT HT IEX Series	from -10°C to +40°C
Storage temperature	from 0°C to +50°C
Humidity	from 20% to 80%
Max fluid temperature – XLT IEX Series	+65°C
Max fluid temperature – XLT HT IEX Series	+85°C

	Pumps must only be used in the authorised areas for the types of group and category that the pumps belong to. The person in charge of assembly / end user must control that the information on the pump's specifications plate is compatible with the features of the area (machine) where it will be fitted.
	The person in charge of assembly / end user must control the compatibility of the pump's temperature class with the type of inflammable substances present in the explosive atmosphere.

2.3 Vibration

Provided the procedures for installation and assembly contained in this document are carried out correctly, Hawk pumps will not generate a level of vibration that could lead to associated risks in conditions of normal use. Furthermore, during pump operation, no operator contact is required as the pumps are fitted onto a larger machine/plant that incorporates them.

2.4 Noise

The equipment was designed and built so that noise is reduced at source, as far as this is compatible with its intended use and operation.

The level of noise measured is less than the minimum level allowed by current legislation.

2.5 High temperatures

Mechanical parts are lubricated to prevent the possibility of overheating due to friction over a long period of time. The choice of lubricating oil, indicated later in this manual, complies with the Atex classification of the pumps. Furthermore, if the normal maintenance procedures are followed, this should not represent a risk.

Machine operators should use appropriate safety equipment provided, such as gloves and overalls.

2.6 Stability

The XLT IEX – XLT HT IEX series of pumps are supplied with the necessary instructions to guarantee a stable and safe assembly in the machine/system that will incorporate them. The person in charge of their assembly/operation must follow and comply with these instructions.

It was designed and built to ensure it does not present any form of risk in terms of its stability in conditions of normal use.



More information in section 5: "Installation"

2.7 Pressurised fluids





The pumps described in this manual are built with suitable materials to ensure they will tolerate the envisaged operating pressures. They are also fitted with all the necessary parts (caps, valves, plungers, etc..) to ensure correct operation and circulation of the envisaged fluids (water and lubricating oil). The transmission lubricating products in the pump body are necessary to safeguard correct operation by keeping the mechanical parts lubricated.

3 SAFETY











3.1 General safety information



Hawk pumps were designed to be safe for use in their intended application, provided they are commissioned (incorporated), used and maintained as instructed in this operating and maintenance manual.

The machine operator and other personnel must read and be sure they have understood the instructions provided in the manual, as well as the final application's data, before installing and using the pumps.

 	The equipment must not be altered or tampered with: this will render null and void any liability of the manufacturer as regards the correct operation or any damage caused by the product.
 	Before using the equipment, make sure that any safety hazard has been eliminated.


It is also vital that machine operators comply with the safety information below:


	Do not attempt to remove or alter any pump parts, unless instructed and as described in this manual.
	Internal inspections, modifications and repairs may only be carried out by trained, technical personnel with prior authorisation from the Manufacturer.
	Do not allow unauthorised personnel to do any work on the equipment.
	Do not wear rings, a wristwatch, jewellery, loose garments or items such as ties or scarves, torn garments, unbuttoned jackets or shirts with an open zipper that could become fast in moving machine parts.
	Wear personal protection equipment as envisaged in this manual in line with the work to be carried out.
	Make sure all the instructions described in the section on Maintenance are carried out on a regular basis.
	Stop using the equipment immediately in case of any anomaly or fault that could jeopardise its correct operation and safety.
	Notify the person in charge of Maintenance in case of any operating malfunction.
	Make sure that any safety guards or other devices for your protection are in place and that all safety devices are working properly (pump guard and safety devices on the machine/system that it is a part of).
	Check that the direction of motor rotation matches the pump rotation when starting it up for the first time or after any maintenance work on the parts involved.

 	Check if there are any other safety instructions that must be followed in the Operating and Maintenance Manual for the machine where the pump is fitted.
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3.2 Residual risks

This machine was designed and built with the intention of eliminating any risks associated with its use. The residual risks are specified below:

a) Crushing:	
Handling and positioning the pump may bring the risk of crushing the upper limbs or hands or feet. Pay particular attention when undertaking these actions. It is compulsory to wear the personal protective equipment provided (work gloves and boots) and to comply with all the procedures designed to safeguard the correct completion of the operating cycle.	

b) Heat-related hazards:	
The pump can reach high temperatures during operation depending on the temperature of the pumped liquid. As a result, the person in charge of the installation must bear this in mind and provide appropriate safety devices and warning signs for personnel.	

3.3 Personal protection equipment

	Failure to use the personal protective equipment specified in this section will expose the machine operators to danger. Employers are required to provide personal protective equipment to the operators using the machine referred to in this manual.
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The operators using the equipment must wear the following personal protective equipment, in line with the work being carried out:

- **Personal protective equipment against the risk of cuts, bruises and high temperatures (max 85 °C)**
- **Work boots**
- **Safety goggles or glasses (if necessary)**



The Employer may decide to use additional safety equipment after assessing any risks and considering any changes made to the production processes.

3.4 Safe working procedures

To reduce the consequences of the hazards described in the section above, operators must comply with the following instructions:

- **Wear** the personal protective equipment referred to in section 3.3;
- **Monitor areas where any hazard is present**, do not start a test cycle if there are any persons located within the hazardous area or in the immediate vicinity who are not involved in the job to be undertaken. Release the controls immediately should any unauthorised persons enter the hazardous area when work is underway.

3.4.1 Safety when using the pump

The area and environment that the high pressure system operates in must be clearly signposted and prohibited to unauthorised personnel. The area should also be restricted and defined. The staff responsible for carrying out the work must first undergo workplace conduct training as well as training on the risks arising from high pressure system damages or defects. Prior to starting up the system, the operator or operators are required to check:

- **that the system has the correct power supply;**
- **that the electrical parts are correctly and adequately protected and work efficiently;**
- **that the high pressure hoses and hose fittings do not exhibit signs of abrasion or excessive wear.**

Any defect, damage or reasonable doubt that might arise before or during the operation must be reported and verified by qualified staff. Should this happen, the system must be stopped immediately and the pressure brought down to zero.

3.4.2 Safety when using high pressure circuits



Here below are some basic indications regarding the high pressure circuit where the pump can be installed.

High pressure circuits should always be fitted with a safety or pressure relief valve.

Components of the high pressure circuits, particularly those that mainly operate outdoors, must be imperviousness to weather conditions such as rain, frost or heat. All electrical parts should have adequate protection against direct or indirect sprays of water and be suitable for use in wet environments.

High pressure hoses must be sized in accordance with the maximum operating pressure of the circuit and always within the field of operation specified by the hose manufacturer. These precautions should also be respected for all the components found within high pressure circuits. The ends of the high pressure hoses should be sheathed or, in any event, secured to a structure in order to prevent dangerous whiplash in the event of a blast or a rupture in the connections.

Lastly, appropriately sized crankcases must be provided in order to protect the rotating component parts for the motion transmission (flexible couplings and universal joints, belts, pulleys, etc.).

 	<p>Check if there are any other safety instructions that must be followed in the Operating and Maintenance Manual for the machine where the pump is fitted.</p>
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3.4.3 Rules of conduct regarding the use of high pressure lance

Here below are some basic indications regarding the use of the pump with high pressure lance equipment.

Those who operate high pressure nozzles must always put their own safety - as well as the safety of third parties likely to be affected by their actions - before any other assessment or action in respect of the situation. Their work must always be guided by common sense and an awareness of responsibility and precautions.

The operator must always acquire appropriate personal protective equipment (helmet with protective visor, waterproof overalls and rubber boots) that guarantee good grip and stability on the ground in wet conditions.

Adequate clothing is effective against splashes of water, but cannot withstand the direct impact of water jets or splashes at close range. In these circumstances, additional protection is recommended.

It is also desirable to have the operators work in teams of at least two people in order that they may provide mutual assistance in case of need or danger, and have them organize an appropriate rotation that will provide cover in the event of long and tiring shifts.

The area affected by the water jet must be prohibited and free from objects which, if hit by the jet, might be damaged or projected elsewhere.

The jet should always be aimed in the direction of the workspace, including during preliminary or trial operations.

Attention must always be paid to the trajectory of debris removed from the jet. If necessary, anything that might be exposed to the jet should be given adequate protection.







The operator should not be distracted for any reason while carrying out his or her work. Those wishing to enter the workspace must wait for the operator to suspend work on his or her own initiative and make their presence immediately known.

Team members must always be aware of each other's intentions in order to avoid potentially dangerous situations.

The system must never be started-up and pressurized before each team member is at their own station and the operator has aimed the jet into the workspace.

 	<p>Check if there are any other safety instructions that must be followed in the Operating and Maintenance Manual for the machine where the pump is fitted.</p>
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3.5 Safety during handling and lifting

 	<p>Before starting, make sure the area designated for the work is organised so that the materials can be lifted and moved safely.</p>
 	<p>The unloading, loading, handling and lifting must be carried out by authorised, qualified personnel who have completed specific professional training.</p>
 	<p>People who are not involved in the handling and lifting work must remain at a safe distance throughout the operation.</p>



All the lifting devices used, including any accessories (hooks, cables, chains) and items used for transport, must have a suitable load-bearing capacity and must be controlled regularly according to current legislation.

3.5.1 Description of the packing; unpacking and transport

The packing materials used to contain the XLT IEX – XLT HT IEX series of Hawk pumps was designed specifically to prevent damage due to impact or vibration during transport or handling.

Each pump is packed individually, wrapped in a sort of moulded, protective case that has the same shape as the pump. Any other parts are packed separately.

The packing cases may be supplied on a pallet in order to facilitate lifting and handling depending on the amount of goods to be shipped and their final destination.

When unpacking the products, check the packing is intact and the number of parts is correct. If you note any discrepancy or damage, please contact your dealer or the Manufacturer directly to agree on the correct course of action.

Dispose of the packing material correctly according to current legal standards.

Hawk pumps may be shipped using various modes of transport depending on the final destination (by road, rail, sea or air). The packing materials should be anchored properly to the vehicle used for transport to prevent uncontrolled movement.



Failure to comply with the following instructions may result in situations of serious danger.



Manual handling of loads must comply with ISO 11228-1, or any applicable national legislation.

3.6 Safety during Maintenance Work

You must comply with the following instructions when carrying out any maintenance or repair work:



Depressurise the water system and disconnect the pump from all power sources before starting any maintenance or repair work.

- Before starting work, hang a "MACHINE UNDERGOING MAINTENANCE" sign in a prominent position on the machine/system where the pump is fitted;
- Do not use solvents or inflammable products or materials for cleaning that could create electrostatic charge
- Be careful not to spill any oil or lubricant grease
- After finishing the job, replace any safety guards and covers that were removed or opened and secure them properly.



Maintenance/repairs may only be carried out by qualified technical staff.

3.7 Products used

All the products used for the normal operation of the equipment, such as oils, lubricants and cleaning products, must be used as instructed in the safety datasheets provided by the manufacturer.

The oil used for the Hawk XLT IEX – XLT HT IEX series of pumps is: SAE 10/40W.

Dispose of spent oil correctly according to current legislation.



**Do not use Hawk pumps with different product from those described.
Contact the Manufacturer in case of any doubt.**

3.8 Specifications Plates

The danger, caution and obligation signs illustrated in this manual are placed near the equipment.

An exact description of the pump, model, serial number and specifications will facilitate a rapid and correct response by service personnel (where applicable).

The identification data is provided on the specifications plate fitted on the machine, as illustrated below.

	<p>It is prohibited to remove (or move) any type of specifications plate and/or label on the machine containing information and/or warnings.</p>
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FACSIMILE
 Specification plate on the machine

SERIE XLT IEX	SERIE XLT HT IEX
 II 2G c T135° (T4) TECH. FILE REF. 00000 Ta -10°C ÷ +50°C MODEL XLT2230IEX Pressure max Volume l/min 300 bar 22 (26) RPM Tmax water 1450 (1740) 65 °C Serial No. Year 000000 2018 LEUCO S.p.A. Via Colletta, 20 42124 Reggio Emilia ITALY Tel. 0522/923011	 II 2G c T135° (T4) TECH. FILE REF. 000000 Ta -10°C ÷ +40°C MODEL XLT3020HTIEXR Pressure max Volume l/min 200 bar 30 (36) RPM Tmax water 1450 (1740) 85 °C Serial No. Year 000000 2018 LEUCO S.p.A. Via Colletta, 20 42124 Reggio Emilia ITALY Tel. 0522/923011
	<p>00000: number of filing practice (see declaration of conformity)</p> <p>3020: number of pump model (it is an example, could change)</p> <p>R: stands for 'right' and indicates only the position of the shaft. It can be indicated 'L' or 'left'.</p>

Additional signs on the machine

 ATTENZIONE!! ATTREZZATURA DESTINATA AD OPERARE IN ATMOSFERA POTENZIALMENTE ESPLOSIVA (MAX ZONA 1) L'ACCOPPIAMENTO MOTORE-POMPA DEVE ESSERE OBBLIGATORIAMENTE ESEGUITO SECONDO LE INDICAZIONI FORNITE NELLE ISTRUZIONI DI ASSEMBLAGGIO	<p>The red sign is found near the transmission shaft and is translated into English. This is the original version in Italian.</p>
 SOSTITUIRE IL TAPPO CIECO CON IL TAPPO LIVELLO OLIO COLORE GIALLO PRIMA DELLA MESSA IN MOTO DELLA POMPA <small>scaricare il manuale pompe su www.hawkpumps.com/download</small> REPLACE PLUG WITH YELLOW OIL DIP STICK BEFORE OPERATING PUMP <small>download pump manual at www.hawkpumps.com/download</small>	<div style="text-align: center;"> </div> <p>The yellow sign is near the plug, at the top of the pump body.</p> <p><i>*la targhetta sul tappo è del colore del tappo stesso, che può variare a seconda della pompa.</i></p>

3.9 First Aid

Some standard First Aid procedures are indicated below that could be used should an injury occur as a result of using the pump or the machine/system incorporating it.

They may be useful for machine operators who are involved in an emergency when handling the equipment at any time (during transport, installation, use, maintenance, adjustment, etc.) or may be needed by other workers who are in the immediate vicinity of the machine.

This Manual is the property of the Manufacturer; any reproduction in any form, even partial, is prohibited.

3.9.1 What to do if someone needs First Aid

- a) call for help (emergency services);
- b) assess the situation of the injured person and check their vital signs;
- c) stop any bleeding;
- d) protect any wounds or burns;
- e) ensure the injured person is not at risk of further injury;
- f) do not take any initiative, such as giving the injured person something to drink, moving him, attempting to treat a sprain or fracture etc, as this may do more harm than good.

3.9.2 Emergency phone call

First aid is most effective when professional help is able to reach the injured person as soon as possible.

Therefore, it is important that the person who arrives on the scene first, calls the emergency services without delay and indicates the following clearly:

- the address of the scene of the accident (or illness);
- the number of injured (or ill) people;
- the possible cause of the event;
- the vital signs of the injured person; specify if he or she is conscious and is breathing normally.

It is always advisable to state at the end of the call:

- your own name and a telephone number where you can be reached;
- someone should wait outside the company for the emergency services to arrive (for example at the porter's office)

Calling the emergency services is top priority. Follow any instructions you receive from the emergency staff to ensure the injured person gets the best possible assistance.

3.9.3 Sprains and breaks

Treating sprains and breaks:

immobilise the affected limb in the same position it is in after the trauma using a splint or bandage and trying to reduce the pain felt by the injured person but do not attempt any dangerous manoeuvres. Apply an ice pack or other similar system.

If the broken bone is exposed, cover the injury with sterile gauze, after applying compression to the specific points to stop bleeding.

Bruises, crushing:

If the extremities of a upper or lower limb (fingers, hands, feet, etc.) have been bruised and/or crushed, first hold the injured part under (cold) running water and then apply an ice pack; check if there are any cuts/bleeding and disinfect the affected area, if necessary.

3.9.4 Bleeding

Stop any bleeding by applying pressure directly on the bleeding area using a sterile gauze pad, raise the limb and apply a tourniquet upstream to the bleeding



Treating superficial wounds:

expose and wash the wound with care to clean it, disinfect it with saline solution and cover with sterile gauze before bandaging; make sure you do not wrap the bandage too tightly and stop circulation

Treating deep wounds:

protecting yourself from any risk of infection is a priority so wear gloves and a face mask to avoid spray; press directly down on the cut or other pressure points until the bleeding stops or the ambulance arrives; call the emergency services (the number varies from country to country) and inform them you are trying to stop arterial bleeding.

You should only attempt to treat the injury after the bleeding has stopped.





	<p>Do NOT use cotton-wool, denatured alcohol or antibiotic powder to disinfect a wound.</p>
	<p>Always wear surgical gloves for protection against bodily fluids.</p>

4 DESIGNATED USE

4.1 Envisaged Use

The XLT IEX – XLT HT IEX series of Hawk pumps must not be used for any other purpose than those described in these instructions under any circumstances. Strict compliance and conformity with the operating conditions, repairs and maintenance as specified by the Manufacturer represent essential elements that are part of the designed use.



The Hawk pumps described in these instructions were designed and built to be incorporated into a machine intended for pumping the listed fluids at high pressure (high pressure cleaner). Their use must also be consistent with their technical specifications (subsection 2.1.1), without being altered, unless agreed, or used for improper purposes.

 	<p>Only trained, qualified personnel, who have read and understood the information provided in this manual, are authorised to use the pump.</p>
 	<p>Do not start up the pump unless the machine incorporating it has been declared compliant with current applicable legal standards (Directive 2006/42/CE and Directive 2014/34/UE).</p>

4.2 Prohibited Uses



The equipment must not be used:

- By any other persons than those specified in subsection 1.1.2
- For any other use than those specified in section 2 and subsection 4.1
- In any other operating conditions than those indicated in subsection 2.2
- Mounted onto any other machine than those specified in subsection 4.1
- For liquids that are inflammable, toxic, corrosive or with an unsuitable density or at temperatures above those specified in the technical specifications listed in this document or on the specifications plate
- For different fluids from those listed in Chapter 2
- For potable water piping systems
- For food use
- For pharmaceuticals



 	<p>The Manufacturer reserves the right to review the terms of guarantee applying to the equipment in case of any other use of the equipment than those mentioned above.</p>
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5 FITTING AND INSTALLATION

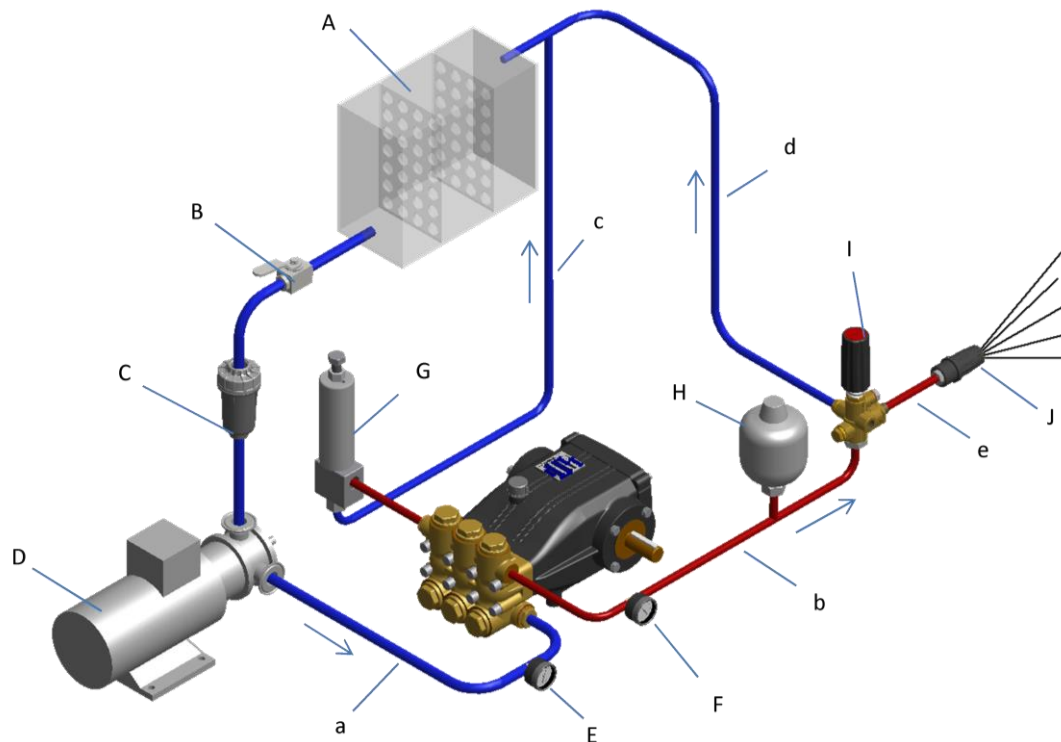
Read this section with due care and attention before attempting to install the machine.

	<p>Incorrect installation of your pumping system may cause injuries to people and damage to property. So, it is essential to comply with all instructions listed below.</p>
	<p>It is important to work in a clean environment when installing the machine.</p>

Pumps must be installed by direct coupling to the motor, which must be selected specifically among ATEX-certified products, compatibly with the pump certification..

	<p>You must use a suitable elastic coupling joint in case of direct coupling with the electric motor (see Attachment III).</p>
	<p>Make sure the pulleys are aligned when driven; adjust the belt tension and provide adequate safety protection. Excessive belt tension can cause the oil to overheat, reduce bearing life and create a danger of explosion.</p>

	<p>The pump should be installed horizontally with respect to the base to facilitate optimum lubrication, on an anti-vibration base.</p>
	<p>Check the direction of the motor and crankshaft rotation (indicated near them): they must match.</p>
	<p>The pump's suction pipe must be proportional to the volume and its diameter must not be less than the suction mouth. It is important that there are as few bottlenecks on this pipe as possible (elbows, T couplings, reductions, etc). Each junction on the suction pipe must be sealed properly with Teflon tape or a similar product to avoid leaks or air intake (cavitation). Cavitation is the formation of bubbles of steam in the liquid: their implosion generates abnormal stress which is very damaging for all pump parts. To safeguard optimum pump life, avoid the circulation of liquid containing sand or other solid particles as this affects the efficiency of valves, the plungers and seals. This can be prevented by fitting an oversized filter on the suction pipe with respect to the pump volume. The filter should be cleaned regularly.</p>
	<p>The delivery pipe must be able to support the operating pressure of the pump. Excessively narrow passages can result in lance pressure loss.</p>
	<p>To prevent injury or damage to the pump, it is essential to fit a pressure control valve and a safety valve to prevent the pressure accidentally exceeding its operating level. Contact our technical staff before fitting these valves. To keep the system pressure under control, a pressure gauge should be fitted on the delivery line with an appropriate bottom scale.</p>
	<p>The motor-pump direct coupling requires application of lubricant grease (sect. 3.10). Connection types with different specifications or not contemplated in this manual shall not ensure full conformity with the certifications provided by LEUCO S.p.A. (Dir. ATEX) who shall not be liable for the selection of other options than those specified in this manual. If you have doubts, we recommend contacting the Manufacturer's Engineering Department.</p>



- | | |
|---|--|
| <ul style="list-style-type: none"> A) Tank or waterworks B) Shut-off valve C) Filter on inlet line D) Auxiliary pump E) Pressure gauge on intake line F) Pressure gauge on delivery line G) Safety valve H) Pressure reducer I) Regulating and bypass valve J) Nozzle | <ul style="list-style-type: none"> a) Feed pipe b) Delivery pipe c) Safety valve drain pipe d) Bypass pipe e) Valve outlet pipe |
|---|--|

5.1 Setting-up by the Purchaser / Operator

The customer is responsible for setting up the following:




	If the pump is coupled with an electric motor, the motor must be conforming with Directive 2014/34/EU and must be suitable for use in the same areas as the pump. It must also have a suitable protection level with the intended use.
	The installer/end user is responsible for deciding the type of coupling between the motor and pump, and for following the instructions provided in this document.
	The installer/end user must ensure a max pressure valve is fitted on the pump delivery outlet.
	The installer/end user must fit a system that guarantees the immediate arrest of the hydraulic system in case of a sudden increase in pump temperature and/or excessive current absorption.

	All connection operations require strict compliance with the specifications given in the User and Maintenance Manual of the end machine where the pump is incorporated.
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5.2 What to do before starting up the pump for the first time

You should complete a range of checks and controls before starting up the pump, in order to prevent errors or accidents during the initial commissioning stage:

- Check no damage was caused to the machine during assembly, installation or transport (stability, screws/bolts secured correctly, correct coupling of mechanical parts/gears);
- Stop all use of the pump immediately if you see any leakage from pressurised pipes and eliminate the cause of the Leakage
- Before starting up the pump, make sure the oil is up to the correct level. We recommend doing the first oil change within the first 50 hours of operation. Subsequent oil changes should take place every 500 hours or more often in case of heavy use. The type of oil used for our pumps is SAE 10/40W.
- Replace the oil cap fitted during shipment with the bleed cap supplied.

	Always follow the safety instructions listed in section 3.
	Failure to comply with these operating conditions invalidates the warranty.
	The machine should NOT BE OPERATED until any damaged parts have been repaired or replaced if it does not seem to guarantee it will run safely and properly.



After the installer has completed all of the required connections, he will test the product to ensure all the devices it contains work properly:

- After starting up the pump, aid priming by keeping the delivery line open (lance). Do not let the pump run dry: this can result in rapid seal wear and invalidates the warranty.
- After use, run the pump with clean water for several minutes. Do not use the pump at low temperatures. To prevent freezing, run the pump dry for about 20 seconds to drain the pipes.

5.3 Long periods of downtime

Prepare the pump if it will not be operated for an extensive period of time:



- Run the pump with clean water for several minutes
- Run the pump without water for 10 seconds with the delivery line (lance) open to drain the pump and the delivery circuit, thus preventing the formation of deposits
- Wash the pump with water and solvents authorised by current legislation
- Dry the pump using compressed air
- Lubricate any unpainted parts
- Avoid the possibility of the system coming into contact with corrosive substances.

	Mineral oils will degrade in case of downtime or inactivity for more than six months, and so must be replaced.
	When resuming operation of the machine after an extensive period of inactivity, repeat the initial commissioning controls (subsection 5.2). Also check the oil and that all screws are secured tightly.

5.4 Operating the pump

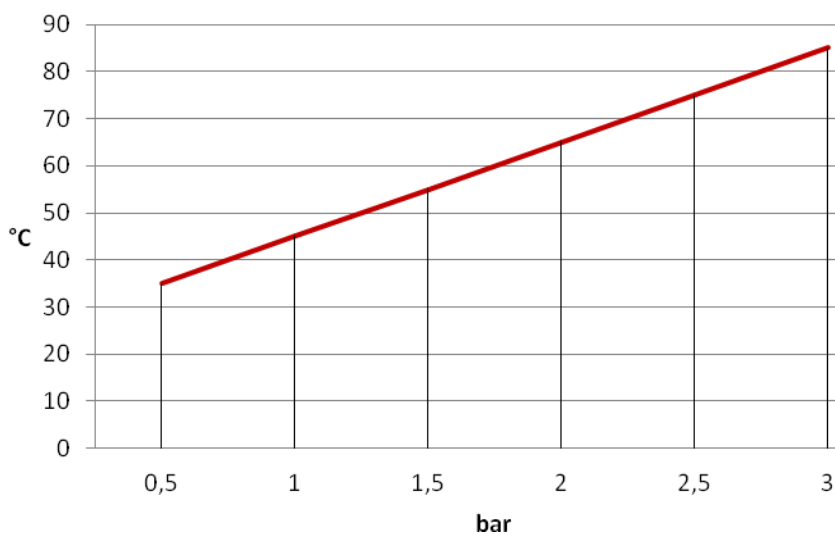
To safeguard proper pump operation, the pump should preferably be fed (maximum pressure 8 bar), otherwise it should be located under the water head or at the same level as the tank.

Hawk pumps are delivered with their first oil fill and are fitted with a sealed cap to prevent oil spilling during transport. Before starting to use the pump for the first time, remember to replace the sealed cap with the cap with the dipstick and bleed.

	Poor supply can cause serious damage to the pump, such as priming problems, vibration, noise and short seal life.
	The pump should not be used at higher pressures or speeds of rotation than those shown on the product's specifications plate.

SPECIFIC INFORMATION FOR XLT HT IEX SERIES

The chart below is useful for choosing the correct supply pressure:



Note how a supply pressure of 3 bar extends the life of the pump (seals and valves), even with low liquid temperatures (for example 45°C).

The hydraulic system supplying the pump must be as short as possible, without any bottlenecks or blockages, such as bends or “T” couplings.

NOZZLE TABLE The table below is used to correctly select the nozzle based on the pump specifications (max. pressure and flow rate factor). The table shows an example (pump with Pmax=100 bar and Flow rate=15 l/min).

Select the pressure value in the first line and move down the table until the flow rate factor that is closest by defect to the pump rate, then identify the suitable nozzle type for the required values. We recommend selecting the nozzle corresponding to the flow rate factor immediately below the closest value (in the example, the value circled in green with the uninterrupted line) in order to preserve the desired pressure values over time.

FATTORE PORTATA	PORTATA (L/MIN) ALLA PRESSIONE (BAR)											PORTATA (L/MIN) ALLA PRESSIONE (BAR)													
	BAR	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	220	240	250	280	300	320	350	
O2	3,3	3,6	3,8	4,1	4,4	4,6	4,8	5,0	5,2	5,4	5,6	5,8	6,0	6,2	6,3	6,5	6,8	7,1	7,3	7,7	8,0	8,2	8,6		
O3	4,8	5,3	5,7	6,1	6,5	6,8	7,1	7,4	7,8	8,0	8,3	8,6	8,9	9,1	9,4	9,6	10,1	10,5	10,8	11,4	11,8	12,2	12,7		
O4	6,4	7,0	7,6	8,1	8,6	9,1	9,5	10,0	10,4	10,8	11,1	11,5	11,9	12,2	12,5	12,9	13,5	14,1	14,4	15,2	15,8	16,3	17,0		
O45	7,3	8,0	8,6	9,2	9,8	10,3	10,8	11,3	11,7	12,2	12,6	13,0	13,4	13,8	14,2	14,6	15,3	16,0	16,3	17,2	17,8	18,4	19,3		
O5	8,1	8,8	9,5	10,2	10,8	11,4	12,0	12,5	13,0	13,5	14,0	14,4	14,9	15,3	15,7	16,1	16,9	17,7	18,0	19,1	19,7	20,4	21,3		
O55	8,8	9,7	10,5	11,2	11,9	12,5	13,1	13,7	14,3	14,8	15,3	15,8	16,3	16,8	17,2	17,7	18,5	19,4	19,8	20,9	21,7	22,4	23,4		
O6	9,7	10,6	11,5	12,3	13,0	13,7	14,4	15,0	15,6	16,2	16,8	17,3	17,9	18,4	18,9	19,4	20,3	21,2	21,7	22,9	23,7	24,5	25,6		
O65	10,5	11,5	12,4	13,2	14,0	14,8	15,5	16,2	16,9	17,5	18,1	18,7	19,3	19,9	20,4	20,9	22,0	22,9	23,4	24,8	25,6	26,5	27,7		
O7	11,3	12,4	13,4	14,3	15,2	16,0	16,8	17,5	18,2	18,9	19,6	20,2	20,9	21,5	22,1	22,6	23,7	24,8	25,3	26,8	27,7	28,6	29,9		
O75	12,1	13,2	14,3	15,3	16,2	17,1	17,9	18,7	19,5	20,2	20,9	21,6	22,3	22,9	23,6	24,2	25,4	26,5	27,0	28,6	29,6	30,6	32,0		
O8	12,9	14,1	15,2	16,3	17,3	18,2	19,1	19,9	20,8	21,5	22,3	23,0	23,7	24,4	25,1	25,7	27,0	28,2	28,8	30,5	31,5	32,6	34,0		
O85	13,7	15,0	16,2	17,4	18,4	19,4	20,3	21,3	22,1	23,0	23,8	24,5	25,3	26,0	26,7	27,4	28,8	30,1	30,7	32,5	33,6	34,7	36,3		
O9	14,8	16,3	17,6	18,8	19,9	21,0	22,0	23,0	23,9	24,8	25,7	26,6	27,4	28,2	28,9	29,7	31,1	32,5	33,2	35,1	36,4	37,6	39,3		
O95	15,6	17,0	18,4	19,7	20,9	22,0	23,1	24,1	25,1	26,0	26,9	27,8	28,7	29,5	30,3	31,1	32,6	34,1	34,8	36,8	38,1	39,4	41,2		
10	16,3	17,8	19,2	20,6	21,8	23,0	24,1	25,2	26,2	27,2	28,2	29,1	30,0	31,7	32,5	34,1	35,6	36,4	38,5	39,8	41,1	43,0	44,8		
11	17,7	19,4	20,9	22,4	23,7	25,0	26,2	27,4	28,5	29,6	30,6	31,6	32,6	33,5	34,5	35,4	37,1	38,7	39,5	41,8	43,3	44,7	46,8		
115	18,4	20,1	21,8	23,3	24,7	26,0	27,3	28,5	29,6	30,8	31,8	32,9	33,9	34,9	35,8	36,8	38,6	40,3	41,1	43,5	45,0	46,5	48,6		
12	19,1	20,9	22,6	24,1	25,6	27,0	28,3	29,6	30,8	31,9	33,1	34,2	35,2	36,2	37,2	38,2	40,0	41,8	42,7	45,2	46,8	48,3	50,5		
125	19,8	21,7	23,4	25,0	26,6	28,0	29,4	30,7	31,9	33,1	34,3	35,4	36,5	37,6	38,6	39,6	41,5	43,4	44,3	46,9	48,5	50,1	52,4		
13	21,2	23,2	25,1	26,8	28,5	30,0	31,5	32,9	34,2	35,5	36,7	37,9	39,1	40,2	41,4	42,4	44,5	46,5	47,4	50,2	52,0	53,7	56,1		
14	22,6	24,8	26,8	28,6	30,4	32,0	33,6	35,1	36,5	37,9	39,2	40,5	41,7	42,9	44,1	45,3	47,5	49,6	50,6	53,5	55,4	57,2	59,9		
15	24,0	26,3	28,4	30,4	32,3	34,0	35,7	37,2	38,8	40,2	41,6	43,0	44,3	45,6	46,9	48,1	50,4	52,7	53,8	56,9	58,9	60,8	63,6		
16	25,5	27,9	30,1	32,2	34,2	36,0	37,8	39,4	41,0	42,6	44,1	45,5	46,9	48,3	49,6	50,9	53,4	55,8	56,9	60,2	62,4	64,4	67,3		
18	29,0	31,8	34,3	36,7	38,9	41,0	43,0	44,9	46,7	48,5	50,2	51,9	53,5	55,0	56,5	58,0	60,8	63,5	64,8	68,6	71,0	73,3	76,7		
20	32,5	35,6	38,5	41,1	43,6	46,0	48,2	50,4	52,4	54,4	56,3	58,2	60,0	61,7	63,4	65,1	68,2	71,3	72,7	77,0	79,7	82,3	86,1		
25	31,2	36,0	40,3	44,2	47,7	51,0	54,1	57,0	59,8	62,4	65,0	67,4	69,8	72,1	74,3	76,5	80,6	84,5	86,4	91,9	95,4	98,7	103,5		

Nozzles chart / Tabella ugelli 10 - 150

SIZE TAG. FORN.	Flow rate (l/min) at Pressure (bar) / Portata (l/min) alla Pressione (bar)																	
	bar	10	15	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150
	PSI	145	218	290	363	435	580	725	870	1015	1160	1305	1450	1595	1740	1885	2030	2175
O2		0.4	0.5	0.5	0.9	0.7	0.8	0.9	0.9	1.0	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5
O23*		1.6	1.9	2.2	2.5	2.7	3.2	3.5	3.9	4.2	4.5	4.7	5.0	5.2	5.5	5.7	5.9	6.1
O25*		0.4	0.5	0.6	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6
O27*		1.8	2.2	2.5	2.8	3.1	3.5	4.0	4.3	4.7	5.0	5.3	5.6	5.9	6.1	6.4	6.6	6.9
O3		0.5	0.6	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.8
O32*		1.9	2.4	2.7	3.1	3.3	3.9	4.3	4.7	5.1	5.5	5.8	6.1	6.4	6.7	7.0	7.2	7.5
O35*		0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0
O37*		2.2	2.6	3.0	3.4	3.7	4.3	4.8	5.3	5.7	6.1	6.5	6.8	7.1	7.4	7.8	8.0	8.3
O4		0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.0	2.1	2.2
O43*		2.2	2.7	3.2	3.6	3.9	4.5	5.0	5.5	5.9	6.4	6.7	7.1	7.4	7.8	8.1	8.4	8.7
O45		0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.1	2.2	2.3
O5		2.5	3.0	3.5	3.9	4.3	4.9	5.5	6.0	6.5	7.0	7.4	7.8	8.2	8.5	8.9	9.2	9.6
O53*		0.7	0.8	0.9	1.0	1.1	1.3	1.5	1.6	1.7	1.8	2.0	2.1	2.2	2.3	2.3	2.4	2.5
O55		2.7	3.3	3.8	4.2	4.6	5.3	5.9	6.5	7.0	7.5	8.0	8.4	8.8	9.2	9.6	9.9	10.3
O6		0.7	0.9	1.0	1.1	1.2	1.4	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7
O65		2.9	3.5	4.1	4.6	5.0	5.8	6.4	7.0	7.6	8.1	8.6	9.1	9.5	10.0	10.4	10.8	11.1
O7		0.8	0.9	1.1	1.2	1.3	1.5	1.7	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
O75		3.1	3.8	4.3	4.9	5.3	6.1	6.9	7.5	8.1	8.7	9.2	9.7	10.2	10.6	11.1	11.5	11.9
O8		0.8	1.0	1.1	1.3	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.1
O85		3.3	4.0	4.6	5.2	5.6	6.5	7.3	8.0	8.6	9.2	9.8	10.3	10.8	11.3	11.7	12.2	12.6
O9		0.9	1.1	1.2	1.4	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.7	2.9	3.0	3.1	3.2	3.3
O95		3.6	4.4	5.1	5.7	6.2	7.2	8.1	8.8	9.5	10.2	10.8	11.4	12.0	12.5	13.0	13.5	14.0
O10		1.0	1.2	1.3	1.5	1.6	1.9	2.1	2.3	2.5	2.7	2.9	3.0	3.2	3.3	3.4	3.6	3.7
O11		3.8	4.6	5.4	6.0	6.6	7.6	8.5	9.3	10.0	10.7	11.4	12.0	12.6	13.1	13.7	14.2	14.7
O12		1.0	1.2	1.4	1.6	1.7	2.0	2.2	2.5	2.7	2.8	3.0	3.2	3.3	3.5	3.6	3.8	3.9
O13		4.0	4.8	5.6	6.3	6.8	7.9	8.8	9.7	10.5	11.2	11.9	12.5	13.1	13.7	14.3	14.8	15.3
O14		1.0	1.3	1.5	1.7	1.8	2.1	2.3	2.6	2.8	3.0	3.1	3.3	3.5	3.6	3.8	3.9	4.0
O15		4.3	5.3	6.1	6.9	7.5	8.7	9.7	10.6	11.5	12.3	13.0	13.7	14.4	15.0	15.6	16.2	16.8
O16		1.1	1.4	1.6	1.8	2.0	2.3	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.4
O17		4.7	5.7	6.6	7.4	8.1	9.4	10.5	11.5	12.4	13.2	14.0	14.8	15.5	16.2	16.9	17.5	18.1
O18		1.2	1.5	1.7	2.0	2.1	2.5	2.8	3.0	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.6	4.8
O19		5.1	6.2	7.2	8.0	8.8	10.1	11.3	12.4	13.4	14.3	15.2	16.0	16.8	17.5	18.2	18.9	19.6
O20		1.3	1.6	1.9	2.1	2.3	2.7	3.0	3.3	3.5	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2
O21		5.4	6.6	7.6	8.6	9.4	10.8	12.1	13.2	14.3	15.3	16.2	17.1	17.9	18.7	19.5	20.2	20.9
O22		1.4	1.7	2.0	2.3	2.5	2.9	3.2	3.5	3.8	4.0	4.3	4.5	4.7	4.9	5.2	5.3	5.5
O23		5.8	7.0	8.1	9.1	10.0	11.5	12.9	14.1	15.2	16.3	17.3	18.2	19.1	19.9	20.8	21.5	22.3
O24		1.5	1.9	2.2	2.4	2.6	3.0	3.4	3.7	4.0	4.3	4.6	4.8	5.0	5.3	5.5	5.7	5.9
O25		6.1	7.5	8.7	9.7	10.6	12.3	13.7	15.0	16.2	17.4	18.4	19.4	20.3	21.3	22.1	23.0	23.8
O26		1.6	2.0	2.3	2.6	2.8	3.2	3.6	4.0	4.3	4.6	4.9	5.1	5.4	5.6	5.8	6.1	6.3
O27		6.6	8.1	9.4	10.5	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
O28		1.8	2.1	2.5	2.8	3.0	3.5	3.9	4.3	4.6	5.0	5.3	5.5	5.8	6.1	6.3	6.6	6.8
O29		7.0	8.5	9.8	11.0	12.0	13.9	15.6	17.0	18.4	19.7	20.9	22.0	23.1	24.1	25.1	26.0	26.9
O30		1.8	2.3	2.6	2.9	3.2	3.7	4.1	4.5	4.9	5.2	5.5	5.8	6.1	6.4	6.6	6.9	7.1
O31		7.3	8.9	10.3	11.5	12.6	14.5	16.3	17.8	19.2	20.6	21.8	23.0	24.1	25.2	26.2	27.2	28.2
O32		1.9	2.4	2.7	3.0	3.3	3.8	4.3	4.7	5.1	5.4	5.8	6.1	6.4	6.7	6.9	7.2	7.4
O33		7.9	9.7	11.2	12.5	13.7	15.8	17.7	19.4	20.9	22.4	23.7	25.0	26.2	27.4	28.5	29.6	30.6
O34		2.1	2.6	3.0	3.3	3.6	4.2	4.7	5.1	5.5	5.9	6.3	6.6	6.9	7.2	7.5	7.8	8.1
O35		8.2	10.1	11.6	13.0	14.2	16.4	18.4	20.1	21.8	23.3	24.7	26.0	27.3	28.5	29.6	30.8	31.8
O36		2.2	2.7	3.1	3.4	3.8	4.3	4.9	5.3	5.7	6.1	6.5	6.9	7.2	7.5	7.8	8.1	8.4
O37		8.5	10.5	12.1	13.5	14.8	17.1	19.1	20.9	22.6	24.1	25.6	27.0	28.3	29.6	30.8	31.9	33.1
O38		2.3	2.8	3.2	3.6	3.9	4.5	5.0	5.5	6.0	6.4	6.8	7.1	7.5	7.8	8.1	8.4	8.7
O39		8.9	10.8	12.5	14.0	15.3	17.7	19.8	21.7	23.4	25.0	26.6	28.0	29.4	30.7	31.9	33.1	34.3
O40		2.3	2.9	3.3	3.7	4.1	4.7	5.2	5.7	6.2	6.6	7.0	7.4	7.8	8.1	8.4	8.8	9.1
O41		9.5	11.6	13.4	15.0	16.4	19.0	21.2	23.2	25.1	26.8	28.5	30.0	31.5	32.9	34.2	35.5	36.7
O42		2.5	3.1	3.5	4.0	4.3	5.0	5.6	6.1	6.6	7.1	7.5	7.9	8.3	8.7	9.0	9.4	9.7
O43		10.1	12.4	14.3	16.0	17.5	20.2	22.6	24.8	26.8	28.6	30.4	32.0	33.6	35.1	36.5	37.9	39.2
O44		2.7	3.3	3.8	4.2	4.6	5.3	6.0	6.5	7.1	7.6	8.0	8.5	8.9	9.3	9.6	10.0	10.4
O45		10.8	13.2	15.2	17.0	18.6	21.5	24.0	26.3	28.4	30.4	32.3	34.0	35.7	37.2	38.8	40.2	41.6
O46		2.8	3.5	4.0	4.5	4.9	5.7	6.4	7.0	7.5	8.0	8.5	9.0	9.4	9.8	10.2	10.6	11.0
O47		11.4	13.9	16.1	18.0	19.7	22.8	25.5	27.9	30.1	32.2	34.2	36.0	37.8	39.4	41.0	42.6	44.1
O48		3.0	3.7	4.3	4.8	5.2	6.0	6.7	7.4	8.0	8.5	9.0	9.5	10.0	10.4	10.8	11.3	11.6
O49		13.0	15.9	18.3	20.5	22.5	25.9	29.0	31.8	34.3	36.7	38.9	41.0	43.0	44.9	46.7	48.5	50.2
O50		3.4	4.2	4.8	5.4	5.9	6.9	7.7	8.4	9.1	9.7	10.3	10.8	11.4	11.9	12.4	12.8	13.3
O51		14.5	17.8	20.6	23.0	25.2	29.1	32.5	35.6	38.5	41.1	43.6	46.0	48.2	50.4	52.4	54.4	56.3
O52		3.8	4.7	5.4	6.1	6.7	7.7	8.6	9.4	10.2	10.9	11.5	12.2	12.7	13.3	13.9	14.4	14.9
O53		18.0	22.1	25.5	28.5	31.2	36.0	40.3	44.2	47.7	51.0	54.1	57.0	59.8	62.4	65.0	67.4	69.8
O54		4.8	5.8	6.7	7.5	8.2	9.5	10.6	11.7	12.6	13.5	14.3	15.1	15.8	16.5	17.2	17.8	18.4
O55		21.5	26.3	30.4	34.0	37.2	43.0	48.1	52.7	56.9	60.8	64.5	68.0	71.3	74.5	77.5	80.5	83.3
O56		5.7	7.0	8.0	9.0	9.8	11.4	12.7	13.9	15.0	16.1	17.0	18.0	18.8	19.7	20.5	21.3	22.0
O57		25.3	31.0	35.8	40.0	43.8	50.6	56.6	62.0	66.9	71.6	75.9	80.0	83.9	87.6	91.2	94.7	98.0
O58		6.7	8.2	9.5	10.6	11.6	13.4	14.9	16.4	17.7	18.9	20.1	21.1	22.2	23.2	24.1	25.0	25.9
O59		28.8	35.2	40.7	45.5	49.8	57.6	64.3	70.5	76.1	81.4	86.3	91.0	95.4	99.7	103.8	107.7	111.5
O6																		

Nozzles chart / Tabella ugelli 160 - 320





SIZE FAT. PORT.	Flow rate (l/min) at Pressure (bar) / Portata (l/min) alla Pressione (bar)		Flow rate (GPM) at Pressure (PSI) / Portata (GPM) alla Pressione (PSI)	
	bar	PSI	bar	PSI
	160	2320	170	2465
	180	2610	190	2755
	200	2900	210	3045
	220	3190	230	3335
	230	3480	250	3625
	250	3770	270	3915
	280	4060	290	4205
	300	4350	310	4495
	320	4640		
O2	5,8	6,0	6,2	6,3
	1,5	1,6	1,7	1,7
	6,3	6,5	6,7	6,9
O23*	1,7	1,7	1,8	1,8
	7,1	7,3	7,5	7,7
	1,9	1,9	2,0	2,1
O25*	7,7	8,0	8,2	8,4
	2,0	2,1	2,2	2,3
O27*	8,6	8,9	9,1	9,4
	2,3	2,3	2,4	2,5
O3	9,0	9,3	9,5	9,8
	2,4	2,4	2,5	2,6
O32*	9,9	10,2	10,5	10,8
	2,6	2,7	2,8	2,9
O35*	10,6	11,0	11,3	11,6
	2,8	2,9	3,0	3,1
O37*	11,5	11,9	12,2	12,5
	3,0	3,1	3,2	3,3
O4	12,3	12,6	13,0	13,4
	3,2	3,3	3,4	3,5
O43*	13,0	13,4	13,8	14,2
	3,4	3,5	3,7	3,8
O45	14,4	14,9	15,3	15,7
	3,8	3,9	4,0	4,2
O5	15,2	15,6	16,1	16,5
	4,0	4,1	4,3	4,4
O53*	15,8	16,3	16,8	17,2
	4,2	4,3	4,4	4,6
O55	17,3	17,9	18,4	18,9
	4,6	4,7	4,9	5,0
O6	18,7	19,3	19,9	20,4
	4,9	5,1	5,2	5,4
O65	20,2	20,9	21,5	22,1
	5,3	5,5	5,7	5,8
O7	21,6	22,3	22,9	23,6
	5,7	5,9	6,1	6,2
O75	23,0	23,7	24,4	25,1
	6,1	6,3	6,5	6,6
O8	24,5	25,3	26,0	26,7
	6,5	6,7	6,9	7,1
O85	26,6	27,4	28,2	28,9
	7,0	7,2	7,4	7,6
O9	27,8	28,7	29,5	30,3
	7,4	7,6	7,8	8,0
O95	29,1	30,0	30,9	31,7
	7,7	7,9	8,2	8,4
10	31,6	32,6	33,5	34,5
	8,4	8,6	8,9	9,1
11	32,9	33,9	34,9	35,8
	8,7	9,0	9,2	9,5
115	34,2	35,2	36,2	37,2
	9,0	9,3	9,6	9,8
12	35,4	36,5	37,6	38,6
	9,4	9,6	9,9	10,2
125	37,9	39,1	40,2	41,4
	10,0	10,3	10,6	10,9
13	40,5	41,7	42,9	44,1
	10,7	11,0	11,3	11,7
14	43,0	44,3	45,6	46,9
	11,4	11,7	12,1	12,4
15	45,5	46,9	48,3	49,6
	12,0	12,4	12,8	13,1
16	51,9	53,5	55,0	56,5
	13,7	14,1	14,5	14,9
18	58,2	60,0	61,7	63,4
	15,4	15,8	16,3	16,8
20	72,1	74,3	76,5	78,6
	19,0	19,6	20,2	20,8
25	86,0	88,7	91,2	93,7
	22,7	23,4	24,1	24,8
30	101,2	104,3	107,3	110,3
	26,7	27,6	28,4	29,1
35	115,1	118,6	122,1	125,4
	30,4	31,3	32,3	33,1
40	144,2	148,6	152,9	157,1
	38,1	39,3	40,4	41,5
50	173,3	178,6	183,8	188,8
	45,8	47,2	48,6	49,9
60	202,4	208,6	214,7	220,5
	53,5	55,1	56,7	58,3
70	230,2	237,3	244,2	250,9
	60,8	62,7	64,5	66,3
80	259,3	267,3	275,0	282,6
	68,5	70,6	72,7	74,7
90				

6 MAINTENANCE

Use the special tools provided in the product's tool-kit for pump maintenance, as this will facilitate the maintenance of certain parts. If the special tool-kit is not available, standard tools can be used (screwdrivers, pin punches etc) but take care not to damage the pump's parts.

Please take the following into account during any maintenance or repair work:

- Before you start any work, remember to put a **"MACHINE UNDER MAINTENANCE"** sign out in a clearly visible position;
- Do not use inflammable products or materials;
- When handling lubricants, protect yourself against mineral oils by wearing the proper gloves, overalls (trousers should never be tucked into work boots) and safety goggles;
- Be careful not to spill any oil or grease.

		All maintenance work should only be attempted by qualified, authorised personnel and noted in the maintenance log.
		Always follow the safety instructions listed in section 3.

The pump's long term efficiency can be safeguarded by following the preventive maintenance schedule below:

CONTROL	DAILY	WEEKLY	50 H	500 H	1000 H	1500 H
CLEAN FILTERS	X					
OIL LEVEL/CONDITION	X					
OIL / WATER LEAKS	X					
HYDRAULIC SYSTEM		X				
1ST OIL CHANGE			X			
REPLACE OIL				X		
REPLACE SEALS					X	
REPLACE CHECK VALVE						X

* Each maintenance schedule depends on the type of job that the pump is used for.

The operating cycle, the temperature and the quality of the pumped liquid, the type and quality of the supply and the accessories used are all fundamental factors that influence the life of pump parts.

If the pump's performance deteriorates, check whether our **"Troubleshooting"** guide describes the source of the problem. If the pump is running without any problems, check it after 1000 hours of operation and then every 500 hours of operation.

After completing any maintenance work, remember to adjust the control / unloader / safety valve and check the condition of the hydraulic system and relative couplings.

The data provided is the result of the cycles verified on our testing benches, therefore any other element that differs to the parameters used may have an impact on the life of the parts.

6.1 General maintenance

Please remember the following general controls:

Controlling the pump assembly:

- ✓ Check the screws used to secure the pump into position have not become loose
- ✓ Tighten them, if necessary, according to the torque indicated in the installation layout

Controlling pipes and couplings (not supplied by LEUCO)::

- ✓ Check for any leaks from the couplings.
Leaks can normally be eliminated by tightening the couplings correctly.
Restore the seal in case of leakage from the couplings on the suction line.
- ✓ Check the state of any hoses.
Pipes or hoses must be replaced if you note any sign of wear, damage, or look scraped or blown.

Controlling the filter (not supplied by LEUCO):

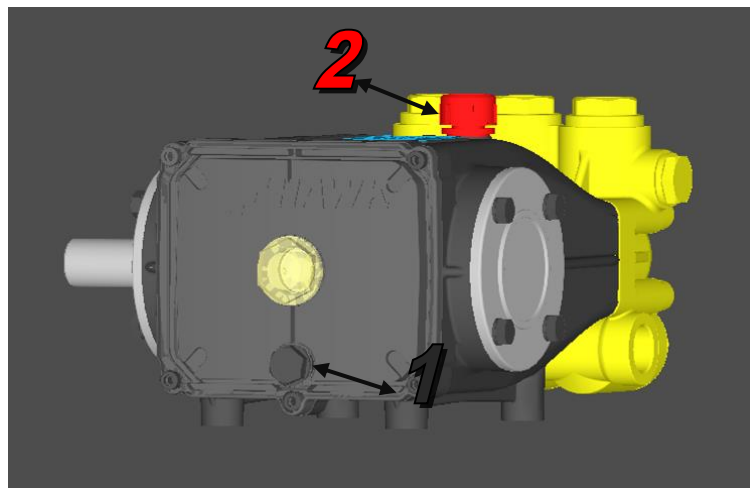
- ✓ Check the state of the filter cartridge.
If the filter cartridge is blocked or damaged, refer to the instructions provided by the filter manufacturer and restore the filter to its optimum filtering capacity.



Controlling the level of the oil:



- ✓ Check when the pump is level and cold.
- ✓ Check the amount of oil using the level indicator (located at the back of the pump body, see subsection 2.1, letter G).
- ✓ Top up with oil, if necessary, as instructed in subsection 3.7, through the oil plug (located on the top of the pump body, see subsection 2.1, letter C).

Replacing the oil:

- ✓ Place the machine where the pump is fitted into a perfectly level position with the pump warm. Do not spill any oil.
Dispose of oil correctly according to current legislation.
- ✓ Use a suitably large recipient to collect the spent oil.
- ✓ Unscrew the drainage cap (1) and wait for all the oil to drain out.
- ✓ Screw the drainage cap back down.
- ✓ Unscrew the oil cap (letter C, subsection 2.1 or n.2 in the illustration below).
- ✓ Fill with the new oil using the filling hole up to the correct level (as described in the subsection on “Controlling the oil level”).
- ✓ Screw the filling cap back down.





 	Refer to any additional specifications and/or company procedures and the operating manual for the final machine for information on any other maintenance work.
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 	If you note any anomaly, you must identify the cause and solve the problem before operating the machine again. Contact the Manufacturer for information on any maintenance work not included in this manual or its attached documents.
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7 DIAGNOSTICS

7.1 Trouble Shooting

 	Troubleshooting should only be attempted by qualified, authorised personnel.
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This section aims to offer the machine operator possible solutions for the problems and malfunctions that may occur most frequently.


Some of the suggested solutions should only be attempted by specialised personnel; others must be carried out by Authorised Service Centres as they require the use of special tools as well as a detailed knowledge of how to carry out repairs.

 	In case of failure of the machine or its parts, contact the Manufacturer if you are unable to get the problem solved.
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PROBLEMS	POSSIBLE CAUSES	SOLUTION
The pump runs but does not produce noise or pressure	The pump is not primed and is running dry	Check if there is water in the suction line Check if the delivery (gun) is open Check the valves are NOT blocked
The pump runs but is too noisy and/or does not reach the expected pressure	Oversized or worn nozzle Insufficient water supply	Replace the nozzle Clean the filter. Replace the filter with an appropriate sized filter. Eliminate any possible intake of air. Check the size of the suction pipe and replace if necessary with a larger diameter pipe.
	Pressure control valve is not set or working properly.	Calibrate the valve.
	Worn plunger seals	Check the status of the seat of the seal. Replace the seals
	Low speed of rotation	Check the motor and the drive
The pump comes up to pressure but pulsates and vibrates strongly	Foreign particles in the valves	Clean the valves
	Worn valves	Replace the valves
	High inlet water temperature	Reduce the water temperature
	Worn plunger seals	Replace the seals
The pump is very noisy	Worn bearings	Replace the bearings
	High inlet water temperature	Reduce the water temperature
	Pump-motor connection problems	Check the status of the keys, flexible coupling or pulley
Short plunger seal life	Cavitation or air in the system	Check the status and size of the suction pipe and replace if necessary with a larger diameter pipe.
	Damaged ceramic plunger	Replace the plunger
	Excessive pressure and / or temperature of the pumped water	Check the pressure and the temperature of the inlet water
Water in the oil	Worn plunger – oil shaft seal ring .If the oil is milky (emulsified), but the level does not increase in the crankcase, it means there is condensation	Replace the ring seal Change the oil more frequently
Water leaking between the crankcase and the manifold housing	Worn seal pack	Replace seal pack
	Worn plunger	Replace plunger
	Worn plunger bolt seal	Replace seal
Oil leakage between the crankcase and the manifold housing	Worn plunger shaft oil seal	Replace the seal

Short bearing life	Pump-motor connection problems	Check the status of the keys, flexible coupling or pulley
	The oil has not been changed regularly	Change the oil as instructed in the maintenance manual for the pump
	Excessive pressure of the pumped water	Check the pressure

8 DISMANTLING AND DISPOSURE

	<p>Contact the Manufacturer directly for the relative information and instructions if the pump is to be dismantled so it can be moved or disposed of.</p>
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The pump should be taken to a specialised centre for disposal according to current legislation concerning occupational hazards. All parts should be separated after removal based on the materials they consist of. Do not discard materials that are harmful for the environment, such as gaskets and lubricants, together with normal waste.

Non ferrous parts in particular should be taken to authorised firms for their correct disposal. Ferrous parts may be sold and used again.

Always inform the manufacturer if the machine is to be sold or will go out of service.



The packing materials can be recycled. Do not dispose of packing materials with normal household waste: take it to a centre for recycling.

The pump contains materials that can be recycled and which should be taken to a recycling centre. Dispose of the oil correctly.

Send the pump to a specialised recycling centre for disposal.

9 SPARE PARTS

Always use original spare parts (Annex II).

10 ANNEXES

1. Declaration of Conformity (www.hawkpumps.com)
2. Technical specification (www.hawkpumps.com)
3. Coupling systems

ATTACHMENT I

Declaration of Conformity

www.hawkpumps.com

ATTACHMENT II

Technical specifications
www.hawkpumps.com

ATTACHMENT III

Coupling systems
Flange H132; H160;
Couplings: H100-112; H132; H160;